Bank Competition and Information Production

PRELIMINARY SLIDE SET, TO BE UPDATED

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Information Production and Credit

- Financial crises are recurring phenomena of a boom followed by a bust (Schularick and Taylor, 2012; Mian et al., 2017)
- In the boom period, lax lending standards increase chances of the next financial crisis (Rodano et al., 2018; Gorton and Ordonez, 2018)
- This can happen because asset prices are high and collateral looks "too" good, making investors overconfident (Baron and Xiong, 2016; Bordalo et al., 2018)
- Or a financial innovation (e.g. securitization as in Keys et al., 2010) or because competition increases after financial liberalization (Dell'Ariccia and Marquez, 2006)
- **Information production** by lenders is thus key to understand the credit cycle

What Determines Lenders' Information Production?

- Banks have special ability to mitigate asymmetric information
- When a bank forms a relationship with a borrower it gives rise to an **ex-post information monopoly** (Sharpe, 1990; Rajan, 1992)
- If banks cannot future extract rents from their borrowers, they will not invest in screening and monitoring. Value of relationship is diminished.
- Thus, **bank competition can adversely affect banks' information acquisition**
- Well known in the theory (Broecker, 1990; Petersen and Rajan, 1994; Boot and Thakor, 2002), but empirical evidence is scant
- We provide the **first market-based evidence** that bank competition does erode the "specialness" of bank loans

Competition and Information Production

- Empirical challenge: bank competition is endogenous

- Extensive literature on **branching deregulation**. Deregulation allowed banks to expand geographically but staggered at the state level (diff-in-diffs)

Key Findings:

- Loan abnormal return is positive (0.4%) in our sample period (1993-2006) but is driven to zero in states that **deregulate interstate branching**

- Especially for informationally opaque firms (low tangibles, smallcap, no access to bond market) and small banks: **information channel**

- Moreover, probability of covenant violations and default (on small business loans) are higher in states that deregulate: **loan quality decreases** after deregulation

Contribution to the literature

- **Bank loan "specialness"**: James (1987); ... Schwert (2019)

  $\Rightarrow$ We have a **causal** interpretation for the (decrease) in bank loan specialness

- **Bank Information Monopoly**: Hale and Santos (2009), Ioannidou and Ongena (2010), Schenone (2010), Saidi and Zaldokas (2019).

  $\Rightarrow$ We **directly** test the effects of market power on the value of banks' information

- **Costs and Benefits of Bank Competition**: Keeley, 1990; ....

  $\Rightarrow$ We contribute to recent literature on the potential downsides of competition:

  - Crawford et al. (2018) show that market power can mitigate negative welfare effects of asymmetric information (structural model of Italian lending market)
  - Gissler et al. (2019) show that competition in the consumer credit market leads to an expansion of credit to riskier borrowers, resulting in higher default rates

Data: Branching Deregulation

- Long history of restrictions to banks' geographical expansions (granting charters generated fee income for US states)
- $<$1970 no **intrastate** (i.e. expand within state borders) nor **interstate** (i.e expand across state borders) branching was allowed.
- 1970-1994: **first wave** of deregulation, state-by-state (Jarayatne and Strahan, 1996)

  By 1994, all states allowed intrastate and interstate branching, **at least in principle**
- 1994: Interstate Banking and Branching Efficiency Act (IBBEA) allowed states to erect barriers to entry. All did (out-of-state banks: 2.5% market share in 1994).
- 1994-2006: **second wave of interstate** deregulation, knocking down barriers state-by-state
- We exploit the second deregulation wave (DealScan data not avaiable before 1990)

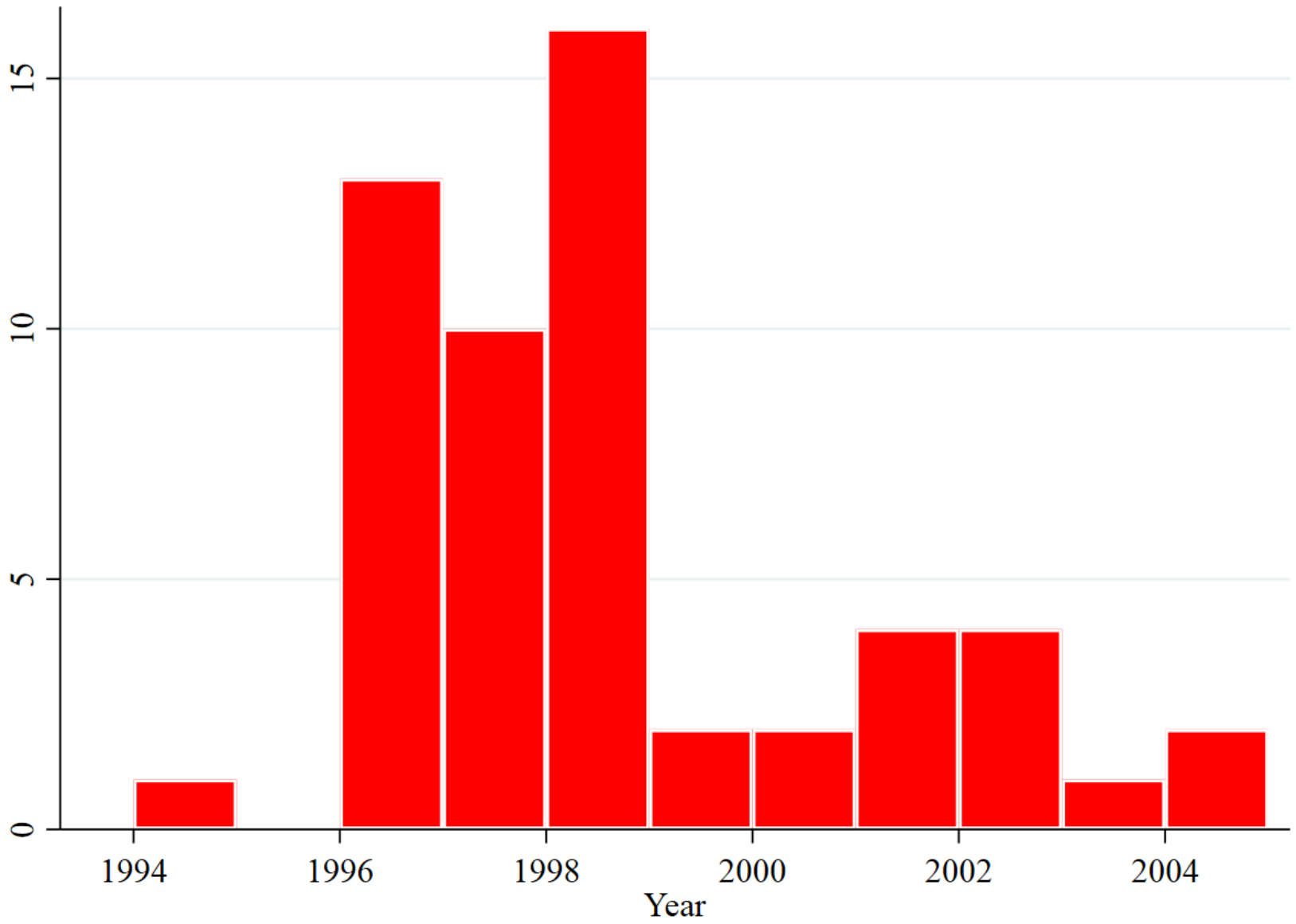
Data: Branching Deregulation

There were four barriers to entry:

1. Minimum age of M&A target by an out-of-state bank
2. Limits to market share of deposits from out-of-state banks
3. Not allowing opening of new branches by out-of-state banks (*de novo* branching)
4. Not allowing purchase of individual branches without acquiring the entire bank

- Rice and Strahan (2010) count these restrictions for each state in each year
- An increase in the index implies greater competition (0 fully restricted, 4 fully open)

Number of Deregulation changes, 1993-2006



Data: Loan Announcements

- **Loan Announcements**: syndicated loans from LPC DealScan from 1993 to 2006
- For our purposes, we consider the issue date of the loan (*DealActiveDate*) as its announcement date
- Match US non-financial firms to Compustat using Chava and Roberts (2008) link file (90% of all US publicly listed firms in DealScan)
- Match to borrower stock returns via CRSP-Compustat file
- Match to lender (i.e. lead arranger) balance sheet information at bank-holding company level using Schwert (2018) DealScan-Compustat lender link file
- Final sample: 4339 firms with 17331 loan announcements from about 90 lead arrangers (400 individual lenders)

Calculation of CARs

- We download daily stock returns from CRSP for each loan announcement
- We set an estimation window of 150 trading days (at least 120 days of non-missing returns) and a 30 days gap before the announcement
- We then run a Fama-French 3 factor model for the estimation window:

$$ER_{i,t} = \alpha_i + \beta_{m,i} ER_{m,t} + \beta_{SMB,i} SMB_t + \beta_{HML,i} HML_t$$

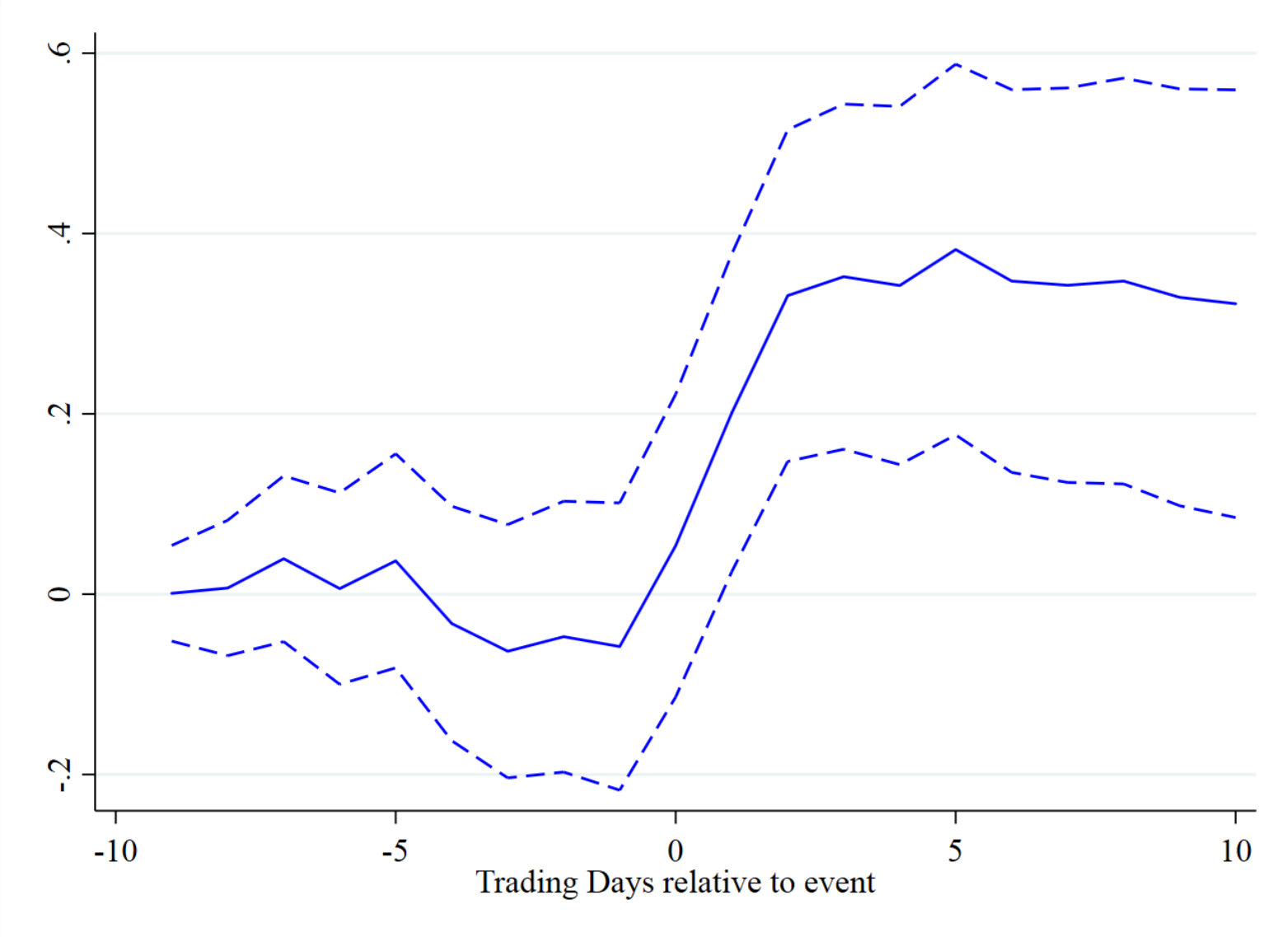
  where $ER_{i,t} = R_{i,t} - R_t^f$ is the excess return of stock i over the risk-free rate

- We then compute the abnormal return as:

$$AR_{i,t} = ER_{i,t} - (\hat{\alpha}_i + \hat{\beta}_{m,i} ER_{m,t} + \hat{\beta}_{SMB,i} SMB_t + \hat{\beta}_{HML,i} HML_t)$$

  and finally compute $CAR_i = \sum_{\tau_1}^{\tau_2} AR_{i,t}$ with $(\tau_1 = T - 1, \tau_2 = T + 3)$

Loan Announcement Returns



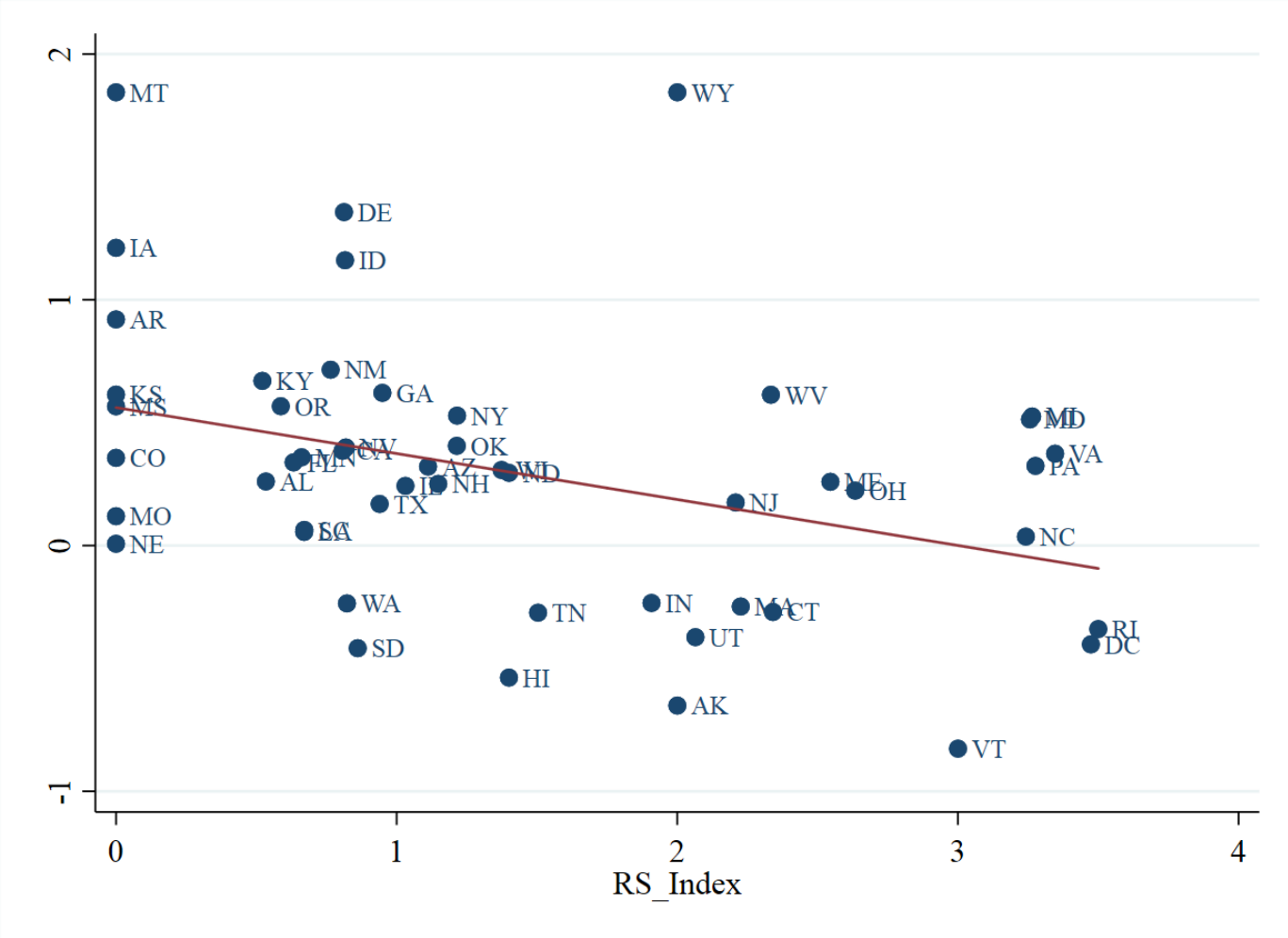
CARs and Competition

$$CAR_{i,t} = \beta_1 \text{RS Index}_{s,t} + \gamma' X_{i,t-1} + \lambda_s + \lambda_t + \epsilon_{i,t}$$

- RS $\text{Index}_{s,t}$ is the deregulation index in state s at time t where firm i is headquartered
- $X_{i,t-1}$ is a vector of deal-specific and firm-specific variables
- λ_s and λ_t are state and time fixed-effects, respectively.
- **Importantly**: we also use with λ_i (firm) and $\lambda_{ind,t}$ (2-digit industry$\times$time) fixed-effects
- Standard errors are clustered at the state level (robust to state-time and firm clustering)

CARs and Competition: State Averages

$\widehat{\beta} = -0.19$ (t-stat -2.88), $R^2 = 0.13$



In the regression, we will exploit *changes* in deregulation index (i.e. we absorb λ_s)

CARs and Competition: Results

RS Index	-0.171***	-0.186***	-0.174***	-0.167***	-0.183***	-0.173***
	(0.043)	(0.037)	(0.037)	(0.054)	(0.042)	(0.043)
log(Deal Maturity)				0.032	0.084	0.041
				(0.088)	(0.082)	(0.080)
log(Deal Amount)				0.131***	0.118**	0.012
				(0.044)	(0.045)	(0.053)
Purpose: Corporate				-0.021	-0.034	0.005
				(0.125)	(0.127)	(0.121)
Purpose: Acquisition				0.291	0.403*	0.356
				(0.186)	(0.206)	(0.224)
Purpose: Debt Repayment				-0.056	-0.018	-0.123
				(0.134)	(0.140)	(0.171)
log(1+age)				0.233***	0.225***	0.506
				(0.051)	(0.051)	(0.312)
log(MktVal)				-0.203***	-0.175***	-0.415***
				(0.045)	(0.043)	(0.121)
Tangibility				0.157	0.255	0.203
				(0.220)	(0.356)	(0.673)
Profitability				-0.779	-0.965	-0.262
				(0.777)	(0.799)	(0.985)
Cash				0.573	0.580	0.070
				(0.426)	(0.417)	(1.098)
TobinQ				0.073	0.109**	0.071
				(0.061)	(0.052)	(0.137)
Fixed effects						
State	Yes	Yes	–	Yes	Yes	–
Year	Yes	–	–	Yes	–	–
Industry-Year	No	Yes	Yes	No	Yes	Yes
Firm	No	No	Yes	No	No	Yes
Observations	16854	16819	15649	15079	15039	13831
R^2	0.004	0.051	0.274	0.007	0.056	0.289

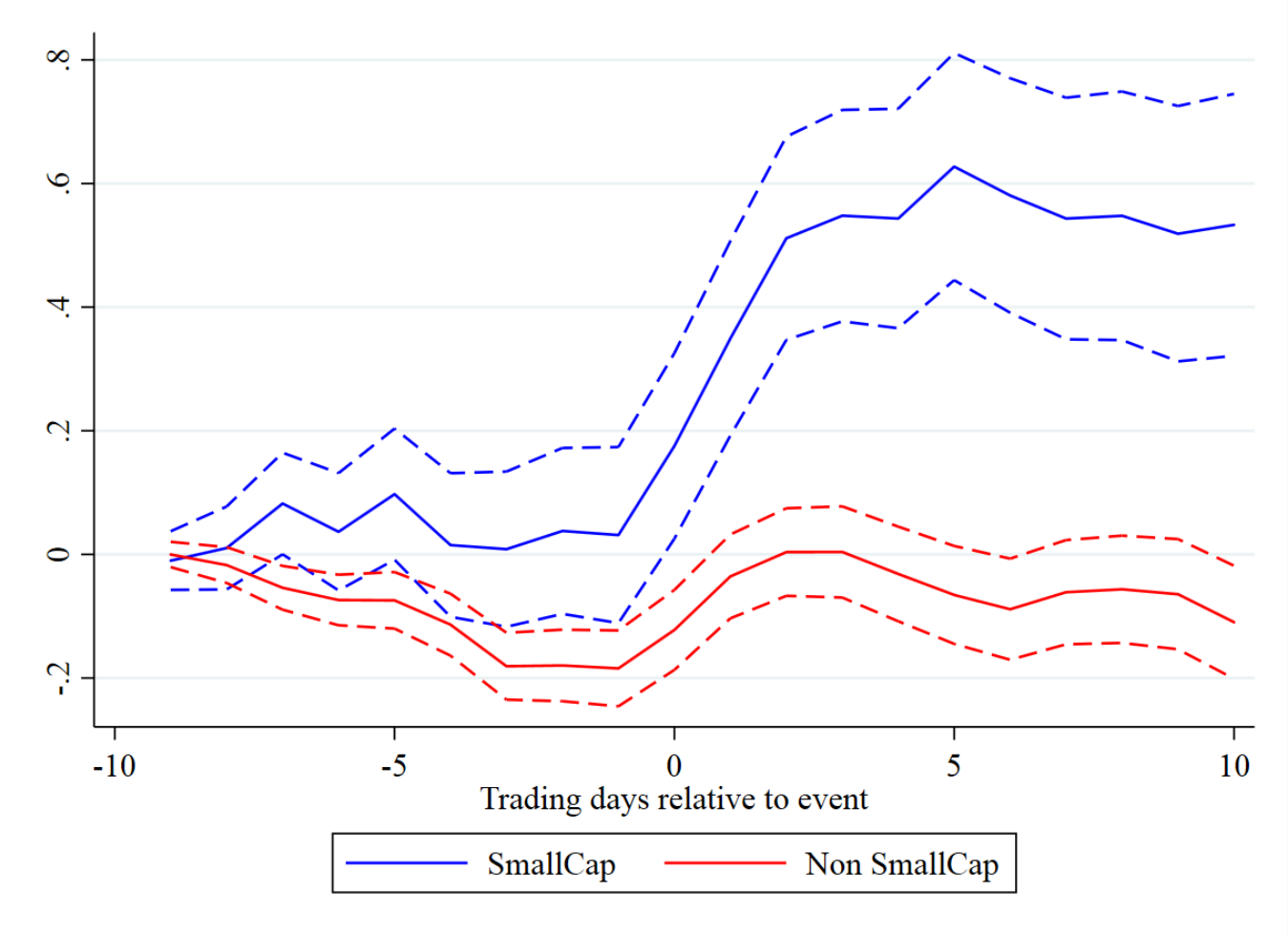
CARs and Competition: Interpretation and Robustness

- CAR is 0.68 pct. points lower in fully competitive state (RS=4) compared to one that fully restricts branching (RS=0)
- If we use a dummy for deregulation (=1 if RS>0, 0 otherwise) obtain $\widehat{\beta} \approx -0.5$: eliminates average CAR

Robustness:

- WLS with number of deals in the state as weights
- Include lead arranger characteristics (size, capitalization, funding...)
- Include Lender×Post fixed-effects: absorbs average screening ability of each lender, before and after deregulation

CAR Firm Heterogeneity



- We expect the CAR to decrease especially for informationally sensitive (opaque, small, bank-dependent) firms after deregulation

CAR and Competition: Firm Heterogeneity

	Small Cap		Bond Issuer		Bond Rating	
	No	Yes	Yes	No	Yes	No
RS Index	0.014	-0.347***	-0.105	-0.291***	-0.076	-0.444**
	(0.063)	(0.081)	(0.069)	(0.093)	(0.063)	(0.179)
Industry-Year	Yes	Yes	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes	Yes	Yes
Borrower and Deal controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5033	8315	6616	7073	9062	4594
R^2	0.271	0.351	0.263	0.361	0.246	0.408

CAR and Competition: Tangibility

		HighTangRatio	
		No	Yes
	(1)	(2)	(3)
RS Index	-0.389***	-0.237***	-0.092
	(0.118)	(0.061)	(0.059)
RS Index × TangRatio	0.590*		
	(0.315)		
Fixed effects			
Industry-Year	Yes	Yes	Yes
Firm	Yes	Yes	Yes
Borrower and Deal controls	Yes	Yes	Yes
Borrower and Deal controls × TangRatio	Yes	–	–
Observations	13865	8006	6504
R^2	0.289	0.305	0.265

CAR and Competition: Bank Heterogeneity

				Top10 Bank	
				No	Yes
RS Index	-0.197***	-0.197**	-0.272***	-0.705**	-0.008
	(0.052)	(0.085)	(0.086)	(0.299)	(0.141)
RS Index × log(Total Assets)	0.045*	0.093**	0.081		
	(0.025)	(0.043)	(0.076)		
State	Yes	Yes	–	–	–
Year	Yes	–	–	–	–
Industry-Year	No	Yes	Yes	Yes	Yes
Firm	No	No	Yes	Yes	Yes
Borrower and Deal controls	Yes	Yes	Yes	Yes	Yes
Observations	10913	8614	7014	1246	3019
R^2	0.026	0.300	0.564	0.757	0.624

Loan Quality and Ex-Post Performance

- Additional implication of our hypothesis: quality of the loans originated after deregulation should be lower

- Ex-post loan defaults are not available on DealScan, so look at probability of covenant violation instead (Demerjian and Owens, 2016)

- We can use data from Small Business Administration (SBA) government guaranteed loans which contains information on ex-post defaults (charge-offs):

$$ChargeOff_{ifst} = \beta_1 \text{RS Index}_{st} + \gamma' X_{ifst} + \lambda_s + \lambda_t + \epsilon_{ifst}$$

Deregulation and Probability of Covenant Violations

	Any	Performance	Capital
RS Index	0.015**	0.014**	0.002
	(0.007)	(0.006)	(0.008)
Fixed effects			
Industry-Year	Yes	Yes	Yes
Firm	Yes	Yes	Yes
Observations	10007	10007	10007
R^2	0.587	0.603	0.532

- Same borrower after state fully opens up to competition has 6 pct. points (0.015×4) higher probability of violating a (perfomance) covenant (average 40%, median 13%)

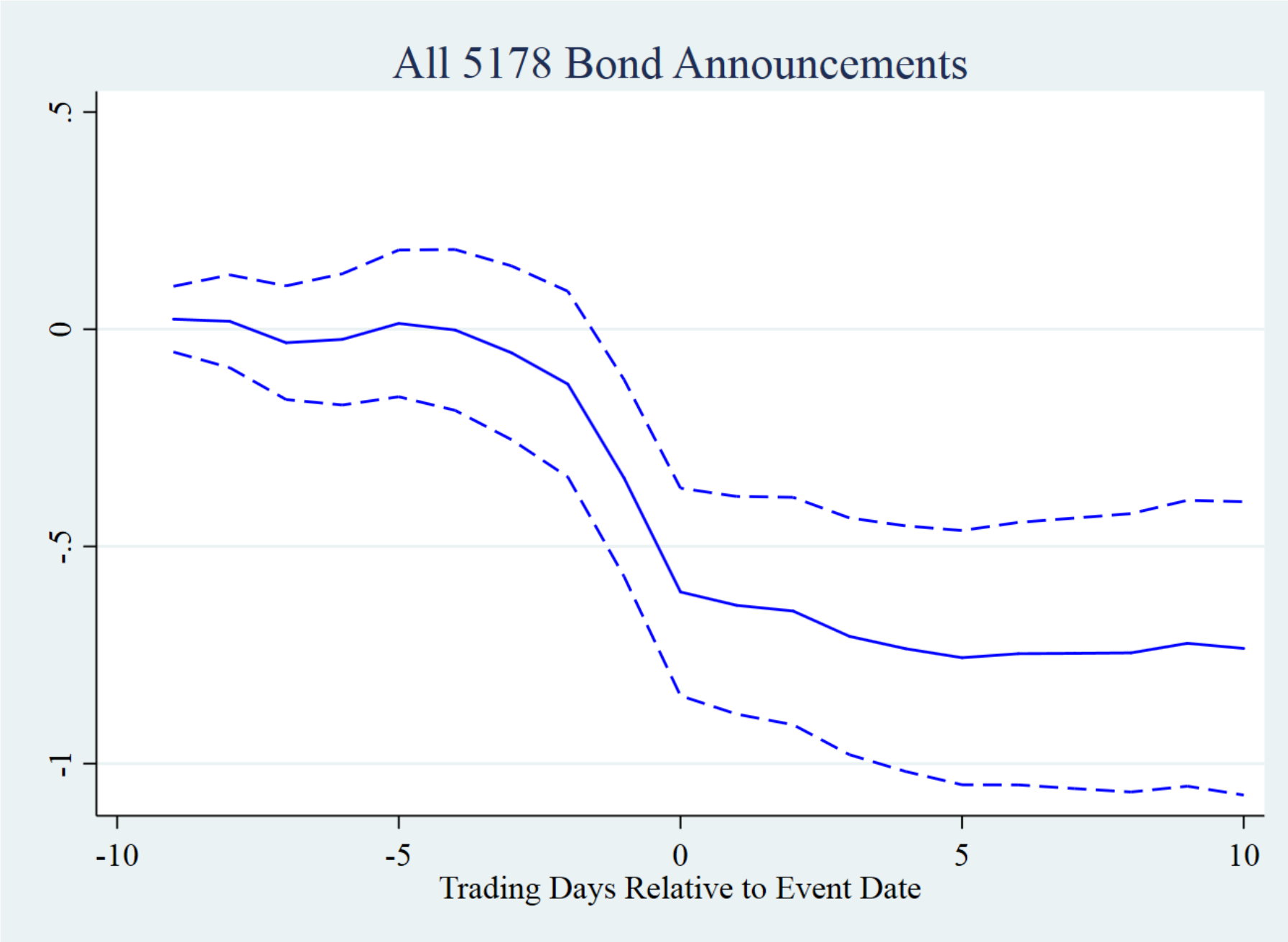
Deregulation and ex-post defaults

	ChargeOff/Total, %		Default=100%	
RS Index	0.185***	0.202***	0.273***	0.298***
	(0.058)	(0.058)	(0.079)	(0.079)
SBA Guarantee	0.145***	0.131***	0.288***	0.265***
	(0.003)	(0.003)	(0.005)	(0.005)
Log(Loan Amount)	1.377***	1.444***	3.668***	3.781***
	(0.041)	(0.041)	(0.056)	(0.056)
Log(Maturity)	-16.319***	-16.627***	-25.056***	-25.566***
	(0.080)	(0.079)	(0.116)	(0.113)
Year FE	Y	-	Y	-
State FE	Y	Y	Y	Y
Industry-Year FE		Y		Y
Observations	488312	488307	488312	488307
R^2	0.195	0.203	0.223	0.233

Conclusions

- We argue that market power is a key determinant of banks' information production incentives
- The results speak about the potential downside of regulation promoting competition in financial markets (Crawford et al., 2018; Gissler et al., 2019)
- But more competition means lower rates and better access to credit (Rice and Strahan, 2010)
- Difficult to make a welfare statement without full model

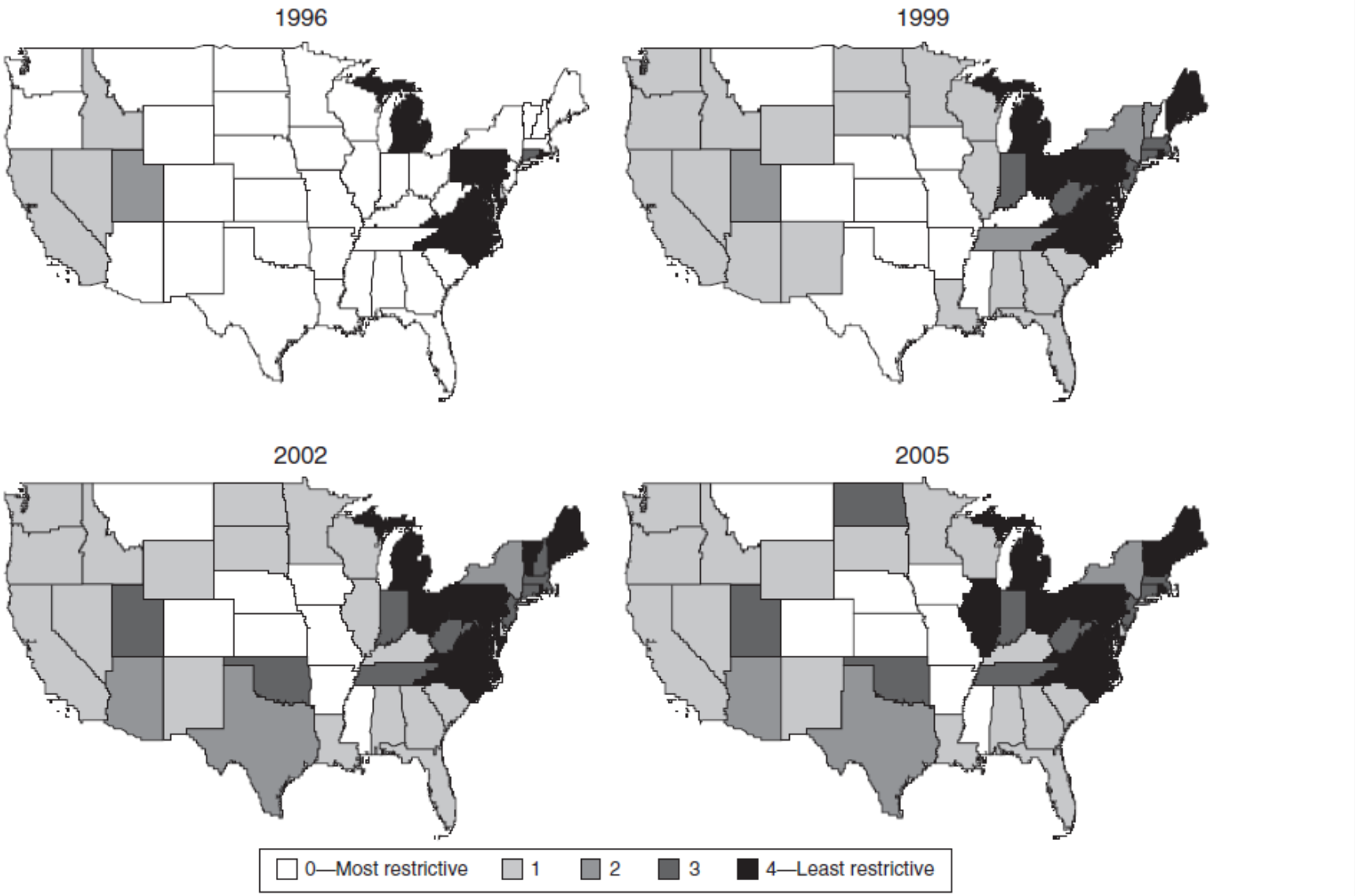
APPENDIX


All 5178 Bond Announcements
.5
0
-.5
-1
-10
-5
0
5
10
Trading Days Relative to Event Date

Summary stats on Deregulation changes, 1993-2006

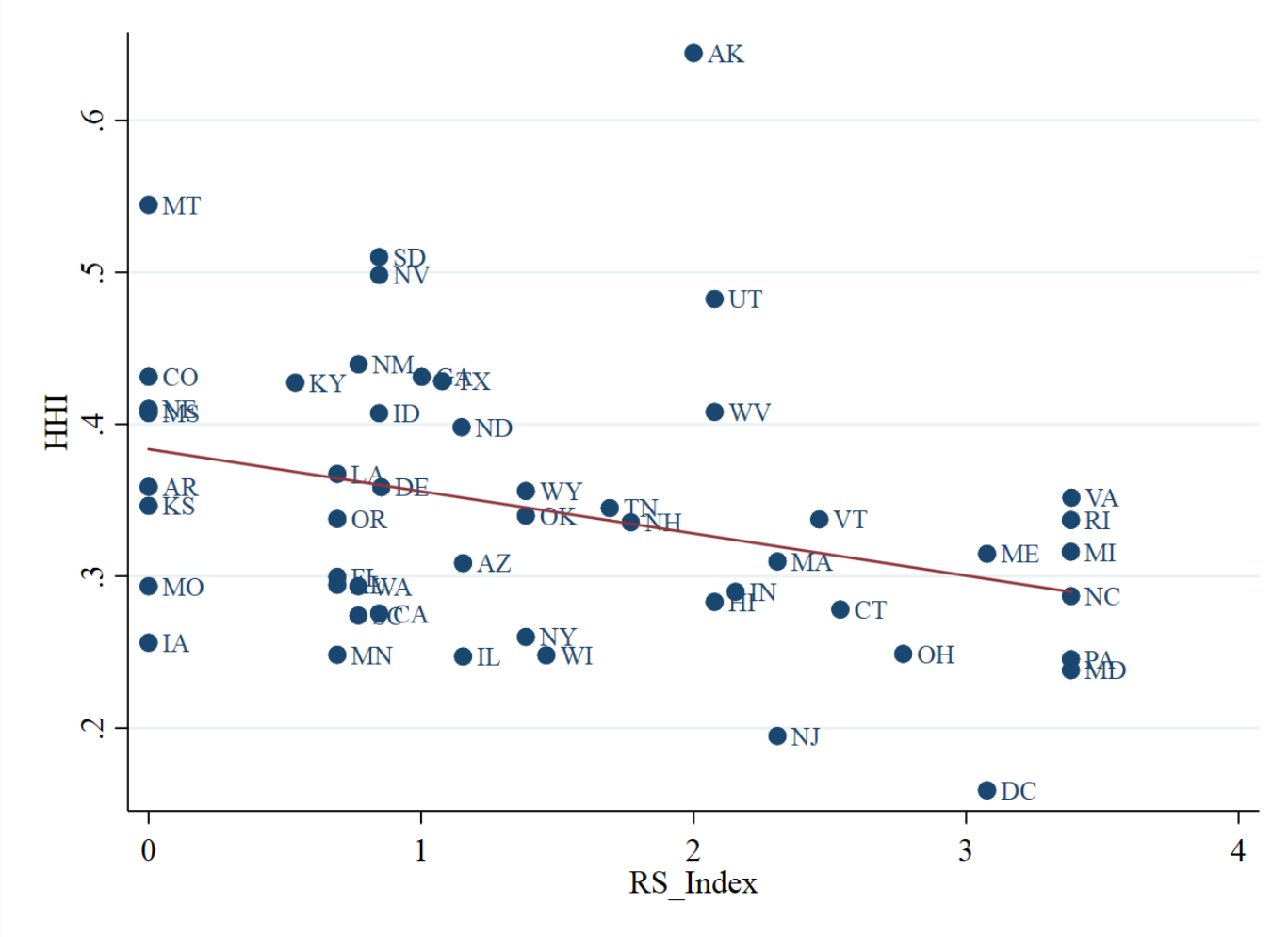
- There are 55 changes for 43 states (33 change only once, 9 change twice)
- On average (median) states knock down 1.9 (1) barriers at a time

The geography of Deregulation changes, 1993-2006



Source: Favara and Imbs (2015)

Deregulation and Concentration (HHI)



Robustness: Out-of-state Lenders Only

RS Index	-0.209***	-0.200**	-0.404***
	(0.061)	(0.080)	(0.125)
Fixed effects			
State Yes	Yes	–	
Time Yes	–	–	
Industry-Time	No	Yes	Yes
Firm	No	No	Yes
Borrower and Deal controls	Yes	Yes	Yes
Observations	7975	5790	4327
R^2	0.034	0.329	0.616

- Deregulation allows the entry of out-of-state lenders with potentially different information technologies (hard info)
- Then, the entry of new lenders with different lending technologies causes the decrease in the loan abnormal returns, rather than competition per se
- Restrict attention to borrowers who borrow from out-of-state lenders before and after deregulation. Same results.

Comparison of CARs with previous studies

- **Loan abnormal return**: James (1987) finds 2-day CAR of 1.93% in 1974-1983

  Fields et al. (2006) show that it declines over time (0.5% in 1990s, $\approx$0 post 2000)

  Consistent with our evidence: competition increases towards end of 1990s

  (Interestingly: Li and Ongena (2015) document that CARs go back up to about 2% in the financial crisis of 2007-09)