The Value of Lending Relationships

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Citrus Finance Conference

(Rick Smith's Expected Retirement Conference)

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*The views expressed here are those of the authors and not necessarily the views of the Office of Financial Research, the Office of the Comptroller of the Currency, the U.S. Department of the Treasury, or any federal agency and do not establish supervisory policy, requirements, or expectations.

Rise of Intangible Capital in Firms

- Intangible investment has increased 60% from 1975-2016
- Academics: How to measure/model/understand intangible capital?
- What do we know?
  - Customer relationships → big part of intangible capital
    - Gourio and Rudanko 2014; Ewens, Peters, and Wang 2019
- *Especially* for banks
    - Ongena and Smith 1998; Boot 2000

Lending Relationships: What Do Borrowers Get?

- Well-known implications of relationships for ***borrowers***
  - Ongoing relationships benefit ***borrowers***
    - More credit availability – Petersen & Rajan 1994
    - Lower pricing – Berger & Udell 1995
    - Larger/more efficient contract space – Drucker & Puri 2009; Prilmeier 2017
  - Losing relationships harms ***borrowers***
    - Market value – Slovin et al. 1993
    - Credit rationing/switching costs – Gan 2007
    - Lost investment and employment – Chodorow-Reich 2014

What Do Lenders Get?

- Less is known about benefits to ***lenders***
  - Retaining credible borrowers, future syndication business
    - Bharath et al. 2007- **"So what do I get? The bank's view of lending relationships"**
  - Negative market reaction to borrower bad credit events
    - Dahiya et al. 2003

Question: How ***valuable*** are relationships *to* ***lenders***?

- **One possible approach**: exhaustive model of costs and benefits
  - Difficult to identify all the reasons that relationships are valuable
  - Hard to measure and value even what we do know about
    - e.g., how valuable is a particular transaction?

What is the *Value* to Lenders?

- In this paper we use a ***Revealed Preference Approach***
  - Use a lender decision that ***risks*** losing the relationship:

Whether to enforce contractual breaches of financial covenants

The risk:

- *Increased propensity of the borrower to terminate the relationship* (Bird et al. 2021b)

Choice to Enforce Contractual Breaches

Parts of the tradeoff are observable and measurable

Benefits

i. Waiver/amendment fees
- Bird et al. 2021a collect via SEC Form 8-K

ii. Borrower risk reduction
- Less debt, cut investment, employment, R&D

  Chava & Roberts 2008; Nini et al. 2009, 2012; Roberts & Sufi 2009; Falato & Liang 2016; *etc.*

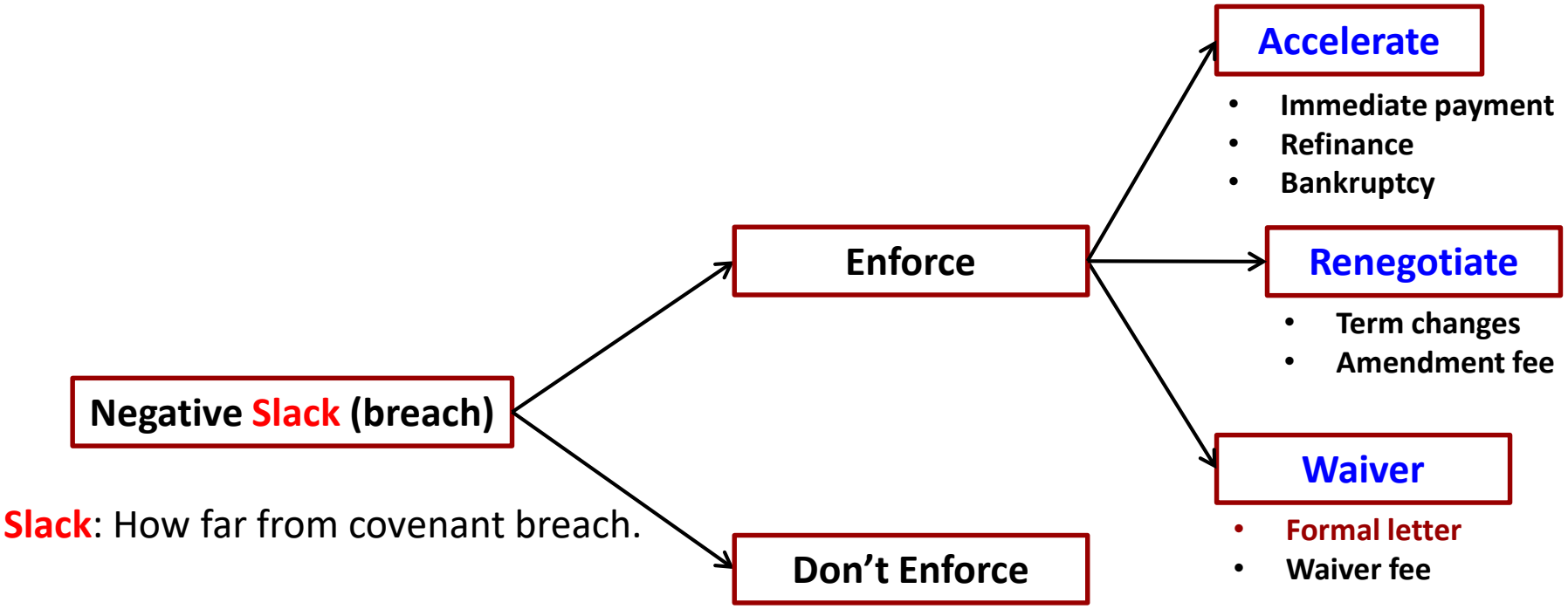
Costs

i. Borrower switches to new lender
- Bird et al. 2021b estimate ↑ switching rate on next loan

Outline

- Introduction
- **Covenant enforcement decision**
- Data
- Estimation
- Results
  - Value of lending relationships
  - What drives the value?
  - Aggregating from loan-level to bank-level *VOR*
  - Using our measure of *VOR*

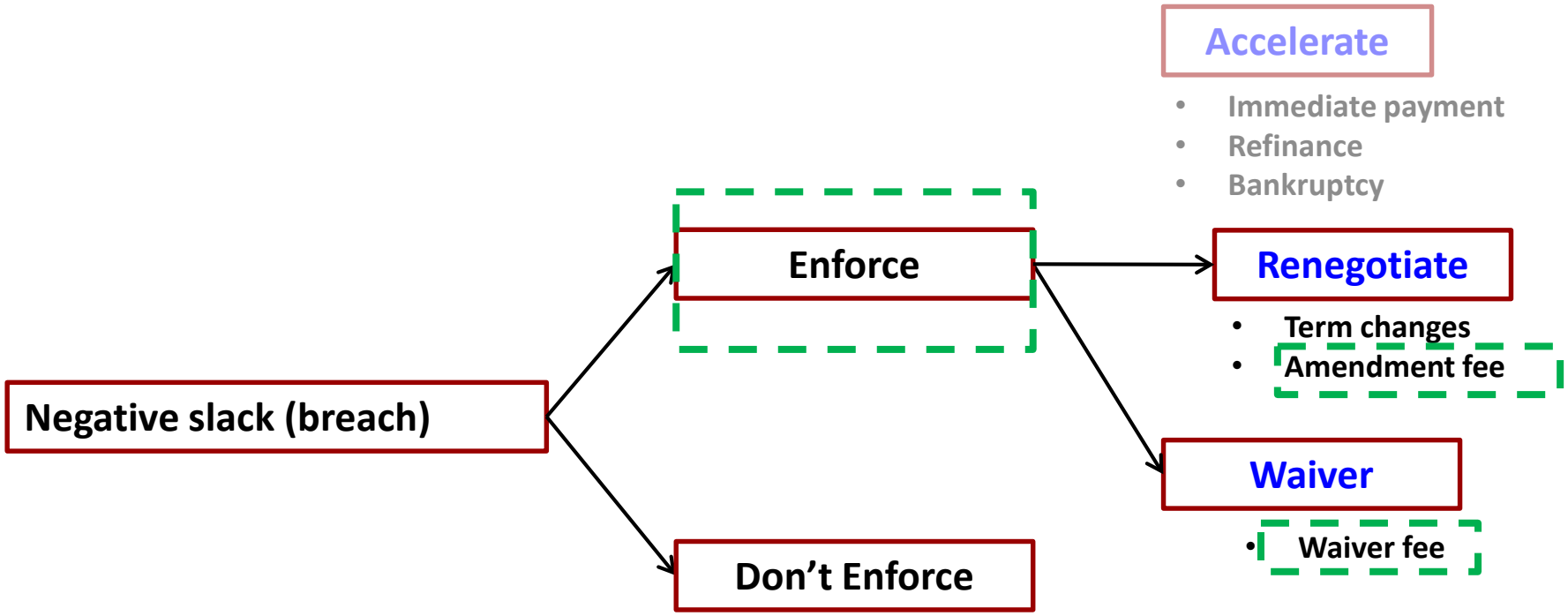
Covenant Breach and Enforcement



Slack: How far from covenant breach.

- **Material** ≈ cash transfers, term changes, acceleration, refinancing
- Not Material ≈ no actions, formal letter without repercussions

Covenant Breach and Enforcement



- Material ≈ cash transfers, term changes, acceleration, refinancing
- Not Material ≈ no actions, formal letter without repercussions

Modeling the Tradeoff

- Enforcement involves **benefits** to lender
  - Can collect a **waiver/amendment fee (ϕ)**
  - Explicit/implicit operational concessions: Δ cost of default (ω)
- Enforcement also involves costs to the lender
  - Lost relationship capital: ↑ probability of borrower switching (ψ)
  - *VOR*: present value of relationship to lender

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  - ***VOR***: present value of relationship to lender

Expected loss of relationship value = ψ * ***VOR***

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  - ***VOR***: present value of **r**elationship to lender

Lender chooses to enforce iff

$$\phi - \omega - \psi * \boldsymbol{VOR} > 0$$

-or-

fees + decrease in cost of default > expected loss of relationship

Modeling the Tradeoff

- Enforcement involves benefits to lender
  - Can collect a waiver/amendment fee (ϕ)
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  - Lost relationship capital: ↑ probability of borrower switching (ψ)
  - ***VOR***: present value of **r**elationship to lender

Lender chooses NOT to enforce iff

$$\phi - \omega - \psi * \boldsymbol{VOR} < 0$$

-or-

fees + decrease in cost of default < expected loss of relationship

Modeling the Tradeoff

- Enforcement involves benefits to lender
  - Can collect a waiver/amendment fee (ϕ)
  - Explicit/implicit operational concessions: Δ cost of default (ω)
- Enforcement also involves costs to the lender
  - Lost relationship capital: ↑ probability of borrower switching: ψ
  - ***VOR***: present value of relationship to lender

On margin, lender indifferent between enforcing or not

$$\phi - \omega - \psi * \boldsymbol{VOR} = 0$$

-or-

fees + decrease in cost of default = expected loss of relationship

Modeling the Tradeoff

- Enforcement involves benefits to lender
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On margin, lender indifferent between enforcing or not

$$\phi - \omega = \psi * VOR$$

-or-

$$VOR = \frac{\phi - \omega}{\psi}$$

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Data and Measurement

- Commercial sources
  - CRSP, Compustat, I/B/E/S, DealScan
- Academic sources
  - Michael Roberts' DealScan-Compustat/CRSP borrower link table
  - Aytekin Ertan's DealScan-Compustat/CRSP lead lenders link table
  - Greg Nini's material covenant violation data (Becher, Griffin, and Nini 2020)
- Manual collection of waiver fees: 8-K filings
  - Bird et al. 2021a,b
- From 1996-2016, 5,908 loan packages (71,051 package-quarters), issued by 1,642 borrowers to 58 lenders

Data and Measurement

- Covenant *Slack*: how far from breach is the borrower?
  - Loans frequently contain multiple covenants (mean = 2.2)
  - Standardize each covenant value by dividing by industry-specific standard deviation of the ratio
  - Use the minimum standardized difference among covenants
- Expected cost of default:
  - Present value of cost of default, given a recovery rate conditional on whether loan is secured, spread + LIBOR, and maturity date
- Relationship termination (switching):
  - Indicator variable = 1 if borrower switches lenders for next loan

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Estimation of Model Components

- Three model inputs:

  ϕ (fees); ω (Δ in expected cost of default); ψ (Δ in probability of switching)

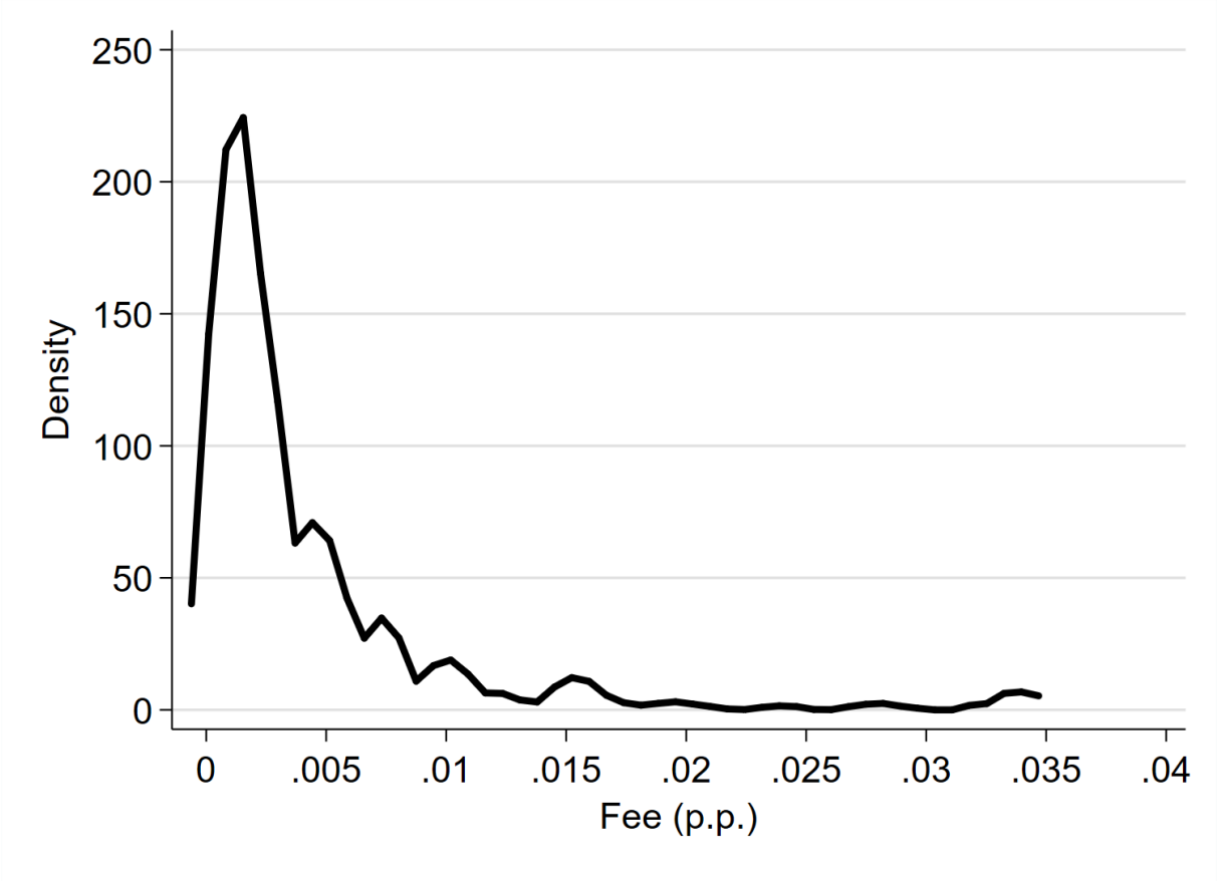
Estimation of Fees

- Three model inputs:

  ϕ (fees); ω (Δ in expected cost of default); ψ (Δ in probability of switching)

- Fees data collected for firms experiencing covenant enforcement (note: not always observable)

Estimation of Fees



→ **Average fee is 0.45% of loan principal**

Fuzzy RD Estimation of *Default Costs* and *Switching*

- Three model inputs:

  ϕ (fees); **ω (Δ in expected cost of default)**; **ψ (Δ in probability of switching)**

- Use **Fuzzy RD** to get at marginal effect of *enforcement* on **ω** and **ψ**

- First stage estimate of enforcement rates around breach cutoff:

$$Enforce_{ikt} = \eta + \lambda * Breach_{ikt} + F(Slack_{ikt}) + G(Slack_{ikt}) + \delta_{ikt}$$

Slack measured as standardized distance to pre-set covenant threshold

Breach = 1 if in breach (negative slack) of at least 1 covenant, zero otherwise

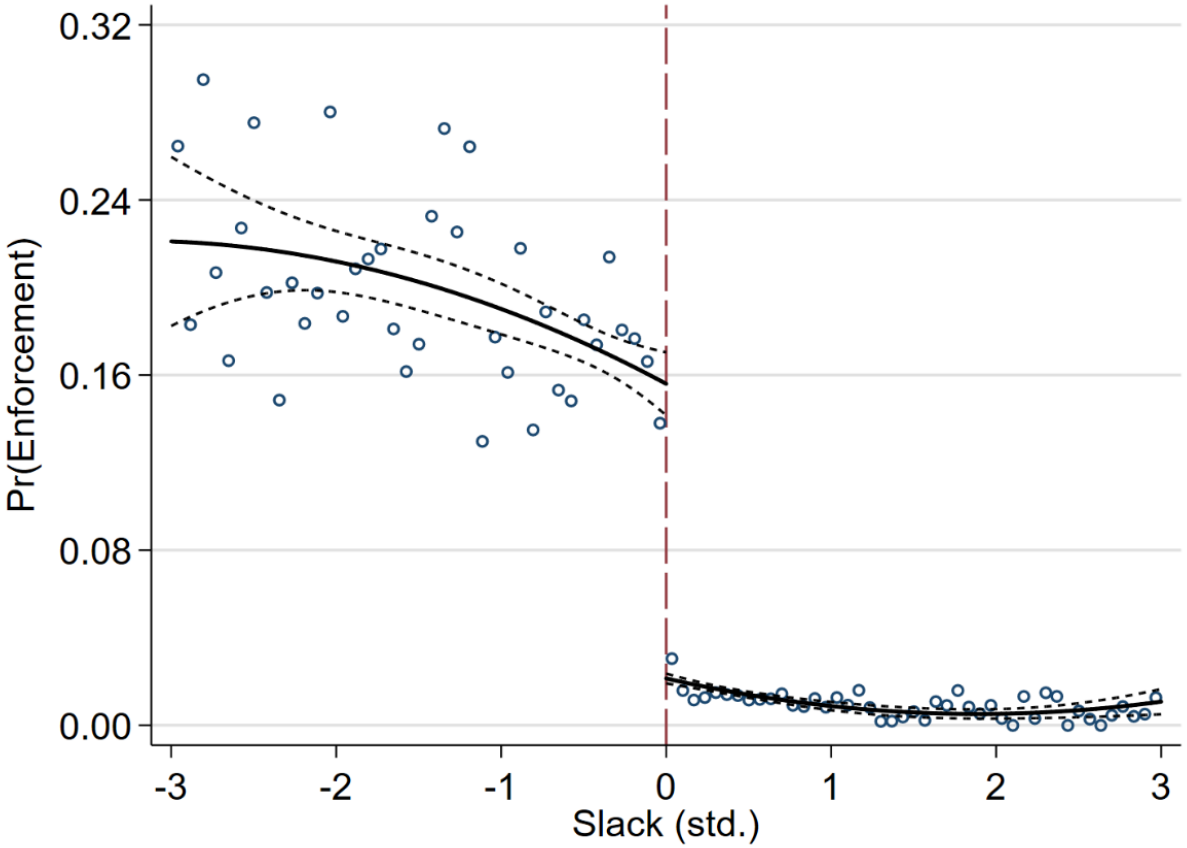
***F*(·)** and ***G*(·)** are flexible polynomial functions of *Slack*

Enforce = 1 if borrower discloses material covenant violation, zero otherwise

***Variable of interest*:**

λ, the increase in enforcement rates at the pre-set covenant threshold

Estimation of Marginal Enforcement (*First stage*)



$$Enforce_{ikt} = \eta + \lambda * Breach_{ikt} + F(Slack_{ikt}) + G(Slack_{ikt}) + \delta_{ikt}$$

Estimation of Marginal Enforcement (*First stage*)

Dependent variable: *Enforcement*				
	(1)	(2)	(3)	(4)
Breach	0.153***	0.149***	0.144***	0.146***
	(0.014)	(0.015)	(0.015)	(0.016)
Polynomial order	0	1	2	3
Bandwidth	1	5	10	20
Adj. R^2	0.0850	0.1098	0.1150	0.1186
Obs.	30,301	50,232	55,983	58,761

$$Enforce_{ikt} = \eta + \lambda * Breach_{ikt} + F(Slack_{ikt}) + G(Slack_{ikt}) + \delta_{ikt}$$

Estimation of Δ in Expected Cost of Default

- Three model inputs:
  ϕ (fees); **ω (Δ in expected cost of default)**; ψ (Δ in probability of switching)

- Fuzzy RD ⟶ marginal effect of enforcement *(First stage)*

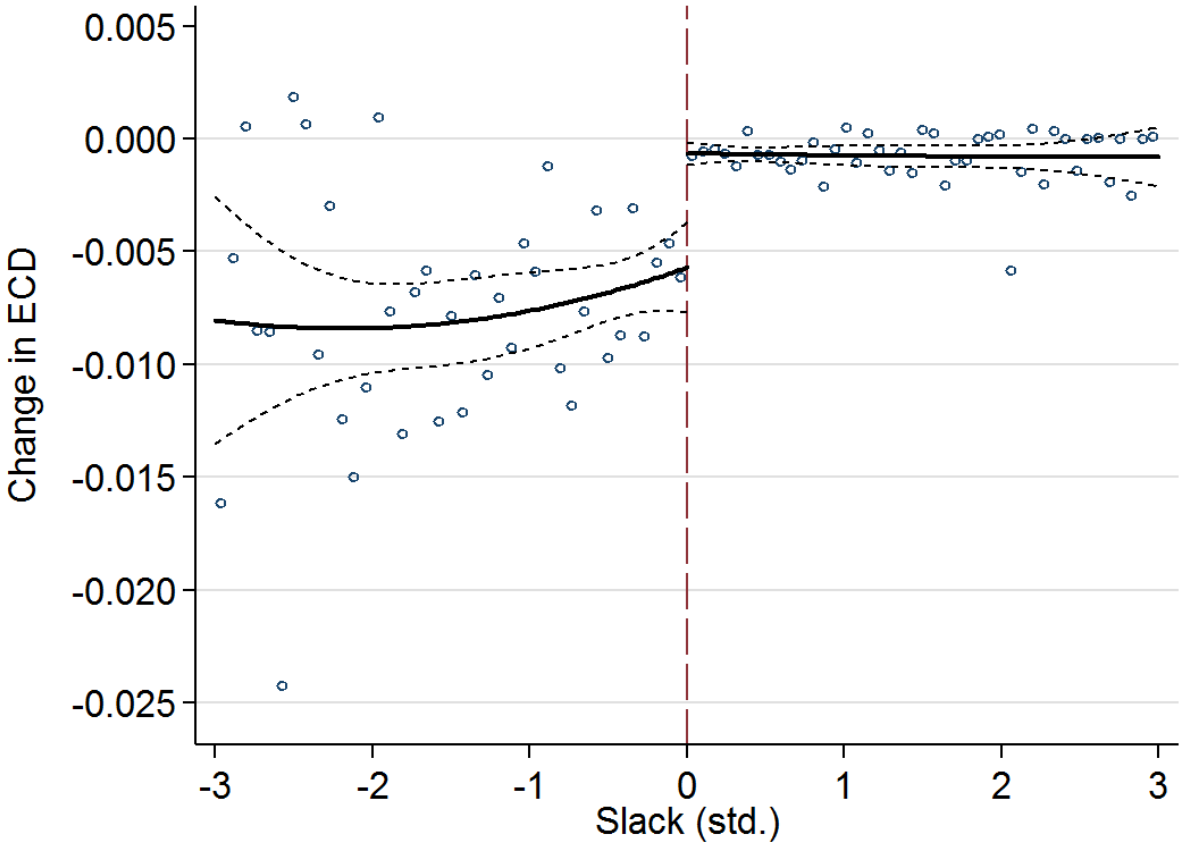
$$Enforce_{ikt} = \eta + \lambda * Breach_{ikt} + F(Slack_{ikt}) + G(Slack_{ikt}) + \delta_{ikt}$$

- **Expected cost of default**: *(Second stage)*

$$\Delta ECD_{ikt} = \alpha + \beta_{ECD} * \widehat{Enforce}_{ikt} + F(Slack_{ikt}) + G(Slack_{ikt}) + \epsilon_{ikt}$$

NOTE: If the marginal covenant enforcement alters borrower behavior, then we expect **the change in *ECD*** will be lower for borrowers just-breaching their covenant thresholds relative to those just-above them.

Estimation of Δ in Expected Cost of Default (*Second stage*)



$$\Delta ECD_{ikt} = \alpha + \beta_{ECD} * \widehat{Enforce}_{ikt} + F(Slack_{ikt}) + G(Slack_{ikt}) + \epsilon_{ikt}$$

Estimation of Δ in Expected Cost of Default (*Second stage*)

Dependent variable: ΔECD				
	(1)	(2)	(3)	(4)
$\widehat{Enforcement}$	-3.524***	-2.901***	-2.860***	-2.750***
	(0.740)	(0.690)	(0.734)	(0.706)
Polynomial order	0	1	2	3
Bandwidth	1	5	10	20
Obs.	21,712	35,651	39,492	41,318

$$\Delta ECD_{ikt} = \alpha + \beta_{ECD} * \widehat{Enforce}_{ikt} + F(Slack_{ikt}) + G(Slack_{ikt}) + \epsilon_{ikt}$$

Estimation of Δ in Probability of Switching

- Three model inputs:

  ϕ (fees); ω (Δ in expected cost of default); **ψ (Δ in probability of switching)**

- Fuzzy RD ⟶ marginal effect of enforcement *(First stage)*

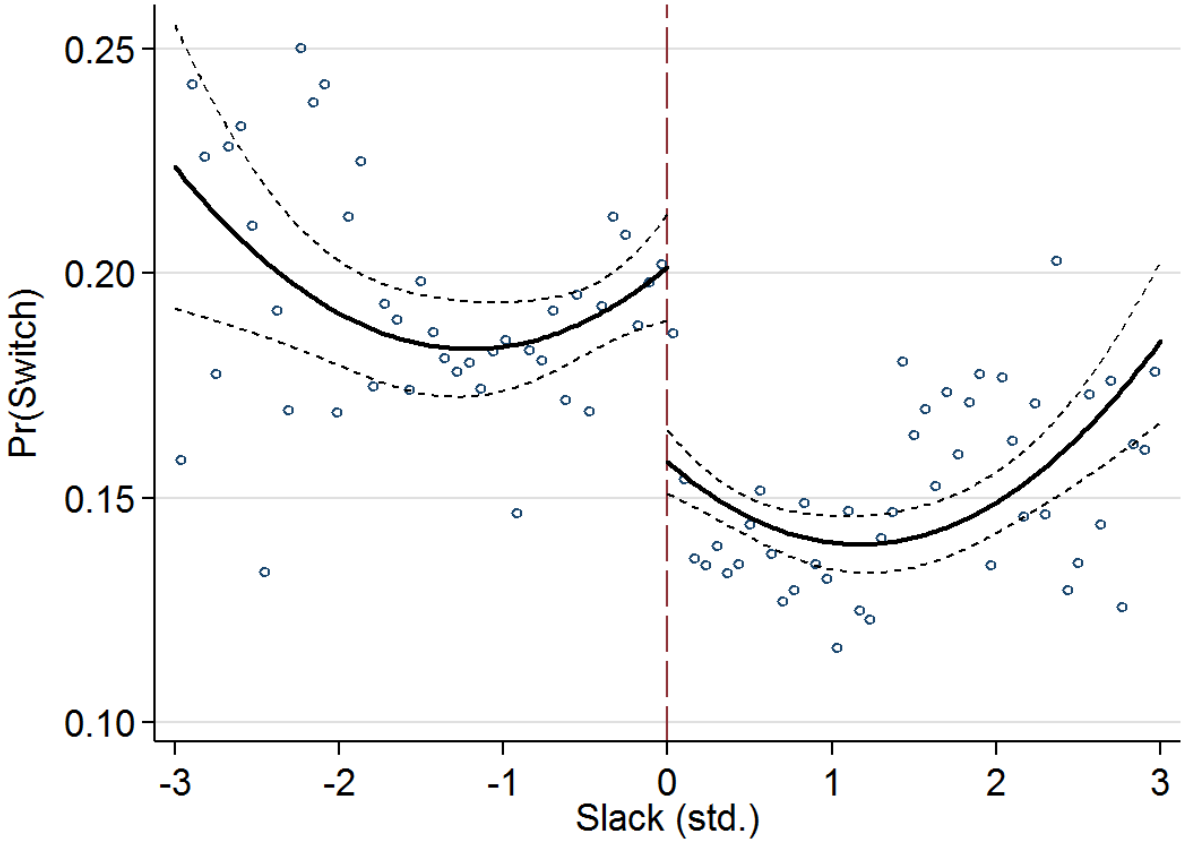
$$Enforce_{ikt} = \eta + \lambda * Breach_{ikt} + F(Slack_{ikt}) + G(Slack_{ikt}) + \delta_{ikt}$$

- **Probability of Switching (*Second stage*)**

$$Switch_{ikt} = \alpha + \beta_{Switch} * \widehat{Enforce}_{ikt} + F(Slack_{ikt}) + G(Slack_{ikt}) + \epsilon_{ikt}$$

NOTE: If marginal covenant enforcement affects the **probability of switching** the change in the probability will be higher for borrowers just-breaching their covenant thresholds relative to those just-above them.

Estimation of Δ in Probability of Switching (*Second stage*)



$$Switch_{ikt} = \alpha + \beta_{Switch} * \widehat{Enforce}_{ikt} + F(Slack_{ikt}) + G(Slack_{ikt}) + \epsilon_{ikt}$$

Estimation of Δ in Probability of Switching (*Second stage*)

Dependent variable: *Switch*				
	(1)	(2)	(3)	(4)
$\widehat{Enforcement}$	0.312***	0.296***	0.290***	0.303***
	(0.095)	(0.103)	(0.102)	(0.103)
Polynomial order	0	1	2	3
Bandwidth	1	5	15	25
Obs.	30,301	50,232	58,040	59,055

$$Switch_{ikt} = \alpha + \beta_{Switch} * \widehat{Enforce}_{ikt} + F(Slack_{ikt}) + G(Slack_{ikt}) + \epsilon_{ikt}$$

Estimation of the Value of Relationships

- The empirical equivalent of our trade off model, $\boldsymbol{VOR = \frac{\phi - \omega}{\psi}}$

$$\boldsymbol{VOR = \frac{\hat{\beta}_{Fees} - \hat{\beta}_{ECD}}{\hat{\beta}_{Switch}}}$$

where:

$\hat{\beta}_{Fees}$: = incremental fees from borrower upon enforcement

$$\Delta ECD_{ikt} = \alpha + \beta_{ECD} * \widehat{Enforce}_{ikt} + F(Slack_{ikt}) + G(Slack_{ikt}) + \epsilon_{ikt}$$

$$Switch_{ikt} = \alpha + \beta_{Switch} * \widehat{Enforce}_{ikt} + F(Slack_{ikt}) + G(Slack_{ikt}) + \epsilon_{ikt}$$

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Main Results: Estimation of Value of Relationships

Parameter	ϕ	ω	ψ	*VOR*	
				$\perp$	$\perp$-adj.
	(1)	(2)	(3)	(4)	(5)
Estimate	0.447***	-2.901***	0.296***	11.309***	11.566***
S.E.	(0.029)	(0.558)	(0.040)	(2.536)	(2.546)

- ϕ: *fee* due to enforcement
- ω: *change in expected cost of default* due to enforcement
- ψ: *probability of switch* due to enforcement

$$\text{VOR} = \frac{\phi - \omega}{\psi}$$

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$$\mathbf{VOR} = \frac{\mathbf{0.447} - (\mathbf{-2.901})}{\mathbf{0.296}}$$

→ Value of Relationships ≈ **11.3%** of loan principal

Main Results: Estimation of Value of Relationships

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- Bootstrap to address non-linearity and non-independence

$$VOR = \frac{\phi - \omega}{\psi}, 10{,}000 \text{ draws (with replacement)}$$

Value of Relationships ≈ **11.6% (of loan principal)**

- Banks act as if these relationships have value.
- *VOR* reflects the "revealed valuation" banks place on lending relationships
- *VOR* is the *perceived* present value of rents associated with lending relationships
  - As such it is "model-free"

Estimated *VOR robust to*

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Alternative polynomials:

- Linear (Baseline)
- Quadratic
- Cubic

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- Linear (Baseline)
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Epanechnikov kernel:

- Local Linear
- Local Quadratic
- Local Cubic

Estimated *VOR robust to*

No-manipulation covenants:

- Linear
- Quadratic
- Cubic
  - Also use a “Donut” Specification

Alternative polynomials

- Linear (Baseline)
- Quadratic
- Cubic

- Local Linear
- Local Quadratic
- Local Cubic

Estimated *VOR robust to*

Sample selection:

- Fee imputation
- Constant sample
- Restrict late
- Restrict early

-manipulation covenants:

Linear

Quadratic

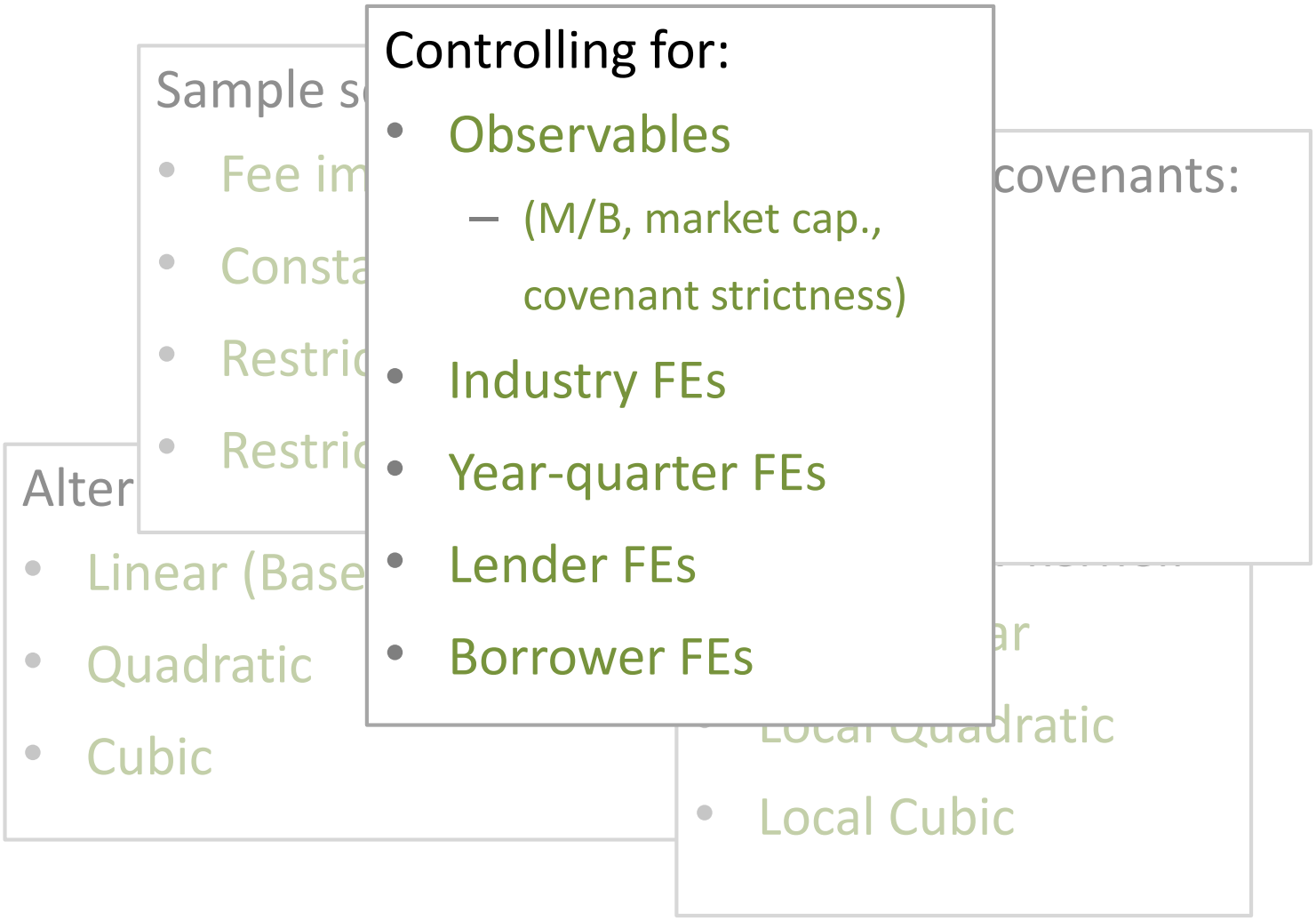
Cubic

Alter

- Linear (Baseline)
- Quadratic
- Cubic

- Local Linear
- Local Quadratic
- Local Cubic

Estimated *VOR robust to*



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What Drives the Value of Banking Relationships?

- If our model captures value, our estimates should vary along dimensions predicted by theory

- We consider the role of:
  - Borrower opacity
  - Lender hold up

- Our goal:
  - Further investigate empirical relevance of relationship capital and validate our estimation strategy

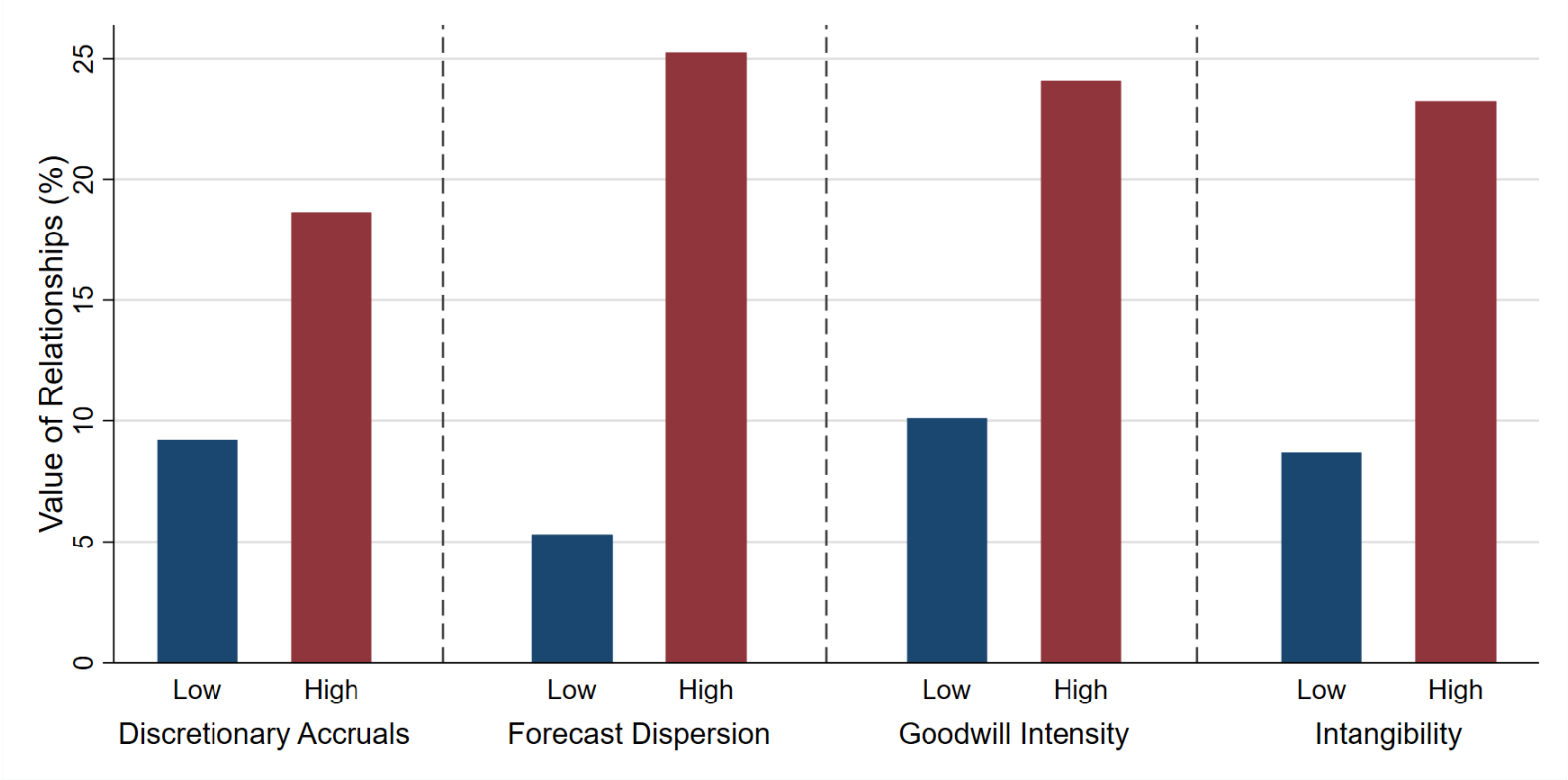
What Drives the Value? The Role of Opacity

- Likely driver is incumbent informational advantage Bharath et al., 2011
  → If so, relationships with high opacity borrowers should have greater value

- Re-estimate model in subsamples (median splits)
  - Discretionary accruals
  - Analyst dispersion
  - Goodwill
  - Intangibility

→ Should all be associated with higher value relationships

Role of Opacity: Subsamples



- ***VOR*** larger for firms with
  - *high discretionary accruals*
  - *high forecast dispersion*
  - *high goodwill*
  - *high intangibility*
- Estimates statistically different at $p < 0.001$ level

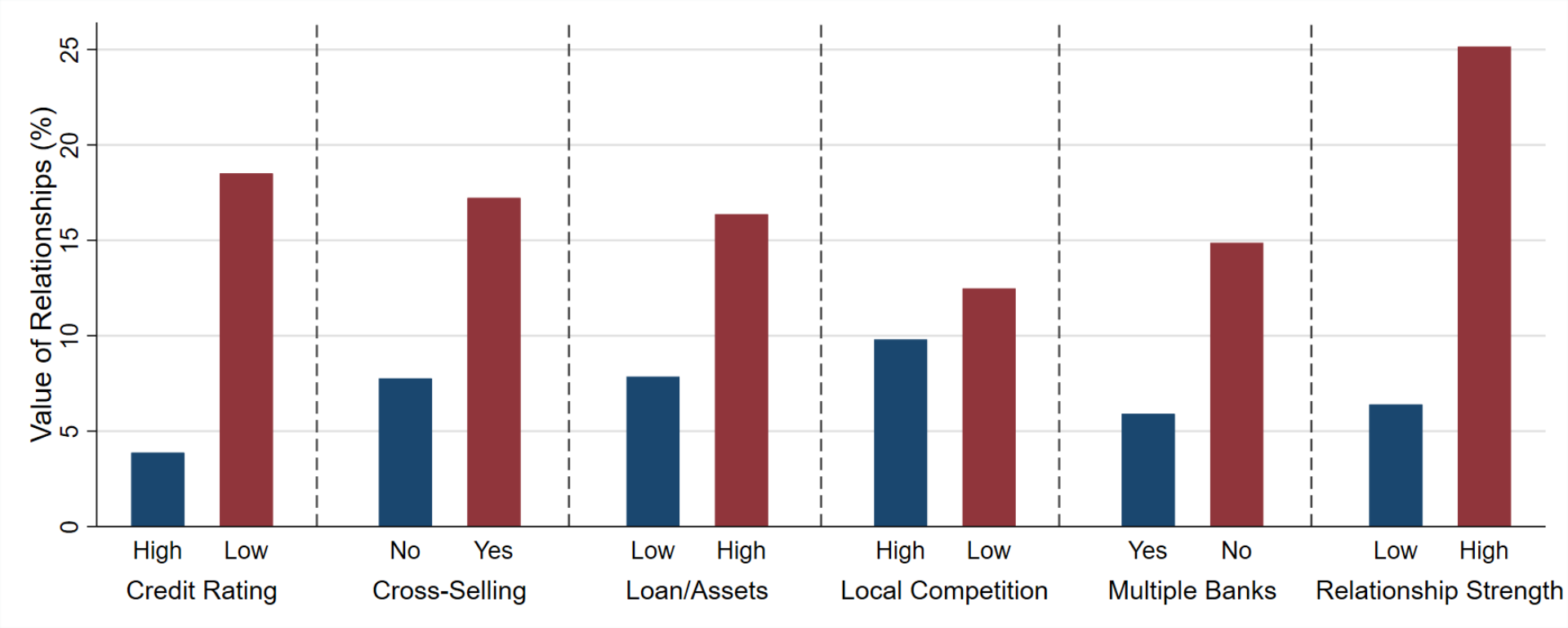
What Drives the Value? The Role of Lender Hold-up

- Lenders take advantage of borrowers w/o outside options – Hauswald & Marquez 2006; Schenone 2010; Bird et al. 2019
  - For example, charge higher spreads
  - Proprietary information makes this more viable and more valuable

- Re-estimate model in subsamples (median splits)
  - Dependent borrowers (Loan-to-assets; single bank)
  - Access to investment grade bond debt
  - Low local competition in the lending market
  - Strength of relationship (length; presence of cross-selling)

→ Should all be associated with higher value relationships

Role of Lender Hold-up: Subsamples



- ***VOR*** larger for firms with
  - *low credit ratings*
  - *multiple products*
  - *high loan-to-assets*
  - *low local bank competition*
  - *single bank*
  - *high relationship strength*
- Estimates statistically different at $p < 0.001$ level

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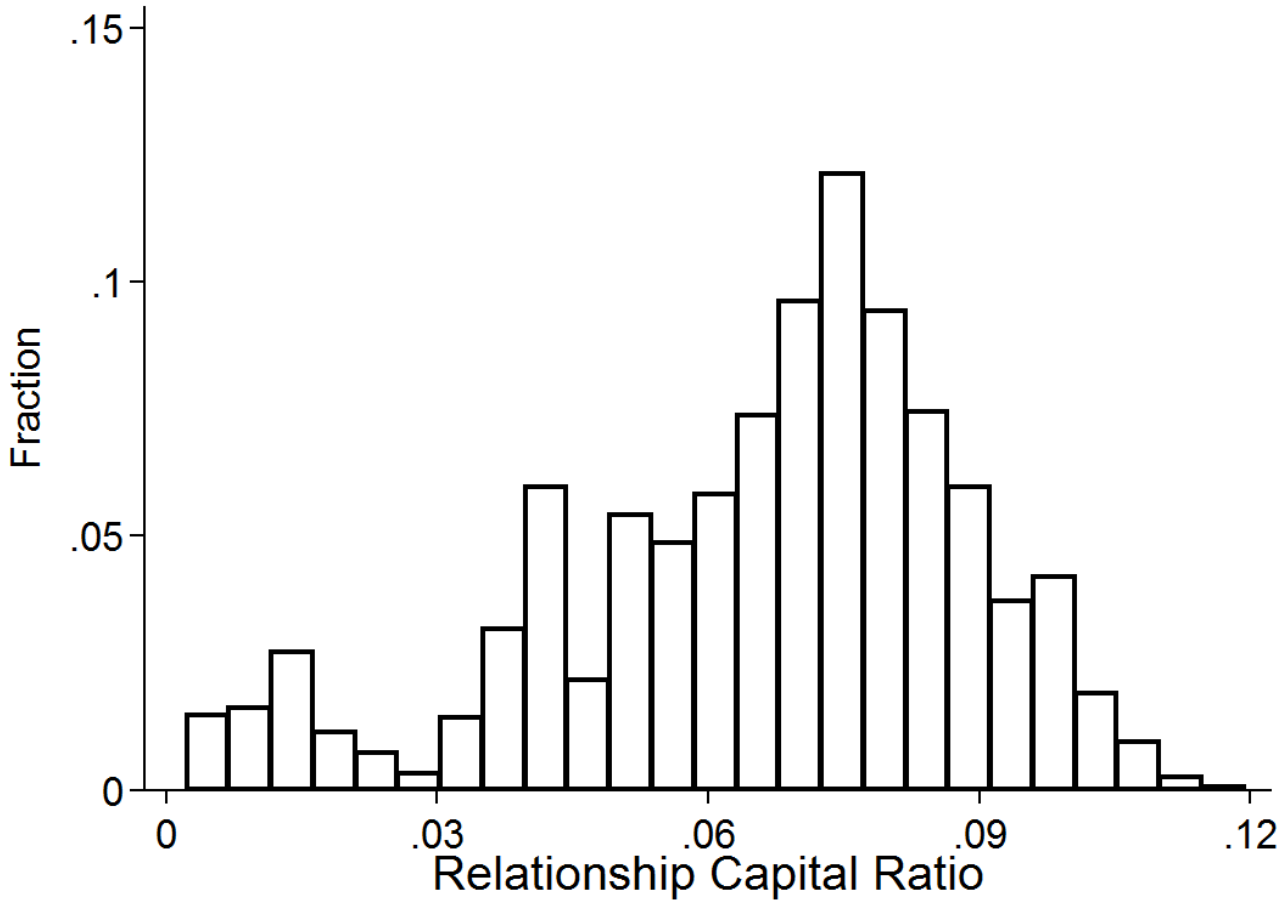
Calculating Bank-level Relationship Capital

- **On average**, banks behave as if they place high value on relationships
  - However, we should not expect banks to value relationships in the same way
  - Use observed heterogeneity of loan portfolios to find bank-level relationship capital

- Aggregate **loan level** estimates to **bank level** using heterogeneity in the (ten) borrower/relationship characteristics:
  - Sort each loan into above/below-median characteristics (e.g., intangibility)
  - Average estimates across the 10 groups to impute value for that relationship
  - Construct weighted-average *VOR* from observed loan portfolio
    - Remember: *VOR* is stated as a percentage of loan value
  - Multiply by bank's total loan book to get **bank-level relationship capital**

  - Divide **bank-level** relationship capital by total assets to get the "**Relationship Capital Ratio**"

Bank-level Relationship Capital Ratio



- Average is 6.6%; Percentiles: 10th (3.6%), 90th (9.2%)
- Importance varies across banks, consistent w/differences in business models
- Bimodal distribution, with minority *not* specializing in relationship lending

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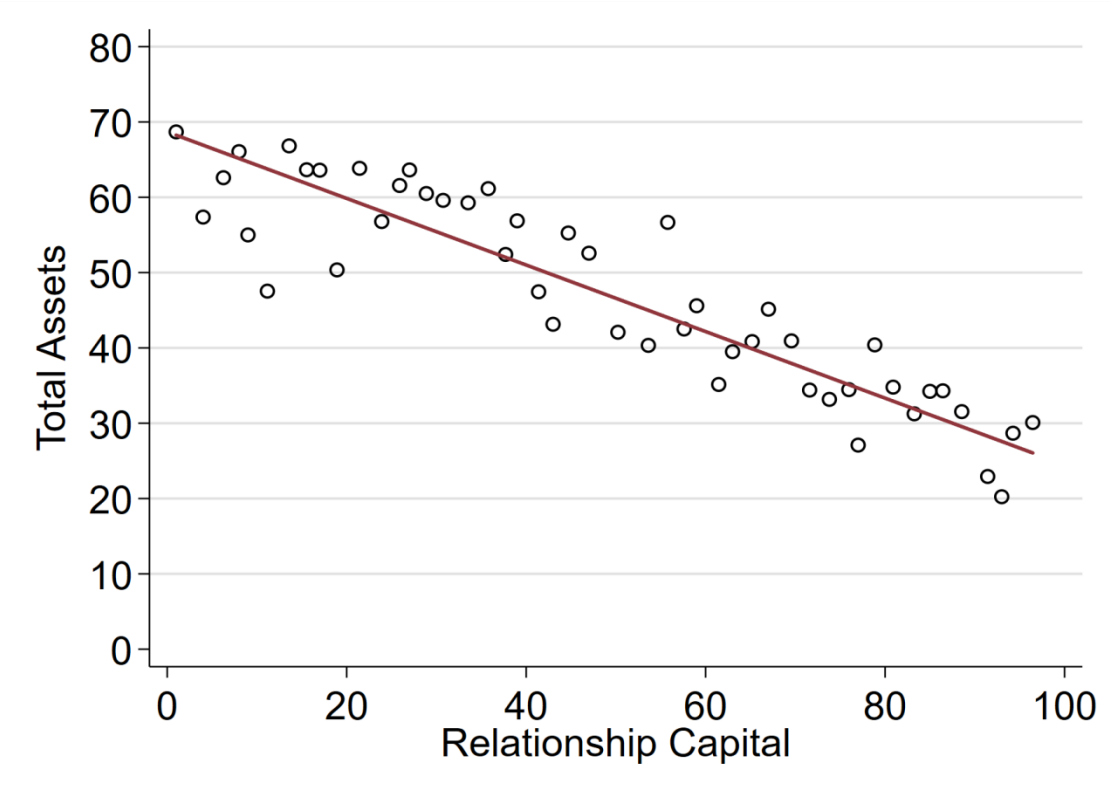
Bank Size and Bank-Level Relationship Capital

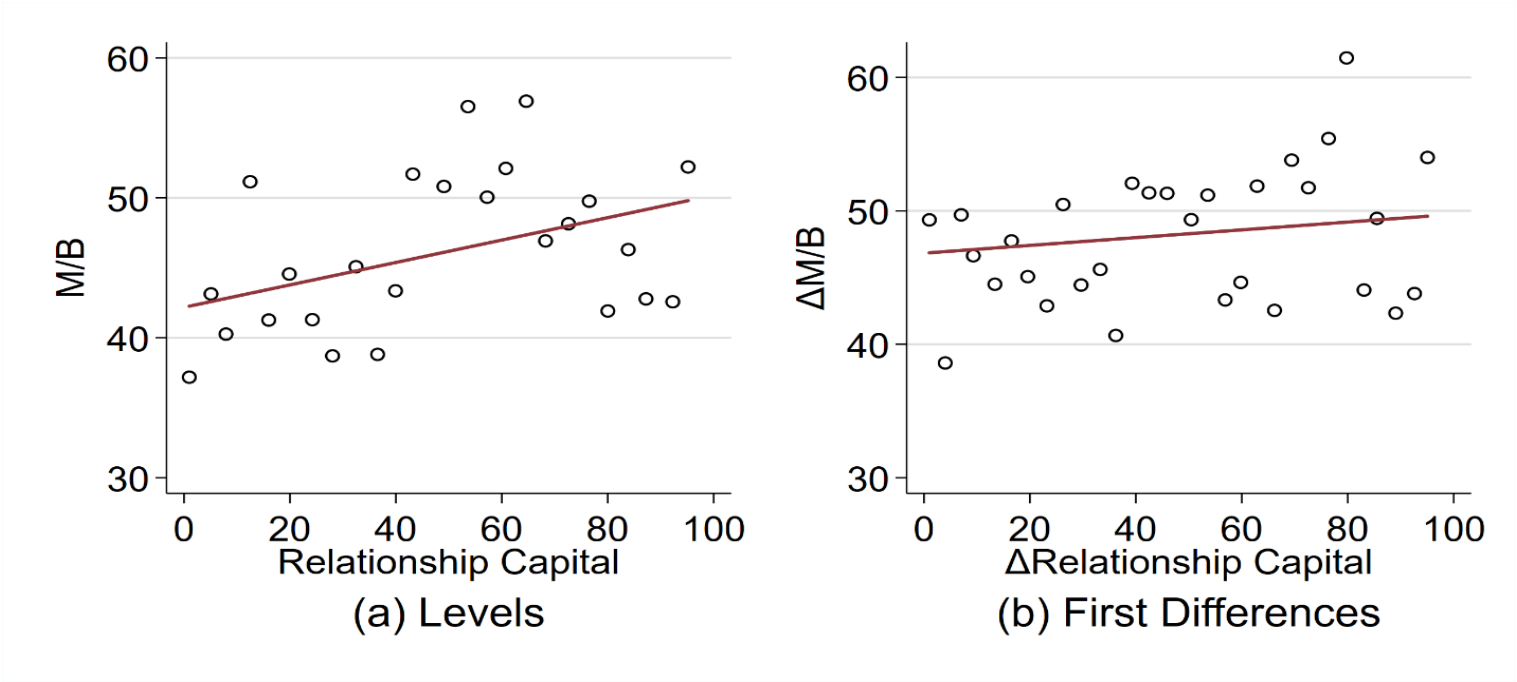
- If relationships are an important source of intangible capital, we should expect relationship-oriented banks to have more of it (e.g., small banks)



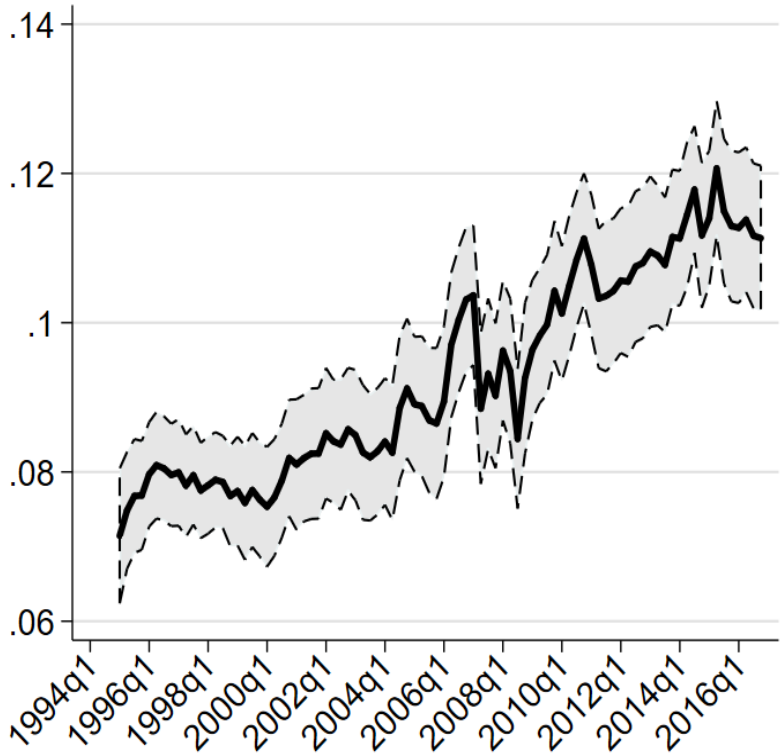
Smaller lenders appear to specialize in high value lending relationships.

Does the Market Value Relationship Capital?

- If relationships are an important source of intangible capital, we should expect a positive correlation with bank value (i.e., M/B)



Relationship Capital over Time

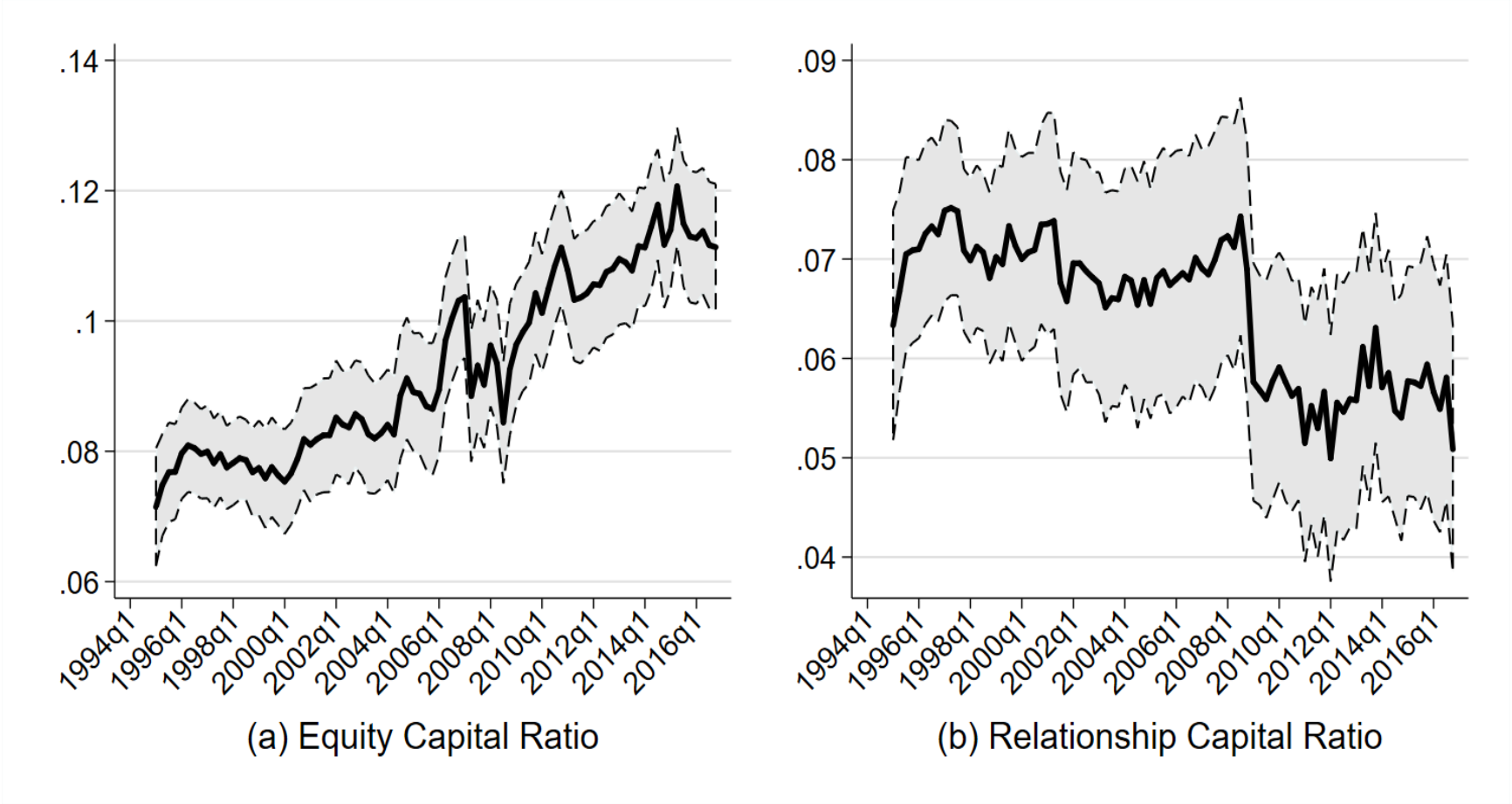


(a) Equity Capital Ratio

(b) Relationship Capital Ratio

- Other than during the crisis, equity capital ratios have steadily risen over time. . .

Relationship Capital over Time



- . . . but our estimates show relationship capital fell considerably (~25%) during the crisis and has yet to recover

Summary

- Value of relationships is a first-order question with implications for bank value – Ongena & Smith 1998; Boot 2000; Egan et al. 2018
  - Has received little direct attention – Dahiya et al. 2003; Bharath et al. 2007

- Use lender actions to get revealed preference measure of *VOR*
  - Robust to reasonable sample and econometric choices
  - Borrower opacity and outside options are key determinants

- Future research:
  - Other factors that drive heterogeneity in value of relationships
  - Importance of relationship value for contracting outcomes
  - How relationship capital affects bank strategy, M&A, valuation
  - Application of revealed preference approach to other valuation

The Value of Lending Relationships

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Thank you!

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- What I didn't get to:

  We use heterogeneity in value to compute **bank level measure of *VOR***
  - Importance varies across banks, consistent w/differences in business models
  - Banks' M/B ratios positively associated with *VOR* (both levels and changes)
  - Aggregate Bank *VOR* fell 25% in Great Recession and, in contrast with equity capital, has not recovered