Bank Competition and the Limits of Creditor Protection Reforms

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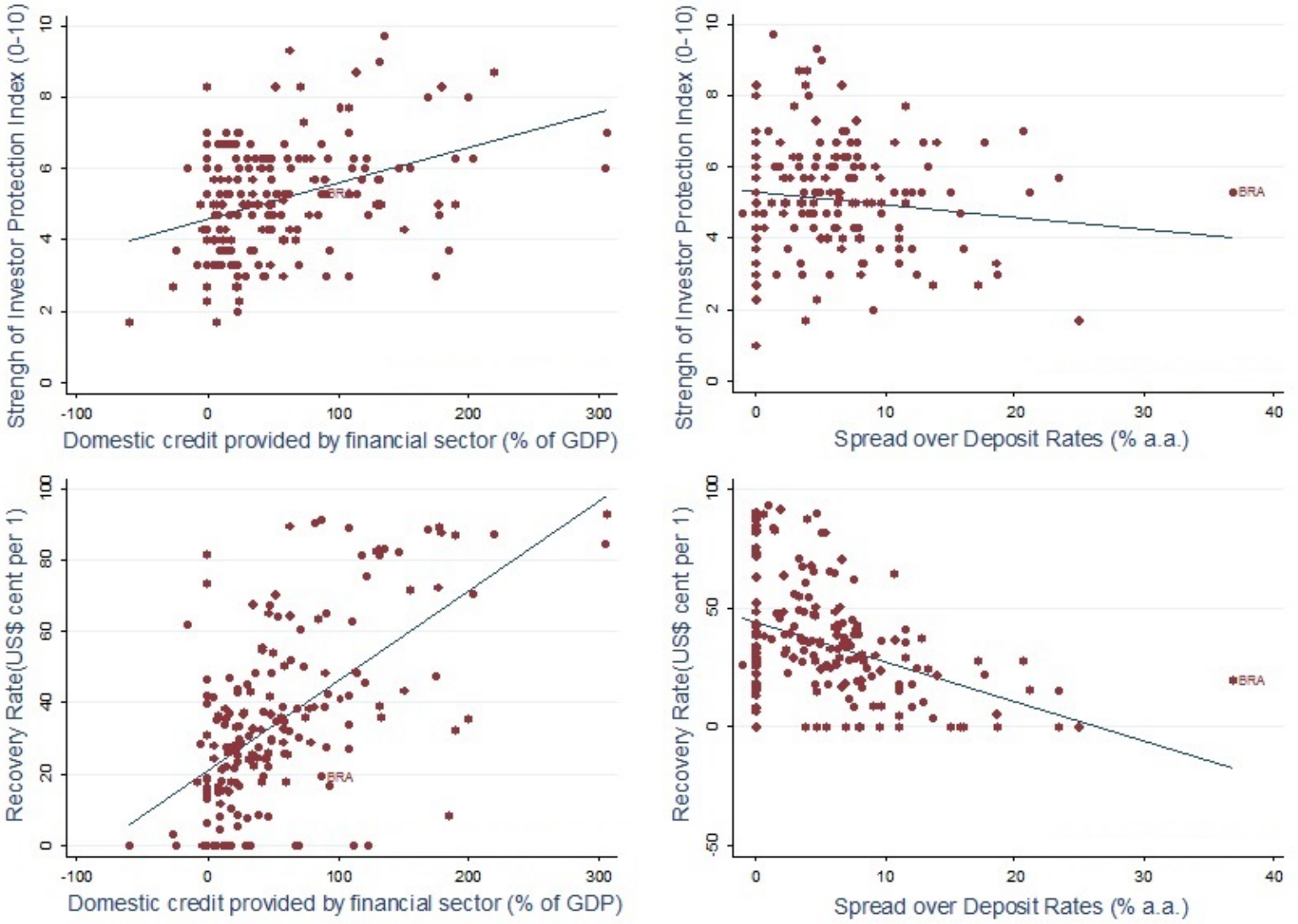
Creditor Protection and Credit Markets

- Better legal conditions for repayment of loans: Aghion et al. (1992)
  - increases credit supply for firms and alleviates credit rationing
  - better credit terms in debt contracts: lower loan interest rates
- Law, Economics and Finance: La Porta et al. (1998)
  - Investor Protection and Development of Credit Markets
- Evidence:
  - La Porta et al. (1997,1998): cross country (49 countries)
  - Demirguç-Kunt and Maksimovic (1998)
  - Djankov et al. (2008)
  - Araujo et al. (2006, 2012), Coelho et al. (2012), Assunção et al. (2014)
  - Lilienfeld-Toal et al. (2012), Campello et al. (2016), Alencar et al. (2016)

Creditor Protection and Credit Markets

Source: World Bank (2005)



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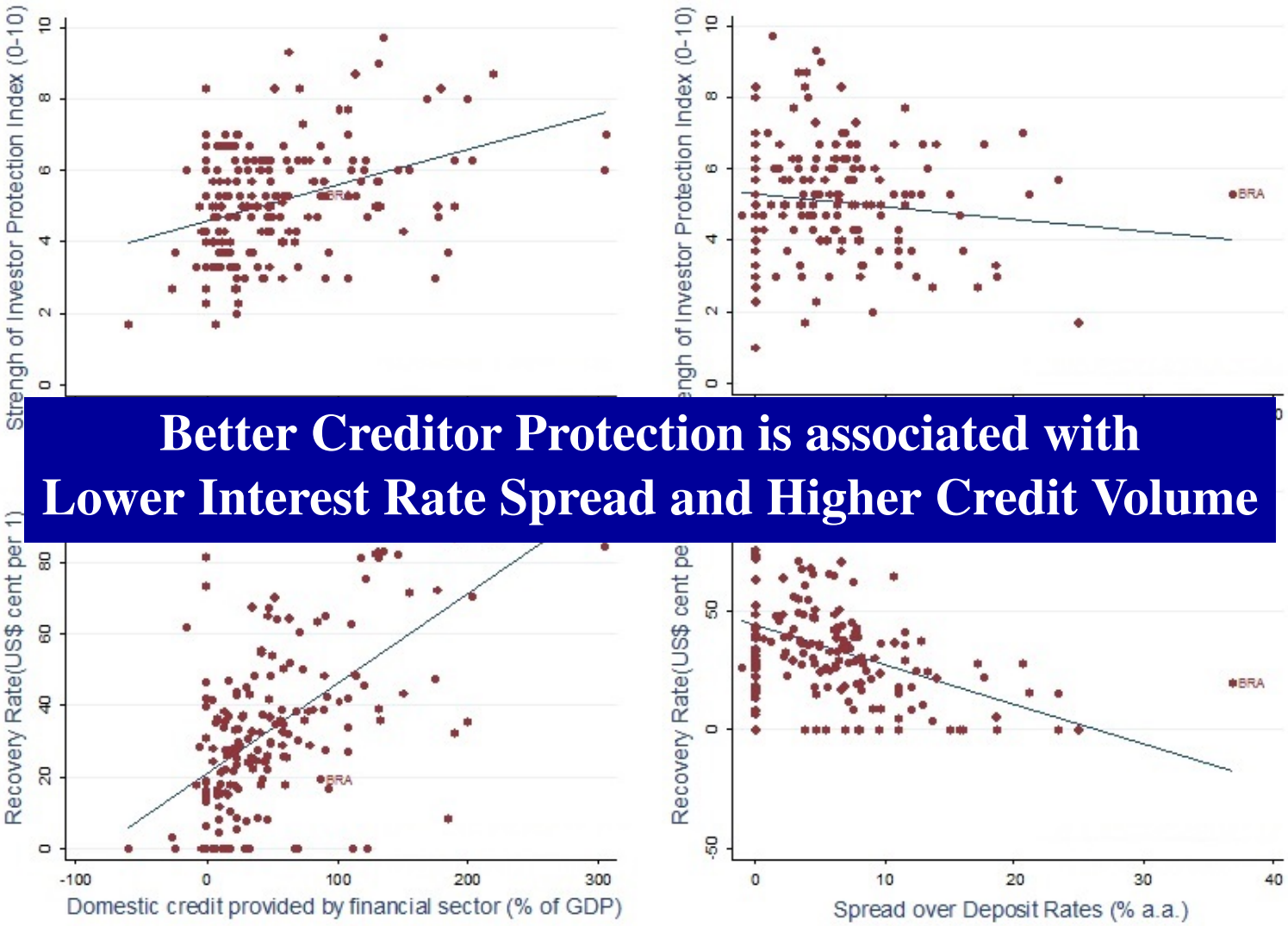


Better Creditor Protection is associated with Lower Interest Rate Spread and Higher Credit Volume

Credit Markets and Bank Loans

Key Features of the Banking Industry

- Bank loans account for a large share of corporate external financing:
  - France (37%), Germany (12%), Japan (42%), U.S. (26%), U.K. (5%)
  - Mayer (1988), Rajan and Zingales (1995), Tirole (2006).
- High concentration rates and mild competition in the banking industry
  - Bikker et al. (2002), Claessens et al. (2004), Bikker et al. (2012)
  - Evidence is consistent with imperfect competition (monopoly, oligopoly, and no long-run perfect competition) for a large set of countries.
- Lack of intense competition is explained by:
  - Technological entry barriers, activity restrictions, restrictions foreign bank entry, and regulations on capital adequacy
  - Claessens and Laeven (2004), Bartha, Caprio and Levine (2004)

This Paper

- Research Question:
  - Can the lack of competition in the financial sector hamper the effects of a more effective creditor protection on credit markets?
- Economic Foundations: Banking oligopoly price theory
  - A bank, in an imperfect competition market, wants to retain the extra margin generated by an increase in creditor protection
  - Margin-volume trade-off: little incentive to reduce loan rates to boost demand for credit (unless competition is prevalent)
  - The lower is the competition in the loan market, the lower will be the reduction (increase) in loan rates (credit supply).
- Empirical Investigation:
  - Using loan-contract level data from Brazil (BCB), we investigate whether (and to what extent) competition in credit lines shapes the effects of an increase in creditor protection on loan interest rates, spread and size.

Why Brazil?

- Brazil is fertile ground for that research question for a number of reasons:
  - Corporate Bankruptcy Reform in 2005:
    - it improved creditor protection in corporate debt transactions and the bankruptcy system's efficiency (Lisboa et al., 2005; Araujo et al, 2006).
  - Diverse degree of competition in credit markets:
    - it depends on local conditions (Coelho et al., 2013), set of product offered by creditors (Barbosa et al., 2015), and on credit lines (Andrade, 2015)
  - Good database:
    - loan-contract level data: rates and size of corporate and consumer loans
    - bank level data: financial statements and balance sheets
    - market power indicators at credit line level
    - Source: The Central Bank of Brazil (SCR)
  - Bank loan accounts for a large share credit in Brazil:
    - free lending funds correspond to 50% of total credit: BCB (2016)

Empirical Strategy and Results

- Approach: Modified differences-in-differences estimation
  - Traditional groups:
    - treated group: corporate loans
    - control group: consumer loans (non-payroll attached)
  - New interaction: triple difference model
    - treatment-status dummy *with* market power indicator.
- Results:
  - Potential Effect: Brazilian Bankruptcy Reform (BBR) could have:
    - $\downarrow$ loan rates 736 basis points (before BBR 33% a.a) wrt to the control group.
    - $\downarrow$ spreads 600 basis points (before BBR 13% a.a) wrt to the control group.
    - $\uparrow$ loan size BRL 9,000 wrt to the control group.
  - Lack of Competition: it hampers 18%-33% (in avg.) of the BBR effect.
- Bottom line:
  - Creditor protection reforms have to be combined with a reduction in entry barrier and competition-enhancing policies in the banking industry.

The Plan of the Talk

- Introduction
- Institutional Background
- The Model
- Database and Descriptive Statistics
- Empirical Strategy
- Estimation Results and Findings
- Robustness Tests
- Final Remarks and Further Steps

The Brazilian Corporate Bankruptcy Reform

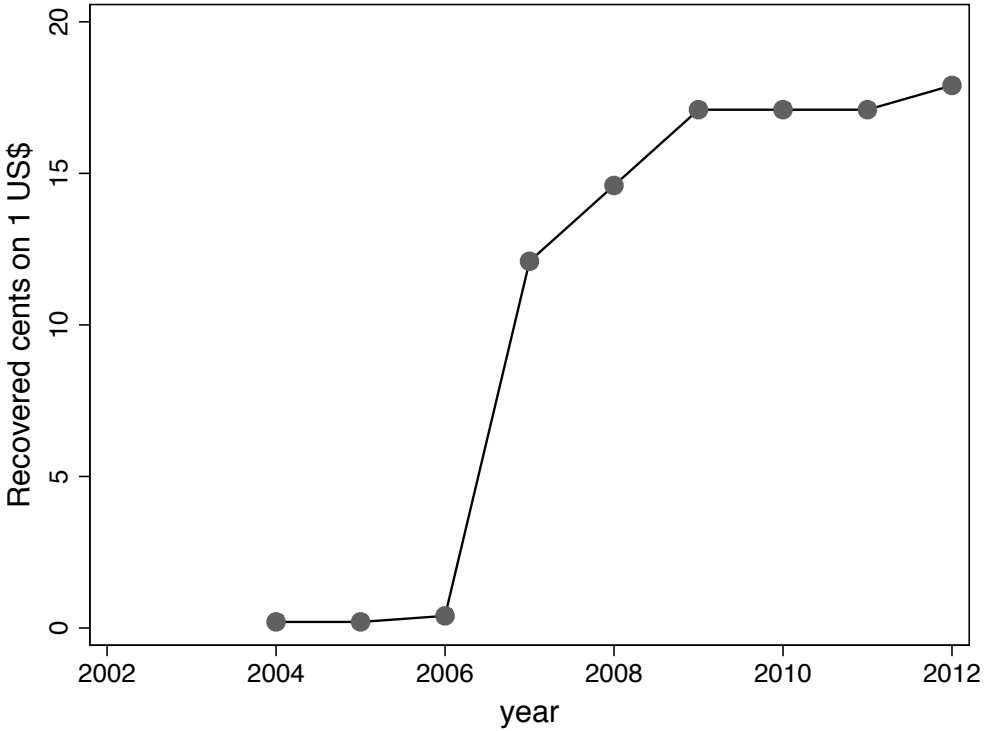
- Institutional aspects:
  - New Bankruptcy Legislation (BBR): Federal Law no. 11.101 (2005)
  - It was issued in February 2005, became legally effective in June 2005
  - BBR was inspired in the U.S. Bankruptcy Codes
- Previous legislations:
  - Until 2005: Federal Law no. 7.661 (1945)
  - Preference to labor demands and taxes at expenses of creditors
  - System punished firms under financial distress (transaction cost)
- Main features of the new legislation:
  - to increase creditor's recovery rate
  - to replace the norms that used to see bankruptcy as a penalty for company that did not fulfill its debt contract, but it has good prospectus.
  - to encourage creditors-borrowers cooperation (extrajudicial recovery)

  $\Rightarrow$ Aim: continuity of business enterprisers with profitable projects

Recovery Rate in Brazil: Before and After BBR

Source: World Bank

Figure 1: Recovery Rate in Brazil over time



Notes: Data from the World Bank Doing Business database.

The Model

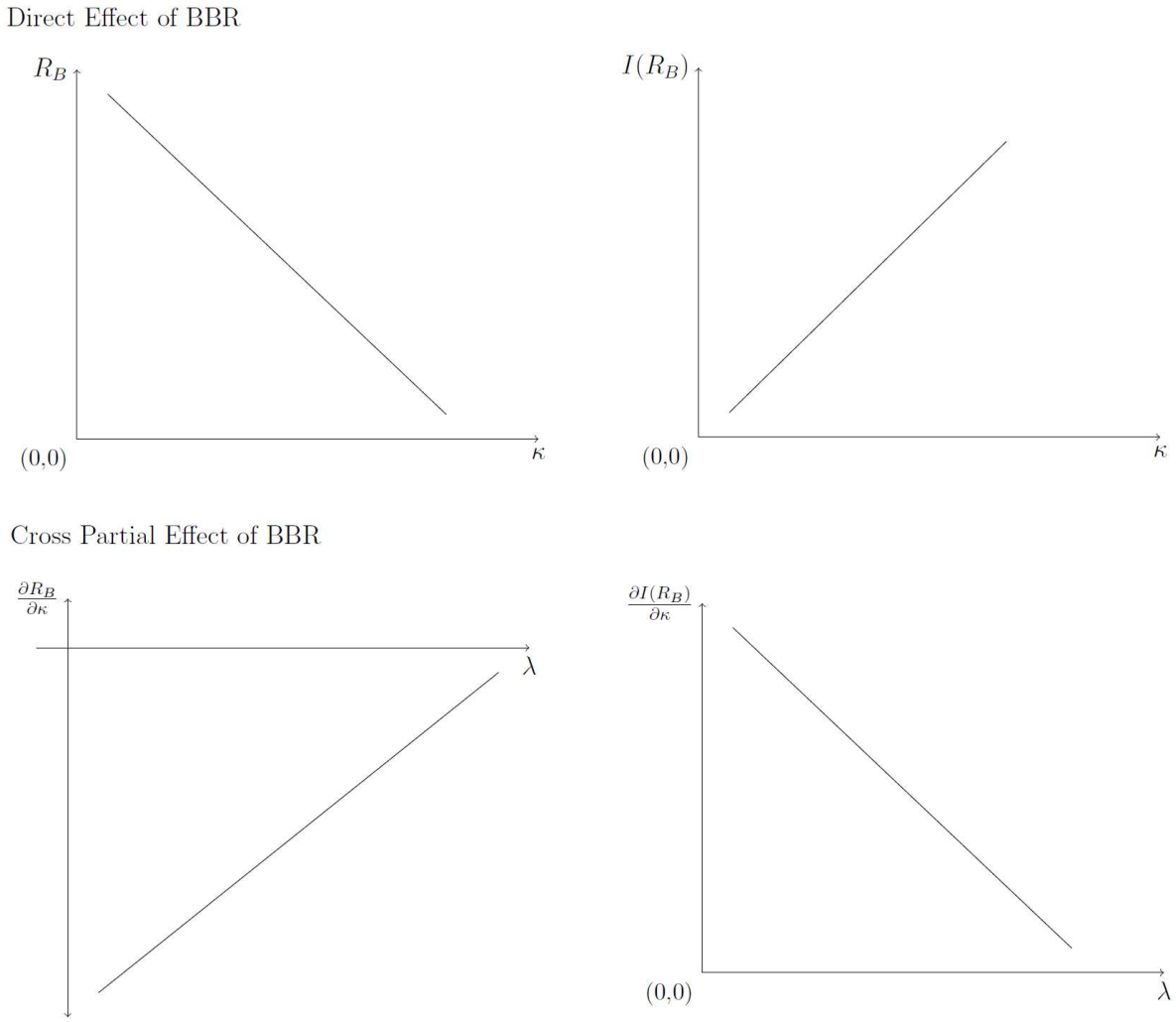
Overview

- The theoretical model is based on two key ingredients:
  1. Brazilian Bankruptcy Reform increased bank's profit
     - it increased recovery rate of secured credit
     - it turned reorganization more efficient: lower probability of default
  2. Banks have some market power in the credit market
     - Current version: no entry (no evidence that BBR leaded to banking entry)
     - Work in progress: switching cost and heterogonous entry cost.
     - References: Klemperer (1987), Kim et al. (2003), Gehrig et al. (2007)

Comparative Statics and Testable Implications

Figures and Intuition

- BBR leaded to a higher $\kappa \in (p, \delta)$



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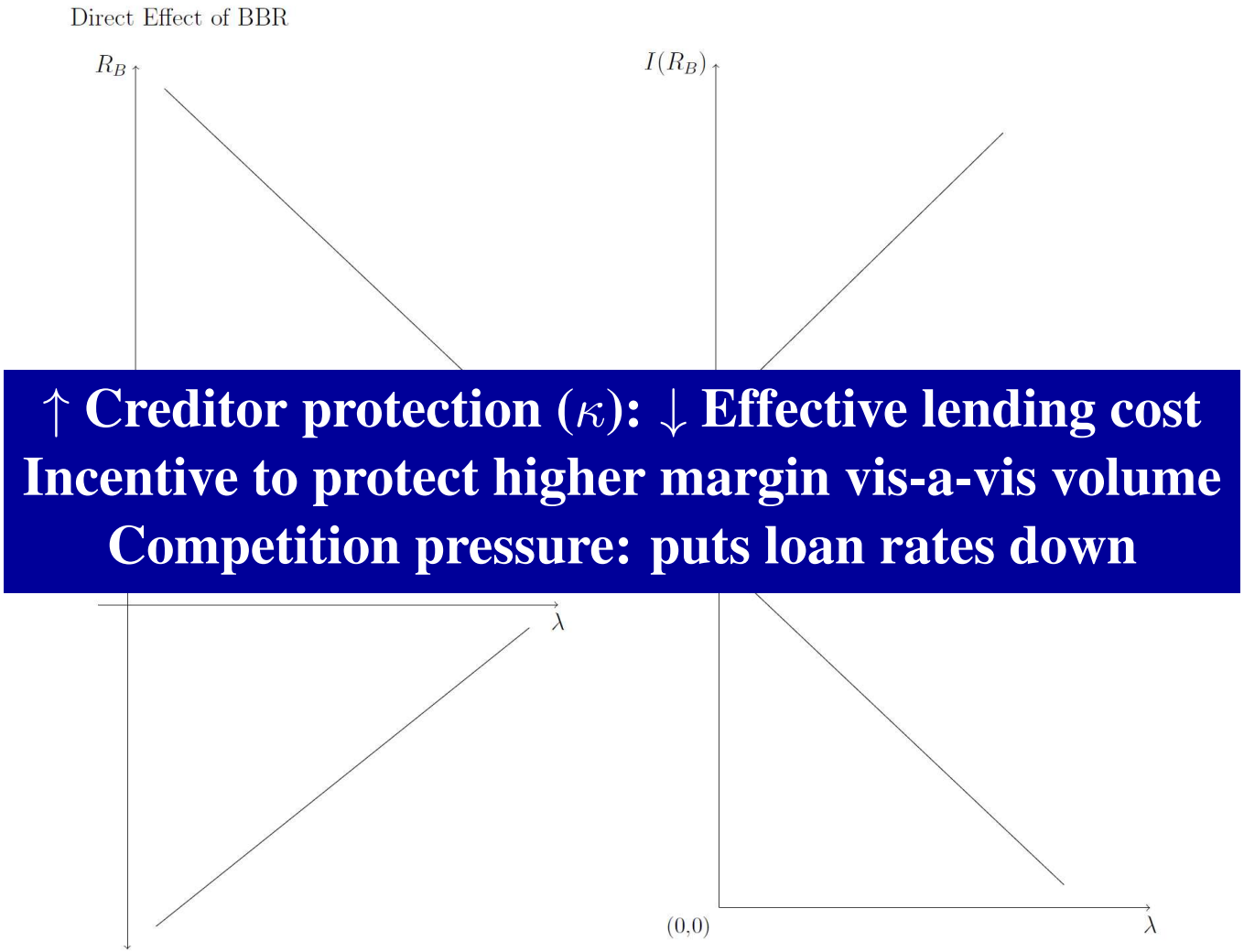


$\uparrow$ Creditor protection (κ): $\downarrow$ Effective lending cost
Incentive to protect higher margin vis-a-vis volume
Competition pressure: puts loan rates down

Database and Descriptive Statistics

- Sources:
  - Credit Information System (SCR): The Central of Brazil (BCB)
    - Our key source of information (contract-level data)
    - information on contract loans above BRL 5,000.00 (USD 2,270.00)
    - not public available (restricted access)
  - Monthly Banking Accounting Data (Cosif): BCB
  - Macroeconomic-financial data (controls): IPEA and BCB
  - Swap Pré-DI rates (for loan spreads): BM&FBovespa

Credit Information System (SCR)

- Period: July 2004 to December 2007 (monthly data)
- Available information: New loan contracts issued every month
  - contracted interest rate, loan size, maturity, contract characteristics (bank, credit line, credit risk, collateral)
- Data restriction:
  - Free lending funds: no compulsory destination
  - Own credit operations: excluded credit operations of intermediaries
  - Prefixed loan rates: loans with pre-determined fixed credit terms
  - Exclusion: real estate and mortage loans, BNDES loans, non-payroll attached loan
- Our observation: Bank-level data - BCB restriction
  - collapsed in the following dimensions: credit line, risk, w/out collateral

Credit lines

- Credit contracts are classified in 10 different credit lines

Description	Number
Overdraft - Consumers	1
Leasing and Goods Financing - Consumers	2
Vehicle Financing - Consumers	3
Loans and Other Credit Lines - Consumers	4
Working Capital; Overdraft and Supplier Financing - Firms	5
Commercial Papers Discount - Firms	6
Leasing and Goods Financing - Firms	7
Vehicle Financing - Firms	8
Loans and Other Credit Lines - Firms	9
Trade Finance: Import and Export - Firms	10

- Each line is also divided in collateralized and non-collateralized lines.

Outcome Variables

- Loan interest rate:
  - bank-month average contracted interest rate of individual credit operations weighted by the size (value) of the credit operations (*CAop*).

$$Y_{blrct} = \frac{\sum_i^I CAop_{iblrct} R_{iblrct}}{\sum_i^I CAop_{iblrct}} \tag{1}$$

- Spread over interbank rate:
  - bank-month average spread over the interbank rate, *IRTS* (same maturity)

$$S_{blrct} = \frac{1 + Y_{blrct}}{1 + IRTS_{WMat_b lrct}}, \tag{2}$$

- Loan size:
  - bank-month average loan size (accounting value)

$$CAop_{blrct} = \frac{\sum_i^I CAop_{iblrct}}{I}. \tag{3}$$

Competition Indicators

- Proxies for competition:
  - Relevant market: competition in each credit line
  - Baseline: credit line, credit risk, collaterized, month, year (finest criteria) .

$$HHI_{lrct} = \sum_{1}^{B} \left(\frac{ContractedCredit_{blrct}}{\sum_{1}^{B} ContractedCredit_{blrct}} \right)^2 \tag{4}$$

  - Extensions: credit line and time (coarser criteria).
  - Other proxies:
    - $C4$: the sum of market share of the first big lenders in a given market
    - MS: the market share of the bank in a given market
    - $H - Statistics$: Panzar-Rosse competition measure in a given credit line

Descriptive Statistics

Outcome variables

Table 7: Descriptive Statistics - Dependent Variables

Variables	Before Bankruptcy Reform					After Bankruptcy Reform				
	Obs	Mean	Sd.Dv.	Min	Max	Obs	Mean	Sd.Dv.	Min	Max
$Y_{b,l,r,c,t}$	6655	0.3614	0.2602	0	1.8127	22590	0.3633	0.2837	0	1.8279
$S_{b,l,r,c,t}$	6620	0.1529	0.2174	-0.1648	1.3905	22402	0.1933	0.2433	-0.1646	1.5238

Table 8: Descriptive Statistics - Dependent Variables (Control group)

Variables	Before Bankruptcy Reform					After Bankruptcy Reform				
	Obs	Mean	Sd.Dv.	Min	Max	Obs	Mean	Sd.Dv.	Min	Max
$Y_{b,l,r,c,t}$	1782	0.4395	0.3115	0	1.7724	7184	0.4711	0.3583	-	1.8261
$S_{b,l,r,c,t}$	1781	0.22	0.2637	-0.1647	1.3202	7142	0.292	0.3101	-0.1644	1.5189

Table 9: Descriptive Statistics - Dependent Variables (Treated group)

Variables	Before Bankruptcy Reform					After Bankruptcy Reform				
	Obs	Mean	Sd.Dv.	Min	Max	Obs	Mean	Sd.Dv.	Min	Max
$Y_{b,l,r,c,t}$	4873	0.3329	0.2323	0	1.8127	15406	0.3131	0.2241	0	1.8279
$S_{b,l,r,c,t}$	4839	0.1281	0.1919	-0.1648	1.3905	15260	0.147	0.1875	-0.1646	1.5238

More Tables

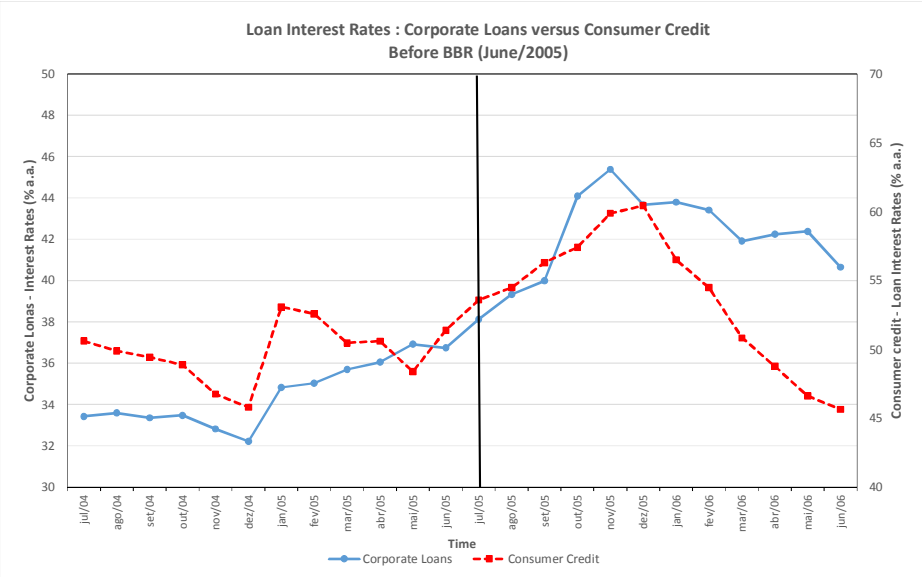
Empirical Strategy

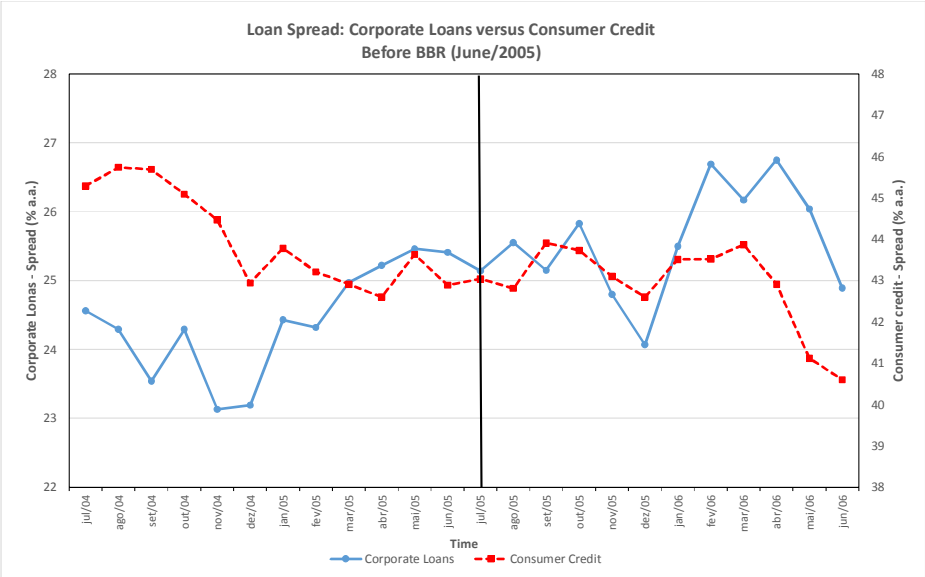
- Modified Differences-in-Differences approach: (triple difference)

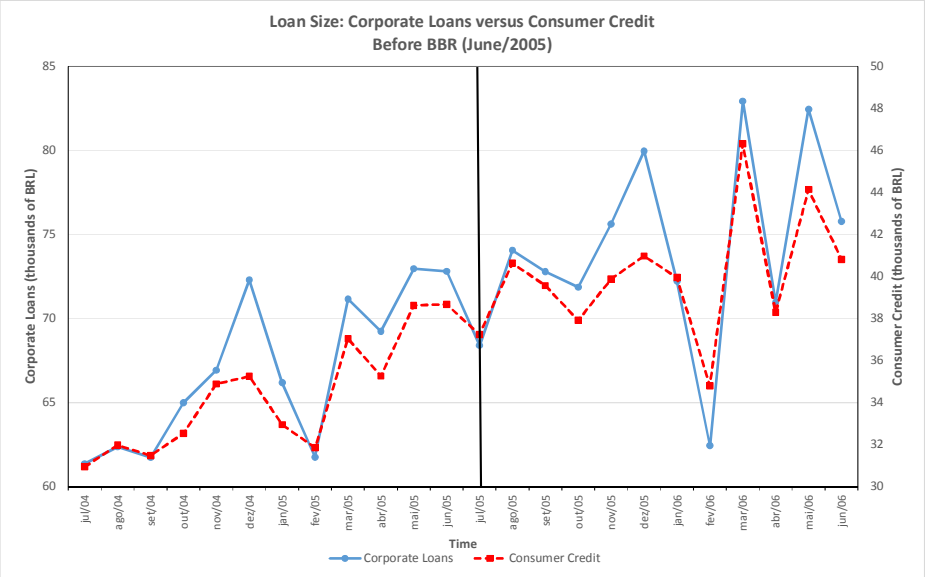
$$
\begin{aligned}
Y_{blrct} \quad = \quad & \beta_0 + \beta_1 \boldsymbol{\Lambda_{lrct}} + \beta_2 \boldsymbol{dmLaw_t} + \beta_3 \underline{\boldsymbol{T_{blrct} dmLaw_t}} + \beta_4 \boldsymbol{\Lambda_{lrct} T_{blrct}} + \beta_5 \boldsymbol{\Lambda_{lrct} dmLaw_t} + \\
& + \beta_6 \underline{\boldsymbol{\Lambda_{lrct} T_{blrct} dmLaw_t}} + \sum_{c=1}^{C} \varphi_c BankControls_{bt} + \sum_{m=1}^{M} \mu_m MacroControls_t + \\
& + \sum_{f=1}^{F} \phi_f dmYear_t + \sum_{h=1}^{H} \phi_h dmMonth_t + \boldsymbol{\eta_{b,l,r,c}} + \varepsilon_{b,l,r,c,t},
\end{aligned}
$$

- $dmLaw_t$: BBR dummy variable (0 before May/2005, and 1, otherwise)
- T_{blrct}: treated-control dummy (1 for treated group, and 0 for control)
  - <u>treated group:</u> corporate loans (without subsided loans)
  - <u>control group:</u> consumer credit loans (without payroll attached credits)
- Market-power "hampering" dummy: $\Lambda_{lrct} T_{blrct} dmLaw_t$ (effect β_6)

Parallel Trends: Treated and Control Groups







Estimation Results and Findings

- Econometric specifications:
  - Model (1): Dif-in-Dif variables, month-year dummies, outliers excluded.
    - Outliers are treated: Hadi (1994) algorithm for loan rates and spreads (1%).
  - Model (2): Dif-in-Dif variables, month-year dummies, with outliers
  - Model (3): Model (1) with controls (bank-specific/macro variables)
  - Model (4): Model (3) with symmetric sample (11 months before and after)

Outlier Sample
Estimations

Main Results

Potential and Net of BBR, and the Hampering Effect

- Potential Effect of BBR: β_3 under perfect competition $HHI = 0$ Estimations
  - Loan Interest Rates: drop $\cong$ 700 basis-points ($\cong$36% a.a. $\rightarrow$ 29% a.a.)
  - Spread: drop $\cong$ 600 basis-points ($\cong$19.06% a.a. $\rightarrow$ 13.06% a.a.)
  - Loan Size: increase $\cong$ 9,000 BRL
- Net Effect of BBR: $\beta_3 + \beta_6 \times HHI_{t \geq June/2005}$
  - Loan Interest Rates: drop $\cong$ 481 basis-points ($\cong$36% a.a. $\rightarrow$ 31.31% a.a.)
  - Spread: drop $\cong$ 436 basis-points ($\cong$19.06% a.a. $\rightarrow$ 14.7% a.a.)
  - Loan Size: increase $\cong$ 7,356 BRL
- Lack of Competition - Hampering Effect: $\beta_6 \times HHI_{t \geq June/2005}$
  - Loan Interest Rates: $\cong$ 219 basis-points ($0.1083 \times 0.202 = 2.19\%$)
  - Spread: $\cong$ 164 basis-points ($0.0812 \times 0.202 = 1.64\%$)
  - Loan Size: $\cong$ 2,140 BRL ($-8,140 \times 0.202 = 1,644$ BRL)
- Bottom Line: Lack of Competition hampers 18.3%-31.3% of the BBR.

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Potential and Net of BBR, and the Hampering Effect

- Potential Effect of BBR: β_3 under perfect competition $HHI = 0$

Estimations

Hampering Effect (HF): Across Credit Lines

- The most competitive credit line: Vehicle Financing ($HHI = 0.14$)
  - Loan Interest Rates: $\cong$ 152 basis-points (HF: 21.7%)
  - Spread: $\cong$ 117 basis-points (HF: 19.5%)
  - Loan Size: $\cong$ 1,139 BRL (HF: 12.7%)
- The least competitive credit line: Loans ($HHI = 0.33$)
  - Loan Interest Rates: $\cong$ 357 basis-points (HF: 50.0%)
  - Spread: $\cong$ 267 basis-points (HF: 44.5%)
  - Loan Size: $\cong$ 2,686 BRL (HF: 30%)

  - Loan Size: $\cong$ 2,140 BRL ($-8,140 \times 0.202 = 1,644$ BRL)

- Bottom Line: Lack of Competition hampers 18.3%-31.3% of the BBR.

Robustness Tests

- Invariance of banking competition to BBR Invariance
- Falsification test
  - Placebo tests Placebo
  - Random assignment of competition measures Random
  - Cluster error at credit line, collateralized and credit risk level
- Other proxies for bank competition Other Proxies
  - Coarse definitions of market power
  - Other proxies for market power

Conclusions and Final Remarks

- Take-Home Message:
  - 2005 Brazilian Bankruptcy Reform (BBR) leaded to lower interest rates (↓ 4% a.a.) and larger size (↑ 7,356 BRL) of corporate loans.
  - Lack of competition in corporate credit market hampered around 18-31 percent of BBR effects on loan interest rates and size (30-50 percent in less competitive credit lines).
- Policy Implication:
  - Potential effects of creditor protection reforms cannot be achieved without competition-enhancing policies in the banking sector
- Further Steps:
  - Model: Switching cost and heterogonous entry cost.
  - More investigation on the invariance of banking competition to BBR
  - Estimation with exclusion of outliers in loan size regressions

Additional Material

Descriptive Statistics

Dif-in-Dif dummy variables

Dummies						
Dummy of BBR	6620	0	0	22402	1.0000	0
Dummy of Treated Group	6620	0.731	0.4435	22402	0.6812	0.466
Dummy of Public Bank	6620	0.1718	0.3772	22402	0.2006	0.4005
Dummy for Collateralized Operations	6620	0.731	0.4435	22402	0.6812	0.466
Interactions						
*Dummy of BBR * Dummy of Treated Group*	6620	0	0	22402	0.6812	0.466
*HHICredit Line, Risk, Collateral * Dummy of Treated Group*	6620	0.179	0.1557	22402	0.1856	0.1834
*HHICredit Line, Risk, Collateral * Dummy of BBR*	6620	0	0	22402	0.2753	0.1605
*HHICredit Line, Risk, Collateral * Dummy of BBR * Dummy of Treated Group*	6620	0	0	22402	0.1856	0.1834

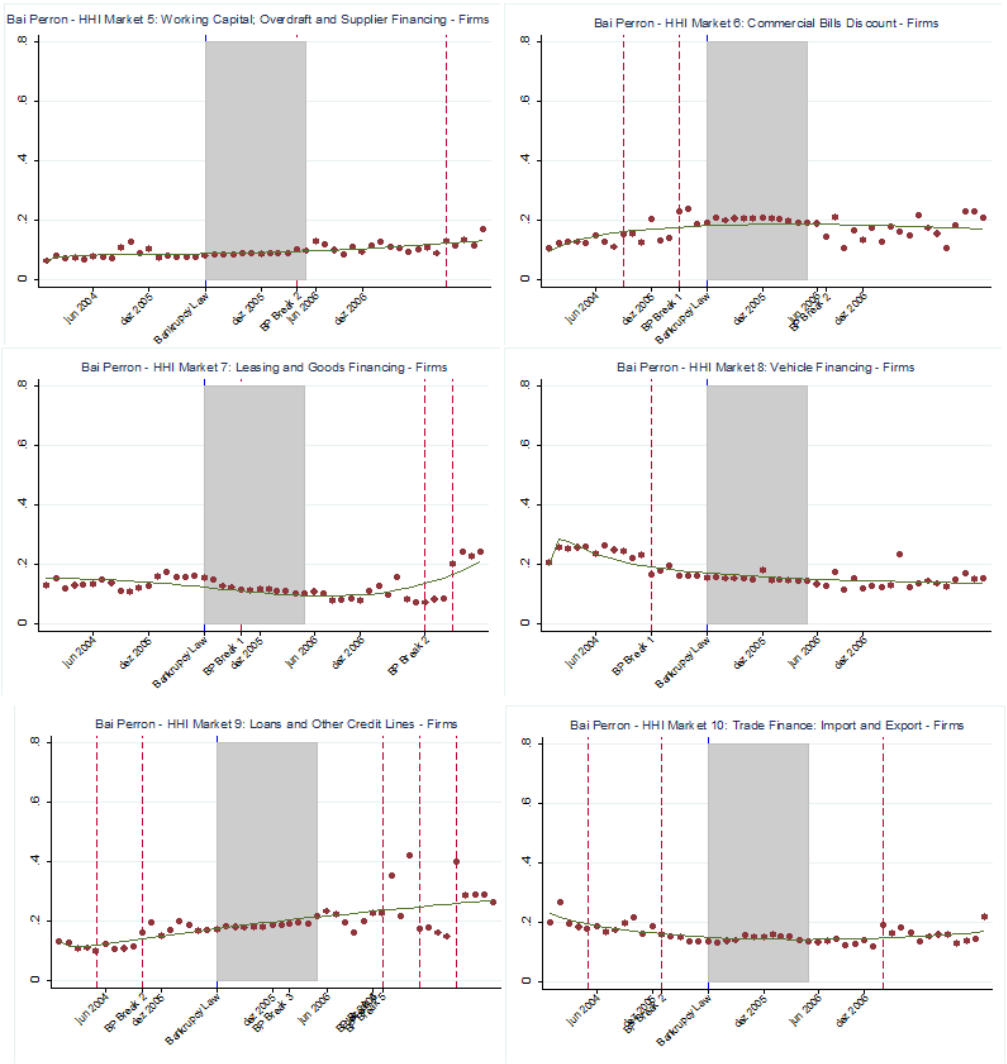
Descriptive Statistics

Control variables

	Before BBR			After BBR		
Control Variables	**Obs.**	**Mean**	**Sd. Dv.**	**Obs.**	**Mean**	**Sd. Dv.**
Market Share - Credit Portfolio	6620	0.0215	0.0337	22402	0.0258	0.0398
$HHI_{CreditLine,Risk,Collateral}$	6620	0.2524	0.1433	22402	0.2753	0.1605
$C4_{CreditLine,Risk,Collateral}$	6620	0.6683	0.2046	22402	0.6899	0.2036
$MkS_{CreditLine,Risk,Collateral}$	6620	0.0841	0.1473	22402	0.0776	0.1448
Interest Rate Term Structure	6620	0.1787	0.0112	22402	0.1407	0.0266
Overnight Interbank Interest Rate	6620	0.1749	0.0138	22402	0.1457	0.0289
Volatility of Overnight Interbank Interest Rate	6620	0.0018	0.0009	22402	0.0013	0.0012
Gross Domestic Product	6620	169.6801	5.8324	22402	206.1822	18.0957
Industrial Production Index	6620	110.6983	6.4425	22402	118.5726	7.9421
Inflation Index	6620	2,399	47.8 898	22402	2,605	69.8346
Basel Capital Index	6614	0.2376	0.23	22400	0.2028	0.1835
Liquidity Index	6108	0.2791	0.1485	20815	0.2772	0.1458
Total Monthly Revenue over Net Capital	6620	0.0575	0.1573	22402	0.0585	0.0734
Total Defaulted Credit Operation	6200	0.0186	0.0561	21696	0.0303	0.1605
Mean Maturity	6620	346.057	368.5779	22402	414.375	430.8747
Net Capital	6620	2.7821	3.9043	22402	4.3234	6.5374

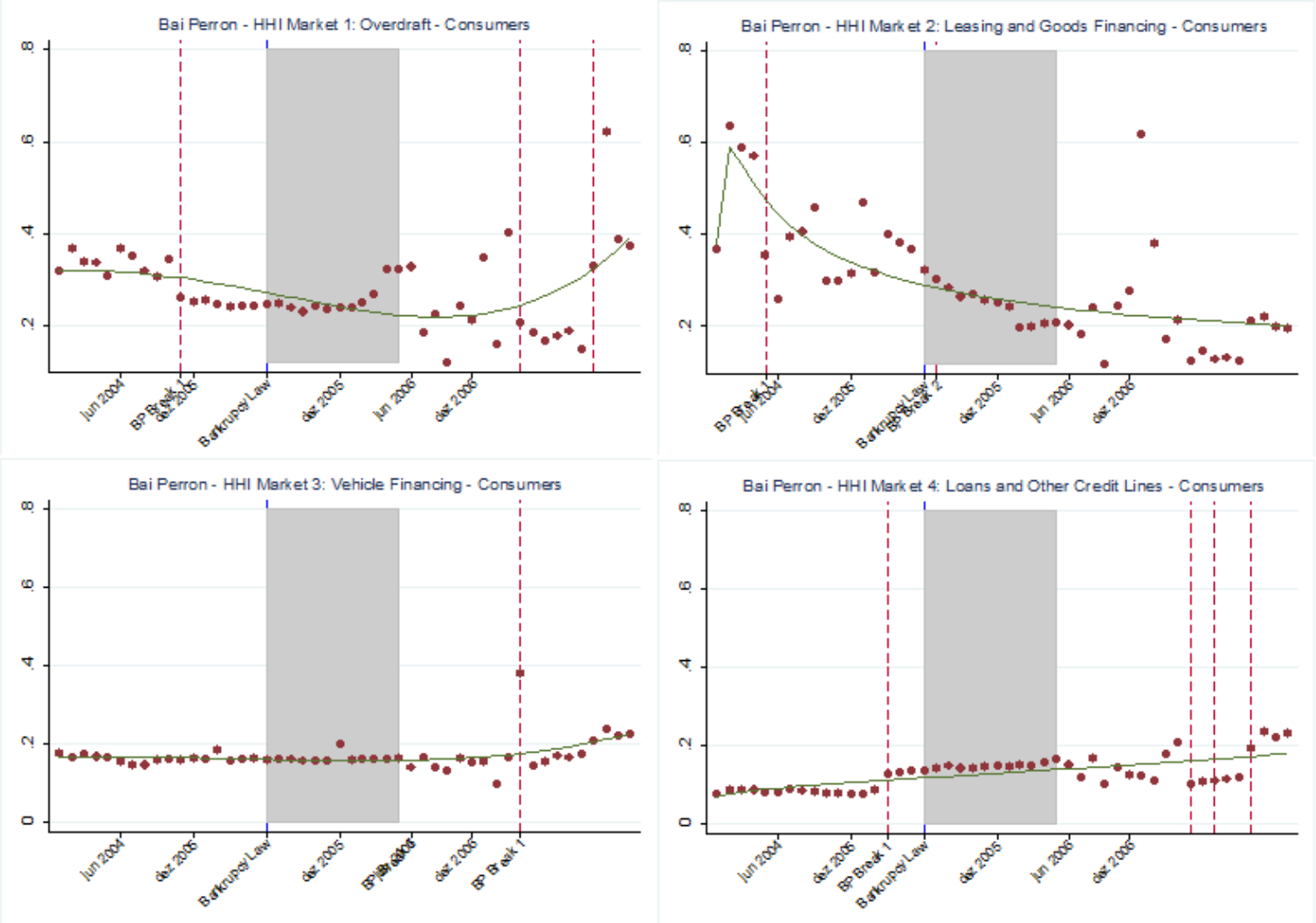
Market Concentration

HHI Structural change analysis: Corporate credit lines



Market Concentration

HHI Structural change analysis: Consumer credit lines



▸ Descriptive Statistics

Outlier Sample

Table 11: Detected outliers on the sample

Variables	**Before Bankruptcy Reform**					**After Bankruptcy Reform**				
	Obs	Mean	Sd.Dv.	Min	Max	Obs	Mean	Sd.Dv.	Min	Max
$Y_{b,l,r,c,t}$	58	2.1549	0.3496	1.8367	3.2441	464	2.6882	0.9501	1.8421	7.9072
$S_{b,l,r,c,t}$	35	1.8047	0.3271	1.381	2.6625	308	2.1301	0.6095	1.4214	6.0057

Specifications

Main Results

Loan Interest Rates

Table 12: Main Results - HHI and Bankruptcy Reform Effect on Mean Interest Rate

	(1)	(2)	(3)	(4)
R-sq: within	0.0311	0.0402	0.0465	0.0453
Test F	F(20,26743)	F(33,23859)	F(33,23555)	F(32,10522)
	42.88	30.3	34.83	15.61
Independent Variables				
β_0	0.2052***	0.7833	0.4531	0.3938
	[0.009]	[0.686]	[0.477]	[1.121]
Market Share - Credit Portfolio	4.0087***	5.2588***	2.0405***	5.1715***
	[0.245]	[0.366]	[0.265]	[0.600]
$HHI_{CreditLine,Risk,Collateral}$	0.0713***	0.1536***	0.0881***	0.0826***
	[0.023]	[0.034]	[0.024]	[0.030]
Dummy of BBR	0.0824***	0.1060***	0.0863***	0.0678***
	[0.008]	[0.013]	[0.009]	[0.012]
Dummy of BBR * Dummy of Treated Group	-0.0707***	-0.0836***	-0.0736***	-0.0708***
	[0.009]	[0.013]	[0.009]	[0.012]
$HHI_{CreditLine,Risk,Collateral}$ * Dummy of Treated Group	-0.0575**	-0.0998**	-0.0621**	-0.0708***
	[0.029]	[0.044]	[0.031]	[0.036]
$HHI_{CreditLine,Risk,Collateral}$ * Dummy of BBR	-0.0960***	-0.2204***	-0.1091***	-0.1328***
	[0.023]	[0.035]	[0.024]	[0.025]
$HHI_{CreditLine}$ * Dummy of BBR * Dummy of Treated Group	0.0925***	0.2020***	0.1083***	0.1307***
	[0.029]	[0.044]	[0.031]	[0.032]

Main Results

Spread over Interbank Rate

Table 13: Main Results - HHI and Bankruptcy Reform Effect on Mean Spread over IRTS

	(1)	(2)	(3)	(4)
N Obs	29,022	26,132	25,800	11,790
R-sq: within	0.0371	0.047	0.0523	0.0581
Test F	F(20,26550)	F(33,23859)	F(33,23555)	F(32,10522)
	51.110	35.680	39.390	20.270
Independent Variables				
β_0	0.0882***	0.7508	0.4398	0.3763
	[0.007]	[0.599]	[0.416]	[0.952]
Market Share - Credit Portfolio	3.5017***	4.6322***	1.7590***	4.4319***
	[0.209]	[0.320]	[0.231]	[0.509]
$HHI_{CreditLine,Risk,Collateral}$	0.0524***	0.1200***	0.0655***	0.0734***
	[0.019]	[0.080]	[0.021]	[0.025]
Dummy of BBR	0.0705***	0.0915***	0.0744***	0.0584***
	[0.007]	[0.011]	[0.008]	[0.010]
Dummy of BBR * Dummy of Treated Group	-0.0664***	-0.0722***	-0.0638***	-0.0610***
	[0.008]	[0.012]	[0.008]	[0.008]
$HHI_{CreditLine,Risk,Collateral}$ * Dummy of Treated Group	-0.0402	-0.0675*	-0.0376	-0.0626**
	[0.025]	[0.038]	[0.027]	[0.030]
$HHI_{CreditLine,Risk,Collateral}$ * Dummy of BBR	-0.0853***	-0.1815***	-0.0868***	-0.1146***
	[0.020]	[0.030]	[0.021]	[0.022]
$HHI_{CreditLine}$ * Dummy of BBR * Dummy of Treated Group	0.0758***	0.1601***	0.0812***	0.1121***
	[0.025]	[0.030]	[0.021]	[0.027]

Main Results

Loan Size (with outliers)

	(1)	(2)	(3)	(4)
R-sq: within	0.0287	0.0574	0.0566	0.0686
Test F	F(20,26743)	F(33,23555)	F(33,23859)	F(32,10522)
	39.470	43.490	43.370	24.220
Independent Variables				
	24.5279***	-2.6759	6.2030	165.5696
β_0	[2.503]	[132.135]	[130.580]	[281.560]
	(0.000)	(0.984)	(0.962)	(0.557)
	-393.9715***	-619.7218***	-635.4845***	46.0910
Market Share - Credit Portfolio	[71.901]	[73.354]	[69.795]	[150.675]
	(0.000)	(0.000)	(0.000)	(0.760)
	-0.3497	-0.2849	-0.1236	1.9331
$HHI_{CreditLine,Risk,Collateral}$	[6.620]	[6.654]	[6.506]	[7.459]
	(0.958)	(0.966)	(0.985)	(0.796)
	-7.7331***	-5.8297**	-5.7529**	-1.3178
Dummy of BBR	[2.325]	[2.523]	[2.492]	[3.097]
	(0.001)	(0.021)	(0.021)	(0.671)
	8.5815***	9.2331***	9.1169***	-2.1521
Dummy of BBR * Dummy of Treated Group	[2.617]	[2.568]	[2.540]	[2.453]
	(0.001)	(0.000)	(0.000)	(0.380)
	44.5477***	47.3016***	46.8313***	46.5028***
$HHI_{CreditLine,Risk,Collateral}$ * Dummy of Treated Group	[8.459]	[8.465]	[8.327]	[8.941]
	(0.000)	(0.000)	(0.000)	(0.000)
	3.3293	3.6863	3.5448	-1.5168***
$HHI_{CreditLine,Risk,Collateral}$ * Dummy of BBR	[6.756]	[6.728]	[6.595]	[6.395]
	(0.490)	(0.550)	(0.540)	-(0.240)
	-4.2503	-8.4554	-8.1399	13.9792*
HHICredit Line, Risk, Collateral * Dummy of BBR * Dummy of Treated Group	[8.530]	[8.485]	[8.359]	[7.938]
	(0.618)	(0.319)	(0.330)	(0.078)

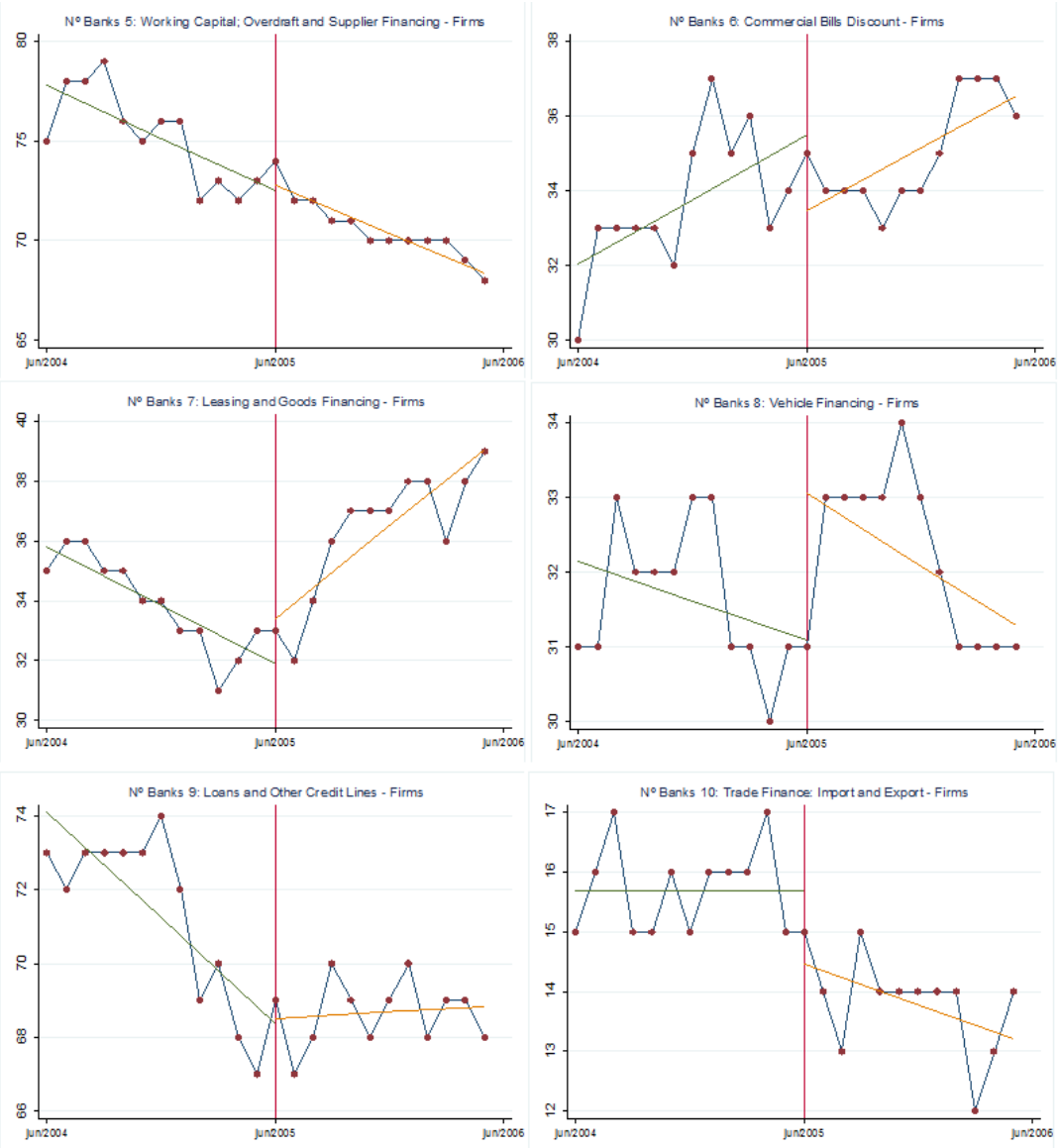
Main Results

Invariance of Banking Competition to BBR

- Potential Concerns:
  - The increase in banking rents/ profits created by BBR may have leaded to banking entry in more protected credit lines
  - It could have created more competition in those credit lines
- Two strategies to deal with them:
  - No structural changes: Number of banks, HHI in credit lines
  - Pre-treatment market power

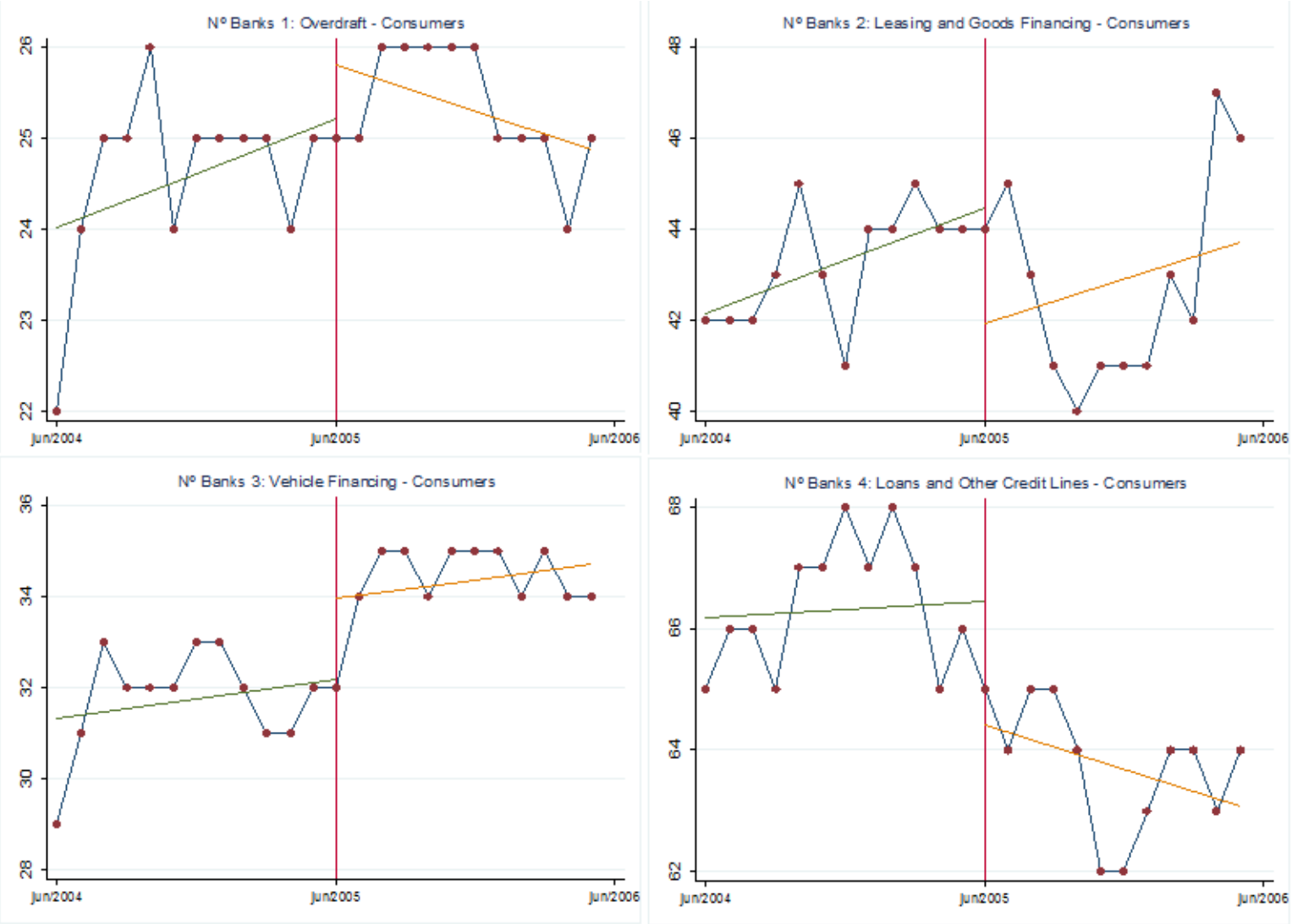
Invariance of Banking Competition to BBR

Number of Banks: Corporate credit lines



Invariance of Banking Competition to BBR

Number of Banks: Consumer credit lines



Invariance of Banking Competition to BBR

Constant Market Power Test

- We use pre-treatment level of competition.
  - HHI is freezed at the one month before the BBR became effective.

$$\widetilde{\Lambda}_{lrct} = \begin{cases} \Lambda_{lrct}, & \text{if } t < May/2005 \\ \Lambda_{lrcMay/2005}, & \text{if } t \geq May/2005 \end{cases}$$

- Results are similar (quali-quantitatively)

Constant Market Power Test

Loan Interest Rates

Table 24: Robustness - Constant Market Power - Interest Rate as Dependent Variable

	(1)	(2)	(3)	(4)
R-sq: within	0.0314	0.0402	0.0465	0.0379
Test F	F(20,26438)	F(33,23600)	F(33,23301)	F(32,16928)
	42.900	29.900	34.460	20.830
Independent Variables				
β_0	0.2204***	0.6545	0.4314	2.0394***
	[0.009]	[0.682]	[0.476]	[0.636]
Market Share - Credit Portfolio	3.9853***	5.2740***	2.0100***	1.5342***
	[0.245]	[0.363]	[0.264]	[0.321]
$HHICons_{CreditLine,Risk,Collateral}$	-0.0622	0.2015***	-0.0342	-0.0294
	[0.039]	[0.061]	[0.044]	[0.023]
Dummy of BBR	0.0948***	0.0938***	0.0945***	-0.0213*
	[0.009]	[0.014]	[0.010]	[0.012]
Dummy of BBR * Dummy of Treated Group	-0.0813***	-0.0680***	-0.0788***	0.0045
	[0.009]	[0.014]	[0.010]	[0.012]
$HHICons_{CreditLine,Risk,Collateral}$ * Dummy of Treated Group	0.0636	-0.1611**	0.0484	0.0880***
	[0.045]	[0.070]	[0.049]	[0.029]
$HHICons_{CreditLine,Risk,Collateral}$ * Dummy of BBR	-0.1553***	-0.1768***	-0.1504***	0.0112
	[0.027]	[0.039]	[0.027]	[0.023]
$HHICons_{CreditLine,Risk,Collateral}$ * Dummy of BBR * Dummy of Treated Group	0.1449***	0.1439***	0.1381***	-0.0412
	[0.032]	[0.047]	[0.033]	[0.028]

Constant Market Power Test

Spread over Interbank Rate

Table 25: Robustness - Constant Market Power - Spread over IRTS as Dependent Variable

	(1)	(2)	(3)	(4)
R-sq: within	0.0388	0.048	0.0541	0.0379
Test F	F(20,26261)	F(33,23600)	F(33,23301)	F(32,16928)
	53.070	36.070	40.370	20.830
Independent Variables				
β_0	0.1016***	0.6402	0.4226	2.0394***
	[0.008]	[0.596]	[0.416]	[0.636]
Market Share - Credit Portfolio	3.4842***	4.6484***	1.7353***	1.5342***
	[0.209]	[0.318]	[0.230]	[0.321]
$HHICons_{CreditLine,Risk,Collateral}$	-0.0631*	0.1590***	-0.0417	-0.0294
	[0.033]	[0.053]	[0.038]	[0.023]
Dummy of BBR	0.0801***	0.0809***	0.0815***	-0.0213*
	[0.007]	[0.012]	[0.008]	[0.012]
Dummy of BBR * Dummy of Treated Group	-0.0749***	-0.0583***	-0.0679***	0.0045
	[0.008]	[0.012]	[0.008]	[0.009]
$HHICons_{CreditLine,Risk,Collateral}$ * Dummy of Treated Group	0.0645*	-0.1201**	0.0581	0.0880***
	[0.038]	[0.061]	[0.043]	[0.029]
$HHICons_{CreditLine,Risk,Collateral}$ * Dummy of BBR	-0.1328***	-0.1435***	-0.1220***	0.0112
	[0.023]	[0.034]	[0.024]	[0.023]
$HHICons_{CreditLine,Risk,Collateral}$ * Dummy of BBR * Dummy of Treated Group	0.1189***	0.1086***	0.1058***	-0.0412
	[0.028]	[0.042]	[0.029]	[0.028]

Robustness

Falsification Tests

Placebo tests

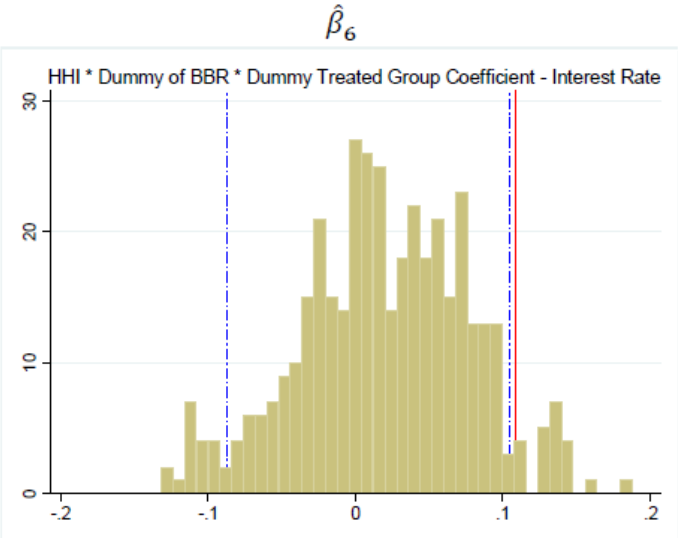
- False Months: BBR was implemented
- We replaced event-dummy $dmLaw_t$ by 6 month, 9 months (before and after the law)
- Estimated coefficients for any placebo and its interactions (including β_3, β_6) are not significant (unstable point estimations)

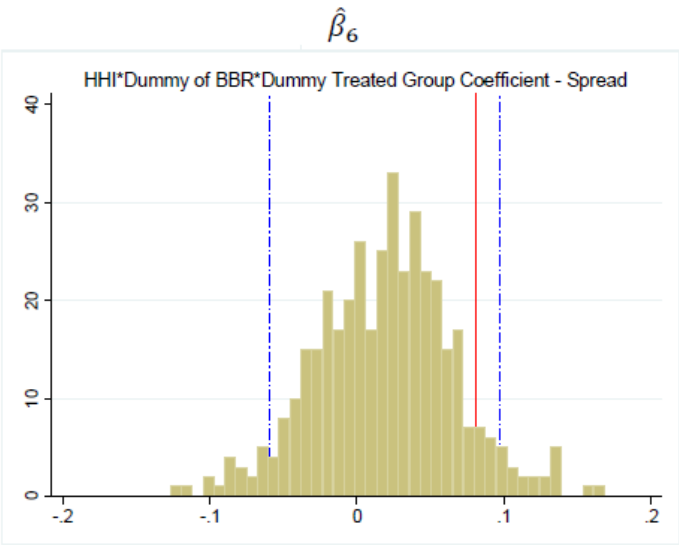
Robustness

Falsification Tests

Random assignment of competition measures

- We randomly switched the HHI between observations (400 draws)
- Estimated 400 regressions to obtain a distribution of estimated coefficients
- We expect that the estimated coefficients (mainly, β_6) remain statistically significant in the simulated confidence interval (90%-95%).





- <u>Do list:</u> to increase the number of simulations.

▸ Robustness

Other proxies for bank competition

- Coarse definitions of market power
  - *HHI* is computed at credit line level (credit line, month-year)
  - Results are similar (hampering effect 37%)
- Other proxies for market power/competiton
  - $C4_{lrct}$: the sum of market share of the first four big lenders
  - MS_{blrct}: the market share of the bank
  - $H - Statistics_{lt}$: Panzar-Rosse competition measure
  - Results are similar (hampering effect: 30%-60%)

Robustness