Loss of a Lending Relationship: Pain or Relief?

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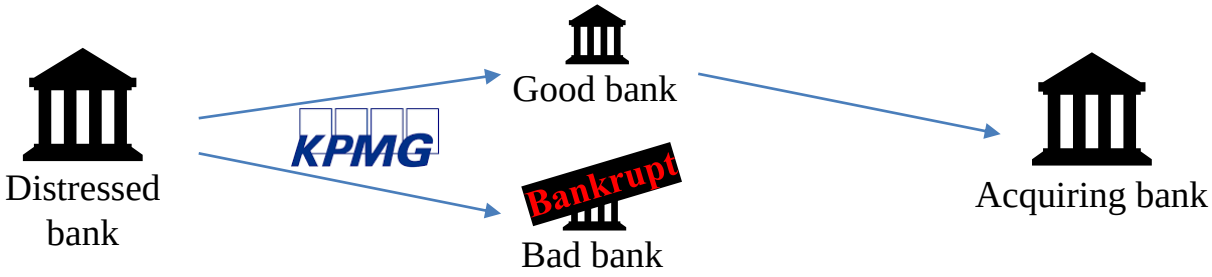
Motivation

- The 2007-9 financial crisis exposed the importance of firm-bank relationships
- During the crisis, lending relationships helped firms access credit
  - Gobbi and Sette (2015); Bolton, Freixas, Gambacorta and Mistrulli (2016); Beck, Degryse, Haas and van Horen (2017)
- But relationships with severely hit banks were less helpful
  - Stressed banks cut lending (Ivashina and Scharfstein, 2010) and raised interest rates (Santos, 2011)
- And due to a stickiness of relationships, firms stuck with bad banks were forced to:
  - Lay off staff (Chodorow-Reich, 2014), Cut investment (Carvalho, Ferreira and Matos, 2015), and even shut down (Jiménez, Ongena, Peydró, and Saurina, 2017)
- Theoretical literature explains why switching is costly (information asymmetries)
  - Sharpe (1990); Rajan (1992); Von Thadden (2004); Bolton, Freixas, Gambacorta and Mistrulli (2016)
- Hold-up is reduced by transparency among banks (e.g. via credit bureaus)
  - Padilla and Pagano (1997); Jappelli and Pagano (2002)

This paper

- Research question – how large are firms' bank-switching costs? Do banks exploit these switching costs? What causes these switching costs (e.g. shoe-leather costs, lack of bank-bank or bank-firm transparency)?
- We contribute to the literature by providing novel identification and estimation of firms' hold-up and switching costs
- Using an exhaustive credit register from Bank of Lithuania
  - Quarterly data (2011 – 2018) on all loans (190,728) between all, **including small**, firms (35,905) and all banks (12)
  - **Interest rates**, loan amounts, maturities, collaterals, loan types, firms' industries, repayment delays
- Simultaneous closures of two banks in 2013 q1 exogenously forced firms to switch
  - A healthy bank left the market (due to its parent's strategic decision to optimize costs)
  - A financially distressed bank was shut down (due to the uncovered misreporting of assets)



Main findings

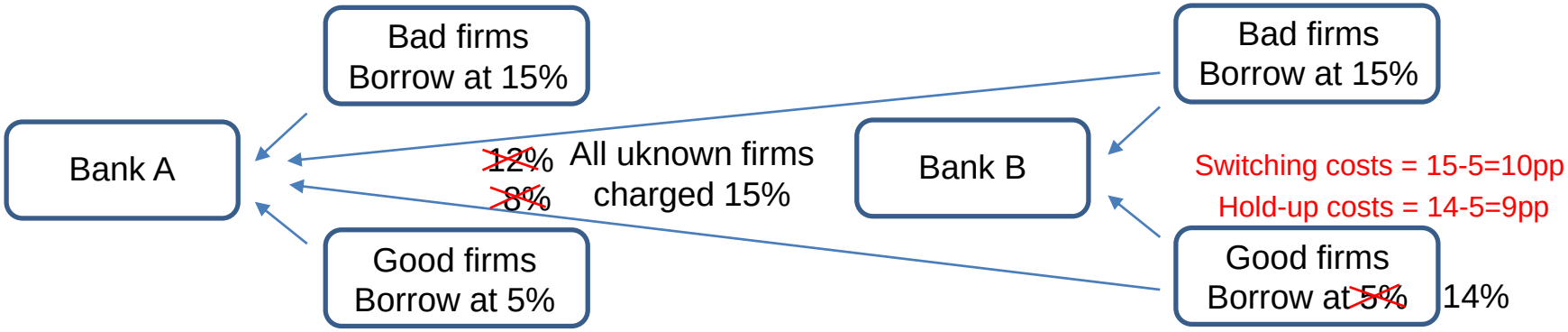
- Closure of the healthy bank did not affect its customers' borrowing costs
- Closure of the financially distressed bank reduced its customers' borrowing costs by 1.1 percentage point, which immediately converged to the market's average
- Especially large drop (3.5 percentage points) for firms lacking other lending relationships
- But smaller for firms with very long (>6 years) relationships

Outline

- Theoretical framework
- Data, institutional setting and shocks
- Results
- Endogeneity concerns
- Conclusions and contribution to the literature

Theoretical framework

- Repeated interactions reduce asymmetric information between firms and banks (e.g. Diamond, 1984)
- Firm-bank relationships create interbank information asymmetries
- This leads to an adverse selection of firms willing to switch banks and makes switching costly for good quality firms (Sharpe, 1990; Rajan, 1992; Von Thadden, 2004)



- Whether or not banks exploit these switching costs depends on their concerns about reputation (Sharpe, 1990)
- Financially distressed banks are less likely to care about their reputation (Boot, Greenbaum and Thakor, 1993)

Data

- Quarterly loan-level data from 2011 Q4 to 2018 Q1 (some info pre-2011)
- Variables: quarter, firm id, bank id, loan id, loan type, industry, loan outstanding amount, interest rate, collateral value, loan initiation date, loan maturity date, indicator of late repayment

Firms' industry	Manufacturing	Retail/Wholesale	Transportation	Other	Total
Number of firms	3,730	9,207	4,209	18,759	35,905
Number of firms without delayed repayments between 2011-2018	2,977	7,758	3,356	15,855	29,946
Number of firms with delayed repayments between 2011-2018	753	1,449	853	2,904	5,959
Percentage of firms with delayed repayments between 2011-2018	20%	16%	20%	15%	17%
Firm size (proxied as total debt to banks), average	1,633,159	818,025	912,740	1,605,811	1,325,397
25th percentile	25,162	19,720	26,341	12,200	16,492
median	97,476	57,924	86,440	40,000	52,896
75th percentile	437,597	228,600	303,427	200,417	246,129
Number of firms at the beginning of the sample - 2011Q4	2,073	4,684	2,161	8,348	17,266
Firm size (proxied as total debt to banks) at 2011Q4, average	1,143,963	609,510	643,322	1,215,557	970,929
25th percentile	27,239	20,273	33,819	14,771	19,028
median	101,348	57,784	101,367	44,779	59,923
75th percentile	434,430	225,705	322,799	257,414	275,412
Number of firms with a single relationship at 2011Q4*	1,446	3,514	1,512	6,858	13,330
Number of firms with multiple relationships at 2011Q4*	627	1,170	649	1,490	3,936
Number of firms with short (average<6y) relationships at 2011Q4*	1,267	3,054	1,499	5,933	11,753
Number of firms with long (average>6y) relationships at 2011Q4*	806	1,630	662	2,415	5,513

*a firm is said to have a relationship with a bank if it had some outstanding debt with that bank within the previous 12 months

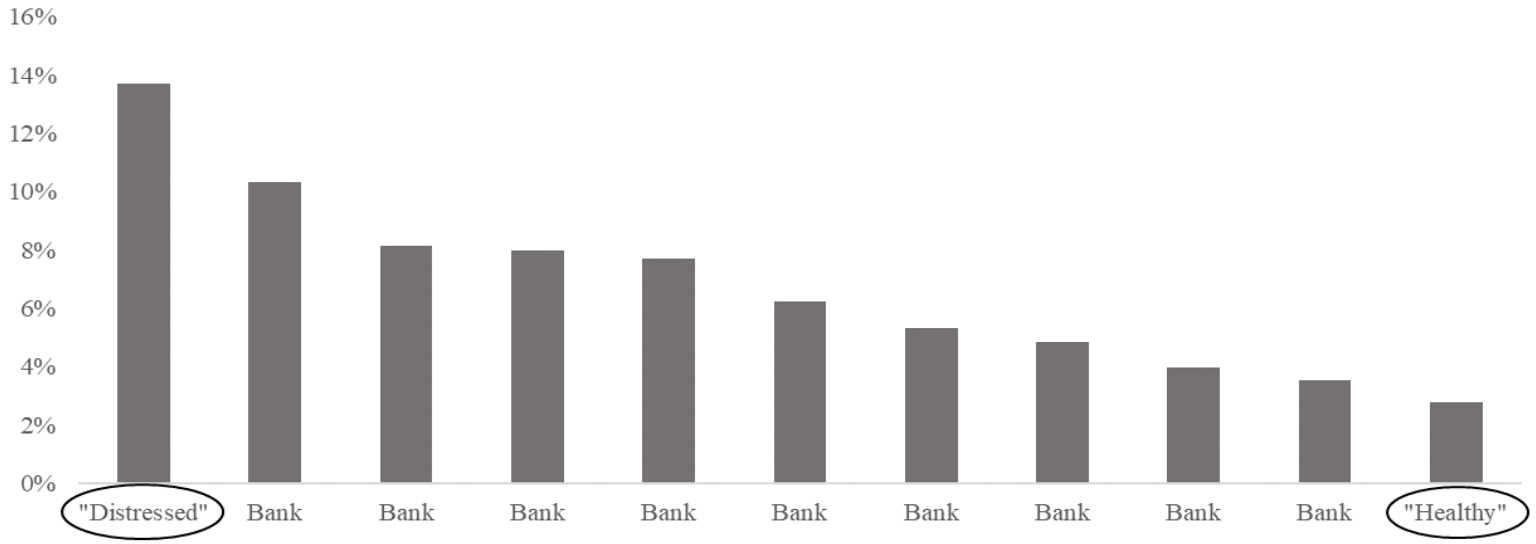
Institutional setting

- Concentrated banking market: 5 (of 12) largest banks were Scandinavian and held 82% of corporate loans' amount (2011 Q4)
- Firms rely on banks: EUR 16.8 b debt to banks; EUR 3.1 b – stock market capitalization; EUR 1.3 b - publicly traded corporate bonds (2011 Q4)
- Lithuanian economy in 2011 sharply recovered:
  - GDP growth of 6%,
  - Banks' profits almost reached a record-high pre-crisis level
- Interest rates were declining, following the expansionary monetary policies of the European Central Bank
- Transparency provided by the credit bureau: detailed ten-year-history of firms' current and expired debt contracts.

Closures of the banks

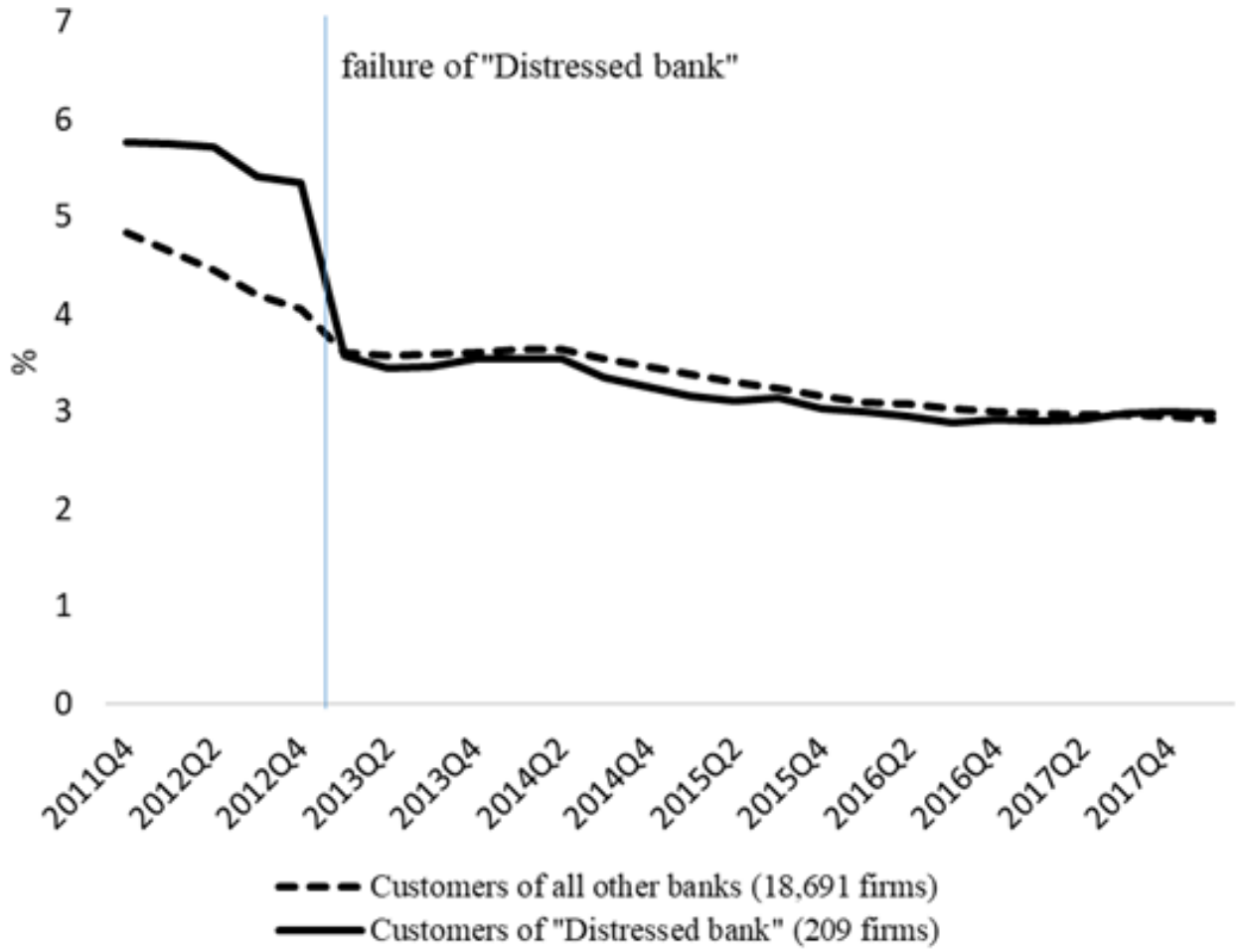
- The “Healthy bank”:
  - 8th largest corporate loans’ portfolio
- The “Distressed bank”:
  - 6th largest corporate loans’ portfolio

Proportion of each bank’s customers with delayed repayments in 2012

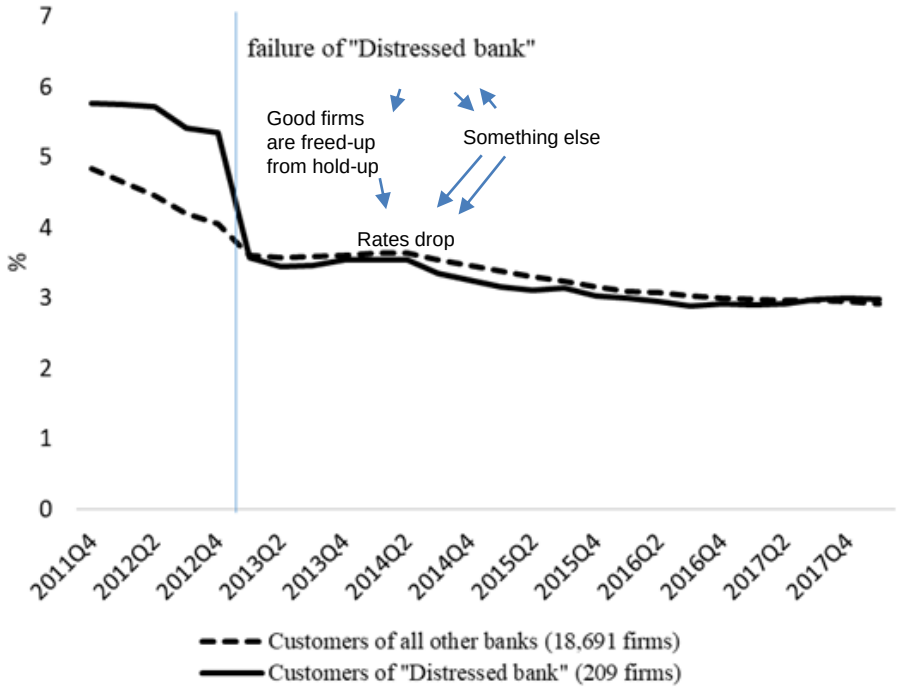


Results: Change of borrowing costs

Average borrowing costs

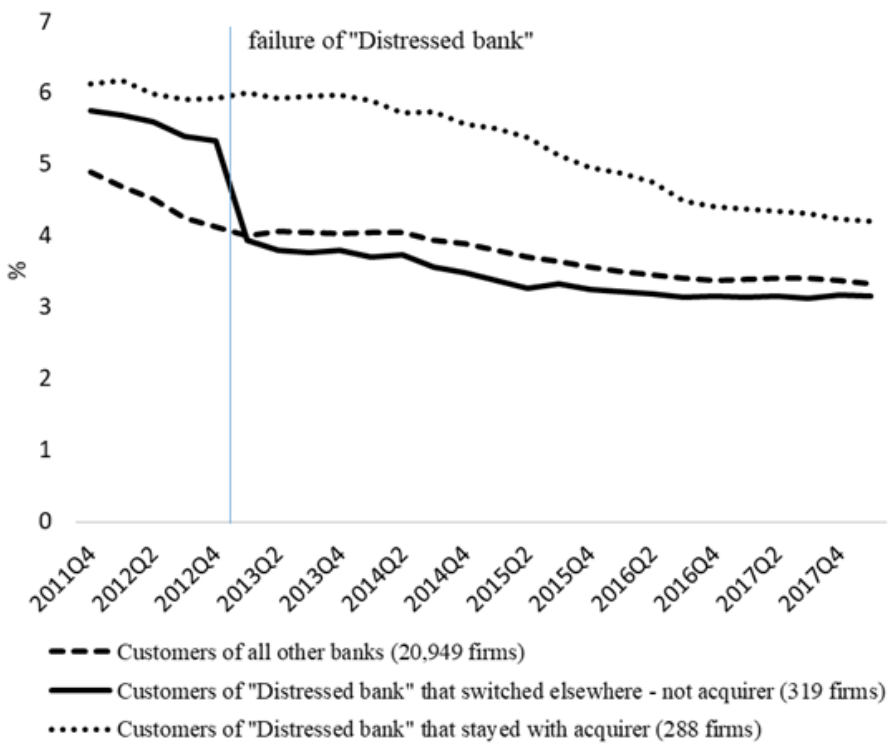


Remaining endogeneity concerns



1. Deterioration (or realization) of firms' quality caused the bank's closure and affected the rates
   - It should affect rates upwards, not downwards
2. Bank's closure raised doubts about quality of "good firms" and affected their loan rates
   - It should affect rates upwards, not downwards so we are underestimating the negative impact
3. Bank's closure made an auditor review assets and stamp firms as "good" and "bad", and this affected their loan rates
   - It took 3 weeks after the closure for the auditor to split the firms. Firms that switched within those 3 weeks show the same drop
4. Bank's closure made another bank buy the "good" portfolio, and the pricing strategy of this bank affected rates
   - We are looking only at those firms which switched to other banks and not the acquiring bank
5. Bank's closure forced firms to switch but only good firms could switch – this affected the observed average of rates
   - We compare only those firms which appear both before and after the closure. Also, we are primarily interested in the good firms anyway, because they are affected by hold-up. We include medium firms for robustness
   - Reverse causality between quality and switching does not sound plausible

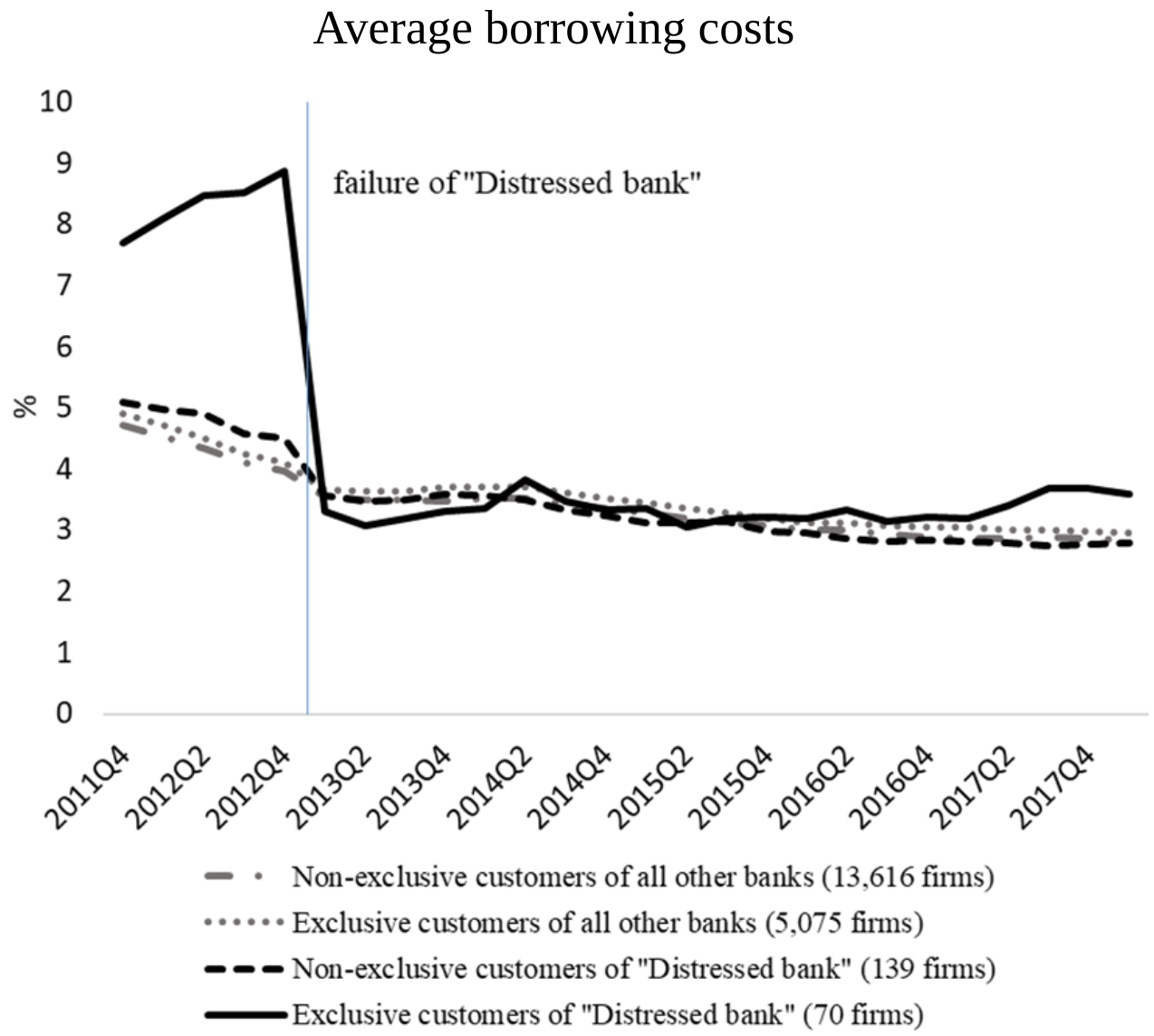
Remaining endogeneity concerns



6. Other (shoe-leather) switching costs responsible
   - But then bad firms would have been also exploited
7. Other banks required more collateral (or lent with different maturities or loan sizes), and thus could lend cheaper
   - The same diff-in-diff analyses for other loan characteristics give no significant results
8. Old loans are driving the results
   - Results are significant when using only newly issued loans in every quarter
9. Market concentration changed
   - If both the control and the treatment groups are affected by a change in competition equally, it doesn't matter
   - According to Klemperer (1987) free (not locked-in) firms, i.e. our treatment group, are affected by competition more. Thus we might underestimate the effect of relationship break-up

Results are robust when using separately leasing contracts and term loans, and the acquiring bank as a control group

Results: Change of borrowing costs



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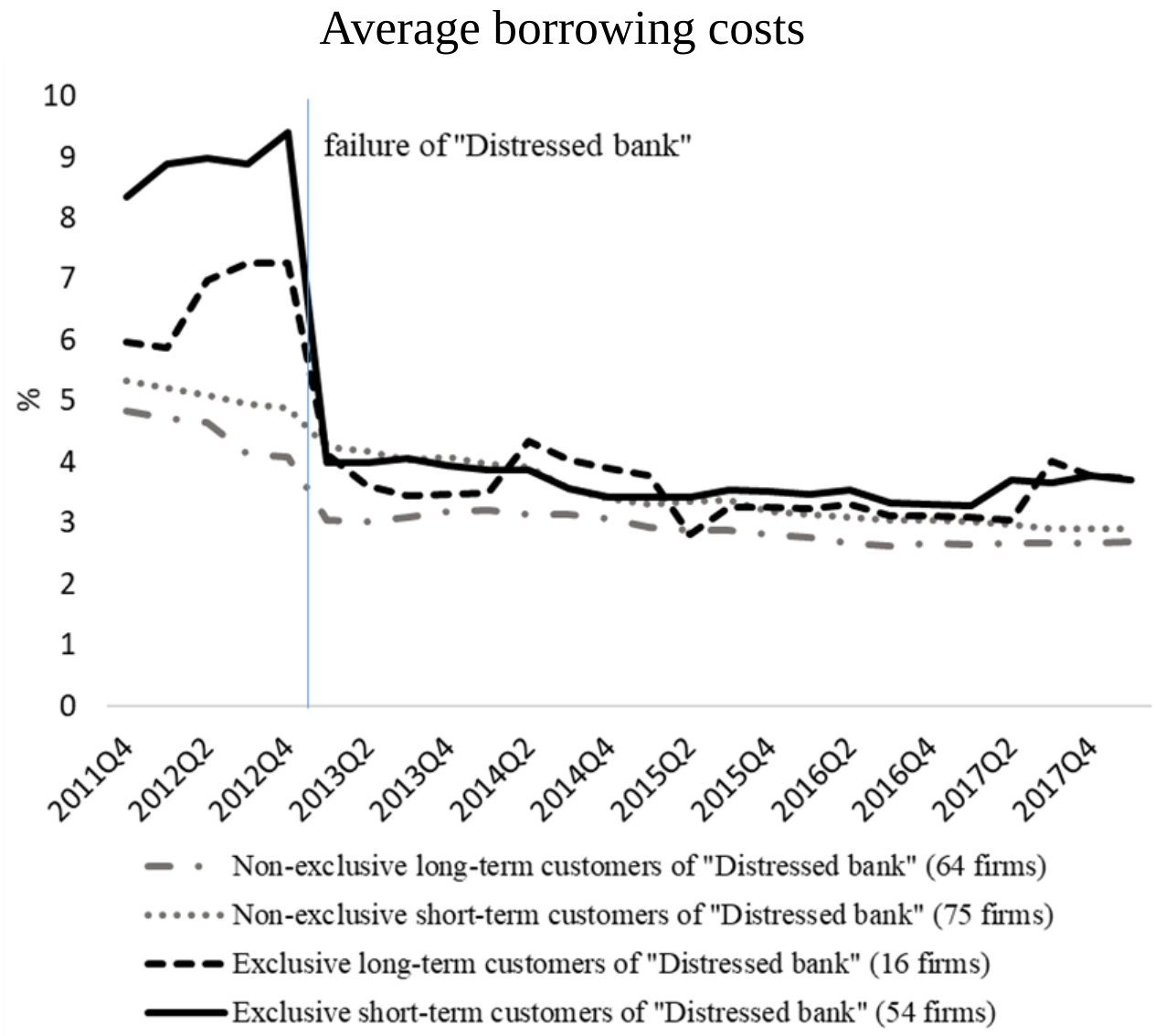

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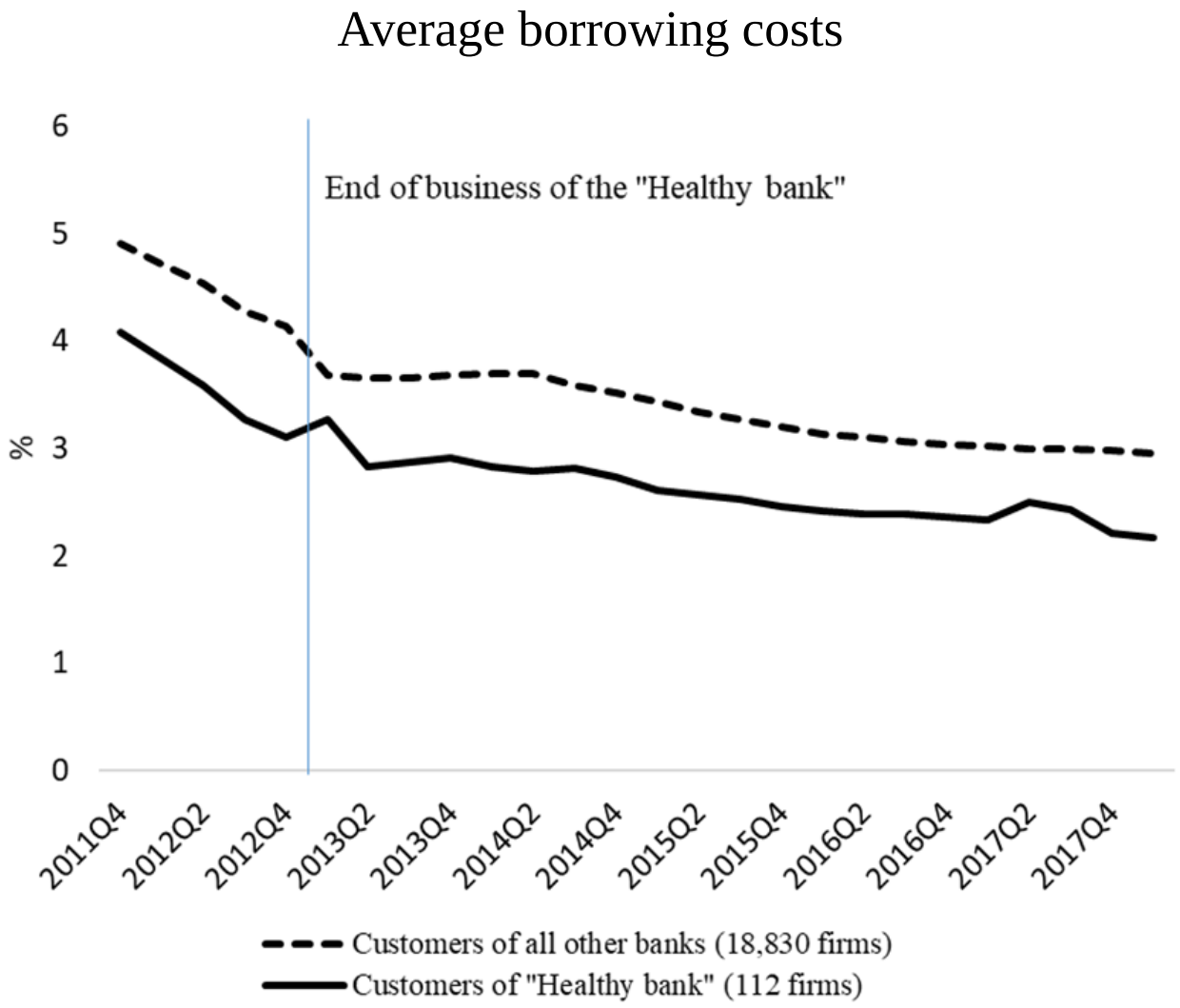

Do rates really drop? Methodology

Difference-in-difference

$$borrowing\_costs_{f,q} = \beta_0 + \beta_1 * after_q + \beta_2 * closed_f + \beta_3 * closed_f * after_q + \varepsilon_{f,q}$$

- Where $borrowing\_costs_{f,q}$ is an average interest rate weighted by loan outstanding amounts in quarter q for firm f
- $after_q$ is a dummy variable equal to 1 if the quarter q is equal to or larger than 2013 q1 and zero otherwise
- $closed_f$ is a dummy variable equal to 1 if firm f was in a treatment group, i.e. a customer of the closed bank "Bank 2", and zero if firm f was in a control group

$$borrowing\_costs_{f,q} = \beta_0 + \beta_1 * after_q + \beta_2 * closed_f + \beta_3 * exclusive_f + \beta_4 * closed_f * after_q + \beta_5 * closed_f * exclusive_f + \beta_6 * exclusive_f * after_q + \beta_7 * closed_f * exclusive_f * after_q + \varepsilon_{f,q}$$

- Where $exclusive_f$ is a dummy variable equal to 1 if firm f is a customer of only one bank and zero otherwise

Do rates really drop? Results

"Distressed" bank

	Dependent variable: borrowing_costs					
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
after	-0.989***		-0.787***		-0.429**	
	(0.000)		(0.000)		(0.013)	
closed	1.174***		0.481***		0.510***	
	(0.000)		(0.000)		(0.002)	
exclusive			0.158***		0.242***	
			(0.000)		(0.000)	
short_term					0.853***	
					(0.000)	
closed x after	-1.420***	-1.096***	-0.955***	-0.498***	-1.209***	-0.606***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
after x closed x exclusive			-2.536***	-2.978***	-0.722	-0.312
			(0.001)	(0.000)	(0.511)	(0.688)
after x closed x exclusive x short_term					-2.758**	-3.685***
					(0.038)	(0.002)
Constant	4.431***	3.584***	4.325***	3.601***	3.971***	3.652***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm-fixed effects		YES		YES		YES
Quarter-fixed effects		YES		YES		YES
Number of observations	232,819	232,819	232,819	232,819	232,819	232,819
Adjusted R-squared	0.043	0.808	0.052	0.809	0.059	0.811

P-values in parentheses. Standard errors are clustered multiway within firms and quarters

*** p<0.01, ** p<0.05, * p<0.1

Do rates really drop? Results

"Healthy" bank

	Dependent variable: borrowing_costs					
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
after	-1.026***		-0.849***		-0.490***	
	(0.000)		(0.000)		(0.005)	
closed	-0.918***		-0.950***		-1.082***	
	(0.000)		(0.000)		(0.000)	
exclusive			0.123***		0.175***	
			(0.004)		(0.000)	
short_term					0.840***	
					(0.000)	
closed x after	0.018	0.106	-0.129	0.152	-0.392***	0.130
	(0.899)	(0.466)	(0.445)	(0.370)	(0.005)	(0.371)
after x closed x exclusive			0.139	-0.304	0.089	-0.540
			(0.634)	(0.292)	(0.858)	(0.200)
after x closed x exclusive x short_term					-0.093	0.378
					(0.886)	(0.524)
Constant	4.476***	3.572***	4.394***	3.584***	4.040***	3.639***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm-fixed effects		YES		YES		YES
Quarter-fixed effects		YES		YES		YES
Number of observations	234,219	234,219	234,219	234,219	234,219	234,219
Adjusted R-squared	0.043	0.807	0.049	0.807	0.057	0.808

P-values in parentheses. Standard errors are clustered multiway within firms and quarters

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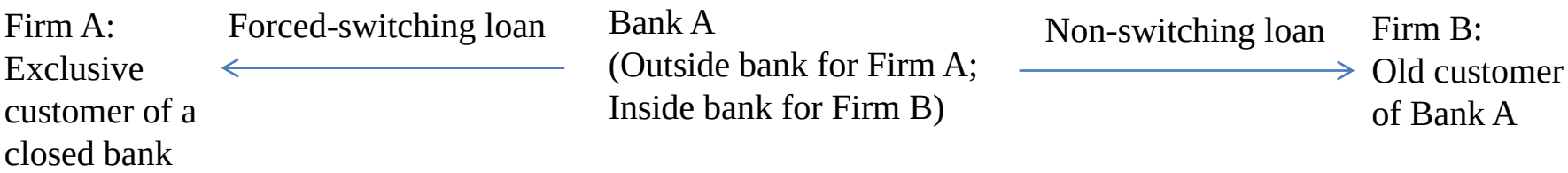
Do rates really converge? Methodology

Loan matching



Matching procedure:

- Match every *forced-switching loan* with as many *non-switching loans* as possible
- Calculate interest rate spread of each pair
- Regress those spreads on a constant and cluster errors at *forced-switching loan* level

Do rates really converge? Results

Subsample	All firms	Nonswitcher with long relationships (>6 years)	Nonswitcher with short relationships (<6 years)
Year & quarter	Yes	Yes	Yes
Outside bank	Yes	Yes	Yes
Repayment troubles last year	Yes	Yes	Yes
Total bank debt (+-70%)	Yes	Yes	Yes
Loan type	Yes	Yes	Yes
Proportion of loan collateralized (+-70%)	Yes	Yes	Yes
Loan maturity (+-70%)	Yes	Yes	Yes
Loan amount (+-70%)	Yes	Yes	Yes
Prior relationship length (+-70%)	Yes	Yes	Yes
Number of switching loans	40	19	19
Number of non-switching loans	199	118	75
Number of observations (matched pairs)	248	139	99
Spread in basis points	3.1	19.7**	-23.5**
	(8.2)	(8.5)	(10.0)

Do long-term relationships benefit firms?

Panel regression

$$interest\_rate_{l,f,b,q} = \alpha + \beta_1 \times ln(quarters\_of\_relationship_{f,b,q}) + \beta_2 \times ln^2(quarters\_of\_relationship_{f,b,q}) + \beta_3 \times time\_to\_maturity_{l,f,b,q} + \beta_4 \times perc\_collateral_{l,f,b,q} + \beta_5 \times loan\_size_{l,f,b,q} + firm \times quarter\ FE + firm \times bank\ FE + bank \times quarter\ FE + loantype\ FE + \epsilon_{l,f,b,q}$$

- $interest\_rate_{l,f,b,q}$ is the interest rate charged for the newly issued loan l, taken by firm f, from bank b, in quarter q
- $quarters\_of\_relationship_{f,b,q}$ is the length of the relationship between firm f and bank b in quarter q measured in quarters
- $time\_to\_maturity_{l,f,b,q}$ is time to maturity of the issued loan
- $perc\_collateral_{l,f,b,q}$ is the amount of the collateral relative to the size of the loan: collateral/loan_size
- $loan\_size_{l,f,b,q}$ is the outstanding amount of the loan
- FE stands for “fixed effects”

Do long-term relationships benefit firms?

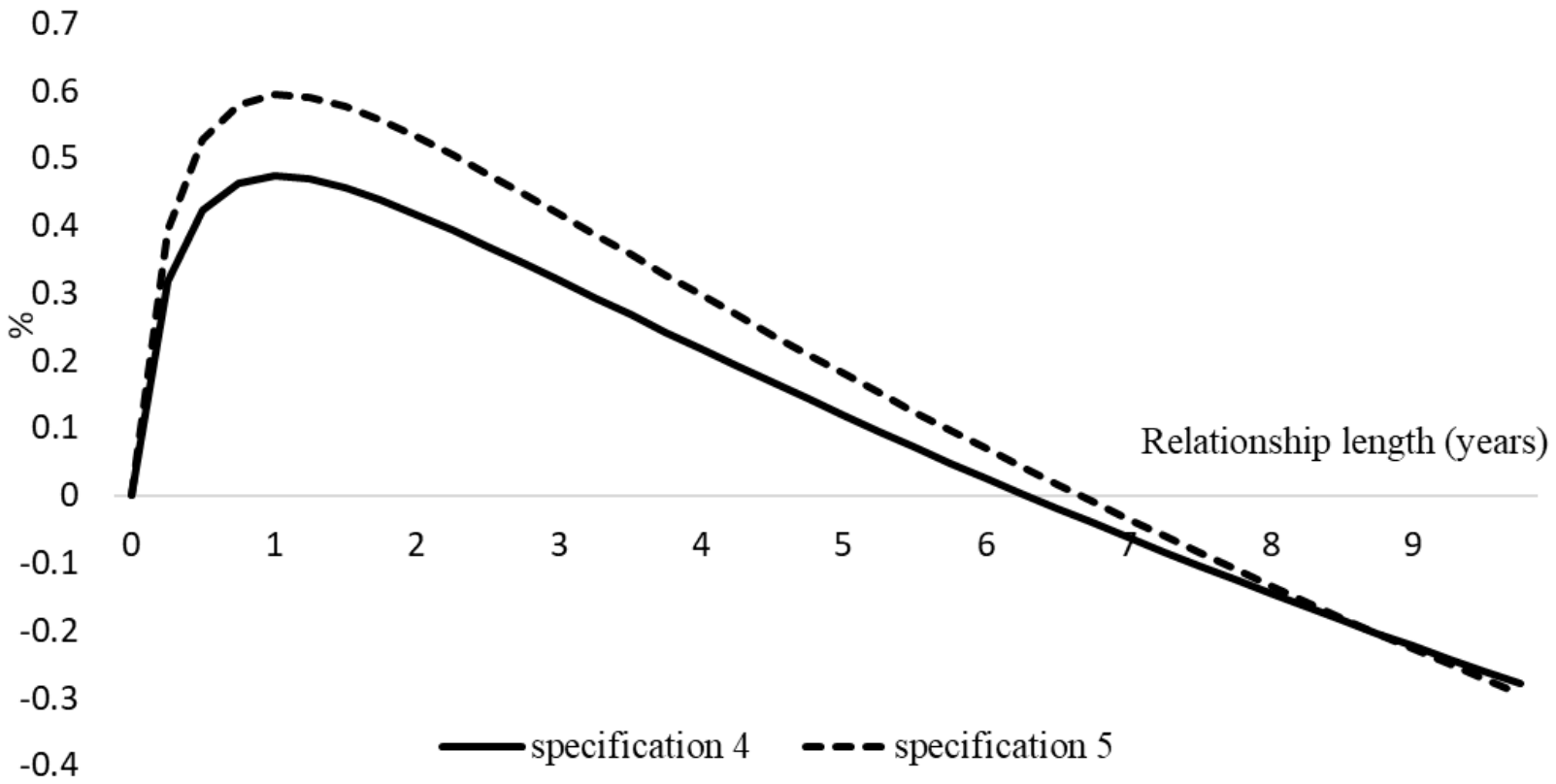
Panel regression

	Dependent variable: loan rate					
	1	2	3	4	5	6
Log(relationship length)	-0.147	0.144***	0.305**	0.598***	0.717***	0.710***
	(0.504)	(0.000)	(0.010)	-0.009	(0.000)	(0.000)
Log(relationship length)^2	-0.036	-0.035***	-0.078***	-0.179*	-0.216***	-0.213***
	(0.492)	(0.000)	(0.005)	(0.098)	(0.007)	(0.008)
Constant	4.078***					
	(0.000)					
Controls for loan characteristics	YES	YES	YES	YES	YES	
Firm - FE		YES				
Quarter - FE		YES				
Bank - FE		YES				
Loan type - FE		YES		YES		
Firm x Quarter - FE			YES	YES	YES	YES
Firm x Bank - FE				YES	YES	YES
Bank x Quarter - FE				YES	YES	YES
Loan type x Quarter - FE					YES	YES
Loan type x Firm - FE					YES	YES
Loan type x Bank - FE					YES	YES
Number of observations	95,400	86,045	58,679	57,769	56,123	56,130
Adjusted R-squared	0.106	0.803	0.936	0.950	0.955	0.955

P-values in parentheses. Standard errors are clustered multiway within firms and quarters
*** p<0.01, ** p<0.05, * p<0.1

Do long-term relationships benefit firms?

Panel regression: fitted values



Conclusion and contribution

- Relationships with healthy banks on average are neither beneficial nor harmful
- We find evidence that relationships with stressed banks can be harmful and difficult to escape
- Closing such banks may help good firms find cheaper credit
- This is explained by switching costs stemming from interbank information asymmetries
- We contribute to the empirical literature on
  - switching costs (Ioannidou and Ongena, 2010; Bonfim et al., 2018),
  - hold-up (Berger and Udell, 1995; Lopez-Espinosa et al., 2017),
  - banks' health (Slovin et al., 1993; Ivashina and Scharfstein, 2010; Santos, 2011)
- Primary contribution: we demonstrate how hold-up costs disappear when a distressed bank is closed (identification + estimation)