The Effect of Information Sharing on Relationship Lending: Evidence from a Natural Experiment [1]

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[1] The views expressed here are the authors' and do not necessarily reflect those of the Bank of Israel.

Motivation

- Relationship banking (RB) has long been discussed in the financial literature as a mean to overcome market frictions.
  - Mitigates information asymmetry between borrowers and lenders.
- How does RB impact household credit?
  - Relationship banking can benefit both customers through increased credit availability and lower costs while also benefiting banks by improving screening ability (Boot 2000; Petersen and Rajan 1994).
  - Long borrower-lender relationships can lead to the hold-up price premia, as borrowers become locked–in their banking relationship (Sharpe 1990; Rajan 1992).
- Challenging to test empirically: data limitation & identify the relevant experimental setting.

Overview

- What we do:
  - Exploit a natural experiment that reduced the amount of information asymmetry between banks and retail consumers.
  - Use the Israeli credit register which covers the universe of retail loans.
- What we find:
  1. Before the introduction of the credit registry strong relationship loans paid higher interest rates than weaker relationship loans, despite having better overall credit history.
     - Suggesting banks extract rent (hold-up premium) from consumers.
  2. Following the information shock the interest rate premium decreased for consumer with stronger relationship lending.
     - Suggesting an increase in information availability reduced the importance of relationship lending.
- Rule out series of alternative explanations.

Related Literature

- Relationship lending:
  - Theory (Sharpe 1990; Rajan 1992; Petersen and Rajan 1994; Berger and Udell 1995).
  - Empirical evidence on relationship lending in consumer credit (Puri and Rocholl 2008; Puri, Rocholl, and Steffen 2017; Agarwal et al. 2018).
- Impact of credit registry (Pagano and Jappelli 1993; Padilla and Pagano 1997; Hertzberg, Liberti, and Paravisini 2011; Einav, Jenkins, and Levin 2013; Miller 2015).
- Household finance (Campbell 2006).

Institutional Environment

- The Credit Data Law (2016) established the Israeli credit register.
- Banks were required to submit all retail credit data starting from 2016.
- Starting 2019 financial institutions could request any lending institution that reports to the register could contact anyone or both credit bureaus to obtain potential borrowers' credit scores and additional credit history.

The Dataset

- Focus on all non-securitized relationship consumer loans granted by Israeli banks.
  - Relationship loans: loan granted to a borrower by the bank where she holds an existing deposit account.
  - Strong relationship loans (*Exclusivity*): a dummy variable which takes the value of 1 if the loan is granted by a bank where the borrower has its sole deposit account.
- August 2018 to February 2020
- Data cleaning
- 1,279,545 loans

Descriptive Statistics

	Pre				Post			
	n	Mean	St. Dev	Median	n	Mean	St. Dev	Median
Exclusive	642,820	0.73	0.44	1	636,725	0.74	0.44	1
Spread (%)	642,820	5.22	3.28	5.85	636,725	4.92	3.11	5.4
Amount (Thousand NIS)	642,820	39.14	69.1	20	636,725	40.52	55.53	24
Maturity (Month)	642,820	43.01	27.79	37	636,725	43.36	28.49	37
Bad_Hist	642,820	0.09	0.28	1	636,725	0.08	0.27	1
Mortg	642,820	0.35	0.48	1	636,725	0.35	0.48	1
Socio	537,162	5.41	2.15	6	534,267	5.4	2.14	6
Age	642,820	6.17	2.81	6	636,725	6.09	2.81	6
Credit_Lim (Thousand NIS)	642,820	16.96	18.44	12	636,725	17.35	17.58	12.8
Borrowers	642,820	1.33	0.47	1	636,725	1.34	0.47	1

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Socio	[illegible]	[illegible]	[illegible]	6	[illegible]	[illegible]	[illegible]	6
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- Spread - the spread between the nominal annualized interest rate and the baseline Israeli interest rate (Prime).
- Credit_Lim - the credit line (overdraft) available to withdraw from the borrower's deposit account.
- Age - age group (14 groups total).
- Socio - based on the Israeli Central Bureau of Statistics socioeconomic index ranging where one represents the poorest socioeconomic conditions and 10 the highest.
- Mortg - a dummy variable which equals 1 if any of the borrowers has an outstanding mortgage.
- Borrowers - one or two borrowers.
- Bad_Hist - dummy variable equals 1 if at least one of the borrowers had a credit facility (loan/mortgage/credit card/credit line) where she was in arrears in the year before the loan was granted

Empirical Methodology

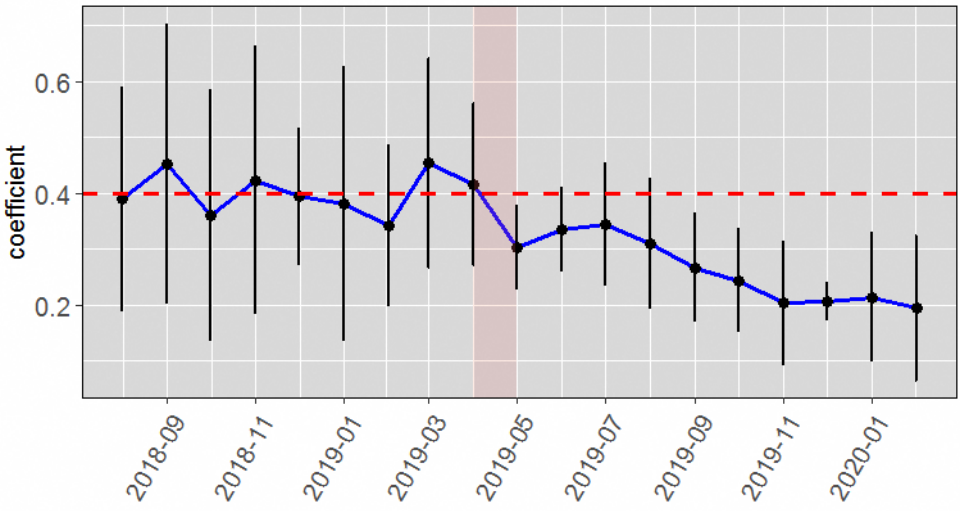
- Research question: how a shock to information asymmetry impacts loans' prices for exclusive borrowers compared to non-exclusive borrowers.
- Hypothesis: once information asymmetry decreases relationship banking matters less.
- Identifying assumption: without introducing the credit registry, the difference in loan pricing between exclusive and non-exclusive relationship lending would have remained constant. Figure

$$Spread_{i,j,k,t} = \gamma_k + \delta_t + \beta_1 Exclusive_{j,k,t} + \beta_2 Exclusive_{j,k,t} * Post_t + \beta_3 X_{i,t} + \beta_4 Z_{j,t} + e_{i,j,k,t} \quad (1)$$

Table: Baseline regressions

	Spread		
	All	Good Hist.	Bad Hist.
	(1)	(2)	(3)
Exclusive	0.399***	0.384***	0.462***
	(0.117)	(0.117)	(0.144)
Exclusive $*$ *Post*	-0.137*	-0.137*	-0.093*
	(0.079)	(0.082)	(0.054)
Loan controls	Yes	Yes	Yes
Borrower controls	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Observations	1,071,429	981,399	89,956
R^2	0.262	0.268	0.156
Adjusted R^2	0.262	0.268	0.156

Figure: Impact of exclusive relationship by month



Concerns and Solutions

Concerns:

1. **Self-selection:** specific consumer characteristics might be related to consumers having one or multiple bank relationships.
2. **Change in borrowers sample composition:**
   - Selection in the type of borrowers who apply for loans before/after the shock.
   - Selection in the type of borrowers approved for loans before/after the shock.

Solutions:

1. Subsample with borrower fixed effects. Link
2. Subsample of "survivals" borrowers and using borrower's fixed effect. Link

Main Results

- Exclusive relationship loans paid around 0.4% more relative to non-exclusive relationship loans.
- This result is consistent with the existence of hold-up costs in banking relationships (Farinha and Santos 2002; Bonfim, Dai, and Franco 2018).
- The introduction of the credit registry significantly mitigated the impact of relationship lending on loan prices.
- The difference in the interest rate paid by exclusive relationship loans and non-exclusive relationship loans is 34% lower after the introduction of the credit registry.
- Our findings are consistent with the conjecture that once information asymmetry is reduced, relationship banking matters less.

Robustness

- ✓ Alternative definition of strong relationship lending.
  1. Exclusive if the borrower did not have a different bank-borrower relationship for at least a year. Link
  2. Exclusive if the deposit account has been opened for at least a year. Link
- ✓ Use bank-time fixed effects to account for banks' time changing supply conditions.
- ✓ We further test the existence of a pre-existing trend.

Extensions and Summary

Future Extensions

- Influence of different bank sizes
- RB during COVID-19

Summary

- Our paper provides new empirical evidence as to the importance of relationship banking in the consumer sector.
- We find that households with stronger relationship lending are more prone to the hold-up premia before the introduction of credit scores.
- Once credit scores are introduced, this premia significantly decreases.

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Figure: Spreads and percent of borrowers with bad history

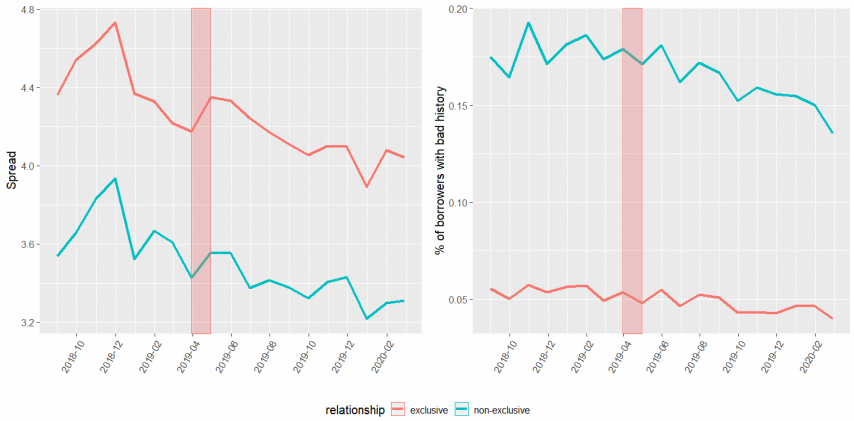

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Table: Estimation with borrower FE

	Spread		
	All	Good Hist.	Bad Hist
	(1)	(2)	(3)
Exclusive $*$ *Post*	-0.114***	-0.100**	-0.171
	(0.035)	(0.035)	(0.095)
Loan controls	Yes	Yes	Yes
Borrower controls	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Observations	697,523	644,057	53,471
R^2	0.840	0.846	0.839
Adjusted R^2	0.760	0.767	0.701

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Table: Controlling for survivorship bias (screening)

	Spread		
	All	Good Hist.	Bad Hist
	(1)	(2)	(3)
Exclusive $*$ *Post*	-0.113***	-0.100**	-0.171
	(0.040)	(0.041)	(0.127)
Loan controls	Yes	Yes	Yes
Borrower controls	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Observations	465,281	431,902	33,379
R^2	0.814	0.822	0.827
Adjusted R^2	0.737	0.745	0.685

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Table: Baseline - Alternative Exclusivity I

	Spread		
	All	Good Hist.	Bad Hist
	(1)	(2)	(3)
Exclusive	0.434***	0.407***	0.600***
	(0.104)	(0.105)	(0.125)
Exclusive $*$ *Post*	-0.148***	-0.147**	-0.102*
	(0.069)	(0.073)	(0.053)
Loan controls	Yes	Yes	Yes
Borrower controls	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Observations	1,084,260	988,159	96,101
R^2	0.261	0.268	0.157

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Table: Estimation with borrower FE - Alternative Exclusivity I

	Spread		
	All	Good Hist.	Bad Hist
	(1)	(2)	(3)
Exclusive $*$ *Post*	-0.125***	-0.108***	-0.209*
	(0.033)	(0.036)	(0.144)
Loan controls	Yes	Yes	Yes
Borrower controls	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Observations	710,359	650,780	59,579
R^2	0.837	0.844	0.834

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Table: Controlling for survivorship bias (screening) - Alternative Exclusivity I

	Spread		
	All	Good Hist.	Bad Hist
	(1)	(2)	(3)
Exclusive $*$ *Post*	-0.124***	-0.108***	-0.209*
	(0.031)	(0.034)	(0.112)
Loan controls	Yes	Yes	Yes
Borrower controls	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Observations	474,224	436,256	37,968
R^2	0.811	0.820	0.817

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Table: Baseline - Alternative Exclusivity II

	Spread		
	All	Good Hist.	Bad Hist
	(1)	(2)	(3)
Exclusive	0.317***	0.299***	0.484***
	(0.100)	(0.098)	(0.130)
Exclusive $*$ *Post*	-0.215***	-0.219***	-0.114***
	(0.057)	(0.061)	(0.027)
Loan controls	Yes	Yes	Yes
Borrower controls	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Observations	1,052,065	957,680	94,385
R^2	0.257	0.264	0.153

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Table: Estimation with borrower FE - Alternative Exclusivity II

	Spread		
	All	Good Hist.	Bad Hist
	(1)	(2)	(3)
Exclusive $*$ *Post*	-0.135***	-0.122***	-0.139*
	(0.033)	(0.036)	(0.084)
Loan controls	Yes	Yes	Yes
Borrower controls	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Observations	678,164	620,301	57,863
R^2	0.837	0.844	0.830

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Table: Controlling for survivorship bias (screening) - Alternative Exclusivity II

	Spread		
	All	Good Hist.	Bad Hist
	(1)	(2)	(3)
Exclusive $*$ *Post*	-0.133***	-0.119***	-0.140*
	(0.030)	(0.033)	(0.079)
Loan controls	Yes	Yes	Yes
Borrower controls	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Observations	447,427	410,789	36,638
R^2	0.811	0.820	0.815

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