Bank Competition and Bargaining over Refinancing

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Motivation

- For many households, when/whether to refinance is among the most important financial decisions they will ever make
- Evidence of widespread "failure to refinance" (Agarwal et al., 2016; Keys et al., 2016)
- Prior research on household (in)action has focused on borrowers' demographic and socio-economic characteristics—and on the channels through which these characteristics may be correlated with *demand* for refinancing
  - Both behavioral/psychological and informational channels (Andersen et al., 2020)
- This paper focuses on the *supply* determinants of refinancing
  - Households' access to finance is shaped by local banking and mortgage market conditions (Ergungor, 2010; Scharfstein and Sunderam, 2016; Célerier and Matray, 2019; Buchak and Jørring, 2021)
  - Competitive frictions can affect refinancing activity (Scharfstein and Sunderam, 2016; Agarwal et al., 2022)

Motivation: Loan renegotiation

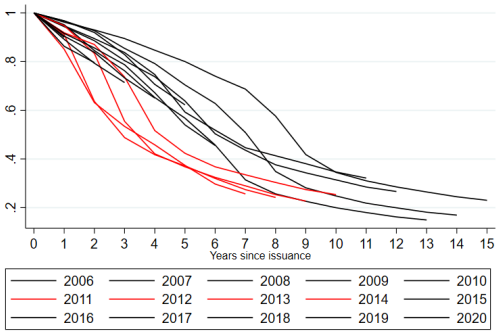


Figure. Fraction of 20 year loans outstanding by years since issuance and vintage

- Most mortgages in Belgium have a fixed interest rate over long maturities ($>$ 15 years)
- However, few mortgages are held until maturity
- For 20 year mortgages, 20% to 60% were repaid after only 5 years in the last decades
- Renegotiation activity is substantial

Motivation: Heterogeneity in local banking markets

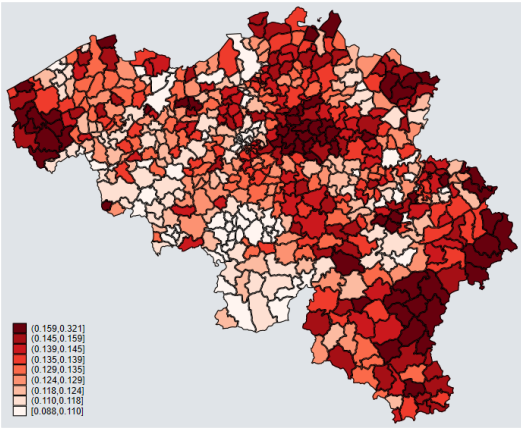


Figure. Local bank branch Herfindahl index in 2020

- Large differences in local banking markets in Belgium
- Some municipalities have few banks with local presence and a concentrated market
- Other markets are less concentrated

This paper

Model

- Refinancing as bargaining game between household, incumbent bank A, and outside lender B
- Switching banks can be costly for households
- Borrowers differ in their "bargaining power" with respect to banks
- Both switching costs and bargaining power function of both market and borrower characteristics

Data

- We use loan-level data on the universe of household borrowing in Belgium since 2006
  - More than 7m mortgages for about 3m households
- We can track households across banks and over time
- Granular measurement of local banking market characteristics

Overview of results

Model Predictions

- Refinancing activity (+ % external) goes up with size and maturity of mortgage
- If local competition ↗, refinancing activity (esp. external) ↗
- Households with lower switching costs are more likely to refinance externally, but have lower average gains conditional on refinancing

Facts

- Internal refinancing more prevalent than external refinancing
- Higher local market concentration is associated with lower refinancing propensity
- Borrowers that already have a credit relation with another bank are more likely to refinance externally—but less so (i) if current lender has local branch, and (ii) in high-income municipalities

Related literature

- Local drivers of household refinancing (Fisher et al., 2021; McCartney and Shah, 2021); bargaining and refinancing (Allen et al., 2014; Bhutta et al., 2021) and household financial decision-making more generally (Miller and Soo, 2021; Keys et al., 2022)
- Credit market structure (Buchak and Jørring, 2021; Ergungor, 2010; Célerier and Matray, 2019), and "stickiness" of household-bank relations (Atmaca et al., 2020; Brown et al., 2020)
- Transmission of monetary policy through mortgage/refinancing markets (Scharfstein and Sunderam, 2016; Benetton et al., 2021; Agarwal et al., 2022)
- Mortgage markets as amplifiers of pre-existing disparities (Bayer et al., 2017; Sakong, 2020; Goldsmith-Pinkham and Shue, 2020) and heterogeneous effects of monetary policy (Coibion et al., 2017; Martinez-Toledano, 2020; Emiris and Koulischer, 2021)

Contribution:

1. New data covering the full population of borrowers and lenders
2. Framework linking borrower choice to competitive and regulatory environment

Simple refinancing decision rule

- The gain / loss from refinancing for a change in interest rate Δr is

$$\Delta D = -D_0 \times \text{Duration}^* \times \Delta r$$

where $\text{Duration}^* = \text{Duration}/(1+r)$ is the modified duration and D_0 is the loan value

- The benefits from a fall in interest rates are increasing in the maturity T

- External refinancing costs of around €10,000 on a €250,000 mortgage

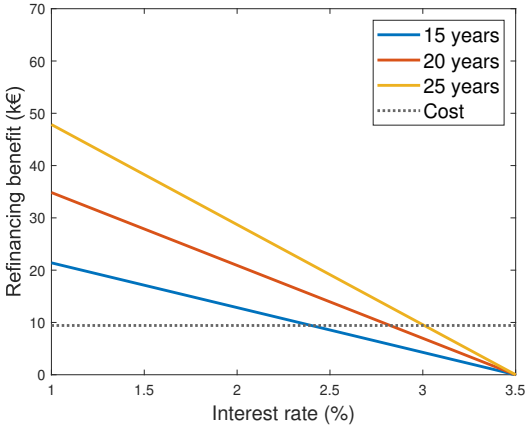
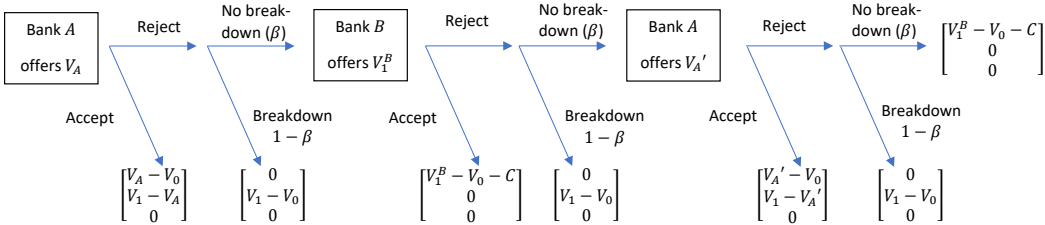


Figure. Benefit of refinancing a €250k mortgage by initial maturity

Bargaining over refinancing: Model setup

- A borrower has a mortgage with a bank A issued at a (fixed) interest rate r_0
- The value of the contractual mortgage payments is V_0 (using r_0)
- At date 1, interest rates fall and the value increases to $V_1 > V_0$
- The borrower can repurchase its loan at the initial value V_0, but does not have the funds to do so
- Bank A and an outside bank B make offers issue a new (larger) loan with the same repayment schedule

Model overview: 3 negotiation stages



- The borrower must pay a cost C for switching bank
- The no-breakdown probability β captures the bargaining power of the borrower

Equilibrium

Proposition (Outcome of bargaining over refinancing)

(i) Captive borrower. *If* $V_1^B - V_0 - C < 0$, *bank A offers* $V_A = V_0$, *and the borrower does not refinance.*

(ii) Internal refinancing. *If* $0 < V_1^B - V_0 - C < \frac{V_1 - V_0}{\beta}$, *bank A offers the borrower*

$$V_A = \beta \left(V_1^B - V_0 - C \right) + V_0,$$

in stage 1, and the borrower accepts this offer.

(iii) External search. *If* $V_1^B - V_0 - C > \frac{V_1 - V_0}{\beta}$, *bank A offers* $V_A = V_1$ *in stage 1, which the borrower refuses. In case of no breakdown after stage 1, bank B then offers* V_1^B *in stage 2, which the borrower accepts.*

Empirical predictions

Implication 1: Refinancing propensities and realized refinancing gains

- Both overall refinancing propensities and the relative share of external refinancing will go up with the outstanding balance and remaining maturity of mortgages. Gross gains from refinancing externally will generally exceed the gains from refinancing internally.

Implication 2: Bank competition and refinancing

- If bank competition rises, total refinancing activity—and, in particular, external refinancing activity—is likely to go up.

Implication 3: Refinancing and household switching costs

- Households with lower switching costs are more likely to refinance externally. Observed average realized gross gains conditional on refinancing externally will be lower for households with lower switching costs.

Mortgage data

Mortgage data from the National Bank of Belgium's (NBB) official household credit registry.

- Universe of household borrowing in Belgium from 2006 to 2021
  - All loans outstanding to (anonymized) individuals in Belgium at each year-end
  - Includes consumer credit, defaults
- Data at the loan-borrower-issuer level
  - Total of 38 million observations
  - On average $\sim$2.8 million borrowers per year and $\sim$2 loans per borrower
  - Trace individual borrower decisions: new loans, moves (change in ZIP code), etc.

Other data

- Bank branch locations

Identification of refinanced mortgages

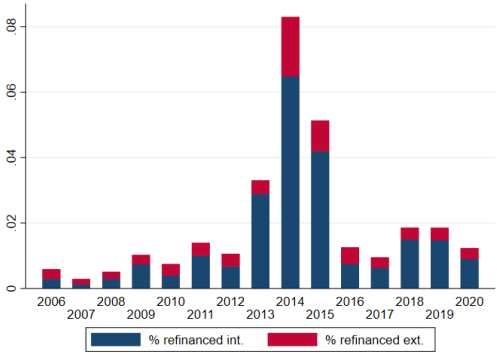
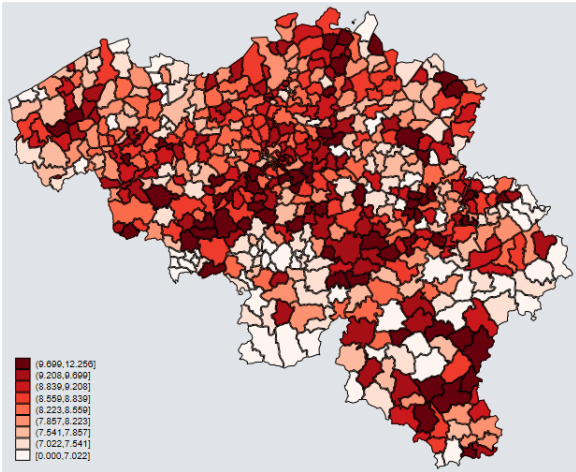


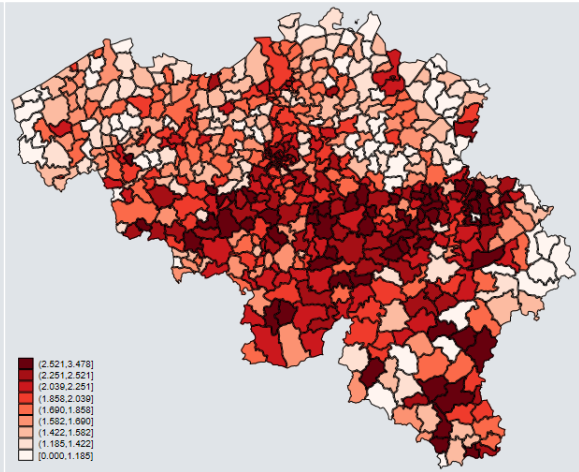
Figure. Fraction of active mortgages being refinanced

- Refinanced loans are flagged only from 2018
- Before 2018, we use the loan characteristics to identify refinancing activity
- A new loan is classified as a refinancing if we observe for the same borrower the deletion of one (at most two) old loan(s) before its maturity date and replacement by a new (at most two) loan(s) with a similar (90-140%) loan amount
- From these we exclude : movers and borrowers with mortgages with multiple banks ("investors")

Geographical heterogeneity in refinancing propensities



(A) Refinancing % in 2015



(B) External refinancing % in 2015

Refinancing propensities (in 2015) as function of loan characteristics

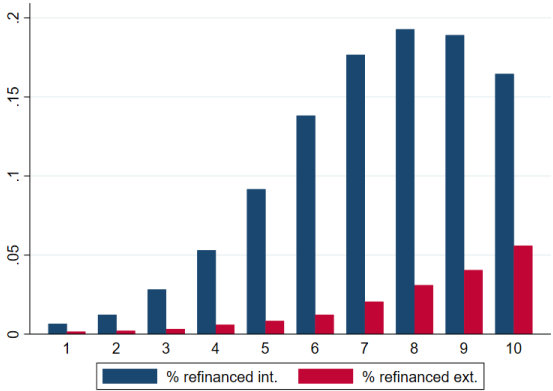


Figure. Refinancing propensity by decile of expected gross gain from refinancing Breakdown

- For each loan, we compute the theoretical gain of refinancing using duration and changes in benchmark rates
- We group loans into deciles of absolute refinancing gain
- Only a limited fraction of loans with positive gains are refinanced
- The share of loans refinanced (internally or externally) increases with the potential gain

Changes in the local banking market landscape

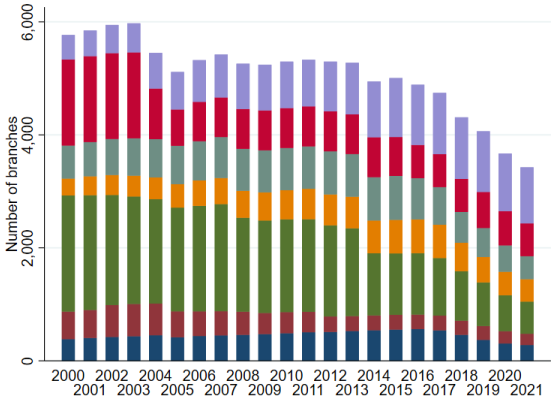


Figure. Number of bank branches in Belgium for the 7 largest banks

- Banks have reduced their local presence over the last two decades
- This has led to changes in the structure of local banking markets
- We correlate these changes in structure to refinancing activity, controlling for local market characteristics
- Specifications include bank-municipality fixed effects, time and borrower fixed effects

Local banking market competition and refinancing decisions

	(1) All	(2) Internal	(3) External
Branches per km2	0.00153***	0.00076***	0.00077***
	(0.00027)	(0.00021)	(0.00017)
Local HHI index	-0.04265***	-0.03348***	-0.00919***
	(0.00462)	(0.00398)	(0.00231)
Refinancing gain polynomial?	No	No	No
Origination year x year F.E.?	Yes	Yes	Yes
Bank x municipality F.E.?	Yes	Yes	Yes
Bank x year F.E.?	Yes	Yes	Yes
Borrower age group F.E.?	Yes	Yes	Yes
Borrower F.E.?	Yes	Yes	Yes
Observations	29,904,070	29,904,093	29,907,884
R squared	0.184	0.176	0.153

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

- Local banking presence is associated with higher refinancing activity
- Higher market concentration is associated with lower refinancing activity
- The correlation between concentration and refinancing is also negative for internal refinancing

Switching costs and refinancing decisions

	(1) Internal	(2) External	(3) External
Lender with local branch	0.00010	-0.00020	-0.00606
	(0.00032)	(0.00015)	(0.00523)
Borrower with other bank	-0.00225***	0.00169***	0.05032***
	(0.00012)	(0.00005)	(0.00133)
Refinancing gain polynomial?	Yes	Yes	Yes
Bank x municipality F.E.?	Yes	Yes	Yes
Bank x year F.E.?	Yes	Yes	Yes
Municipality x year F.E.?	Yes	Yes	Yes
Borrower age group F.E.?	Yes	Yes	Yes
Subsample refinancers?	No	No	Yes
Observations	13,837,919	13,840,874	448,841
R squared	0.056	0.013	0.189

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

- In the model, switching costs are a key determinant of refinancing decisions
- We use borrowers with multiple banks to proxy for lower switching costs
- We find that these borrowers are more likely to refinance externally and less likely to refinance internally

Geographic heterogeneity

Conclusion

Question

- How do credit supply and bank competition affect borrower refinancing activity?

This paper

1. Framework for borrower - bank bargaining over refinancing
2. Credit registry and regulatory data on borrowing of population in Belgium

Preliminary results

- If local competition ↗, refinancing activity (esp. external) ↗
- Households with lower switching costs are more likely to refinance externally, but have lower average gains conditional on refinancing
- Empirical results are consistent with the predictions of the model

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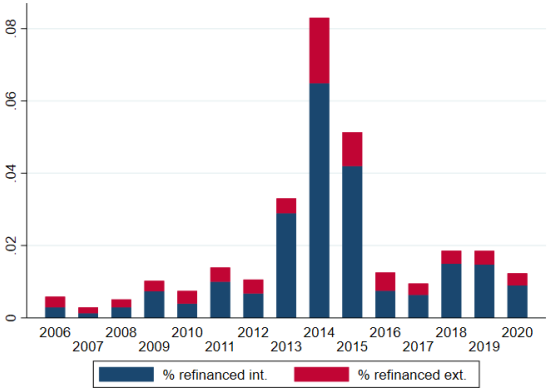
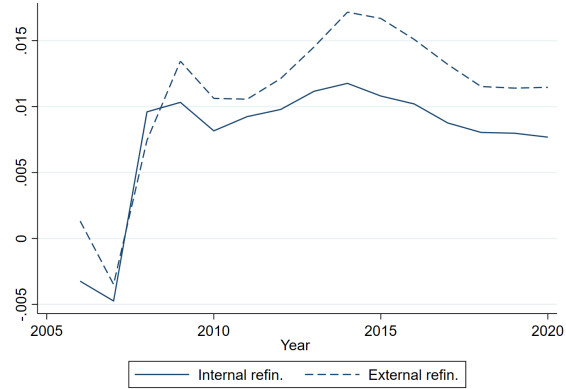
Appendix

Refinancing activity and realized gains

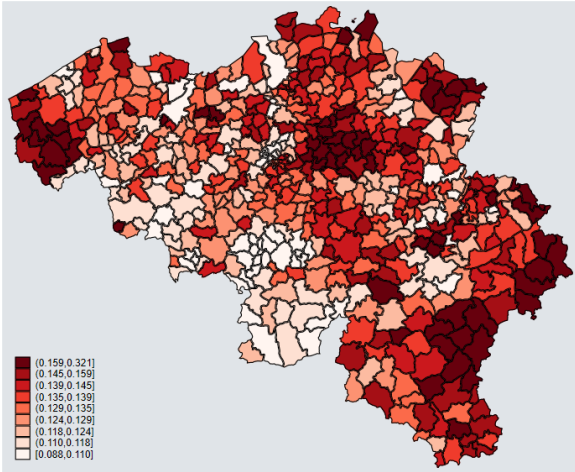


(A) Fraction of active mortgages being refinanced in the next calendar year

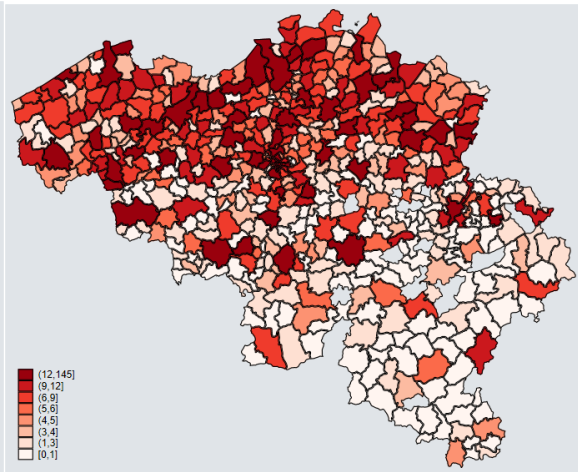


(B) Interest rate differential on old vs. new loans

Local mortgage market concentration

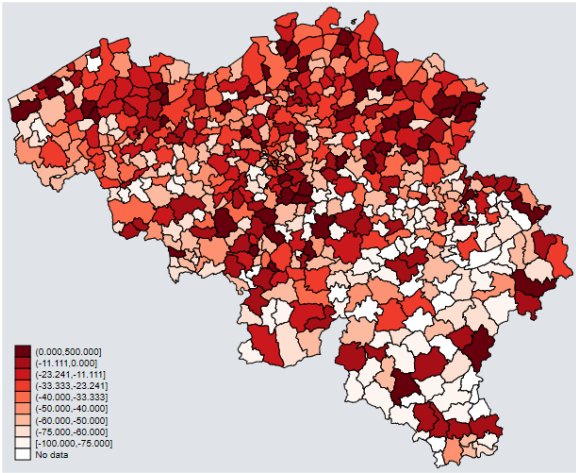


(A) Local HHI index in 2020

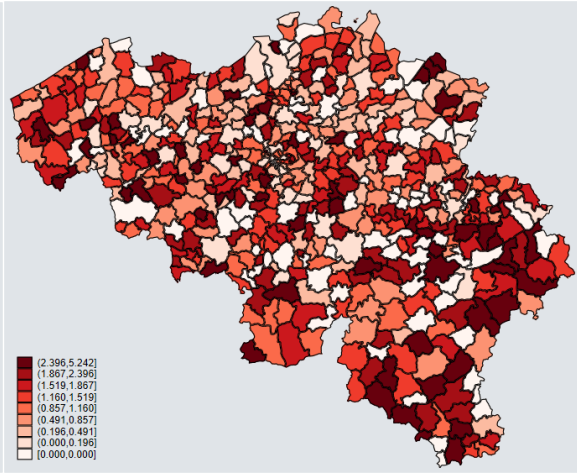


(B) Number of bank branches in 2020

Local mortgage concentration and household-bank relations

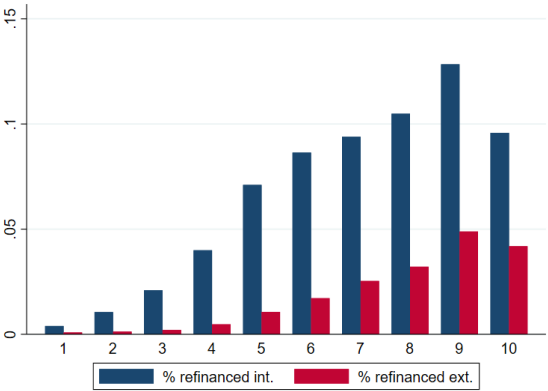


(A) Relative change in number of bank branches 2007–2020

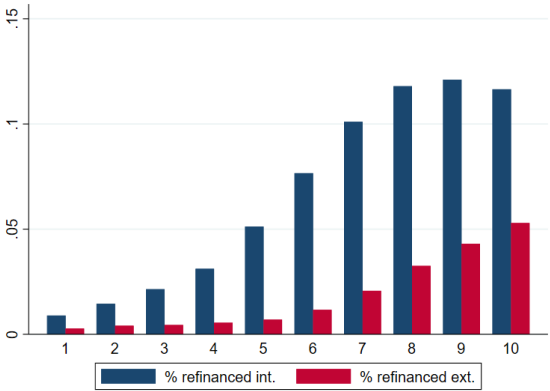


(B) Proportion of borrower-year combinations experiencing local branch closure of lender

Refinancing propensities (in 2015) as function of loan characteristics



(A) Deciles of remaining time until maturity



(B) Deciles of estimated loan balance

Back

Geographical heterogeneity in the importance of switching costs

	(1) Internal	(2) External	(3) External
Lender with local branch	-0.00001	-0.00030	-0.00603
	(0.00046)	(0.00022)	(0.00768)
High-income municipality	0.00020	0.00017	-0.00004
× Lender with local branch	(0.00062)	(0.00030)	(0.01029)
Borrower with other bank	-0.00268***	0.00183***	0.05612***
	(0.00017)	(0.00007)	(0.00198)
High-income municipality	0.00079***	-0.00027***	-0.01042***
× Borrower with other bank	(0.00023)	(0.00010)	(0.00265)
Refinancing gain polynomial?	Yes	Yes	Yes
Bank x municipality F.E.?	Yes	Yes	Yes
Bank x year F.E.?	Yes	Yes	Yes
Municipality x year F.E.?	Yes	Yes	Yes
Borrower age group F.E.?	Yes	Yes	Yes
Subsample refinancers?	No	No	Yes
Observations	13,837,919	13,840,874	448,841
R squared	0.056	0.013	0.189

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Switching costs and realized gains from refinancing

	(1) Internal	(2) External	(3) Internal	(4) External
Lender with local branch	-0.16339	0.42701**	-0.17145	0.44735**
	(0.10625)	(0.21537)	(0.11044)	(0.21263)
Borrower with other bank	0.01241	-0.09767***	-0.00410	-0.07511**
	(0.01008)	(0.02583)	(0.02481)	(0.03354)
Borrower with other bank × Lender with local branch			0.02088	-0.04083
			(0.02686)	(0.04865)
Initial interest control?	Yes	Yes	Yes	Yes
Origination year x year F.E.?	Yes	Yes	Yes	Yes
Bank x municipality F.E.?	Yes	Yes	Yes	Yes
Bank x year F.E.?	Yes	Yes	Yes	Yes
Municipality x year F.E.?	Yes	Yes	Yes	Yes
Borrower age group F.E.?	Yes	Yes	Yes	Yes
Observations	543,155	168,326	543,155	168,326
R squared	0.128	0.189	0.128	0.189

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Back