

# The effect of mergers in search markets: Evidence from the Canadian mortgage industry

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The views in this paper do not reflect those of the Bank of Canada.

# Introduction

- ▶ **Objective:** Study the impact of megers on transaction prices in search markets
  - ▶ *Search Markets:* Prices are determined through a search and negotiation process
    - ▶ *Examples:* Housing, loans, insurance, cars
    - ▶ *Dispersion:* Search frictions explain a significant fraction of observed dispersion in these markets
  
- ▶ **Case study:** Market for mortgages in Canada
  1. *Concentrated:* Big-8 issue 80% of new mortgages
  2. *Individual pricing:*
    - ▶ Branch managers issue discounts
    - ▶ Heterogeneous search effort
    - ▶ Consumer loyalty
  3. *Homogenous contracts:*
    - ▶ Government insurance program, so no risk of default
    - ▶ 5-year fixed-rate

# Research questions

1. What is the impact of a merger on transaction mortgage rates?
  - Is the merger's impact spread equally across consumers?
  - Does competition raise or lower residual rate dispersion?
2. Can we use the tools of retrospective merger analysis to measure market power in markets with search frictions?
  - In **posted-price** markets reduced-form estimate provides a direct measure of the change in market power caused by merger
  - In **search** markets, price change depends **not just** on firms' relative market power, but also on **the willingness and ability of consumers to haggle**

# Overview of our approach:

## 1. **Reduced-form estimation:**

- ▶ *Quasi experiment:* Horizontal merger of two national lenders
- ▶ *Difference-in-difference:* Compare the distribution of transaction rates among two groups of borrowers
  - ▶ Treated: Both lenders present in  $\mathcal{N}_i$
  - ▶ Control: One or none present in  $\mathcal{N}_i$
- ▶ *Objects of interest:* (i) average effect of merger on transaction rates, (ii) distribution of rate increases and (iii) effect of merger on dispersion.

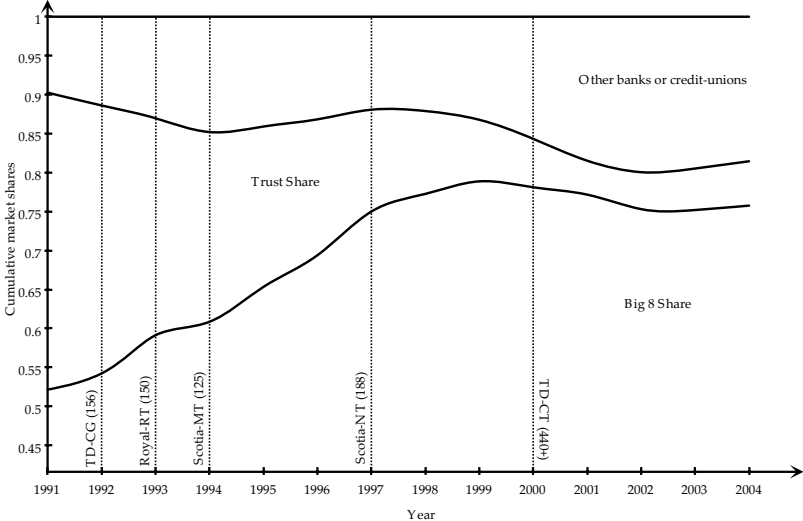
## 2. **Structural estimation:** Measure the extent of market power across consumers with different search/negotiation costs.

- ▶ Decompose effect of merger into search-effort and market-power effects
- ▶ Identify the contribution of search frictions in generating market power

## Data source: Insured mortgage contracts

- ▶ **Population:** New home buyers with less than 25% down-payment (about 80% of new home buyers).
- ▶ **Source:** Mortgage insurance companies
- ▶ **Key variables:**
  - ▶ *Contract information:* interest rate (posted & transaction), term, amortization, bank name, loan size, house price
  - ▶ *Household information:* location of the house, income, credit score, broker, prior history with bank, prior location (owner/renter/parents)
  - ▶ *Lender information:* Company (confidential), branch network locations.
- ▶ **Sample:**
  - ▶ *Contract selection:* (i) 5-year fixed-rate, (ii) 25-years amortization, (ii) new contract (excl. renewal).

# Market structure



# Retrospective analysis: mergers as quasi experiments

- ▶ Focus on one **merger** between bank  $A$  and trust company  $B$ .
- ▶ Two groups of borrowers:
  - ▶ **Treated:** Consumers with both  $A$  and  $B$  in choice-set  $\mathcal{N}_i$
  - ▶ **Control:** Consumers with with only  $A$  or  $B$ , or neither in  $\mathcal{N}_i$
  - ▶ **Assumption:** Consumers shop in a neighborhood  $r$  around their new house
- ▶ Two time periods:  $(t_1)$  one year after the merger,  $(t_0)$  one year before the merger.
  - ▶ The bank started closing duplicate branches about a year after the merger.

# Retrospective analysis:

1. Average merger effect:

$$\alpha = E(\Delta \text{Transaction price} | \text{Treated}) - E(\Delta \text{Transaction price} | \text{Control})$$

2. Distributional merger effect:

$$\begin{aligned} \alpha(u) &= E(\Delta \text{Price for } u^{\text{th}} \text{ percentile} | \text{Treated}) \\ &\quad - E(\Delta \text{Price for } u^{\text{th}} \text{ percentile} | \text{Control}) \end{aligned}$$

$\alpha(u)$ : Effect on consumers paying  $u^{\text{th}}$  highest price  
(Method due to Athey & Imbens (2006))



## Effect of the merger

	Estimates	95% Confidence Interval	
<b>Average</b>	0.06	0.03	0.08
<b>Distribution</b>			
10th Percentile	0.09	0.05	0.13
25th Percentile	0.08	0.05	0.1
Median	0.08	0.05	0.11
75th Percentile	-0.001	-0.06	0.07
90th Percentile	-0.004	-0.05	0.04
<b>Dispersion</b>			
$\Delta$ Coef. Variation	-0.05	-0.08	-0.02
$\Delta q_{75} - q_{25}$	-0.08	-0.13	-0.01

## Theory: Mergers when prices are negotiated

**Objective:** Develop a framework to evaluate the impact of mergers when prices are negotiated that:

1. replicates merger effects both qualitatively & quantitatively
2. allows us to decompose merger effect and identify the contribution of search frictions for market power

# Model of search and negotiation

- ▶ Search and Negotiation takes place over three stages:
  1. **Negotiation:** Buyer gets a TIOLIO quote,  $m$ , from one lender
  2. **Search:** If  $m$  is rejected, buyer chooses effort level to gather  $\tilde{n}$  more quotes—cost of effort ( $u$ ) heterogeneous
  3. **Competition:**  $\tilde{n}$  additional lenders compete for consumer
- ▶ Solving backwards, TIOLIO depends on buyer's outside option/reservation price
- ▶ Reservation price depends on  $u$  and number of lenders in market

$$m = r(u, n) = c + \pi(u, n)$$

where  $c$  is the common lending cost (on top of bond rate and observed characteristics)

# The model matches the reduced-form estimates

- ▶ Positive average merger effect:

$$\alpha(u) = \pi(u, n-1) - \pi(u, n) > 0, \text{ for all } u < \bar{u}(n)$$

- ▶ Heterogeneous merger effect:

$$\begin{aligned}\alpha(u) &\geq \alpha(u'), \text{ for all } u' \geq u \\ \pi(u, n-1) - \pi(u, n) &\geq \pi(u', n-1) - \pi(u', n)\end{aligned}$$

- ▶ Decrease in dispersion:

$$\begin{aligned}\pi(u_{25}, n-1) - \pi(u_{25}, n) &\geq \pi(u_{75}, n-1) - \pi(u_{75}, n) \\ \text{IQR}(n) &\geq \text{IQR}(n-1)\end{aligned}$$

# Can retrospective mergers in search markets yield insight into changes in market power?

1. Decomposition: Merger changes market power and search costs
  - ▶ ATE underestimates market power increase from merger
  - ▶ Identify pure market power effect off consumers with 0 search costs (max number of quotes): 11 bps
  - ▶ ATE corresponds to 50 % of actual market power effect, if all consumers gathered the max quotes
2. Counterfactual: lower search cost distribution (cut by 1/2)
  - ▶ 30 % **increase** in the ATE of the merger
  - ▶ 46 % **more** homogeneous effects across consumers.

## Implications for competition policy

- ▶ In search and negotiation markets, average merger effect can mask important heterogeneity
  - ▶ Mergers do not affect all consumers equally
- ▶ Presence of search frictions implies that the average effect can significantly underestimate the market power increase caused by the merger
  - ▶ When evaluating approved mergers retrospectively look for heterogeneous effects, and concentrate on effect at lower percentiles of distribution to gauge market power
- ▶ Net effect of mergers differs depending on size of search costs