The Pricing of Financial Products in Retail Banking: Competition, Geographic Proximity and Credit Limits[1]

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Motivation (I)

- Canadian retail banking is represented by the following institutions:
  - "Big 6" national banks (BMO, CIBC, NBC, RBC, Scotia, TD)
  - Desjardins and other local credit unions
  - A few regional players (ATB) and foreign banks
- The geographical footprint of each institution is very different across the nation
- Some reasons:
  - Differentiation in the type of areas covered (population, economic characteristics, etc)
  - "Cultural" focus: French-speaking vs English-speaking areas
  - Historical reasons: Bank of Montreal vs Toronto Dominion

Motivation (II)

- Banks are multiproduct firms and offer different products used for payment purposes and credit: Accounts, credit cards, lines of credit, etc

- Geographic presence affects competition and the outcomes of these products (fees, rates, credit limits)

- **Our question:** What is the effect of competition and geographic proximity on the prices and credit limits of these financial products?

Related literature

- Competition between Canadian banks (Allen and Liu 2007). Large literature on credit unions (scale/scope economies, risk-taking, etc)
- Structural entry literature: Bresnahan and Reiss (1989, 1990, 1991), Berry (1992), Mazzeo (2002), etc
- Bajari, Hong and Ryan (2010). Estimator also used by Perez-Saiz (*Rand, 2015*)
- Cohen and Mazzeo (2007): Structural entry model for the US retail banking industry.
- Mazzeo (2002) and Manuszak and Moul (2008): How competition affects outcomes (prices)?
- Huge retail banking competition/relationship lending literature

Data: Markets selected

- We choose small rural isolated census subdivisions to get well-defined markets in 2006. Separated by at least 15 km.

- Population: between 200 and 50,000 people

- 448 markets markets across 9 provinces

- We observe geographic presence of Big6 or credit unions (7 potential entrants in every market)

Example of market selected

- From the center of each census subdivision, we count the number of branches within a 10 km radius
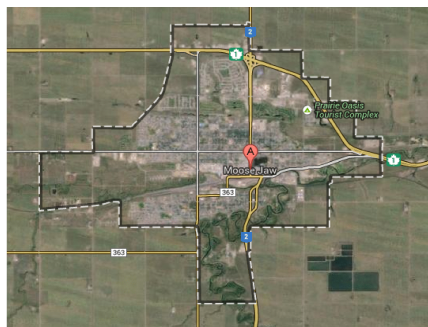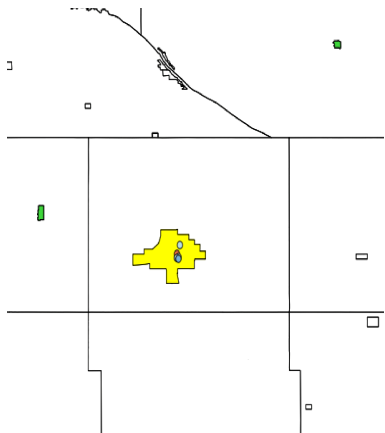
Approach

- Estimate a static entry game to identify the determinants of expansion into markets

- Jointly estimate this entry game with several outcome equations (fees/rates, credit limits) for bank accounts, credit cards and lines of credit

- Use simulation methods to estimate jointly these entry and outcomes

- Endogeneity problem: How does competition affect outcomes? Prices are high because the market is attractive (and there is entry), or because there is little competition?

Results from entry model (I)

Credit unions have lower entry barriers and focus on markets economically less attractive a nd with h igher French speaking population than Big6 b anks

Variable	Entry model
Panel A: Competitive effects:	
Competitive effect of BIG6 on BIG6	0.04499
	(0.02179)
Competitive effect of CU on BIG6	0.24508
	(0.03198)
Competitive effect of BIG6 on CU	-0.06866
	(0.02342)
Panel B: Demographic variables:	
Intercept	-0.96986
	(0.08476)
Population BIG6	-0.00096
	(0.02264)
Population CU	0.20220
	(0.02113)
Income BIG6	0.00680
	(0.02097)
Income CU	0.17917
	(0.02430)
Unemployment BIG6	-0.26600
	(0.03510)
Unemployment CU	-0.29688
	(0.02927)

Results from entry model (II)

| Variable	Entry model
Panel B: Demographic variables:	
Business activity BIG6	0.19471
	(0.02312)
Business activity CU	–0.11042
	(0.01934)
Proportion French BIG6	–0.16209
	(0.02738)
Proportion French CU	0.19254
	(0.02401)
British Columbia	0.18568
	(0.02193)
Manitoba	0.26834
	(0.02705)
New Brunswick	0.46453
	(0.04539)
Newfoundland and Labrador	0.45780
	(0.04642)
Nova Scotia	0.51770
	(0.05128)
Prince Edward Island	0.45050
	(0.04790)
Quebec	0.16603
	(0.02357)
Saskatchewan	0.14108
	(0.01756)

Results from entry model (III)

Variable	Entry model
Panel C: Firm-level effects:	
National Size	0.44322
	(0.04583)
Regional Size	0.05438
	(0.02134)
BMO	0.14693
	(0.02125)
BNS	-0.06172
	(0.01642)
CIBC	0.28283
	(0.03228)
CU	0.52861
	(0.05185)
NBC	-0.99947
	(0.10124)
distance to historical HQ	-0.26752
	(0.03353)
distance to historical HQ (square)	-0.01513
	(0.01987)

Household-level data

- Household from CFM (2007-2010)

- Accounts, credit cards, lines of credit with every Big6+CU

- Product characteristics: Account types, rewards, etc

- Household characteristics: Demographics, payment usage, risk
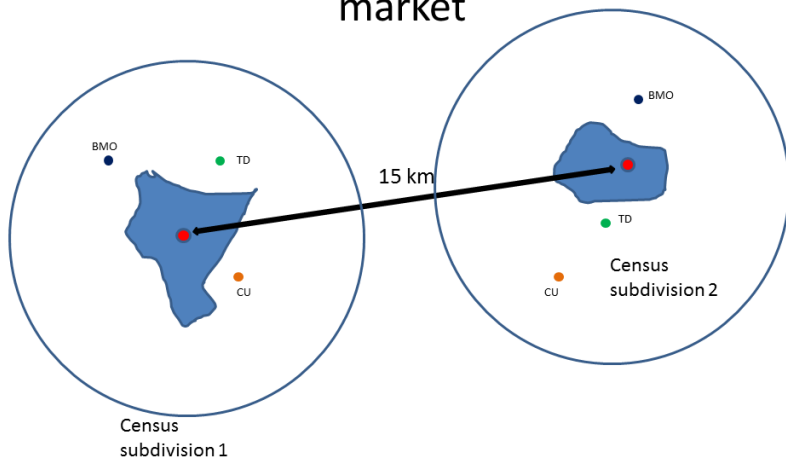 variables (unemployment, debt)

Selecting households (I)

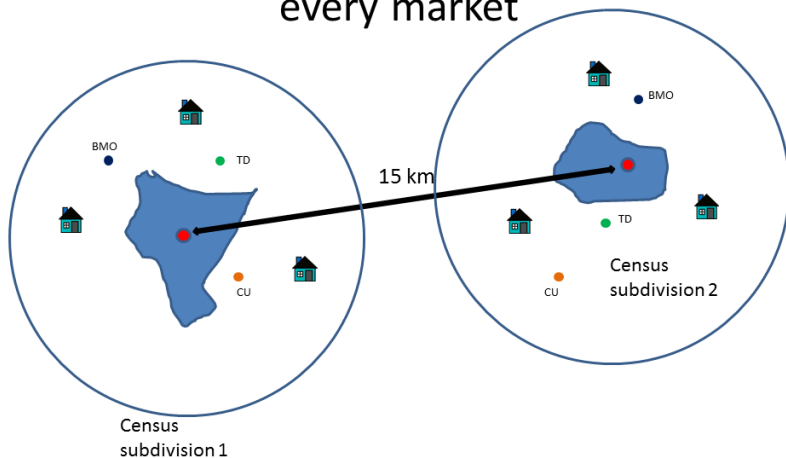## Step 1: Select isolated markets

15 km

Census
subdivision 2

Census
subdivision 1
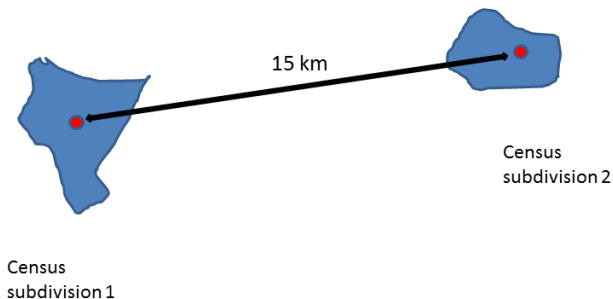
Selecting households (II)

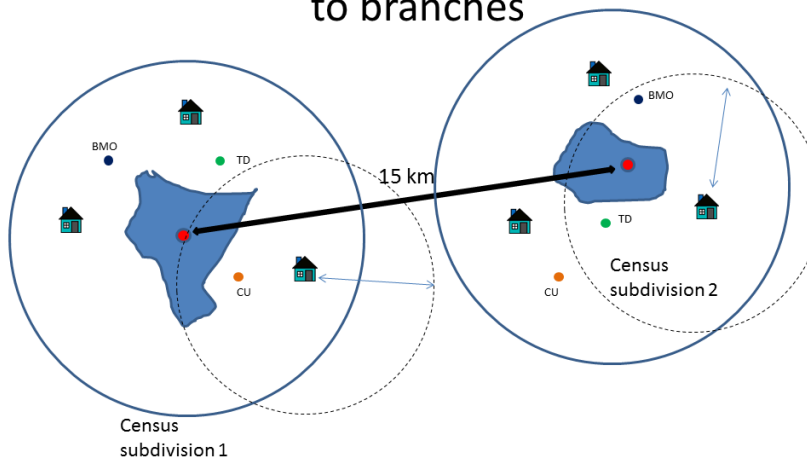## Step 2: Identify branches around every market

Selecting households (III)

Step 3: Identify CFM households around every market

Selecting households (IV)

Step 4: Identify proximity of households to branches

Selecting households (V)

- In total 448 markets

- 7 potential entrants in every market (Big6 + CU)

- 5,893 unique household-year observations (we use years 2007 to 2010)

- Products:
    - Accounts, credit card, lines of credit, provided by one financial institution
    - We observe (or not) these products for every household
    - An observation: A household-year-product.
      $N = 5,893 \times 7 = 41,251$ observations in total

- Results for households

  An additional competitor in the market decreases the fees
- paid for a bank account by -23% (using OLS: -4.9%)

- Annual fees for credit cards: -34% less per extra competitor. OLS: -1.7%

- Geographic proximity of financial institution explains also
  - Lower rates paid
  - Higher probability of adoption of product

Estimates: Adoption of financial products

Variable	Accounts		Credit cards		Lines of credit	
	Structural	Probit	Structural	Probit	Structural	Probit
Financial advisor			0.05698	0.03409	0.07558	0.04260
			(0.00751)	(0.01781)	(0.01111)	(0.02352)
Heavy usage	0.08473	0.04575	0.07960	0.02176		
	(0.01438)	(0.00414)	(0.01884)	(0.00425)		
Sophisticated			0.04943	0.02608	0.10536	0.07235
			(0.00826)	(0.01929)	(0.01455)	(0.02611)
Close provider	**0.82572**	**0.80525**	**0.66973**	**0.63894**	**0.68709**	**0.64906**
	(0.07048)	**(0.01831)**	**(0.07368)**	**(0.01795)**	**(0.06635)**	**(0.02593)**
Household variables	YES	YES	YES	YES	YES	YES
Provincial fixed effects	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES
Observations	41251	41251	41251	41251	41251	41251

Estimates: Fees/rates equation

	Accounts		Credit cards		Lines of credit	
Variable	Structural	OLS	Structural	OLS	Structural	OLS
Account balance	-0.03601	-0.03610				
	(0.00387)	(0.02468)				
Checking account	0.16995	0.16979				
	(0.01771)	(0.05353)				
Card protection			0.34655	0.34683		
			(0.03744)	(0.08595		
Rewards			1.95571	1.95581		
			(0.19593)	(0.10687		
Limit (in logs)			0.19425	0.19708	0.16601	0.16556
			(0.01862)	(0.01700)	(0.01644)	(0.05803)
Fixed rate					0.13933	0.13914
					(0.01413)	(0.11107)
Secured					0.18260	0.18224
					(0.01772)	(0.11343)
Length relationship	0.05990	0.05966			0.00198	-0.00240
	(0.00745)	(0.01751)			(0.00288)	(0.03849)
Close provider	**-0.37887**	**0.13316**	**-0.41602**	**0.15251**	**-0.26144**	**-0.25080**
	(0.03279)	**(0.08256)**	**(0.04182)**	**(0.10951)**	**(0.02503)**	**(0.16550)**
Number of competitors	**-0.07236**	**-0.04943**	**-0.16207**	**-0.01766**	**0.05554**	**0.06022**
	(0.00852)	**(0.01620)**	**(0.01608)**	**(0.02398)**	**(0.00703)**	**(0.03313)**
Household variables	YES	YES	YES	YES	YES	YES
Bank fixed effects	YES	YES	YES	YES	YES	YES
Provincial fixed effects	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES
Observations	6135	6135	5581	5581	2162	2162

Estimates: Limits equation

Variable	Credit cards		Lines of credit	
	Structural	OLS	Structural	OLS
Card protection	0.24063	0.23801		
	(0.02223)	(0.04907)		
Rewards	0.36677	0.36375		
	(0.03794)	(0.06392)		
Fixed rate			-0.42414	-0.42417
			(0.03916)	(0.04928)
Secured			0.61390	0.61399
			(0.06319)	(0.04350)
Difficulty debt	0.03802	0.01083	-0.00578	-0.00509
	(0.00614)	(0.00981)	(0.00157)	(0.00901)
Employed	0.02202	0.01182	0.23269	0.23269
	(0.00325)	(0.09969)	(0.02342)	(0.13206)
Length relationship			0.03370	0.03491
			(0.00382)	(0.01873)
Close provider	**-0.11024**	**-0.11930**	**-0.19480**	**-0.19478**
	(0.01046)	**(0.07230)**	**(0.01928)**	**(0.07288)**
Number of competitors	**0.04290**	**0.01088**	**0.01114**	**0.01325**
	(0.01062)	**(0.01605)**	**(0.00246)**	**(0.01399)**
Household variables	YES	YES	YES	YES
Bank fixed effects	YES	YES	YES	YES
Provincial fixed effects	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES
Observations	5581	5581	2162	2162

Conclusion

- Estimate entry decision and prices/limits equations to control for selection problems

- Detailed geographic location of bank branches and household demographics and product characteristics

- Detailed structural model that uses simulation methods