

Profit from Auto Insurance in Ontario, Canada: Analysing the Effectiveness of the Regulator

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Novel Ideas: MPhil Seminar Series

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Roadmap of Today

1. History of Auto Insurance In Canada
2. Overview of Ontario Industry and Regulator
3. Data and Descriptive Statistics
4. Theoretical Framework
5. Empirical Framework - Preliminary Results
6. Next Steps / Avenues of Research

A History Lesson



Mandatory Auto Insurance

- Auto Insurance is under provincial authority
- Consumers, firms, and province saw a clear need for mandatory auto insurance
- Provinces want to make auto insurance mandatory without companies running away with profit



How Some Provinces in Canada Responded

- Saskatchewan
 - Instituted Saskatchewan Government Insurance (SGI) in 1944
 - Mandated auto insurance in 1946
- Manitoba
 - Manitoba Public Insurance and mandated insurance in 1971
- British Columbia
 - Insurance Corporation of British Columbia and mandated insurance in 1973
- Quebec
 - Régie de l'assurance automobile du Québec in 1978

Ontario Auto Insurance: The Industry and Its Regulator



Requiring Companies to Apply to Change Premiums

- As of 1988, the Financial Services Commission of Ontario (FSCO) required all companies selling consumer auto insurance to apply to change their premiums.
- Cap return on equity at 12.5%.



The Application Process

Provide the Regulator With:

- How they determine the premium they charge

Regulator Assumes:

- 25% Expense Ratio

Underwriting Profits = Premiums - claims - 25% of Premiums

ROE = premiums / equity base

*Both after tax premiums



Policy and Premium Rate Changes

Profitability Cap Changes:

- Lowered ROE Cap
 - 12% -> 11.5% -> 11%
- In 2015 moved from ROE cap to profit cap of 6% on premiums

Changes to Policy Requirements:

- 2010 Law Change
 - Capped payouts for about 70% of injuries
- From 2010 to 2011 claims costs dropped 24.6% and earned loss ratio went from 87% to 63%
 - Resulting in an increase of



Policy and Premium Rate Changes

“We have only ever rejected one application to increase premiums”

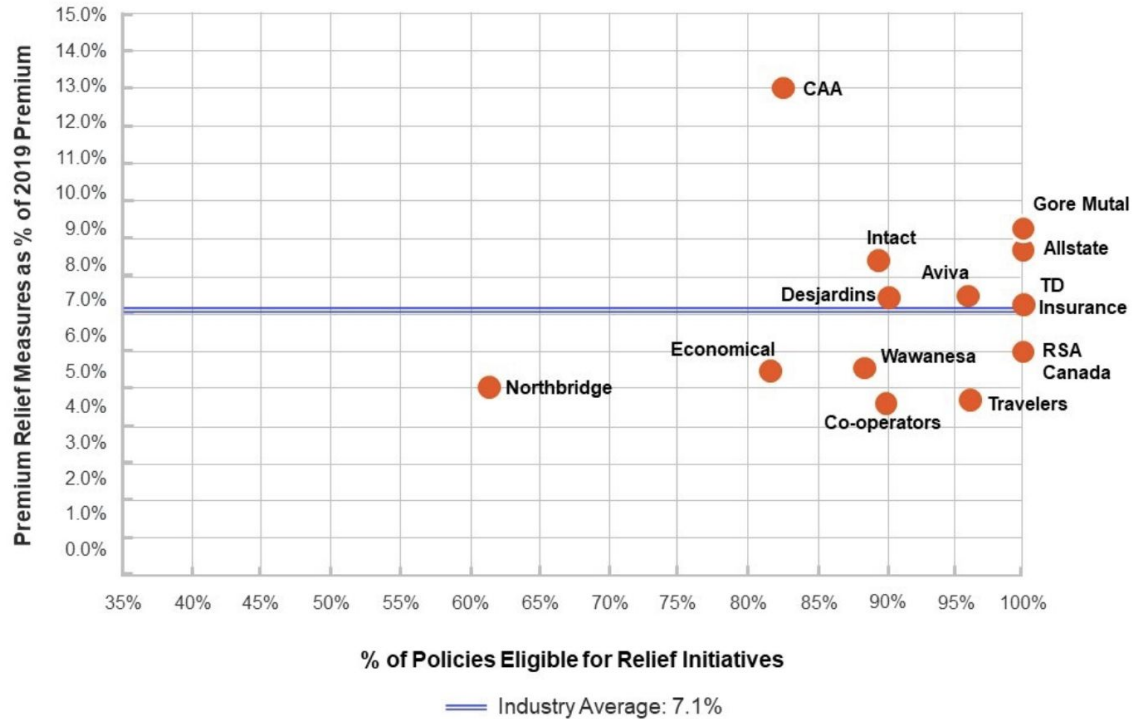
- Employee of the FSCO/FSRA, Department of Auto Insurance



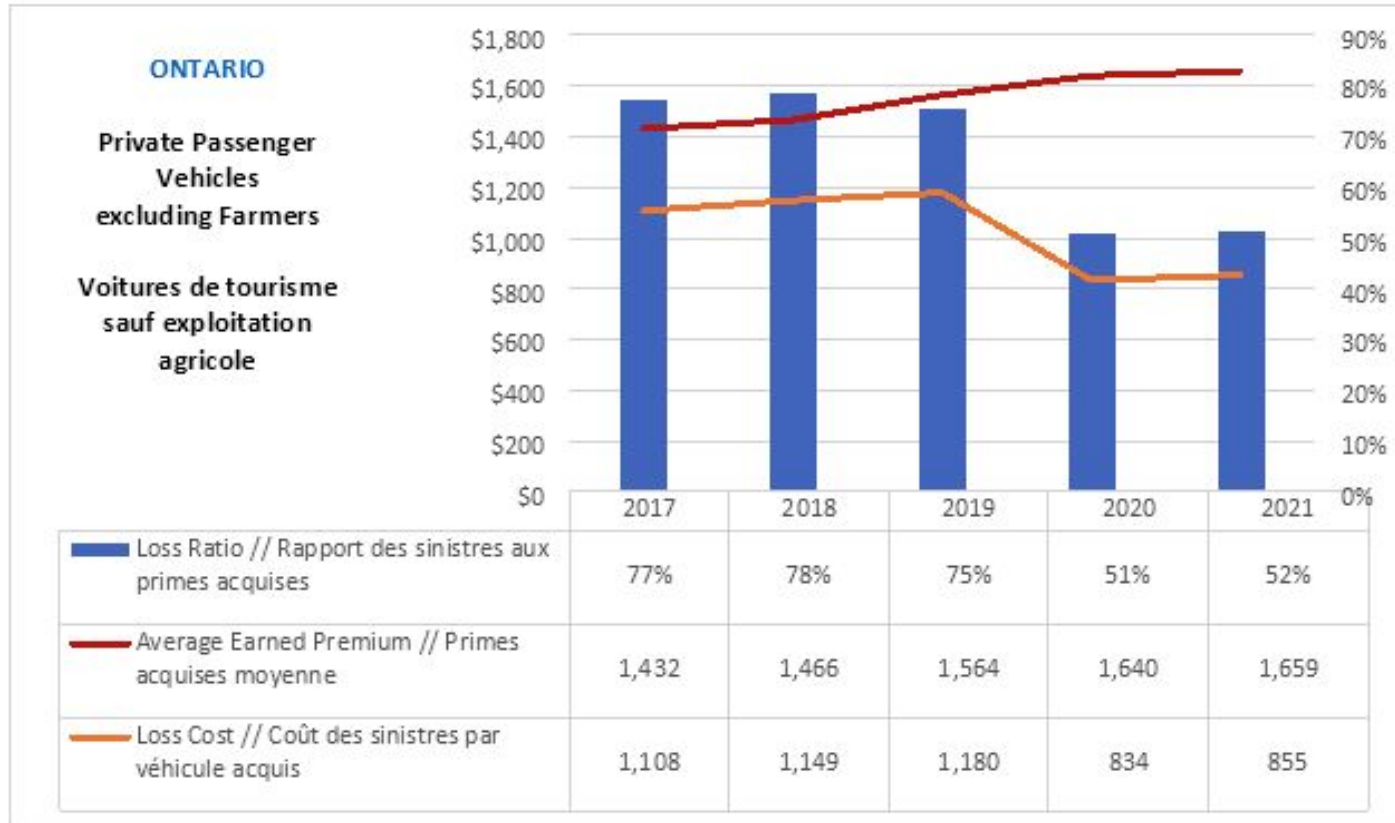
How Did the Industry in Ontario Respond to COVID 19?

- Premium Relief Measures in July 2020
 - Far below reduction in claims costs
- Widening Gap between premiums and claims
 - Largest gap in the country

Premium Relief Measures as % of 2019 Premium – July, 2020



Auto Insurers in Ontario gave on average a 7.1% rebate to consumers in the summer 2020.



COVID-19 brought in the largest gap between premiums and claims Ontario has ever seen.

Source: GISA



How Did the Other Provinces Respond to COVID 19?

Manitoba:

- 11% rebate in April 2020
- 27% rebate for 2022

Saskatchewan:

- 20% rebate for 2020 and 2021

British Columbia:

- 11% rebate in March 2020
- 20% for 2020 and 2021



My Research Question

To what degree has the FSRA been able to hold the industry to the premium and ROE caps it has put in place?



Data



Three Data Sets and One History Log

Ontario Aggregate Data (GISA):

- 1992 to 2021
- Insurance premiums and claims by type of coverage and number of vehicles

Market Shares (FSRA):

- 2001 to 2021
- % of premiums written
- % of vehicles written

Rate Change Filings (FSRA):

- 1999 to 2022
- Date applied, date approved, dates of change implemented, approved average rate increase (%)

Ontario Auto Insurance History Log (FSRA):

- Name changes, mergers, and acquisitions
- 1980 to 2022



Calculating Average Premium: Per Company Per Year

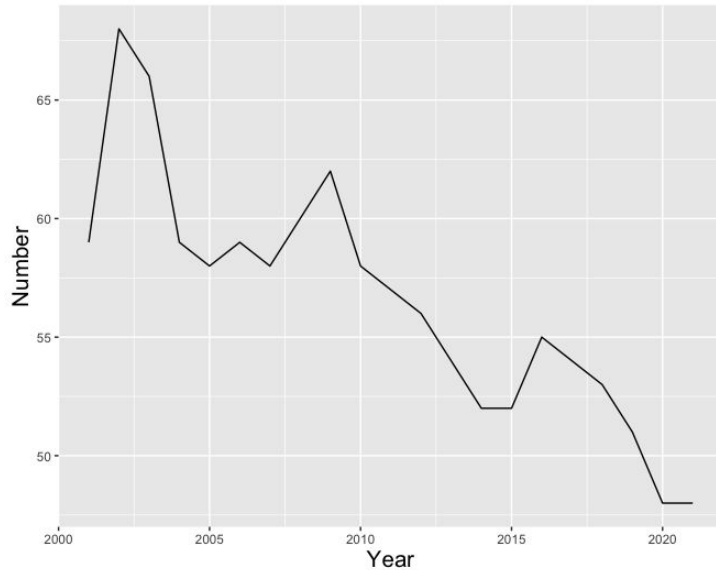
$$\text{Average Premium} = \frac{\text{market share written premiums} * \text{written premiums}}{\text{market share written vehicles} * \text{number written vehicles}}$$

*Also calculated separately using earned premiums and number of earned vehicles

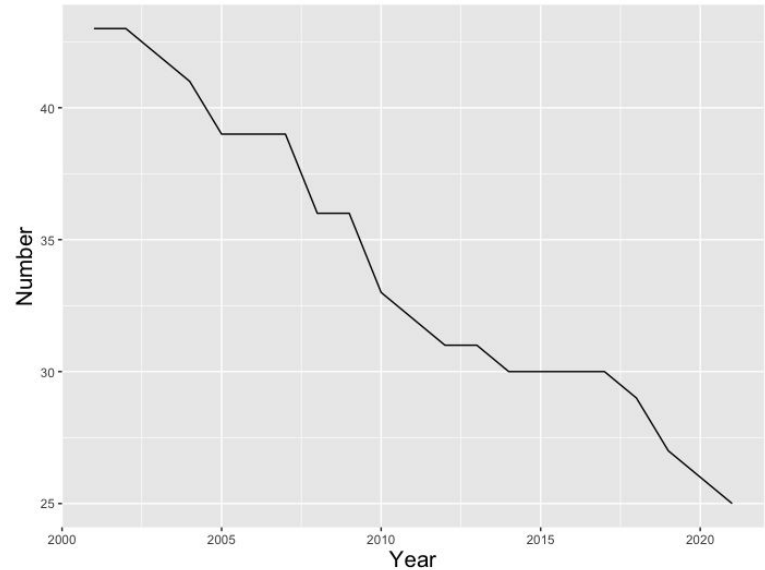
Overview of the Industry:

Number of Companies and Their Market Shares

Number of Firms Selling Auto Insurance in Ontario



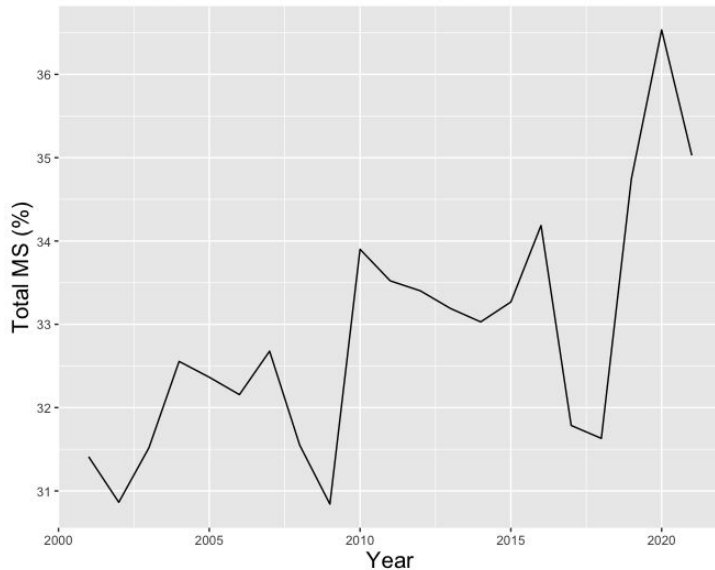
Number of Parent Firms Selling Auto Insurance in Ontario



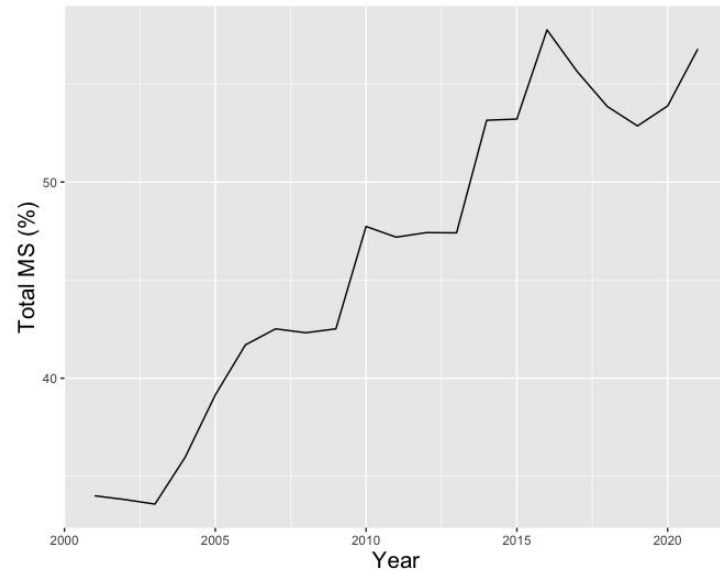
Overview of the Industry:

Number of Companies and Their Market Shares

Combined Market Share of Top 4 Largest Firms



Combined Market Share of Top 4 Largest Parent Firms





Overview of the Industry:

Correlation Between Premiums and Claims by Coverage Type

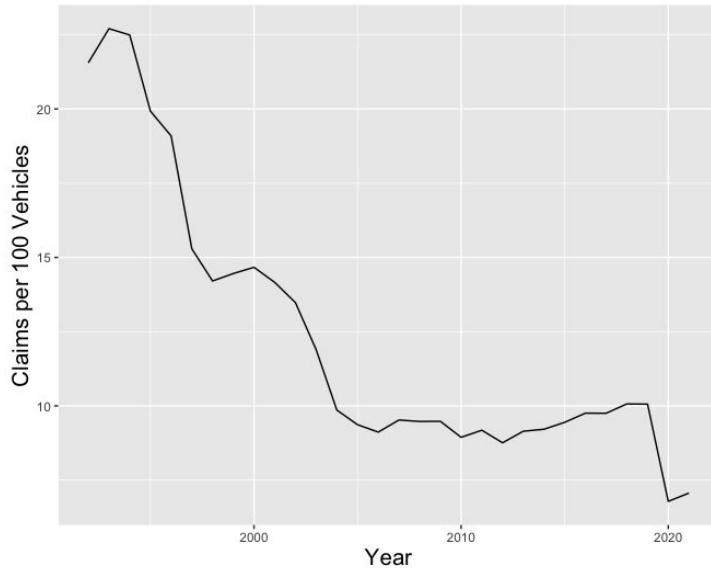
- Premiums lag claims
- Mandatory coverages and their premiums are more strongly correlated

Coverage	correlation	correlation_1
Third Party Liability	0.7583	0.8506
Total Mandatory Coverages	0.6798	0.802
Grand Total - All Coverage	0.6709	0.7965
Property Damage	0.7143	0.7182
Accident Benefits	0.4985	0.6916
Underinsured Motorist	0.5996	0.6896
Bodily Injury	0.5514	0.689
Direct Compensation	0.4154	0.6269
Total Bonus Coverage	0.3694	0.6013
Collision - all codes	0.2848	0.5916
Comprehensive - all codes	0.3248	0.5675
Underinsured Automobile	0.3744	0.5491
Specified Perils - all codes	0.5807	0.5328
All Perils - all codes	0.3173	0.4995

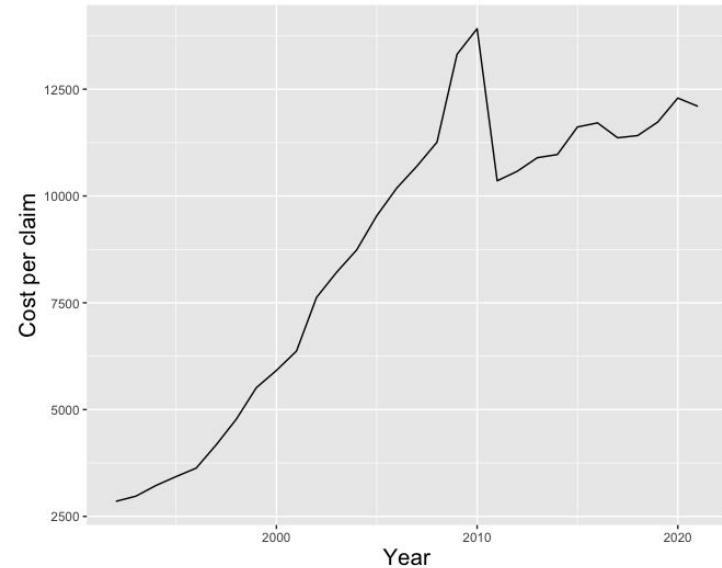
Overview of the Industry:

Premiums, Number of Claims, and Cost of Claims

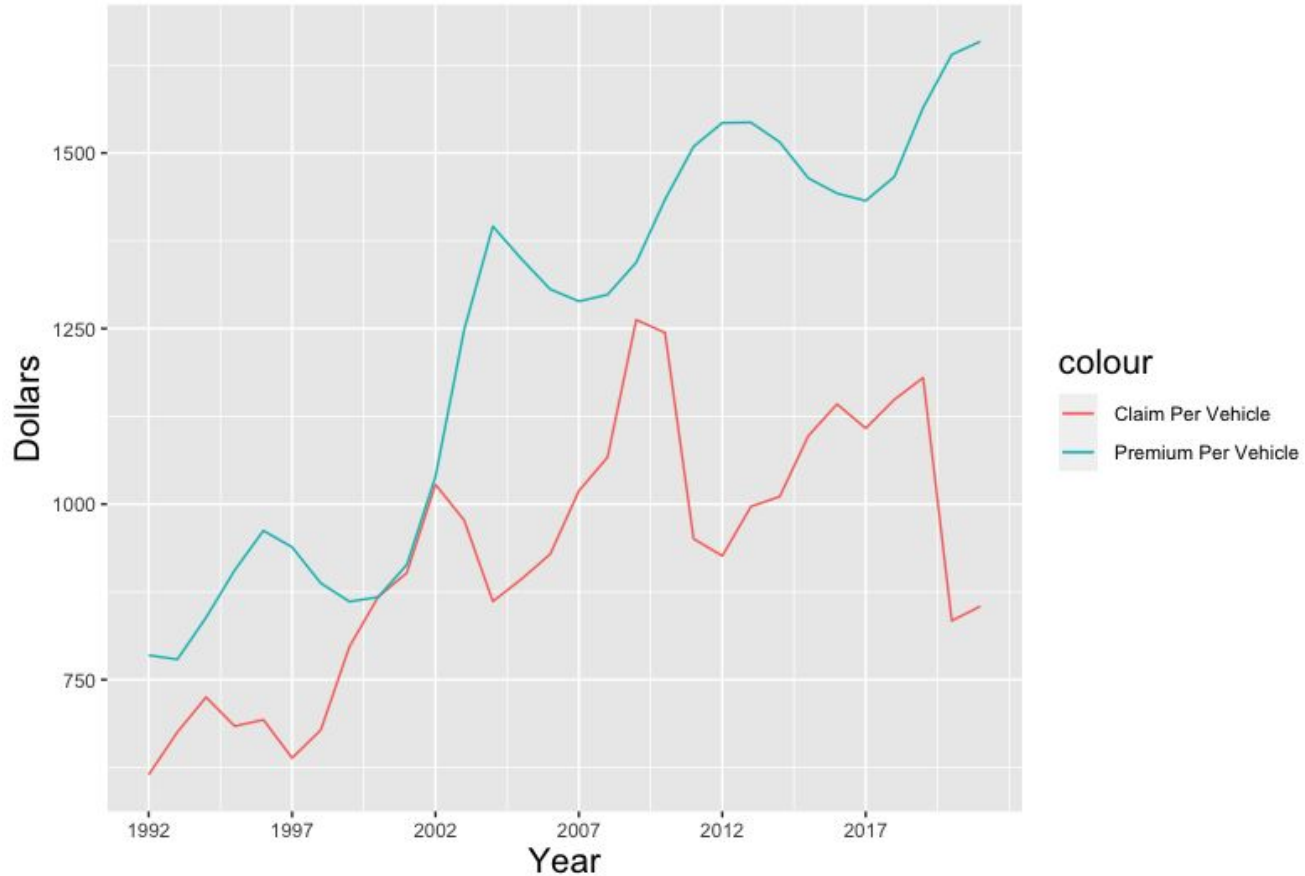
Number Claims per 100 Vehicles



Average Cost of a Claim



Marginal Claim Cost and Premium over Time



Premiums and Claims have diverged since 2010, claims costs peaked in 2010 while premiums have continues to hit new limits.

Theoretical Model



Discrete Choice Model - Barry 1994

- Utility of consumer i for product j depends on characteristics of the product and consumer
- Requires outside option
- Define mean utility level

$$\delta_j \equiv x_j \beta - \alpha p_j + \xi_j.$$

- Market Shares: Conditional on characteristics, and prices, consumer purchases k iff over all products, k maxes mean utility.

$$s_j(\delta(\mathbf{x}, \mathbf{p}, \xi), \mathbf{x}, \theta) = \int_{A_j(\delta)} f(\mathbf{v}, \mathbf{x}, \sigma_v) d\mathbf{v}$$



Other Models to Consider and Build

Producer - Regulator Model (Asymmetric Information)

- Producer applies to increase rates with some private information on claims, expenses, and public information on premiums
- Regulator sets a cap on profits and approves, denies, or adjusts based on public information, and signal of private information

Price (Premium) Leadership: Seaton and Waterson, 2013

- Dominant firm moves to change price and other companies follow
- Distinction between subsidiaries and other firms in industry

Empirical Model



Estimating Demand - Barry 1994

Logit

- Beta's are equal across companies
- Errors are i.i.d. across products with extreme value distribution function

$$\ln(s_j) - \ln(s_o) = \delta_j \equiv x_j\beta - \alpha p_j + \xi_j,$$

Nested Logit

- Added component: Partition the set of products
- Clear starting point: Group by ownership

$$\ln(s_j) - \ln(s_o) = x_j\beta - \alpha p_j + \sigma \ln(\bar{s}_{j/g}) + \xi_j,$$



Preliminary Results

Demand Regression:

$$\ln(s_{jt}) - \ln(s_{ot}) = \mathcal{B}(p_{jt} - p_{ot}) + \epsilon_j$$

Regression Results for Demand Estimation:

	OLS Earned	OLS Earned, Owners	OLS Written	OLS Written, Owners
diff_earned_price	-0.00114*** (0.00007)	-0.00080*** (0.00006)		
	[-0.00128, -0.00101]	[-0.00092, -0.00068]		
diff_written_price			-0.00114*** (0.00007)	-0.00079*** (0.00006)
			[-0.00127, -0.00100]	[-0.00091, -0.00067]
Num.Obs.	1134	678	1134	678
R2	0.196	0.201	0.196	0.202
RMSE	2.11	1.52	2.11	1.52

Outside Option: Use Gore Insurance



Elasticity and Markup Intervals

$$\mathcal{E}_d = \frac{p}{s} \frac{ds}{dp} = \frac{p}{s} \mathcal{B} s (1 - s)$$

$$\mathcal{E}_d = p \mathcal{B} (1 - s)$$

$$\text{Markup} = \frac{1}{\mathcal{E}_d}$$

OLS:

- Elasticity [-2.0, -1.58]
- Markup [50%, 63%]

OLS (Owners):

- Elasticity [-1.41, -1.04]
- Markup [70%, 96%]

Next Steps and Avenues of Research



Things to Add to the Regressions

Inattention

- Do current policy holders continue to look for lower rates?
- Switching costs

Claims Data

- Aggregate claims data correlates with individual company premium
- Possible IV



Estimation Goals

Expense Ratio: The province has maintained the same assumption of non-claims costs in the late 80's. Have business really gotten no more efficient?

- If the true expense ratio is $>25\%$, then rates were approved to be higher than they should have been

Cost pass through: Policy change in 2010, to what degree did the drop in claims costs get passed on to the consumer?

- If the gap between premiums and costs were being kept close together by the regulator we would see a large percent of costs being passed through as a reduction in premiums for the consumer



Thank You for Your Time

Please feel free to provide any feedback, comments, questions, and concerns.