Adverse Selection and (un)Natural Monopoly in Insurance Markets

Authors: Kong, Layton, and Shepard, 2023

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Overview

Overview

Motivation

- Adverse selection has long been a focus of research into health insurance markets
- Selection can alter prices, change contract design, and even lead to the complete unraveling of markets
- Moreover, regulations and incomplete information typically prevent companies from price discriminating
- Considers the roll that adverse selection can play in insurance market structure

Motivation

- While studies often focus on markets with a fixed structure, effects on firm entry decisions may also be relevant
- Argues that when lower cost enrollees are also more price sensitive, it can result in a reduction in the number of firms that can be sustained in equilibrium
- This is particularly relevant in settings where insurance plans are purchased in regulated competitive markets

Example

- Suppose there are 2 health insurance operating in a market, each charging $350 in monthly premiums with separate networks of doctors and hospitals
- All else equal, 50% of people prefer the network covered by Plan A while 50% prefer that of Plan B. There are two types of people, good and bad health, and that each of these make up half of the enrollees in each plan.
- Bad health enrollees care more about how close the nearest doctor is than good health enrollees. As a result, they are less price sensitive than good health enrollees

Example

- Now, consider what would happen if insurance Plan A reduced its price to \$345. They would lose \$5 from the 50% of people who were already on their plan.
- However, they would gain a substantial portion of the good health enrollees in Plan B, who are less concerned about how convenient the network covered by Plan B is.
- As a result, the average cost per enrollee and increased demand may counteract the loss of revenue from the price reduction from existing enrollees
- This may very well result in the only equilibrium being one in which only a single firm can remain in the market

Overview

"Simple" Model

- The authors illustrate the main features of the issue with a more simple version of it
- There is a population of people located uniformly (geographically) on a unit circle and N firms located equidistantly around the edge
- Fixed cost F for the firms and the insurance products have a constant value V to all consumers
- Two types of consumers, the healthy L types and unhealthy H types, whose population shares are θ_L and $\theta_H = 1 - \theta_L$
- Type H costs C_H for the insurer and gets disutility t_H for each unit of distance travelled (analogous for type L)
- We assume that $C_H > C_L$ and $t_H > t_L$

"Simple" Model

- The utility for person of type i getting insurance from company j is (where ℓ corresponds to location)

$$U_{ij} = V - t_i \cdot \|\ell_i - \ell_j\| - P_j$$

- If all prices are the same, each firm has a demand share of $\frac{1}{N}$
- With differentiated prices, person of type i will choose j if $U_{ij} > U_{ij-1}$

$$\Leftrightarrow \|\ell_j - \ell_i\| - \|\ell_{j-1} - \ell_i\| < \frac{1}{t_i}(P_{j-1} - P_j)$$

- From the properties of uniformity, the firm j share of total demand from type i as a function of all prices, P is $D_{ij}(P) = \frac{1}{N} - \frac{1}{2t_i}((P_j - P_{j-1}) + (P_j - P_{j+1}))$
- Importantly, firms compete with their neighbors

"Simple" Model

- From above, the partial derivative of demand wrt price is $\frac{1}{t_i}$. Profits are:

$$\pi_j(P) = ((P_j - C_H)\theta_H D_{Hj}(P) + (P_j - C_L)\theta_L D_{Lj}(P) - F$$

- Thus, the FOC is

$$\theta_H D_{Hj}(P) + \theta_L D_{Lj}(P) = \frac{1}{t_L}(P_j - C_L)\theta_L + \frac{1}{t_H}(P_j - C_H)\theta_H$$

- In a symmetric equilibrium, all firms will charge P^* and demand shares will be $\frac{1}{N}$:

$$P^* = \underbrace{\frac{\frac{1}{t_L}\theta_L C_L + \frac{1}{t_H}\theta_H C_H}{\frac{1}{t_L}\theta_L + \frac{1}{t_H}\theta_H}}_{\text{MC}} + \underbrace{\frac{\frac{1}{N}}{\frac{1}{t_L}\theta_L + \frac{1}{t_H}\theta_H}}_{\text{Lerner Markup}}$$

"Simple" Model

- We can express average costs as $\theta_L C_L + \theta_H C_H$
- Because $t_H > t_L$, we have that

$$\frac{\frac{1}{t_L}\theta_L}{\frac{1}{t_L}\theta_L + \frac{1}{t_H}\theta_H} > \theta_L \text{ and } \frac{\frac{1}{t_H}\theta_H}{\frac{1}{t_L}\theta_L + \frac{1}{t_H}\theta_H} < \theta_H$$

- Which implies $AC - MC > 0$
- To meet the conditions of optimality, we must have that

$$P^* - AC(P) - F \cdot N = MC(P) - AC(P) + \frac{\frac{1}{N}}{\frac{1}{t_L}\theta_L + \frac{1}{t_H}\theta_H} - F \cdot N > 0$$

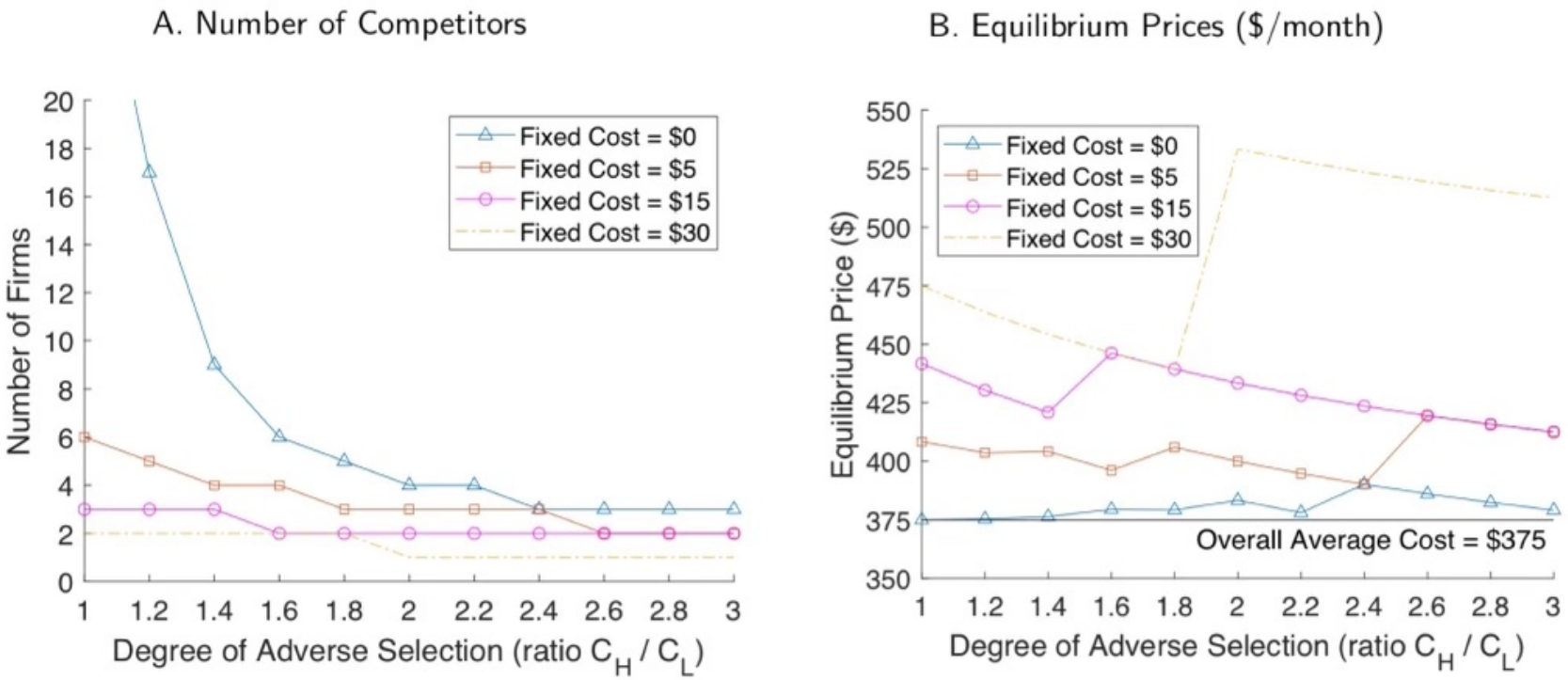
- In the case of no fixed cost, this simplifies to

$$N < \frac{1}{(AC - MC)(\frac{\theta_L}{t_L} + \frac{\theta_L}{t_H})}$$

- Thus, the degree of adverse selection (AC-MC) creates a limit on the number of firms the market can support, which is exacerbated by the fixed cost

"Simple" Model

Figure 2. Equilibrium Number of Competitors and Prices in Simple Model



Overview

Empirical Setting

- The paper examines on the subsidized insurance exchanges in Massachusetts following the state's health care reform
- Created regulated insurance markets and provided income-linked subsidies for those earning less than 300% of the poverty line
- The market regulations included risk adjustment and price floors/ceilings
- The paper uses administrative data on enrollment, claims, and beneficiary demographics

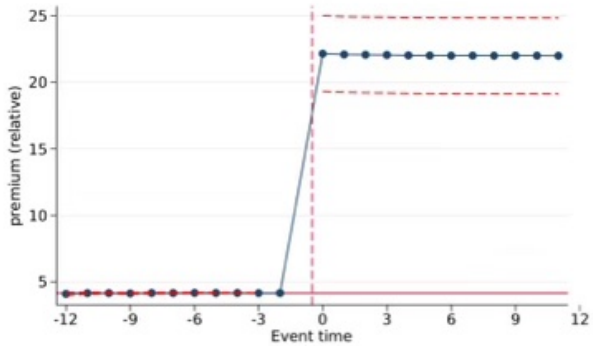
Empirical Evidence

- First examines case studies in which plans undercut one another. In one case, a plan dropped premiums by $100 per month to have the cheapest plan in the market
- In response, their market share tripled and their average cost fell by $150 per month
- Meanwhile, the plan that was undercut (previously the cheapest) saw its market share almost halve while its average cost spiked
- Similar responses occurred to other (less dramatic) cases of undercutting
- Then turns to a stacked event study design where events are price changes and differential exposure to price changes is used to identify price elasticities and the slopes of average cost curves

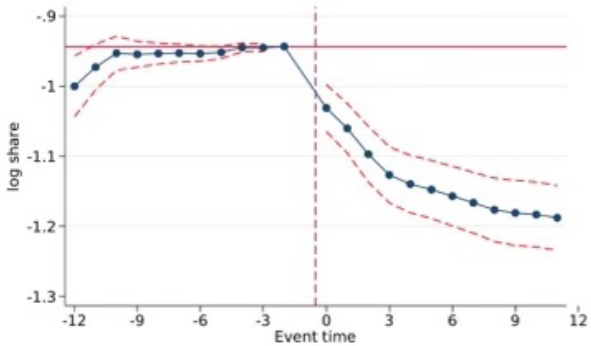
Event Study

Figure 6. Pooled Event Study Estimates for All Enrollees

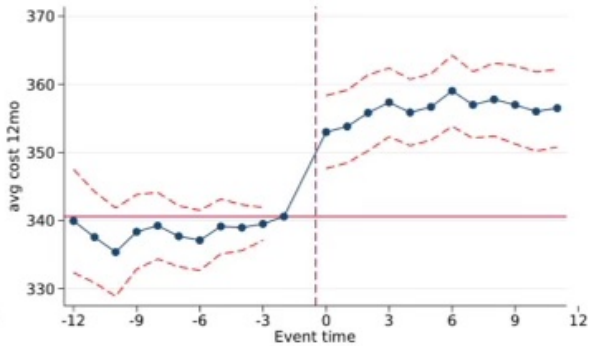
(a) Relative Premiums ($/month)



(b) Log Market Shares



(c) Average Cost ($/month)



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Strucural Estimation

- Does IO voodoo to estimate a multinomial choice model using the Massachusetts dataset
- Results imply a semi-elasticity of around 1.6 percent and a nearly 1:1 response of average cost to premium changes
- They also estimate a cost model to get expected costs for each insurer of covering each consumer
- The model predicts price responses that closely track the reduced form results
- The estimated demand model also indicates a strong positive correlation between costs and willingness to pay

Simulations

- Conducts policy simulations to analyze the effect of two policies - risk adjustment and price floors - on number of firms sustained and equilibrium prices
- The model has two stages of firm decisions - first the entry decision, then Nash-Bertrand price setting
- Equilibria are defined as a set of prices and entry decisions such that the prices are best responses to those set by others, no firms that enter make negative profits, and no firms could profitably enter the market
- They assume everyone purchases insurance, so they cap the price set by a monopolist at $475 per month

Simulations

- Under the estimated parameters of the model, the market can only support a single monopolist
- The effects of risk adjustment are mixed, with moderate levels generating improvement for consumers via competition but full adjustment making consumers worse off than moderate since there is no longer an incentive to attract healthier enrollees via lower prices
- Price floors, particularly those just above the average cost among all enrollees in the market, were also highly effective and interestingly often resulted in lower prices by limiting the undercutting incentive

Overview

Discussion

- I found the paper interesting though at times difficult
- There were some counter-intuitive results relating to things like price floors and risk adjustment
- Very policy relevant given the limited competition on ACA exchanges in recent years
- Was a good application of 410-3 concepts
- Unsure how adding the extensive margin would work - not particularly relevant in MA, but very relevant with the ACA