Noncommitment Model (SGPNE)

$\theta \sim U[0,1]$. Value good at θ per pd.
Two period model.
Suppose you sell to $[\theta_1, 1]$ at $t=1$.
Then, at $t=2$, $D(p) = \theta_1 - p$
at $t=2$, $p_2^*(\theta_1) = \theta_1/2$
$q_2^*(\theta_1) = \theta_1/2$

Then, $\pi^*(\theta_1) = \underbrace{(1-\theta_1)}_{q_1}\underbrace{(\theta_1 + \theta_1/2)}_{p_1} + \frac{\theta_1^2}{4}$

(θ_1): $\frac{3}{2} - \frac{5}{2}\theta_1 = 0 \Rightarrow \theta_1^* = \frac{3}{5}$

Thus, $q_1 = \frac{2}{5}$, $p_1 = 9/10$
$q_2 = \frac{3}{10}$, $p_2 = \frac{3}{10}$

Commitment

$D(p) = 1-p$ 1 period:
$\Rightarrow p^* = \frac{1}{2}$ (per period)
Durable goods: $p_1 = 1$, $p_2 = \frac{1}{2}$,
$q_1 = \frac{1}{2}$, $q_2 = 0$

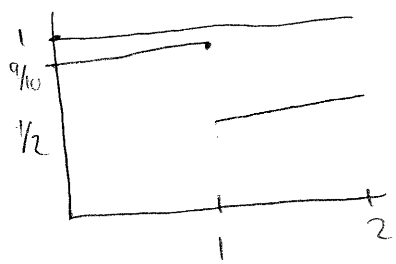
Observations

1. Decreasing price sequence
2. $\pi^{NC} = (\frac{2}{5})(\frac{9}{10}) + (\frac{3}{10})(\frac{3}{10}) = \frac{36+9}{100} = \frac{45}{100} < \frac{1}{2} = \pi^C$

   The monopolist is hurt by the lack of commitment ability.
3. $p_1^{NC} < p_1^C$

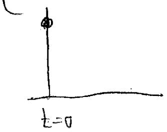
Coase conjecture

Suppose monopolist sets prices at $0, \Delta T, 2\Delta T, \ldots$ where $\Delta T \to 0$.



Conjecture: $\pi^*(\Delta T) \longrightarrow 0$ as $\Delta T \to 0$

$\Rightarrow p(t;\Delta T) \longrightarrow c$

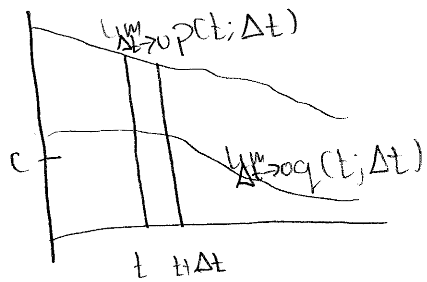
$q(t;\Delta T) \longrightarrow$ 

everyone buys at $t=1$

$\Rightarrow$ No deadweight loss.

For proof, see Fudenberg/Tirole, ch. 10.2.

Sketch of indirect proof



at time t, monopolist can charge $\lim_{\Delta t \to 0} p(t+1;\Delta t)$. Loss to using this strategy: people who would have purchased at t pay less: $\underbrace{q(t,\Delta t)\,\Delta t \cdot \frac{dp}{dt}\,\Delta t}_{\text{second order in } \Delta t}$

But monopolist gains: $\underbrace{(1-e^{-r\Delta t})}_{\text{first order in } \Delta t} \cdot \underbrace{\pi(\text{all future consumers})}_{\neq 0 \text{ by assumption}}$

The gains will exceed the losses $\Rightarrow$ The monopolist <u>wants</u> to cut the price earlier.

In equilibrium need either that $\frac{dP}{dt}$ is large or π(all future consumers) goes to zero.

The Coase conjecture isn't really an active research area

<u>Avoiding Coase conjecture</u>

1) Reputation

2) Rentals vs sales (commitment problem disappears)
- antitrust problems

- moral hazard problem.

3] Price protection guarantee
- makes it possible to charge monopoly price.

4] Inflow of new consumers.
5] Delays in consumer search. (lower bound on Δt).
6] Menu change costs. (Δt becomes endogenous.)

Multiproduct monopoly

Two goods: $x_1(p_1, p_2)$, $x_2(p_1, p_2)$

$$\max_{p_1, p_2} (p_1 - c) x_1(p_1, p_2) + (p_2 - c) x_2(p_1, p_2)$$

$$(p_i): \quad (p_i - c)\frac{\partial x_i}{\partial p_i} + x_i(p_1, p_2) + (p_j - c)\frac{\partial x_j}{\partial p_i} = 0$$

$$\Rightarrow \frac{p_i - c}{p_i} = -\frac{x_i(p_1, p_2)}{p_i \frac{\partial x_i}{\partial p_i}} - \frac{p_j - c}{p_i \frac{\partial x_i}{\partial p_i}} \frac{\partial x_j}{\partial p_i}$$

$$= -\frac{1}{\varepsilon_{ii}} + \underbrace{K}_{>0} \frac{\partial x_j}{\partial p_i}, \quad \varepsilon_{ii} = \frac{\partial x_i}{\partial p_i} \cdot \frac{p_i}{x_i}$$

If $\frac{\partial x_j}{\partial p_i} > 0$, $\frac{p_i - c}{p_i} > -\frac{1}{\varepsilon_{ii}}$ (i, j are substitutes)

If $\frac{\partial x_j}{\partial p_i} < 0$, $\frac{p_i - c}{p_i} < -\frac{1}{\varepsilon_{ii}}$ (i, j are complements.)

Chevalier + Goolsbee: "Are Durable Goods Consumers Forward Looking?"

Motivations for doing empirical work

1. General insights into theories.
   - Do consumers/firms behave as we assume/derive?
   - are the effects quantitatively important?

2. Learn about particular examples.

NEIO (New empirical industrial organization.)
- post 1975
- focus on a single industry

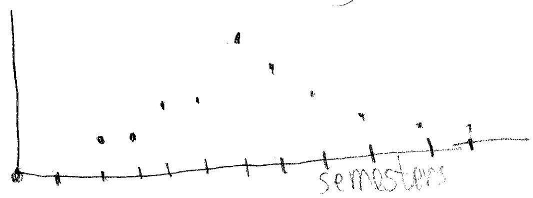
What industry do you pick to study?
- Industry should be interesting
- Industry should be easy to examine.
- Data availability (most data is privately held.)

Chevalier and Goolsbee

Questions
1. Do consumers pay attention to future prices in a rational way?
2. Optimal durability theorem.
3. Textbooks - "introduce new editions to eliminate used book market?"
   - Optimal durability theorem suggests this is not true.

- # books is the # of observations
- industry structure is one in which authors have prior knowledge
- waiting is not an issue. (not much intertemporal or inter-book substitution, cond. on assignment.)

Revision probability



<u>Question</u>: Does the willingness to pay decline as the revision hazard increases?

(*) In I/O, people do not believe survey data.

<u>Model</u>: We are interested in WTP, but we only observe demand.

$$u_{ijt} = \begin{cases} X_{jt}\beta - \alpha\left(p_{jt} - \delta(1-\overbrace{P[die_{jt}]}^{\text{what is prob. textbook dies?}})\mu p_{jt}\right) + \overbrace{\xi_{jt}}^{\text{random component of book}} + \overbrace{\varepsilon^{new}_{ijt}}^{\text{idiosyncratic error}} & \text{if buy new} \\ f(X_{jt}) + \varepsilon^{used}_{ijt} & \text{if buy used} \\ \varepsilon^{none}_{ijt} & \text{if buy none} \end{cases}$$

consumer, industry, time

(From Econometrics)

<u>Prop</u>: assume ε^{new}_{ijt}, ε^{old}_{ijt}, ε^{used}_{ijt} are iid extreme value type I random variables. (logit).

Then

$$\log q^{new}_{jt} - \log q^{none}_{jt} = X_{jt}\beta + \alpha\left(p_{jt} - \delta(1-P[die_{jt}])\mu p_{jt}\right) + \xi_{jt}$$