

# Monopoly

Glenn Ellison

# Monopoly Information Design

Altering the information consumers receive about a product will affect profit and consumer surplus.

Ex. Fully informed consumers have  $v \sim U[0, 18]$ .  $c=6$ .

**With full info** monopoly price is  $p^m = 12$

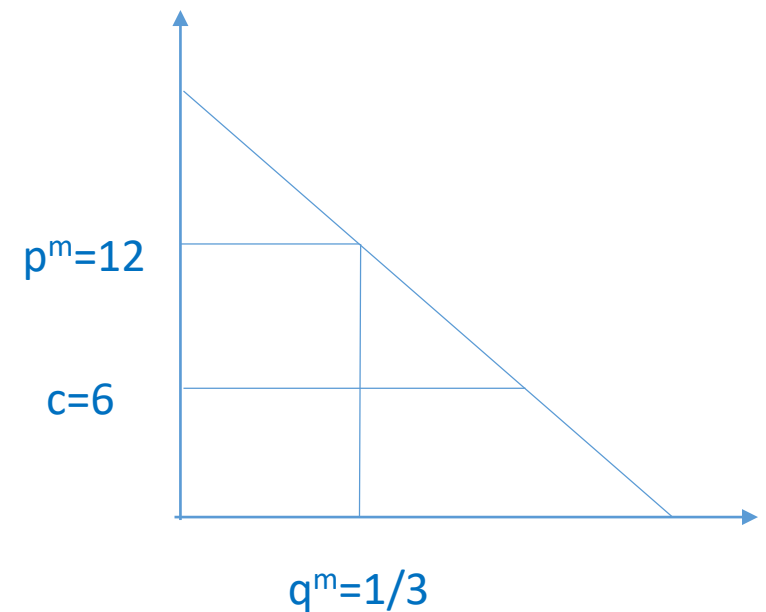
- Profit  $\pi = \frac{1}{3} \cdot (12 - 6) = 2$ . CS  $= \frac{1}{2} \cdot \frac{1}{3} \cdot 6 = 1$ .

**With no info** all have  $E(v) = 9$  so  $p^m = 9$ .

- Profit  $\pi = 1 \cdot (9 - 6) = 3$ . CS = 0.

**A partial info example** had  $p^m = 10$ .

Profit  $\pi = \frac{2}{3} \cdot (10 - 6) = \frac{8}{3}$ . CS  $= \frac{2}{9} \cdot (16 - 10) = \frac{4}{3}$ .



# Monopoly Information Design

## Partial Information Can Increase Consumer Surplus

The partial information example assumed the ability to provide a signal related to each consumer's value:

$$s = \begin{cases} L & \text{if } v \in [0,6] \\ M & \text{if } v \in [6,14] \\ H & \text{if } v \in [14,18] \end{cases}$$

Bayesian updating from such a signal has

$$E(v|L) = 3$$

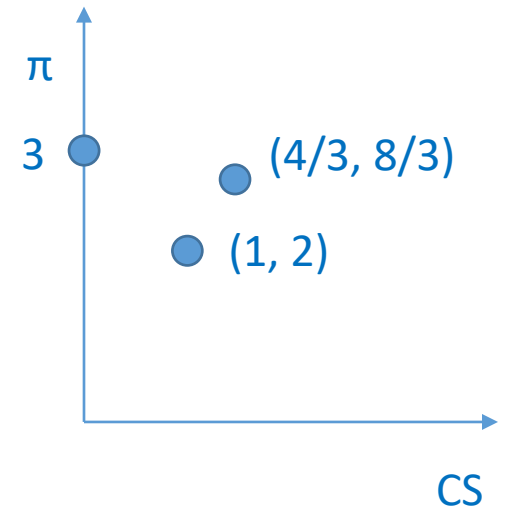
$$E(v|M) = 10$$

$$E(v|H) = 16$$

The posterior distribution of the consumer's valuations is then a three point distribution with probability  $1/3$  on  $v = 3$ ,  $4/9$  on  $v = 10$ , and  $2/9$  on  $v = 16$

Under this information structure monopoly pricing is socially efficient.

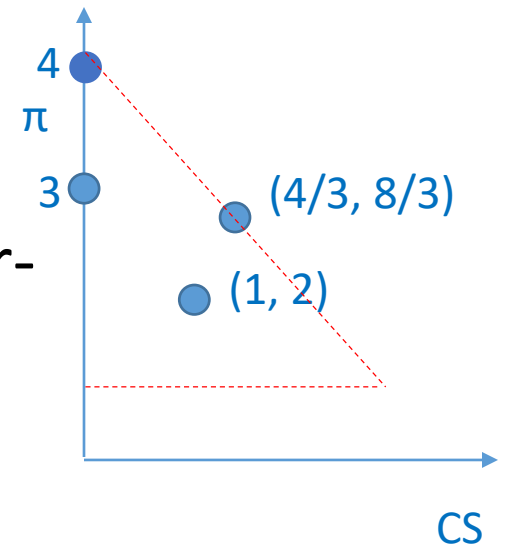
Consumers and the monopolist are both better off than with full information.



# Monopoly Information Design

## Buyer Optimal Information Structures

Roesler and Szentes (*AER* 2017) characterize both the buyer-optimal information policy and the full set of possible surplus divisions for the problem with unit demands with  $v \sim F$  on  $[0, 1]$  and  $c=0$ . Write  $\mu = E_F(v)$ .



Suppose the platform can choose any joint distribution on  $(v, s)$ .

WLOG we can assume  $s = E(v|s)$ . Consumer decisions will depend only on  $E(v|s)$ , so we might as well give them this number directly.

Write  $G$  for the CDF of  $s$ . Note that  $v = s + \varepsilon$ , with  $E(\varepsilon|s) = 0$ , so  $F$  is a mean-preserving spread of  $G$ . This implies that  $E_G(s) = \mu$ .

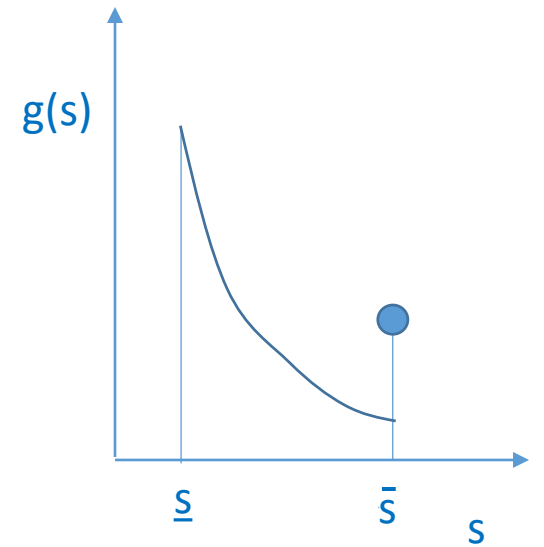
The monopolist's price depends on the joint distribution of  $(v, s)$  only through  $G$ . So profits and consumer surplus only depend on  $G$ . We focus on choosing  $G$ .

# Monopoly Information Design

Roesler-Szentes (2017)

Step 1: Choose best  $G$  from a limited class.

$$\text{For parameters } \underline{s}, \bar{s} \text{ define } G_{\underline{s}, \bar{s}}(s) = \begin{cases} 0 & \text{if } s < \underline{s} \\ 1 - \frac{s}{\bar{s}} & \text{if } s \in [\underline{s}, \bar{s}) \\ 1 & \text{if } s \geq \bar{s} \end{cases}$$



If the platform chooses  $G_{\underline{s}, \bar{s}}(s)$ , then  $\pi(p) = p \left( 1 - G_{\underline{s}, \bar{s}}(p - dp) \right) = p \left( \frac{s}{p} \right) = \underline{s}$  is constant for all  $p \in [\underline{s}, \bar{s}]$ , so  $\underline{s}$  is a profit-maximizing price.

Trade always occurs at this price, so

Consumer Surplus = Maximized Social Surplus – Profit = Max Social Surplus –  $\underline{s}$ .

Observation 1: Within this class of  $G$ 's the consumer optimal solution is clear: we want to choose the smallest possible  $\underline{s}$  subject to the constraint that  $F$  must be a mean preserving spread of  $G_{\underline{s}, \bar{s}}$ .

For any  $\underline{s} < \mu$  we can find an  $\bar{s}$  for which  $E_{G_{\underline{s}, \bar{s}}}(s) = \mu$ . But the required  $\bar{s}$  might be bigger than 1. So there is a strictly positive lower bound on  $\underline{s}$ .

# Monopoly Information Design

Roesler-Szentes (2017)

Step 2: Show that no other distribution  $G$  can give greater consumer surplus than is possible with some  $G_{\underline{s}, \bar{s}}(s)$ .

An outline of this argument is:

1. Suppose  $G$  is a valid choice. Then  $F$  is a mean preserving spread of  $G$ . Write  $\pi$  for the profit given this distribution.
2. Consider the distribution  $G_{\pi, \bar{s}}$  that has  $E_{G_{\pi, \bar{s}}}(s) = \mu$ . It gives the same profit as  $G$ . It also maximizes social surplus. So it gives at least as much consumer surplus as  $G$ .
3. To complete the proof it remains only to show that  $G_{\pi, \bar{s}}$  is a valid choice. To show this, it suffices to show that  $F$  is a mean-preserving spread of  $G_{\pi, \bar{s}}$ . By transitivity of the mean-preserving-spread property it suffices for this to show that  $G$  is a mean-preserving spread of  $G_{\pi, \bar{s}}$ .

To see this, recall that (given the identical means)  $G$  is a mean-preserving spread of  $G_{\pi, \bar{s}}$  if the CDF of  $G_{\pi, \bar{s}}$  crosses the CDF of  $G$  once from below as  $s$  goes from 0 to 1.

$G_{\pi, \bar{s}}$  was chosen so that  $G_{\pi, \bar{s}}(\pi) = 0$ . Obviously, this makes the CDF as small as possible for  $s < \pi$ . For all  $p \in [\pi, \bar{s})$  we have  $p(1 - G(p)) \leq \pi = p(1 - G_{\pi, \bar{s}}(p))$ , so  $G(s) \geq G_{\pi, \bar{s}}(s)$  also holds for  $s \in [\pi, \bar{s})$ . Above  $\bar{s}$  the CDFs reverse,  $G(s) \leq G_{\pi, \bar{s}}(s)$  because  $G_{\pi, \bar{s}}(s) = 1$ . So they do cross once as desired. (The crossing is at  $\bar{s}$ .)

# Monopoly Information Design

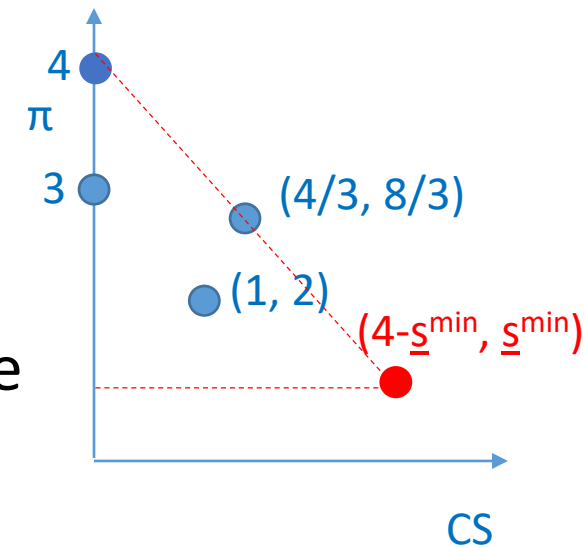
Roesler-Szentes (2017)

Full characterization:

- The full set of possible profit/consumer surplus divisions is the right triangle below and to the left of the profit-maximizing and consumer-surplus maximizing points.

The argument for this is not too hard:

- With the signal structure  $G_{\underline{s}^{min}, \bar{s}}$  the monopolist is indifferent over all prices in the interval  $[\underline{s}^{min}, \bar{s}]$ . This signal structure with a higher price can get us all points on the red dashed line to the left of  $(W^{max}, \underline{s}^{min})$ .
- For any  $s \in [\underline{s}^{min}, \mu]$ ,  $G_{s, \bar{s}}$  is a valid signal structure. Setting the lowest possible price with such signals gets us all the points on the dashed 45 degree line.
- Again, we can get points to the left by using the same signals and having the indifferent monopolist charge a higher price.

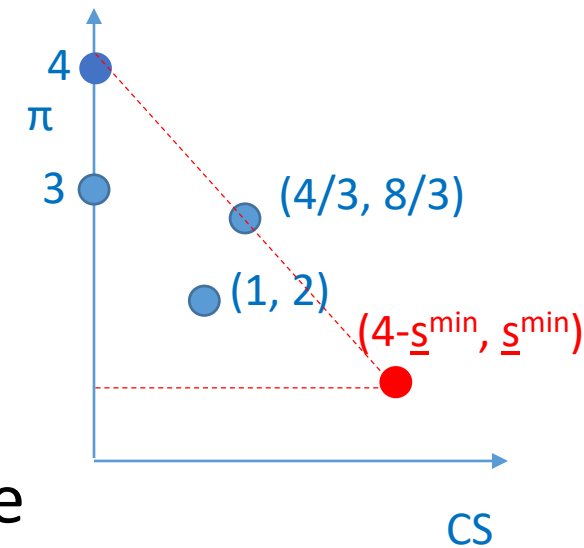


# Monopoly Information Design

Roesler-Szentes (2017)

Main ideas to take away:

- The profit maximizing information structure is simple: telling consumers only that their value is at least  $c$  lets the monopolist achieve full efficiency and extract all surplus.
- A good way to think about information design is to think about choosing the distribution of the consumer's posterior.
- To minimize profit we choose a distribution with just a few high-value consumers and a steep peak of moderate-value consumers that keeps the monopolist just indifferent to raising its price.





# A Brief History of Empirical IO

- Today, I'll be covering a couple of fairly recent empirical IO papers related to monopoly pricing.
- First, though, I'll go back in time and trace out the evolution of empirical work in IO.
- I hope this is useful for understanding how people in IO think about empirical work, and that it may point out some opportunities.
- I think of empirical IO as having four overlapping eras:
  - Early empirical IO
  - The Structure-Conduct-Performance paradigm
  - The New Empirical Industrial Organization (NEIO) revolution
  - Structural empirical IO

# A Brief History: Early empirical IO

- Before 1960s, empirical work in IO consisted mostly of case studies.
- An IO economist would be an expert on a particular industry and write books about it, documenting lots of facts, noting interesting structures, mechanisms, or practices, speculating on their sources.
- The game theoretic approach to IO theory had not yet developed and limited interaction with theory.

Can be interesting!



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We used to have an assignment where we would send students to the library to track down a case study of their choice, read some of it, and think about it in connection with modern theory.

# A Brief History: Structure-Conduct-Performance

- The US Census of Manufactures surveys manufacturing firms every ten years and reports statistics broken down by industry.
- By the 1950s economists could perform regression analyses.
- Joe Bain pioneered regression studies in IO using census data, and developed the Structure-Conduct-Performance paradigm.
- The paradigm looked for broader truths that held across all industries.
- Papers typically regressed industry-level profits or Lerner indexes on factors related to industry “structure”: concentration ratios, barriers to entry, and advertising expenditures, etc.
- Regressions might have 150 or 450 observations and were treated as identifying causal effects of industry structure on markups.

One summer when Zvi Griliches was a graduate student, he ran a regression.

# A Brief History: Structure-Conduct-Performance

Many SCP papers were written in the 1960s and 1970s.

Many critiques to the paradigm also arose and became increasingly accepted.

- Idiosyncratic industry characteristics are important. For example, profits in the steel industry are affected by prices of iron ore and coking coal and the power of labor unions. If one includes all factors relevant to some industry on the RHS, there will be more RHS variables than observations.
- Variables in the census data can be poor measures of economic objects, and the measurement errors will covary with “structure”. Costs are not marginal costs, they include arbitrary accounting for depreciation, won’t treat advertising as a partially durable investment, etc.
- Endogeneity should matter, and it was not being addressed. How could industry structure and profits not be jointly determined in the equilibrium of some game?

There was an explosion of interest in game-theoretic IO theory in the late 70’s and early 80’s.

# A Brief History: The NEIO Revolution

The New Empirical Industrial Organization developed in the late 70's and early 80's and rapidly took over the empirical side of the field.

NEIO had several features that distinguished it from earlier work, although some elements were a return to the earlier norms.

- The focus was typically on a single industry, so relevant details, regulations, institutions, etc., could be captured and accommodated in the analysis.
- Focus was placed on what was well measured, such as prices charged and quantities sold, rather than on variables like costs and profits that could be accounting fictions.
- There was a great deal of attention paid to identification and endogeneity.
- Theory became central. Analyses often relied on some theory to motivate the specifications. Analyses were often motivated by a desire to assess the applicability of or enrich our understanding of some model.

# A Brief History: Structural empirical IO

From the beginning the NEIO revolution included work that was described as structural: attempts to estimate the underlying relationships like supply and demand that led to equilibrium outcomes.

Over time, the understanding of what is structural has shifted.

- Structural work is increasingly understood to involve assuming that some theoretical model is correct up to a set of to-be-estimated parameters.
- It often aims to estimate the most primitive determinants of outcomes: production functions and utility functions.
- Estimates of model primitives enable counterfactual simulations to predict the effects of alternate policies or market structure.
- Models are less connected to modern theory and tend to instead follow a set of standard empirical practices.

# Research Topics

Empirical IO papers can have multiple motivations:

- Provide insight on an applied/policy question.
- Improve understanding of some theoretical model.
- Improve on existing empirical techniques.

One can approach the problem of finding a topic in multiple ways:

- Identify an applied question and look for data to address it.
- Identify a theory that has received limited attention and investigate industries well suited to studying it.
- Identify an opportunity to collect rich data and think about policy questions/theories to study with it.
- Identify a potential improvement to the technique used in some paper.



# Back to Big Questions?

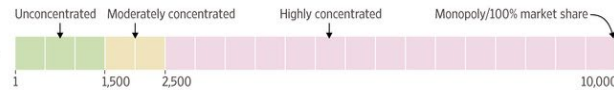
There has also been a recent revival of interest in “big” questions.

THE WALL STREET JOURNAL

## Measuring Concentration

The **Herfindahl-Hirschman Index (HHI)** is a widely accepted measure of market concentration. The Department of Justice and the Federal Trade Commission use it to determine the effects of a merger on an industry.

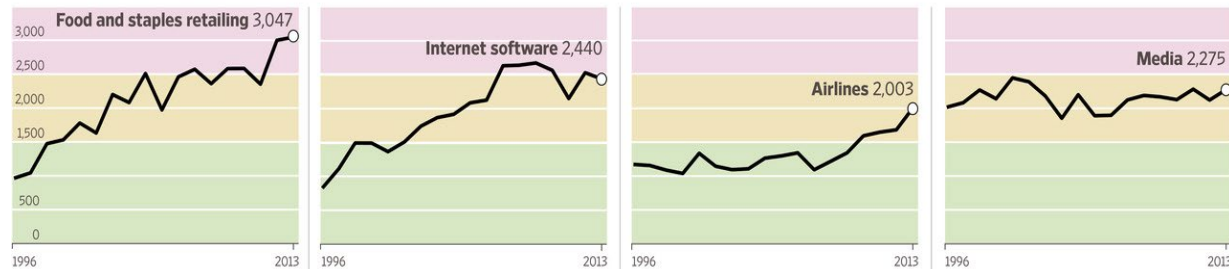
**Theoretical range: 1 to 10,000**  
The DOJ and FTC have the following general guidelines for measuring market concentration.



## A Company-Specific Approach

Researchers at USC developed an HHI score that is based on the combined mix of products and services a company sells. Gerard Hoberg and Gordon Phillips used securities filings to determine the specific markets in which each U.S.-based public company competes and calculated an HHI score. That differs from regulators, who typically measure concentration by studying a single market's participants.

Median custom HHI for companies primarily operating in each industry over time



## 2013 HHI's for select companies



Safeway, which was recently acquired by Albertsons, is one of a handful of large grocery chains that lead many markets, while Wal-Mart Stores—though huge—competes across many more lines of products, in some cases against significant competition. Rite Aid, like other large drug-store chains, has grown in part through mergers and acquisitions.

Even as the number of Internet companies has soared, many have stayed focused on specific markets, which they have come to lead, as with Twitter and Facebook. Even though Google dominates the search business, it competes in multiple industries, reflecting a lower overall HHI.

Although major U.S. airlines have consolidated significantly in recent years, they often compete head-to-head, keeping their individual HHIs lower. Airlines argue that competition remains strong, but the U.S. Justice Department is investigating pricing practices and allegations of anticompetitive behavior.

Within the media industry, several large companies have carved out leading market positions, including in advertising and live events.

Source: Department of Justice; Gerard Hoberg and Gordon Phillips, University of Southern California; S&P Capital IQ

THE WALL STREET JOURNAL

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COUNCIL OF ECONOMIC ADVISERS ISSUE BRIEF  
APRIL 2016

## BENEFITS OF COMPETITION AND INDICATORS OF MARKET POWER

### Introduction

This issue brief describes the ways in which competition between firms can benefit consumers, workers, entrepreneurs, small businesses and the economy more generally, and also describes how these benefits can be lost when competition is impaired by firms' actions or

sanction anticompetitive behavior, and help define the contours of antitrust law through court decisions. These measures not only have immediate effects on the behavior that is challenged but also may help deter anticompetitive abuses in the future.

Promoting competition extends beyond enforcement of

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## The Rise of Market Power and the Macroeconomic Implications

Jan De Loecker, Jan Eeckhout

NBER Working Paper No. 23687

Issued in August 2017

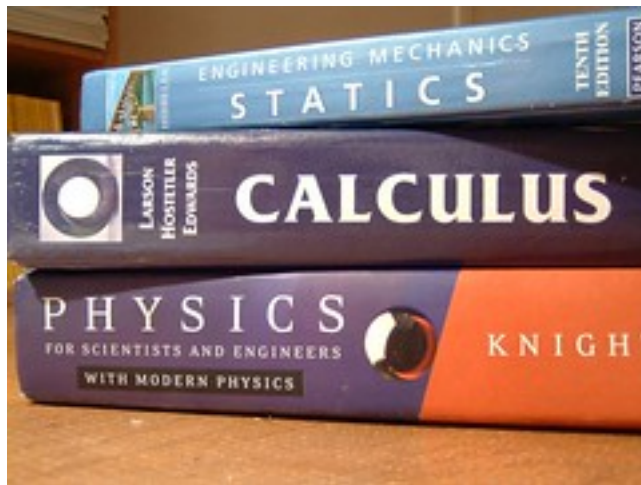
NBER Program(s): EFG IO PR

We document the evolution of markups based on firm-level data for the US economy since 1950. Initially, markups are stable, even slightly decreasing. In 1980, average markups start to rise from 18% above marginal cost to 67% now. There is no strong pattern across industries, though markups tend to be higher, across all sectors of the economy, in smaller firms and most of the increase is due to an increase within industry. We do see a notable change in the distribution of markups with the increase exclusively due to a sharp increase in high markup firms.

We then evaluate the macroeconomic implications of an increase in average market power, which can account for a number of secular trends in the last 3 decades: 1. decrease in labor share, 2. increase in  
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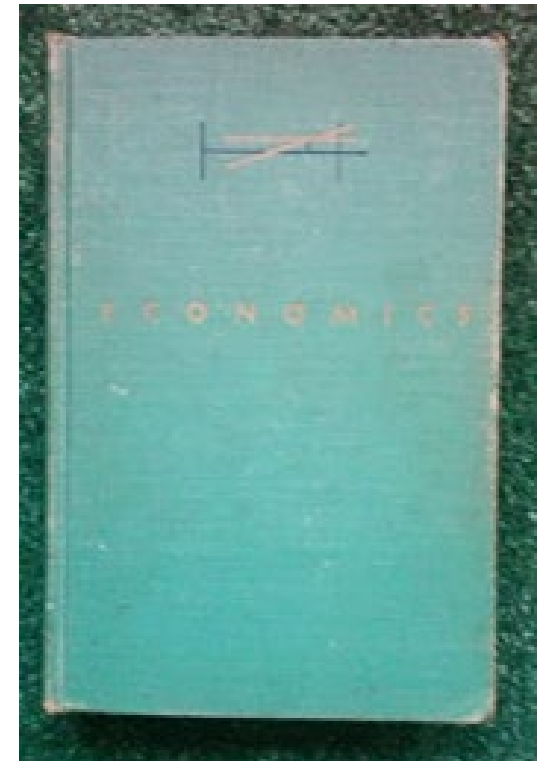


# “Are Durable Good Consumers Forward-Looking?: Evidence from College Textbooks”



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One of the best-selling textbooks of all time, Samuelson's "Economics." First edition available on AbeBooks for \$95 (very good condition).



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# “Are Durable Goods Consumers Forward Looking?” Chevalier-Goolsbee

## Motivation

The paper studies the market for college textbooks. It is jointly motivated by two of the goals I mentioned.

- Can we say anything about how relevant durable goods models are in practice?
  - Are consumers forward-looking and well informed?
- Can we comment on complaints/controversies over textbooks?
  - Do the revision cycles really reflect useful new information, or are they an attempt to create artificial obsolescence?
  - Why are textbooks so expensive?

# “Are Durable Goods Consumers Forward Looking?” Chevalier-Goolsbee

## Motivation

The topic choice reflects NEIO sensibilities.

- There are an industry-specific and theoretical questions of interest.
- The simplicity of the business makes modeling easier.
  - Students can't wait to buy so decision-making is static.
  - Students only consider the assigned text. This allows us to treat each book as an independent observation and makes demand estimation less complicated.
  - We can decide not to worry about “lemons” problems in the used market.
- The environment is good for data collection.
  - In the pre-Internet era most students bought books from college bookstores.
  - A firm had book assignments and course enrollments for a large number of courses and aggregate sales by textbook.
  - 3 subjects x 10 semesters x many textbooks provides degrees of freedom.

# “Are Durable Goods Consumers Forward Looking?” Chevalier-Goolsbee

## Background

Some basic facts about the environment are:

- New editions typically come out every 3-5 years.
- Textbook prices are roughly fixed over the cycle.
- The used/new price ratio is standardized at 50/75%. Bookstores will only buy back the current edition.
- Approximately 30% of students buy new books, 20% buy used books, we hope the others make extensive use of the library.
- Faculty assign textbooks. Students decide whether to buy the assigned book.
- The hazard rate for revision peaks in the third year. New editions are unlikely to be introduced when the most recent edition is very recent/very old.

# “Are Durable Goods Consumers Forward Looking?” Chevalier-Goolsbee

## Approach

The paper’s basic strategy for examining whether consumers are forward-looking is two step-approach:

- Estimate the probability that a book will be revised before the next semester.
- Examine whether students are less likely to purchase book when a revision is more likely. (The expected net price for such books is higher.)

Note that one might have taken a very different approach focusing on how firms price were it not for the basic fact about prices being fixed over the edition cycle.

# “Are Durable Goods Consumers Forward Looking?” Chevalier-Goolsbee

## Step 1

**Step 1:** Estimate hazard rate of new editions conditional on

- age
- field
- intro/advanced text

Here is the graph for intro books.  
They find peak at 2.5-3 years.

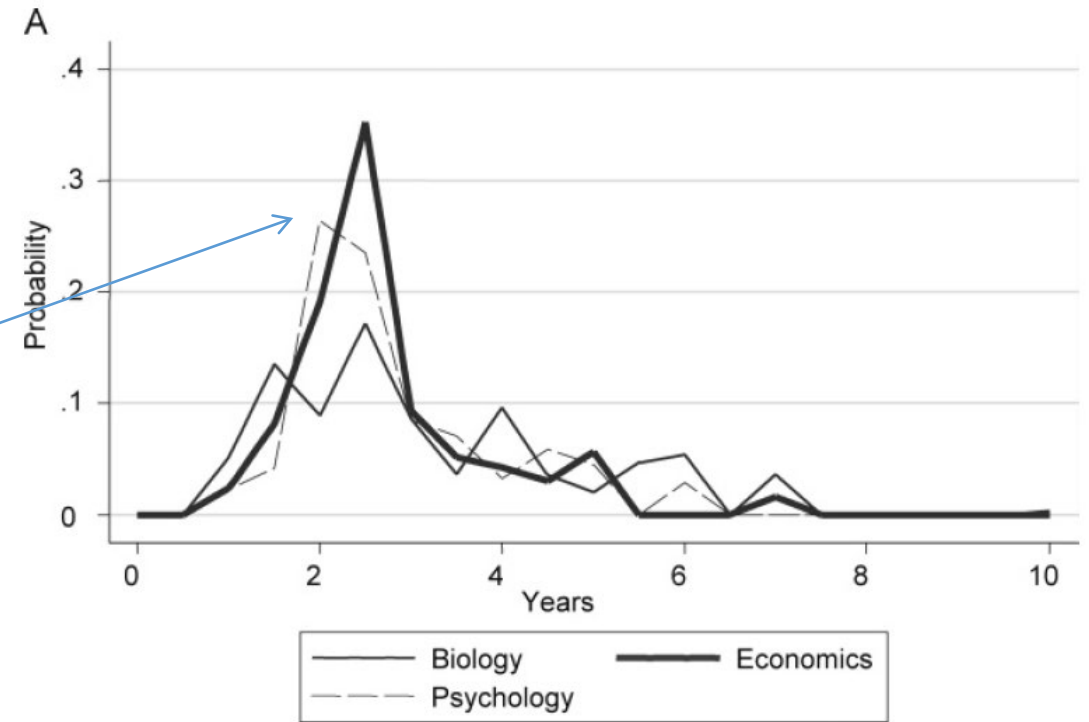


FIGURE IA  
Revision Hazard for Introductory Books by Age of Edition

# “Are Durable Goods Consumers Forward Looking?” Chevalier-Goolsbee

## Step 2

**Step 2:** Write down a model of demand and estimate

$$u_{ijt} = \begin{cases} X_{jt}\beta - \alpha(P_{jt} - \delta(1 - \text{Pr}(DIE)_{jt})\mu P_{jt}) + \zeta_{jt}^{new} + \epsilon_{ijt}^{new} & \text{if new} \\ F(X_{jt}^{used}) + \zeta_{jt}^{used} + \epsilon_{ijt}^{used} & \text{if used} \\ \epsilon_{ijt}^0 & \text{if none} \end{cases}$$

*from step 1* (circled around  $\text{Pr}(DIE)_{jt}$ )  
*~0.5---buyback discount* (pointing to  $\delta$ )  
*unobserved quality* (pointing to  $\zeta_{jt}^{new}$ )  
*price sensitivity* (pointing to  $\alpha$ )  
*book characteristics* (pointing to  $X_{jt}\beta$ )  
*discounting & perception of probability* (pointing to  $F(X_{jt}^{used})$ )  
*idiosyncratic consumer "type"* (pointing to  $\epsilon_{ijt}^{used}$ )

We will see many papers this semester where we start by writing down a consumer's utility function, assume a distribution for the errors, assume consumers maximize utility, and derive demand curves that way

# “Are Durable Goods Consumers Forward Looking?”

## Chevalier-Goolsbee

### Step 2

**Prop:** If  $\epsilon'$ s are *i.i.d.* across consumers and products, and have a type 1 extreme value distribution, then:

$$\ln \left( s_{jt}^{new} / s_{jt}^0 \right) = X_{jt}\beta - \alpha P_{jt} + \alpha \delta \mu (1 - \Pr(DIE)_{jt}) P_{jt} + \xi_{jt}^{new}$$

new book sales/assignments

(assignments - new book sales - (observed) used book sales)/assignments

Notes:

1. This fact allows us to easily estimate most parameters of the utility model using a regression.
2. We cannot, however, separately estimate  $\delta$  and  $\mu$ . Only their product is identified.
3. We will need an instrument for price because it would be correlated with  $\xi_{jt}^{new}$ . They use a dummy for having a nonprofit publisher, the fraction of nonprofit competitors, and a measure of market concentration.
4. Don't worry too much about the demand estimation for now--Tobias will cover that in week 4.



# “Are Durable Goods Consumers Forward Looking?,” Chevalier-Goolsbee

## Results

TABLE III  
BASIC DEMAND SPECIFICATIONS

Independent variables	(1)	(2)	(3)
Price	-0.060 (0.008)	-0.061 (0.012)	
$P \times (1 - DIE_{jt})$ : Price $\times (1 - \text{revision dummy})$	0.033 (0.003)	0.037 (0.003)	0.037 (0.009)
Econ dummy	0.116 (0.100)	0.092 (0.093)	
Biology dummy	-0.010 (0.092)	-0.004 (0.086)	
Intro book dummy	-0.143 (0.087)	-0.145 (0.078)	
% Shrink-wrapped	0.500 (0.100)	0.448 (0.112)	0.57 (0.26)
Average SAT	-0.0001 (0.0004)	0.00002 (0.0004)	0.001 (0.0007)
Fraction required	1.30 (0.23)	1.72 (0.17)	0.830 (0.238)
Edition age	-0.04 (0.01)	-0.024 (0.006)	-0.215 (0.034)
Paperback dummy	-0.50 (0.15)	-0.37 (0.22)	
Trade dummy		-0.63 (0.41)	
$\lambda$	0.55 (0.092)	0.61 (0.15)	
Sample	> \$40	All	> \$40
Model	Logit	Logit	Logit
Dummies?	Time	Time	Time, book
N	7,064	9,459	7,064

Can compute elasticity of demand at mean prices for students not facing revision (-1.63) versus facing revision (-3.95).

Define  $\lambda = \delta \mu$   
Assume  $\mu \in (.4, .75)$   
Myopia ( $\lambda = 0$ ) rejected.  
Point estimate suggests  $\delta$  close to one.

### Instruments for price:

- Nonprofit publisher
- Course-level share of non-profits
- Publisher course-level Herfindahl

### Instrument for DIE:

- predicted hazard

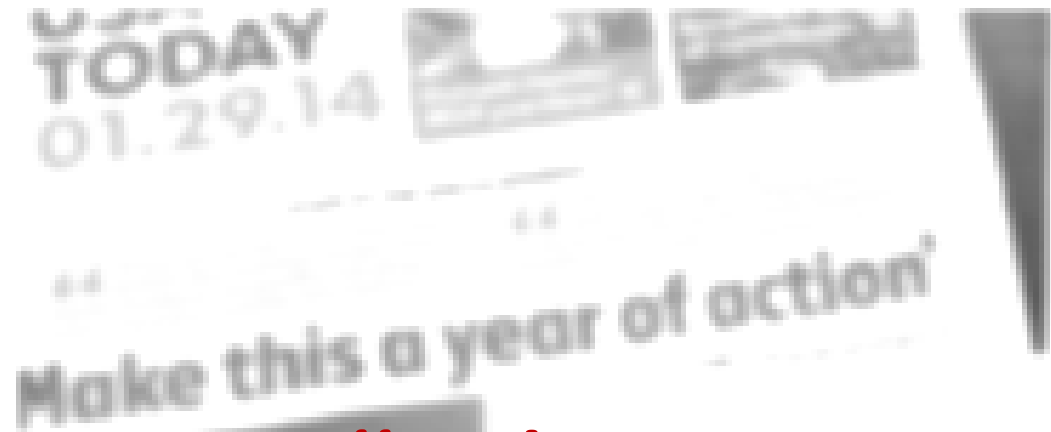
# “Are Durable Goods Consumers Forward Looking?” Chevalier-Goolsbee

## Comments

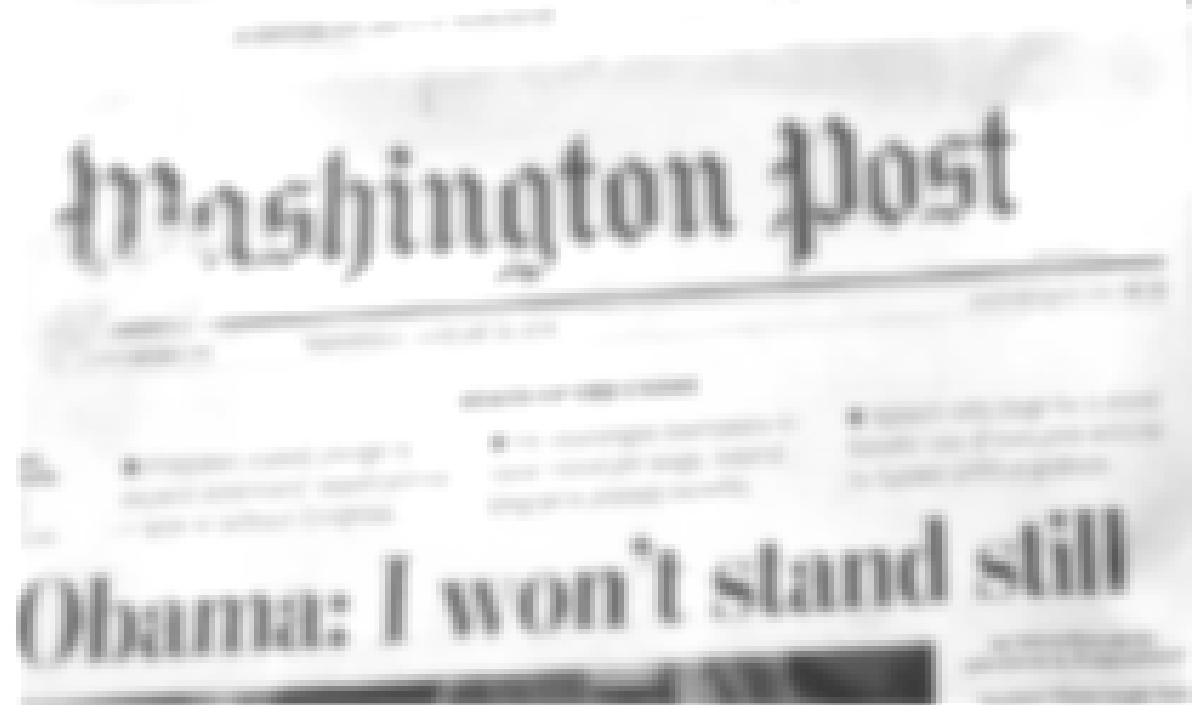
As with any paper one can think of potential concerns:

- Missing non-bookstore sales
  - Private used book sales seem potentially important and they have little data. They do estimate an alternative version assuming all assigned students buy either new or used
- Instruments
  - Absent a valid instrument the estimated price coefficient  $\alpha$  would be biased toward zero. If the estimated  $\alpha\delta\mu$  is unbiased, then we would overestimate  $\delta\mu$ .
- Distribution of errors
  - A converse of the Proposition is that the relationship will not hold if the errors are not *iid* extreme value
- Functional form identification
  - The predicted revision probability is a function of age and subject. We can't use it as an instrument and flexibly model the effects of age and subject.

One other nice feature of the paper is that they include some more recent data on Amazon used book prices and show that price effects are present: used book prices are lower when revisions are more likely; and used book prices drop dramatically when a new edition is listed as forthcoming.



**“What Drives Media Slant?:  
Evidence from US Newspapers”**



# “What Drives Media Slant?,” Gentzkow and Shapiro

## Motivation

Media slant is striking.

- FoxNews and Sinclair have tremendous reach within the US and present very different news from that seen on CNN, ABC, CBS, NBC, MSNBC, etc.
- Russia has imposed tight controls on media reporting of its war with Ukraine.

While the media control exerted by Putin, Berlusconi, Orban, etc. has clear political motivation, it is less clear whether US media slant necessarily reflects political motivations as opposed to simply being an example of a profit-maximizing firm optimally choosing product “quality”.

Gentzkow and Shapiro would ideally like to conduct a two-step investigation of this question using a sample of 429 local newspapers in the US.

- Step 1: Estimate the slant that would be chosen by a profit maximizing newspaper.
- Step 2: Compare the actual and profit-maximizing slants. Examine whether any differences are related to owner ideology.

What the paper actually does falls short of this aspirational description, but it has been influential for the questions it raised and for the techniques developed to quantify media slant.

# “What Drives Media Slant?,” Gentzkow and Shapiro

## Quantifying Media Slant

The paper uses speeches given on the floor of the US Congress and the full text of non-opinion news stories to measure media slant.

- Consider two- and three-word phrases that appear many but not too many times in newspaper headlines.
- Compute  $\chi^2$  statistic testing whether frequency of use differs by party. Select 1000 phrases with the largest difference favoring each party, e.g. tax breaks, illegal immigration, Iraq war (war on terror), estate tax (death tax).
- For each newspaper, regress the excess frequency with which it uses each phrase on the phrase’s Republicanness. Define slant  $y_n$  as the estimated coefficient. This can capture “slant” both in terms of the issues the newspaper features and how it talks about them.

The resulting measure is moderately correlated with a conservativeness rating available for some newspapers from reader assessments.

It will surely reflect things we would not want to call “slant” as well, e.g. urban vs. rural interests and regional speech patterns.

# “What Drives Media Slant?,” Gentzkow and Shapiro

## Effect of Slant on Demand

Consumer demand is again derived from a utility function:

$$u_{izn} = \bar{u}_{zn} - \gamma(y_n - I_z)^2 + \varepsilon_{izn}$$

- Assume utility maximizing slant is  $I_z = \alpha + \beta r_z$ .  
No heterogeneity/error.
- Assume that the  $\varepsilon_{izn}$  are iid extreme value variables so

$$\log \frac{S_{nz}}{1-S_{nz}} = \bar{u}_{zn} - \gamma(y_n - (\alpha + \beta r_z))^2$$

In the model we can estimate how the utility-maximizing slant varies with  $r_z$  by looking at the coefficient on  $y_n r_z$  in a regression of  $\log \frac{S_{nz}}{1-S_{nz}}$  on newspaper and zip-code characteristics.

Indexes:  $i$  for consumer,  $z$  for ZIPcode,  $n$  for newspaper.  
 $r_z$  is fraction Republican.  
 $S_{nz}$  is fraction purchasing.

# “What Drives Media Slant?,” Gentzkow and Shapiro

## Effect of Slant on Demand

Table II reports significant effects of the interaction in various specifications.

EVIDENCE ON THE DEMAND FOR SLANT<sup>a</sup>

Description	Model			
	OLS	OLS	OLS	2SLS
(Zip share donating to Republicans) × Slant	10.66 (3.155)	9.441 (2.756)	14.61 (6.009)	24.66 (7.692)
Zip share donating to Republicans	-4.376 (1.529)	-3.712 (1.274)	—	-10.41 (3.448)
(Zip share donating to Republicans) <sup>2</sup>	-0.4927 (0.2574)	-0.5238 (0.2237)	—	-0.7103 (0.2061)
Market–newspaper FE?	X	X	X	X
Zip code demographics?		X	X	X
Zip code X market characteristics?		X	X	X
Zip code FE?			X	
Number of observations	16,043	16,043	16,043	16,043
Number of newspapers	290	290	290	290

I find it more convincing as a demonstration that demand is increasing in the slant-Replication interaction than as an estimate of the “utility-maximizing” slant.

The latter relies on strong assumptions. All we observe is how a newspaper’s sales vary across ZIPs, so it’s hard to say how sales would change with a different slant.



# “What Drives Media Slant?,” Gentzkow and Shapiro

## Is Slant Profit-Maximizing?

Figure 4 shows that slant is more Republican for newspapers in more Republican markets.

It accounts for about 20% of the variation in measured slant.

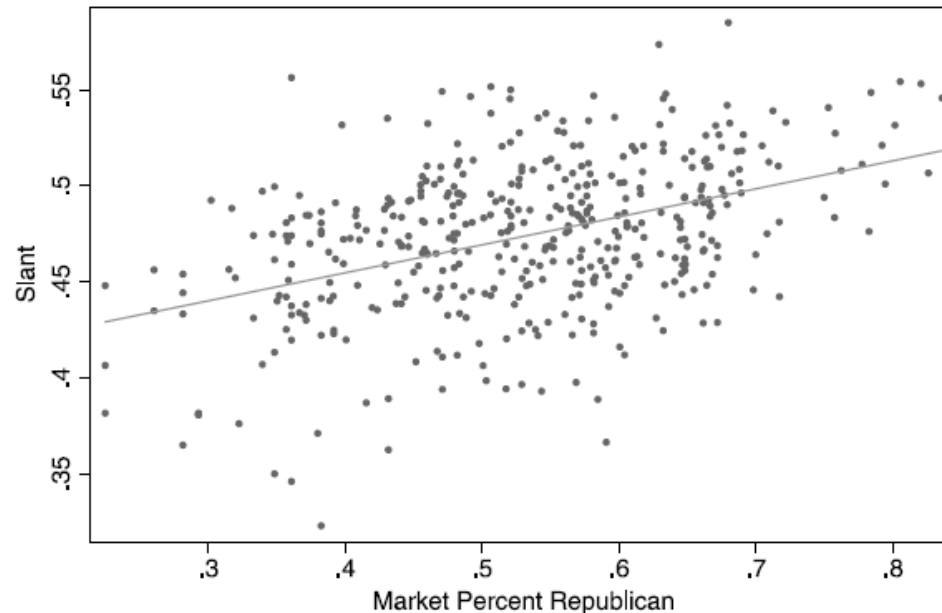


Image by Matthew Gentzkow and Jesse M. Shapiro.

The demand estimates don't separately identify  $\gamma$  and  $\beta$  so we can't say if the slope is that implied by profit maximization.



# “What Drives Media Slant?,” Gentzkow and Shapiro

## Is Slant Profit-Maximizing?

To examine whether slant is also affected by owner ideology the paper investigates whether owner-fixed effects are a significant predictor of slant.

DETERMINANTS OF NEWSPAPER SLANT<sup>a</sup>

	OLS	2SLS	OLS	RE
Share Republican in newspaper's market	0.1460 (0.0148)	0.1605 (0.0612)	0.1603 (0.0191)	0.1717 (0.0157)
Ownership group fixed effects?			X	
State fixed effects?				X
Standard deviation (SD) of ownership effect				0.0062 (0.0037)
Likelihood ratio test that SD of owner effect is zero ( <i>p</i> value)				0.1601
Number of observations	429	421	429	429
<i>R</i> <sup>2</sup>	0.1859	—	0.4445	—

<sup>a</sup>The dependent variable is slant index ( $\hat{y}_i$ ). Standard errors are given in parentheses. An excluded instrument in the 2SLS model is share attending church monthly or more in the newspaper's market during 1972–1998, which is

The fixed effects substantially increase the  $R^2$  of the regression, but are not jointly significant *if one also includes state fixed effects*.

On Wednesday I'll discuss the theory of monopoly price discrimination.

See you then!

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14.271 Industrial Organization I  
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