ECN 453: Market Structure 2

Nicholas Vreugdenhil

Market Structure

- Today we will continue our discussion of the following questions:

- How many firms would you expect to find in a given market?

- How large would you expect these firms to be?

Plan

1. Model assumptions vs reality (continued from last time)

2. Endogenous entry costs

3. Market concentration determines market power

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1. **Model assumptions vs reality (continued from last time)**

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Model assumptions vs reality: history matters

- Last time: we wrote down a model of entry and competition that made predictions about how many firms would be in a given market given the parameters

- Today, continue discussion of the model assumptions...

Model assumptions vs reality: history matters

- How can we relax these assumptions?

- **Agglomeration externalities**: why are so many high-tech firms in the bay area?

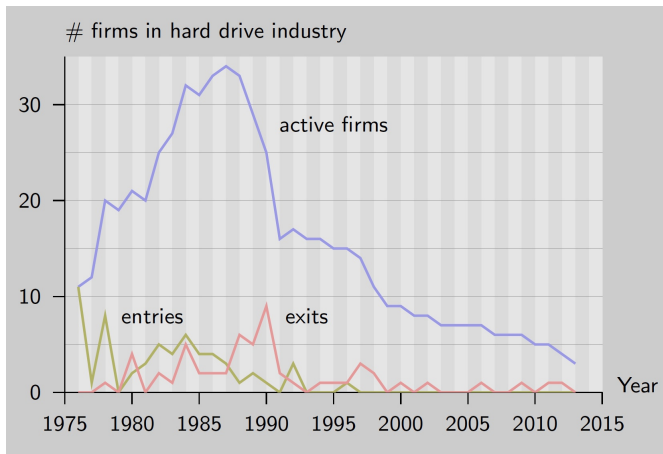# Model assumptions vs reality: history matters

- How can we relax these assumptions?

- **Agglomeration externalities**: why are so many high-tech firms in the bay area?
    - Snowball effect: HP and some other firms initially, who attracted new ones and so forth

- **Overall: The particular historical details of the evolution of an industry may in some cases determine the long-run market structure in ways that go beyond simple determinants**

Evolution of US Beer Industry

Capacity (10^3 barrels)	1959	1967	1975	1983	1989	1998	2001	2006
10 - 100	68	36	10	15	8	77	81	83
101 - 500	91	44	19	12	7	19	19	19
501 - 1000	30	35	13	2	3	1	1	4
1001 - 2000	18	18	13	13	5	4	2	2
2001 - 4000	8	10	12	9	6	7	5	3
4001+	2	4	15	23	20	20	20	22

- Exogenous factors changing over time can change industry structure:

- E.g. TV created a national market, interstate highway system decreased transport costs, created "shipping brewers", better bottling tech, consumer demand for variety increased

Evolution of new industries

firms in hard drive industry

active firms

entries   exits

Year

- Observed regularities: fast growth followed by a period of consolidation (sometimes, a 'shakeout' where many firms exit by merger or bankruptcy).

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Another example of a real-world market at odds with the previous model...

- Beer industry in Portugal similar to the US

- 3 firms dominate US, 2 firms dominate Portugal

- Why is this observation at odds with the model from the last lecture?

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- Beer industry in Portugal similar to the US

- 3 firms dominate US, 2 firms dominate Portugal

- Why is this observation at odds with the model from the last lecture?

- A: US is 30-50x bigger than Portugal, model predicts number of firms in US should be $\sqrt{30}$ to $\sqrt{50}$ more than in Portugal!

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- Why is the number of firms in reality different to what the model would predict?

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- One aspect: **advertising**

- Value of advertising as a *percentage of sales* is similar between countries

- In order to enter the US industry and compete with Budweiser and Miller Lite, new entrant would need to pay a greater entry cost than in Portugal

- **Entry costs are endogenous** (endogenous - i.e. entry costs change - with respect to market size)

Endogenous entry costs

- Idea with the previous model: due to price competition, if market scales by 2x then there will be room for *less* than 2x as many firms.

- If entry costs increase with market size, this is an *additional* reason whereby the number of firms does not increase as much as market size.
    - Idea: Bigger market induces firms to make bigger investments

Endogenous entry costs: example

- Suppose a country wants to deregulate its telecommunications sector, government sells a single license to operate

- Revenues for this license are S

- To get the license the firm must already be established as a telecommunications company; doing so costs F

- We will consider two ways to allocate the license.

Endogenous entry costs: example - allocation with lottery

- n potential firms, each gets license with probability $\frac{1}{n}$

- How many firms enter? Set $\pi = \frac{S}{n} - F = 0$

- Then: $\hat{n} = \left[\frac{S}{F}\right]$

- Here, number of firms is proportional to the market size (no price competition!)

Endogenous entry costs: example - allocation with auction

- Assume the 'auction' is like Bertrand competition (but the highest price wins so each firm competes equilibrium bid *up* to S if $n > 1$, bids 0 if $n = 1$)
    - (Auction: used in NZ, Australia, US, some countries in Europe and South America)

- How many firms will enter (assuming $F > 0$)?

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    - (Auction: used in NZ, Australia, US, some countries in Europe and South America)

- How many firms will enter (assuming $F > 0$)? Only enter if you are the only firm *no matter what the market size is*!
    - So: while the value of winning increases as S increases, the bids submitted by the other firms also increase, and profit is still $= 0$.

    - Auction essentially creates an endogenous entry cost: if B is the bid for the license then total 'entry cost' is $F + B$, and B scales with market size S

- **If entry costs are endogenous, then the number of firms is less sensitive to changes in market size**

Common sources of endogenous entry costs

- Advertising

- Bidding for a government license/'escalation wars'

- R&D expenditures (like patents for a medical drug which might spur a patent race)

Endogenous entry costs: empirical evidence

- If the theory of endogenous entry costs is correct, what would we expect to see in the data?

- More precise question: What relationship do we expect to see between industry size and concentration in *more* vs *less* advertising-intensive industries.

- One test: relationship between industry size and concentration is *greater* in *less* advertising-intensive industries.

Endogenous entry costs: empirical evidence

Low-adv industries	A/RS (%)	High-adv industries	A/RS (%)
Salt	0.26–0.45	Frozen food	1.2–7.1
Sugar	0.06–0.24	Soup	2.7–6.0
Flour	0.17–0.96	Margarine	2.3–10.2
Bread	0.02–0.42	Soft drinks	1.2–5.4
Processed meat	0.30–0.70	RTE cereals	8.34–12.9
Canned vegetables	0.29–0.71	Mineral water	1.5–5.0
		Sugar confectionery	1.4–6.0
		Chocolate confectionery	2.9–6.5
		R&G coffee	1.9–16.7
		Instant coffee	2.2–11.1
		Biscuits	1.9–8.0
		Pet foods	4.0–8.4
		Baby foods	0.9–4.2
		Beer	1.0–5.43

Figure: Advertising/retail sale ratios for various industries across 5 countries

Endogenous entry costs: empirical evidence
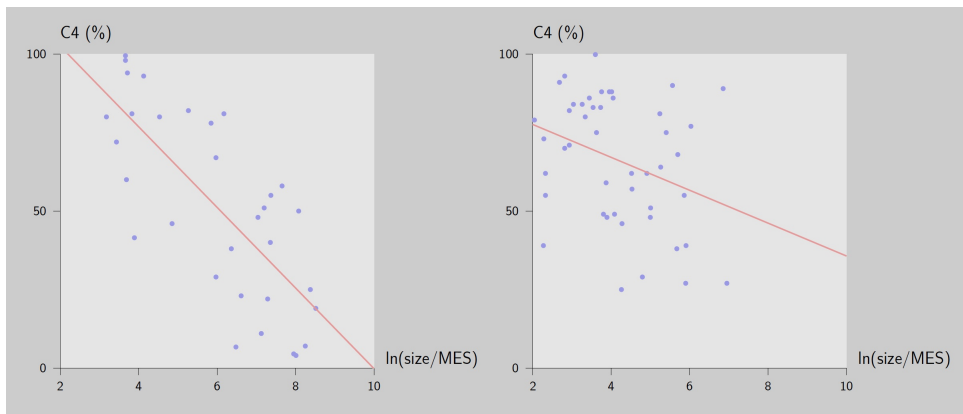

Figure: Industry size and concentration; left: 'low advertising industries', right: 'high advertising industries'. Use $ln(size/MES)$ on horizontal axis as a proxy for S/F, motivated by our previous model that related the number of firms (i.e. concentration) to S/F.

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2. Endogenous entry costs

3. **Market concentration determines market power**

Market concentration determines market power

- It can be shown that, under Cournot competition with identical firms:

$$L = \frac{H}{-\epsilon}$$

- $L = \sum_{i=1}^{n} s_i \frac{p - MC_i}{p}$
    - 'Market power' measure

- $H = \sum_{i=1}^{n} s_i^2$
    - 'Market concentration' measure

    - Note: don't multiply by 10000 for this formula

- ϵ: demand elasticity

- Note: If $n = 1$ this is our previous optimal pricing formula for a monopolist!

Market concentration determines market power: example

- **Setup:** Two markets, same demand elasticity

- Market 1: 2 firms with same market share

- Market 2: 1 firm with 70% share, two small firms with 15% share each

- **Question:** Under Cournot competition, where is market power the greatest?

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- **Setup:** Two markets, same demand elasticity

- Market 1: 2 firms with same market share

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- **Question:** Under Cournot competition, where is market power the greatest?

- A: find market with greatest H:

- Market 1: $H = 5000$

- Market 2: $H = 5350$

- Market 2 has the greatest market power

Summary of key points*

- Know different measures of concentration and how to compute them, particularly HHI

- Know the model of entry costs and market structure

- Understand the comparative statics of the model of entry costs and market structure, and minimum efficient scale

- Understand the assumptions behind the model and that sometimes they may need to be relaxed to fit the particular historical details of the industry.

- Know why endogenous entry costs are useful for explaining some common empirical patterns in the data.

- Know the formula: $L = \frac{H}{-\epsilon}$ and how to use it.

*To clarify, all the material in the slides, problem sets, etc is assessable unless stated otherwise, but I hope this summary might be a useful place to start when studying the material.