

## Econ 665/465 - Public Policy 310: Market Power and Public Policy

# Introduction

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Office Hours: Online sign up sheet, in my office, Social Sciences 230

Specialize: Industrial Organization and Productivity. I'm originally from Canada.

# The Class: Market Power and Public Policy

- The Goal: Think about the economic foundations of public policies meant to deal with monopoly power, market power more generally.
- The tools: microeconomic theory, game theory, asymmetric information, some limited knowledge of econometrics and statistics will be helpful.
- The applications: historical background, policy debates, details of regulation.

# The Question: Inequality

- Recent discussion of income inequality (Piketty).
- The 3rd richest man in the world (from Forbes) is Carlos Slim. He has assets of 80 billion dollars.
- Most of the Slim fortune, is derived from Telmex, privatized Mexican telephone monopoly.
- Telmex and Telcel had, in 2006, 90 percent market share in landlines, and 80 percent market share in cell phones.

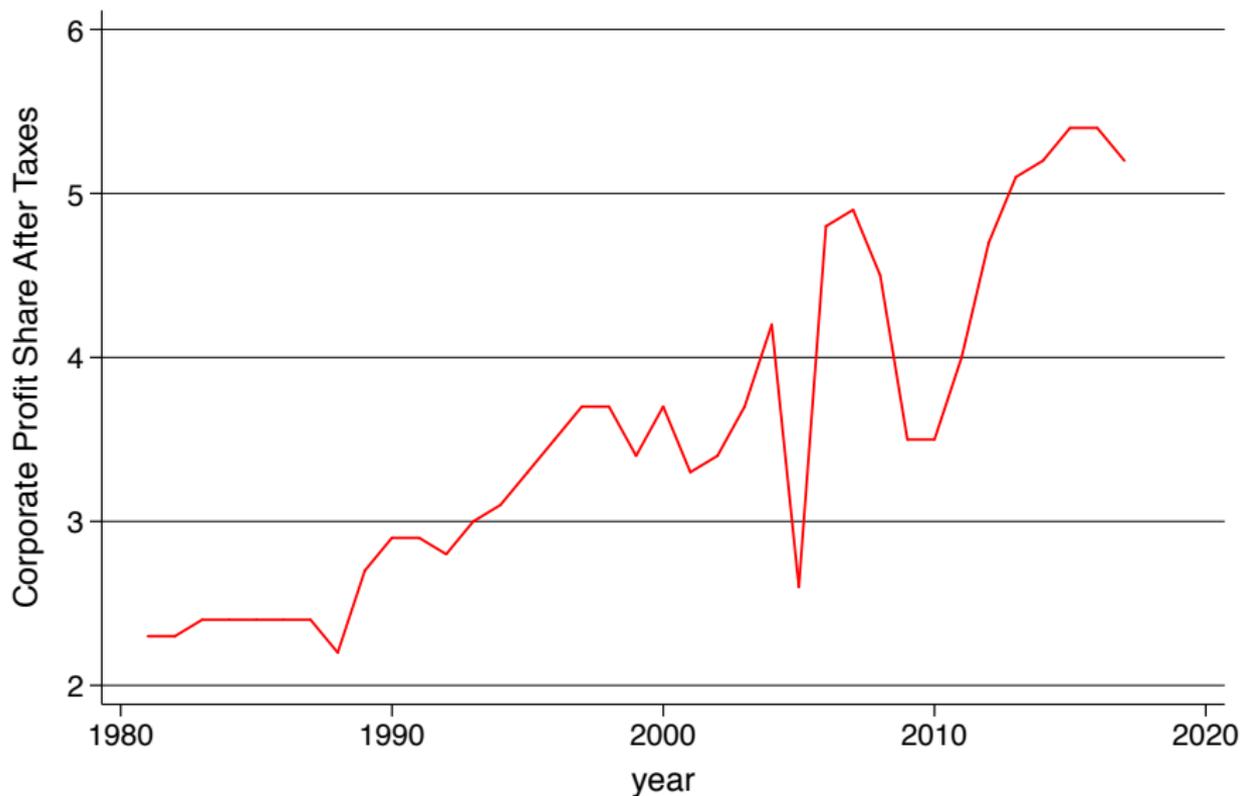
# The Question: Online Commerce

- Amazon is now 50 percent of online commerce (5 percent of all retail).
- Google and Facebook are 58 percent of digital ads (amazon is another 4 percent).
- Google is 93 percent of searches in Europe (about 88 percent in US). Has been for about ten years or more.

# The Question: Online Commerce

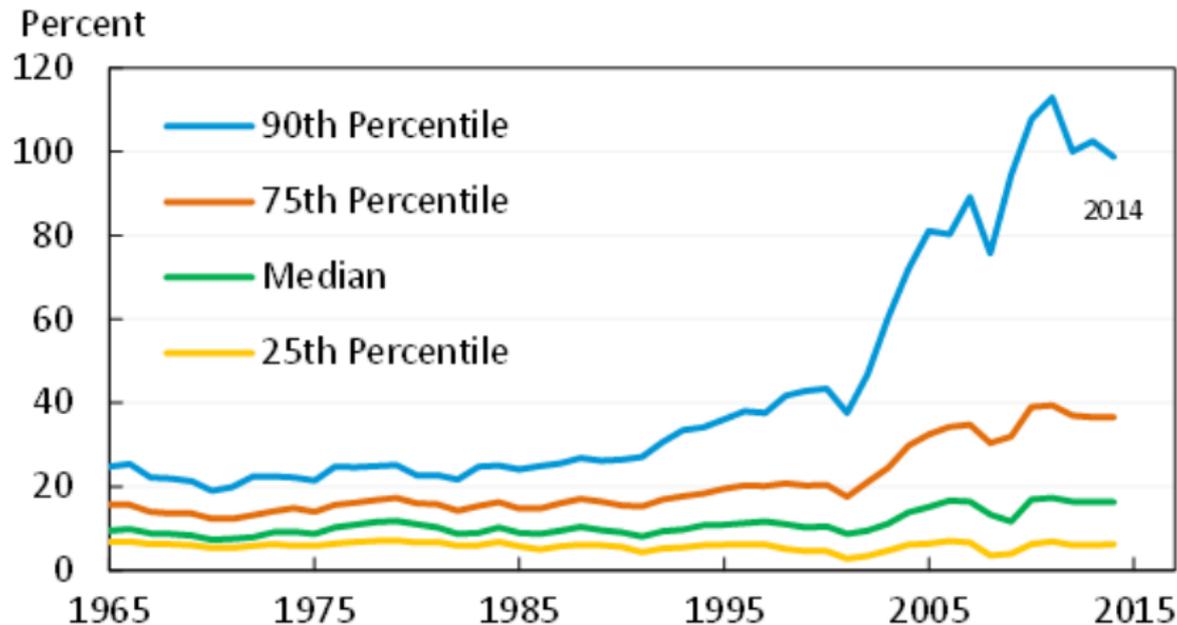
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- Google and Facebook are 58 percent of digital ads (amazon is another 4 percent).
- Google is 93 percent of searches in Europe (about 88 percent in US). Has been for about ten years or more.
- “Hipster Antitrust”: should we regulate Amazon or Facebook’s size, even if they do not seem to cause high prices for consumers.

# Rising Corporate Profits



# Rising Corporate Profits

**Figure 1: Return on Invested Capital Excluding Goodwill, U.S. Publicly-Traded Nonfinancial Firms, 1965–2014**



Note: The return on invested capital definition is based on Koller et al (2015), and the data presented here are updated and augmented versions of the figures presented in Chapter 6

# Prerequisites

- Intermediate Microeconomics (Lagrangians).
- Game Theory (Subgame Perfection, Cournot).
- Asymmetric Information.
- Regression (OLS), Probit.

# Textbooks

## Main Textbook:

- Required: Tim Wu,  
The Curse of Bigness: Antitrust in the New Gilded Age, Columbia Global Reports, 2018.
- Recommended: Oz Shy,  
Industrial Organization: Theory and Applications, MIT Press 1995.
- Supplementary (you don't have to purchase these): Jean Tirole,  
The Theory of Industrial Organization, MIT, 1987 (dated, but the original textbook for the field to some extent).  
Kwoka and White,  
The Antitrust Revolution: Economics, Competition, and Policy 6th Edition  
(there are many editions of this book, and I will be drawing cases out of it)  
Whinston Lectures on Antitrust Economics, MIT Press, 2006.
- Many different readings from antitrust cases, most of which I will provide over the course of the class.

## Where we will go

- Explore current issues in market power. Many of which we have inn
- What are regulators at the Federal Trade Commission and the Department of Justice worried about.
- Choose your own adventure: which issues do we want to cover?

# Assessment

Evaluation: You will be evaluated based on five different components.

- Midterm (20%) Friday March 8th (in class).
- Final (25%) Friday April 17th (in class).
- 4 Problem Sets (25%).
- Class Presentations:
  - Presentation of one of the antitrust cases (20%)  
or
  - Presentation of industry study (20%).
- Participation (10%).

# Online Stuff

Everything will be at

<https://sites.duke.edu/collardwexler/teaching/econ465/>

- Class Webpage.
- Emails: permission to share them is the default.
- Online booking for office hours on my webpage.

# James B. Duke

- Starts a cigarette company in 1879 (rather than cigars or chewing tobacco).
- Durham is the center of the chewing tobacco, and cigarettes are a small part of the tobacco industry at this point.
- Will then be transformed into the American Tobacco Company.

## Why are there so few tobacco companies in 1890, so many in 1850?

- The Bonsack machine for packing cigarettes.
- Increased the amount of cigarettes that someone could pack by over 100 times (100,000 versus 2,000 per day beforehand). Labor costs go from 85 cents per thousand from 2 cents per thousand from 1880 to 1890.
- Patented (patent 238,640 in fact), and licensed to several companies. Bonsack accumulated a number of patents for the production of cigarettes.
- Many of these innovations in the 19th century gave rise to large economies of scale in many industries.
- American Tobacco will have two large plants in New York City and Richmond.

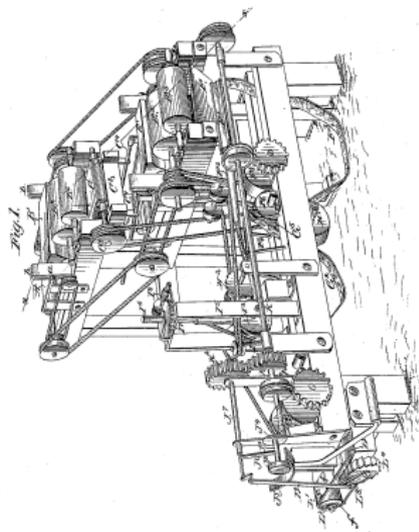
(Model.)

5 Sheets—Sheet 1.

J. A. BONSACK.  
Cigarette Machine.

No. 238,640.

Patented March 8, 1881.



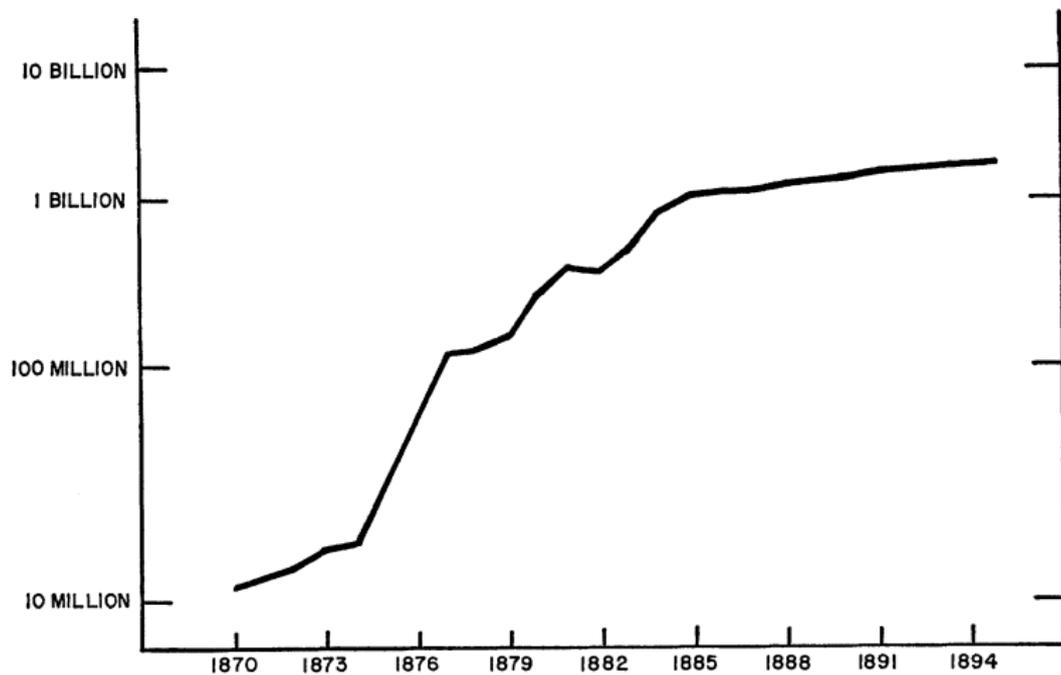
WITNESSES:  
*John P. C. Frinkler*  
*E. C. W. Byrnes*

INVENTOR:  
*J. A. Bonsack*  
 BY *Allen T. Co.*  
 ATTORNEYS.

U.S. PATENT OFFICE: WASHINGTON, D.C.

Figure 1

NUMBER OF CIGARETTES ON WHICH INTERNAL REVENUE TAXES WERE PAID, 1870-1895  
(Semi-Logarithmic Scale 1 x 60)



## American Tobacco and Duke

- In 1889 the Duke Tobacco Company has a 30 percent market share for cigarettes, with profits of \$400,000 a year on gross sales of \$4.5 million.
- In January of 1890, the five leading cigarette firms came together to form the American Tobacco Company. Goodwin and Company, William S. Kimball, Kinney Tobacco, Allen and Binter, and the W. Duke & Sons Company.
- Quasi Monopoly of the Tobacco Industry from 1896 until it's breakup in 1911: 90 percent market share of cigarettes.
- American Tobacco is one of the original 12 members of the Dow Jones Index.
- Subsequent acquisition of over 250 tobacco companies from 1890 to 1907.
- Duke triggers a price war which helps precipitates additional consolidation of the industry.

# American Tobacco

- American Tobacco diversified into other tobacco products.
- By 1902, 60 percent of chewing tobacco, 80 percent of snuff, 14 percent of cigars.
- However, it's market share drops from 90 percent to 74 percent in cigarettes. This erosion of market share is typical of a lot of cartels.

# Sherman Act

- Sherman Act passed in 1890.

“every contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce among the several States, or with foreign nations, is declared to be illegal.”

“Every person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade or commerce among the several States, or with foreign nations, shall be deemed guilty of a felony, and, on conviction thereof, shall be punished by fine not exceeding \$100,000,000 if a corporation, or, if any other person, \$1,000,000, or by imprisonment not exceeding 10 years, or by both said punishments, in the discretion of the court.”
- American Tobacco broken up by a 1911 decision (same time as Standard Oil).
- Duke Endowment founded in 1924.

# Breakup of American Tobacco

- Breakup by Supreme Court Decision.  
“in and of itself, as well as each and all of the elements composing it whether corporate or individual, whether considered collectively or separately [was] in restraint of trade and an attempt to monopolize, and a monopolization within the first and second sections of the Anti-Trust Act.”
- Interesting that much of this decision is about monopolization of new markets (smoking tobacco, plug, snuff, etc...), rather than the monopoly of the cigarette market.
- Offshoots are Liggett & Myers, Lorillard, R. J. Reynolds, among others.

# Firms

## An introduction

In a market economy, firms are in charge of deciding what and how much to produce, and consumers respond to this by shopping for the best alternative.

This course analyzes the behavior of firms.

- What's a firm? What defines the boundary of a firm?
- Given established boundaries, how do firms make production decisions and how do they compete with each other?
- Should government meddle with the operation of firms?

We will focus on questions 2 and 3.

However, before we go to questions 2 and 3, let's do a bird's eyes analysis of question 1.

# Firms

## An introduction

"A **firm** is an organization that transforms *inputs* (resources it purchases) into *outputs* (valued products that it sells). It earns the difference between what it receives as revenue from selling its output and what it spends on inputs." (Carlton and Perloff, p.11)

Firms are not as important in all economies:

- US: 84% of national production is done by firms, 12% is by government, 4% by nonprofit institutions (universities and hospitals), private households (less than 0.2%)
- Government share of production is higher in other economies: 37% in Ghana, 40% in Sudan, 90% in Algeria! (1992 figures from the UN)
- But not at all less-developed countries have high government share of production: Bangladesh, Paraguay and Nepal have very small government sectors, with less than 3% of economy.

# Firms

## Some demographics

- The US economy has about 6 million companies (2007 data).
- Average size of US firms is 20 employees. But the distribution of firm sizes is highly skewed.
- 90% of firms employ fewer than 20 people.
- Only 0.2% of firms have 500 or more employees, but these account for 50% of all employees (2007)
- Top 975 US firms have 10,000 employees or more: they account for 27% of employment and 36% of assets.

# Firms

## Some demographics

- Share of employment and assets of the largest US firms has fallen since 1970
- Shift from manufacturing to services, in which firms are smaller.

# Firms

## Entry and exit

- There is considerable amount of "churning" through entry and exit, i.e. at a given instance, there are a lot of young firms.
- Despite entry, the four largest firms in an industry stay in that group on average for over 10 years.
- Half of all entrants fail within 5 years of entry.
- Patterns across Europe
  - Firms are somewhat smaller in Europe than in US
  - Countries with smaller markets have less dispersed size distributions

## Figure: Firm Size

Table 1. **Small firms across broad sectors and countries, 1989-94**  
 (firms with fewer than 20 employees as a percentage of total)

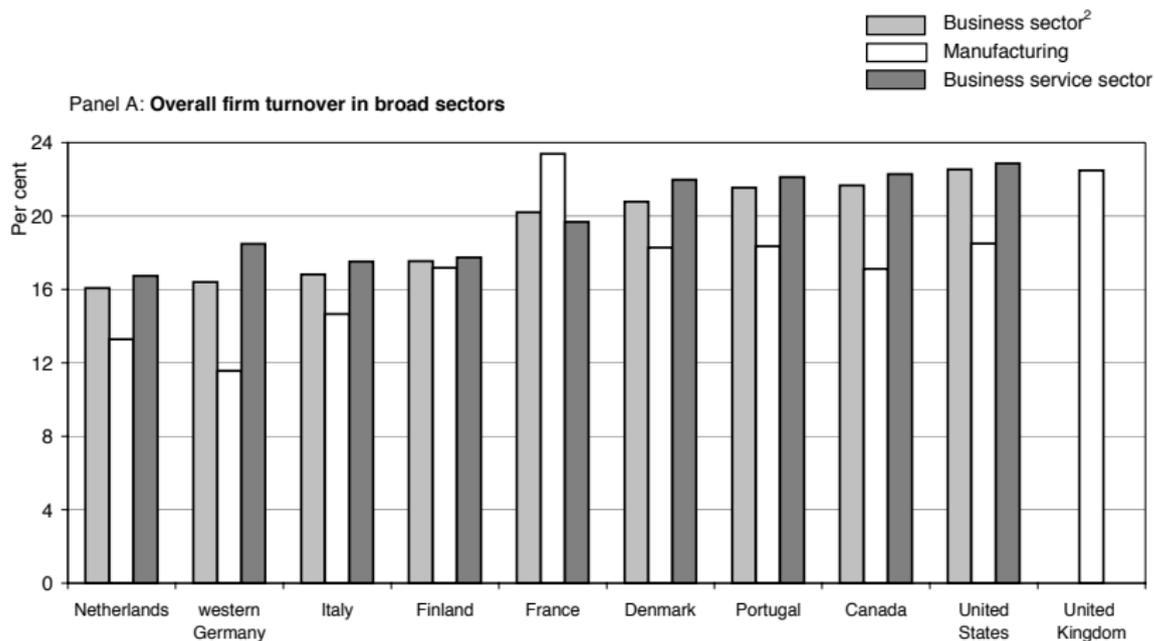
	Firms				Employment <sup>1</sup>			
	Total economy	Non-agricultural business sector <sup>2</sup>	Manufacturing	Business services	Total economy	Non-agricultural business sector <sup>1</sup>	Manufacturing	Business services
Unites States	86.7	86.5	69.9	87.9	16.6	17.3	5.8	20.6
western Germany	87.9	87.1	77.9	90.2	23.6	23.6	11.3	33.8
France	78.6	78.8	73.6	78.8	13.9	14	17.0	12.1
Italy	93.1	93.0	87.5	96.5	34.4	38.1	30.3	46.3
United Kingdom	..	..	74.9	..	..	..	8.3	..
Denmark	90.0	88.1	74.0	90.8	30.2	30.2	16.1	33.4
Finland	92.6	92.6	84.8	94.5	25.8	25.8	13.0	33.0
Netherlands	95.8	96.0	86.7	96.8	31.2	34.2	16.9	41.9
Portugal	86.3	85.9	70.5	92.8	27.7	26.9	15.7	39.8

1. Share of total employment in firms with fewer than 20 employees.

2. This aggregate excludes agriculture (ISIC rev3: 1-5) and community services (ISIC rev3: 75-99).

## Figure: Firm Turnover = Entry Rate + Exit Rate

Figure 2. **Turnover rates in OECD countries, 1989-94**  
(entry and exit rates, annual average)<sup>1</sup>



# Organizational taxonomy of firms

By objective:

- Profit-maximization
- Non-profit

By ownership structure:

- Sole proprietorship (72% of firms, 4% of sales) (2006 data)
- Partnership (9.5% of firms, 13% of sales)
- Corporation (18.5% of firms, 83% of sales)
- Examples?

# Organizational taxonomy of firms

## The Corporation

- A corporation raises money by selling stock
- Shareholders elect a board of directors
- Board of directors hire and fire managers
- Shareholders get paid share of profits (dividends), or they can transfer their ownership rights by selling their shares
- Shareholders are paid after debt holders

Advantage of corporation structure: The firm can raise money from shareholders, not just its own partners. Because more people can invest, it's easier to raise money/capital, and easier to grow.

Disadvantage of corporations: separation of ownership from control. If the managers run the firm and if managers are not owners of the firm, what do the managers maximize?

# Organizational taxonomy of firms

Who pays the debts?

- Unlimited vs. limited liability
- Sole proprietorship: often unlimited liability. Corporation: limited liability. Partnership: can be either.
- Advantage of limited liability: partners/shareholders are more likely to invest in the firm because they bear less risk.
- Banks in 19th century Scotland. Limited liability banks in Edinburgh grew much larger than unlimited liability banks, and failed much less often.
- Disadvantage of limited liability: shareholders too willing to allow managers to take risks?

# How do firms grow?

- Horizontal expansion
  - Produce more using own plants or build new plants
  - Buy up your competitors' plants (horizontal merger)
- Vertical expansion
  - Produce your inputs (McDonalds' potato farms in Turkey)
  - Buy your supplier (GM bought its auto-body maker in 1926)
- Conglomerates
  - Firms in unrelated businesses combine

# Why do firms merge?

- 1 Reduce competition, increase profit
- 2 Economies of scale
- 3 Economies of scope
- 4 Reduce transaction costs
- 5 Install better management
- 6 Get rid of cost-increasing "legacy" contracts
- 7 Game the tax code: Firm A has \$100 profit, Firm B has \$100 loss. If corporate tax rate is 50%, much tax does the merged firm pay?

Which of these mergers would benefit society as a whole?

BTW - an analysis of the causes and consequences of mergers is still a great research topic.

# Mergers

## Merger waves

Jovanovic and Rousseau (2002) and (2003)

- 5 merger waves since late 19th century
  - 1890's: monopolization wave (stopped with Sherman Act)
  - 1920's (before the depression): scale-economies wave
  - Late 1960's: conglomerate wave
  - 1980's: "refocusing" wave
  - Late 1990's: "globalization" wave
- Merger waves coincide with booms in stock market
- Merger waves correspond to times of high dispersion of "capital efficiency"
- (Most) Merger waves also correspond to times of technological breakthroughs. Many industries experience a "goldrush" at the start and later "shakeouts," but some new technologies (electricity, IT) affect many industries at the same time and change the way business is done.

# Mergers

## Merger waves

Figure: Mergers as component of stock market capital reallocation

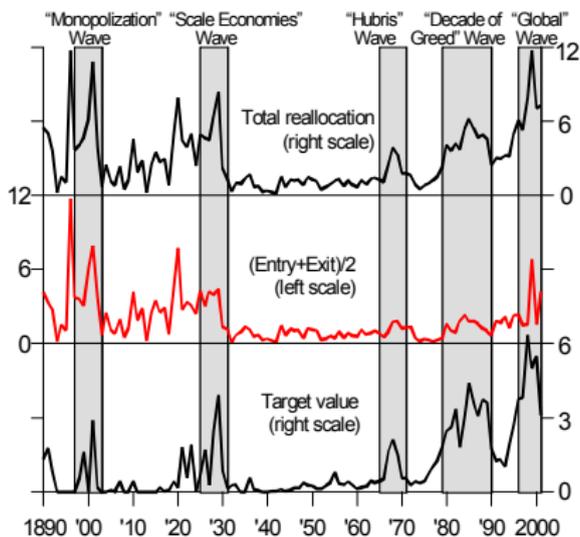


Figure 1: Reallocated capital and components as percentages of stock market value, with merger waves shaded, 1890-2001.

# What is a firm?

## Firm boundaries

When do you produce something inside the firm as opposed to buying it?

- General intuition: Conducting a transaction outside the firm exposes the firm to opportunistic behavior by the suppliers.
- Example: Hold-up problem. If supplier is in monopoly position, he will have bargaining power and may raise prices.
- Absorbing the supplier into the firm curbs opportunistic behavior.

# What is a firm?

## Firm boundaries

Other limits of contracting *across* firm boundaries:

- One can try to prevent "opportunistic behavior" by writing (court-enforceable) contracts with suppliers
- But the cost of writing a contract rises with complexity of the task
- The key tradeoff is contracting costs versus opportunistic behavior.
- Simple, well specified tasks are often conducted outside the firm in markets
- Complex, less well specified tasks are done within the firm.
- Pol Antras (2003): Auto manufacturers open up their own plants in other countries. However, European textile manufacturers do not buy cotton farms in Egypt.

# What is a firm?

## Firm boundaries

- Similarly, why don't all firms vertically integrate?

# What is a firm?

## Firm boundaries

- There are costs to vertical integration too:
  - Integrated suppliers are run by managers
  - Think of the example of a health insurer merging with a hospital.
  - As firm size and scope increases, this becomes harder to manage.
- There are also explicit transaction costs to vertical mergers: lawyer and investment banker fees, vertical constraints.

# What is a firm?

## Firm boundaries

Sometimes, integration is not needed to provide incentives.

- Reputation and long term relationships can also help mitigate opportunistic behavior.
- Japanese vs. US auto industry in the 1980s
  - Toyota had far fewer suppliers than GM
  - GM used competitive bidding to lower price.
  - Toyota had long-term relationships with suppliers.
  - GM had large inventories for parts. Frequent part quality problems, due to changing supplier.
  - Toyota had small inventories and just-in-time production. Far fewer quality problems.
  - Lesson: sometimes "competitive" incentives do not work as well as "relational" incentives.

# What is a firm?

## Firm boundaries

Should there be 2 independent firms or 1 firm operating the productive resources below:

- Golf course next to hotel
- Candy manufacturer and sugar plantation
- Power plant using gas turbine and natural gas pipeline
- Health insurer sending enrollees to hospital

# Costs: REVISION

## Taxonomy

Types of costs:

- 1 Fixed costs - don't depend on level of output
  - Suppose (in fall 1999) you were start your own Dot-Com. What would be your fixed costs?
  - Which of these fixed costs would be *sunk*, which would be *avoidable*?
- 2 Variable costs - depend on level of output

# Costs

## Definitions

- 1 Total cost:  $C(q) = F + VC(q)$
- 2 Marginal cost:  $MC(q) = \frac{dC(q)}{dq}$
- 3 Average cost  $AC(q) = \frac{C(q)}{q}$

# Costs

## MC and AC

**Claim:**  $MC(q)$  crosses U-shaped  $AC(q)$  at minimum average cost level

- Intuition: If AC is rising, the cost of additional output should be larger than the average. Similarly, if AC is declining, cost of additional output should be lower than the average.
- Mathematical proof: Let  $q^*$  be the minimum of  $AC(q)$ .
- Minimum means  $\frac{dAC(q^*)}{dq} = 0$
- Now use:  $TC(q) = qAC(q)$ .
- But:  $MC(q) = \frac{dTC(q)}{dq}$
- And:  $\frac{dTC(q)}{dq} = AC(q) + q\frac{dAC(q)}{dq}$
- Substitute  $q = q^*$ .

# Costs

## Economies of Scale

- Increasing returns to scale (IRS):  $AC(q)$  falls with  $q$ .
- Constant returns to scale (CRS):  $AC(q)$  stays the same with  $q$ .
- Decreasing returns to scale (DRS)

Why might  $AC$  decline with scale:

- Fixed costs
- Ability to assign workers to more specialized tasks (pin factory)
- Physical laws: ratio of surface area to volume of container

# Costs

## Economies of Scope

- Many firms produce more than one type of product
- It might be cheaper to produce two products together rather than separately
  - Beef and hide
  - Shared components (software libraries)
- On average, most firms are fairly specialized. 80% of total output is classied to lie within a single industry.
- However, large firms (146 of top 200 manufacturing firms) are much less specialized (operate in 11 different industries on average)

# Costs

## Scale and Scope economies

- Economies of scale and economies of scope can complement each other
- Bakeries: individual bakeries of multi-plant firms tend to specialize to exploit economies of scale within plant, but are marketed together
- Can economies of scale and economies of scope conflict?