

# ANTITRUST ECONOMICS 2013

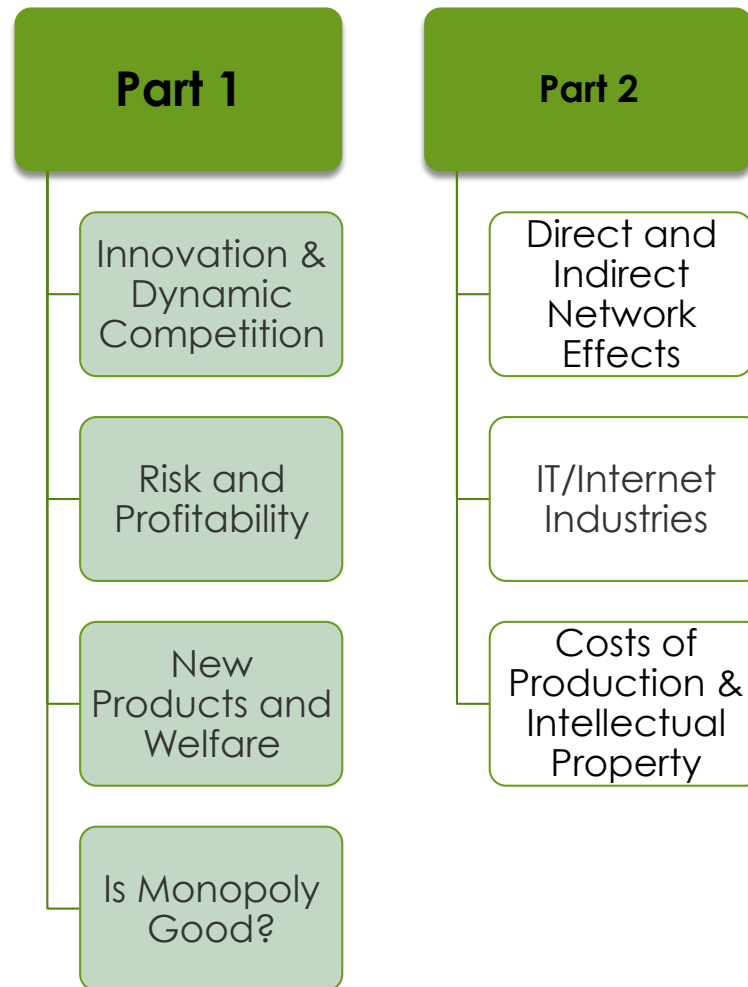
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## TOPIC 4: INNOVATION AND DYNAMIC COMPETITION

# Overview

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# Innovation and Dynamic Competition

# What is Dynamic Competition?

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Dynamic competition involves non-price competition that improves products or creates new products over time

Dynamic competition involves incremental as well as drastic innovation

Sometimes it creates whole new industries or categories

Dynamic competition may involve building direct and indirect network effects over time

# Consequences of Dynamic Competition

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Firms face a constant threat of competition and complete destruction as a result of innovation

Firms and indeed entire industries are born and die

High churn rates of the top firms in the economy

Sometimes it involves bursts of technological change leading to massive disruption—steam engine, electricity, mobile apps

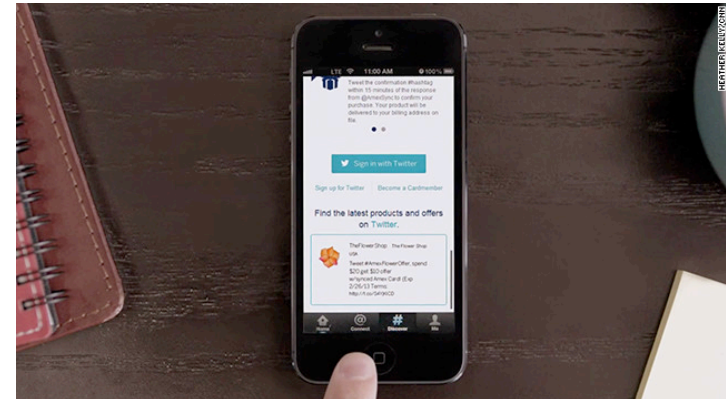
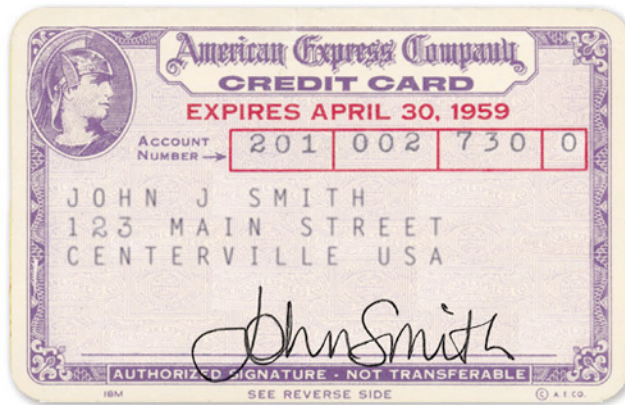
# Top 20 Companies 1970-2013 by Market Cap

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Rank	1970		1985		2000		2013	
	Company	Market Value	Company	Market Value	Company	Market Value	Company	Market Value
1	IBM Corp	36.4	IBM Corp	95.7	General Electric Co.	475	Apple Inc.	402.25
2	AT&T Corp	26.8	Exxon Mobil Corp.	40.3	Exxon Mobil Corp.	302.2	Exxon Mobil Corp.	399.92
3	General Motors Corp	23	General Electric Co.	33.2	Pfizer Co.	290.2	Google Inc.	272.1
4	Exxon Mobil Corp.	16.4	AT&T Corp	26.7	Cisco Systems Inc.	275	Berkshire Hathaway Inc.	255.8
5	Eastman Kodak Co.	12.2	General Motors Corp	22.3	Citigroup Inc.	256.4	Wal-Mart Stores, Inc.	246.38
6	Sears Roebuck & Co.	11.8	Royal Ducht Pet	16.9	Wal-Mart Stores	237.3	General Electric Co.	244.26
7	Texaco Inc.	9.5	British Telecom	16.8	Microsoft Corp.	230.6	IBM Corp.	236.34
8	General Electric Co.	8.5	Du Pont De Nemours	16.3	American Int. Group	228.2	Microsoft Corp.	233.82
9	Xerox Corp	6.8	Toyota Motors Corp	16.2	Vodafone Group	219.7	Chevron Corporation	229.94
10	Gulf Corp	6.7	Amoco Corp	16	Merck & Co.	215.1	Johnson & Johnson	219.57
11	Du Pont De Nemours	6.3	BellSouth Corp	15	Nokia Corp.	202.4	Procter & Gamble Co.	209.79
12	Ford Motor Co.	6.1	Sear Roebuck & Co.	14.2	Intel Corp.	202.3	Pfizer Inc.	201.44
13	Royal Ducht Pet	6	Chevron Corp	13	GlaxoSmithKline	201.9	AT&T Inc.	200.99
14	Mobil Corp	5.8	Mobil Corp	12.4	Oracle Corp	162.2	Wells Fargo & Co.	193.81
15	Minnesota Mining & Mfg Co.	5.6	American Express	11.8	SBC Communications Inc.	161.6	JPMorgan Chase & Co.	191.99
16	Avon Products	5.1	Procter & Gamble Co.	11.7	BP Amoco	155.5	Coca-Cola Co.	171.98
17	Coca-Cola Co.	5	Standard Oil Co.	11.5	Coca-Cola Co.	151.1	Oracle Corp.	168.42
18	Procter & Gamble Co.	4.7	Matsushita Electric	11.5	IBM Corp	150.8	Philip Morris International Inc.	149.21
19	Chevron Corp	4.6	Atlantic Richfield Co.	11.5	Johnson & Johnson	146.1	Citigroup Inc.	142.73
20	ITT Industries	3.6	Eastman Kodak Co.	11.4	EMC Corp	145.5	Verizon Communications Inc.	137.03

# Some Firms Survive Dynamic Competition

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**American Express is a 150+ year old company that started in pony express and has “reinvented” itself at least three times.**

# Many Firms Don't Survive Dynamic Competition

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# The Newspaper Industry

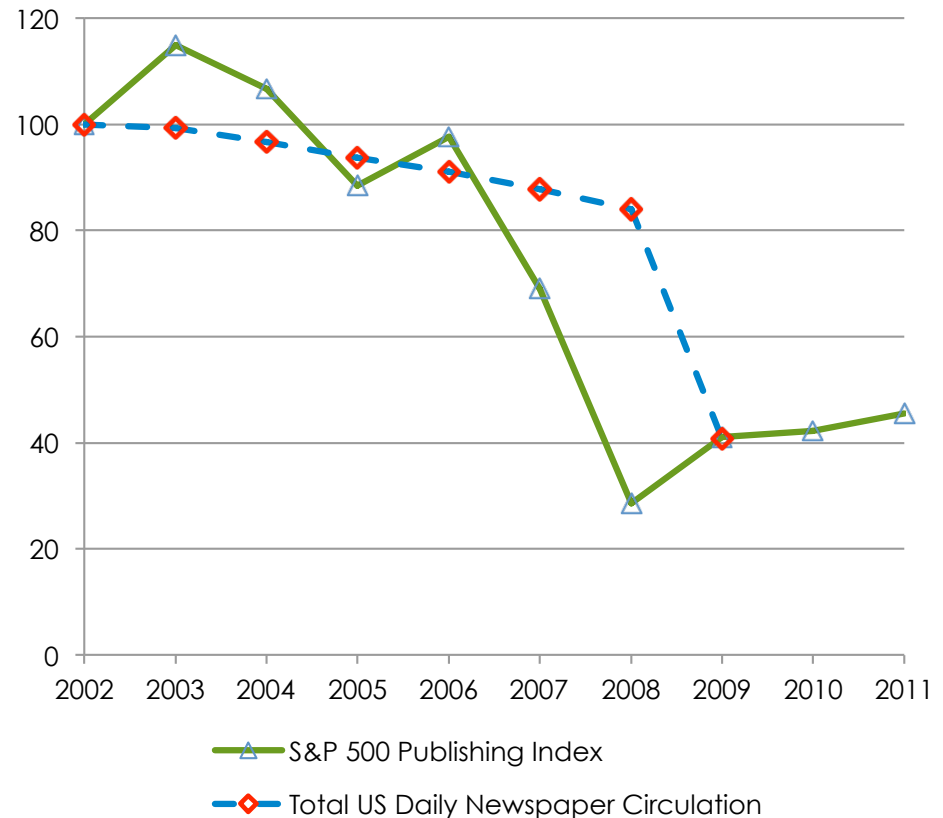
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As technology drove more online content, fewer eyeballs went to print where advertising prices were much higher. The result is an industry that has seen its print circulation reduced by 60% and market cap nearly reduced by 70%.

## US Newspaper Publishers 2002-2011

	2002	2011
Circulation	114M	46M
Market Cap	\$57.6B	\$18.8B
Internet Usage (as a % of the population)	55.7%	75.6%

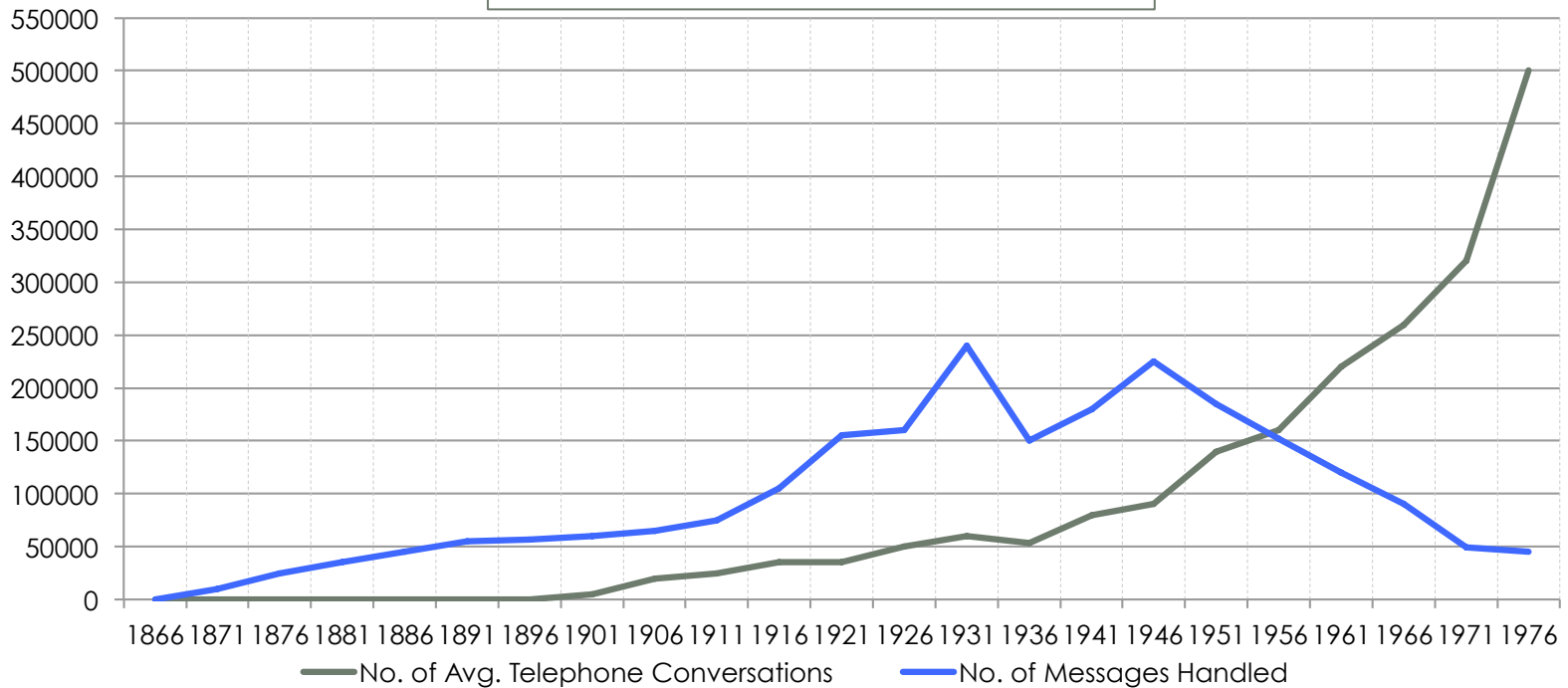
### Newspaper Industry Performance Measures



# The Telephone Eclipsed the Telegraph

Western Union which had a telegraph monopoly famously turned down the telephone patent in the 1870s.

United States Telegraphs v. Telephones  
1866 - 1980



- Source: Historical Statistics of the United States
- Note: Telephone conversations is represented by Bell System's local exchange service only. Units are in thousands

# Innovation as a Series of Winner-Takes All Races

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Competition in some high-technology industries involves sequences of races to develop a new product.

In the initial race, firms invest heavily to develop a product that creates a new category or becomes an early leader in a new category.

Winners get large market shares and high profits for a while.



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# Risk and Profitability

# Risk, Rewards, and Profits

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With scale economies, network effects, and intellectual property-protected innovation there is competition **for the market**. Prospective entrants recognize that the successful firm will win the whole market and have a monopoly.

Firms make risky investments in winning these competitions. Entry into the competition occurs up to the point where the **ex ante** risk-adjusted return is competitive.

The winner **ex post** acts like a monopolist. But on average the firms that entered into the competition realize a competitive risk-adjusted return. The monopoly winnings balance the competitive failures.

The monopoly returns are the reward for incurring the investment costs and taking on the risk. Competition **for the market** eliminates true monopoly profits on average.

# New Startups Are Risky

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Almost 3 out of 4 new venture-backed firms fail to succeed and have zero return to their investors; even more don't enable VCs to recover their investments.

Very few entrepreneurs receive positive returns for their investment of time. Almost all fail.

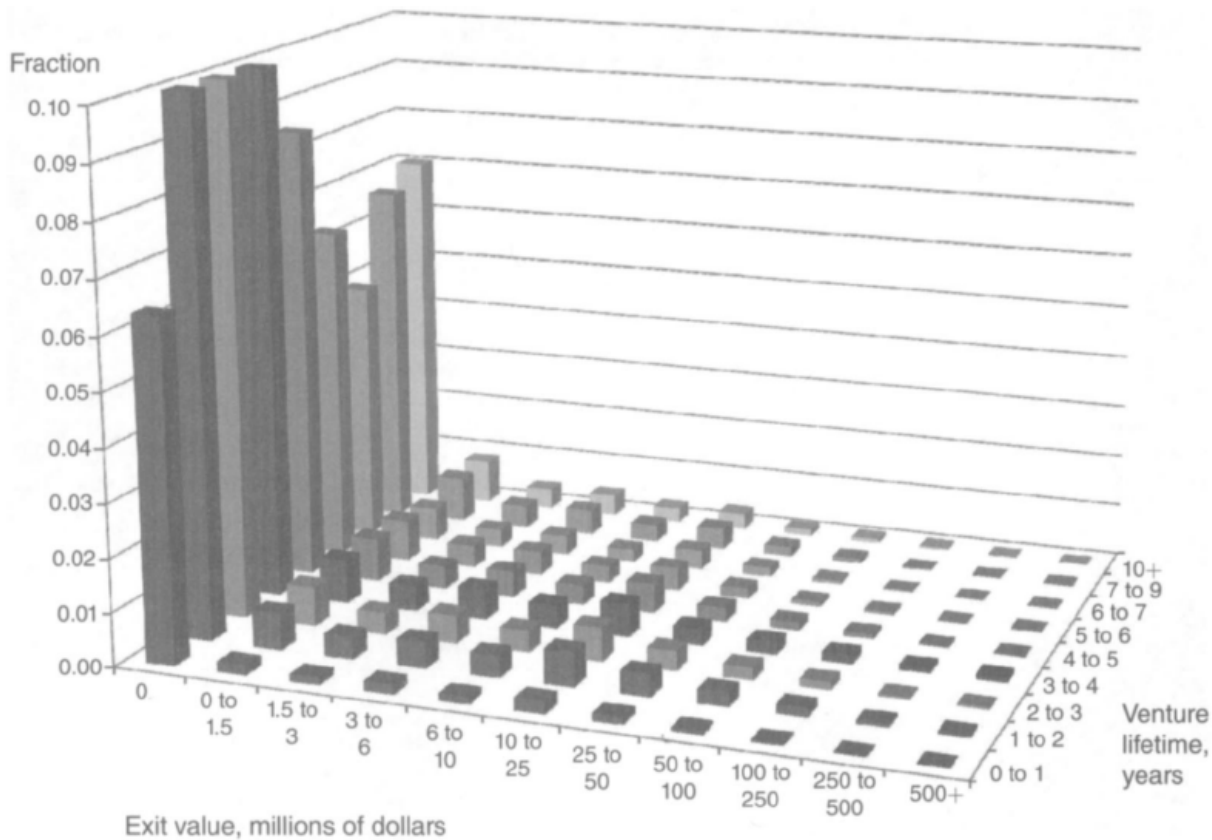
Entrepreneurs are exposed to the idiosyncratic risk of the enterprise and they cannot diversify that risk.

Therefore, entrepreneurship is a very risky activity with a great dispersion of payoffs.

# Very few new ventures succeed

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## Joint Distribution of Venture Lifetime and Exit Value



Source: Hall and Woodward (2010)

# Success in Pharmaceutical Industries' R&D projects

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**Table I.** Current and maximum possible success rates by therapeutic class for self-originated NCEs with INDs first filed from 1981 to 1992\*

<i>Therapeutic class</i>	<i>NCEs</i>	<i>Approved NCEs</i>	<i>Open NCEs†</i>	<i>Current success rate†</i>	<i>Maximum success rate‡</i>
Analgesic/anesthetic	49	10	4	20.4%	28.6%
Anti-infective	57	16	3	28.1%	33.3%
Antineoplastic	38	6	6	15.8%	31.6%
Cardiovascular	120	21	6	17.5%	22.5%
Central nervous system	110	16	14	14.5%	27.3%
Endocrine	33	6	4	18.2%	30.3%
Gastrointestinal	15	3	2	20.0%	33.3%
Immunologic	13	2	0	15.4%	15.4%
Respiratory	25	3	0	12.0%	12.0%
Miscellaneous	43	3	4	7.0%	16.3%

NCE, New chemical entity.

\*Therapeutic class information is missing for five compounds.

†As of December 31, 1999.

‡Assumes that all open NCEs will eventually be approved.

Source DiMasi, 2001. Risk in new drug development:  
Approval success rates for Investigational Drugs



# Cost and Returns over New Drug Lifecycle

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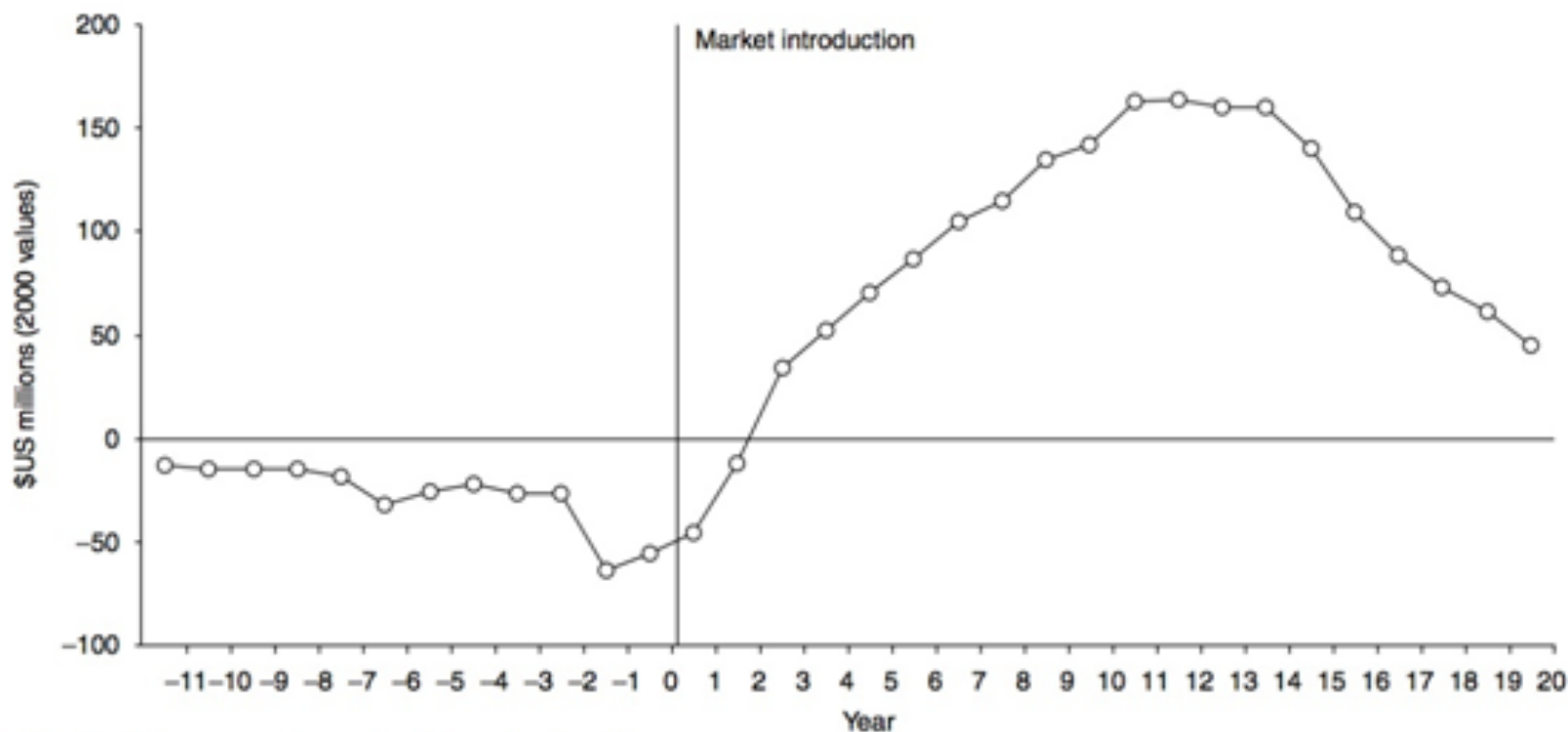


Fig. 5. Cash flows over the product life cycle: baseline case.

Henry Grabowski, John Vernon and Joe DiMasi, *Returns on R&D for 1990s New Drug Introductions*, *PharmacoEconomics*, vol. 20 no. Supplement 3 (2002)

# More than 50% of Pharma profits come from 10% of New Chemical Entities (NCE)

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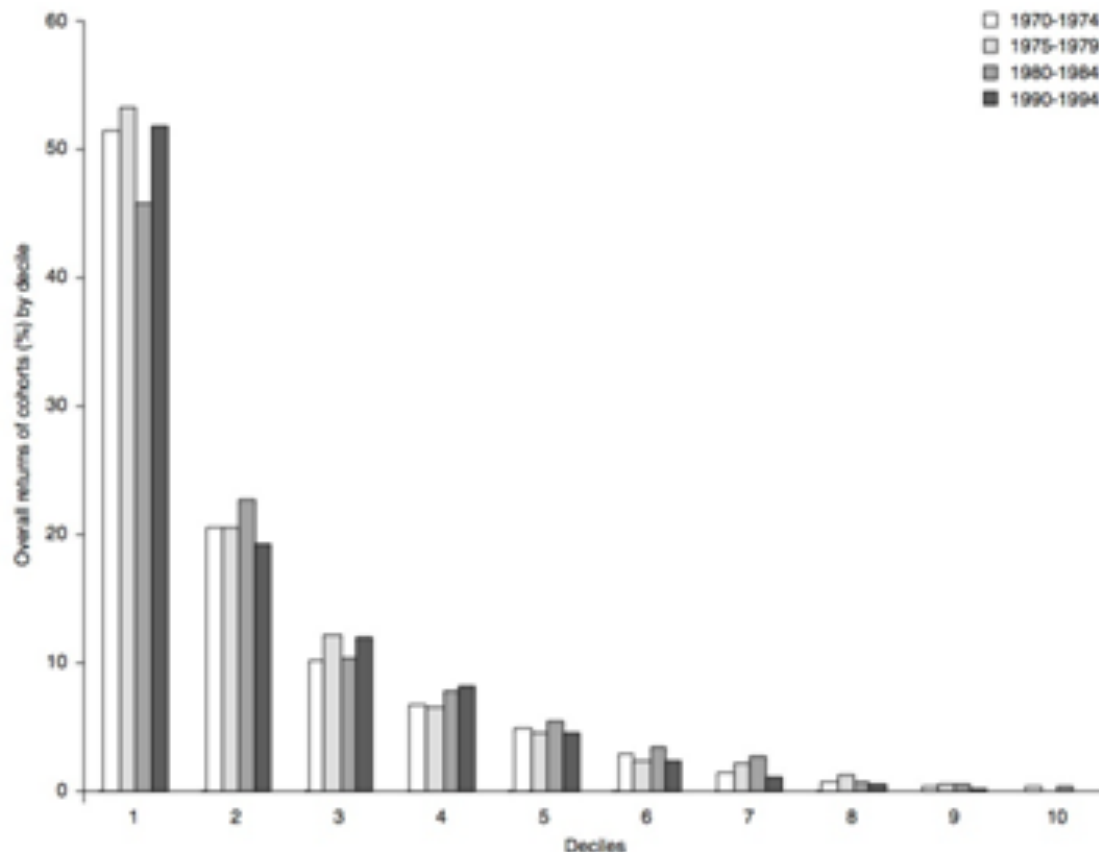


Fig. 8. Present values of four sample cohorts of new drug introductions accounted for by decile.

Henry Grabowski, John Vernon and Joe DiMasi, *Returns on R&D for 1990s New Drug Introductions*, *PharmacoEconomics*, vol. 20 no. Supplement 3 (2002)

# Risks and Costs for New Biologic Entities

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Only 30% of “new biological entities” that make it to clinical trials in humans succeed.

Average R&D costs of bringing biologic drug to market is \$868 million (cancer more than \$1 billion).

Grabowski finds new biologic drugs need exclusivity of 12.9-16.2 years to break-even with a 12.5% discount rate (which may not properly adjust for risk)

# Risk, Return, and Effort

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Entrepreneurs and their investors evaluate risk-adjusted expected return

- Will the risk-adjusted expected return compensate for my investment, and risk taking, and yield a return?

Expectations at the time of the investment (ex ante)

- Not fair to look after someone has become successful!

Expected profits depends on probability of success

- 1/10 chance means profits of the 1 need to compensate for the losses of the 9

Cost of risk must get compensated

- People and investors need a premium for uncertainty

# “High” Profits and Successful Firms

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For firms to be willing to engage in dynamic competition, they must expect to earn, on average, a competitive rate of return on their R&D investments and generate enough market power to do so.

Firms make risky investments in winning these competitions. Entry occurs up to the point where the **ex ante** risk-adjusted return is competitive.

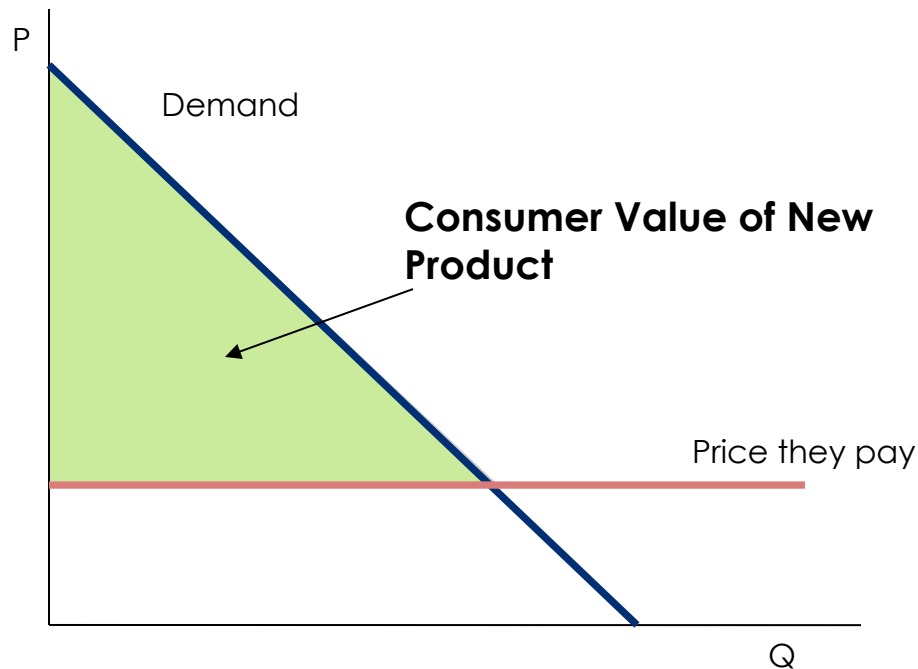
The winner **ex post** may assure “high profits” measured by margins. But on average the firms that entered into this competition realized a competitive risk-adjusted return. The winnings balance the competitive failures.

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# New Products and Welfare

# Economics of “new products”

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When a new product is created consumers get the difference between their willingness to pay and the cost: none of which they would have gotten if the product hadn't been created.



# Economics of “new products”

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All Flavors



For the United States the annual consumers' surplus is approximately \$78.1 million from the introduction of a new brand of cereal (Apple Cinnamon Cheerios).



# Economics of “new products”

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Mini



Minivan

The total welfare gain from the introduction of the minivan over 1984-1988 was about \$2.9 billion, of which \$2.8 billion came from consumer surplus.

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# Is Monopoly Good?

# Antitrust Limits the Abuse of Market Power

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Antitrust is designed to limit the ability of dominant firms to harm competitive process.

- EC: Article 102 prohibits firms from “abusing” a dominant position through exclusionary and exploitative practices. Aside from merger clearance it does not limit firms from obtaining a dominant position or increasing their degree of dominance.
- US: Section 2 of the Sherman Act prohibits the acquisition or maintenance of monopoly power. US antitrust law does not limit the use of monopoly power to charge high prices and therefore does not have the corresponding notion of exploitative abuse.

Possible tension between antitrust and IP law: antitrust law limits monopoly power while IP law bestows market power. How can this be reconciled?

# Antitrust Embraces a Similar Tradeoff between the Incentives to Innovate and Monopoly Power as does IP law

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Antitrust laws generally don't prevent firms from becoming monopolies on the merits and enjoying the fruits of monopoly. True for US; exploitative abuses exist in EC but are seldom enforced.

Antitrust laws have the same underlying rationale as intellectual property laws for allowing firms to obtain market power and earn profits from that power—it provides incentives for investment and risk-taking.

# The Benefits of Monopoly Recognized in Antitrust Jurisprudence

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Advocate General Jacobs tells us in *Bronner* that “... if access to a production, purchasing or distribution facility were allowed too easily there would be no incentive for a competitor to develop competing facilities. Thus, while competition was increased in the short term it would be reduced in the long term.”

Judge Learned Hand’s decision in *Alcoa*: “the successful competitor, having been urged to compete, must not be turned upon when he wins.”

Justice Scalia’s “monopoly is good” view in the 2004 *Trinko* decision: monopoly is “not only not unlawful; it is an important element of the free-market system.”

# Dynamic Analysis of Welfare Effects

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In a static world...

- Suppose a firm monopolizes the market leading to a transfer from consumers of  $T$  and a deadweight loss of  $D$ . There are also efficiencies shown by  $E$ .
- Therefore, an optimal penalty for monopolization is  $T + D$ .
- A firm faced with having to pay the optimal penalty would proceed with its monopolization whenever  $E > D$ .

Suppose we consider this for a two-period dynamic world...

- Suppose in a first period the firm invests in the design and production of a new artificial tooth that will be ready in the second period.
- Rivals in the second period can easily copy the tooth, so the firm will try to obtain legal barriers, and if it cannot do so, it will try to exclude competitors.

# Dynamic Analysis of Welfare Effects

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If the firm monopolized the market

- It will impose a welfare loss on consumers equal to the monopoly transfer and deadweight loss ( $T + D$ ) and introduce efficiency gains  $E$ .

If the firm is deterred from monopolizing the market

- It will not impose any welfare loss on consumers or any efficiency gains.

In this dynamic description, the firm's investment "creates" the market. The anticipation of an antitrust penalty would diminish its incentives to invest in the activity that creates the market.

- An antitrust penalty based on a static assessment can suppress the creation of new products leading to loss in significant social wealth

# Dynamic vs. Static Competition in Antitrust Analysis

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A century ago, Schumpeter described dynamic competition centered on drastic innovations as the “perennial gale of creative destruction”. He noted the importance for consumer welfare of “competition from the new commodity”.

On the other hand, textbooks treat perfect competition as the welfare-maximizing market structure and treat departures from this as problematic.

**Perfect competition** is an ideal as regards to **static competition**, but not for **dynamic competition**.



# Dynamic vs. Static Competition in Antitrust Analysis

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There are three important implications for antitrust economic analysis:

- Rational expectations of significant market power for some period of time is a **necessary** condition for dynamic competition to exist.
- Leaders in these industries will charge prices well above marginal costs to earn high profits.
- A key determinant of the performance of these industries is the vigor of the dynamic competition.

# End of Part 1, Next Class Part 2

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