# DEPARTMENT OF JUSTICE

# MAXIMIZING WELFARE THROUGH TECHNOLOGICAL INNOVATION

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## I. Introduction

Good morning and thank you for inviting me to speak. Today, I want to step back from details about the practice of antitrust enforcement and focus instead on the policy and the economics of what United States antitrust enforcement is trying to achieve. Therefore, I will begin with the policy and economics in the abstract, then I will apply these principles to the day-to-day of the Antitrust Division's enforcement practices.[1]

## II. Consumer Welfare and the Importance of Efficiency and Dynamism

### A. Consumer Welfare and Shifting the Supply Curve "Out"

Let's start with the basics. The goal of U.S. antitrust enforcement is "to protect and enhance competition and consumer welfare."[2] This common statement packs a lot of meaning into a few words, so let's drill into it a bit. Rather than using the less precise term "consumer welfare," I will use the more precise economic concept of "surplus." Total surplus is the difference between what it

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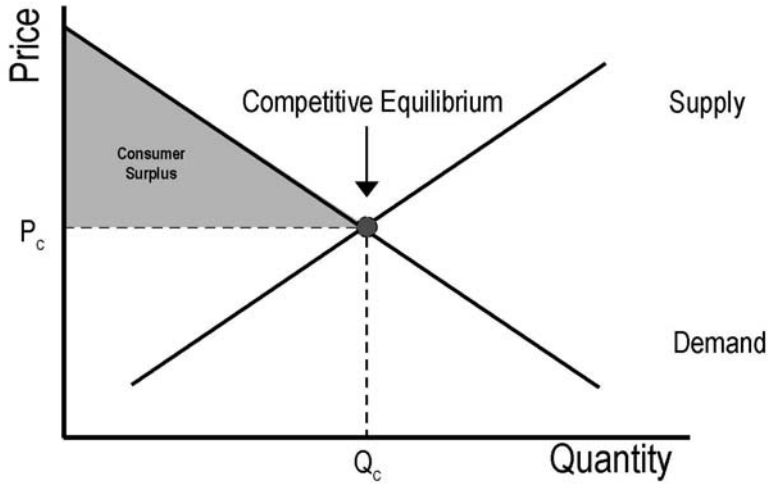
[1]I thank Hill Wellford for his help in preparing these remarks.

[2]Statement of Deborah Platt Majoras, Chairman, Fed. Trade Comm'n, before the Antitrust Modernization Comm'n (March 21, 2006). *See also* Brooke Group Ltd. v. Brown & Williamson Tobacco Corp., 509 U.S. 209, 221 (1993) (referring to the antitrust laws' "traditional concern for consumer welfare"); Statement of Thomas O. Barnett, Assistant Att'y Gen., U.S. Dep't of Justice, before the Antitrust Modernization Comm'n (March 21, 2006). There is a discussion about whether "consumer welfare" should mean "consumer surplus" or "total surplus" to use more precise economic terms. *See generally* Gregory Werden, *Monopsony and the Sherman Act: Consumer Welfare in a New Light,* forthcoming in 74 ANTITRUST L.J., at n.5 and accompany text. Other than to observe that the distinction rarely makes a difference in practice, I will not attempt to resolve the issue today.

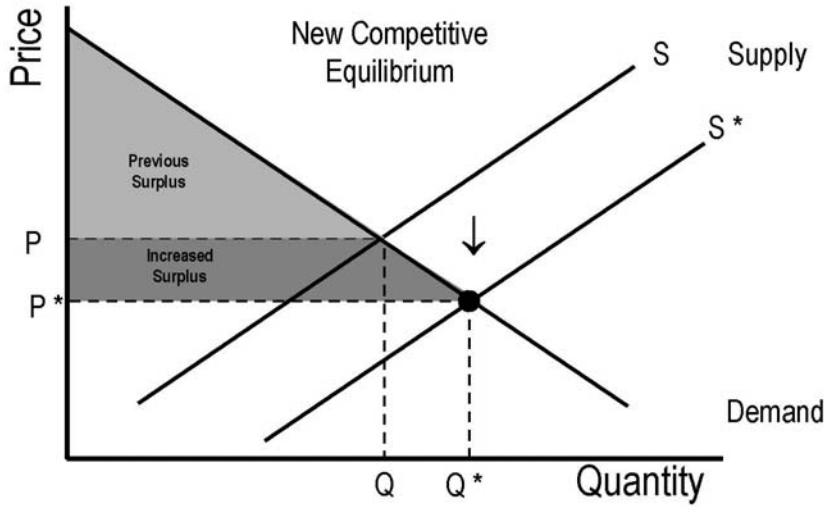
costs society to produce a good (or service) and the value that society places on that completed product. Total surplus can be broken down into two components: consumer surplus and producer surplus. Consumer surplus is the difference between what a consumer actually pays for a good and the maximum he or she would be willing to pay. Producer surplus is the difference between what a producer receives for selling a product and the costs of producing it. While we consider both in our antitrust enforcement decisions, I will focus principally on consumer surplus, for ease of exposition.

Consumer surplus will increase if the price declines, or if the quality or quantity at a given price increases, or if a new and better (more valuable) alternative to the good emerges. This is best illustrated by a chart called the demand curve, where – to keep things simple – we will focus merely on price:



Once we understand the demand curve, it is easy to see how a monopoly supplier can reduce both consumer surplus and total surplus. A monopolist will price at the point where its marginal revenue intersects with its marginal cost. In effect – and for simplicity, we will ignore the possibility of price discrimination[3] – the monopolist will choose to forego some additional customers in order to keep the price high. This permits the monopolist to keep a larger part of the available surplus. In addition, total surplus declines because another part of the surplus simply disappears – it is a "deadweight loss." This is easiest to see when we add the monopolist's marginal revenue curve to the demand curve chart:

[3]If a monopolist can practice price discrimination, then for an additional unit of sales it can lower price only to that additional customer; thus, it can increase its revenue because a lower price for an additional sale does not simultaneously reduce the revenue from other sales. In a model with perfect price discrimination, the monopolist will continue to make price-discriminating sales until the final price equals marginal cost, resulting in the same quantity of output as in a model of perfect competition. This result leads to a wealth transfer from consumers to the monopolist, but it also eliminates the deadweight loss, as discussed in the text. *See generally* DENNIS W. CARLTON & JEFFREY M. PERLOFF, MODERN INDUSTRIAL ORGANIZATION 290-312 (4th ed. 2005). This extreme example of perfect price discrimination illustrates a situation in which total surplus is not affected but consumer surplus is reduced.




A competitive market avoids deadweight loss because price tends to fall to the point where the marginal consumers' demand price meets the marginal cost of production. So, the classic, simple model of competition is a good thing for consumers.

But if you think about the competitive equilibrium chart for a moment, you will recognize that there is another problem that a simple model of competition does not solve: once price hits the competitive equilibrium point, neither consumer nor total surplus can increase any more because consumers value incremental output at less than its cost of production. How can we surmount this obstacle?

The answer, at least as a matter of theory, is simple: we need to move the supply curve. In economic parlance, we need to shift the supply curve "out":

Now, I hope, you see why I have subjected you to this primer on economic theory. Competition is important, but a simple model of competition – driving price down toward marginal cost – is not enough. If antitrust policy is to achieve its long-term goal of increasing consumer welfare, it also needs to foster the conditions that shift the supply curve "out." Antitrust policy must embrace a more sophisticated model of competition, one that recognizes the importance of innovation and other factors that increase efficiency. So let's look next at some empirical studies regarding how and what types of innovation drive increases in overall welfare.

### B. The Importance of Technological Change and Dynamic Efficiency

Efficiency, as we generally use the term in U.S. antitrust enforcement, is a measure of how much wealth is created in proportion to the inputs used: the more

efficient a process, the more output it can create or the more inputs it can save for other uses, and the more wealth results. There are several types of efficiency.

The first type I will call static efficiency and is, in short, minimization of the deadweight loss described above. In other words, within a given production technology and demand conditions, the most efficient output is where the marginal cost of production equals the value of the product to the marginal consumer (price equals marginal cost).

The second type of efficiency relates to streamlining or otherwise reducing the cost of production using existing technology. I will call this incremental dynamic efficiency. As an example, think of fine tuning a production line so that it can produce ten widgets per hour instead of eight.

The third type of efficiency I will call leapfrog dynamic efficiency, which refers to gains that come from entirely new ways of producing products or services.[4] As an example, think about making video telephone calls on wireless Internet connections rather than landline analog telephones, or automobiles providing transportation rather than horses.

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[4] *See generally* Thomas O. Barnett, Assistant Att'y Gen., U.S. Dep't of Justice, Interoperability Between Antitrust and Intellectual Property, Address at the George Mason University School of Law Symposium on Managing Antitrust Issues in the Global Marketplace 2-3 (Washington, D.C., Sept. 13, 2006), http://www.usdoj.gov/atr/public/speeches/218316.pdf. The line between incremental and leapfrog dynamic efficiency is undoubtedly blurred at the edges.

These latter two types of efficiency are dynamic because they shift the supply curve out and change the efficient quantity of production.

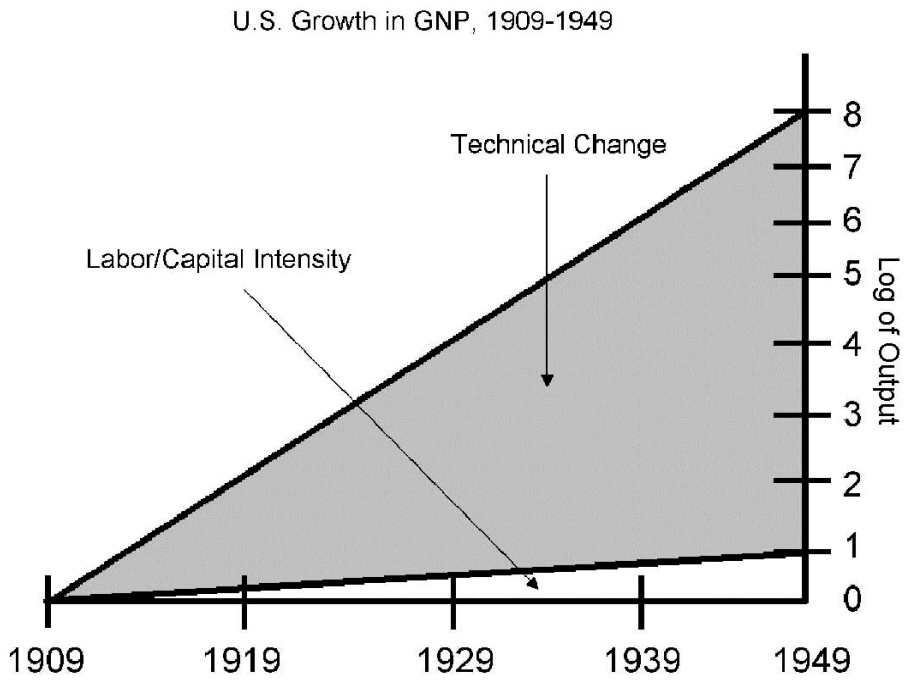
Since we care about the supply curve, antitrust enforcers care about efficiency, but should we also care about what *type* of efficiency? The answer is yes, because it turns out that dynamic efficiency – particularly leapfrog dynamic efficiency – accounts for the lion's share of efficiency/welfare gains.

Again, I will direct you to a chart, this one derived from studies by Massachusetts Institute of Technology economist Robert Solow, who won the 1987 Nobel Prize for Economics for his research into the forces that cause economic growth.[5] Working in the 1950s, Solow became interested in growth models, which at the time usually assumed that growth was a function of labor and capital intensity – essentially, a static-efficiency concept of merely working harder and building more machines and factories. When Solow tested that assumption, he found serious flaws: increasing the intensity of work and the number of machines could explain initial gains, but these gains would necessarily plateau as a given technology saturated its production market, leading to a long-term growth rate of

[5]*See* Press Release, The Royal Swedish Academy of Sciences, The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 1987 (Oct. 21, 1987), http://nobelprize.org/nobel_prizes/economics/laureates/1987/press.html.

nearly zero. Yet, in reality, long-term growth was occurring, so Solow set out to find the missing factor.

Solow found that between 1909 and 1949, gains from labor and capital intensity accounted for only one-eighth of United States GNP growth, while the remainder – a remarkable seven-eights – could be ascribed to an unmeasured force he termed "technical change."[6] Placed in a chart, this result is striking:




[6]*See generally* Robert M. Solow, *A Contribution to the Theory of Economic Growth*, 70 Q. J. ECON. 65 (1956) (identifying flaws in then-current growth theory).

He ultimately inferred (I am now quoting from his Nobel Prize lecture in 1987) that "the permanent rate of growth . . . is independent of the saving (investment) rate and depends entirely on the rate of technological progress in the broadest sense."[7] In other words, improvements in technology – new ways of producing, rather than just old methods done more intensely – create the vast majority of improvement in real societal wealth. Subsequent work on Solow's growth model shows that the percentages of growth vary over time, of course, and technological innovation is sometimes less, sometimes more than seven-eighths of the growth equation.[8] But Solow's basic point is well proven: in developed economies, technical change – dynamic efficiency – is the primary engine of productivity growth.

### C. Competition and the Power of Productivity

So, to recap: increased welfare is the goal, and to maximize the increase in welfare, simple competition within a given technology is not enough. We need to

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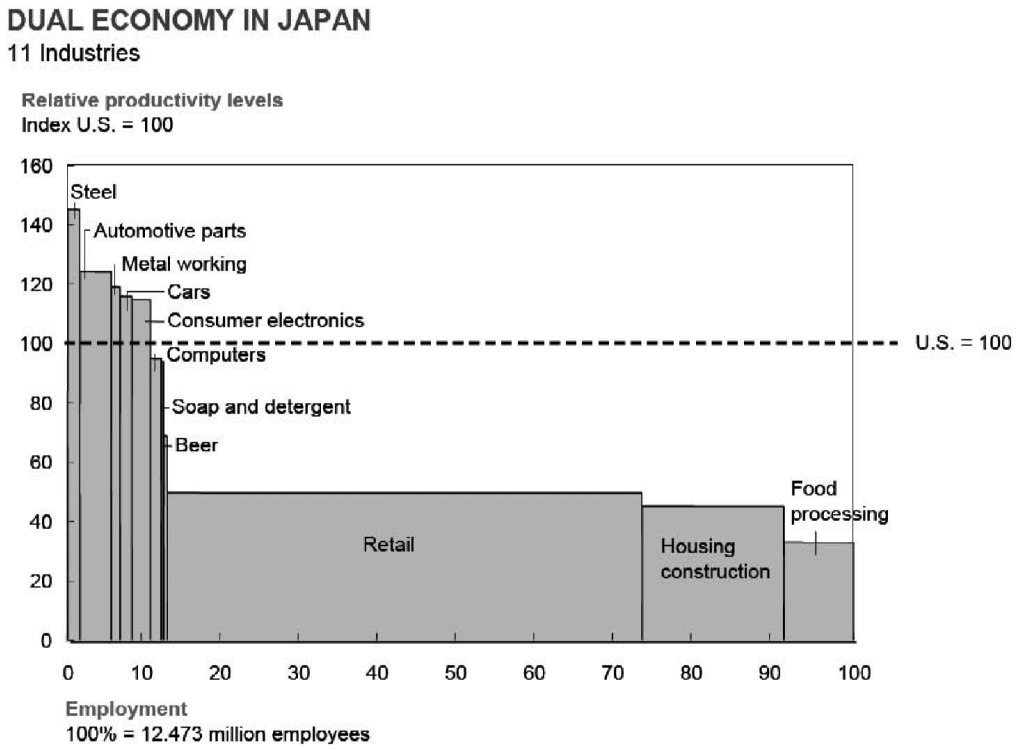
[7]Robert M. Solow, Growth Theory and After, Prize Lecture for the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 1987 (Dec. 8, 1987), http://nobelprize.org/nobel_prizes/economics/laureates/1987/solow-lecture.html.

[8]*See, e.g.*, Michael J. Boskin & Lawrence J. Lau, *Capital, Technology, and Economic Growth*, *in* TECHNOLOGY AND THE WEALTH OF NATIONS 17 (Nathan Rosenberg et al. eds., 1992) (During the four decades following World War II, the estimated contribution of technical progress to economic growth was: United States–49%, Japan–55%, United Kingdom–73%, France–76%, and West Germany–78%).

foster conditions that shift the supply curve "out," and dynamic efficiency, particularly leapfrog dynamic efficiency, is how best to achieve this result. But what drives technology change and increases in efficiency? What causes firms and economies to increase efficiency at a rapid pace?

The answer can be found in William Lewis's remarkable book, *The Power of Productivity*.[9] One of Lewis's conclusions was that productivity – a concept that combines efficiency and measures of output – explains why some countries get richer and some countries stay poor. But Lewis had another conclusion, one that is far less appreciated: that vigorous competition is the key driver of productivity growth. In short, Lewis found that competition is the key driver of technological advancement. Once more, a powerful demonstration can be found in a chart:

[9]WILLIAM W. LEWIS, THE POWER OF PRODUCTIVITY: WEALTH, POVERTY, AND THE THREAT TO GLOBAL STABILITY (Univ. of Chicago Press 2004).




The chart[10] shows that Japan's steel and auto parts industries are more productive than the same industries in the U.S., while the productivity of other industries such as retail and housing construction lags far behind the U.S. Lewis asked, what is the main difference across these Japanese industries? After considering and rejecting many other factors, Lewis concluded that the difference was the opportunity for competition: steel and auto firms competed in a tough global market, whereas retail and construction firms operated under domestic Japanese conditions that did not foster competition. The implication was clear and was supported by a

[10] *Id.* at 25 (with modifications subsequently created by Lewis).

McKinsey Institute study across fourteen nations: competition drives efficiency and productivity, and does so to an astounding degree. Lewis concluded "[m]ost economic analysis ends up attributing most of the differences in economic performance to differences in labor and capital markets. This conclusion is incorrect. Differences in competition in product markets are much more important."[11] "[C]ompetition," he recognized, "is the way more productive firms win out. Productivity increases as more productive firms expand and take market share away from less productive firms. Sometimes the less productive firms go out of business. Other times they react to the competitive pressure and increase their own productivity. Either way, overall productivity increases."[12]

Ultimately, Lewis concluded that competition policy explains which countries are the most productive, because competition policy influences the extent to which a culture of competition takes hold not just in global markets, but in smaller domestic markets as well. In fact, "it's competition policy" is the first heading of Lewis's summary chapter.[13] So let's turn to antitrust policy and how the United States makes use of all these observations.

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[11] *Id.* at 13 (emphasis omitted).

[12] *Id.*

[13] *Id.* at 230.

## III. Efficiency, Dynamism, and Practice of Antitrust Enforcement

### A. Implications for Antitrust Policy

United States antitrust law does not create a regulatory regime that requires firms to employ efficient practices.[14] To the contrary, it employs an enforcement model, which intervenes only where a firm violates a law.[15] This enforcement model is premised on the fundamental guiding principle that markets – not government regulation – creates the most efficient results. Accordingly, we focus in our enforcement efforts on efficiency and innovation that can increase welfare.[16] We even apply these concepts in establishing our overall enforcement priorities – cartel enforcement, efficient merger review, and non-merger civil enforcement, a topic to which I will return in a moment.

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[14]*See generally* Joseph Farrell and Michael Katz, *The Economics of Welfare Standards in Antitrust*, COMP. POL. INT'L Vol. 2 No. 2 (2006). The authors each served as Deputy Assistant Attorney General for Economics at the Antitrust Division.

[15]Hill B. Wellford, Counsel to the Assistant Att'y Gen., U.S. Dep't of Justice, Antitrust Issues in Standard Setting, Address at the China Electronics Standardization Institute 2d Annual Seminar on IT Standardization and Intellectual Property 5-6 (Beijing, China, March 29, 2007) (contrasting a regulatory model of government oversight with the U.S. enforcement approach), http://www.usdoj.gov/atr/public/speeches/222236.htm.

[16]*See* Leegin Creative Leather Prods. Inc. v. PSKS Inc., 127 S. Ct. 2705, 2722 (2007) (striking down the per se rule of antitrust illegality on the grounds that the rule's "end result hinders competition and consumer welfare").

The United States directly focuses on efficiency as part of our effects-based method of antitrust enforcement.[17] When examining challenged conduct, we explicitly evaluate whether and how the practice could shift the cost curve "out," what might be its impact on static and dynamic efficiency, and how overall productivity may be affected. This task is by no means easy. The Department of Justice employs a staff of roughly 50 Ph.D. economists, as well as other economic professionals, to help us better understand these issues and ask the correct questions. Case recommendations often hinge upon how the legal and economic staffs view effects on short- and long-term efficiency. We are appropriately skeptical of generalized efficiency claims – in mergers, for example, we demand careful accounting and a showing that claimed efficiencies are merger specific[18] – but we give well-supported efficiency claims great weight.[19]

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[17]Wellford, Antitrust Issues in Standard Setting, *supra* note 15, at 4-6 (discussing the effects-based test employed in the United States).

[18]U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, COMMENTARY ON THE HORIZONTAL MERGER GUIDELINES 49-59 (2006), http://www.usdoj.gov/atr/public/guidelines/215247.pdf.

[19]*E.g.*, Press Release, U.S. Dep't of Justice, Department of Justice Statement on the Closing of its Investigation into Whirlpool's Acquisition of Maytag (Mar. 29, 2006) ("The Division also evaluated carefully the large cost savings and other efficiencies that Whirlpool has indicated it will achieve through the transaction. The parties provided detailed analyses supporting enough of these claimed efficiencies to indicate that Whirlpool is likely to achieve significantly more savings than Maytag could achieve if this transaction does not proceed. These efficiencies further reduce the likelihood that the transaction might harm consumer welfare."), http://www.usdoj.gov/atr/public/press_releases/2006/215326.pdf.

Dynamic efficiency is a particular focus, and helps explain why U.S. antitrust enforcers have devoted so much time to issues surrounding innovation. Recall the work of Robert Solow and subsequent growth theory researchers, who demonstrated that, while static efficiency is important, the greater share of welfare gains – sometimes the much greater share – comes from technical change and the forces of dynamic efficiency. Their work has a clear policy implication: antitrust enforcers must be careful not to pursue immediate, static efficiency gains at the expense of long-term, dynamic efficiency improvements, since the latter are likely to create more consumer welfare than the former. Accordingly, U.S. enforcers approach practices that bear on innovation incentives with something close to the medical principle of "first, do no harm."[20] I have described this concept as being careful not to kill the goose that lays the golden egg.[21] Frank Easterbrook, a judge on the Court of Appeals for the Seventh Circuit, has stated it more dramatically: "[a]n antitrust policy that reduced prices by 5 percent today at the expense of reducing by 1 percent the annual rate at which innovation lowers the cost of production would be a calamity. In the long run a continuous rate of change,

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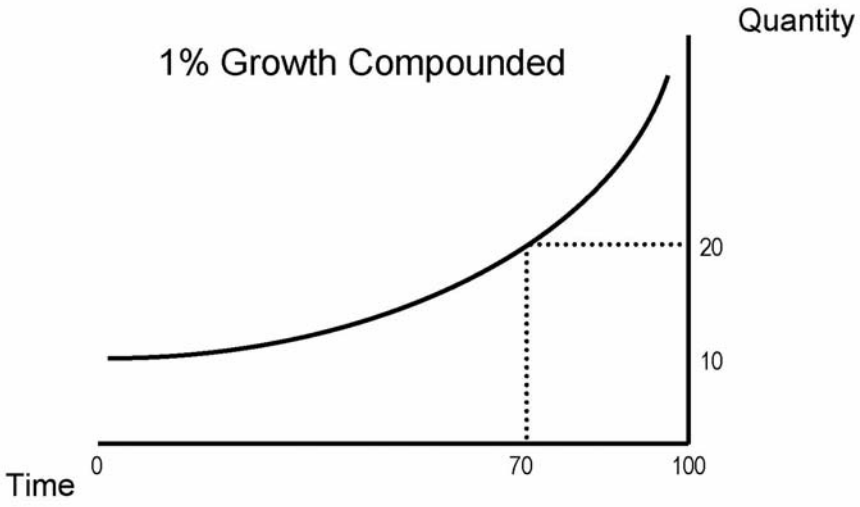
[20]*See* Thomas O. Barnett, Assistant Att'y Gen., U.S. Dep't of Justice, Section 2 Remedies: a Necessary Challenge, Address at the Fordham Competition Law Institute 34th Annual Conference on International Antitrust Law and Policy 4 (New York, Sept. 28, 2007), http://www.usdoj.gov/atr/public/speeches/226537.pdf.

[21]Barnett, Interoperability Between Antitrust and Intellectual Property, *supra* note 4, at 4.

compounded, swamps static losses."[22] Small rates of change – in this chart, a one percent rate – can have large impacts on consumer welfare:[23]




To quote Solow for one last time, "[a]dding a couple of tenths of a percentage point to the growth rate is an achievement that eventually dwarfs in welfare significance any of the standard goals of economic policy."[24]

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[22]Frank H. Easterbrook, *Ignorance and Antitrust*, *in* ANTITRUST, INNOVATION, AND COMPETITIVENESS 119, 122–23 (Thomas M. Jorde & David J. Teece eds., 1992).

[23]This chart shows that a mere one percent rate of increase, compounded, amounts to a doubling in under 70 years, a period that is well within the expected lifespan of the average consumer.

[24]Robert M. Solow, Growth Theory and After, *supra* note 7.

Since dynamic efficiency is crucial, preserving innovation incentives is one of the most important concerns of U.S. antitrust law. This can mean bringing an action to prevent conduct that reduces innovation or it can mean declining to act where overly aggressive antitrust enforcement risks chilling the type of vigorous, innovative competition that brings long-term benefits to consumers. In this regard, we recognize that when innovation leads to dynamic efficiency improvements and a period of market power, it is not a departure *from* competition, but it is a particular *type* of competition, and one that we should be careful not to mistake for a violation of the antitrust laws.[25]

### B. Enforcement Priorities at the Antitrust Division

This brings me to my last point, which is the way in which the foregoing economic principles explain the enforcement priorities of the Antitrust Division. The Division applies a hierarchy of antitrust enforcement: the first priority is hard-core cartels, which we prosecute under the criminal law; the second priority is mergers; and the third, still important, is non-merger civil conduct, including single-firm conduct. Taking these in reverse order, let's begin with single-firm conduct, which is analyzed under Section 2.

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[25] *See* Barnett, Interoperability Between Antitrust and Intellectual Property, *supra* note 4, at 3-5.

Section 2-covered activity poses particular challenges because, as I explained in my remarks at the opening of the joint DOJ-FTC single-firm conduct hearings, mere possession of monopoly power is not and should not be unlawful. The law only prohibits acquiring or maintaining monopoly power through improper means. The challenge lies in identifying what are improper means. Judge Easterbrook has succinctly stated the challenge: "[a]ggressive, competitive conduct by a monopolist is highly beneficial to consumers. Courts should prize and encourage it under the antitrust laws. Aggressive, exclusionary conduct by a monopolist is deleterious to consumers. Courts should condemn it under the antitrust laws. There is only one problem. Competitive and exclusionary conduct look alike."[26]

My purpose today is not to resolve this issue but to emphasize the importance to efficiency and welfare of resolving it correctly. Condemning mere possession or exploitation of monopoly power, for example, likely does more harm than good. Indeed, the ability to charge monopoly prices, at least for a short while, can be what induces firms to take the risks that produce innovation and other

[26]Frank H. Easterbrook, *On Identifying Exclusionary Conduct*, 61 NOTRE DAME L. REV. 972, 972 (1986).

efficiencies, which ultimately benefits consumers.[27] Similarly, it can be difficult to determine whether new functionality added to an existing product is a welfare-enhancing innovation, a tactic to exclude rivals, or both. Accordingly, our concern for dynamic efficiency – including long-term innovation incentives – is a key reason why we exercise appropriate caution in enforcement of the antitrust laws against single-firm conduct.[28]

Merger enforcement requires an intermediate amount of caution when it comes to the consideration of dynamic efficiencies. On the one hand, most mergers are efficient because they can combine financing, research teams, manufacturing and distributional know-how, and other resources that can significantly improve dynamic efficiency (and static efficiency as well). Since some types of innovation require tremendous risk and initial outlays of capital –

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[27]Thomas O. Barnett, The Gales of Creative Destruction: the Need for Clear and Objective Standards for Enforcing Section 2 of the Sherman Act, address before the Hearings on Section 2 of the Sherman Act 5-7 (Washington, D.C., June 20, 2006) (quoting Verizon Commc'ns, Inc. v. Law Offices of Curtis V. Trinko, 540 U.S. 398, 407 (2004)), http://www.usdoj.gov/atr/public/speeches/216738.pdf; *see also* Hearings on Section 2 of the Sherman Act: Single Firm Conduct as Related to Competition, http://www.ftc.gov/os/sectiontwohearings/index.shtm.

[28]This year, the agencies issued a report to further examine the role of innovation within antitrust law and policy. This "IP2 Report" (so called to distinguish it from a 2003 report by the FTC) addresses Section 1-covered practices such as licensing and patent tying, as well as Section 2-covered practices such as unilateral refusals to license. U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, ANTITRUST ENFORCEMENT & INTELLECTUAL PROPERTY RIGHTS: PROMOTING INNOVATION AND COMPETITION (April 17, 2007), http://www.usdoj.gov/atr/public/hearings/ip/222655.pdf.

the average approved new drug in the United States at the time of 2003 study, for example, was backed by investment of nearly $900 million[29] – a combination of smaller firms might well be beneficial. On the other hand, a merger could be used to absorb a disruptive and more innovative rival, and increased concentration could have unilateral or coordinated effects that reduce many aspects of competition, including the pressure to innovate.[30] There is significant debate in the economic literature as to whether larger or smaller firms produce the most innovation and what type of firms best produce what type of dynamic efficiencies, but antitrust enforcers are not required to takes sides in that debate. Fortunately, our task is more narrow, and more readily achievable: a fact-specific inquiry to determine whether a *specific* merger is likely substantially to lessen competition,[31] and, if so, whether there is relief that would preserve competition while permitting some aspect of the merger to proceed.

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[29]*See* Joseph A. DiMasi et al., *The Price of Innovation: New Estimates of Drug Development Costs*, 22 J. HEALTH ECON. 151 (2003) (the figure takes into account failures, and capitalizes the investment to the date of the drug's introduction).

[30]*See* Commentary on the Horizontal Merger Guidelines at 25-32 (discussing several enforcement actions against mergers based, in part, or potential negative consequences on innovation).

[31]*See* Clayton Act § 7, 15 U.S.C. § 18.

This brings me to the Antitrust Division's first priority, hard-core criminal cartel conduct. You know that we treat such conduct as per se illegal and that cartels reduce static efficiency. You may not appreciate, however, the extent to which our condemnation of cartels rests on our concern for dynamic efficiency. The pioneering growth theorist Joseph Schumpeter explained dynamic efficiency as:

> competition from the new commodity, the new technology, the new source of supply, the new type of organization . . . competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the outputs of the existing firms but at their foundations and their very lives.[32]

This type of competition – which Schumpter termed "creative destruction" – is anathema to cartels. Remember, cartels do not merely set prices. They also allocate customers, divide geography, restrict output, and take other steps to prevent change. Their entire purpose is to manage supply and avoid the disruptive forces of competition – to pursue what Nobel laureate John Hicks over 70 years ago termed "[t]he best of all monopoly profits . . . a quiet life."[33] The essence of cartel behavior is to reduce the competition that spurs dynamic efficiency and long-

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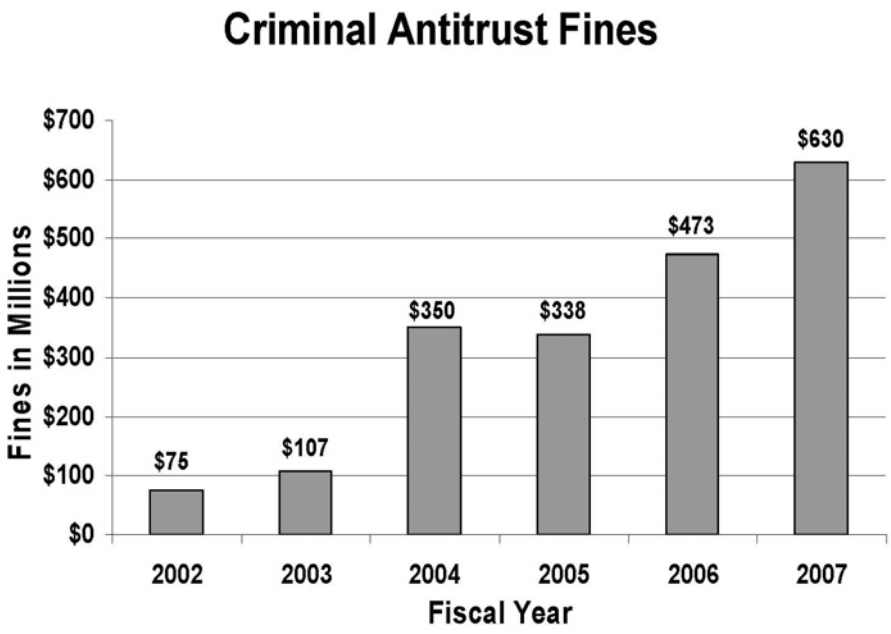
[32] JOSEPH SCHUMPETER, CAPITALISM, SOCIALISM AND DEMOCRACY 84 (Harper Perennial 1976) (1942).

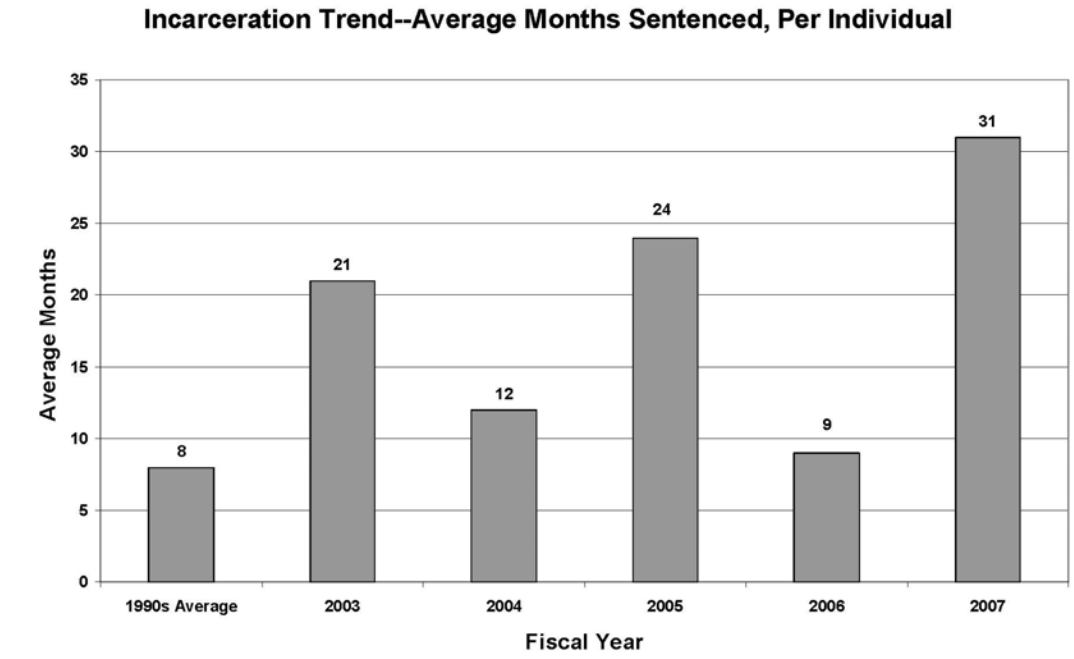
[33] John R. Hicks, *Annual Survey of Economic Theory: The Theory of Monopoly*, 3 ECONOMETRICA 1, 8 (1935) (referring to monopoly, which is what cartels collectively seek to achieve).

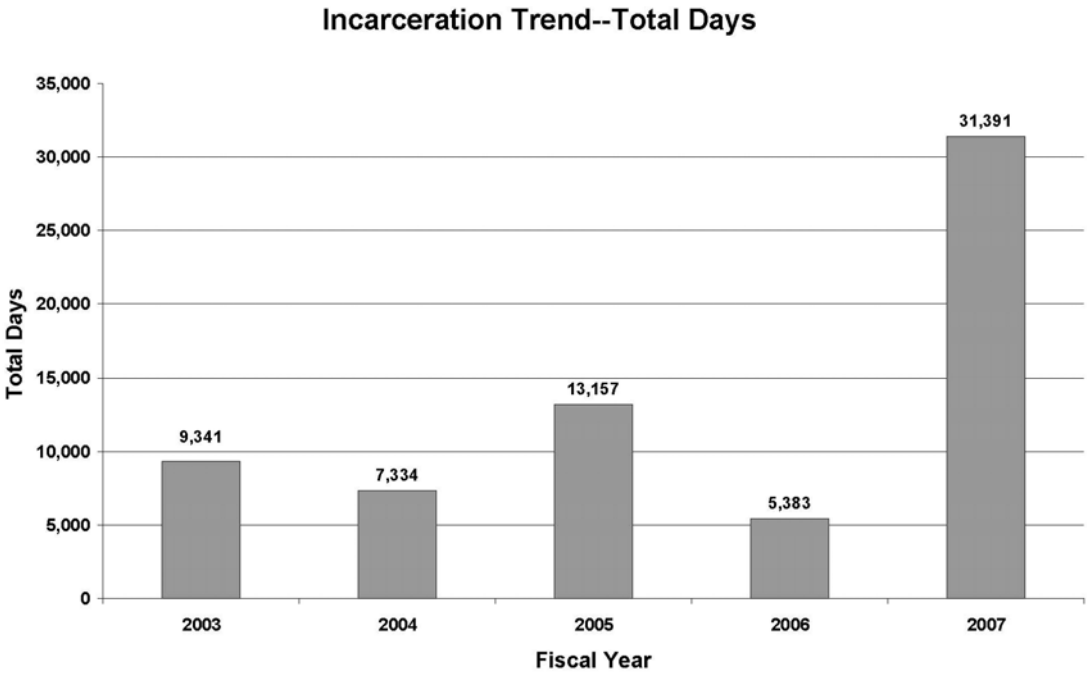
term economic growth. And worse, cartels do not even trade plausible static efficiencies for this lost dynamism; therefore, they are double the "calamity" that Judge Easterbrook discussed in the passage I quoted earlier. They are a direct assault on the principles of competition that drive our market economy and they richly deserve the severe sanctions available against them under U.S. law.

## IV. Conclusion

Thus, I leave you on a positive note. These last charts show that our efforts against cartels – the greatest enemy of dynamic efficiency and long-term welfare growth – are stronger than ever:






Thank you for inviting me to speak today.