



## Is Cheaper Always Better? Misusing the Concept of Marginal Cost in Policy Discussions

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by Solveig Singleton<sup>i</sup>

The influence of economics on policy culture has generally been for the good, contributing to deregulation and the liberalization of policy around the world.

But it has also unloosed a flood of jargon into the world of legislators, lawyers, and pundits, and sometimes the precise meanings of economic terms and the limitations of economic ideas are misunderstood, particularly by those educated in other disciplines, such as law. “Marginal cost” is one of these misunderstood concepts, and this paper examines the relevance of marginal cost in public policy.

Formally, marginal cost is “the additional cost of producing one more unit of output; the change in total costs divided by the change in output.”<sup>ii</sup> That is, the cost of stamping out the millionth widget over and above the cost of the previous 999,999. It is a useful and important concept, but in areas of public policy analysis ranging from competition policy to intellectual property to medical treatment, over-emphasis on marginal cost is perpetrating mischief.

In particular, misuse of the concept results in an over-emphasis on consumers’ interest in getting low prices in the short term, neglecting their longer term interests in quality, technological progress, surety of continued supply, and even low prices in the longer term.

### The Origins and Limits of “Marginal Cost” Concepts

Decades back, economists developed an economic model of “perfect competition.” In a state of perfect competition, there are enough buyers and sellers that no individual can influence price, and information and transaction costs are zero. In this world, prices fall to marginal cost. One definition of economic efficiency, is based in this concept of competition.

The models help us isolate factors that influence the tendency for prices to approach cost over time in real markets.<sup>iii</sup> But the model was not intended as a normative model of what the world *ought* to look like. If perfect competition obtained in the real world, economic activity would grind to a halt,<sup>iv</sup> because no seller could profit from selling; buyers would instantly know they could get a better deal elsewhere, and switch. Setting information costs or transaction costs at zero to see what happens is interesting. But one might equally well

create an interesting model by setting labor costs or transportation costs or materials' costs at zero. There is no normative reason that one ought to be zero than any other. All are scarce resources in the real world.

The artificiality of the assumptions about transaction and information costs and other aspects of the world of perfect competition strip the price/cost relationship in the perfect competition model of relevance to the real world. Pricing at marginal costs would provide no return on investment. The bottom line is, the concept of marginal cost and its companion concepts -- perfect competition, zero information costs, and zero transaction costs -- have next to no value in assessing policy. Many economists, including Demsetz<sup>v</sup> and Coase,<sup>vi</sup> warned that marginal cost and models of perfect competition were not to be taken as guides to what the real world ought to look like.<sup>vii</sup> Nonetheless, the idea that marginal cost is a standard of what prices "ought" to be has spread, especially among antitrust lawyers. The influential economist William Baumol warns:

Economists have generally been careful to point out that perfect competition is an artificial concept, albeit a useful and powerful analytic device. . . . But the optimality properties long associated with this market form . . . have tempted some who are not as careful as they should be to invite regulators and antitrust authorities to use perfect competition theory for guidance in their rulings, as a way to promote the public interest. For example, only this year I heard a conference presentation dealing with the economic and legal principles of copyright suggest that the innovating Schumpeterian entrepreneurs are automatically to be deemed proper subjects for antitrust attentions because in the period before imitators enter the market, they can charge prices that exceed the marginal-cost levels of perfect competition. Never mind that this is a prescription for undermining intertemporal efficiency. Never mind that marginal-cost pricing would generally preclude recoupment of the research and development (R&D) costs of the innovations at issue, costs that will have to be incurred many times again if innovation is to continue. And never mind that a world of perfect competition requires constant returns to scale and firms so small that they would never attract the attention of regulatory or antitrust personnel. Baumol,<sup>1</sup>

### **The Current (Mis)Use of "Marginal Cost" Concepts in Policy**

Understanding that prices need not follow costs as a normative matter is particularly important to intellectual property. With IP, the cost of producing the first unit—the first pill, or film print, or CD—may be in the millions of dollars, and the cost of every subsequent copy is near zero.<sup>viii</sup> Yet, ultimately, the claim that information goods ought to be priced at marginal cost is made rather frequently and at alarmingly high levels.<sup>ix</sup> At most the notion is qualified by the observation that pricing strictly at marginal cost provides no incentive for anything to be produced, so there must be “balance” or a “tradeoff.” Here is one example:

Once a book has been written, economic efficiency requires that anyone who is willing to pay the marginal cost of another copy of the book should be able to buy a copy. For books in digital format this marginal cost is practically zero, thus the book should be given to everyone who can be bothered to spend the time reading it. Giving the book author a copyright over his or her work means that he or she will want to sell

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<sup>1</sup> Regulation Misled by Misread Theory,"

it for a price greater than marginal cost, to maximise profits from the book, which is inefficient. . . So . . . we sacrifice some economic efficiency by allowing what is created to be sold at a price above marginal cost of reproduction, while gaining from the creation of the ideas or content in the first place.<sup>x</sup>

But since using a state of perfect competition as a normative goal is inappropriate, there is no reason to regard a price set at marginal costs as being normatively desirable, and thus no reason to “balance” it at all, or even to refer to marginal cost as relevant to anything.

Another example of the misuse of marginal cost is in policy relating to medicines and biologic treatments. Here is another IP venture with declining average cost. Research and testing costs are immense, as are the risks, but the cost of propagating another pill or a “biogeneric” is almost nothing.<sup>xi</sup> The Congressional Budget Office concludes that consumers would benefit from the production of biogenerics, because of the fall in prices that this would yield.<sup>xii</sup> The unspoken assumption is one need not worry about the prices being too low, unless they fall below the costs of production. The report fails to address the prospect that consumers would be harmed in the long run by prices too low to support research and development *ex ante*. Yet, for example, biogenerics would help reduce the market for drugs to combat chemotherapy-induced side effects by about \$3 billion by 2016.<sup>xiii</sup> This means fewer incentives to create more biologics in the long run, clearly relevant to consumers. But to too many policymakers, the sole measure of consumer welfare is short-run price.

Networks such as railroads and electricity also fall into this category,<sup>xiv</sup> as do two sided firms--firms that must convince two sides to participate--game developers and users, credit cards (customers and merchants), operating system software (developers and users).<sup>xv</sup> Pricing at marginal cost is not relevant. Yet recent precedents in competition policy rely on the theory of marginal cost.<sup>xvi</sup> The new antitrust guidelines make a point of mentioning that a departure from marginal costs is not a reliable guide to whether a market is competitive or not. But originally the entire concept of antitrust was premised on the theory of perfect competition;<sup>xvii</sup> take away marginal cost, and it is hard to see what is left.

Sometimes declining marginal cost economic sectors are described as being in the production of “public goods,” or of goods that are not scarce, or that are nonrivalrous.<sup>2</sup> But the extent to which this has policy significance is exaggerated. Many manufactured goods, if not literally nonrivalrous, are barely rivalrous. The cost of replicating digital information or stamping out another pill is near zero, but the cost of stamping out another pencil or another toaster is not that far off. The difference is a matter of degree, not a matter of kind. And the differences shrink over time. Everyone who makes something wants their marginal costs (and other costs) to go down. By one measure, only 11 percent of GDP comes from sectors with rising marginal cost (a feature of firms reaching capacity constraints, as do hospitals and

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<sup>2</sup> “Non-rivalrous” means that more than one person can use the good at the same time. Physical goods are generally classified as rivalrous, and information as non-rivalrous.

factories); half is produced under constant marginal cost (a possible example is hydroelectric power)—leaving as much as 40 percent from firms that report declining marginal cost.<sup>3</sup>(

Economists may assure those concerned about “marginal cost” in policy that economist themselves do not misuse the concept. In polite conversation, one may humbly assure them that the cautions are intended for non-economists. But this reassurance is actually untrue.<sup>xviii</sup> Prominent economist Wiliam Baumol accuses his fellow professionals of being repeated misusers of the concept, and some of Harold Demsetz’s cautions against the misuse of “information costs” were directed against fellow economist Kenneth Arrow. Others economists also seem determined to ignore the problem.<sup>xix</sup>

### **Towards Dynamic Measures of Efficiency**

As noted above, describing competition as a state in which marginal cost is zero has been used to define one type of economic efficiency. This is “static” efficiency. One compares a snapshot of reality to the model at a given instant to see if it conforms or does not conform.<sup>xx</sup> If prices are not be set at marginal cost, one is done; one has found static inefficiency. Competition is a price, not a process over time.

But we see above that perfect competition and marginal cost do not supply a standard of efficiency that is meaningful in the real world. Is there a better understanding of competition and efficiency? A better measure of efficiency is dynamic efficiency, in which competition is understood to be a process of change over time that benefits consumers in several ways. With the concept of dynamic efficiency, profit margins are expected to be high enough above marginal cost to support investment. First, that means not only high enough to support the accounting costs of doing business on an ongoing basis, but high enough to exceed the opportunity cost of alternatives and to attract investment over time. If it costs \$5.00 to set up the lemonade stand, \$6.00 in lemonade sales for \$1.00 net profit won't tempt me to set up, if Mom promises me \$3.00 to mow the lawn. As firms earn profits above cost, this attracts new entrants into the market to come in and undercut the first price. Also, dynamic theories of efficiency take account of the fact that costs may change.<sup>xxi</sup> No large firm has more than a transitory advantage. In Schumpeter's well-known description of creative destruction, he notes that during the period when a large firm does enjoy an advantage, it is able to pour extensive resources into research and innovation. Empirical business studies such as the *The Rule of Three* confirm the vulnerability of large firms to competition, even as markets tend to mature around a few dominant players and some small niche firms.<sup>xxii</sup> There is no perfect competition, but neither is there stagnation of the sort that harms consumers.

Some therefore might talk of balancing static and dynamic efficiency, or short and long run efficiency.<sup>xxiii</sup> But note that "balance" is a grand metaphor for fudging it, or compromise. One cannot really balance static and dynamic efficiency, as if weights or

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<sup>3</sup>Alan S. Blinder, Elie R. D. Canetti, David E. Lebow, and Jeremy B. Rudd., *Asking About Prices: A New Approach to Understanding Price Stickiness* (New York, NY: Russell Sage Foundation, 1998), pp. 102.

numbers could be attributed to each and compared to yield some objective outcome. One cannot balance a contradiction. As Paul McNulty puts it:

"The two concepts [perfect versus real competition] are not only different; they are fundamentally incompatible. Competition came to mean, with the mathematical economists, a hypothetically realized situation in which business rivalry ... was ruled out by definition."<sup>xxiv</sup>

Hayek emphasizes the extent of the contradiction. "If the state of affairs assumed by the theory of perfect competition ever existed, it would not only deprive of their scope all the activities which the verb 'to compete' describes but would make them virtually impossible."<sup>xxv</sup> One could not undercut another's prices, market one's product, or offer a superior or unique product.

Does the concept of static efficiency or marginal cost have \*any\* appropriate uses? Rarely. Alfred Kahn measures the inefficiency of regulatory regimes by noting the departure of regulatory pricing from marginal cost (he also cautions against using marginal cost or other artificially low measures of cost as a basis for setting prices).<sup>xxvi</sup> The regulated market in question is producing a set of outcomes (including prices) that are different from those that would prevail in a free market. Since one does not know what outcomes the free market would yield, and one knows that forces in such markets will tend to push prices towards marginal cost, it may be legitimate to compare the difference between regulated prices and marginal cost as a measure of the inefficiency of regulation, for want of any other numerical measure. But the real loss for consumers from regulation is not the difference between the regulated prices and marginal cost—it is the lack of a market process. The benefits of a market process to consumers include the movement of resources to their highest valued uses considering opportunity cost, the mutual benefits of voluntary trade, the generation of correct pricing signals, the forces that discipline ineffective operators, and the rewards for entrepreneurs who produce better results. It is therefore not appropriate to use marginal cost concepts by which to judge the outcome of a real market; they can be at best a very rough benchmark for what might be going on in a market if one has none better.

Bottom line: in the vast majority of cases, dynamic efficiency makes sense in the real world in a way that static efficiency simply does not.

### **Lessons for Public Policy**

Models of perfect competition and the concept of marginal cost have some power to explain some of the forces at work in real markets, but they are not a sound normative measure of what the real world ought to look like. These corollaries follow:

- Prices set above marginal cost are not a sign of undue market power or monopoly due to intellectual property or anything else.

- It makes sense to count cost savings as consumer benefits only if one takes account of other types of consumer harm and benefit over time; and/or only when one has no idea what the real-world market price would be, warts such as market power, and all.
- Prices above marginal costs bring new investment and new competitors into the market in question.
- Setting prices at marginal cost (for example, in the context of compulsory licensing of music or pharmaceuticals) does not amount to setting the "right" price; only a market can do that.
- Insisting on static inefficiency in the short run reduces investment and undermines dynamic efficiency in the long run.

Someone who compares the world of perfect competition to the real world is likely to see market failures propagating left and right. In the real world, though, supposed "market failures" have a powerful tendency to cure themselves. This is true in intellectual property markets and other declining marginal cost sector as elsewhere.

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<sup>i</sup> Solveig Singleton is a lawyer and adjunct with the Convergence Law Institute.

<sup>ii</sup> Robert B. Ekelund Jr. and Robert D. Tollison, *Economics*, Third Edition, p. 197 (HarperCollins 1991).

<sup>iii</sup> See Ekelund and Tollison, p. 239-241 (In describing a model of perfect competition, they note "If [Price] equals [LRMC] resource allocation is ideal in the sense that the things consumers want are produced by competitive firms in the exact quantities and combination... that consumers desire and at the lowest cost... The model of perfect competition is based on several key assumptions. One of these assumptions is that information about the prices and services is free. .. We live, of course, in a more complex world.")

<sup>iv</sup> Hayek described "perfect" competition which as "the absence of all competitive activities." F.A. Hayek, *Individualism and Economic Order* (Chicago: University of Chicago Press, 1948), p. 92.

<sup>v</sup> See Harold Demsetz, "Information and Efficiency: Another Viewpoint," 12 J. L. & ECON. 1, 11 (1969)(explaining the fallacy of concluding that the free-market under-produces information, by examining a "nirvana" based on models of efficiency)("The partitioning of economic activity into the act of producing knowledge and the act of disseminating already produced knowledge is bound to cause confusion when the attempt is made to judge efficiency. It is hardly useful to say that there is 'underutilization' of information if the method recommended to avoid 'underutilization' discourages the research required to produce the information.").

<sup>vi</sup> See Carl J. Dahlman, "The Problem of Externality," 1979, in *Public Goods and Market Failures*, Tyler Cowan, Ed., 1992, p. 209, 212-217; Ronald Coase, "The Coase Theorem and the Empty Core: A Comment," 24 J. L. & ECON. 183, 187 (1981) ("[W]hile consideration[s] of what would happen in a world of zero transaction costs can give us valuable insights, these insights are, in my view, without value except as steps on the way to

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the analysis of the real world of positive transaction costs."); *see also* Gordon Tullock, "The Two Kinds of Legal Efficiency," 8 HOFSTRA L. REV. 659, 668 (1980) (describing the misuse of transaction costs concepts in law and economics literature).

<sup>vii</sup> "What the theory of perfect competition discusses has little claim to be called competition at all and ... its conclusions are of little use as guides to policy." F.A. Hayek, "The Meaning of Competition," in F.A. Hayek, *Individualism and Economic Order* (Chicago: University of Chicago Press, 1948), p. 92.

<sup>viii</sup> See quotations from Kenneth Arrow in Harold Demsetz, "Information and Efficiency: Another Viewpoint," 12 J. L. & ECON. 1 (1969)(explaining the "Nirvana Fallacy").

<sup>ix</sup> William J. Baumol, "Regulation Misled by Misread Theory," AEI-Brookings Joint Center for Regulatory Studies 2005: Distinguished Lecture Presented at the American Enterprise Institute, pp. 1-7, 2005; *see also* James V. DeLong, "Marginalized," TCSDaily, July 29, 2003.

<sup>x</sup> Statement by Aaron Schiff ("economics PhD.," <http://www.26econ.com/category/copyright/>).

<sup>xi</sup> See James V. DeLong, "Aesop Comes to America: Intellectual Property and Pharmaceuticals," C:/Spin, May 3, 2002.

<sup>xii</sup> Congressional Budget Office, "S. 1695: Biologics Price Competition and Innovation Act of 2007: As ordered reported by the Senate Committee on Health, Education, Labor, and Pensions," CBO Cost Estimates, June 27, 2007.

<sup>xiii</sup> Decision Resources, "Entry of Biogenerics and Decreasing Use of Amgen's Epogen and Johnson & Johnson's Procrit Will Cause a \$2.8 Billion Decline in the Drug Market for Chemotherapy-Induced Anemia by 2016: Upheaval is Forecasted for the Markets of Five Chemotherapy Side Effect Indications," Decision Resources, October 29, 2007, available at <http://www.bio-medicine.org/biology-technology-1/Entry-of-Biogenerics-and-Decreasing-Use-of-Amgens-Epogen-and-Johnson--26-Johnsons-Procrit-Will-Cause-a--242-8-Billion-Decline-in-the-Drug-Market-for-C-1554-1>.

<sup>xiv</sup> See George Bittlingmeyer, "The Economic Problem of Fixed Costs and What Legal Research Can Contribute," 14 LAW & SOCIAL INQUIRY 739, 760 (1989) ("The economic problem of fixed costs emerged in the middle of the 19th century with the development of modern transportation systems and modern methods of mass production. Railroads, pipelines, steamship lines, steel mills, sugar refineries and cement plants serve as examples.")

<sup>xv</sup> David S. Evans, "the Antitrust Economics of Two-Sided Markets," [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=363160](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=363160).

<sup>xvi</sup> Timothy J. Muris, "Payment Card Regulation and the (Mis)Application of the Economics of Two-Sided Markets," *Columbia Business Law Review*, Vol. 2005, No. 3, pp. 515-550 (2005).

<sup>xvii</sup> "One of the assumptions of perfect competition is the existence of a Sherman Act." George Stigler, "Perfect Competition, Historically Contemplated," *Journal of Political Economy* (February 1957).

<sup>xviii</sup> One explanation for the persistence of dubious cost theories in antitrust is that the body of law has become a tax on business supported by the antitrust bar and other consultants so long as it does not go too far." George Bittlingmeyer, "The Antitrust Emperor's Clothes," *Regulation*, p. 50, Fall 2002 ("The party in power allows the

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antitrust bar to collect a large part of its implicit regulatory tax by guiding firms through a structured by complex merger review process and brokering consents.").

<sup>xix</sup> See, e.g. Weyl, E. Glen, "The Price Theory of Two-Sided Markets," Draft, December 2006, available at [http://economics.uchicago.edu/Weyl\\_011507.pdf](http://economics.uchicago.edu/Weyl_011507.pdf). This paper develops models showing that two-sided markets may not be priced as is "socially optimal," and recommends price regulation or activist regulatory policies on this basis, only noting in an opaque fashion at the very end that the models may have limited application to the real world.

<sup>xx</sup> More formally, static inefficiency is "a condition associated with the welfare loss due to the presence of a monopoly. The loss can be summarized as the production of too little output sold at too high a price." Ekelund and Tollison, p. G-20.

<sup>xxi</sup> See, e.g. Jerry Ellig and Daniel Lin, "Dynamic Competition and Monopoly Regulation," in Michael Crew (ed), *Expanding Competition in Regulated Industries*, pp. 112-113 (Kluwer Academic Publishers 2000). ("[D]ynamic theories offer substantially different predictions than static theories, and these predictions explain many aspects of real-world competition that economists appreciate but often exclude from formal theory. Performance competition, network effects, cost-cutting, continuous quality improvements, and innovation generally are well explained by dynamic theories, but largely unaccounted-for in static theories.")

<sup>xxii</sup> Jagdish Sheth and Rajendra Sisodia, *The Rule of Three: Surviving and Thriving in Competitive Markets*, p. 8 (The Free Press: 2002). ("Economists have long assumed that markets are either oligopolistic, in which a handful of large firms divide up the spoils, or monopolistic, with many smaller firms coexisting in specialized niches. The reality in most markets is clearly different. While they may start out in a pattern approximating monopolistic competition, they end up in a pattern that includes both types of players.")

<sup>xxiii</sup> See, e.g. statement by Assistant Attorney General Thomas O. Barnett, Antitrust Division, at the 4<sup>th</sup> Annual Competition Policy Conference in London, the United Kingdom, "Competition Enforcement in an Innovative Economy," *Federal News Service*, June 20, 2008. ("There are . . . two types of efficiencies: static and dynamic. Static efficiency describes the tendency of a marketplace to reduce costs by refining existing products and capabilities. In a free, highly competitive economy, competing firms quickly adapt to an existing technology, streamline their methods, cut costs, and drive the price of an existing product down to something close to the cost of production (marginal cost). This is a tremendously positive system that drives economic surplus into the hands of consumers. Static efficiency is a powerful force, and the competition laws are important tools for promoting it. . . But focusing on static efficiency alone sells our economies far short of their potential. The far greater driver of economic growth is dynamic efficiency.")

<sup>xxiv</sup> Paul McNulty, "A Note on the History of Perfect Competition," *Journal of Political Economy* (August 1967): 398.

<sup>xxv</sup> F.A. Hayek, "The Meaning of Competition," in F.A. Hayek, *Individualism and Economic Order* (Chicago: University of Chicago Press, 1948), p. 92.

<sup>xxvi</sup> See Alfred E. Kahn, *The Economics of Regulation* (reprinted, Cambridge: The MIT Press, 1988) 1:77-83.