

PRICING PROZAC:
WHY THE GOVERNMENT SHOULD SUBSIDIZE THE
PURCHASE OF PATENTED PHARMACEUTICALS

Douglas Gary Lichtman*

Economist Michael Kremer recently proposed that the government offer to buy important pharmaceutical patents from their respective patent holders.¹ His argument is that public ownership would largely eliminate the monopolistic distortions caused by the patent system, distortions that tend to be especially acute in the pharmaceutical context.² Under Kremer's proposal, the government would pay patent holders a sum sufficient to reward them for their research investments. In turn, the patent holders would relinquish their intellectual property

* Fellow, The Information Society Project, Yale Law School. B.S.E., 1994, Duke University; J.D., 1997, Yale Law School. Special thanks to Anne Joseph, Stephen Kahn, Bruce Kobayashi, Michael Kremer, Maura Rees, Alan Schwartz, and Molly Shaffer Van Houweling.

1. See MICHAEL KREMER, A MECHANISM FOR ENCOURAGING INNOVATION (Harvard Inst. Int'l Dev. Discussion Paper No. 533, 1996), revised in Michael Kremer, Patent Buy-Outs: A Mechanism for Encouraging Innovation (Aug. 18, 1997) (draft on file with author); see also *A Patent Cure-All?*, ECONOMIST, June 15, 1996, at 75 (discussing Kremer proposal). A similar idea was independently proposed in Robert C. Guell & Marvin Fischbaum, *Toward Allocative Efficiency in the Prescription Drug Industry*, 73 MILBANK Q. 213 (1995); and a relevant discussion of the economics of pharmaceutical monopolies appears in MARK JOHNSTON & RICHARD ZECKHAUSER, THE AUSTRALIAN PHARMACEUTICAL SUBSIDY GAMBIT: TRANSMUTING DEADWEIGHT LOSS AND OLIGOPOLY RENTS TO CONSUMER SURPLUS (National Bureau of Econ. Research Working Paper No. 3783, 1991).

The idea of purchasing patents is actually not so peculiar as it might at first sound. As Dava Sobel reports in a recent best-seller, the British government once offered a £20,000 reward to the first inventor whose device or process could determine "longitude within half a degree [of a great circle]." DAVA SOBEL, LONGITUDE 58 (1995). The winner — and note the interesting parallels to Kremer's proposal — could claim the prize only after surrendering the innovation for public use, see *id.*: at 84.

2. Although patents always confer some degree of market power, pharmaceutical patents are likely an extreme case. There are, after all, few substitutes for a patented drug like Prozac. Moreover, consumers in the pharmaceutical market (unlike consumers more generally) have no realistic option to defer consumption and thereby hold out for lower prices. Some pharmaceutical products surely do not fit this mold. Prices for a new headache medicine, for example, would be checked by competition with already-existing treatments. For many drugs, however, patent protection can be an incredibly strong form of market power.

rights, clearing the way for formerly-patented pharmaceuticals to be sold in fully competitive markets.³

The proposal has much to recommend it. Unlike more conventional approaches,⁴ Kremer's suggestion balances the twin goals of encouraging private research and increasing the availability of new pharmaceuticals. At the end of the day, innovators in the pharmaceutical industry would still be rewarded. The critical difference is that those rewards would be paid out of general tax receipts instead of being extracted from specific pharmaceutical markets by profit-maximizing monopolists.

One limitation to Kremer's system, however, is that it is rather insensitive to the efficiency costs associated with taxation. Patent-purchasing is likely to require significant tax revenue. To fairly purchase the Prozac patent, for example, the government would need to offer to pay the net present value of the product's expected profits.⁵ That is sure to be a tidy sum. The collection of such a sum would itself impose a significant efficiency cost⁶ — a cost that seems to weigh heavily against the efficiency savings Kremer's scheme was originally designed to achieve.

In this Article, I sketch an alternative mechanism for minimizing the social cost of pharmaceutical patents. The proposal builds on Kremer's original insight, but it has the potential to better balance tax and monopoly distortions. The idea is straightforward: the government could significantly reduce the social cost of pharmaceutical patents simply by offering a cash subsidy to any consumer who values a

3. Kremer's full proposal is significantly more detailed. See KREMER, *supra* note 1. He advocates a higher level of financial reward than that offered under the current patent regime because he correctly notes that the social value of patented pharmaceuticals greatly exceeds the value of the patent monopoly itself. See *id.* at 7. He also takes care to set out and analyze an auction-based mechanism by which the government could both estimate the appropriate size of this payment and protect that decision from political manipulation. See *id.* at 15-17. My summary is designed only to sketch the fundamentals; readers interested in more fully evaluating Kremer's ideas are strongly encouraged to consult his work directly.

4. A system of compulsory licensing, for example, would decrease patent holders' profits and, hence, discourage innovation. Nevertheless, such systems are often proposed. See Harry Schwartz, *Weak Drug Patents Would Inhibit Innovation*, WALL ST. J., Apr. 20, 1987, at A1.

5. A lower purchase price might, in the short term, seem attractive. Over the long term, however, a lower price would serve only to discourage private pharmaceutical research. By paying the full net present value, the government would be maintaining current incentive levels.

6. See *infra* note 16 and accompanying text for a more detailed discussion of this efficiency loss.

patented drug above its marginal cost but is nonetheless unwilling to pay the monopoly price. What is interesting, however, is the fact that the required subsidies turn out to be devilishly small — a result that keeps the scheme relatively efficient even in the face of tax distortions, government error, and the host of practical difficulties sure to arise in the process of identifying appropriate consumers.⁷

Two intuitions motivate the proposal. First, a subsidy dollar can have more than a dollar's impact on the market. Consider a consumer willing to pay four dollars for a good that is being sold at a price of five. Give him just one dollar and you will, in effect, be increasing the producer's revenue by five dollars. A dollar given directly to that producer, by contrast, would yield but a dollar's gain. Thus, small, well-targeted consumer subsidies can have the same impact as large, direct-to-producer grants, but at a fraction of the cost.

Second, once the government starts to subsidize large numbers of consumer purchases, monopolists will respond by lowering their prices; this will decrease the number of government dollars ultimately required. As I will explain more fully, government subsidies can be used to shift out the low end of the demand curve, increasing the number of consumers willing to pay high (but not quite monopoly) prices. This shift, in turn, can make the traditional monopoly strategy of charging an exorbitant price but selling relatively few units less attractive than the more socially desirable alternative of charging a lower price but selling many more units.

One unique advantage to this proposal is that it benefits subsidized and non-subsidized consumers alike. Medicaid⁸ and similar welfare programs offer no comparable plus. Those programs operate outside the market, rewarding members (with new-found access) and producers (with increased profits⁹), but doing little to help ineligible consumers. Subsidies, by contrast, operate within the market. They drive prices

7. If the required subsidy is small, the government can waste several dollars for each accurately-spent dollar and still, on balance, improve efficiency. See *infra* note 30 and accompanying text.

8. Medicaid is a federally subsidized, state-run medical program that provides financial assistance to the very poor. See generally MICHAEL S. SPARER, *MEDICAID AND THE LIMITS OF STATE HEALTH REFORM* 31-65 (1996).

9. Although Medicaid is not widely advertised as a financial aid program for the pharmaceutical industry, it certainly has that effect. Ironically, this may be a subtle virtue. Monopoly profits are inefficiently small as compared to the societal value made possible by patentable innovation; profits earned through Medicaid sales might therefore better align the monopolist/innovator's incentives (total profit) with society's own interests (increasing societal value).

down and hence make all consumers — not just subsidized consumers — better off.¹⁰

In the text that follows, I use some simple numeric examples to explore these forces and to show the principal considerations that motivate this consumer subsidy proposal. What follows is not intended to be a blueprint for the actual implementation of the scheme; as will be readily apparent, many important implementation details still require attention. Instead, my purpose is to further the discussion that Michael Kremer and his colleagues began¹¹ — a critically important discussion of monopolistic behavior, private pharmaceutical research, and mechanisms that might ultimately reduce the troubling gap between per-dose cost and per-dose price.

Imagine that Merck (or any large research conglomerate) has just developed a new, patentable drug. Assume that the drug can be produced and distributed at zero cost¹² — that is, once this drug has been developed, assume that efficiency will be achieved only when every consumer enjoys access to it.¹³

Table 1 shows a market of four consumers. The right-hand column indicates the maximum price each would be willing to pay for one dose of the medicine.

10. The subsidy proposal advocated herein differs significantly from Medicaid and other traditional government health programs. First, as pointed out in the text, state Medicaid programs operate exclusively to benefit Medicaid recipients and pharmaceutical manufacturers. Thus, when California recently added Prozac to its list of approved Medicaid treatments, it negotiated a low per-dose price for in-program purchases but left Eli Lilly free to sell Prozac more generally at a supra-competitive, monopoly price. See Chris O'Malley, *California OKs Prozac for Its Medicaid Program*, INDIANAPOLIS STAR, Feb. 21, 1996, at F2.

Second, state Medicaid programs are narrowly focused, normally targeting only consumers at or near the poverty line. See SPARER, *supra* note 8, at 31-65. The subsidy scheme I propose would be much broader in its application.

There are other differences between these competing proposals, but, at this stage, it is more important to stress the critical similarity: both programs serve to alleviate some of the deadweight loss caused by the private ownership of patented pharmaceuticals. In this sense, the two programs are significantly complementary.

11. See *supra* note 1.

12. Although admittedly a simplification, this assumption is not far from accurate. Drugs (like many innovative goods) are expensive to develop but relatively inexpensive to produce.

13. More formally, I assume that the marginal cost of production is zero. Efficiency requires that the drug be given to every consumer who values it above its marginal cost; in this case, that would mean giving it to every consumer who values it at all.

Table 1

Consumer	Willing to Pay
A	\$10
B	\$7
C	\$4
D	\$2

Facing this demand, patent-holder Merck would maximize revenue by charging a price of \$7. At that price, Merck would sell two doses (one each to consumers *A* and *B*) and earn a total of \$14. This is Merck's profit-maximizing strategy; there is no higher or lower price that would yield increased revenue.

Table 2 adds two columns to Table 1. The first lists Merck's price (\$7) and the second shows "consumer surplus" — basically, how much each consumer values the drug above its price. Consumer *A* enjoys a surplus of \$3 since he would have been willing to pay \$10 for a dose but was able to purchase one for only \$7.

Table 2

Consumer	Willing to Pay	Price	Consumer Surplus
A	\$10	\$7	\$3
B	\$7	\$7	\$0
C	\$4	\$7	—
D	\$2	\$7	—

Notice that Table 2 depicts an inefficient result. Consumers *C* and *D* are both being denied access to the drug even though it has already been developed and, by assumption, could be offered to them at no additional cost. The reason for this inefficiency is monopolist Merck's self-interested, profit-maximizing pricing strategy.

Now introduce a subsidy into this market. If consumer *A* were to give \$1 to consumer *C*, the market would change in several important

ways. Merck would voluntarily lower its price. A price of \$5 would now generate three sales, and, from the producer's standpoint, \$15 (the revenue generated by those three sales) is better than \$14 (the maximum revenue possible at the old price of \$7). Thus, in response to the subsidy, monopolist Merck would charge a lower price and make more money.

Relatedly, consumer *A* would experience an increase in consumer surplus. Although it would cost him \$1 to fund the subsidy, the monopoly price would decrease by \$2, and that translates into a net savings of \$1. Consumer *B* would be better off as well. Under the subsidy scheme he pays \$5 for a drug he values at \$7. Table 3 shows these post-subsidy results.

Table 3

Consumer	Willing to Pay	Price	Consumer Surplus
A	\$10 - \$1	\$5	\$4
B	\$7	\$5	\$2
C	\$4 + \$1	\$5	\$0
D	\$2	\$5	—

Of course, there is no reason to stop there. A subsidy given to consumer *D* would drive the price even lower — again increasing the total consumer surplus enjoyed by consumers *A*, *B*, and *C*, and again increasing the revenue earned by monopolist Merck. One such subsidy is shown in Table 4.

Table 4

Consumer	Willing to Pay	Price	Consumer Surplus
A	\$10 - \$1	\$4	\$5
B	\$7 - \$1	\$4	\$2
C	\$4	\$4	\$0
D	\$2 + \$2	\$4	\$0

In general, whenever a monopolist is charging a price above cost, there exists some non-zero subsidy that could be transferred from high-valuing consumers to low-valuing consumers such that all affected consumers would be made better off, and the monopolist's profits would be increased (or, at worst, not diminished).¹⁴

Two worries complicate this general result. (Both are introduced here but addressed more fully later in the Article.) First, even though it is in their best interest, consumers will find it difficult to coordinate a program of consumer-funded subsidies. Some consumers will be tempted to strategically misstate their valuations in the hope of receiving undeserved subsidy dollars. Others will simply refuse to participate, attempting to free-ride on a subsidy scheme funded by everyone else. To solve these coordination problems, consumers will need to fund the scheme through mandatory tax contributions.¹⁵

That, of course, will introduce new inefficiencies. In the process of collecting tax dollars, the government inadvertently distorts markets that are otherwise efficient. An increase in the income tax, for example, would cause some workers to spend more time at leisure and less time at work. If the labor/leisure market was efficient before the advent of income tax — and we have no reason to believe that it was not — those tax-induced changes are a new source of market inefficiency.¹⁶

14. I show this more general result in the Appendix.

15. The solution is actually a bit more complicated than I summarize here. Using tax dollars to fund the scheme does solve the free-rider problem, but it does not fully resolve the problem of consumers who strategically misstate their valuations. Linking the subsidies to more objective data (like total income or wealth) may serve to address this problem. A consequence, however, is that some subsidy dollars can be expected to be improperly allocated. See *infra* note 30 and accompanying text for a discussion of this solution and an argument that its costs are easily outweighed by the program's gains.

As for the tax solution, notice that, to some extent, consumers actually would be able to coordinate a system of subsidized buying outside the tax system. When consumers share resources (buying one copy of a magazine but then passing it around) they are engaging in precisely this sort of non-tax cross-subsidization. In the pharmaceutical context, insurance companies could perhaps perform a similar role, buying intellectual property rights from the pharmaceutical companies and then distributing to members, at cost, the patented pharmaceutical products.

16. A similar explanation can be made with respect to other types of taxation. For example, an increase in the sales tax collected on one type of good would lead some consumers to stop purchasing that (preferred) good and instead purchase a substitute product. These strategic responses to taxation decrease societal efficiency. For a fuller introductory discussion, see Barton H. Thompson, Jr., *The Endangered Species Act: A Case Study in Takings & Incentives*, 49 STAN. L. REV. 305, 355 (1997). Of course, as Louis Kaplow correctly points out, this type of inefficiency could be avoided if each individual's tax increase were perfectly offset by his gains from the corresponding government spending. See Louis Kaplow, *The Optimal Supply of Public Goods and the*

In addition to the social costs of taxation, there is a second type of loss implicated by the subsidy scheme: government error. For every dollar accurately spent on efficiency-increasing subsidies, several dollars will surely be wasted. Honest errors, information asymmetries, and strategic misbehavior by would-be subsidy recipients will all cause the government occasionally to subsidize the wrong consumers. These misdirected dollars themselves represent only distributional error;¹⁷ however, because each is a tax dollar, these misdirected dollars increase the scheme's efficiency costs as well.

The foregoing leads to two important results. First, as our simple model demonstrated, so long as any non-purchasing consumer values a patented drug above cost, a subsidy scheme has the potential of greatly improving market efficiency. Second, however, any such subsidy scheme has to be extremely inexpensive; otherwise the program's efficiency gains (eliminating the deadweight loss caused by monopoly pricing) will be outweighed by its efficiency costs (the deadweight loss of tax collection). In the more formal model that follows, I show that the required subsidies can, in fact, be sufficiently small.

Before turning to that analysis, it is worth re-emphasizing the overarching policy goals behind this proposed program of consumer subsidies. Pharmaceutical manufacturers like Merck and Eli Lilly spend billions of dollars to develop and test new, innovative drugs. The patent system encourages these investments by offering the promise of large monopoly rewards. The problem is that the method by which monopolists extract those rewards from the market results in societal waste; consumers who would willingly pay the costs of producing each additional dose are nevertheless priced out of the market. If a subsidy scheme could change this result — if it could entice producers to lower their prices and sell to all consumers who value the drugs — the waste caused by monopoly pricing would be largely eliminated. Producers would continue to earn supra-competitive profits, but consumers would nevertheless have broad access to the patented drugs.

To begin our more formal analysis, consider a simple market distorted by a patent monopoly. For ease of discussion, we will assume a market with zero marginal cost and linear demand. These assumptions are admittedly not trivial; many of the results that follow are at least

Distortionary Cost of Taxation, 49 NAT'L TAX J. 513 (1996).

17. One caveat bears mention. While, for the most part, errors lead only to a slightly inefficient redistribution of wealth from some taxpayers (mainly the wealthy) to others (mainly the poor), systematic errors could conceivably shift the demand curve in such a way so as to raise prices or increase deadweight loss. This result is unlikely, however, as long as errors are randomly distributed through the demand curve.

partially tied to the shape of the demand curve and the level of marginal cost. I make these simplifying assumptions, however, because the primary purpose of this discussion is to show more specifically how tax and monopoly distortions interrelate — and to prove that, over a wide range of assumptions, the subsidy concept is indeed a tenable, efficient alternative to the unmodified patent regime.

Figure 1

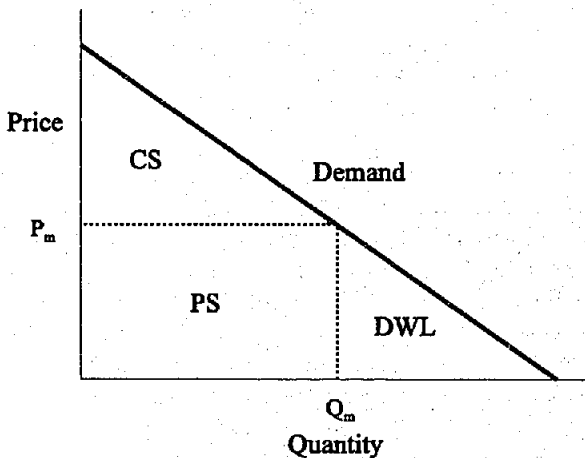


Figure 1 presents our initial market. The dark diagonal line represents demand and the line ($y = P_m$) marks the patent holder's profit-maximizing price. Consumer surplus,¹⁸ producer surplus,¹⁹ and deadweight loss²⁰ are labeled *CS*, *PS*, and *DWL* respectively. And, as is

18. Consumer surplus is the difference between what a consumer would be willing to pay for a good and the price actually paid by that consumer. If a consumer buys a television he values at \$100 for a price of only \$60, he is said to enjoy a consumer surplus of \$40.

19. Producer surplus is the corresponding concept for producers. If a producer sells at a price of \$60 a television that costs him only \$50 to produce, he receives a surplus of \$10.

20. Deadweight loss is a measure of the consumer and/or producer surplus that theoretically could be achieved but, due to the structure of the market, is nevertheless lost. If, for example, the television referred to above were never sold, there would be deadweight loss in the amount of \$50 (the sum of potential consumer and producer surplus).

always the case for a market with linear demand and constant marginal cost, $CS = DWL = (0.5 * PS)$.²¹

One way to eliminate the deadweight loss shown in Figure 1 would be to have the government purchase this patent at a price equal to the expected producer surplus. Once purchased, the patented idea could be released into the public domain and sold in competitive markets. Deadweight loss would be fully avoided, and the patent holder fully rewarded, all at an apparent cost of only PS dollars.²²

There are two potential difficulties with this "purchase-the-patent" scheme. First, the government needs a mechanism by which to accurately estimate producer surplus. Second, the government needs then to collect those PS tax dollars.

From an efficiency standpoint, the first of these concerns — accurately estimating PS — is actually not a worry at all. It does not matter if one innovator is over-compensated and another is under-compensated, as long as the average payment is approximately correct. Error in and of itself raises distributional, but not efficiency, concerns. Thus, even if the government turns out to be very bad at approximating PS , efficiency requires only that the government not systematically err on one side or the other.²³

More serious efficiency concerns are raised by the second issue, the need for tax revenue. As discussed previously,²⁴ tax collection creates deadweight loss. Thus, the purchase-the-patent scheme actually trades one type of deadweight loss for another. The deadweight loss caused by monopoly pricing is recaptured, but a new deadweight loss caused by the collection of PS tax dollars is imposed.

21. This is a well-known result in economics. When facing linear demand and zero marginal cost, a monopolist maximizes profit by selling to exactly half the consumers. Geometrically, this means that $CS = DWL = (0.5 * PS)$. See generally PAUL A. SAMUELSON & WILLIAM D. NORDHAUS, *ECONOMICS* 583 (13th ed. 1989).

22. As discussed earlier in this Article, this is the heart of Kremer's interesting proposal. See *supra* note 1 and accompanying text.

23. This assumes risk neutrality. However, since most patentable pharmaceutical research is undertaken by large corporations (Merck, Upjohn, Glaxo-Wellcome, Bristol-Myers, Eli Lilly) this seems to be a reasonable assumption.

The real concern here might be that the government would intentionally underestimate producer surplus in the hope of protecting scarce budgetary resources. As Michael Kremer points out, however, this type of worry can be addressed by designing a robust mechanism by which to estimate PS . Kremer himself proposes an auction-based system that, in theory, induces pharmaceutical companies to reveal their private estimates as to the value of any particular patent. His scheme minimizes government discretion and hence makes systematic error less likely. See KREMER, *supra* note 1.

24. See *supra* note 16 and accompanying text.

We can estimate the net gain from the purchase-the-patent scheme as follows. From Figure 1, we know that the recaptured societal waste — the triangle marked *DWL* — is of size $(0.5 * PS)$.²⁵ The exact size of the tax-imposed deadweight loss is less clear, but an informed estimate might place the efficiency loss at about 30 cents for each dollar of additional tax revenue.²⁶ Thus, balancing the gain against the loss, the purchase-the-patent scheme results in a net societal benefit of approximately $(0.2 * PS)$.

Now consider Figure 2. In this figure, I have marked several price/quantity pairs that yield a producer surplus of size *PS*. Were they possible, a monopolist would be indifferent between any of these points. For example, a monopolist would be just as happy charging the monopoly price (P_m) and selling the monopoly quantity (Q_m), as it would be charging $\frac{2}{3}$ that price and selling $\frac{3}{2}$ that quantity.²⁷

25. The exact amount of deadweight loss is actually a function of two market conditions: the shape of the demand curve (here, assumed to be linear); and the producer's ability to price discriminate. The more a producer is able to price discriminate — the more he is able to identify low-valuing consumers and charge them a correspondingly low price — the fewer the number of consumers needlessly excluded from the market.

For the most part, price discrimination is both difficult and illegal. Patent holders are rarely able to distinguish low-valuing from high-valuing consumers. Clues that are available to the government (tax returns, voluntary disclosures made for the purpose of qualifying for health and welfare programs, etc.) are, for good reason, not available more broadly. Moreover, even where price discrimination is practical, such behavior is sharply restricted under both antitrust and patent misuse doctrine.

This does lead to an interesting suggestion. Perhaps the government should exempt pharmaceutical companies from patent misuse and antitrust actions whenever the activity in question is designed to implement some form of efficiency-improving price discrimination. Indeed, the government might even consider assisting pharmaceutical companies in establishing multi-level pricing. After all, to whatever extent successful, a price discrimination solution would be an incredibly inexpensive way to improve market efficiency.

26. Cf. Thompson, *supra* note 16, at 355 (noting that recent estimates of the deadweight loss caused by income tax range from 7 to 28 percent, while loss from a one percent increase in all taxes is estimated to be in the range of 17 to 56 cents per dollar of extra revenue). Importantly, the specific assumption made here is immaterial. Any plausible figure will suffice — and lead to the same general conclusions with regard to the relative performance of the subsidy scheme, the purchase-the-patent scheme, and today's patent system. I choose a specific value only for convenience.

27. In the text, I focus on price/quantity pairs between which the producer would be indifferent. However, once we identify the most desirable pair, we can encourage the producer to select it simply by increasing the stated price by an infinitesimal amount. To keep things clear, I omit this small refinement from the text discussion.

Figure 2

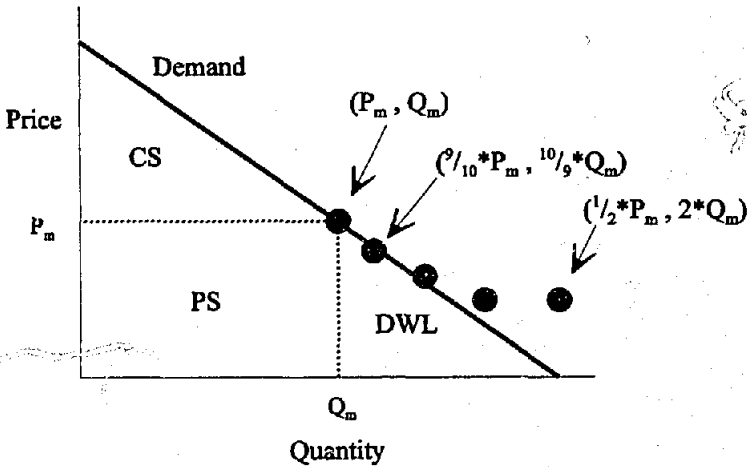
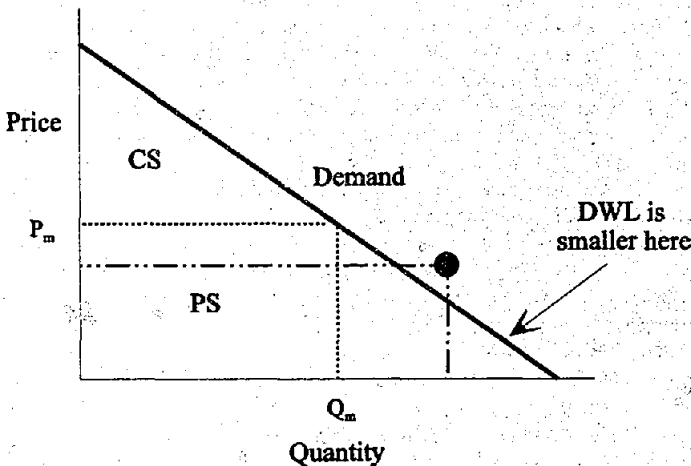


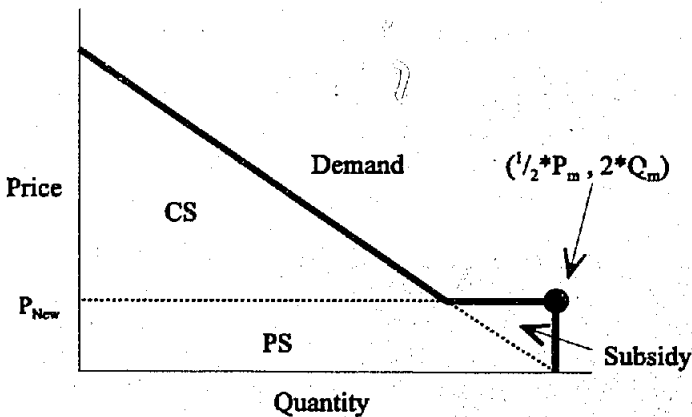
Figure 3 isolates one point from the arc. At that price/quantity pair — like all points on the curve — some of the deadweight loss that would have been caused by monopoly pricing has been eliminated. The monopolist still earns its full monopoly profit, but it does so in a manner less harmful to society as a whole. Price drops and consumer surplus correspondingly increases.

Figure 3



The point isolated in Figure 4 is the price/quantity pair that completely eliminates deadweight loss. The monopolist's price has fallen to $(\frac{1}{2} * P_m)$ and consumer surplus has doubled.²⁸ The cost of this technique is represented by the triangle marked "subsidy." In other words, to eliminate simultaneously deadweight loss and maintain the patent holder's full profit level, the government would need to subsidize consumer purchases by this amount.

Figure 4



Putting logistics to one side for the moment, note the advantages that this subsidy scheme enjoys over both today's patent system and the purchase-the-patent alternative. The triangle representing the subsidy in Figure 4 is $\frac{1}{8}$ the size of the original rectangle PS .²⁹ Thus, accounting for both efficiency gains and losses, the three options compare as follows:

28. This price/quantity pair is easily identified. The only way to completely eliminate the deadweight loss caused by monopoly pricing is to sell the good to all $(2 * Q_m)$ consumers. For the producer to earn only PS dollars, the corresponding price must be $(\frac{1}{2} * P_m)$. Thus, this is the only point on the arc that both maintains the producer's profit level and completely eliminates the monopoly's deadweight loss.

29. The subsidy triangle is of height $(\frac{1}{2} * P_m)$ and length $(\frac{1}{2} * Q_m)$. The area is therefore $(\frac{1}{8} * P_m * Q_m)$.

Table 5

	DWL (Monopoly)	DWL (Tax Collection)
Patent System	$0.5 * PS$	0
Purchase-the-Patent	0	$0.3 * PS$
Consumer Subsidy	0	$0.3 * (1/8 * PS)$

Now we can turn to logistics. Imagine that, for every subsidy dollar accurately spent, three dollars are inadvertently given to the wrong consumers. Alternatively, imagine that five dollars, or even seven, must be spent in order to place just one dollar correctly. According to the table above, so long as one in every eight dollars is placed in the hands of an appropriate consumer, the consumer subsidy scheme will be the most effective option.³⁰

For pharmaceuticals, this type of ratio seems exceedingly achievable. After all, valuations for pharmaceutical products surely bear some relationship to other, more easily ascertainable data. The maximum price that a consumer would be willing to pay for Prozac, for example, is likely to be well correlated to that consumer's total wealth or perhaps his yearly income. Even better, this data is already collected by existing health and welfare agencies.

As for the dangers of abuse, it is true that any government scheme is vulnerable to manipulation. Consumer subsidies are no exception. However, because subsidies operate within the broader market, any opportunity for abuse is small. This would be especially true if subsidies were ultimately implemented in a very precise manner — a \$5 non-transferable coupon given to consumer *A*, usable only toward this month's purchase of Prozac. The patent system is surely safer; the

30. Consumer subsidies are more efficient than the unmodified patent system so long as one in every thirteen dollars is spent correctly. The one-in-eight metric is the ratio needed for consumer subsidies to outperform the purchase-the-patent alternative.

Note that the comparison to the unmodified patent system will change depending on the assumption made regarding the deadweight loss of tax collection, *see supra* note 26, and will also vary based on the shape of the demand curve, *see supra* note 25. The comparison to the purchase-the-patent scheme is sensitive only to the assumption regarding the shape of demand. The relative efficiency gains can either increase or decrease depending on the specific patterns.

purchase-the-patent system (with its direct, out-of-the-market cash transfers) is surely more dangerous.

CONCLUSION

As mentioned early in the text, the proposal sketched in this Article represents only the beginning of a conversation. Further research is needed to measure how well consumer willingness-to-pay is correlated to available, objective data; likewise, further consideration must be given to the question of how a system of consumer subsidies could best be implemented within the existing framework of health and welfare agencies. My purpose here was simply to suggest that those questions are well worth pursuing. Under the right conditions, consumer subsidies can be a cheap, robust, and effective means by which to recapture the deadweight loss associated with monopoly pricing.

APPENDIX

In the text, I assume that it is always in society's best interest to eliminate all of the deadweight loss associated with monopoly pricing. This is not necessarily true. Efficiency might be best served were the government to pursue a mixed strategy, allowing some of the deadweight loss to remain but eliminating the remainder by means of a consumer subsidy.

To see why this is so, consider the following simple model.³¹ Let P_m be the monopolist's supra-competitive price. Let Q_m be the number of consumers willing to purchase the good at that price, and let M be the marginal cost of producing each additional dose. Define r to be the fraction of a dollar sacrificed to deadweight loss for every tax dollar collected. Thus, the collection of PS tax dollars costs $(r * PS)$ in deadweight loss.

Now, identify some non-purchasing consumer who nevertheless values the good above its marginal cost. By definition, this consumer is willing to pay up to C dollars for the good where C is some number greater than M but less than P_m . Imagine that this consumer is given a non-zero subsidy (S), funded by tax dollars.

If the monopolist were to lower its price to the level $(C + S)$, this subsidized consumer would be able to purchase the good. The monopolist's profit would increase by the amount that consumer would pay $(C + S)$, decrease by the marginal cost of producing the additional unit (M), and decrease by a total of $(Q_m * (P_m - (C + S)))$, since all consumers would now be able to purchase the drug at the new, lower market price. If PS is to be maintained, then it would have to be true that:

$$(C + S) - (M) - (Q_m * (P_m - (C + S))) = 0$$

Consumer surplus would change in light of this subsidy scheme. Surplus would decrease by the cost of the subsidy (S) and decrease by the deadweight loss of tax collection $(r * S)$; but surplus would increase by the total of $(Q_m * (P_m - (C + S)))$, which reflects the benefit consumers gain from a lower market price. This is a net increase in consumer surplus so long as:

$$(-S) - (r * S) + (Q_m * (P_m - (C + S))) > 0$$

31. This model is a generalized version of the argument presented in the text. It makes no specific assumptions regarding the shape of the demand curve nor the size of the deadweight loss caused by tax collection.

Regrouping and combining these two expressions, we reach the interesting result: a non-zero subsidy will increase consumer surplus without decreasing producer surplus so long as:

$$C > (M + (r * S))$$

That is, subsidies increase efficiency whenever a non-purchasing consumer values the good over the sum of its marginal cost and the deadweight loss imposed by the collection of the relevant subsidy.

If subsidies were costless in the sense that they imposed no deadweight loss — in other words, if r were zero³² — efficiency would dictate that the government subsidize every non-purchasing consumer who values the drug above marginal cost. By contrast, since tax collection does impose some non-zero deadweight loss, efficiency requires that particularly low-valuing consumers be denied assistance even if they do, in fact, value the good above marginal cost. (For distributional and humanitarian reasons, of course, society might choose to support even these low-valuing consumers.)

32. Variable r would be zero if subsidies were accomplished outside of the tax system — if, for example, consumers could coordinate a direct system of cash transfers. As noted previously, *see supra* note 15, this is not so impossible as it might sound. When consumers share resources (buying one copy of a magazine but then passing it around) they are engaging in precisely this sort of “costless” subsidization.

