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COPYRIGHT'S PRICE DISCRIMINATION PANACEA

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TABLE OF CONTENTS

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I. INTRODUCTION

> PANACEA: FROM GREEK *PANAKEIA*, A REMEDY OR CURE REPUTED TO HEAL ALL DISEASES.[1]

According to the conventional wisdom, price discrimination offers two advantages compared to uniform or linear pricing in the production of copyrighted works.[2] First, it can reduce the deadweight losses[3] otherwise associated with the higher prices that copyright makes possible.[4] Second, it can increase the producer surplus or rents[5] associated with the production of any given copyrighted work and thus ensure the expected profitability of a wider range of works.[6] This increase in profitability should, in turn, lead to the production of more copyrighted works. If the conventional wisdom is right, then the proper response would be not merely to tolerate, but to actively promote price discrimination schemes with respect to works of authorship. Accordingly, if changes to copyright's existing legal rules would enable more, or more perfect, price discrimination, then such changes should be adopted.[7]

Of course, not everyone is so sanguine about price discrimination. Existing economic and legal critiques have focused on the first supposed advantage, and have shown that a shift to price discrimination

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1. 11 THE OXFORD ENGLISH DICTIONARY 122 (2d ed. 1989).

2. For an example of the conventional wisdom, see Richard A. Epstein, ProCD v. Zeidenberg: *Do Doctrine and Function Mix?*, *in* CONTRACTS STORIES 94, 104–05 (Douglas G. Baird ed., 2007).

3. A deadweight loss arises whenever goods are priced in excess of marginal cost. When price exceeds marginal cost, some consumers who value the good at more than its marginal cost, but less than its market price, will not buy it. The deadweight loss consists of the loss in consumer and producer surplus attributable to such lost sales. *See, e.g.*, William W. Fisher III, *Reconstructing the Fair Use Doctrine*, 101 HARV. L. REV. 1659, 1702 (1988).

4. *See, e.g.*, William W. Fisher III, *Property and Contract on the Internet*, 73 CHI.-KENT L. REV. 1203, 1240 (1998); Glynn S. Lunney, Jr., Comment, Atari Games v. Nintendo*: Does a Closed System Violate the Antitrust Laws*?, 5 HIGH TECH. L.J. 29, 41–46, 73 (1990) (arguing that Nintendo's use of a lockout chip on its videogame system may result in price discrimination and discussing the effects of such price discrimination).

5. Economic rent constitutes the difference between the amount paid for an input and the amount necessary to induce that input to be supplied. WILLIAM J. BAUMOL & ALAN S. BLINDER, ECONOMICS: PRINCIPLES AND POLICY 365 (7th ed. 1997).

6. *See, e.g.*, Stanley M. Besen & Leo J. Raskind, *An Introduction to the Law and Economics of Intellectual Property*, 5 J. ECON. PERSP. 3, 5 (1991) ("Price discrimination allows producers to appropriate a larger share of the social benefits of their innovations and, thus, may permit some innovations that would otherwise not occur."); Neil Weinstock Netanel, *Copyright and a Democratic Civil Society*, 106 YALE L.J. 283, 315–16 (1996) (noting that legal scholars who use standard economic analysis "maintain that copyright should lend blanket support to owner ability to engage in price discrimination among various users, so that owners can obtain their full complement of consumer surplus").

7. *See, e.g.*, William W. Fisher III, *Theories of Intellectual Property*, *in* NEW ESSAYS IN THE LEGAL AND POLITICAL THEORY OF PROPERTY 172, 196–98 (Stephen Munzer ed., 2001) (contending that some intellectual property theories would view enabling more price discrimination through alterations in the first sale doctrine as positive for society).

will not always reduce, and may sometimes increase, deadweight losses.[8] Yet, these critiques have not reduced the pervasive, almost absurdly utopian perception of price discrimination[9] — perhaps because they do not address price discrimination's second supposed advantage. As a result, these critiques leave open the argument that even if a price discrimination scheme only converts consumer surplus into producer surplus, it still enhances social welfare by increasing the incentives to produce more and better works of authorship.

This Article reexamines the second supposed advantage and offers an alternative critique of price discrimination as a panacea for the monopoly costs copyright can impose. Both the traditional theoretical account of the desirability of price discrimination and the existing critiques rely on a partial equilibrium analysis. They examine the consequences of various price discrimination schemes only for the specific market at issue — the market for a specific copyrighted work or for copyrighted works more generally — and ignore or assume away any effects on the remainder of the economy.

This use of partial equilibrium analysis is troubling. If an increased ability to price discriminate, whether driven by technological changes or changes in copyright law, leads to the production of more works of authorship, the resources to produce those additional works must come from somewhere. Over the long run, we cannot assume

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8. For formal economic critiques, see Michael L. Katz, *Nonuniform Pricing, Output and Welfare Under Monopoly*, 50 REV. ECON. STUD. 37 (1983) (demonstrating that in a partial equilibrium analysis, a switch from uniform pricing to second-degree price discrimination generates ambiguous effects on social welfare); *see also* Marius Schwartz, *Third-Degree Price Discrimination and Output: Generalizing a Welfare Result*, 80 AM. ECON. REV. 1259 (1990) (demonstrating that, in a partial equilibrium analysis, a switch from uniform pricing to third-degree price discrimination will increase welfare in some cases and reduce it in others).

For legal critiques that rely on economic analysis, see Yochai Benkler, *An Unhurried View of Private Ordering in Information Transactions*, 53 VAND. L. REV. 2063 (2000) (arguing that because price discrimination is costly to implement, whether it is socially beneficial will depend on whether enhanced consumer access to excludable works will outweigh the loss from reduction in free access to previously non-excluded works); Julie E. Cohen, *Copyright and the Perfect Curve*, 53 VAND. L. REV. 1799 (2000) (stating that real world evidence indicates that contractual price discrimination does not function as smoothly as its proponents claim); Wendy J. Gordon, *Intellectual Property as Price Discrimination: Implications for Contract*, 73 CHI.-KENT. L. REV. 1367 (1998) (finding that, at best, price discrimination is a way of nullifying the negative effects of monopolies, but that it also may "raise price and reduce quantities, without yielding any incentive payoff large enough to compensate"); Michael J. Meurer, *Price Discrimination, Personal Use and Piracy: Copyright Protection of Digital Works*, 45 BUFF. L. REV. 845 (1997) (discussing how the introduction of realism into traditional discussions of the benefits of price discrimination raises doubts about whether price discrimination results in efficiency gains).

9. *See* Michael J. Meurer, *Copyright Law and Price Discrimination*, 23 CARDOZO L. REV. 55, 64 (2001) ("Until recently, copyright scholars failed to link specific copyright doctrines to the practice of price discrimination and when they have noticed price discrimination, they tend to share a rosy view of its effect on social welfare. Since there has been little controversy about social welfare effects, there has been little commentary.").

that the necessary resources would otherwise have been left idle.[10] Rather, to produce more works of authorship, the resources must be taken from some other productive sectors of the economy. This is not to say that the resource necessary to produce more works of authorship, namely creativity, is ultimately limited — a nonrenewable resource, as it were — but simply an acknowledgement that creativity, like any other resource, is scarce. At any point, the time and talent used to write a book, direct a movie, or compose a song cannot simultaneously be used for something else. This raises the question of whether encouraging people to devote additional time and talent to producing more works of authorship generates more value for society than the something else to which those resources would otherwise have been devoted.[11]

Partial equilibrium analysis answers this question by assuming that the remainder of the economy consists of markets that are both complete[12] and perfectly competitive. So long as the remainder of the economy satisfies these assumptions, every other market will, at equilibrium, reach a point where both the marginal social value and cost, and the marginal private value and cost, are equal and fully reflected in the price of the resources.[13] Given these assumptions, if implementing a price discrimination scheme enables the producers of copyrighted works to offer a higher price for the resources necessary to

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10. As Fritz Machlup has explained, "Whenever permanent economic policies . . . are discussed, sound economics must start from the principle that no activity can be promoted without encroaching on some other activity. More of one service or product must mean less of another." STAFF OF SUBCOMM. ON PATENTS, TRADEMARKS, & COPYRIGHTS OF THE S. COMM. ON THE JUDICIARY, 85TH CONG., AN ECONOMIC REVIEW OF THE PATENT SYSTEM, at 46 (Comm. Print 1958) (prepared by Fritz Machlup).

11. *See* Arnold Plant, *The Economic Aspects of Copyright in Books*, 1 ECONOMICA 167, 170 (1934) (discussing whether the monopoly provided to copyright holders is beneficial to the economy); *see also* BENJAMIN KAPLAN, AN UNHURRIED VIEW OF COPYRIGHT 75 (1967) (arguing that copyright may "run the risk of attracting too much of the nation's energy into the copy-righted protected sectors of the economy"); Robert M. Hurt & Robert M. Schuchman, *The Economic Rationale of Copyright*, 56 AM. ECON. REV. 421, 425, 430 (1966) (contending that resources may be misallocated when too much copyright protection is given); Glynn S. Lunney, Jr., *Reexamining Copyright's Incentives-Access Paradigm*, 49 VAND. L. REV. 483, 489 (1996) (suggesting that failure to consider the opportunity cost associated with increased incentives to create copyrighted works "renders the incentives-paradigm worthless as a guide to copyright's proper limits"); Meurer, *supra* note 9, at 96–97 (arguing that optimal incentive for the production of copyrighted works is reached at something less than recovery of the full surplus).

12. A market is complete if it contains no externalities. That is, in a complete market, there are no actions by consumers or producers that "lead to costs or benefits that are not reflected in the price of the product in the market." DAVID A. BESANKO & RONALD R. BRAEUTIGAM, MICROECONOMICS 355 (2d ed. 2005).

13. Marginal social cost is equal to the sum of marginal private cost and incidental cost (costs borne by others). Likewise, marginal social value is equal to the sum of marginal private value and incidental value. BAUMOL & BLINDER, *supra* note 5, at 305–06. In a market with no externalities there are no incidental costs; therefore, marginal social value and cost must equal marginal private value and cost.

produce additional works, then this ability to pay more establishes that producing more works is the most valuable use of those resources.

The fatal flaw of relying on partial equilibrium analysis is that the remainder of the economy does not consist of complete and perfectly competitive markets. This limitation has been apparent for years; in 1956, R.G. Lipsey and Kelvin Lancaster proved that this essential, yet mistaken assumption is material.[14] Most economists and economically-minded legal scholars have nevertheless eschewed the use of more realistic second-best equilibrium analysis for the simpler models and clearer answers generated by partial equilibrium approaches.[15] If pressed, those who rely on partial equilibrium analysis would first argue that the economy, even if not perfectly competitive, comes close enough. Second, they would argue that because perfect competition represents the desired ideal, perfect competition should be assumed because all other markets should be moving in that direction, even if some are not yet there.

Neither of these justifications, however, excuses the use of partial equilibrium analysis for copyrighted works. When discussing the production of more or fewer works of authorship, the central resource at issue is creativity. Unlike other markets, markets for creativity are fundamentally incompatible with perfect competition.[16] Incentives for the production of any type of creative product cannot exist if there is perfect competition. When a new product is introduced in a perfectly competitive market, it is instantly copied and perfect substitutes are made available, with prices driven immediately to marginal cost. As a result, some degree of monopoly or market power is essential to have any financial incentive to produce creative products at all. Markets for creativity are thus not perfectly competitive; nor does perfect competition represent the desired ideal. The usual justifications for partial equilibrium analysis do not apply.

Moving away from the assumptions inherent in a partial equilibrium analysis leads to the world of the second-best.[17] No longer are

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14. R.G. Lipsey & Kelvin Lancaster, *The General Theory of Second Best*, 24 REV. ECON. STUD. 11, 16–17 (1956). In their analysis, Lipsey and Lancaster address whether a move from monopoly to competition in a particular market improve social welfare. The answer from a partial equilibrium analysis is an unambiguous yes, but as they show, if the rest of the economy contains monopoly elements, then the answer is indeterminate. Depending on the nature and the extent of the monopoly elements in the rest of the economy, a move to competition in any one market could either increase or decrease social welfare.

15. *See, e.g.*, Richard S. Markovits, *Second-Best Theory and Law & Economics: An Introduction*, 73 CHI.-KENT L. REV. 3 (1998).

16. *See* Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, *in* THE RATE AND DIRECTION OF INVENTIVE ACTIVITY: ECONOMIC AND SOCIAL FACTORS 609, 617 (2d prtg. 1964) ("In a free enterprise economy, inventive activity is supported by using the invention to create property rights; precisely to the extent that it is successful, there is an underutilization of the information.").

17. Economics is a curious science. It is the only one that ranks models on the extent to which they differ from an "ideal" perfect competition model. Most sciences look for models

the effects on other markets assumed away by reciting the magic Latin incantation *ceteris paribus* — all else constant. Instead, one must expressly account for how changes in one imperfect market affect other imperfect markets. This Article presents a second-best model to examine the allocation of creativity in an economy. Instead of assuming perfect competition in all other markets, this model assumes that market power persists in all markets for creative goods. Using this assumption, it then examines the welfare consequences associated with a switch to perfect price discrimination in the market for one particular type of creative good. This model can be described as consisting of one market for copyrighted works and a second market for all other creative, non-copyrighted products. The model could also be described as having one market for a particular type of copyrighted work, such as films or books, or for a particular class of copyrighted works, such as digitally-distributed works, and a second market for all other copyrighted works. For either description, the key assumption is that to produce more of a given creative product, the necessary resources will come from another creative sector that is also imperfectly competitive or monopolistic, rather than from a non-creative sector that satisfies the assumptions of the perfect competition model.[18]

The adoption of more realistic assumptions radically alters the welfare consequences associated with a shift to perfect price discrimination.[19] In particular, the second-best model demonstrates that the second supposed advantage of price discrimination — providing additional incentives for the production of more and better works of authorship — may actually be a disadvantage. The more and better

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that mimic the real world and measure a model's accuracy with respect to real world considerations. Economists, on the other hand, label their models as "first-best," "second-best," and so on based upon the extent to which they differ from the perfect competition model. This methodology could just be a labeling tradition, with no normative significance, except for the fact that it also seems to reflect a bias in economists' thinking as well — namely, that there is something wrong with the real world when it fails to follow the dictates of their models, as opposed to there being something wrong with their models when they fail to reflect the real world.

18. Forty years ago, Benjamin Kaplan raised the possibility that too much copyright would risk "attracting too much of the nation's energy into the copyright-protected sectors of the economy." KAPLAN, *supra* note 11, at 75. From a partial equilibrium perspective, the assertion is unfounded. Given the assumption that all other markets are complete and perfectly competitive, whatever rights copyright may provide, as long as the producers of copyrighted works can afford to pay more for the resources necessary to create additional works, that fact alone necessarily establishes that the production of additional copyrighted works represents the highest and best use of those resources. Yet, the specter Kaplan raises becomes very real once it is recognized that producers of copyrighted works probably compete for resources with other creative sectors of the economy.

19. This sort of reversal is not uncommon in moving from partial to general equilibrium analysis. *See, e.g.*, ANDREU MAS-COLELL ET AL., MICROECONOMIC THEORY 538–40 (1995) (presenting an example in which the naïve application of partial equilibrium analysis suggests that firm owners in one city bear the full burden of a tax on labor imposed by that city and contrasting that incorrect result with the general equilibrium conclusion proving that labor bears full burden of tax).

works that price discrimination renders profitable do not necessarily represent a net social gain; this characterization is an illusion generated by the unrealistic assumptions underlying the partial equilibrium approach. Rather, this increased output in the price discriminating sector of the economy occurs at the expense of reducing output in the other, non-price discriminating creative sectors. In general, the increased copyright output in the price discriminating sector will usually prove less valuable to society than the alternative creative uses to which the resources would otherwise have been devoted.

This analysis suggests that copyright law ought to be far less tolerant of arguments that rely on the supposed efficiency advantages of price discrimination. Although the second-best model identifies some situations in which price discrimination may improve social welfare, these situations are very limited. Moreover, having peered behind the curtain and found the second advantage of price discrimination to be illusory, price discrimination's sole remaining advantage compared to uniform pricing is its potential to reduce deadweight losses.

In the copyright context, however, the potential for reducing deadweight losses is not much of an advantage. Copyright industries are usually characterized as having imperfect or monopolistic competition, rather than a straightforward monopoly. As a result, deadweight losses are likely to be small. Even in those circumstances where deadweight losses are more substantial, those losses can often be eliminated by narrowing copyright protection.[20] This approach would eliminate deadweight losses without generating, as price discrimination would, too much incentive for investing in copyrighted works and thus leading to a misallocation of society's creativity.

This Article takes up these issues in turn. Part II briefly introduces perfect or first-degree price discrimination and its efficiency advantages in a partial equilibrium analysis. Part III considers a second-best equilibrium model and uses it to examine the supposed efficiency advantages of first-degree price discrimination. Given the second-best equilibrium conclusions, Part IV addresses the various price discrimination schemes routinely employed in the marketing of

20. *See infra* text accompanying notes 25–27. To address the concern that a copyright owner will market only a hardcover in the absence of price discrimination, copyright's fair use doctrine could be read more broadly, thus allowing others to publish low price paperbacks. This solution would address the potential deadweight loss associated with that concern. For much of the nineteenth century, others could freely prepare and distribute their own translations and abridgements of copyrighted works. *See* Lunney, *supra* note 11, at 534–36. While it is politically unlikely that the United States will ever return to that copyright model, we must recognize that a limitation on copyright can reduce deadweight losses as or more effectively than price discrimination serves two purposes. First, even if we are not going to reduce the scope of copyright, we should still understand the full extent of the social welfare losses that overly broad copyright entails. Second, other countries are not yet fully bound to the United States' exuberantly excessive copyright regime, leaving open the possibility that another country may adopt this approach.

copyrighted works and evaluates their likely welfare consequences in the real world. Part V concludes.

II. PRICE DISCRIMINATION AND COPYRIGHT IN A PARTIAL EQUILIBRIUM ANALYSIS

Copyright law may sometimes directly enable, indirectly allow, or ultimately limit a copyright owner's ability to price discriminate. In the context of derivative work[21] and public performance[22] rights, copyright affirmatively and specifically enables price discrimination.[23] For example, if a person wants to make a derivative use, such as making a movie from a book or broadcasting a song over the radio, she cannot simply purchase a copy of the book or album in the open market and proceed with her planned use.[24] Because these uses differ from the ordinary uses — such as reading the book or listening to the album — individuals who intend to make derivative uses are likely to value their use quite differently from, and often more highly than, ordinary consumers. To enable the copyright owner to capture this higher valuation, copyright law generally requires a derivative user to obtain the copyright owner's specific permission for her intended use. This permission requirement enables the copyright owner to segment and price such uses separately from the uses of ordinary consumers.

In other instances, copyright does not specifically enable or limit price discrimination, but instead provides legal rights that a copyright owner can use to establish a price discrimination scheme. For example, copyright owners have the exclusive right to reproduce their works.[25] While the right does not itself segment different consumers into different markets, copyright owners have nonetheless used this reproduction right to implement such price discrimination schemes. In the publishing industry, a copyright owner can offer a high-priced hardcover first and then wait a year to offer a lower-priced paperback as a way of separating high reservation value[26] consumers from low reservation value consumers. The reproduction right prohibits anyone else from offering a paperback in the meantime and thereby provides the necessary legal background rule for the scheme to work. Simi-

21. 17 U.S.C. § 106(2) (2000 & Supp. V 2005) (granting the copyright owner the exclusive right "to prepare derivative works based upon the copyrighted work," which would include a film version or a translation of a novel).

22. *Id.* § 106(4), (6) (granting the copyright owner the exclusive right to perform certain kinds of copyrighted works publicly, such as by performing the work on the radio, in a concert hall, or in a stadium).

23. *See* Lunney, *supra* note 11, at 628–53.

24. *See id.*

25. 17 U.S.C. § 106(1).

26. A consumer's reservation value is the maximum price that the consumer is willing to pay for that unit of a good. BESANKO & BRAEUTIGAM, *supra* note 12, at 449.

larly, in *American Geophysical Union v. Texaco Inc.*,[27] the copyright owner used the reproduction right to establish a system of per-copy charging for scientific articles[28] in order to separate and charge accordingly research institutions that made more copies of a work, and hence may have valued the work more highly, from institutions that made fewer copies.[29]

In addition to enabling price discrimination, copyright also contains provisions that limit a copyright owner's ability to price discriminate. These provisions include doctrines such as fair use,[30] first sale,[31] and preemption.[32] Although each of these doctrines addresses a different set of issues, all of them may potentially limit a copyright owner's ability to separate, and price accordingly, high and low reservation value consumers.

Whether copyright enables or limits price discrimination, either generally or in any particular instance, depends on the precise interplay between these doctrines. For example, the price discrimination at issue in *American Geophysical Union* was only permissible under copyright law because the Second Circuit rejected Texaco's argument that the institution's copying of the works for use by its researchers constituted fair use.[33] Had the court accepted Texaco's broader interpretation of the fair use doctrine, the copyright owner could not have continued its per-copy price discrimination scheme.[34]

Thus, understanding the welfare consequences of price discrimination is critically important to copyright law. If, as this Article suggests, price discrimination in markets for copyrighted works is generally undesirable because it has the effect of reducing social welfare, then copyright doctrines that limit the ability of copyright owners to price discriminate should be interpreted more broadly. At the same

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27. 60 F.3d 913 (2d Cir. 1994).

28. *See id.* at 916–17 (holding that Texaco committed copyright infringement when it made unauthorized photocopies of copyrighted scientific articles for its researchers when a per-copy licensing scheme for obtaining authorization was in place).

29. *See* Glynn S. Lunney, Jr., *Fair Use as Market Failure:* Sony *Revisited*, 82 B.U. L. REV. 975, 1020–23 (2002).

30. 17 U.S.C. § 107 (2000).

31. *Id.* § 109 (allowing the owner of a copy to generally give, sell, rent, or otherwise dispose of that copy as she sees fit, notwithstanding the right of the copyright owner to control her work's distribution in § 106(3)).

32. *Id.* § 301 (preempting and rendering unenforceable as a general matter state law rights that are "equivalent to any of the exclusive rights within the general scope of copyright . . . in works of authorship"). Preemption has become more important in recent years as copyright holders have attempted to enforce their rights through contract and digital rights management ("DRM"). DRM is a form of software or code added to or included with digitally-stored works. It controls or limits the consumer's ability to use or copy the digitally-stored work (or is supposed to).

33. *Am. Geophysical Union*, 60 F.3d at 918–32.

34. This alternate ruling would not have entirely eliminated the copyright owner's ability to price discriminate because it would have left intact the practice of charging institutional and individual consumers different prices. *See* Lunney, *supra* note 29, at 1021 n.170.

time, those doctrines that enable price discrimination should be interpreted more narrowly. For years conventional wisdom has characterized price discrimination with respect to copyrighted works as generally welfare enhancing; consequently, the opposite trend has prevailed.[35] To determine whether this trend should continue, it is necessary to begin with the conventional wisdom.

A. The Existing Theoretical Background of Price Discrimination

To illustrate the efficiency advantages of first-degree price discrimination in a partial equilibrium analysis, the first step is to compare the optimal pricing and welfare consequences under (1) uniform pricing and (2) first-degree price discrimination. Under uniform or linear pricing, a producer with market power will charge a single uniform price for each and every unit of the good sold. To maximize her profit, the producer will determine that uniform price by producing additional units of the good until her marginal revenue equals her marginal cost. She will then set her price to clear the market, so that consumer demand will equal her output.[36]

Using this approach, a profit-maximizing producer with market power will set her price at a level somewhat above her marginal cost. This supracompetitive pricing generates rents for the rights holder, but it creates a gap between price and marginal cost that will force some consumers who would have purchased the product at the lower, competitive price to forego consumption of the product and turn to some less desirable substitute. In partial equilibrium analysis, the familiar deadweight loss triangle[37] represents the welfare loss associated with the supracompetitive price.

In contrast, under first-degree price discrimination, the producer will charge each consumer the consumer's precise reservation value for each unit of the good purchased. To achieve such price discrimination, a monopolist may have to charge each consumer a different price for the good. Even for a single consumer, a monopolist may have to charge that consumer a different price for each unit purchased. With uniform pricing, any reduction in the price charged to one consumer also reduces the price charged to every other consumer. As a result, the producer has to balance the additional sales that could be achieved by setting a lower price against the revenue lost from reducing the price charged to consumers willing to pay a higher price. In contrast, a first-degree price discrimination scheme allows the producer to charge

35. *See supra* notes 8–9.

36. *See, e.g.*, JOAN ROBINSON, THE ECONOMICS OF IMPERFECT COMPETITION 144 (1934).

37. The deadweight loss triangle refers to the graphical representation of deadweight loss which occurs in markets that are not perfectly competitive. For an example of such a graph, see BESANKO & BRAEUTIGAM, *supra* note 12, at 432 fig.11.16.

consumers prices precisely tailored to their reservation values without affecting the price charged to other consumers. Accordingly, the marginal revenue under first-degree price discrimination for each unit sold is simply the price charged for that unit; the producer will sell additional units up to the point where marginal cost equals inverse demand.

Because the price discriminating producer will charge a price for the last unit sold equal to both its marginal cost and marginal value, there is no gap between price and marginal cost for the marginal unit. As a result, first-degree price discrimination eliminates the deadweight loss associated with uniform pricing. Each consumer is charged precisely her reservation value for each unit of the good; no one is forced to do without the good or accept a less perfect substitute because of the monopolist's pricing structure. Moreover, under first-degree price discrimination, the output levels and social welfare are identical to what would be achieved under perfect competition, under which price would be set equal to marginal cost. Assuming that a monopoly exists, first-degree price discrimination is Pareto optimal[38] (at least within the context of a partial equilibrium analysis) and, from a social welfare perspective, clearly superior to uniform pricing.[39]

Because these results are mathematical truisms within the context of a partial equilibrium analysis, there is room for only limited, efficiency-based critiques of first-degree price discrimination. First, one can simply deny the existence of first-degree price discrimination in real world markets. Although instructive as a purely theoretical concept, it is difficult to imagine any real world situation under which a producer could precisely determine and charge each consumer her exact reservation value, while precluding arbitrage altogether. If a producer attempted to do so, high reservation value consumers would pretend to have a low reservation value in order to obtain a lower price for the good; low reservation value consumers would seek to resell their lower price units to high reservation value consumers. As a practical matter, in the real world, a producer will almost always have

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38. As a leading economics text defines it: "An allocation that is Pareto optimal uses society's initial resources and technological possibilities efficiently in the sense that there is no alternative way to organize the production and distribution of goods that makes some consumer better off without making some other consumer worse off." MAS-COLELL ET AL., *supra* note 19, at 313.

39. Professor Mankiw concludes his comparison of uniform pricing and first-degree price discrimination as follows:

> [W]hen a firm can perfectly price discriminate . . . each customer who values the goods at more than marginal cost buys the good and is charged his willingness to pay. All mutually beneficial trades take place, there is no deadweight loss, and the entire surplus derived from the market goes to the monopoly producer in the form of profit.

N. GREGORY MANKIW, PRINCIPLES OF MICROECONOMICS 338 (2d ed. 2001).

to rely on some less perfect form of price discrimination.[40] From an efficiency perspective, the desirability of less perfect forms of price discrimination is unclear, even within the context of partial equilibrium analysis.[41]

Second, first-degree price discrimination enables the producer to capture the entire surplus associated with the good. Under perfect competition, the consumer captures the surplus between the price and consumer's reservation value because price is set equal to marginal cost. Even under uniform monopoly pricing, consumers typically retain some part of the available surplus. However, with first-degree price discrimination, the producer captures all the available surplus, transferring wealth from consumers to the producer. While economists generally consider this transfer as a distributional issue without efficiency consequences, Richard Posner has suggested that it may have efficiency consequences to the extent that the rents available will lead individuals to spend resources to capture those rents.[42] As a theoretical matter, a producer would presumably be willing to spend an amount up to the rents available in an attempt to capture them. Any such expenditure will necessarily reduce the surplus available on at least a dollar-for-dollar basis by converting the surplus into expense.

B. Application of Existing Theories to Copyright

To explore the existing partial equilibrium analysis, consider two longstanding examples of price discrimination associated with the production of copyrighted works. The practice in the book publishing industry serves as the first example. Publishers initially offer a high priced hardcover of a novel before offering a low priced paperback a year later. In doing so, publishers are attempting to separate high reservation value consumers from low reservation value consumers. High reservation value consumers will purchase the hardcover while low reservation value consumers will wait for the lower priced paperback. Some commentators have argued that the sale of hardcovers and paperbacks does not constitute price discrimination but merely an at-

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40. Following the nomenclature established by A.C. Pigou, second-degree price discrimination schemes distinguish between the reservation values of an apparently homogenous group of consumers based on the choices consumers make between the different price-product packages offered by the monopolist. Third-degree price discrimination schemes attempt to distinguish between the reservation values of consumers based upon observed differences (e.g. age, apparent wealth, occupation, location) that are related to consumers' likely reservation values. *See, e.g.*, JEAN TIROLE, THE THEORY OF INDUSTRIAL ORGANIZATION 134–35 (14th prtg. 1998).

41. *See* sources cited *supra* note 8.

42. *See* RICHARD POSNER, ANTITRUST LAW: AN ECONOMIC PERSPECTIVE 11 (1976) ("[A]n opportunity to obtain a lucrative transfer payment in the form of monopoly profits will attract real resources into efforts by sellers to monopolize, and by consumers to prevent being charged monopoly prices.").

tempt to satisfy consumers' demands for different editions.[43] However, if the publisher did not intend to price discriminate, it would offer both editions at the same time. For some extremely popular works, such a simultaneous offering may occur; this Article will focus on the far more common practice of offering the two versions sequentially.

The distribution scheme in this example is not first-degree price discrimination. However, compared to selling either a hardcover only or a paperback only at a uniform price, the scheme offers the same dual advantages of price discrimination. First, separating consumers into two markets may reduce deadweight loss by allowing the copyright holder to offer the paperback at a somewhat lower price than if only the paperback were available. Second, the combined producer surplus available from selling both a hardcover and a paperback is necessarily higher than selling either version alone; otherwise, the copyright holder would not engage in the price discrimination scheme. The additional surplus available to the producer may ensure the profitability of additional works. The price discrimination scheme may thereby lead to the production of more and better works.[44]

In evaluating the welfare implications of this price discrimination scheme, existing critiques note that the savings in deadweight losses are likely to be small and the transaction costs incurred to establish the system are likely to be substantial.[45] Prices for the paperback version may be lower with price discrimination, but consumers must wait additional time before the paperback becomes available. Thus, any reduction in deadweight loss is likely to be slight. At the same time, the implementation of the price discrimination scheme imposes substantial costs, because a hardcover is more expensive to produce than a paperback.[46] Absent the price discrimination scheme, a publisher could offer both hardcovers and paperbacks at the same time and likely would produce far fewer hardcovers in response to consumer demand. The publisher's effort to price discriminate directly increases

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43. *See, e.g.*, Barry W. Tyerman, *The Economic Rationale for Copyright Protection for Published Books: A Reply to Professor Breyer*, 18 UCLA L. REV. 1100 (1971).

44. This conclusion follows from the usual assumption in copyright that more money means more and better works and ignores the backward bending nature of the labor supply curve. Glynn S. Lunney, Jr., *The Death of Copyright: Digital Technology, Private Copying, and the Digital Millennium Copyright Act*, 87 VA. L. REV. 813, 887 (2001). For information on the theory that the labor supply curve is backward bending, see G. Hanoch, *The "Backward-Bending" Supply of Labor*, 73 J. POL. ECON. 502 (1965).

45. *See, e.g.*, Benkler, *supra* note 8, at 2072 ("Implementing price discrimination is costly. The producer must invest in identifying discrete market categories that would bear different prices. It must also take measures — technical, contractual, marketing, or any combination — to prevent arbitrage of the good from low value users to high value users.").

46. Publishers could simply sell a highly priced paperback initially, and then reduce the price later. Presumably, the decision by publishers not to use this strategy may reflect their desire to avoid angering consumers, who would undoubtedly complain about such a straightforward price gouging strategy.

the costs associated with a given work and thereby reduces the associated producer and consumer surplus.

Film companies are another example of an industry that uses a similar price discrimination scheme. Initially, companies offer the film only in first-run theaters before expanding the film's availability to DVDs, Pay-Per-View, subscription cable, and broadcast television. Again, the scheme relies on offering physically differentiated versions of the work at different points in time to separate high and low reservation value consumers while simultaneously preventing arbitrage. This price discrimination scheme may reduce deadweight losses, as some films might otherwise be offered only in theaters.[47] It also increases the producer surplus associated with each film and thus may ensure the creation of more and better works.

However, as with books, with films the price discrimination scheme likely reduces deadweight losses only slightly while entailing significant costs. The per unit costs of showing a film in first-run theaters is far higher than showing the film on broadcast television. If the film company were not trying to price discriminate, it could offer the film simultaneously through all of these distribution channels. Although some people might still choose to see the film in a theater, in a simultaneous distribution scheme that number would probably be smaller than under the price discrimination scheme. As a result, without the price discrimination scheme, fewer resources would be spent on first-run theaters and a more streamlined and cost effective distribution scheme likely would develop. Again, the film company's desire to capture a larger portion of the available surplus results in an expenditure of resources that directly reduces the available surplus.

In either example, if it were simply a question of balancing the reduction in deadweight losses against the transaction costs, these price discrimination schemes would likely generate little, if any, net welfare gain, and might entail significant net welfare losses. While in both examples instituting a price discrimination scheme may reduce deadweight losses, any reduction in deadweight loss is probably slight. At the same time, both schemes are costly to implement.

A partial equilibrium analysis suggests, however, that is not the end of the issue. While implementing price discrimination is expensive and that expense represents a real efficiency loss,[48] doing so en-

47. If a copyright owner of a film was forced to choose between: (1) first-run theaters, (2) broadcast or premium television, or (3) DVD as a method of distribution, I'm not certain that all copyright owners would choose (2) or (3). Some might plausibly choose just (1) in order to capitalize on those consumers with the highest reservation values.

48. Moreover, while a monopolist will ensure that a price discrimination scheme is worth the costs from the monopolist's point of view, the monopolist's rationality does not ensure that social welfare will increase as a result of her scheme. The monopolist will ensure only that the costs of the price discrimination scheme are less than the additional producer surplus earned as a result of the scheme. But that additional producer surplus can come from either reducing deadweight loss or converting consumer surplus. If the sole or primary ef-

ables rights holders to capture additional surplus. This additional surplus may result in the production of works that would not have been created but for the price discrimination scheme. For example, expensive films rely on the revenues generated through the sequential release to the theatre and post-theatre markets in order to break even. In a partial equilibrium analysis, so long as the total revenue generated exceeds the work's costs, the creation of an additional marginal work would be desirable and welfare-enhancing. Society should therefore expect a net social benefit because the value added by the additional marginal works financed by a price discrimination scheme will be greater than the costs of establishing the scheme, or so the partial equilibrium analysis would conclude.

Both of these examples of price discrimination succeed in separating high reservation value consumers from low reservation value consumers because they minimize the ability of consumers to engage in arbitrage. However, the first sale doctrine[49] has limited the extent to which copyright owners can engage in price discrimination. Under the first sale doctrine, once the copyright owner has sold a copy of her work, the purchaser "is entitled, without the authority of the copyright owner, to sell or otherwise dispose of the possession of that copy."[50] Accordingly, once a film studio decides to sell a copyrighted work on DVD, there are two markets that the company may seek to separate through a price discrimination scheme: (1) individual consumers who are purchasing the DVD for their own consumption, and (2) video rental stores that are purchasing the DVD in order to rent it to their consumers. The first sale doctrine prevents the film company from separating these two markets. If the film company tries to offer a low priced DVD for consumer consumption and a high priced DVD for video rental store consumption, the first sale doctrine enables the video rental stores to simply purchase the low priced consumer DVD. Under these conditions, the price discrimination scheme will fail.[51] The first sale doctrine does not fully preclude companies from engaging in price discrimination; it does, however, effectively limit the film company to those schemes that assure the video rental stores at least as much profit as they could earn by buying and then renting to their customers the low priced consumer DVDs.

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fect of a price discrimination scheme is to transfer consumer surplus to the producer, then adopting a price discrimination scheme can represent a rational decision for the monopolist, but still impose a net welfare loss on society.

49. 17 U.S.C. § 109 (2000).

50. *Id.* § 109(a).

51. In 1980, Disney tried such a two-track marketing system, but rental stores simply purchased the low priced consumer cassettes and ignored the license provisions Disney implemented in an attempt to separate rental and consumer cassettes. JAMES LARDNER, FAST FORWARD: HOLLYWOOD, THE JAPANESE, AND THE ONSLAUGHT OF THE VCR 192 (1987).

A partial equilibrium analysis suggests that the limitations imposed by the first sale doctrine on copyright owners' ability to price discriminate are undesirable for both copyright owners and society.[52] The analysis further suggests that the law ought to be changed to enable such price discrimination.[53] Since the mid-1980s, copyright owners have sought to limit the first sale doctrine through legislative and judicial means. First, copyright owners have asked Congress to amend or repeal the doctrine.[54] These efforts have typically been successful only where the redistribution of the work threatened widespread, unauthorized copying.[55] Second, copyright owners have asked courts to enforce a form agreement, namely an End User License Agreement ("EULA"), attached to or included in the work.[56] These form agreements specifically re-characterize the transaction as a license. If a court enforces the form agreement and accepts this re-characterization,[57] then the copyright owner will not be subject to the first sale doctrine. Although the consumer will possess a copy, she will possess the copy as a licensee and not as an owner.[58] Hence the express language of § 109, the first sale doctrine, will not apply.[59]

Most recently, copyright owners have focused on ensuring that the first sale doctrine is not extended to the Internet. Digital transfers automatically make a second copy on the recipient's computer. Although the sender could erase the original copy and thereby replicate

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52. *See* sources cited *supra* note 8.

53. *See, e.g.*, Julie Holland Mortimer, *Price Discrimination, Copyright Law, and Technological Innovation: Evidence from the Introduction of DVDs*, 122 Q. J. ECON. 1307, 1341–42 (2007) (analyzing price discrimination strategies in the videocassette and DVD markets, and using a partial equilibrium analysis to argue that both consumer and studio welfare would be higher if copyright owners could control the rental market directly).

54. For an account of the film industry's battle to eliminate the first sale doctrine in response to the introduction of the VCR, see LARDNER, *supra* note 51, at 286–88.

55. Computer Software Rental Amendments Act of 1990, Pub. L. No. 101-650, 104 Stat. 5134 (codified as amended at 17 U.S.C. § 109(b) (2000)); Record Rental Amendment of 1984, Pub. L. No. 98-450, 98 Stat. 1727 (codified as amended at 17 U.S.C. § 109(b) (2000)). For an example of how copyright owners have used attempted to use judicial means to limit the first sale doctrine, see Lunney, Jr., *supra* note 44, at 902–04 (recounting the film industry's attempt to obtain judicial interpretations of the public performance doctrine that would effectively block unauthorized videotape rentals).

56. *See, e.g.*, Step-Saver Data Sys., Inc. v. Wyse Tech., 939 F.2d 91, 96 n.7 (3d Cir. 1991) (noting the computer software industry's development of licenses to avoid the first sale doctrine).

57. *Compare id.* at 105–06 (excluding license terms from the parties' contract), *with* ProCD, Inc. v. Zeidenberg, 86 F.3d 1447, 1452–53 (7th Cir. 1996) (incorporating license terms into the parties' contract).

58. For the typical consumer, there is no difference in the substance of the transaction whether it is characterized as a sale or a license. She will pay the copyright owner a set price at the time she obtains the copy and will not be subject to additional payments or license fees. However, characterizing the transaction as a license will prevent the consumer from taking advantage of: (1) the right to resell the copy accorded an "owner" under the first sale doctrine and (2) the right to make copies essential to use the copy under § 117(a). 17 U.S.C. §§ 109(a), 117(a) (2000).

59. *See Step-Saver*, 939 F.2d at 96 n.7.

the transfer of an analog or physical copy, the fact that the transfer creates a second copy makes it unclear whether the first sale doctrine would apply.[60] Copyright owners have opposed efforts to amend the first sale doctrine to expressly cover digital transfers. It is unclear whether copyright owners are opposing such an amendment because they fear that digital transfers will lead to unauthorized additional copies (i.e., when the sender both sends a copy to another and keeps her own) or because they fear that such transfers will limit the opportunities for price discrimination. In either event, the Copyright Office has issued a report supporting the copyright owners' position and recommending that Congress not amend the first sale doctrine to make it expressly applicable to digital transfers.[61]

Partial equilibrium analysis also suggests that recognizing an exclusive right to control private performances of copyrighted works may soon become welfare-enhancing, as the costs of enforcing such a right continue to fall due to technological innovations. With prior technology, enforcing a per listen pricing scheme would have been unduly expensive and completely impracticable. However, tracking the number of times consumers watch or listen to a copyrighted work is now becoming increasingly feasible because of networked digital technology.[62] Indeed, many existing digital devices already track such information. In many cases, they are also already connected to the Internet or other communications systems, either intermittently, such as iPods, or permanently, such as digital video recorders ("DVRs"). As a result, these devices can readily "phone home" to provide copyright owners with detailed usage information.[63]

As digital technology approaches the point where the transaction costs of enforcing the copyright owners' private performance right become sufficiently low, the existence of such a right would likely improve a copyright owner's ability to separate, and to charge different prices to high and low reservation value consumers. To the extent that the number of times an individual watches or listens to a given work is an effective proxy for that individual's reservation value, such per-access pricing would prove an effective metering device and hence price discrimination scheme.[64] By enabling copyright owners to

60. *See* 1 U.S. COPYRIGHT OFFICE, DMCA SECTION 104 REPORT 79–80 (2001).

61. *See id.* at 78–80, 96–101.

62. *See* Jonathan Zittrain, *What the Publisher Can Teach the Patient: Property and Privacy in an Era of Trusted Privacation*, 52 STAN. L. REV. 1201, 1214–15 (2000) (discussing a future scenario in which trusted systems are used to monitor and limit a consumer's use of copyrighted works).

63. *See* JONATHAN ZITTRAIN, THE FUTURE OF THE INTERNET — AND HOW TO STOP IT 101–02, 110–11 (2008).

64. Even here, the price discrimination scheme is not perfect. On average, a person who listens to a song one hundred times may well value the work more than a person who listens to the song twice. However, that is likely to be true only on average. This limitation arises because a consumer's willingness to pay is not necessarily the same as her ability to pay.

price discriminate more effectively, recognizing a private performance right would, at least according to the conventional wisdom, enhance social welfare by reducing deadweight losses and by encouraging the production of more and better works.

From a partial equilibrium perspective, the desirability of amending the Copyright Act to limit the first sale doctrine, accepting the copyright owner's characterization of the transaction as a license, or refusing to extend the doctrine to file transfers over the Internet appears reasonably clear. Recognizing a right to control private performances, again whether through formal amendment of the Copyright Act or by allowing copyright owners to implement such controls through contracts and DRM technologies, appears equally clear. Yet, before embracing these conclusions, the question remains whether the advantages of first-degree price discrimination, so clear in a partial equilibrium setting, will survive a more general equilibrium analysis. As this Article will show, they do not.

III. PRICE DISCRIMINATION IN A SECOND-BEST ANALYSIS

The supposed efficiency advantages of first-degree price discrimination become far less compelling under a more general equilibrium analysis. This Part aims to illustrate the differences through the creation of a second-best model. Section A presents a brief discussion of the practical, real world concerns that motivate the use of a second-best model. To keep the analysis accessible, Section B begins with a discrete example that compares the results from a partial equilibrium analysis with those from a more general equilibrium analysis. Following the example, Section C considers a more general continuum of goods example. Sections D and E extend the continuum model to cover the cases of imperfect price discrimination and cases where price discrimination is present in both markets. Finally, Section F compares the results from the second-best analysis to those achieved under a partial equilibrium analysis.

A. Reality and Assumptions: The Practical Concerns that Motivate a Second-Best Analysis

The move from a partial equilibrium to a second-best analysis corresponds to a specific factual issue: if an increased ability to price discriminate leads to the production of more and better copyrighted

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For example, there may well be some extremely wealthy consumers who, although they only listen to a song twice, would nonetheless pay more for those two plays than another, extremely poor consumer would pay for one hundred plays. Similarly, as between two consumers who both desire only two plays, or who both desire one hundred plays, differences in income or wealth may create substantial differences in their per-listen reservation value.

works, where do the necessary resources to produce the additional works come from? As discussed in Part I, over the long run, there are two possible answers. First, as the partial equilibrium analysis assumes, the resources might come from sectors of the economy that are or closely approximate both complete and perfectly competitive markets. Second, the resources might come from markets that are either not complete or not perfectly competitive.

If all that was required to justify the use of second-best analysis was a showing that other markets were either not complete or not perfectly competitive, that would be a trivial task. As Herbert Hovenkamp has stated: "In the real world, perfect competition is the exception rather than the rule, and a purist would probably conclude that perfect competition is nowhere to be found."[65] The problem, however, is not that the partial equilibrium assumptions present an incomplete picture of real world markets. Models always simplify. The problem arises instead when differing simplifying assumptions lead to materially different conclusions. In that case, the assumptions should be chosen that more accurately reflect likely real world circumstances.

Applying this general principle, it is far more realistic to assume that the additional resources needed to produce more and better works of authorship come from markets that, like the market for copyrighted works itself, are incomplete and not perfectly competitive, rather than from those that are complete and perfectly competitive.[66] Given the level of protection that copyright already provides works of authorship, the notion that idle creativity remains underutilized in noncreative sectors of the economy is unreasonable.[67] When considering a move from broad copyright with uniform pricing to broad copyright with price discrimination, the low hanging fruit of systematically un-

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65. Herbert Hovenkamp, *Positivism in Law & Economics*, 78 CAL. L. REV. 815, 832 (1990).

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

67. As Benjamin Kaplan once warned: "Magnify the [copyright-provided] headstart and you may conceivably run the risk of attracting too much of the nation's energy into the copyright-protected sectors of the economy." KAPLAN, *supra* note 11, at 75. It is hard to imagine a headstart longer than the one already provided by copyright. As Justice Breyer noted in his dissent in *Eldred v. Ashcroft*, the copyright's life-plus-seventy year term is effectively perpetual:

> Regardless, even if this cited testimony were meant more specifically to tell Congress that somehow, somewhere, some potential author might be moved by the thought of great-grandchildren receiving copyright royalties a century hence, so might some potential author also be moved by the thought of royalties being paid for two centuries, five centuries, 1,000 years, "'til the End of Time." And from a rational economic perspective the time difference among these periods *makes no real difference*. The present extension will produce a copyright period of protection that, even under conservative assumptions, is worth more than *99.8%* of protection *in perpetuity* . . . .

537 U.S. 186, 255–56 (2003) (Breyer, J., dissenting).

deremployed creativity has already been taken. Moreover, my own sense is that creative people are likely to remain creative however and wherever they are employed in the economy. If this belief is accurate, then increasing copyright owners' ability to price discriminate is likely to draw additional creativity from other creative sectors of the economy. Further, as discussed at the outset, creativity is likely to be traded within markets that are neither complete nor perfectly competitive.[68]

When an increased ability to price discriminate leads to incentives that attract additional creativity into the production of a copyrighted work, that additional creativity can come either: (1) internally, from some other creative activity that is also protected by copyright; or (2) externally, from some other creative activity not protected by copyright. For example, an increased ability to price discriminate with respect to feature films may increase the salary that a computer animation firm can offer computer programmers and thus draw additional programmers. Those additional programmers must come from somewhere. But for the offer of higher pay that price discrimination made possible, those additional programmers might have written mass-market software for a computer software company or created in-house analytical software for an investment banking firm.

While all three forms of software receive copyright protection, there are significant differences in the type of protection copyright provides and copyright's role in appropriating the marginal social value each type of software generates. For example, so long as the investment banking firm keeps the analytical software in-house, copyright's protection will likely prove to be of very little significance in appropriating the marginal social value that the software generates. In contrast, both mass-market software and software that generates scenes for a feature film rely on a combination of copyright, contractual restrictions, and technological protection measures to appropriate their marginal social value. Yet, copyright likely provides significantly more extensive protection to scenes in a feature film, as a work of fiction, than it does to a useful work, such as applications software.[69] Because of a perceived need for greater access, courts for many years have provided factual or useful works copyright protection that is less extensive than the protection they have provided fictional or entertaining works.[70] The difference has only become more

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

69. *See* Douglas Lichtman, *Copyright as a Rule of Evidence*, 52 DUKE L.J. 683, 689–99 (2003) (discussing the evolution of copyright doctrine to emphasize protection of creative over useful works); *see also* Lunney, *supra* note 11, at 620–27 (demonstrating that providing more protection to fictional works than to factual works will lead to overinvestment in fictional works).

70. *See, e.g.*, Baker v. Selden, 101 U.S. (11 Otto) 99, 103–04 (1880) (explaining that a copyright on a useful work was necessarily narrow because it was intended to be used, but

pronounced since the Supreme Court expressly rejected the "sweat of the brow" doctrine in *Feist Publications, Inc. v. Rural Telephone Service, Co*.[71] Whatever justification courts offer for providing less extensive copyright to useful works, the resulting difference in the protection's scope leads to a corresponding gap in the ability to appropriate the marginal social value of a computer program that generates a useful result and one that provides entertainment.

Alternatively, rather than coming from some other copyright-protected activity, the additional resources necessary to generate more and better works may come from informal creativity markets that are left unprotected by formal systems of intellectual property. Despite the ever-expanding scope of intellectual property, a surprising number of these informal creativity markets persist. More than a decade ago, Jessica Litman identified creative cuisine as one such market.[72] Kal Raustiala and Christopher Sprigman have identified apparel design as another.[73] And, of course, a number of commentators have pointed to open source software as another anomalous exception to the seeming need for the incentives provided by copyright.[74]

However the cycle of innovation and imitation in the absence of formal intellectual property protection is far more common than these few examples suggest. In every aspect of life and business, people continually develop new and different ways of doing, communicating, and seeing things. Subsequently, the innovations that prove effective, the expressions that catch on, and the styles that become popular are imitated by others. It may be an exaggeration, but only a slight one, to suggest that all life consists of imitation and innovation.

Even when considering only behavior primarily motivated by financial concerns, innovation and imitation are everywhere. Some people prove successful in their careers and when they do, others imitate them. When I became a professor, I imitated my favorite teachers and professors, or at least my perceptions of them. I added my own variations and improvements to what I recalled, as much to reflect my own personality as to improve my effectiveness as a teacher. I have

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then cautioning: "Of course, these observations are not intended to apply to ornamental designs, or pictorial illustrations addressed to the taste. Of these it may be said, that their form is their essence, and their object, the production of pleasure in their contemplation.").

71. 499 U.S. 340, 352–61 (1991). For the purpose of determining whether a work is copyrightable or not, the "sweat of the brow" doctrine states that it is not necessary for the material in question to show originality. Rather, copyright can also cover those works for which the creator put much effort to compile the factual material. *Id.* at 352–53.

72. Jessica Litman, *The Exclusive Right to Read*, 13 CARDOZO ARTS & ENT. L.J. 29, 44–46 (1994).

73. Kal Raustiala & Christopher Sprigman, *The Piracy Paradox: Innovation and Intellectual Property in Fashion Design*, 92 VA. L. REV. 1687, 1689 (2006).

74. *See, e.g.*, Yochai Benkler, *Coase's Penguin, or, Linux and* The Nature of the Firm, 112 YALE L.J. 369 (2002); Josh Lerner & Jean Tirole, *Some Simple Economics of Open Source*, 50 J. INDUS. ECON. 197 (2002).

some hope that my students who choose a similar path will imitate and modify my teaching style.

More generally, lawyers create and advance legal arguments to support their clients' positions. Some of these arguments become law, while others simply prove to be effective advocacy techniques.[75] In either case, successful arguments quickly become widely adopted and imitated by other lawyers.[76] One of the most widely shared experiences among first year law firm associates is use of the firm's form file as a starting point for drafting a complaint, brief, or contract. Lawyers receive some direct compensation for these innovations, to the extent that they benefit a specific client, but receive no compensation for the spillover benefits that their innovations create. Doctors operate similarly. Physicians develop new surgical techniques and new diagnosis and treatment protocols. When those techniques prove successful, they are then taught to, and imitated by, other physicians.[77] Again, payments by clients cover the costs of creating these innovations; yet, doctors are almost entirely uncompensated for the substantial positive externalities these innovations create. In business, someone created the department store, the grocery store, the super store, the convenience store, the drive-through, the warehouse store, the dollar store, the shopping mall, delivery pizza, takeout Chinese, and the flea market.[78] In each case, the innovator received some compensation for her innovation through the successes of her own busi-

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75. Melvin Belli, for example, is generally credited with starting the now common practice of calculating pain and suffering damages on a per diem basis. 3 MELVIN M. BELLI, SR., MODERN TRIALS § 55.16, at 779 (2d ed. 1982) ("The jury must be made to appreciate what pain and suffering is, what ridicule is, what embarrassment is, day by day, hour by hour, minute by minute, second by second."). While he undoubtedly received some benefits from his innovation — better cases, perhaps, and certainly, his contingent fee share of the increased pain and suffering awards his clients received — other attorneys who copied Belli's advocacy technique and their clients also benefited and did so without making any direct payment to Belli for his innovation.

76. James Boyle presented a similar example at a 2006 conference on software patents. *See* David J. Kappos & Ray Strimaitis, Collaborative Innovation and the Patent System — Replacing Friction with Facilitation 9–10 (Software Info. Ctr. Symposium 2005), *available at* http://www.researchoninnovation.org/swconf/IBM Views On Software Patents.pdf.

77. Consider the following example from Professor Adelman's patent law treatise:

> Clearly, doctors treating heart patients want to know which patients are likely to experience serious complications such as ventricular fibrillation after a heart attack. Suppose a doctor discovered that certain heart sounds are associated with a substantial increase in the risk of ventricular fibrillation. Unless the doctor's discovery can be the basis for a statutory process or some product such as an automatic device for detecting such heart sounds, the doctor has made an unpatentable discovery. Much of the science of medicine is based on such unpatentable discoveries.

1 MARTIN J. ADELMAN, PATENT LAW PERSPECTIVES § 1.4[3] (2d ed. 2007).

78. *See* Leegin Creative Leather Prods., Inc. v. PSKS, Inc., 127 S. Ct. 2705, 2729 (2007) (Breyer, J., dissenting) ("We all benefit freely from ideas, such as that of creating the first supermarket.").

ness, but substantial and uncompensated spillover benefits also existed.

Each of these markets has ways of compensating innovators. In some, lead time advantages offer an incentive for successful entrepreneurs.[79] In others, being a successful innovator offers reputational advantages that again provide an incentive for innovation.[80] In still others, direct payments from clients cover the cost of the innovation.

Each mechanism described above provides an incentive for innovation precisely because it deviates from the assumptions of the perfect competition model. Each innovation also creates substantial and uncompensated positive externalities. In short, markets for creativity, wherever they are found in the economy, are neither complete nor perfectly competitive. To evaluate the welfare effects of implementing price discrimination in the markets for copyrighted works, it is necessary to determine whether the additional creativity needed to produce more and better works will: (1) come from other creative sectors of the economy; or (2) somehow be generated out of the economy's non-creative sectors that more closely mimic the assumptions of the partial equilibrium model. A second-best analysis becomes appropriate precisely to the extent that additional creativity for authorship comes from other creative sectors.

B. Illustrating the Intuition: A Simplified, Two Good Model with Price Discrimination

A second-best or more general equilibrium story begins with the partial equilibrium story often used to illustrate the advantages of first-degree price discrimination. First consider a producer facing the step-function inverse demand, shown in Figure 1, who must decide whether to incur a fixed cost, *F*, to introduce a product, Good X. For convenience, the marginal cost for additional units of the good is set equal to zero, once *F* is incurred.

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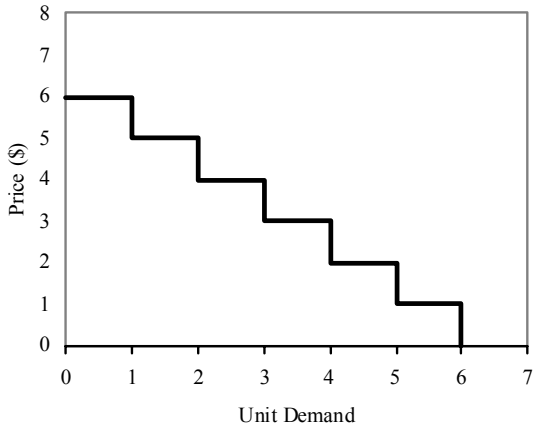
79. *See, e.g.*, Stephen Breyer, *The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies, and Computer Programs*, 84 HARV. L. REV. 281, 299–300 (1970) (explaining lead time rents as an incentive for authorship); *see also* Glynn S. Lunney, Jr., *Patent Law, the Federal Circuit, and the Supreme Court: A Quiet Revolution*, 11 SUP. CT. ECON. REV. 1, 57–59 (2004) (providing a formal model of lead time rents as an incentive for innovation).

80. *See* Lunney, *supra* note 79, at 59–63 (providing a formal model of reputational rents as an incentive for innovation).

Figure 1: Good X — Inverse Demand



If the producer cannot price discriminate, then the profit-maximizing uniform price to charge is $3.[81] At that price, the producer will sell four units and earn a conditional producer surplus[82] of $12. If *F* is more than $12, then the producer will not introduce the product. In contrast, if the producer can engage in first-degree price discrimination, then she will charge each consumer the consumer's exact reservation price and will earn producer surplus of $21.[83] With first-degree price discrimination, the producer will introduce Good X so long as *F* is less than $21.

The difference between the surplus captured under first-degree price discrimination and that captured under uniform pricing establishes a gap between the level of *F* at which the introduction of Good X will prove profitable under uniform pricing and the level of *F* at which it will prove profitable under first-degree price discrimination.

81. If the producer sets her uniform price equal to $6 per unit, she will sell one unit and receive $6 in revenue. A uniform price of $5 per unit will achieve sales of two units and total revenue of $10. With a uniform price of $4, the producer will sell three units and earn total revenue of $12. With a uniform price of $3, the producer will sell four units and earn total revenue of $12. With a uniform price of $2, she will sell five units with total revenue of $10. Thus, for the inverse demand curve shown in Figure 1 and a marginal cost of zero, the producer maximizes her profit by setting a uniform price equal to either $4 or $3 per unit. The model assumes that the producer will sell four units at $3 each in order to maximize the total surplus available under uniform pricing.

82. The term conditional producer surplus is used to reflect that the producer must pay the fixed costs of creating the work out of this surplus. It is not therefore pure profit or rent. For the sake of convenience, all future references to producer surplus should be read as referring to conditional producer surplus.

83. For the inverse demand curve shown in Figure 1 with first-degree price discrimination, the producer will charge the first consumer $6 for the good, the second consumer $5, the third consumer $4, the fourth consumer $3, the fifth consumer $2, and the sixth and final consumer $1, for a total revenue of $21.

This gap leads to the possibility that in some cases Good X will not be produced under uniform pricing, even though its production appears socially desirable. If *F* is $16, then under uniform pricing Good X will not be produced even though its value to society[84] ($18 under uniform pricing or $21 under first-degree price discrimination) apparently exceeds the good's costs. In contrast, allowing the producer of Good X to engage in first-degree price discrimination would enable her to earn an increased producer surplus, thereby ensuring the introduction of Good X. Indeed, in a partial equilibrium analysis, first-degree price discrimination ensures that Good X is introduced in every case where its value exceeds its costs, apparently guaranteeing an efficient allocation of resources. The inevitable conclusion that follows from this analysis is that allowing the producer to engage in first-degree price discrimination enhances social welfare.

To reach this conclusion, a fixed introduction cost (*F*) for Good X and a constant marginal cost are assumed. To recover her fixed costs, the producer must charge a price in excess of marginal cost. This pricing strategy, however, deviates from the efficiency rule dictated by the perfect competition model, according to which price must equal marginal cost. Nevertheless, for private production of the good to occur, the producer must have some market power, exploited either through a uniform monopoly price or price discrimination in order to recover her fixed costs. Yet, once it is assumed that one good has a fixed introduction cost, it makes little sense to assume, as a partial equilibrium analysis does, that no other good entails such an introduction cost. A more general equilibrium analysis assumes that other goods also have a fixed introduction cost and then examines whether, and if so how, that changes the conclusion.

Suppose then that there exists a second good, Good Y, that requires the same fixed introduction cost, *F*; entails no marginal cost to produce additional units once the good is introduced; and faces the step-function inverse demand shown in Figure 2.

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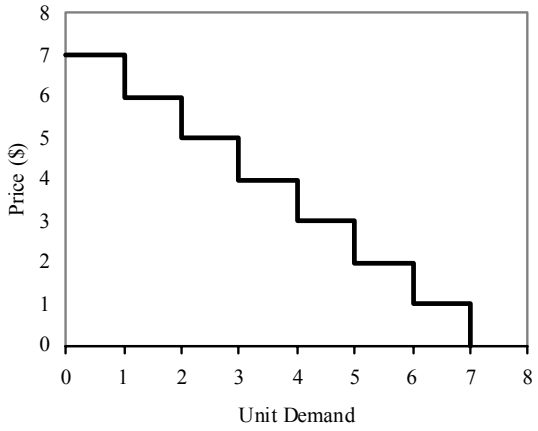
84. Following the usual practice, value is defined as the area under the demand curve with first-degree price discrimination or the combination of producer and consumer surplus under uniform pricing. *See, e.g.* BESANKO & BRAEUTIGAM, *supra* note 12, at 451 fig.12.2 (graphically illustrating the producer and consumer surplus under first-degree price discrimination). Thus, under first-degree price discrimination, the value will equal the revenue ($21) to the producer. *See supra* note 83. Under uniform pricing, the value will equal the producer surplus ($12, with 4 units sold at $3 each), plus consumer surplus ($6), which is reflected by the difference between each consumer's reservation price and the uniform price ($3 + $2 + $1), for a total value of $18.

Figure 2: Good Y — Inverse Demand



Under uniform pricing, the producer's profit-maximizing price for Good Y is $4. At that price, the producer would sell four units of Good Y and earn a producer surplus of $16. While it is possible to perform the same sort of partial equilibrium analysis as before, a more general equilibrium analysis would move from an examination of the two cases individually to an examination of the two cases together. Suppose then that the two goods (X and Y) both require the same fixed input, but there is only a sufficient supply of the fixed input to produce one of the two goods. As between the two, consumers value the production of Good Y more highly than Good X because they are willing to pay more for Good Y. Thus, the fixed input is efficiently allocated only if allocated to the production of Good Y. Given this setup, the following three cases explore the efficiency consequences of first-degree price discrimination.

Case 1 — Uniform Pricing for Both Goods: First, consider the case where both goods would be sold under uniform pricing. The fixed input would be used to produce Good Y, because the expected producer surplus for Good Y ($16) is higher than the producer surplus expected for Good X ($12). Accordingly, the producer of Good Y would offer a higher price for the fixed input than the producer of Good X. As a result, only Good Y would be produced, achieving the efficient allocation of the fixed input.

Case 2 — Price Discrimination for Good X Only: Second, consider the case where the available technology or legal rules allow first-degree price discrimination for Good X, but Good Y continues to be marketed under uniform pricing. The producer surplus for Good X

under first-degree price discrimination ($21) is higher than the producer surplus available for Good Y under uniform pricing ($16). As a result, the producer of Good X could bid the fixed input away from the producer of Good Y so that only Good X would be produced. This allocation of the fixed input would be inefficient and would reduce social welfare because the combined consumer and producer surplus would be lower ($21) compared to Case 1 ($22).[85]

A more general equilibrium analysis thus suggests a result that directly contradicts the result reached in a partial equilibrium analysis. In Case 2, allowing first-degree price discrimination for Good X results in a net decrease in social welfare. However, as with most second-best analyses, the results here can be ambiguous, as Case 3 illustrates.

Case 3 — Price Discrimination for Both Goods: Third, suppose that under existing laws and marketplace conditions, first-degree price discrimination already exists in the market for Good X, while uniform pricing applies to Good Y. If either the legal rules or the technology available changed so that first-degree price discrimination became practicable for Good Y, such a change would increase social welfare. Under first-degree price discrimination for both goods, the producer surplus for Good Y ($28)[86] would be higher than surplus for Good X ($21). The producer of Good Y would therefore be able to bid the fixed input away from the producer of Good X. As in Case 1, the producer of Good Y would obtain the fixed input, Good Y would be produced, and the fixed input would be efficiently allocated. Thus, social welfare would increase from $21 to $28 as a result of enabling the producer of Good Y to engage in first-degree price discrimination. Moreover, social welfare is higher in this Case ($28) as compared to that in Case 1 ($22), where the markets for both goods were subject to uniform pricing.

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85. With uniform pricing for Good Y, social welfare equals the producer surplus of $16 (four units sold at a price of $4 each), plus the consumer surplus reflected by the difference between each consumer's reservation price and the uniform price of $4. As illustrated in Figure 2, the first consumer has a reservation value of $7 and receives consumer surplus of $3; the second consumer has a reservation value of $6 and receives consumer surplus of $2; and the third consumer has a reservation value of $5 and receives consumer surplus of $1. The total surplus is $22, the sum of the total consumer surplus associated with Good Y under uniform pricing ($16) plus the total consumer surplus ($6). Under first-degree price discrimination, the producer sells all units at the applicable reservation price, and social welfare equals the producer surplus ($21) because the producer fully captures each consumer's reservation value ($6+$5+$4+$3+$2+$1).

86. Again, under first-degree price discrimination, social welfare equals the producer surplus. For the inverse demand curve shown in Figure 2 for Good Y, the producer would charge the first consumer $7 for the good, the second consumer $6, the third consumer $5, the fourth consumer $4, the fifth consumer $3, and the sixth and final consumer $2. The total revenue (and producer surplus) would be $27.

Conclusions from the Discrete Model: The discrete two good model establishes that the seemingly clear desirability of first-degree price discrimination in a partial equilibrium analysis is not so clear. In this model, unless all markets can practice first-degree price discrimination, allowing first-degree price discrimination in some markets can decrease social welfare. Moreover, if the available technology enables first-degree price discrimination in only some markets, eliminating first-degree price discrimination in those markets can increase social welfare.

As these cases illustrate, a switch to first-degree price discrimination in any given market has two potentially conflicting efficiency consequences. On one hand, a switch to first-degree price discrimination would reduce the deadweight loss associated with uniform pricing and thereby generates an unambiguous increase in social welfare (the "Deadweight Effect"). On the other hand, a switch to price discrimination also increases the producer surplus associated with the introduction of a product; this increase in producer surplus has ambiguous effects on social welfare. While the increased surplus may ensure the profitability and introduction of one product, use of the available fixed input to introduce one product will foreclose the production of another, potentially more valuable product (the "Allocation Effect"). As Cases 2 and 3 suggest, when these two effects are combined, a switch to first-degree price discrimination may either increase or decrease social welfare, depending on the market conditions actually present.

The conclusions from the second-best analysis thus differ sharply from those of a partial equilibrium analysis. A partial equilibrium analysis concludes that, in the absence of transaction costs, first-degree price discrimination is always welfare-enhancing. However, a more general equilibrium analysis concludes that the introduction of first-degree price discrimination in some, but not all markets, can reduce social welfare. Specifically, a switch from uniform pricing to first-degree price discrimination in a given market will reduce social welfare when the Allocation Effect both reduces social welfare and outweighs the Deadweight Effect.

C. Extending the Analysis to a Continuum of Goods

Given that the desirability of first-degree price discrimination is theoretically indeterminate, the next step is to identify those market conditions that determine when a switch to first-degree price discrimination is likely to reduce social welfare.

To examine this issue, the second-best analysis can be extended from the discrete, two good case to one involving two industries, X and Y, each with a continuum of goods that can be produced. In the

real world, these two industries might represent the production of copyrighted works and the production of creative but not copyrighted products, or the production of digital works and the production of analog works. The model assumes that both industries require a common input of which there is a limited supply, such as authorship talents or creativity more generally. To facilitate a graphical comparison of the net social welfare effect of shifting the available resources, and hence production, between the two industries, it is assumed that one unit of the common input can produce one additional good in either industry. In addition, the input is assumed to be a constant and fixed cost for the production of each good within both industries. In either industry, the producer has monopoly power over each good and may set its price either through uniform pricing or first-degree price discrimination. The expected producer surplus associated with any given good can be used to bid for the available stock of the fixed input. Equilibrium is reached when the available supply of the common input is fully allocated between the two industries. Thus, the producer surplus associated with the marginal good in each industry becomes the effective price for units of the common input.

To conduct the analysis, the goods available for production within each industry per unit of the fixed input will be ranked according to three criteria: (1) social welfare (SW_{pd}) and producer surplus (PS_{pd}) associated with the production of the good under first-degree price discrimination (which are identical); (2) social welfare (SW_u) associated with the good under uniform pricing; and (3) producer surplus (PS_u) associated with the good under uniform pricing. Under first-degree price discrimination, the producer fully recovers the available surplus. The model assumes that none of the surplus is converted into cost. Thus, with first-degree price discrimination, social welfare equals producer surplus. Uniform pricing imposes some deadweight loss, reducing the available surplus associated with production of a good ($SW_u < SW_{pd}$). Uniform pricing also leaves some of the available surplus in the hands of consumers ($PS_u < SW_u < PS_{pd}$). The model ranks the goods available for production within each industry along a continuum according to SW_{pd} and assumes a reasonably constant relationship among PS_u, SW_u, and PS_{pd} across an Industry so that the ranking of any given product remains consistent across the three criteria.

The analysis begins with four cases: (1) markets in both industries are monopolistic; (2) markets in both industries are imperfectly competitive; (3) markets for Industry X goods are monopolistic, while those for Industry Y goods are imperfectly competitive; and (4) markets for Industry X goods are imperfectly competitive, while those for Industry Y goods are monopolistic. Each case starts with the assumption that goods in each industry are marketed under uniform pricing,

and then evaluates the welfare consequences of a switch to first-degree price discrimination for Industry X goods.[87]

Case 1 — Monopolistic Markets for Both Industries: First, consider a case where the deadweight loss and the consumer surplus under uniform pricing are identical fractions of a good's social value under first-degree price discrimination (the good's "full social value"). Such equality between consumer surplus and deadweight loss occurs in a monopoly model where the producer faces linear inverse demand and constant marginal costs. In such a case, under uniform pricing, the deadweight loss and the consumer surplus each equal exactly one-quarter the good's full social value.[88] What is left constitutes the producer surplus under uniform pricing and equals exactly one-half the good's full social value.[89] Having determined the relationship between social value, consumer surplus, and producer surplus for each creative good within an industry, that relationship can be applied across the continuum of such creative goods for each industry as a whole.

In analyzing the effects of a switch from uniform pricing to first-degree price discrimination in Industry X, the analysis focuses on those portions of each industry's demand for the last units of the fixed input, which is where competition would occur. Because the producer surplus of the marginal goods from each industry sets the effective price of the fixed input, this competition necessarily takes place between goods of the two industries that have comparable private and social values. For expositional ease, the model assumes that the utility of the goods from each industry in this area of competitive overlap ranges from 0 to 1. The model also assumes that the industries are of similar size,[90] with each having 100 different goods[91] available for production in the area of competitive overlap and a uniform decrease in utility from good-to-good.

Given these assumptions, it is possible to generate curves reflecting PS_u, SW_u, and SW_{pd} for the continuum of goods available for production in each industry, as reflected in Figure 3.

87. For a consideration of the case where markets in Industry Y already employ perfect price discrimination, see *infra* Part III.E.

88. *See* Lunney, *supra* note 11, at 557 n.283.

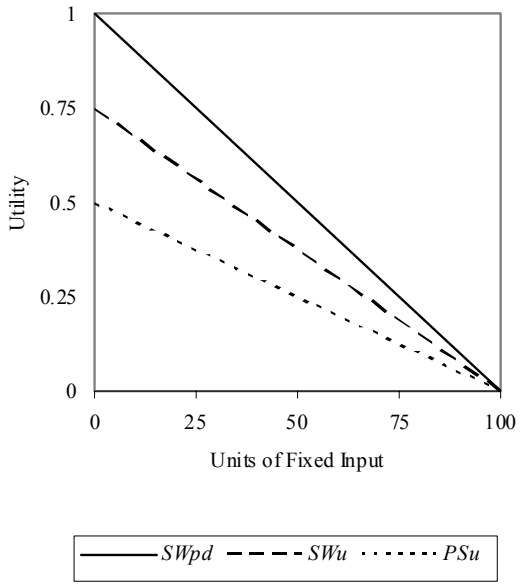
89. *Id.*

90. This assumption affects the magnitude, but not the sign, of the welfare effects from the model.

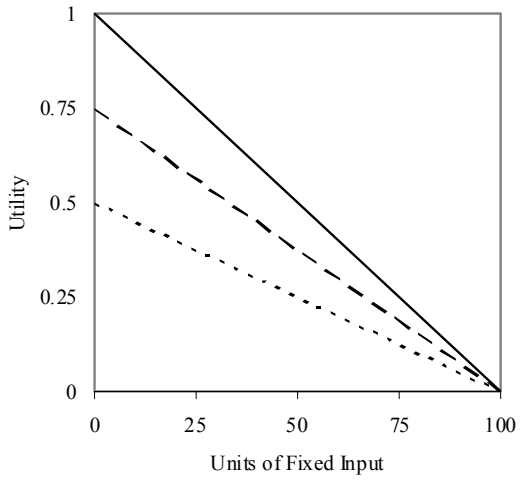
91. While the model expressly quantifies output in terms of additional works of authorship, the model also applies if the output increase represents an increased quality in the works created. Thus, an additional unit of output might represent a whole new work, more realistic special effects or other improvements to some more basic version of a film.

Figure 3: PS_u, SW_u, and SW_{pd} for the Continuum of Goods

Industry X



Industry Y



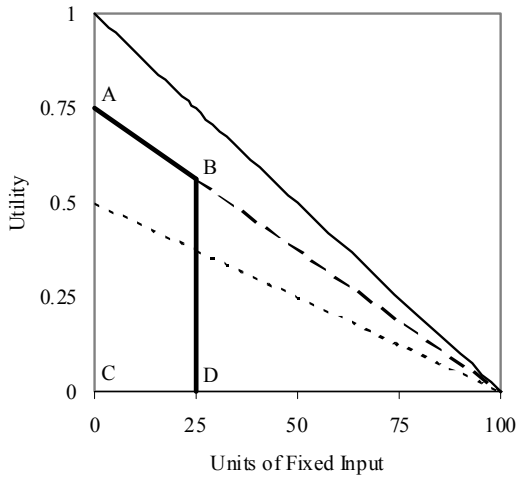
In these two figures, SW_{pd} is assumed to be 1 for the most valuable good in each industry and falls to 0 for the least valuable good. Thus the SW_{pd} curve runs from (0, 1) to (100, 0). Given the assumptions regarding a monopoly market for each good, linear inverse demand, and constant marginal costs, the SW_u for the most valuable good in each industry is 0.75, reflecting the combination of a producer surplus equal to one-half of SW_{pd} and consumer surplus equal to one-fourth of SW_{pd}. The SW_u curve thus runs from (0, 0.75) to (100, 0). Again, given the assumptions of relatively inefficient markets for the goods from the two industries, the producer surplus is exactly one-half of SW_{pd}, and thus, the PS_u curve runs from (0, 0.5) to (100, 0).

Under uniform pricing in both industries, the PS_u curve effectively represents the inverse demand for the fixed input in each industry. Suppose that there are fifty units of the fixed input available[92] and that they are allocated between the two industries until $PS^X = PS^Y$ for the marginal goods in the two industries. Given this setup, exactly one-half of the available fixed input will go to the production of Industry X goods and one-half to the production of Industry Y goods. The resulting social welfare, consisting of combined consumer and producer surplus, is the area under each SW_u curve given the output levels achieved, as illustrated in Figure 4.

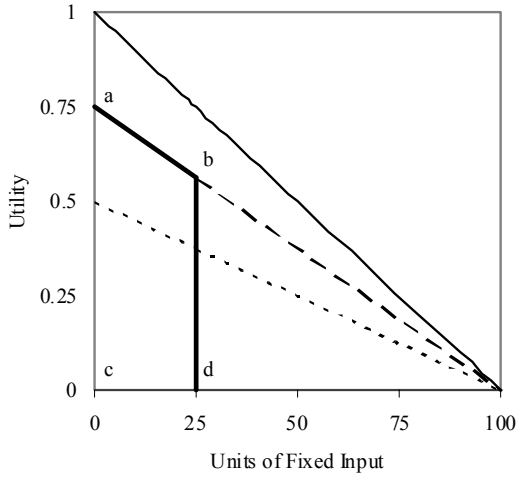
92. I have selected the quantity of the fixed input available for two reasons. First, with fifty units of the fixed input, I will show that under price discrimination in Industry X there is no Industry Y production, facilitating the comparison of the welfare gains and losses from price discrimination. Second, although there is no Industry Y production, the condition that, at the "with price discrimination" equilibrium, $PS^X = PS^Y$ still holds. An infinitesimal increase in the fixed input available would be split between Industries X and Y, and $PS^X = PS^Y$ is thus still binding. A reduction in the available supply of fixed input introduces slack into the constraint, such that at equilibrium $PS^X > PS^Y$. Thus, the full margins over which the reallocation occurs is not being considered and the analysis is limited to cases where Industry Y does not have a sufficient number of desirable goods to compete with Industry X for the full range of the fixed input available.

Figure 4: Case 1 — Allocation of Resources and Social Welfare with Uniform Pricing in Both Industries

Industry X



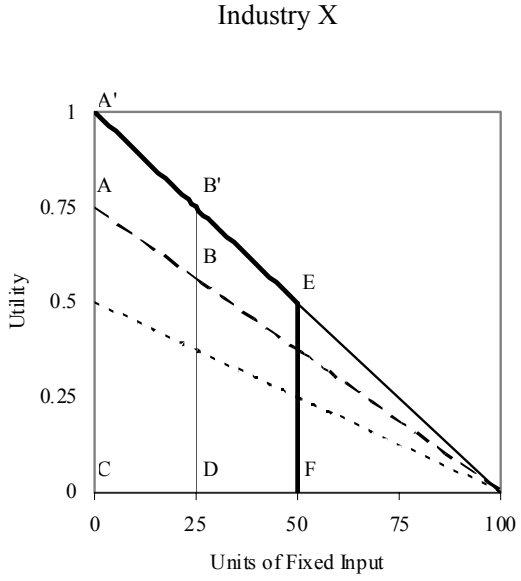
Industry Y



If legal or technological changes enable producers of Industry X goods to engage in first-degree price discrimination, then both the private and social value associated with the production of each Industry X good will increase. If the fifty units of fixed input are reallocated between the two industries so that, for the marginal goods in

each, $PS^X = PS^Y$, then all available fixed input will be allocated to the production of Industry X goods.[93] As there will no longer be any Industry Y production, we can focus on Industry X exclusively. Thus, the social welfare associated with a switch to price discrimination in Industry X equals the area under the SW_{pd} for Industry X, given the output achieved, as illustrated in Figure 5.

Figure 5: Case 1 — Welfare Generated by Industry X Production Following a Switch to First-Degree Price Discrimination



The fixed input now generates social welfare reflected by the trapezoid *CA'EF*. The change in social welfare can be broken into two components. First, the welfare associated with the preexisting Industry X output increases, as the value of that output expands upward from *AB* to *A'B'*. This increase arises because first-degree price discrimination eliminates the deadweight loss associated with the Industry X output under uniform pricing. As Figure 5 shows, this Deadweight Effect is positive.

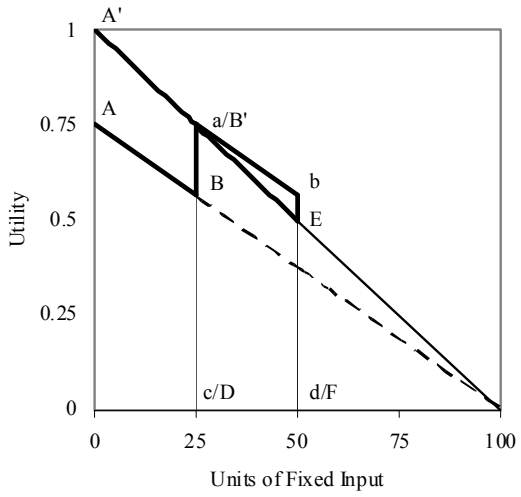
Second, output levels in Industry X increase from D to F on Figure 5. This generates a second apparent increase in welfare, reflected by the trapezoid *DB'EF*. However, in order to supply Industry X with

93. With uniform pricing, the *PS* available to bid for the creativity necessary to produce the first Industry Y good is slightly less than 0.5 because producer surplus with uniform pricing is exactly one-half the good's full social value. The *PS* available to bid for the same unit of creativity for the fiftieth Industry X good with perfect price discrimination is equal to the good's full social value, 0.5.

the fixed input necessary for this output expansion, Industry Y production must be eliminated. A partial equilibrium analysis assumes that the social loss associated with this elimination equals the price of the necessary resources, which equals the surplus associated with the marginal Industry X good produced (point *E* in Figure 5). While accounting for the loss of Industry Y output reduces the apparent welfare gains from the increased Industry X output, the welfare effects remain undeniably positive.

By contrast, under a more general equilibrium analysis, the net effect on welfare from this reallocation of production is negative. This effect can be shown by comparing the welfare gain from the additional Industry X production, reflected by the trapezoid *DB'EF* in Figure 5, and the welfare loss from the reduced Industry Y production, reflected by the trapezoid *cabd* in Figure 4.[94] Figure 6 superimposes the trapezoid *cabd* onto the trapezoid *DB'EF* in order to facilitate comparison of these gains and losses.

Figure 6: Case 1 — Net Welfare Effects



To compare relative gains and losses, PS_u, SW_u, and PS_{pd} are all measured per unit of the fixed input. Given this setup, any increase in Industry X production requires a one-to-one decrease in Industry Y production, and the bases of the two trapezoids are therefore equal (*cd* = *DF*). The heights of the two trapezoids, *ca* and *DB'*, are also equal because PS_u for the first Industry Y good equals the PS_{pd} for the

94. Because of the assumed symmetry of the two industries, the trapezoid *cabd* for Industry Y in Figure 4, *supra* p. 419, is identical to the trapezoid *CABD* for Industry X in Figure 4, *supra* p. 419 and Figure 5, *supra* p. 420.

twenty-sixth Industry X good. However, because SW_u is a constant fraction of SW_{pd}, the SW_u curve is flatter than the SW_{pd} curve, and therefore $b > E$. The trapezoid *cabd*, which reflects the social value of the lost Industry Y production, is larger than the trapezoid *DB'EF*, which reflects the social value of the additional Industry X production. As a result, the shift in resources from Industry Y to Industry X brought about by first-degree price discrimination in Industry X generates a net welfare loss, reflected by the triangle *abE*.

While it appears from Figure 6 that the Deadweight Effect, reflected by the *AA'B'B* trapezoid, is likely to outweigh the Allocation Effect, reflected by the triangle *abE*, the assumptions are not intended to yield definitive quantitative answers but simply to provide a qualitative sense of the direction and relative magnitudes of the two effects. As Figure 6 illustrates, reducing the deadweight losses associated with uniform pricing increases social welfare. Thus, as in the partial equilibrium analysis, the Deadweight Effect is positive. However, in sharp contrast to the partial equilibrium result, the additional Industry X output generated by the switch to first-degree price discrimination in Industry X is less valuable to society than the Industry Y output it replaced. Thus, the Allocation Effect is negative.

Case 2 — Imperfectly Competitive Markets for Both Industries: Next, consider a case where, for both Industries, the markets for the individual creative goods are neither monopolistic nor perfectly competitive. Such markets would arise where the available products compete more directly and are more readily substitutable than in Case 1. The increased competition results in each producer capturing less monopoly profit; for the same reason, the deadweight losses associated with each product are also lower. For example, if each good were marketed under conditions approximating a Cournot duopoly,[95] in a market with linear inverse demand and constant marginal costs, then the deadweight loss under uniform pricing would equal one-ninth of the good's full social value (compared to one-fourth of the full social value under monopoly).[96] The remaining surplus would be split evenly between producers and consumers, with each receiving four-ninths of the good's full social value as their respective surplus.

These values can be used to illustrate the consequences of a switch to first-degree price discrimination in imperfectly competitive markets.[97] Increasing the available supply of the fixed input from 50

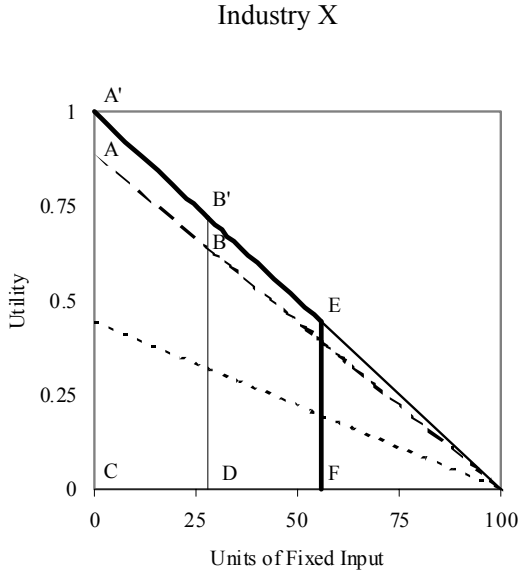
95. In a Cournot duopoly, two firms offer identical products with each firm seeking to maximize its profit by setting the quantity of the good it will produce rather than setting the price. *See* MAS-COLELL ET AL., *supra* note 19, at 387–90.

96. *Id.* at 391–93 (discussing example 12.C.1: Cournot Duopoly with a Linear Inverse Demand Function and Constant Returns to Scale).

97. The results obtained do not depend on the precise numerical values for producer surplus and deadweight loss chosen for the Cournot duopoly model. So long as the nature of

to 55.556 units in order to ensure that the constraint $PS^A = PS^B$ is binding at the margins, it is possible to perform the same type of analysis as in Case 1. First, the relevant PS_u, SW_u, and SW_{pd} curves for each industry are generated. Then, the available fixed input between the two industries is allocated, assuming uniform pricing for the markets in both. Finally, the welfare consequences of a switch to first-degree price discrimination in Industry X are determined. Given these assumptions, at equilibrium all units of the fixed input are allocated to production in Industry X, which generates the welfare reflected by the trapezoid *CA'EF* in Figure 7.

Figure 7: Case 2 — Welfare Generated by Industry X Production Following a Switch to First-Degree Price Discrimination



As in Case 1, the welfare consequences of the switch to first-degree price discrimination in Industry X can be broken into two components. First, the Deadweight Effect is positive, as reflected by the upward shift from *AB* to *A'B'*. However, because the markets were relatively efficient to begin with, the deadweight loss under uniform pricing was relatively small and consequently, the Deadweight Effect is smaller than for Case 1. Second, the Allocation Effect is negative.

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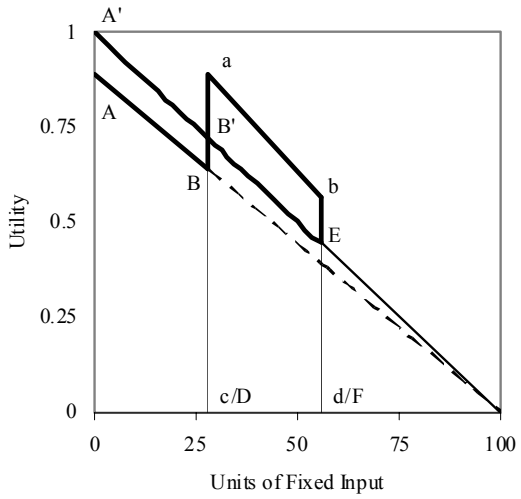
the competition present in the markets is such that the deadweight loss is reduced when compared to that found in the monopoly considered in Case 1, the increase in social welfare from the Deadweight Effect will be smaller than in Case 1. Similarly, so long as the fraction of the surplus that consumers receive is larger than in Case 1, the welfare losses from the Allocation Effect will be larger than those found in Case 1.

Figure 8 shows the Allocation Effect by superimposing the welfare losses due to reduced Industry Y output onto the welfare gains due to increased Industry X output.

Figure 8: Case 2 — Net Welfare Effects



The Allocation Effect is negative, as in Case 1. In this case, both $a > B'$ (0.8889 > 0.7200) and $b > E$ (0.6420 > 0.4444).[98] The welfare loss due to the shutdown of Industry Y is larger than the welfare gain due to increased Industry X output, and the net social loss from the reallocation of resources from Industry Y to Industry X is reflected in the trapezoid *B'abE*. Compared to Case 1, the Allocation Effect here is much larger in magnitude.

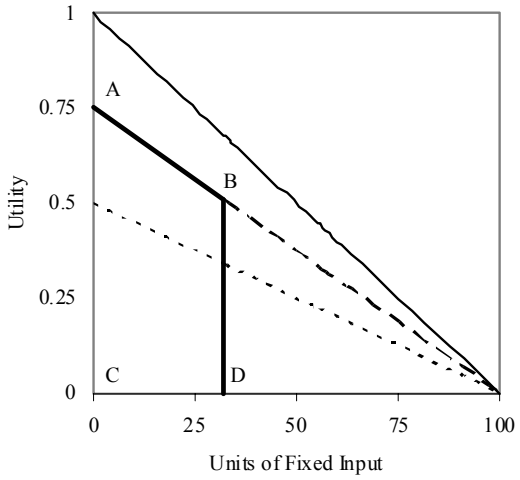
98. Given the production function assumed, resources are transferred from Industry Y to Industry X on a one-to-one basis. Determining the net change in social welfare would ordinarily involve calculating the social welfare lost from eliminating production in Industry Y, which would equal the trapezoid *CABD* in Figure 7, *supra* p. 423. However, graphically comparing the net welfare change from switching resources from Industry Y to Industry X requires calculating *A* (or *a*, which is equal to A in this case) and *B*. With uniform pricing in Industry Y, the marginal social value of the very first unit of Industry Y production is the value of SW_u at zero units of production (0.8889, at point *a*). With uniform pricing in both industries, the marginal social value of the very last unit of Industry Y production is the value of SW_u at 27.7778 units of production. Because SW_u is a straight line, running from 0.8889 to 0, it is possible to calculate the value of SW_u at 27.7778 units with the formula 0.8889 * (1 - 0.27778). Thus, the marginal social value of Industry Y's last unit of production is 0.641975, at *b*. In contrast, the social value gained by switching these resources to Industry X follows the SW_{ps} line from the point at which additional production begins (27.7778 units), where the marginal social value is 1 * (1 - 0.2778), or 0.7222 at *B'*, and continuing out to the last unit of production (55.5556 units), where the social value is 1 * (1 - 0.5556), or 0.4444, at *E*.

Once again, the results differ sharply from those of a partial equilibrium analysis. While the Deadweight Effect remains positive, Figure 8 shows that the Allocation Effect is not positive, as partial equilibrium analysis suggests, but negative, and strongly so.

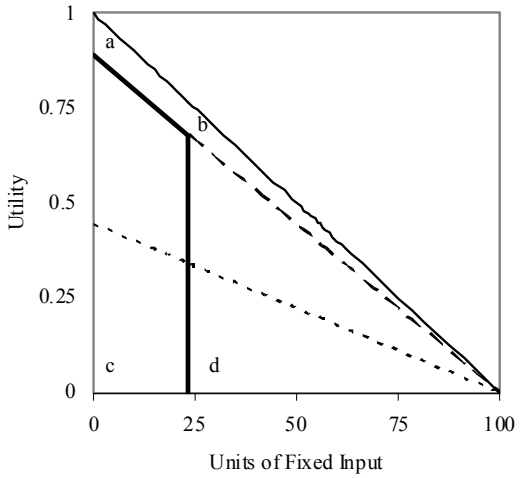
Case 3 — Industry X Monopolistic, Industry Y Imperfectly Competitive: For the third case, consider a scenario where the markets for each individual Industry X good are monopolistic as in Case 1, while those for each Industry Y good are imperfectly competitive as in Case 2. Under uniform pricing, because this model has expressly abandoned symmetry, the available fixed input will not necessarily be divided evenly between the two industries. Thus, the first step is to examine how an available supply of 55.556 units (to ensure that $PS^A = PS^B$ binds at the margins) will be allocated assuming uniform pricing for both industries. The results are presented in Figure 9.

Figure 9: Case 3 — The Allocation of Resources and Social Welfare with Uniform Pricing Given Monopolistic Industry X Markets and Imperfectly Competitive Industry Y Markets

Industry X



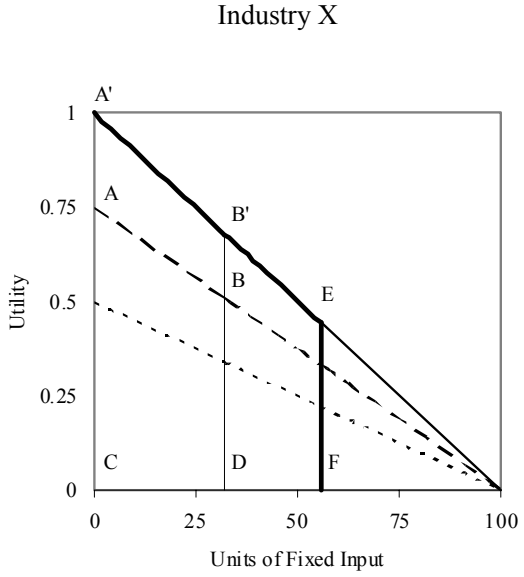
Industry Y



As Figure 9 illustrates, a producer recovers a higher fraction of the total social value of a good in the monopolistic Industry X, where $PS_u = (0.5) * SW_{pd}$, and a lower fraction in the imperfectly competitive Industry Y, where $PS_u = (0.4444) * SW_{pd}$. As a result, if available resources are allocated so that $PS^A = PS^B$ for the marginal good in each industry, then two consequences follow. First, to satisfy $PS^A = PS^B$ for the marginal goods across the two industries, more of the fixed input must be allocated to Industry X than to Industry Y. Second, if $PS^A = PS^B$, then given the respective relationship between PS_u and SW_u for each industry, $SW^A = (0.8889) * SW^B$ for the marginal goods. In other words, at the margins and with uniform pricing, the allocation of the fixed input is distorted, resulting in too little production for Industry Y.

Given this initial allocation of the fixed input, it is now possible to consider the welfare consequences of a switch to first-degree price discrimination in Industry X. As in Cases 1 and 2, such a switch will lead at equilibrium to a shutdown of Industry Y and to the allocation of the available fixed input completely to Industry X production. The welfare consequences for Industry X are reflected in Figure 10.

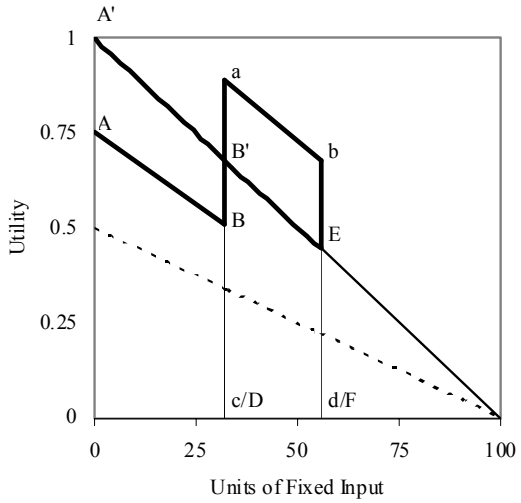
Figure 10: Case 3 — Welfare Generated by Industry X Production Following a Switch to First-Degree Price Discrimination



As in the previous cases, the switch to price discrimination in Industry X generates total social welfare reflected by the trapezoid *CA'EF*. The Deadweight Effect is positive, due to the upward shift of

utility from *AB* to *A'B'*. Moreover, because of the relatively large deadweight loss associated with Industry X goods under uniform pricing, the Deadweight Effect is strongly positive. On the other hand, the Allocation Effect remains strongly negative. Figure 11 superimposes the welfare losses from reduced Industry Y output on the welfare gains from increased Industry X output to obtain a clearer picture of the net welfare effects.

Figure 11: Case 3 — Net Welfare Effects



As in Case 2, both $a > B'$ (0.8889 > 0.6797) and $b > E$ (0.6797 > 0.4444). Thus, the Allocation Effect is again strongly negative, with the net welfare loss from the reallocation of resources reflected by the trapezoid *B'abE*. In this Case, the Allocation Effect is strongly negative partly because of a preexisting distortion in the market.

This preexisting distortion arises because of the initial assumptions about the nature of the markets and pricing scheme. To understand the distortion, recall that the common resource — creativity — is allocated efficiently only if the marginal social values associated with the marginal goods in Industry X and Industry Y are equal. If there is an unproduced Industry X good with a marginal social value higher than the last (or marginal) Industry Y good being produced, then shifting creativity from that Industry Y good to the higher valued Industry X good will necessarily improve social welfare, and vice versa. However, in private markets, the common resource between Industry X and Y is allocated by price, which is set by the fraction of a good's social value captured as producer surplus.

Given uniform pricing, monopolistic markets in Industry X, and imperfectly competitive markets in Industry Y, producer surplus for goods in Industry Y equaled one-half of the good's marginal social value. In contrast, for Industry X, producer surplus equaled two-thirds of the good's marginal social value. As a result, at equilibrium, when $PS^A = PS^B$ for the marginal good from each industry, the social value of the marginal Industry X good is less than that of the marginal Industry Y good ($SW^A = 1.5 * PS^A < 2 * PS^A = 2 * PS^B = SW^B$).

In other words, Case 3 corresponds to a situation where Industry Y is producing too little output compared to the social ideal under uniform pricing. Allowing price discrimination in Industry X exacerbates this preexisting distortion, creating a double distortion that increases the magnitude of the welfare loss due to the Allocation Effect.

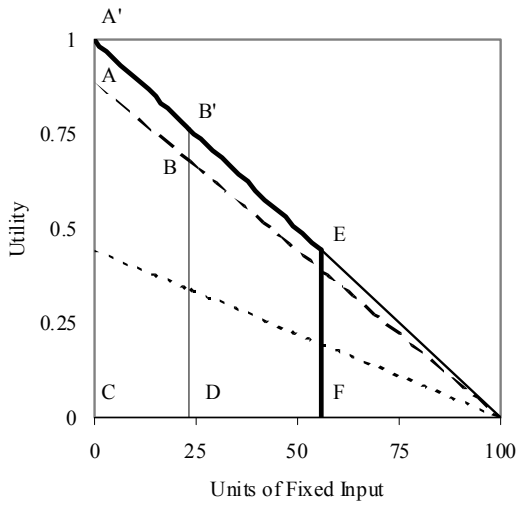
As in Cases 1 and 2, the results differ sharply from those of a partial equilibrium analysis with respect to the welfare consequences of the Allocation Effect. While the Deadweight Effect increases social welfare, the additional Industry X output generated by price discrimination is worth less to society than the Industry Y output it displaces. As a result, the additional Industry X output continues to represent a net welfare loss, and contrary to the partial equilibrium conclusion, the Allocation Effect remains strongly negative.

Case 4 — Industry X Imperfectly Competitive, Industry Y Monopolistic: The final Case involves a scenario in which the markets for individual Industry X goods are imperfectly competitive, while those for the individual Industry Y goods are monopolistic. These assumptions are simply the reverse of those in Case 3. The available supply of 55.5556 units of the fixed input are allocated between the two industries in this Case as shown in Figure 9, except that Industry X now represents Industry Y and vice versa.

As in Case 3, under uniform pricing and with $PS^A = PS^B$ for the marginal goods in each industry, more of the fixed input will be allocated to the monopolistic industry in order to achieve equilibrium. In this case, that means Industry Y output will be higher than Industry X output. The new relationship between PS_u and SW_u for each industry is given by $SW^A = (1.3333) * SW^B$ for the marginal goods. As a result, the allocation of the fixed input is distorted, with too much production in Industry Y.

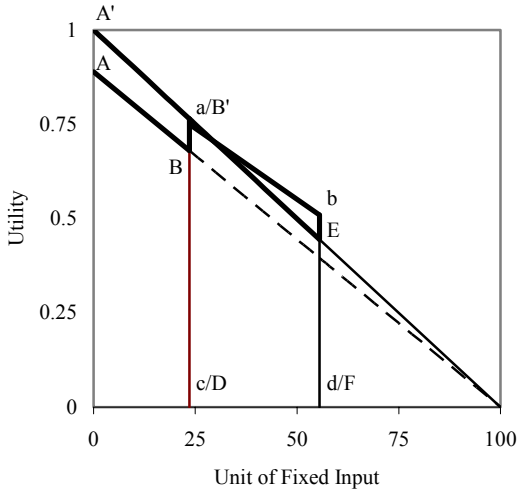
If first-degree price discrimination is introduced in Industry X, the switch will lead, at equilibrium, to a shutdown of Industry Y and the allocation of the available fixed input to Industry X. Figure 12 shows the resulting welfare consequences for Industry X.

Figure 12: Case 4 — Welfare Generated by Industry X Production Following a Switch to First-Degree Price Discrimination



This switch to price discrimination in Industry X generates total social welfare reflected by the trapezoid *CA'EF*. The Deadweight Effect is positive, as illustrated by the upward shift of the value associated with the preexisting production levels from *AB* to *A'B'*. However, because the Industry X markets were imperfectly competitive rather than monopolistic, the Deadweight Effect is relatively small. The Allocation Effect, however, remains slightly negative. As before, it is possible to superimpose the welfare losses from reduced Industry Y output on the welfare gains from increased Industry X output to obtain a clearer picture of the net welfare effects, as shown in Figure 13.

Figure 13: Case 4 — Net Welfare Effects



Initially, because too little Industry X output was achieved under uniform pricing, transferring some of the fixed input from Industry Y production to Industry X production actually increases social welfare, thus $B' > a$ (0.7647 > 0.7500). However, price discrimination overcorrects this initial distortion and leads to an overproduction in Industry X, thus $E < b$ (0.4444 < 0.5098). Moreover, because $B'E$ and ab are linear, and because the net welfare gain at one end (reflected by the difference between B' and a) is smaller than the net welfare loss at the other (reflected by the difference between E and b), the Allocation Effect (trapezoid $aB'bE$) is slightly negative.

As a result, Case 4 comes closest to duplicating the conclusions from the partial equilibrium analysis. Here, price discrimination can help correct the underproduction of Industry X output that would otherwise occur with uniform pricing. Therefore, instituting a price discrimination scheme that shifts resources from Industry Y to Industry X is initially desirable. However, price discrimination overcorrects for this initial distortion to such a degree that it introduces a new, more severe distortion — overproduction in Industry X. As a result, contrary to the partial equilibrium conclusion, the Allocation Effect remains slightly negative even in this Case. Similarly, the Deadweight Effect is positive in this case as well, but only slightly because the markets for Industry X goods were relatively efficient.

Conclusions from the Continuum Model: The results from these four cases can be summarized as follows:

Table 1: Summary of Allocation and Deadweight Effects of Switch to First-Degree Price Discrimination in Industry X

		Industry Y	
		Imperfectly Competitive	Monopolistic
Industry X	Imperfectly Competitive	AE: Strongly Negative DE: Slightly Positive	AE: Slightly Negative DE: Slightly Positive
	Monopolistic	AE: Strongly Negative DE: Strongly Positive	AE: Slightly Negative DE: Strongly Positive

AE: Allocation Effect DE: Deadweight Effect

As with the discrete model, the conclusions from the continuum model differ sharply from those of a partial equilibrium analysis. These cases show that a switch to first-degree price discrimination in any given market will not necessarily enhance social welfare and may in fact reduce it. The outcome depends on the relative magnitudes of the welfare losses from the Allocation Effect and the welfare gains from the Deadweight Effect. More importantly, and in sharp contrast to the partial equilibrium results, with the continuum model the Allocation Effect is invariably negative. While a switch to first-degree price discrimination in Industry X increases the incentives associated with production and thus leads to increased output, that additional output is less valuable to society than the Industry Y output it displaces. Rather than increase social welfare, the Allocation Effect generated by price discrimination imposes a net welfare loss on society.

In addition to establishing that a switch from uniform pricing to first-degree price discrimination may reduce welfare, the continuum model further suggests three general guides for evaluating the likely welfare consequences of such a switch. First, although the results derived from the continuum model are only qualitative, they suggest that a switch to first-degree price discrimination in an industry is likely to prove welfare-enhancing only to the extent that the price discrimination scheme substantially reduces a deadweight loss otherwise pre-

sent. The price discrimination scheme must not only reduce the deadweight loss, but must reduce it sufficiently to outweigh the utility lost due to the Allocation Effect, which is invariably negative.

Second, the continuum model also demonstrates that the partial equilibrium analysis errs in attributing a net welfare gain to the increased production caused by first-degree price discrimination. Rather than generate an unambiguous increase in social welfare, the continuum model shows that increased production from price discrimination in a particular industry yields a net reduction in social welfare in every one of the four cases. If it were possible to obtain the necessary resources to increase one industry's output at no net social cost, as the partial equilibrium analysis implicitly assumes, then the imposition of a price discrimination scheme would increase that industry's output[99] and would generate a clear social benefit. However, once the apparent gains from increased Industry X output are netted out against the losses due to reduced Industry Y output, the Allocation Effect is negative in all cases. In more practical terms, this suggests that if a product cannot successfully attract the resources necessary for its creation under a uniform pricing rule, it should not be produced under a price discrimination scheme. Changing the legal or regulatory framework to allow first-degree price discrimination in some markets will enable less socially valuable products in those markets to draw resources away from other, more highly valued products elsewhere in the economy.

Third, once it becomes clear that the Allocation Effect is likely to prove negative, the costs of implementing a price discrimination scheme become a central issue. Despite the fact that the Deadweight Effect is positive in all cases, the negative impact of the Allocation Effect may, even in Case 1, lower the benefit of implementing a price discrimination scheme. This is most apparent in Cases 3 and 4, where the Allocation and Deadweight Effects appear to balance each other almost exactly. If the switch to a price discrimination scheme entails any significant transaction costs, that cost increase may prove sufficient to tip the balance towards a net welfare loss. Additionally, given that the Allocation Effect is invariably negative, the assurance that the value added through the creation of additional works of authorship, or by improving the quality of existing works, will necessarily cover the costs of implementing a price discrimination scheme is no longer persuasive.[100]

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99. It should be clear from the discussion that this Article focuses on output as the variety, number, or quality of creative goods from an industry, rather than output as the quantity of any particular good.

100. *See* Lunney, *supra* note 44, at 887.

D. Extending the Framework to Encompass Imperfect Price Discrimination

Even with the advent of interactive digital distribution, perfect or first-degree price discrimination probably remains unachievable. Interactive digital distribution may make complex licensing arrangements possible, where prices are apportioned for any number of specific uses. However, such license agreements will almost certainly remain imperfect at identifying each consumer's precise reservation value for each use. Existing partial equilibrium analyses by Katz, Roberts and Varian have already demonstrated that such imperfect (whether second- or third-degree) price discrimination schemes may reduce social welfare.[101] The graphical approach presented here may be adapted to incorporate these analyses, extend them to consider the welfare effects from increasing one industry's output (in terms of product variety), and illustrate that these analyses underestimate the welfare losses associated with price discrimination.

Existing analysis suggests that a switch from uniform pricing to price discrimination under monopoly conditions will always increase producer surplus.[102] Such a switch may, on the other hand, either decrease or increase total surplus. Using the two industry continuum of goods model and the assumptions in Case 1[103] the general equilibrium effects of imperfect price discrimination can be illustrated by considering two cases — Cases 5 and 6. Both cases assume that, as a result of a switch to an imperfect price discrimination scheme, Industry X producers capture a producer surplus that is an increased fraction of their respective goods' full social value. The cases differ, however, in that under Case 5, total surplus also increases from 75% of full social value under uniform pricing to 80% under price discrimination. In contrast, under Case 6, the switch to price discrimination in Industry X merely redistributes surplus from consumers and thus neither increases nor decreases the total surplus associated with each good produced in Industry X.

Given the assumptions of the model, if fifty units of the fixed input are allocated between the two industries and Industry X switches to imperfect price discrimination, then the resulting increase in producer surplus will lead to a reallocation of ten units of the fixed input from Industry Y to Industry X. In both cases, this reallocation reduces

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101. *See, e.g.*, Katz, *supra* note 8; K.W.S. Roberts, *Welfare Considerations of Nonlinear Pricing*, 89 ECON. J. 66 (1979); Hal R. Varian, *Price Discrimination and Social Welfare*, 75 AM. ECON. REV. 870 (1985).

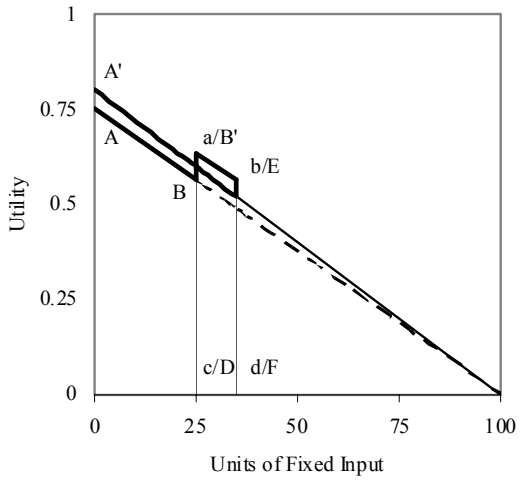
102. *See supra* Part II.A.

103. Case 1 assumed that the market for each good within an industry is a monopoly characterized by a linear, downward sloping inverse demand curve and zero marginal cost.

net social welfare, because the resources would have generated more surplus if invested in the additional Industry Y goods. However, in Case 5, where the switch also increases total surplus, the Deadweight Effect generates an increase in the surplus associated with the preexisting production level of Industry X. Whether the increase in total surplus from the Deadweight Effect will outweigh the loss in surplus from the Allocation Effect depends on the precise magnitude of the changes in producer and consumer surplus achieved through the switch to imperfect price discrimination.

For the assumptions set forth for Case 5, the welfare effects are summarized in Figure 14.

Figure 14: Case 5 —The Welfare Effects of Imperfect Price Discrimination with Increased Producer Surplus and Reduced Deadweight Loss

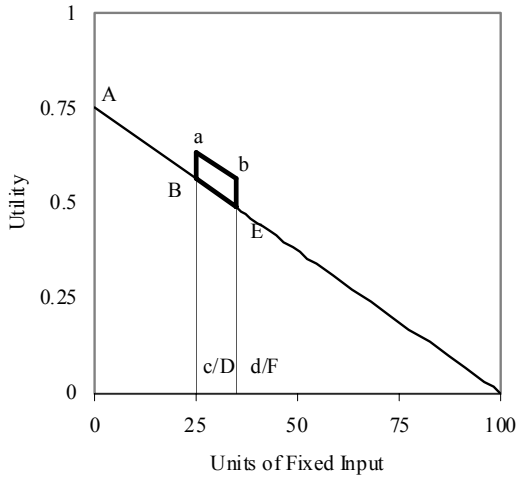


As in Cases 1 through 4, the second-best model graphically isolates the Deadweight and Allocation Effects. Given the particular assumptions made, Figure 14 suggests that the increase in surplus associated with the Deadweight Effect will likely outweigh the reduction in surplus associated with the Allocation Effect, given the particular assumptions made. However, and contrary to the partial equilibrium account, the Allocation Effect continues to be negative. A switch to price discrimination in Industry X increases Industry X output, but the re-allocated fixed input units would have generated more surplus if used to produce additional Industry Y goods.

In Case 6, where implementing a price discrimination scheme in Industry X merely redistributes surplus from consumers to the pro-

ducer, a partial equilibrium analysis suggests that the welfare effects of implementing such a price discrimination scheme are neutral — surplus is neither gained nor lost, merely transferred. However, the second-best analysis demonstrates that implementing price discrimination in Industry X under these assumptions reduces total surplus, as shown in Figure 15.

Figure 15: Case 6 — The Welfare Effects of Imperfect Price Discrimination Increased Producer Surplus and Reduced Deadweight Loss



In this case, the only effect is a reduction in total surplus from the Allocation Effect. In Figure 15, this loss is reflected in trapezoid *BabE*. Here, as elsewhere, the Allocation Effect is negative. A switch to price discrimination in Industry X increases Industry X output, but the re-allocated fixed input units would have generated more surplus if used to produce additional Industry Y goods.

E. A Final Case: Perfect Price Discrimination in Both Industries

Before leaving the continuum model, one further case deserves consideration. In all of the cases presented, this Article assumes that only one of the creative industries can (legally and technologically) move to first-degree price discrimination. But what if both of the industries were able to move to first-degree price discrimination?

There are two situations where this possibility might arise. The first situation occurs when the markets in both industries are initially subject to uniform pricing, and a legal or technological change is be-

ing considered that would allow both industries' markets to move to first-degree price discrimination — Case 7. In the second situation — Case 8 — first-degree price discrimination already exists in Industry Y, and the question is whether Industry X markets should be allowed, through legal or technological change, to move in that direction as well.

With respect to Case 7, if it is assumed that each creative good in both Industry X and Industry Y is traded in an imperfectly competitive market, as set forth in Case 2,[104] a shift from uniform pricing to first-degree price discrimination for both industries has the following effects. First, the shift eliminates the deadweight losses in both industries and thus increases welfare. The extent of the welfare increase is shown by the trapezoid *AA'B'B* in Figure 8.[105] Second, there is no Allocation Effect because no resources are reallocated from Industry X to Industry Y. Just as in Case 1 and Case 2 with uniform pricing, the available resources are distributed evenly between the two industries if both industries are able to engage in first-degree price discrimination.

If both industries can move to first-degree price discrimination, the Allocation Effect is not negative for the first time in the second-best analysis. Instead, it is zero.

While not negative, the supposed gains from encouraging the production of additional works touted by the partial equilibrium story remain illusory. In this case, there is no Allocation Effect because the fraction of the full social value captured by producers as surplus is identical in the two industries, whether the markets rely on uniform pricing,[106] or are subject to first-degree price discrimination.[107] In either situation, the available common resource is efficiently allocated between the two industries. For that reason, a move to first-degree price discrimination does not reallocate the common resource or lead to more and better works from Industry X. Consequently, the welfare effects of switching to first-degree price discrimination in both industries depend solely on the relative magnitude of the Deadweight Effect and the transaction costs incurred to implement the price discrimination scheme.

Case 8, where first-degree price discrimination already exists in Industry Y, is the first case that duplicates the results of the partial equilibrium analysis. If Industry Y is already engaging in first-degree price discrimination and legal or technological changes would allow

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104. If both industries are more monopolistic, the Deadweight Effect in each industry would be somewhat larger, corresponding to the trapezoid *AA'B'B* in Figure 6, *supra* p. 421. The Allocation Effect would remain zero.

105. *See* Figure 8, *supra* p. 424.

106. In this case, the producer surplus is one-half the full social value of each good in Case 1, or four-ninths the full social value of each good in Case 2.

107. In this case, the producer surplus is 100% of the full social value of each good.

Industry X to engage in first-degree price discrimination, the Allocation Effect would be positive,[108] precisely as the partial equilibrium analysis suggests. Thus, if all markets for creativity other than the one at issue are already able to price discriminate perfectly, then the partial equilibrium analysis would have real world significance. More realistically, since first-degree price discrimination is only a theoretical concept, showing that other creative markets are more able to price discriminate than the market at issue would be sufficient. If this can be shown, then it becomes plausible that the additional incentives that allowing more, or more precise, price discrimination in a particular creative market would generate would likely yield a net increase in social welfare along the lines that a partial equilibrium analysis would suggest.[109]

F. A Comparison of the Partial and More General Equilibrium Results

In the case where first-degree price discrimination is allowed in one but not all markets, the partial and the more general equilibrium models reach fundamentally different conclusions regarding the desirability of first-degree price discrimination in any given market. The models reach such different conclusions because they rely on fundamentally different assumptions regarding the opportunity cost associated with the production lost in the other markets not engaging in price discrimination. In particular, a partial equilibrium analysis assumes that all other markets are complete and perfectly competitive. Given this assumption, there is no gap between social and private value (or cost) at the margins. Instead, in theory, all benefits and costs are fully internalized such that for the marginal goods, marginal cost equals marginal benefit equals price in all markets but those for copyrighted works. As a result, when resources are drawn away from other industries to produce more copyrighted works, the price of those resources fully reflects the marginal social value of their other potential uses. Therefore, the net social opportunity cost of reducing output in other industries is zero, and the surplus associated with increased production of copyrighted works represents a direct increase in social welfare.

In contrast, a second-best equilibrium analysis expressly assumes that other markets are also likely to prove imperfect. Just as there is a gap between private and social value for creative copyrighted works, a

108. In fact, the Allocation Effect would be identical in size to the Allocation Effect shown for each case in Figures 6, 8, 11, and 13, but would be positive. *See supra* Figure 6, at p. 421; Figure 8, at p. 424; Figure 11, at p. 428; Figure 13, at p. 431.

109. I have explored such an argument as a justification for limited rights to control derivative works and public performances. *See* Lunney, *supra* note 11, at 628–53.

second-best analysis assumes that there is likely a gap between the private and social value for all creative goods, whether copyrighted or not. This gap is precisely measured by the difference between SW_u and PS_u. In these other industries, a producer can offer a price up to PS_u for the fixed input necessary to ensure a good's creation. However, so long as uniform pricing (or imperfect price discrimination) leaves some of the good's available surplus to consumers, that price is less than the good's marginal social value. As a result, when resources are drawn away from other creative industries to increase the production of copyrighted works, the price of those resources does not fully reflect the social cost of the reallocation. Consequently, the net social cost of reducing creative output in non-copyrighted markets is not zero and this opportunity cost must be taken into account. When this is done under any realistic set of assumptions, the surplus gained from increased output of copyrighted works is more than offset by the surplus lost due to reduced output in the creative, but uncopyrighted industries.

IV. EVALUATION OF EXISTING PRICE DISCRIMINATION SCHEMES IN COPYRIGHT INDUSTRIES

When measured against the conclusions from the more general equilibrium analysis in Part III.F, many of the existing price discrimination schemes commonly employed in the copyright industries seem likely to generate significant welfare losses. Generally, existing schemes seem to do little to reduce deadweight losses and entail significant costs to implement. The justification for these schemes relies heavily on the supposed welfare gain from the creation of more and better copyrighted works. The second-best analysis suggests that such price discrimination schemes are precisely those most likely to reduce social welfare.

Consider again the book publishing and film distribution examples.[110] In both cases, the price discrimination scheme is unlikely to reduce deadweight losses significantly. For example, the ability to offer physically differentiated forms of a novel may slightly reduce the ultimate price charged for the paperback; however, it will also force some consumers to wait an additional time before they can purchase the book. As a result, any reduction in deadweight loss associated with a lower paperback price is largely offset by the long delay in the paperback's availability.

A price discrimination scheme is also costly to implement, particularly in the film distribution case, which requires the creation of a repeatedly redundant distribution system. Therefore, both the book

110. *See supra* Part II.B.

publishing and film distribution schemes rely heavily on the assumption that the value added by the more and better works justifies these costs. Although such a justification is perfectly consistent with a partial equilibrium analysis, it proves to be illusory — a mere reflection of the flawed opportunity cost assumption inherent in the partial equilibrium analysis. After more realistic assumptions are employed, the supposed welfare gain from the creation of additional works becomes a welfare loss. Price discrimination can increase the incentives available for any given copyrighted work, and may thereby ensure the production of additional books and films. These works are undoubtedly of some value to society. Yet they are probably of less value than the alternative uses to which the resources necessary to create them would otherwise have been devoted.

When we move beyond these traditional analog price discrimination schemes into the digital world, courts and commentators have commonly assumed that the Internet, and interactive digital distribution more generally, will substantially expand the opportunities for price discrimination.[111] In analyzing the normative desirability of this expansion, most have acknowledged the twin advantages of reduced deadweight loss and increased incentives that the partial equilibrium analysis assigns to price discrimination. Consider Judge Easterbrook's enthusiastic embrace of price discrimination in *ProCD, Inc. v. Zeidenberg*.[112]

In that case, ProCD compiled some 3,000 telephone directories into a single digital database, SelectPhone, which it sold (or perhaps licensed) in CD form.[113] Zeidenberg purchased (or licensed) a copy of the database, downloaded the listings from it, and posted them on his website.[114] ProCD then sued Zeidenberg, alleging that his use was commercial and therefore violated a "no commercial use" restriction in the EULA accompanying the database.[115]

In deciding whether this provision of the EULA was binding on Zeidenberg under Wisconsin's version of Article 2 of the Uniform Commercial Code, Judge Easterbrook began his analysis not with the applicable legal rules, but with a parable about price discrimination:

> The database in SelectPhone[] cost more than $10 million to compile and is expensive to keep current. It is much more valuable to some users than to others. . . . [So] ProCD decided to engage in price discrimination, selling its database to the general public

111. *See, e.g.*, Fisher, *supra* note 4, at 1234–40; Meurer, *supra* note 8, at 876.
112. 86 F.3d 1447 (7th Cir. 1996).
113. *Id.* at 1449.
114. *Id.* at 1449–50.
115. *Id.*

> for personal use at a low price (approximately $150 for the set of five discs) while selling information to the trade for a higher price. . . .
>
> If ProCD had to recover all of its costs and make a profit by charging a single price — that is, if it could not charge more to commercial users than to the general public — it would have to raise the price substantially over $150. The ensuing reduction in sales would harm consumers who value the information at, say, $200. They get consumer surplus of $50 under the current arrangement but would cease to buy if the price rose substantially. If because of high elasticity of demand in the consumer segment of the market the only way to make a profit turned out to be a price attractive to commercial users alone, then all consumers would lose out — and so would the commercial clients, who would have to pay more for the listings because ProCD could not obtain any contribution toward costs from the consumer market.
>
> To make price discrimination work, however, the seller must be able to control arbitrage. . . .
>
> Instead of tinkering with the product and letting users sort themselves — for example, furnishing current data at a high price that would be attractive only to commercial customers, and two-year-old data at a low price — ProCD turned to the institution of contract. Every box containing its consumer product declares that the software comes with restrictions stated in an enclosed license. This license, which is encoded on the CD-ROM disks as well as printed in the manual, and which appears on a user's screen every time the software runs, limits use of the application program and listings to non-commercial purposes.[116]

This price discrimination parable was a curious place to begin for a variety of reasons, not the least of which is that price discrimination does not seem to have been ProCD's purpose in seeking to enforce its commercial use restriction against Zeidenberg.[117] Nonetheless, Judge

116. *Id.* at 1449–50.

117. As Michael Meurer has noted, ProCD's lawsuit was not filed to maintain its ability to price discriminate, but to stop the defendant Zeidenberg from posting the telephone listings on a website and thus enabling ProCD's consumers to obtain the product from Zeiden-

Easterbrook saw ProCD's contractual commercial use restriction as an effort to enable price discrimination and, firmly believing in the desirability of such price discrimination, enforced the license provision.[118] That doing so required both a new interpretation of legal rules governing contract formation and a narrowing of copyright's preemption doctrine[119] proved no impediment to Judge Easterbrook in his zeal to ensure ProCD's ability to price discriminate.

Yet, moving from the partial equilibrium conclusions regarding price discrimination to the more general equilibrium results makes the desirability of the supposed price discrimination scheme in *ProCD v. Zeidenberg* questionable at best. As with more traditional price discrimination schemes, the reduction in deadweight loss achieved by ProCD's attempt to price discriminate was likely small (assuming that price discrimination was ProCD's goal). Certainly, it is possible, as Judge Easterbrook speculated, that if ProCD were unable to enforce its license it might sell only to commercial users at a high price.[120] Yet, based on the facts available, it appears just as likely that ProCD would have sold to everyone at the low, ordinary consumer rate. Moreover, if the deadweight losses from ProCD's pricing scheme are objectionable, such losses could be avoided entirely by refusing to enforce the license. This refusal would allow Zeidenberg to make his copy of the ProCD telephone directory available to everyone at the low, ordinary consumer price.

Certainly, as Professor Richard Epstein has speculated, it is also possible that ProCD could not have recovered its investment without being able to price discriminate between commercial and personal use markets.[121] However, there is no evidence to support this speculation.

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berg rather than ProCD. Whether Zeidenberg intended to make a profit from his website or merely posted the information for his own amusement had no bearing on ProCD's motivation for the suit. *See* Meurer, *supra* note 9, at 78 n.83.

118. *See id.*

119. With respect to the preemption issue, Judge Easterbrook reasoned that the contractual restriction was not "equivalent" to copyright within the meaning of copyright's express preemption provision, 17 U.S.C. § 301(a) (2000), because "[a] copyright is a right against the world. Contracts, by contrast, generally affect only their parties; strangers may do as they please, so contracts do not create 'exclusive rights.'" *ProCD*, 86 F.3d at 1454. Of course, as Judge Easterbrook had already noted, the commercial use restriction appeared on the screen every time the software ran. *Id.* at 1450. If this message bound every consumer who used the software after seeing this restriction, just as Judge Easterbrook bound Zeidenberg, then ProCD's commercial use restriction would be a "right against the world" every bit as much as copyright is. Moreover, the statutory preemption standard requires the court to ask whether the state law right is "equivalent to any of the exclusive rights within the general scope of copyright," rather than whether the state law in question is "equivalent to copyright." 17 U.S.C. § 301(a). Here, the actual contract term at issue prohibited the copying of the database. Epstein, *supra* note 2, at 98. A state law right to prohibit reproduction was not only equivalent to, but identical to, one "of the exclusive rights" within the general scope of copyright — the reproduction right. 17 U.S.C. § 106(1) (2000 & Supp. V 2005).

120. *ProCD*, 86 F.3d at 1449.

121. Epstein, *supra* note 2, at 105 (noting that "any additional revenue from low-intensity users could make the difference between a profitable and a failing venture, so that limiting

More importantly, Epstein's assertion suffers from the same flawed assumption about opportunity cost to which partial equilibrium analysis inevitably leads. This fallacy emphasizes what society has to gain if ProCD invests in its SelectPhone database — the database itself and its corresponding social value — and by negative implication, what society has to lose if price discrimination is not permitted. However, such an analysis omits any consideration of what that $10 million[122] would otherwise have bought for society. After all, if the resources are not invested in this database, they will be invested elsewhere, in some other productive endeavor. As the second-best analysis demonstrates, if price discrimination is necessary to make a particular investment attractive, that is usually because those resources would be more valuable to society if used elsewhere.

Generalizing from the facts of *ProCD v. Zeidenberg* to price discrimination more generally yields similar conclusions. With respect to the first supposed advantage of price discrimination, it is unlikely that switching to price discrimination will significantly reduce the deadweight loss otherwise associated with a copyrighted work. For most works, copyright likely leads to markets that function more similarly to imperfectly competitive markets among differentiated products than to markets that function as pure monopolies.[123] As a result, the deadweight losses associated with uniform pricing are likely to be relatively small in most cases in any event. Moreover, numerous social institutions, such as libraries and video rental stores, minimize the deadweight losses uniform pricing might otherwise impose.[124] As *ProCD v. Zeidenberg* demonstrates, if excessive deadweight losses are truly problematic, they could be eliminated by narrowing or adjusting copyright law accordingly. For example, if a book publisher chooses to issue a hardcover of a new novel, copyright law could be amended or interpreted so that a paperback issued simultaneously would be considered non-infringing. This would avoid the deadweight loss that issuing a hardcover alone would otherwise generate.

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the seller to high-intensity customers reduces the likelihood that a venture will get off the ground in the first place").

122. *ProCD*, 86 F.3d at 1449.

123. For example, Landes and Posner have asserted in a single article both that "[c]opyrights . . . rarely confer monopoly power" and that "we maintain throughout our analysis the assumption of a downward-sloping demand curve for copies of a given work." William M. Landes & Richard A. Posner, *An Economic Analysis of Copyright Law*, 18 J. LEGAL STUD. 325, 327 n.4, 361 (1989). Professor Kitch has identified this inconsistency as the type of mistake often made in economic analysis of intellectual property issues. Edmund W. Kitch, 53 VAND. L. REV. 1727, 1734–35 (2000). Rather than read these two statements as a fatal contradiction, perhaps Landes and Posner were merely suggesting that copyright protection does not afford a copyright owner a full monopoly, even if it grants a copyright owner some ability to price in excess of marginal cost. *See* Christopher S. Yoo, *Copyright and Price Differentiation*, 79 N.Y.U. L. REV. 212, 218 (2004) (stating that "substitutes are readily available for most works").

124. *See* Cohen, *supra* note 8, at 1812–13.

The purported efficiency gains from increasing the producer surplus associated with any given copyrighted work — price discrimination's second supposed advantage — are simply an illusion. Once the unrealistic assumptions behind partial equilibrium analysis are abandoned, the trade-offs created by allowing price discrimination in one sector of the economy are apparent. Price discrimination for books and films may result in more books and films, but the resources used to produce them cannot then be used for other purposes. Thus, more price discrimination for copyrighted works may mean more of those works, but it also necessarily means less of something else. Once the unrealistic assumption that all other markets are complete and perfectly competitive is abandoned and a more realistic set of assumptions is embraced, the most reasonable conclusion is that the additional works of authorship generated by price discrimination are likely to prove less valuable to society than the uses to which the resources would otherwise have been devoted.

Finally, even in the digital world, price discrimination schemes are likely to prove expensive to implement. Although physically differentiated products are not strictly required in a digital environment,[125] producers still need to monitor and police consumers' use of their works to ensure the desired market separation. In some cases, monitoring and policing may be relatively easy, as in *ProCD v. Zeidenberg* where the defendant Zeidenberg posted the ProCD database on the Internet and offered the database to his subscribers.[126] In other cases, policing consumer use may prove extremely difficult, as in a case where an individual uses the ProCD database to look up a telephone listing for a business call, but does so in the privacy of her office. Even the most sophisticated DRM system could not determine the purpose, whether personal or professional, behind a consumer's use of the database in such a case.

In short, price discrimination schemes for copyrighted works, whether in the analog or digital world, are unlikely to advance social welfare. To the contrary, by transferring what would otherwise be consumer surplus to producers, price discrimination schemes will attract too much creativity and other scarce resources into the production of copyrighted works, and thereby generate a net reduction in social welfare. This suggests that copyright doctrine should be adjusted accordingly by giving broader scope to those aspects of copyright that can limit copyright owners' ability to price discriminate,[127]

125. For example, in one early attempt at price discrimination in a digital environment, a computer manufacturer offered the same version of a computer to all of its consumers, but then required the consumers to pay an additional fee for the software necessary to unlock features built into the computer. *See* Hubco Data Prods. Corp. v. Mgmt. Assistance, Inc., No. 81-1295, 1983 WL 1130, at *1–4 (D. Idaho Feb. 3, 1983).

126. *ProCD*, 86 F.3d at 1450.

127. This includes the fair use, first sale, and preemption doctrines.

while giving a narrower scope to those aspects that promote price discrimination.

For example, while concerns over unauthorized copying may justify a limit on the first sale doctrine,[128] expanding the ability to price discriminate cannot provide such a justification. Because the welfare effect from allowing price discrimination will likely prove negative, courts and regulators should undertake a balancing test before acting to limit the availability and applicability of the first sale doctrine in the digital environment. This test would balance any welfare gains from limiting unauthorized copying against the welfare loss that will likely result from expanding opportunities to price discriminate. Similarly, even if it became practicable to enforce, Congress should not amend the Copyright Act to expressly incorporate a right of private performance.[129] Recognizing a right of private performance would be undesirable precisely because it enhances the ability of copyright owners to price discriminate. For the same reasons, courts should read copyright's fair use and preemption doctrines broadly enough to prevent a copyright owner from implementing such a right through contract and technological means.

V. MORE GENERAL SECOND-BEST IMPLICATIONS

This Article highlights several important issues. As noted previously, assumptions are critical in economic analyses, and second-best analysis is messy. Absent detailed information about the markets at issue, second-best models can generate frustratingly ambiguous, "maybe yes, maybe no" answers. This ambiguity contrasts sharply with the usually simple and clear conclusions reached using first-best or partial equilibrium analysis. Unfortunately, as this Article illustrates, partial equilibrium's simple clarity can come at the expense of accuracy. This is not to say that partial equilibrium analysis does not have its uses. All models, economic or otherwise, must necessarily simplify the real world situation they examine. But simplifying requires assumptions; as this analysis of price discrimination has demonstrated, sometimes the failure to recognize the significance of a choice between different simplifying assumptions can lead to material errors.

When assumptions control conclusions, the assumptions necessary for the conclusions must be defensible. This Article's price discrimination analysis rests on two starting assumptions: (1) markets for copyrighted works likely function more as a form of imperfect or mo-

128. As discussed, Congress has limited the scope of the first sale doctrine for copyrighted sound recordings and computer programs. *See supra* note 55 and accompanying text.

129. *See supra* text accompanying notes 61–64.

nopolistic competition, rather than as pure monopolies; and (2) the additional creativity needed to produce more and better works of authorship likely comes from other creative sectors. These assumptions are ultimately empirical propositions that can be tested and proven by reference to real world markets. For now, it seems reasonable to assume that additional authorship will come from other creative fields — fields that also generate positive externalities, fields where imitation and copying are common, and fields where the markets are neither complete nor perfectly competitive — rather than from non-creative fields that come closer to the assumptions of the partial equilibrium model.

To some extent, second-best analysis is useful precisely because it generates ambiguities. As the various cases set forth in this Article suggest, second-best analysis inevitably produces conclusions along the lines of "if this is true, then the welfare consequences of this change are *x*," but "if something else is true, then the welfare consequences are *y*." By tying particular conclusions to particular assumptions and by making those assumptions explicit, second-best analysis focuses attention on the key issue of which set of assumptions most accurately reflects the real world.

In contrast, partial equilibrium analysis tends to conceal its necessary assumptions. For example, when Landes and Posner used a partial equilibrium model to analyze copyright, they never explained the underlying assumptions essential to partial equilibrium analysis.[130] Perhaps, they expected that every reader would be familiar with the underlying assumptions. Since they never expressly stated the assumption that the additional resources needed to create more and better works of authorship were coming from complete and perfectly competitive (and therefore, necessarily uncreative) sectors of the economy, some readers may have remained unaware of that essential assumption. Moreover, because they never stated it, the authors never had to defend the assumption, nor did they have to explain how it affects their various conclusions. This lack of transparency is not unique to Landes and Posner, but ubiquitous to law and economic analyses that rely on partial equilibrium models.[131] Everyone knows the saying "garbage in, garbage out." Unfortunately, partial equilibrium analysis tends to hide the "garbage in," making it harder to recognize the garbage coming out.

In addition to the importance of making assumptions both explicit and accurate, the second-best analysis of price discrimination also reminds us that the ability to pay more for creativity as a common resource does not reliably indicate a correspondingly higher social value. This increased ability to pay could reflect a higher social value,

130. *See* Landes & Posner, *supra* note 123, at 333–44.
131. *See* Kitch, *supra* note 123, at 1734–35.

but it could also mean that one use captures a larger share of its associated marginal social value in the form of producer surplus. Being a popular author may pay significantly more than being a great teacher, but that does not indicate which activity creates a higher marginal social value. The higher pay simply indicates which activity has more complete markets surrounding it and is therefore better able to monetize the social value created.

The markets with which copyright surrounds works of authorship are not complete and hence do not ensure that a rights holder captures all of the marginal social value of his work. Such perfect appropriability is unobtainable and is theoretically ideal only under a set of implausible assumptions.[132] If the copyright industry competes for the resources necessary to create more and better works primarily with other creative sectors of the economy, then the key to optimal resource allocation is not perfect appropriability, but relative appropriability — just as the issue elsewhere is not externality, but relative externality, or is not free riding, but disproportionate free riding.[133] From an efficiency perspective, copyright reaches its optimal scope when it ensures that the creativity invested in copyrighted works roughly captures as much of the associated marginal social value as do competing uses of the creativity. Capturing any more will result in too much creativity being devoted to the production of copyrighted works and too little being left for other creative sectors of the economy.

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132. Professor Wagner recognizes the inevitable fact of incomplete appropriability:

> Notwithstanding efforts to the contrary, information cannot truly be controlled, at least not in the way that the control-critics suggest. That is, the "fencing" of information is a remarkably futile proposition; the control we offer owners of intellectual property rights is simply not the control we offer landowners. It should not be, but more importantly, it *cannot* be.

R. Polk Wagner, *Information Wants to Be Free: Intellectual Property and the Mythologies of Control*, 103 COLUM. L. REV. 995, 999 (2003). However, in his subsequent analysis, Professor Wagner entirely misses the normative implications of incomplete appropriability in his subsequent analysis. *Id.* at 1017–24 (using both a partial equilibrium analysis and one that ignores uniformity costs to model the costs and benefits of expanded intellectual property rights).

133. In his dissent in *Leegin Creative Leather Products v. PSKS, Inc.*, 127 S. Ct. 2705 (2007), Justice Breyer takes a key step towards recognizing that the analogous efficiency question with respect to free riders is best answered not by asking whether there is any degree of free riding, but by asking whether there is disproportionate free riding in a particular context. Breyer states:

> There is a consensus in the literature that "free riding" takes place. But "free riding" often takes place in the economy without any legal effort to stop it. Many visitors to California take free rides on the Pacific Coast Highway. We all benefit freely from ideas, such as that of creating the first supermarket. Dealers often take a "free ride" on investments that others have made in building a product's name and reputation. The question is how often the "free riding" problem is serious enough significantly to deter dealer investment.

Id. at 2729.

Compared to the markets which surround other creative investments, the rights associated with copyright already ensure more complete markets for the creativity embodied in works of authorship. The rights copyright provides are both extremely broad and absurdly long,[134] protecting against essentially every unauthorized use of the work that makes, or could make, money.[135] While there are exceptions to copyright's broad scope, such as the idea-expression dichotomy and the fair use doctrine, the resulting markets surrounding copyrighted works are far more complete than those surrounding other creative investments. As a result, copyright's existing scope has probably already led to the overproduction of copyrighted works.

Legal or technological change that enables copyright owners to price discriminate either more often or more perfectly will only exacerbate this overproduction problem. An increased ability to price discriminate will increase producer surplus for any given work, increase the incentives for the production of copyrighted works, and thereby attract even more creativity to the production of copyrighted works. This increase does not indicate that such additional works are the more valuable use of the resources. Rather, it merely indicates that copyright enables the rights holder to capture a larger fraction of the resulting marginal social value for works of authorship than for the competing creative but uncopyrighted uses. As a result, the additional incentives that price discrimination provides compared to uniform pricing may lead to more and better works, but producing these works will generate a net welfare loss for society as a whole. But for the price discrimination, the resources necessary to produce them would have been used to produce more valuable creative goods elsewhere in the economy.

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134. At the moment, copyright lasts for the life of the author plus seventy years, or ninety five years for anonymous works and works made for hire. 17 U.S.C. § 302(a), (c) (2000) Furthermore, at any time, Congress is free to extend that duration, even for existing works, subject only to the nearly nonexistent burden of satisfying rational basis scrutiny. *See* Eldred v. Ashcroft, 537 U.S. 186, 204–05 (2003). This compares to an initial term of no more than twenty-eight years in the original United States Copyright Act. *See* Act of May 31, 1790, ch. xv, § 1, 1 Stat. 124. Compared to this nearly seventy year expansion in the copyright term, the term for a patent has expanded over the same time period by only six years, from an original term of fourteen years to the present term of twenty years. *Compare* Act of Apr. 10, 1790, ch. vii, § 1, 1 Stat. 110, 111, *with* 35 U.S.C. § 154(a)(2) (2000).

135. *See, e.g.*, Benny v. Loew's, Inc., 239 F.2d 532, 534 (9th Cir. 1956) (explaining that copyright extends "to any lawful use of their property, whereby they may get a profit out of it"), *aff'd sub nom.* Columbia Broad. Sys., Inc. v. Loew's, Inc., 356 U.S. 43 (1958).

APPENDIX: FORMAL PROOF THAT PERFECT PRICE DISCRIMINATION IS NOT NECESSARILY PARETO EFFICIENT IN A SECOND-BEST WORLD

While the two good discrete model and the two industry continuous model both illustrate the fact that allowing perfect price discrimination in one market may not increase social welfare in a second-best analysis, we can also prove the point formally.[136] Consider first the model used to prove that private production of public goods will not usually prove Pareto efficient. Suppose that there is an economy with two goods: a private good (*X*), and a nonexcludable, nonrival pure public good (*G*). Suppose further that the existing production technology allows transformation of one unit of labor, *L*, into either one unit of *X* or one unit of *G*.

In a two consumer economy,[137] where each consumer, *i*, has an initial labor endowment, l_i, each consumer seeks to maximize her utility function $u^i(x_i, G)$, where $G = g_1 + g_2$,[138] subject to her budget constraint, $l_i = x_i + g_i$. Assuming that the utility function is well-behaved,[139] to obtain a Pareto efficient allocation of the available labor, we solve:

$$\underset{\{x_1,\, x_2,\, G\}}{\text{Max}} \quad u^1(x_1, G) \qquad (1)$$

Subject to:

$$u^2(x_2, G) = \bar{u}^2$$

where $\bar{u}^2$ is some constant level of utility for consumer 2 and

$$x_1 + x_2 + G = l_1 + l_2 \text{ (the budget constraint).}$$

Using the Lagrange multiplier technique to solve, we write the Lagrangean:

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136. *See supra* Part III.B–C.

137. The model can be readily extended to *N* consumers.

138. Because *G* is a pure public good, each consumer receives not only the benefit of her own purchase of the public good, g_i, but the benefit of the other consumer's purchase as well.

139. To solve the model, we must assume that the utility function is strictly quasi-concave. Thus, $u_x^i \equiv \frac{\partial u^i}{\partial x_i} > 0$ and $u_G^i \equiv \frac{\partial u^i}{\partial G} > 0$.

$$L = u^1(x_1, G) + \lambda(u^2(x_2, G) - \bar{u}^2) + \mu(l_1 + l_2 - x_1 - x_2 - G) \quad (1a),$$

where λ and μ are the Lagrangean multipliers.

Taking the partial differential of the Lagrangean for our three variables, we find:

$$\frac{\partial L}{\partial x_1} \Rightarrow u^1_{x_1} = \mu\,; \quad (2a)$$

$$\frac{\partial L}{\partial x_2} \Rightarrow \lambda u^2_{x_2} = \mu\,; \text{ and} \quad (2b)$$

$$\frac{\partial L}{\partial G} \Rightarrow u^1_G + \lambda u^2_G = \mu\,. \quad (2c)$$

We can rewrite (2c) as $\frac{u^1_G}{\mu} + \frac{\lambda u^2_G}{\mu} = 1.$ Substituting for μ, using (2a) and (2b), the Pareto efficient solution is defined by:

$$\frac{u^1_G}{u^1_{x_1}} + \frac{u^2_G}{u^2_{x_2}} = 1\,. \quad (3)$$

Equation (3) represents the well-known Samuelson condition.[140] To achieve a Pareto efficient outcome in the case of a pure public good, the summation of each individual consumer's marginal rate of substitution, or $\sum \frac{u^i_G}{u^i_x}$, must equal the marginal rate of transformation of x into G, which was assumed to be 1 at the outset.

To see that markets will not usually achieve an efficient level of production of public goods, we can compare the Samuelson condition to the Nash equilibrium that each consumer acting on her own, to maximize her own welfare, would achieve. Instead of solving (1), each consumer in this case would solve her individual welfare maximization problem:

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140. Paul Samuelson initially identified this condition in a pair of articles. *See* Paul A. Samuelson, *Diagrammatic Exposition of a Theory of Public Expenditure*, 37 REV. ECON. STATS. 350 (1955); Paul A. Samuelson, *The Pure Theory of Public Expenditure*, 36 REV. ECON. STATS. 387 (1954).

$$\underset{\{x_i,\, G\}}{\text{Max}} \quad u^i(x_i, G) \tag{4}$$

Subject to:
$$x_i + g_i = l_i;$$
$$G = g_1 + g_2; \text{ and}$$
$$g_i \geq 0.$$

Substituting for x_i and G, we can rewrite (4) in terms of g as:

$$\underset{\{g_i\}}{\text{Max}} \quad u^i(l_i - g_i, g_1 + g_2) \tag{4a}$$

Taking the differential of (4a) for consumer 1 and assuming that consumer 1 purchases at least some of the public good, yields: $-u_x^1 + u_G^1 = 0$, or $\frac{u_G^1}{u_x^1} = 1$. By the same logic, $\frac{u_G^2}{u_x^2} = 1$. In other words, both consumers will purchase (or invest labor in producing) additional units of the public good until the marginal rate of substitution of the public good for the private equals the marginal rate of transformation.

The Nash equilibrium (g_1^N, g_2^N) will thus satisfy:

$g_1^N + g_2^N = G^N$, with $g_1^N > 0$ and $g_2^N > 0$, and $\frac{u_G^1}{u_x^1} = \frac{u_G^2}{u_x^2} = 1.$

But we know that this is not Pareto efficient because it violates the Samuelson condition. Instead of the sum of the marginal rates of substitution for all consumers equaling the marginal rate of transformation, as required by the Samuelson condition, in the Nash equilibrium, *each* consumer's marginal rate of substitution equals the marginal rate of transformation.

So much is well established in the economics literature.[141] The literature also establishes that we can achieve a Pareto efficient outcome in the production of the public good by enabling perfect price discrimination with respect to the public good.[142] In this context, perfect price discrimination creates personalized markets for the public good, where each consumer's consumption of the public good becomes a distinct commodity with its own market and its own price. If it could be achieved, the resulting equilibrium, known as a Lindahl equilib-

141. *See, e.g.*, MAS-COLELL ET AL., *supra* note 19, at 359–64.
142. *See, e.g.*, *id.*

rium, would essentially convert the public good into a private good and ensure a Pareto efficient outcome.[143]

However, we reach quite different conclusions if, instead of providing each consumer with an initial allocation of labor, l_i, that can be used to produce either a private or a public good, we model the same two good, two consumer economy, but provide each consumer with an initial allocation of creativity, c_i, that can be used only to produce two different public goods, *G* and *H*.

In such a case, we find the Nash equilibrium where each consumer solves:

$$\underset{\{H,\,G\}}{\text{Max}} \quad u^i(H,G) \tag{5}$$

Subject to:

$$h_i + g_i = c_i;$$
$$G = g_1 + g_2;$$
$$g_i \geq 0;$$
$$H = h_1 + h_2; \text{ and}$$
$$h_i \geq 0;$$

Substituting for *H* and *G*, we can rewrite (5) in terms of *g* as:

$$\underset{\{g_i\}}{\text{Max}} \quad u^i(c_1 - g_1 + c_2 - g_2, g_1 + g_2) \tag{5a}$$

Taking the differential of (5a) for consumer 1 and assuming that consumer 1 purchases at least some of each public good yields: $-u_H^1 + u_G^1 = 0 \Rightarrow u_H^1 = u_G^1$, or $\frac{u_G^1}{u_H^1} = 1$. By the same logic, $u_H^2 = u_G^2$, or $\frac{u_G^2}{u_H^2} = 1$.

The Nash equilibrium (G^N) for Equation (5) will thus satisfy: $g_1^N + g_2^N = G^N$, with $c_1 > g_1^N > 0$ and $c_2 > g_2^N > 0$, $H^N = c_1 + c_2 - G^N$, and $\frac{u_G^1}{u_H^1} = \frac{u_G^2}{u_H^2} = 1$.

143. *See* E. Lindahl, *Just Taxation — A Positive Solution*, *in* CLASSICS IN THE THEORY OF PUBLIC FINANCE 152, 168–76 (Richard A. Musgrave & Alan T. Peacock eds., Elizabeth Henderson trans., 1958); *see also* Jean-Claude Milleron, *Theory of Value with Public Goods: A Survey Article*, 5 J. ECON. THEORY 419, 436–51 (1972); MAS-COLELL ET AL., *supra* note 19, at 363–64, 569–70.

While the marginal rate of substitution in this solution looks similar to the problematic one in the private-public good model, to see whether this Nash equilibrium is Pareto efficient, we must solve:

$$\underset{\{H,\,G\}}{\text{Max}} \quad u^1(H,G) \tag{6}$$

Subject to: $u^2(H,G) = \bar{u}^2$ where $\bar{u}^2$ is some constant level of utility for consumer 2; and $H + G = c_1 + c_2$ (the budget constraint).

As we did for Equation (1), we use the Lagrange multiplier technique to solve and write the Lagrangean:

$$L = u^1(H,G) + \lambda(u^2(H,G) - \bar{u}^2) + \mu(c_1 + c_2 - H - G) \tag{6a}$$

where λ and μ are the Lagrangean multipliers, though they are not necessarily identical in value to those in Equation (1a).

Taking the partial differential of the Lagrangean for our two variables, we find:

$$\frac{\partial L}{\partial H} \Rightarrow u_H^1 + \lambda u_H^2 = \mu \text{; and} \tag{7a}$$

$$\frac{\partial L}{\partial G} \Rightarrow u_G^1 + \lambda u_G^2 = \mu. \tag{7b}$$

Setting the left-hand side of equations (7a) and (7b) equal to each other, and rewriting to combine terms, a Pareto efficient outcome must satisfy:

$$u_H^1 - u_G^1 = \lambda(u_G^2 - u_H^2). \tag{7c}$$

While we do not know the value of the Lagrangean multiplier λ and cannot therefore fully identify the Pareto efficient solutions, we do know that in this case, the Nash equilibrium is one such Pareto efficient solution. Because any Nash equilibrium to the two public good model requires that $u_H^1 = u_G^1$ and $u_H^2 = u_G^2$, the equality set forth in Equation (7c) for a Pareto efficient outcome will necessarily hold for every Nash equilibrium solution.

As a result, where we have a resource such as creativity that must be allocated between one of two (or more) public goods, the Nash

equilibrium will be Pareto efficient. Moreover, in this second-best context, if we were to rewrite the legal rules to enable perfect price discrimination with respect to one of the public goods, but because of technological or other limitations could not do so for the other, the ensuing Nash equilibrium would no longer be Pareto efficient. Indeed, such a move would essentially re-create the one private-one public good model and its associated inefficiencies.

So far, we have formally modeled the efficiency consequences of switching to perfect price discrimination in cases involving one private and one public good, and two public goods. A final case that merits consideration is the one private, two public goods case. To the extent that a creative person may, depending on the relative returns available, choose to engage in either creative or uncreative labor, a one private, two public goods model may be the one that most closely corresponds to real world conditions.

For such a one private-two public goods model, it can be shown that Pareto efficiency requires that $\sum \frac{u_G^i}{u_x^i} = \sum \frac{u_H^i}{u_x^i} = 1$. In other words, the Samuelson condition must be satisfied for both public goods, such that the sum of the consumers' marginal rates of substitution for each public good equals the marginal rate of transformation. Similarly, it can also be shown that a Nash equilibrium requires

$$\frac{u_G^1}{u_x^1} = \frac{u_G^2}{u_x^2} = \frac{u_H^1}{u_x^1} = \frac{u_H^2}{u_x^2} = 1,$$

and is thus not Pareto efficient. It would therefore represent a Pareto improvement if we could implement perfect price discrimination for both public goods.

But what if we could implement perfect price discrimination for only one of the public goods? Surely, that represents a step in the right direction — one more condition for Pareto optimality fulfilled — and should prove welfare enhancing. Unfortunately, that cannot be established as a general proposition. This is precisely the point that Lipsey and Lancaster proved more than fifty years ago:

> [I]t is not true that a situation in which more, but not all, of the optimum conditions are fulfilled is necessarily, or is even likely to be, superior to a situation in which fewer are fulfilled. It follows, therefore, that in a situation in which there exist many constraints which prevent the fulfillment of the Paretian optimum conditions, the removal of any one con-

> straint may affect welfare or efficiency either by raising it, by lowering it, or by leaving it unchanged.[144]

Consider again the one private-two public goods model. Let G^P, H^P, and x_i^P be a Pareto efficient solution, and G^N, H^N, and x_i^N be a Nash solution. Given that the marginal rate of substitution of G for x equals the marginal rate of transformation for each consumer in the Nash solution, and that the sum of the marginal rates of substitution for all consumers equals the marginal rate of substitution in the Pareto efficient solution, $\frac{u^i_{G^N}}{u^i_{x^N}} > \frac{u^i_{G^P}}{u^i_{x^P}}$. For this to be true, given the assumption that the utility functions are well-behaved, $G^P > G^N$, $x_i^N > x_i^P$, and by the same reasoning, $H^P > H^N$. This replicates the familiar result and shows that the two public goods will be underproduced in the private market.

Assume that technology or the law changes to enable perfect price discrimination for G, so that we satisfy the Samuelson condition with respect to good G, $\sum \frac{u^i_G}{u^i_x} = 1$, but not for H, so that $\frac{u^1_H}{u^1_x} = \frac{u^2_H}{u^2_x} = 1$ continues to hold, and let G^n, H^n, and x_i^n be the resulting Nash solution. In order to satisfy the Samuelson condition, $G^n > G^N$, reflecting the expected increase in the production of G. However, given the budget constraint, increasing the production of G must mean reduced production of both x_i and H, thus $H^n > H^N$ and $x_i^n < x_i^N$. This result follows so long as we treat H as an uncorrected public good market, in which case

$$\frac{u^1_H}{u^1_x} = \frac{u^2_H}{u^2_x} = 1,$$

for both H^n and H^N.[145] Moreover, given the Nash solution criteria for H, $H^n < H^N < H^P$. Consequently, $x_i^P < x_i^n < x_i^N$ and $G^n > G^P > G^N$.

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144. Lipsey & Lancaster, *supra* note 14, at 12.

145. As a result, if either H or x_i falls compared to the one private-two public good case, then the other must fall as well for the Nash equilibrium condition for good H to continue to hold.

Given this outcome, we cannot determine whether enabling perfect price discrimination with respect to good *G* increased or decreased any consumer's utility, compared to the utility achieved without price discrimination. The switch increases *G*'s production relative to *x*, but it also increases *G*'s production relative to *H* as well. While the first is desirable, the second is not. Good *H* was already underproduced. Enabling perfect price discrimination for good *G* overcorrects for the underproduction problem with respect to good *G*, further distorting the market for good *H*. Whether such a switch would enhance the welfare of any consumer cannot be determined in the abstract, but depends entirely upon the market conditions actually present.