# AN INDUSTRIAL ORGANIZATION APPROACH TO COPYRIGHT LAW

MICHAEL ABRAMOWICZ*

## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INTRODUCTION</strong></td>
<td>35</td>
</tr>
<tr>
<td><strong>I. COPYRIGHT AND THE ECONOMICS OF PRODUCT DIFFERENTIATION</strong></td>
<td></td>
</tr>
<tr>
<td>A. The Salop Model</td>
<td>48</td>
</tr>
<tr>
<td>1. The Setup</td>
<td>48</td>
</tr>
<tr>
<td>2. The Results</td>
<td>52</td>
</tr>
<tr>
<td>3. The Counterintuition: Pecuniary Externalities</td>
<td>55</td>
</tr>
<tr>
<td>B. Modifying the Salop Model</td>
<td>58</td>
</tr>
<tr>
<td>1. Variability in Consumer Surplus</td>
<td>59</td>
</tr>
<tr>
<td>2. Additional Modifications</td>
<td>63</td>
</tr>
<tr>
<td>3. A Simulation Study</td>
<td>67</td>
</tr>
<tr>
<td><strong>II. ADDITIONAL ECONOMIC AND NONECONOMIC CONSIDERATIONS</strong></td>
<td></td>
</tr>
<tr>
<td>A. Other Economic Considerations</td>
<td>68</td>
</tr>
<tr>
<td>1. Distribution</td>
<td>68</td>
</tr>
<tr>
<td>a. Producers vs. Consumers</td>
<td>69</td>
</tr>
<tr>
<td>b. Winner-Take-All Markets</td>
<td>71</td>
</tr>
<tr>
<td>c. Positional Goods</td>
<td>77</td>
</tr>
</tbody>
</table>

* Associate Professor of Law, George Washington University. J.D., Yale Law School; B.A., Amherst College. For research support, I would like to thank the Law and Economics Center at the George Mason University School of Law, as well as the George Washington University Law School. For excellent comments and suggestions, I thank workshop participants at the George Mason University Department of Economics, George Washington University Law School, University of Texas School of Law, University of Virginia School of Law, and William and Mary School of Law, as well as Amitai Aviram, David Bernstein, Elizabeth Chorvat, Terrence Chorvat, Lloyd Cohen, Shubha Ghoah, Jack Hirshleifer, Richard Ippolito, Eugene Kontorovich, Michael Krauss, Michael Meurer, Kimberly Moore, Thomas Nachbar, Mark Nadel, Dan Polsby, Richard Posner, Maxwell Stearns, Moin Yahya, and Todd Zywicki. For research assistance, I thank Melissa Jensen.
2. Externalities ....................................................... 80
   a. Information Externalities .................................. 80
   b. Congestion Externalities .................................... 82
   c. Network Externalities ...................................... 86
B. Differentiation and Democracy .................................. 88
   1. Democracy vs. Economics .................................... 89
   2. A Democratic Assessment of Production Incentives .... 94

III. APPLICATIONS AND IMPLICATIONS ............................... 97
A. Applications ....................................................... 97
   1. Peer-to-Peer Technology .................................... 97
   2. The Copyright Term ......................................... 103
B. Implications ....................................................... 104
   1. Copyright and Distributive Justice ....................... 104
   2. Copyright Across Time ...................................... 108

CONCLUSION ............................................................ 110
APPENDIX .............................................................. 112
Copyright law's paramount goal is often said to be the provision of incentives for producing new works, yet the literature on copyright offers few concrete examples of how any legislatively plausible changes in copyright law would have meaningful effects on the variety of copyrighted works available to consumers. Those who favor restricting copyright's scope or duration note that authors necessarily build on the works of their predecessors. Because copyright law does not protect ideas, however, they can point only to peripheral categories of works that copyright law stymies, such as counter-culture Mickey Mouse cartoon strips or digital sampling of existing works. Meanwhile, those who defend copyright and seek

---

1. See, e.g., Twentieth Century Music Corp. v. Aiken, 422 U.S. 151, 156 (1975) ("[T]he ultimate aim is, by [copyright law's] incentive, to stimulate artistic creativity for the general public good."); 1 Paul Goldstein, Copyright § 1.0 (2d ed. 1996) (stating that copyright law attempts to "encourage[ ] the production of the widest possible array of literary, musical and artistic works"); Stephen Breyer, The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies, and Computer Programs, 84 Harv. L. Rev. 281, 291-321 (1970) (providing a seminal economic analysis of whether copyright is necessary to provide adequate incentives to create works); Joseph P. Liu, Copyright and Time: A Proposal, 101 Mich. L. Rev. 409, 428 (2002) ("The primary policy justification for copyright protection in the United States is the incentive justification.").


5. See generally Randy S. Kravis, Comment, Does a Song by Any Other Name Still Sound as Sweet?: Digital Sampling and Its Copyright Implications, 43 Am. U. L. Rev. 231 (1993) (discussing the copyright implications of digital sampling); Thomas C. Moglovkin, Note, Original Digital: No More Free Samples, 64 S. Cal. L. Rev. 135 (1990) (same).
to extend it bemoan the decline in profits that record companies have suffered and that Hollywood may face. Yet they do not name the musical groups that may be sent over the edge into bankruptcy or the movies that would not have been made if anticipated sales were slightly lower, and with good reason. In general, the works on the borderline of being created are not the ones that consumers would care about the most, and the outcome of contemporary debates about copyright law’s scope will impact only those marginal works. It would thus be easy to conclude that debates on copyright law, though perhaps a useful form of intellectual exercise, matter only a bit in the real world.

Such a conclusion, however, would be unwarranted. Copyright theorists often consider trade-offs between incentives to produce new works and other values, in particular maximizing dissemination of existing works to users, a trade-off that is sometimes called


7. See, e.g., Ronald Grover & Heather Green, The Digital Age Presents Hollywood Heist: Will Tinseltown Let Techies Steal the Show?, BUS. WK., July 14, 2003, at 73, 76 (reporting that Hollywood executives are concerned that the movie industry may suffer the same loss of profits suffered by the music industry).

8. Alireza Naghavi and Günther Schulze offer the following recent summary of the conventional wisdom:

For a welfare assessment of copyright protection, the negative static effects of copyright protection need to be weighed against its positive dynamic effects. The static effect is that the protected artistic product or the intellectual property receives only suboptimal-dissemination, i.e. it is underconsumed. Given that a product has been produced, it is optimal from a welfare point of view to sell it at its marginal cost, which is typically very low.... Copyright protection puts the producer in a monopolistic situation for the duration of the copyright thereby ensuring positive profits. This establishes an incentive to produce innovations, but at the same time reduces consumption compared to a non-monopolistic situation. The optimal copyright protection balances the effect of increased incentives to produce market innovations from higher protection against the reduced consumption from it at the margin.

Alireza Jay Naghavi & Günther G. Schulze, Bootlegging in the Music Industry: A Note, 12 EUR. J.L. & ECON. 57, 62-63 (2001); see also Liu, supra note 1, at 429 (“Roughly speaking,
the incentives-access paradigm. An expansive doctrine of fair use, for example, may allow users greater access to copyrighted works, but any expansion will decrease incentives to produce new works. Yet there have been few attempts to make the trade-off any more precise. In particular, scholars have not considered whether this trade-off is the same regardless of the number of works that copyright law generates. This Article argues that the greater the success of copyright law in generating large numbers of works, the more copyright law should care about access. Just because incentives are the paramount goal of the copyright system as a whole does not mean that they are the most important consideration at the margins.

Copyrighted works can serve as imperfect substitutes for one another, so the more works that exist of a particular type, the greater the number of substitutes that will exist for any particular work. The importance of incentives to produce new works is less significant when the number of existing works and the chance that a new work will be largely redundant are greater. Equivalently, the goal of disseminating existing works should be of relatively great significance in markets with large numbers of copyrighted works. A world without copyright would be an impoverished one, but changes along the edges of copyright law that lead to slight reductions in the number of works produced but greater dissemi-

depending on the strength of the protection, we can have more works with more restricted access, or fewer works with broader access.


10. See, e.g., Pierre N. Leval, Toward a Fair Use Standard, 103 HARV. L. REV. 1105, 1110 (1990) ("The doctrine of fair use limits the scope of the copyright monopoly in furtherance of its utilitarian objective.... [T]he use must be of a character that serves the copyright objective of stimulating productive thought and public instruction without excessively diminishing the incentives for creativity."); Glynn S. Lunney, Jr., Fair Use and Market Failure: Sony Revisited, 82 B.U. L. REV. 975, 977 (2002) ("On the one side, a [fair use] may indirectly lead to fewer works of authorship by reducing the incentives to create such works. On the other, allowing such use to continue may directly improve the public's ability to use, transform, or otherwise obtain access to existing works.").

11. That does not mean that a world without copyright would have no works at all. See generally Breyer, supra note 1 (arguing that copyright law appears to be justified but that the case is close); Arnold Plant, The Economic Aspects of Copyright in Books, 1 ECONOMICA 167, 168-70 (1934) (noting that many authors would continue to publish in the absence of copyright).
nation of other works could increase social welfare. Similarly, efforts to improve the ability of authors to control use and limit duplication of copyrighted works might reduce social welfare, even if they result in modest increases in the number of works.

This Article elaborates the insight that marginal copyrighted works are not likely to produce large contributions to social welfare. It does so by focusing on the economics of product differentiation, a venerable area of study in industrial organization that until very recently has received no sustained attention in copyright scholarship, and limited attention in law-and-economics scholarship more generally.

12. A recent article by Christopher Yoo considers the implications of the economics of product differentiation for copyright law. See Christopher S. Yoo, Copyright and Product Differentiation, 79 N.Y.U. L. Rev. 212 (2004). That Yoo and I were working on similar ideas at the same time reinforces that many copyrighted works are close substitutes for one another. Nonetheless, Yoo's work and mine are not nearly as close substitutes as the titles suggest. The phenomenon of demand diversion, to be discussed shortly, lies at the center of my account, but is peripheral in Yoo's. See id. at 260-64. Yoo argues that "the differentiated products approach undercuts the conventional understanding that any measure that enhances dynamic efficiency necessarily reduces static efficiency by showing how encouraging entry can promote both considerations simultaneously." In other words, Yoo argues that if copyright can increase incentives to create new works (thus, Yoo assumes, enhancing dynamic efficiency), that change will also increase static efficiency, because additional entry will drive down prices and benefit consumers. The simulation analysis in this Article offers a similar finding.

There is an important difference in emphasis between Yoo's approach and the approach here, however. Yoo notes correctly that changes in copyright law may increase authors' ability to appropriate surplus, and he suggests that these changes will in effect increase dynamic efficiency by lowering prices and increasing access to consumers. What Yoo does not discuss is that a policy increasing the appropriability of consumer surplus may have other direct consequences, which might decrease consumer access with a potentially negative effect on social welfare. Consider, for example, a law facilitating crackdowns on file sharers. Yoo's analysis emphasizes that the law will increase appropriability, indirectly leading to a greater number of works and lower prices. The analysis in this Article would also emphasize that the increase in the number of works may contribute only slightly to consumer welfare, even taking into account lower prices, as in the Salop model; meanwhile, the direct effect of the law would be to limit consumer access to copyrighted works by discouraging file sharing.

The most relevant previous analysis appears in a brief discussion by Michael Meurer in an article otherwise devoted to the significance of price discrimination in copyright law:

Producers of copyrighted works over-harvest from that common pool—a particular producer does not account for the distraction his new work imposes on existing works or other new works. As a result, multiple producers sometimes race to get to the market first with essentially duplicative works. The race causes two related social harms: producers rush products to market too soon and the duplicative investment by competing producers is wasteful. Reducing the reward to the copyright owner below expected total surplus alleviates the negative effects from the race to the market.

Michael J. Meurer, Copyright Law and Price Discrimination, 23 CARDOZO L. REV. 55, 96-97
The basic insight is a straightforward elaboration of the intuition that once a number of choices exist in a particular genre, further expansion of choice adds relatively little social value. The problem, as it is termed in the literature, is that of demand diversion, sometimes called "business stealing." A producer entering a market with differentiated products cares about its own profit and ignores the effect of entry on other producers. By writing a vegetarian cookbook, I may be able to win many sales that otherwise would have gone to the 445 vegetarian cookbooks that already exist. My entry into the cookbook market might thus be an example of rent dissipation, because my investment in the cookbook project is aimed in part at taking away rents (more commonly known as profits) that the authors of existing cookbooks otherwise would have enjoyed. Of course, my cookbook may offer some new recipes, improvements on existing recipes, and other features that benefit consumers, so my entry into the market might increase the total rents available. The more cookbooks of a particular type that already exist, however, the smaller this increase is likely to be.

In theory, I might rationally choose to write the cookbook even though the increase in consumer welfare is less than the cost of producing the cookbook. In such a circumstance, society might be

---


15. See http://www.amazon.com/exec/obidos/search-handle-urlAndex%3Dbooks%26field-keywords%3Dvegetarian%20cookbook (last visited May 22, 2004) (listing 445 vegetarian cookbooks). No matter how original the 446th entrant, a substantial percentage of its sales is likely to come from those of its competitors.
better off if I had opened a restaurant instead of written a cookbook.\textsuperscript{16} Though theoretically possible, the specter of overentry, that is of a greater than socially optimal number of producers entering the market, does not drive this Article's analysis. The danger of overentry, after all, is not limited to markets for copyrighted works. Perhaps we have too many restaurants, but we probably would not tolerate a "restaurant board" that would block entry in the restaurant market.\textsuperscript{17} Such distrust in government solutions would be even more appropriate in response to a proposal for a "copyright board" that would screen new works. In addition, we may suspect that many copyrighted works produce positive externalities, making overentry far less likely to be a problem.\textsuperscript{18}

Even if there is no overentry in markets for copyrighted works, however, this means only that existing copyrighted works produce

\textsuperscript{16.} The opportunity cost of copyrighted works figures prominently in Lunney, supra note 9. Lunney explains:

If we broaden copyright, we increase the economic return on any given authorship investment. We can thereby lure resources, in the form of labor and capital, away from other productive endeavors into the production of copyrighted works and lead the market to produce additional works. But to create these additional works, we must strip the resources from other sectors of the economy.\textsuperscript{Id. at 487-88.} Lunney accordingly recognizes that copyright should seek to encourage individuals to invest in authoring more valuable works. See \textsuperscript{id. at 490-91.} Lunney, however, does not consider product differentiation theory and arrives at conclusions quite different from this Article's. See \textsuperscript{id. at 645-46 (advocating limits on derivative rights, though product differentiation theory alone would appear to point in the opposite direction).} For another article offering a brief recognition of the opportunity cost of copyrighted works, see Robert M. Hurt & Robert M. Schuchman, \textit{The Economic Rationale of Copyright}, 56 AM. ECON. REV. 421, 425-26 (1966).

\textsuperscript{17.} Such intolerance is not an inevitable aspect of a legal system, even of one that encourages free enterprise. Jewish law, by the principle of \textit{hasagat gevul}, prohibits the creation of a business that will produce significant demand diversion. See generally CHAIM JACHTER & EZVA FRAZER, \textit{GRAY MATR. DISCOURS. IN CONTEMPORARY HALACHAH} 107-18 (2000), excerpt available at http://www.jlaw.com/Articles/hasagatgevul.html (last visited May 22, 2004) (discussing the principle). The principle has even been applied to publishing, providing a Jewish law version of copyright. See generally Israel Schneider, \textit{Jewish Law and Copyright}, at http://www.jlaw.com/Articles/copyright1.html (last visited May 22, 2004) (discussing Jewish law's approach to copyright more broadly). Interestingly, however, there is an exception for the teaching of Torah, suggesting that Talmudic sources recognized the possibility that education might be a positive externality. See Dennis W. Carlton & Avi Weiss, \textit{The Economics of Religion, Jewish Survival, and Jewish Attitudes Toward Competition in Torah Education}, 30 J. LEGAL STUD. 253, 266-72 (2001). Of course, I do not imply that a general prohibition on business stealing would improve economic efficiency, as virtually all competition involves some degree of business stealing.

\textsuperscript{18.} See infra Part II.A.2.a.
more benefits to consumers than they cost to produce, not that copyright law itself has achieved some form of global optimality. Copyright theory cares about dissemination of existing works in addition to production of new works, therefore, a legal change that increases dissemination may be justified even if it imposes some cost by reducing the number of new works. It is hard to imagine a legal change that could reduce the number of restaurants while still leaving restaurant patrons better off. An expansive fair use doctrine, however, provides consumers greater access to existing works while decreasing producers’ incentives to produce new works.\textsuperscript{19} Copyright scholars may be correct in assuming that this is a trade-off, with the decreased production incentives counting as a social cost.\textsuperscript{20} Demand diversion, however, reveals that a marginal decrease in the number of new works might not be as much of a cost as would otherwise appear. More concretely, demand diversion reveals that the proportional increase in the size of the market attributable to a new work generally will be greater than the proportional increase in social welfare; the 446th vegetarian cookbook is unlikely to increase consumer surplus from cookbooks by even 1/446th. Rent dissipation analysis suggests that although copyright law’s paramount goal may be to increase incentives for the production of new works, this goal may not be of as much significance at the margin, and relatively more attention should be paid to ensuring dissemination. The analysis provides some support to those who argue that copyright law should provide consumers with relatively broad, though presumably not unlimited, rights to copy copyrighted works.

Demand diversion also deserves special attention in copyright law because this area presents doctrinal questions that implicate broad social welfare concerns for which the possibility of demand diversion is relevant. The courts face questions like whether copyright can

\textsuperscript{19} See supra notes 8-10 and accompanying text.

\textsuperscript{20} In the patent context, one industrial organization economist has recognized that decreased production might be a social benefit. See Michael Waterson, \textit{The Economics of Product Patents}, 80 AM. ECON. REV. 860, 867-68 (1990) (noting that patent law may make society better off by discouraging entry and reducing business stealing). Waterson alludes briefly to copyright in the last paragraph of his article, but his discussion assumes without justification that redundancy is less likely to be problematic for copyright than for patent. \textit{Id}. at 869.
protect a graphical user interface,\textsuperscript{21} or whether one song should be found to infringe a similar but not identical song.\textsuperscript{22} In answering close questions about the breadth of property rights, judges may consider policy ramifications such as the effects of decisions on incentives to produce new works. Copyright law is a crude instrument developed under conditions of gross uncertainty,\textsuperscript{23} but it must be made and developed under such conditions nonetheless. As long as the copyright context, unlike many other economic contexts in which demand diversion is a concern, routinely requires judges to make decisions about the scope of property rights, judges might as well take demand diversion into account. Some judges may even intuit that it would not make much difference if society had somewhat fewer books, movies or compact discs, but squelch the sentiment, thinking they are being curmudgeonly.\textsuperscript{24}

There is an additional reason that the phenomenon of demand diversion is particularly salient in the copyright context. Although in any market there will be benefits to consumers of successive entry that may offset its costs, these benefits will be relatively low in a market for copyrighted works. Copyrighted goods can be reproduced for low marginal cost, and a relatively small number of works therefore can serve an entire market. Even if there are an excessive number of restaurants, each new restaurant increases the total capacity of the restaurant market. The number of vegetarian restaurants may determine how many people can enjoy ordering hummus, but with just a single vegetarian cookbook, everyone can


\textsuperscript{22} See, e.g., Arnstein v. Porter, 154 F.2d 464, 468-70 (2d Cir. 1946) (considering whether musical compositions by Cole Porter infringed the plaintiff's copyrights).

\textsuperscript{23} See Lunney, supra note 10, at 978 ("We do not know nearly as much as we sometimes pretend regarding the economic working of the markets for copyrighted works, nor do we fully understand the relationship between increased copyright revenues and the ultimate public purpose of copyright—creation of additional works."); Rubenfeld, supra note 4, at 22 (recognizing that copyright raises "incredibly complex empirical questions of economic efficiency").

\textsuperscript{24} For an unabashedly curmudgeonly argument that there are too many books published each year, see Joseph Epstein, Think You Have a Book in You? Think Again, N.Y. TIMES, Sept. 28, 2002, at A17, which notes that "[s]omething on the order of 80,000 books get published in America every year, most of them not needed, not wanted, not in any way remotely necessary."
enjoy making hummus. Successive entry conceivably could still increase the quality of the best available product, but this consideration may be less important in markets for copyrighted works. In such markets, relative quality may rival absolute quality in importance, making additional entry less significant.  

It might seem that even a modest decline in the rate at which copyrighted works are produced would result in a noticeably impoverished culture. Film, music and literature, however, seemed vibrant thirty or fifty years ago, even though the number of new titles released on an annual basis was much lower. If some percentage of copyrighted works never existed, our world might be only a little less interesting. It is important to avoid allowing cognitive tricks to affect our intuitive assessments of the value of marginal works, that is, those that *ex ante* are expected to produce the smallest profit. Though it might seem that if one-tenth of the movies made last year had not been produced the world would have been noticeably less satisfying, that may be in part for reasons of cognitive salience. We remember the movies that we have seen, but not those that we might have seen instead if a few of the movies that we had seen had not been produced. Some works that receive little attention today might receive much more in such a world. To be sure, any decrease in the number of works produced decreases consumer welfare. This consequence may be a cost worth bearing, however, if the reason for the decrease is a change in the law permitting greater copying of existing works. Perhaps copyright law can allow all but the wealthiest of us to enjoy more movies or music even if fewer movies are produced or less commercial music is created.

25. *See infra* text accompanying notes 125-27.


27. For a discussion of how salience may have adverse effects on policy, see Timur Kuran & Cass R. Sunstein, *Availability Cascades and Risk Regulation*, 51 STAN. L. REV. 683, 736-46 (1999).
Copyright is important for reasons other than economics, and recent commentators have analyzed the role of copyright in democratic governance. It might seem that even if a marginal decrease in the number of copyrighted works imposes only a small cost from an economic standpoint, marginal works may be vital from a democratic point of view. This claim collapses under close analysis, however, and not just because the vast majority of copyrighted works add little to democratic deliberation. The dissemination of existing works is as important to democratic as to economic theory. If rent dissipation theory recommends, for example, broad fair use, there is no a priori reason to believe that democracy demands a different balance. It is even possible to construct a case that we might be better off with somewhat fewer works that clearly comment on public policy, because a significant democratic function produced by copyrighted works is to challenge individuals’ prior opinions. Diversification of works may contribute to this function to some extent, by exposing individuals to a wide range of points of view, but it also may allow individuals to select products that only reinforce their pre-existing views. The point here, of course, is not to argue that democratic theorists should seek ways of discouraging contributions to public discourse. Rather, it is to show that the significance of marginal works is complicated in both democratic and economic theories, and that the democratic considerations at least do not produce a definitive rebuttal to the claim that slight reductions in the number of new works might be beneficial if those reductions are accompanied by increased dissemination of other works.

Part I explores the economics of product differentiation. After focusing on one article that helps illustrate concretely the problem of business stealing, the discussion draws on the broader literature to explain how variations in the assumptions of this model might produce competing effects. Part I also reports the results of an original simulation study (reported in full in the Appendix). The study reinforces the argument that business stealing is a greater concern in low marginal cost markets, and it shows that regardless of whether there is overentry or underentry, permitting some

copying may increase consumer welfare. Part II supplements the analysis with a number of different perspectives, canvassing a range of economic arguments, including distributional concerns and various forms of externality arguments, as well as democratic theory. Perhaps most interestingly, it explains how the concept of demand diversion can improve on a prominent account of "winner-take-all" markets. The winner-take-all account is most persuasive with respect to markets for copyrighted works, and attention to demand diversion can better explain the possibility of excess entry than the winner-take-all nature of markets upon which that account has focused. Finally, Part III briefly considers the dual applications of peer-to-peer technology and the copyright term, and evaluates two broader potential implications of the analysis: that copyright law can seek to achieve distributive justice without much cost and that copyright law should become less expansive over time.

I. COPYRIGHT AND THE ECONOMICS OF PRODUCT DIFFERENTIATION

The earliest and still probably the most famous work on the economics of product differentiation is Hotelling's model of two firms, both selling the same product, deciding where to locate along a straight line. \textsuperscript{29} Customers, it is assumed, are uniformly distributed over the line and will purchase from the nearest firm, unless a lower price from a firm located farther away justifies the additional transportation costs. The firms, for example, might be ice cream salesmen along a beach. \textsuperscript{30} The model shows that, in the absence of cooperation, if every consumer will buy an ice cream from one of the salesmen, the two salesmen will both cluster at the center of the beach. The result is intuitive. If either salesman is on one side of the beach rather than at the center, he can pick up more customers by moving closer to the center. Once both are at the center, neither has an incentive to move, because doing so would lead some consumers to switch to the competitor. From a social standpoint, the result is


\textsuperscript{30} Hotelling suggested that the line "may be Main Street in a town or a transcontinental railroad." \textit{Id.} at 45. The advantage of the beach metaphor is that it makes more plausible the assumption that no consumer will travel off the line to obtain the product.
suboptimal, as customers' transport costs would be minimized if the salesmen located at one-quarter and three-quarters the length of the beach.

Although the producers in Hotelling's model are selling a homogeneous product, the model provides a metaphor for product differentiation, with location in physical space analogous to location in product space. For example, two adjacent Indian restaurants deciding how spicy to make their food, given a uniform range of customer preferences, might both sell moderately spicy food, even though consumer tastes would better be satisfied if one restaurant sold mild-medium and the other medium-spicy. The Hotelling metaphor has perhaps had its most significant application in political science, as a way of explaining why the platforms of two competing political parties might both tend toward moderation. The literature offers numerous variations on the basic Hotelling setup, with some variations producing dramatic changes in results. Perhaps most surprisingly, d'Aspremont, Gabszewicz, and Thisse altered Hotelling's assumptions in such a way that the ice cream vendors would choose to locate on opposite extremes of the beach, thus achieving maximum, rather than minimum, differentiation. They assumed that customers faced quadratic transportation costs, so traveling three miles was nine times worse than traveling one mile. The result of maximum differentiation followed from the

31. Hotelling himself recognized this application:

The competition for votes between the Republican and Democratic parties does not lead to a clear drawing of issues, an adoption of two strongly contrasted positions between which the voter may choose. Instead, each party strives to make its platform as much like the other's as possible. Any radical departure would lose many votes, even though it might lead to stronger commendation of the party by some who would vote for it anyhow. Each candidate "pussyfoots," replies ambiguously to questions, refuses to take a definite stand in any controversy for fear of losing votes. 

Id. at 54. Commentators seized on the political analogy relatively quickly and used it to explain subsequent electoral results. See, e.g., A. Smithies, Optimum Location in Spatial Competition, 49 J. POL. ECON. 423, 423 (1941).


34. Id. at 1148.
recognition that firms would locate as far from each other as possible to minimize price competition.  

This Part's focus is not on whether there is too much or too little differentiation among works that are produced, but whether too many or too few works are produced. It is worth noting, however, that the phenomena are analytically connected. Commentators have observed homogeneity in radio station offerings, as listeners with minority viewing tastes may receive no attention while those with more typical tastes can choose from a number of stations seemingly distinguishable only by their call letters. This might occur because a radio station owner would rather have a small piece of a large market than all of a small market, regardless of the fact that the listeners will simply be transplanted from other stations. Catering to the otherwise neglected aficionado of ragtime or gospel music might maximize the number of people who spend time listening to radio and consequently increase social welfare, but it often will be in the radio station's interest simply to produce yet another top 40 or oldies offering. The number of radio stations, of course, is constrained by the radio frequency spectrum, but the number of many other media is essentially unlimited.

35. Id. at 1149. Hotelling's model also included the possibility of price competition. Hotelling, supra note 29, at 45-47. In the absence of quadratic transportation costs, however, neither producer would have an incentive to move away from the other in order to reduce such competition.


37. Maximizing the number of listeners, however, is not the same as maximizing listeners' welfare. As David Haddock and Daniel Polsby point out, what is relevant is how much listeners value their listening, and it is thus possible that increased diversity of programming choices might maximize listeners at the expense of listeners' welfare. See David D. Haddock & Daniel D. Polsby, Bright Lines, the Federal Communications Commission's Duopoly Rule, and the Diversity of Voices, 42 FED. COMM. L.J. 331, 342 (1990) (noting that "there can be too much diversity for the public good, if the public good is to be measured by the value that members of the public place on the programming that they are offered").

38. This distinction has at least one important consequence. With a very small number of competitors, marginal entrants may on average be less redundant than the initial entrants after the first. For example, it may be that the first five stations are all top 40 offerings, while a sixth station decides to cater to a minority taste. With larger numbers of works in particular
becomes not only excessive clustering by those who have entered the market, but also excessive entry into the relevant market. To see why this is, let us consider an alternative to the Hotelling model, and then a variety of extensions and complications.

A. The Salop Model

1. The Setup

The Salop product differentiation model will allow us to see how entry into an industry with differentiated products could be socially excessive. Although the Salop model itself produces excessive entry, my intent is simply to show that excessive entry is possible, not that it is inevitable. This model can then serve as a baseline to compare with other variations that might produce optimal or inadequate entry into a market. In the Salop product differentiation model, firms locate around a circle instead of along a straight line. For example, the firms may be gas stations located around a lake, though once again the physical lake can serve as a metaphor for product space. A consumer who incurs a relatively high transport cost driving around the lake to reach a gas station, therefore, is analogous to one in product space who suffers from not being able to find the cookbook perfectly tailored to the consumer's needs. The cookbook purchaser's "transport costs" do not refer to actual transportation at all, but simply to buying a cookbook whose selection of recipes is not quite what the consumer was seeking.

One advantage of the circle metaphor relative to the line is conceptual. Product diversity in many markets is not linear, because products vary along more than one dimension. For example, consider Figure 1, illustrating four cookbooks. Traveling around the circle, the cookbooks promise recipes on French appetizers, Italian appetizers, Italian entrees, and French entrees. One could imagine

---

40. See infra Part I.B.
41. Salop, supra note 39, at 144.
more points on the circle. A cookbook might cover Italian cooking, and it could be placed between Italian appetizers and Italian entrees on the circle, or a cookbook on French and Italian appetizers could be located between the French appetizers and Italian appetizers on the circle. \(^{42}\) Regardless of the number of entrants, the circle reflects that there are no extremes, there are simply a variety of products that are more or less like one another. Even the circle is an imperfect reflection of reality, however. The cookbook example is admittedly artificial, and any attempt to place an entire genre of actual works around a circle in a coherent way is likely to fail. A more realistic representation might allow for entry in \(n\)-dimensional space, an extension that I undertake through a simulation model in the Appendix.

Figure 1: A simple illustration of the Salop model

The more significant advantage of the circle metaphor is that it is mathematically tractable relative to both the straight line and \(n\)-dimensional space. If products are spaced equidistantly around the circle, then from an economic standpoint, each producer is in the same position as every other and makes the same decisions. The circle metaphor facilitates the calculation of a symmetric Nash

\(^{42}\) Of course, there may not be books in the real world with precisely that focus, but there certainly are books that are close. See, e.g., DIANA SHAW, SWEET BASIL, GARLIC, TOMATOES, AND CHIVES: THE VEGETABLE DISHES OF TUSCANY AND PROVENCE (1992).
equilibrium—that is, an equilibrium in which each producer reaches the same pricing decision and from which each producer has no incentive to deviate. In Salop's model, all firms enter at once, spacing themselves evenly around the circle. This assumes away the question of whether there is too much or too little differentiation for a given number of firms, permitting a focus on the number of firms that enter rather than where they locate. Consumers are distributed uniformly around the circle and, in a temporary simplification of Salop's model, we will assume that each will make a purchase from exactly one firm, taking into account their transportation costs to the firms. Transportation costs increase linearly with distance, so traveling a distance of two is twice as bad as traveling a unit distance.

After the firms enter, each will set a price that maximizes its future profits. Collusion among firms is assumed to be impossible. Each firm must pay a fixed cost to enter, but because this fixed cost is sunk, it does not directly affect a firm's pricing decision. All firms sell the same homogeneous good and face the same marginal cost; they differ only in spatial location around the circle. Each firm considers that increases in price will provide more revenue from each consumer who still purchases from that firm, but increases in price may lead some consumers to travel to one of the firm's neighbors along the circle. Each firm takes into account the expected pricing decisions of neighboring firms, but each firm will realize that because the circle is uniform, each firm is making exactly the same calculation as every other firm. Each firm

43. For an introduction to the concept of a Nash equilibrium, see DOUGLAS G. BAIRD ET AL., GAME THEORY AND THE LAW 21-23 (1994).
44. Jean Tirole explains, "(t)he point of Salop's model is not to look at the particular product choice but rather to study the extent of entry .... Omitting the choice of location allows us to study the entry issue in a simple and tractable way." JEAN TIROLE, THE THEORY OF INDUSTRIAL ORGANIZATION 283 (2001).
45. Salop considers the possibility that some consumers will not be served. See Salop, supra note 39, at 144-45. I will relax this assumption infra Part I.B.1.
46. The model does not consider the possibility of price discrimination based on distance. If such discrimination were possible, then firms might have an incentive to charge less to more distant consumers. Because all firms are identically situated, however, any attempts at price discrimination ultimately would fail, as the firm closest to each consumer would be able to meet any price decrease and still obtain the consumer.
47. Note that it is the difference in space that corresponds to product differentiation, so sale of a homogeneous product is a useful simplification.
therefore ends up calculating the uniform price from which no firm would have an incentive to deviate upwards or downwards. The greater the number of firms, the lower this price will be. Given a uniform price, each consumer ends up traveling to the firm closest to it, even though consumers would be willing to travel to more distant producers if their prices were lower. One of the attractions of the model is that it allows for price competition without producing a complex asymmetric equilibrium in which each producer charges a different price.

The analysis so far has assumed some number of firms entering the market, but a central question for our purposes is how many firms will enter. The number of firms that enter is assumed to be the number that will lead to each firm's earning zero economic profit given the optimal pricing strategy. Zero economic profit corresponds to a normal rate of return on investments of capital and labor. This assumption reflects that if, given a certain number of entrants, greater than normal returns were expected, some other firms would decide to enter the market too. The assumption of zero economic profits is central to many models of industrial organization, and the allowance of free entry is what justifies it. Additional entry will, even apart from any price effect, lower existing producers' profits. If it did not cost anything to enter the market, then the only nonprice effect of additional entry would be to reduce transport costs, and entry would necessarily be socially beneficial. The fixed cost of entry, however, dissipates what otherwise would be the economic rent enjoyed by a small number of producers extracting higher prices from consumers. The ultimate social welfare calculus demands a determination of whether the fixed cost investments are sufficient to justify the corresponding reductions in transport costs.

48. A definition of "economic profit" is "[t]he amount by which total revenues exceed total opportunity cost." ROBERT B. EKELUND, JR. & ROBERT D. TOLLISON, ECONOMICS G-6 (4th ed. 1994).

49. The analysis ignores the "integer constraint," i.e., that the number of firms that enter must be an integer and not a fractional number. See, e.g., Mankiw & Whinston, supra note 14, at 49. A small degree of supernormal returns is possible if an additional entrant would not only eliminate those returns for all firms, but also make total returns for each firm negative.

50. "Free entry" here means that anyone can enter, not that anyone can enter for free.
2. The Results

Salop's model produces several interesting results. First, the number of competitive firms is equal to the square root of unit transport costs times the number of consumers divided by fixed costs.\(^5^1\) As expected, the formula shows that increases in transportation costs increase entry, because such increases raise the amount that a firm can charge without losing customers nearest it to another firm. Increases in the number of consumers raise entry too, for the obvious reason that more consumers mean a larger market. Meanwhile, smaller fixed costs increase entry because they allow more firms to enter before the positive profits dissipate. Second, each firm charges a price above marginal cost, specifically, marginal cost plus the square root of the product of unit transport and fixed costs divided by the number of consumers.\(^5^2\) When transport costs rise, price competition is muted, because each producer needs to worry less about a consumer defecting to another producer. Price rises with increases in fixed costs, meanwhile, because of the assumption of zero economic profit in equilibrium. Increased fixed costs mean that firms must recover more to break even.\(^5^3\)

The most interesting conclusion of Salop’s model for our purposes is that the optimal number of firms from the perspective of the

\(^{51}\) Salop, supra note 39, at 148.

\(^{52}\) Id.

\(^{53}\) What may be less intuitive than the general direction of all these relationships is that the effects are sublinear, as indicated by the square root signs. The number of firms changes only slowly with increases in transport costs or decreases in fixed costs, and prices increase only slowly with increases in transport or fixed costs. For example, if transport costs increase by a factor of nine, the number of firms will increase by only a factor of three, and the difference between price and marginal cost also will increase by only a factor of three. The interrelationship between price and the number of entering firms explains this. The increased entry attributable to a rise in transport costs tends to reduce price, because more firms are crowded around the circle and thus alternative choices are more attractive to consumers. The increase in price attributable to transport costs will therefore not be as high as it would be in a hypothetical world where entry made the market no more crowded. Because the increase in price is sublinear, the increase in entry is sublinear too. Similarly, because an increase in fixed costs increases price, more firms will enter, so the overall decrease in the number of firms that enter in response to an increase in fixed costs is smaller than it would be if an increase in fixed costs had no effect on price. The small size of this decrease, meanwhile, limits the amount by which the price can rise. In effect, the effects of transport or fixed costs are shared by relatively modest changes in the number of entering firms and the equilibrium price.
social planner is exactly half the number that enter in equilibrium.\textsuperscript{54} This result reflects the central intuition of this Article: new entrants steal business from existing entrants. The model shows more than this, however, because the model recognizes that increased entry provides a benefit to consumers by reducing the distance that they must travel to obtain the product, whether in geographical or product space. What is arresting is that Salop's model shows that even though there are competing effects, one effect tends to dominate the other. Salop himself acknowledges that this finding might not be robust,\textsuperscript{55} and we will examine how changing some of Salop's assumptions might change the results.\textsuperscript{56} Before we do so, however, let us develop an intuitive grasp of Salop's conclusion that entry is twice the optimum, with the fixed cost associated with the marginal entrant in equilibrium necessarily exceeding any benefits to consumers from that entrant.

The central intuition underlying the Salop model is that in deciding whether to raise their price above any hypothetical equilibrium price, firms face inframarginal consumers. These are consumers who are so close to the firm that they will continue to purchase from it even if price increases, as long as the difference between the firm's price and its neighbors' is not too great. Because firms make this calculation at the same time, the equilibrium price ends up being relatively high, representing the point that even though an increase in price would cause a firm to lose only marginal consumers, it would still lose money from pricing any higher. Meanwhile, entry benefits both marginal and inframarginal consumers, but by a relatively small amount, especially in the case of inframarginal consumers. The tendency of distance to mute price competition therefore, leads to relatively high prices that in turn lead to entry beyond the point at which consumer benefits would justify the fixed costs of such entry.

This explanation is not proof that excessive entry will result, although Salop does prove the result. Salop derives his results with calculus, but I will offer an informal demonstration of the conclusion that twice as much entry as is socially optimal will occur to

\begin{footnotesize}
\begin{enumerate}
\item Salop, supra note 39, at 152.
\item Id. at 156.
\item See infra Part I.B.
\end{enumerate}
\end{footnotesize}
crystallize the intuition developed above. Social welfare is the sum of consumer welfare and producer welfare. To maximize social welfare, therefore, we must minimize the sum of transport and fixed costs. We can disregard both gross consumer surplus and price, because of the assumption that every consumer will purchase one unit of the product regardless of the price. That is, we do not care how high prices are, because high prices simply affect the relative welfare of consumers and producers and by assumption do not result in any deadweight loss. Regardless of the number of firms, any change in the number of firms will have a proportionate effect on fixed costs and transport costs, so that, for example, doubling the number of firms will double fixed costs and halve transport costs. The social optimum therefore must be the number that equalizes fixed costs and transportation costs. 57

This social optimum is not a stable equilibrium, because firms would earn profits at this point and thus more will enter the market. Firms will earn profits because the profit margin will be more than enough to cover fixed costs. The price margin, the difference between price and marginal cost, will always be equal to the transportation costs of traveling from one firm to its neighbor, regardless of how many firms have entered the market. 58 No consumer will ever have to travel that far, however. The farthest a consumer will have to travel is half the distance between two firms, and the average consumer will have to travel only one-fourth the distance. The price margin will therefore always be equal to four times the transportation costs of an average consumer. At the social optimum, however, we have seen that fixed costs are equal to transportation costs. The price margin must then be equal to four times the fixed costs per consumer as well. Three-quarters of this price margin is profit at the social optimum, and firms will enter

57. If fixed costs and transportation costs are both 1, then doubling either and halving the other would produce a sum of 2¼ instead of 2.
58. Salop proves this mathematically, but it is also shown by a consideration of firms' incentives. At this price, any firm's attempt to increase or decrease its price will result in lost profits. For example, if a firm raises its price margin by 25% (one-quarter of the transport costs between the firm and each of its neighbors), then it will lose 25% of its customers, as the marginal customer will be three-eighths of the distance between the firm and its neighbor, rather than one-half of that distance. If instead the firm lowers its price by 25%, it will increase its customer base by 25%. Both of these moves are unprofitable.
the market. Doubling the number of firms doubles fixed costs while cutting transport costs and the price margin in half. This eliminates profit. The net result is that twice as many firms enter in equilibrium as would exist at the socially optimal level.

3. The Counterintuition: Pecuniary Externalities

One response to the claim that business stealing might lead to excessive entry is to point to the distinction between pecuniary and technological externalities. An externality is an effect of an individual's activity on someone else. Externalities can be negative or positive. A classic example of a negative externality is pollution; the polluter does not bear the full cost of its activity. An example of a positive externality is vaccination, which benefits not only the patient but also third parties. Externalities can also be pecuniary or technological, with pecuniary externalities being those that operate through markets. More formally, a technological externality is an externality that affects the production function of a firm. For example, if my pollution causes my neighbor's cows to develop more slowly, then my neighbor will be able to produce less beef or milk for a given combination of cows and feed, creating a technological externality. An externality is pecuniary if an effect is felt despite no change in the production function. For example, if I also decide to become a beef producer, then I may hurt my neighbor both by driving up the price of inputs and by driving down the price of outputs, but my neighbor will still be able to make the same amount of beef for any combination of cows and feed.

The externalities associated with the business-stealing effect are pecuniary, as entry by one firm affects other firms' ability to sell their products, but not their ability to produce products. This may seem puzzling, because economists often emphasize that while technological externalities produce market imperfections, and thus are candidates for governmental intervention, pecuniary externalities do not. Consider, for example, Judge Posner's discussion of pecuniary externalities in his *Economic Analysis of Law*:

59. See, e.g., EKELUND & TOLLISON, supra note 48, at 445.
Competition is a rich source of "pecuniary" as distinct from "technological" externalities—that is, of wealth transfers from, as distinct from cost impositions on, unconsenting parties. Suppose A opens a gas station opposite B's gas station and as a result siphons revenues from B. Since B's loss is A's gain, there is no diminution in overall wealth and hence no social cost, even though B is harmed by A's competition and thus incurs a private cost.  

The example initially seems superficially similar to the present problem, but the comparison is imperfect. In Posner's example, A's gas station is "opposite" B's, but the central point of Salop's model is that firms are located in different places. Even apart from this difference, however, the example is flawed, at least if it is intended as a general statement that the pecuniary externality does not matter. Indeed, if A had to pay a fixed cost to open her gas station, then there would be a diminution in wealth if there were no other effects, because A might have invested the money instead on an activity that increases economic activity. Of course, there might well be other effects, such as a decrease in the price of gas closer to the marginal cost, allowing some who value gas at more than its marginal cost to obtain it, and thus avoiding deadweight loss. My point, of course, is not that business stealing is necessarily bad, but merely that it must be taken into account.

Posner is not the only economist to hint that pecuniary externalities should be ignored, and this conventional wisdom makes sense under conditions of perfect competition. 61 It has long been recog-
nized, however, that pecuniary externalities may lead to suboptimal results when the economy is not in a condition of competitive equilibrium. Tibor Scitovsky, who first developed the distinction between pecuniary and technological externalities fifty years ago, recognized that although pecuniary externalities do not require accommodation in competitive equilibrium, they may matter at other times. Scitovsky focused directly on investment, identifying conditions in which investment produces pecuniary externalities that ideally would be internalized. Although investment in a market will tend to bring that market closer to equilibrium, Scitovsky noted, it might lead another market away from equilibrium. Even though the specific example that Scitovsky cites involves a positive externality, the Salop model provides just one example in the industrial organization literature of a negative pecuniary externality that matters. Indeed, pecuniary externalities matter so often in industrial organization and economic development that the phrase is rarely invoked, and when it is invoked it may be to point out that they may well matter in conditions of imperfect competition.

65. Scitovsky noted, "equilibrium in a perfectly competitive economy is a situation of Paretian optimum, except when there is interdependence among the members of the economy that is direct, in the sense that it does not operate through the market mechanism." Id. at 144. In other words, perfect competition maximizes welfare except when there are technological externalities. Later, he explained:

What is puzzling ... is that interdependence through the market mechanism should be held to account for the failure of the market economy to lead to the socially desirable optimum, when equilibrium theory comes to the opposite conclusion and relies on market interdependence to bring about an optimum situation. Pecuniary external economies clearly have no place in equilibrium theory.

Id. at 146.
66. Id. at 147-51.
67. Id. at 148.
68. Id. at 149 ("We can conclude, therefore, that when an investment gives rise to pecuniary external economies, its private profitability understates its social desirability."). Scitovsky uses the phrase "external economies" to refer to what are now known as positive externalities, and the phrase "external diseconomies" to refer to what are now known as negative externalities.
69. For example, Paul Krugman writes:

In competitive general equilibrium, of course, pecuniary externalities have no welfare significance and could not lead to the kind of interesting dynamics we shall derive later. Over the past decade, however, it has become a familiar point
B. Modifying the Salop Model

The Salop model developed in Part I.A involves a series of simplifications. That there might be too many books, movies, or music albums under some set of credible assumptions is an important result for legal decision makers for two reasons. First, it undermines the assumption that any increase in incentives to produce new works is necessarily beneficial. Indeterminacy itself is relevant to policy decisions, because if we have no more reason to believe that a change in production incentives is likely to be beneficial than that it is likely to be harmful, we should respond by paying more attention to those effects that we can classify as improving or harming welfare. Second, the question of whether any particular market is beyond or short of the point at which entry decreases welfare is ultimately not the most significant one. That would be the relevant question if the government were considering establishing a board to restrict entry in some market or across the economy. The focus of this Article, however, is on the business-stealing effect, which might be relevant even if entry would maximize social welfare, when only the producer and consumers who purchase the product are counted in that calculation. Nonetheless, to develop the fullest understanding of when excessive entry may occur, we should probe the assumptions of the Salop model to test its robustness and to determine where it is most applicable. The

that in the presence of imperfect competition and increasing returns, pecuniary externalities matter; for example, if one firm's actions affect the demand for the product of another firm whose price exceeds marginal cost, this is as much a "real" externality as if one firm's research and development spills over into the general knowledge pool.


70. In developing the distinction between technological and pecuniary externalities, Scitovsky considers such a possibility, without explicitly endorsing it. See Scitovsky, supra note 64, at 150 ("Hence the belief that there is need either for centralized investment planning or for some additional communication system to supplement the pricing system as a signaling device."). The primary problem with such a project is that the costs of errors by a central government authority might outweigh the benefits, especially if government officials have motivations other than maximizing social welfare.
conclusion is that some models predict excessive entry while others predict inadequate entry, but all at least are unanimous in acknowledging the existence of the business-stealing effect.

1. Variability in Consumer Surplus

Perhaps the most vulnerable assumption in the presentation of the Salop model above is that each consumer will purchase exactly one unit of the good. This permitted us to ignore gross consumer surplus, thus focusing on the trade-off between transport costs and entry costs. The assumption may work well for some markets, such as the market for textbooks or casebooks, as few students will dare not purchase an assigned textbook and few professors will dare assign more than one. It is, however, a simplification, especially across the range of markets protected by copyright. I may own a bookshelf full of vegetarian cookbooks, and my decision whether to buy the latest book on lentils may depend in part on its price. Each new cookbook that I purchase increases my gross consumer surplus. Moreover, I may be pleased that my cookbooks cover the full range of vegetarian cooking, rather than all focusing on my favorite topic of tofu preparation. At the same time, of course, your cookbook collection might not contain a single vegetarian cookbook, even though you would be willing to add one if you could find the perfect cookbook at the right price.

This reality check seems to force three distinct modifications to the model. First, a single consumer might be located at multiple locations around the circle. Ideally, I might like an Indian vegetarian cookbook, a vegetarian desserts book, and an encyclopedia of soy products, and for each of these I will have to consider whether the best book available is close enough to what I am looking for. Second, a consumer might be willing to purchase cookbooks only if transport costs are sufficiently low, that is, only if the cookbook is just what the consumer is looking for. Third, a consumer might be willing to purchase a cookbook only if the price is sufficiently low, even if the cookbook is of just the sort that the consumer is seeking.

71. Consumers might be heterogeneous in ways beyond those described here. Michael Waterson, for example, considers the possibility of heterogeneity in his assessment of how easy it might be to serve consumers. See Michael Waterson, Product Differentiation and Profitability: An Asymmetric Model, 39 J. INDUS. ECON. 113 (1990). This type of heterogeneity seems less likely to be significant in markets for copyrighted works than in many other markets.
That is, even in the absence of transport costs, the gross consumer surplus might be above marginal cost but potentially below what might be the equilibrium price of a book.

The first of these modifications is relatively harmless. For analytical purposes, a consumer who is located at multiple points on the circle can be treated as multiple consumers, and so the model works just as before. If I wish to purchase a vegetarian desserts book and an Indian vegetarian cookbook for my bookshelf, that is no different economically than if I wanted to purchase the first for myself and the second for my sister, or if I wanted to purchase the first and my sister wished to purchase the second. An objection is that this is not a fully accurate depiction of consumer preferences, because the purchase decisions may be interrelated. A consumer who buys one cookbook might be less willing to buy another. For example, once I buy a vegetarian desserts book, I will be willing to buy an Indian vegetarian cookbook only if it is exactly what I was looking for or only if it is sufficiently inexpensive, because I have spent a portion of my budget that I had allocated to cookbooks.\(^2\)

This objection primarily means that the second "consumer" associated with a particular individual is one subject to the second and third modifications above.

Let us now consider the second modification, the possibility of a consumer who decides not to purchase because of high transport costs. Fortunately, this is an alteration to the model that Salop himself considers, one that I omitted earlier in order to focus on the situation in which a consumer necessarily would purchase from some firm. Salop recognizes that if gross consumer surplus is positive but finite, then above a certain price a consumer will not purchase from a producer even if price plus transport costs would be higher from all other producers.\(^3\)

If we assume that all consumers have the same gross consumer surplus, as Salop does, then there

---


73. Salop also considers a third possibility, that a price could be so low that a firm not only would receive all of the consumers between it and its neighbor, but also half the consumers on the other side of its neighbor. Salop labels this price threshold, which produces a discontinuity in the demand curve, the "supercompetitive" price. Salop, supra note 39, at 143. The intuition is that if one firm's price is sufficiently low that it will attract customers who are located directly at its neighbor, it will also attract customers who are a bit farther. If it makes sense for someone at the neighbor to travel all the way to the firm, then, given linear transaction costs, once a customer a bit further away arrives at the neighbor, it makes sense for that consumer to travel in addition the same distance that a customer initially located at the neighbor traveled. The supercompetitive price, however, is not an equilibrium, as the firm that loses all of its consumers would have an incentive to lower its price.
will be some price threshold above which each producer in effect has a monopoly market and faces a monopoly demand curve. Salop calculates the price and the number of firms that enter the market, subject once again to a zero profits constraint.\textsuperscript{74} The price margin is slightly lower than in the competitive equilibrium, because when gross consumer surplus is low, high prices will lead some consumers not to purchase at all. The number of firms that enter the market is therefore slightly lower as well.\textsuperscript{75} The number is nonetheless still greater than the optimal number of firms.\textsuperscript{76}

Salop's model, with prices in the monopolistic range, is uninteresting for our purposes because there is no competition between products.\textsuperscript{77} As soon as gross consumer surplus is low enough that some consumers are outside both nearby firms' potential monopoly markets, there is no consumer who would even consider anything other than the most closely located firm. This strange result stems from the assumption that all consumers have the same gross consumer surplus. This brings us to the third modification suggested above, the possibility of a consumer who will purchase the product only if its price is sufficiently low. Realistically, regardless of whether there are consumers who will not purchase from anyone because of high transport costs, there will also be consumers with low transport costs who simply might decide not to enter the market. By focusing exclusively on transport costs, Salop's model ignores this type of heterogeneity among consumers.

\textsuperscript{74} Id. at 145-48.
\textsuperscript{75} Intuitively, the existence of consumers who may or may not purchase a product has two effects on entry. The first is that the reduction in gross consumer surplus for these consumers makes them less likely to make a purchase for a given price, and the corresponding reduction in profits makes entry less attractive. The second is that price will fall because firms will not want to risk the possibility of losing consumers, and so entry again becomes less attractive.

\textsuperscript{76} Salop, \textit{supra} note 39, at 152. The number of firms will be in between the monopoly and competitive level if the equilibrium price is such that each producer's region of potential monopoly demand, that is consumers who would purchase from that firm in the absence of other firms, just touches those of its neighbors. \textit{Id}.

\textsuperscript{77} The comparison of the number of firms that will enter with monopolistic pricing to the number that optimally would enter is of apples and oranges, because the latter number is the number that optimally would enter given that the entire market is to be served. If the consumers immediately between two firms will not make purchases because gross consumer surplus is less than transport costs, then each firm has monopoly power over all its potential consumers. If this would also be true with one more firm in the market, then each firm would still have monopoly power over all its potential consumers, and there would be no business stealing effect from additional entry. At least until entry is sufficient so that all consumers are covered, any entry up to this point necessarily must be welfare-improving, given the assumption that all firms are equally spaced after entry. Therefore in a model like Salop's, but without consumers whose gross consumer surplus is high enough that they plausibly might purchase from either of two firms, entry will be insufficient.
It is straightforward how this type of heterogeneity might lead to insufficient entry rather than to excessive entry. Suppose that consumers remain uniformly distributed about the circle, but there is also some random distribution of gross consumer surplus from purchasing a unit of the product around the circle. The number of consumers who will purchase the product will then depend on the price, and some consumers who value the product at above marginal cost will decide not to purchase the product if the price is too high. We have seen that increased entry decreases the equilibrium price level by increasing competition, and it will also have the effect of increasing the total number of consumers who purchase the product and receive consumer surplus. In contrast to the Salop model, entry increases gross consumer welfare. The marginal entrant, however, does not fully take this effect into account, caring only about the fraction of consumers who otherwise would not have purchased a product and now purchase from this firm. The inability of firms to internalize the price effect thus produces a tendency toward underentry.

This tendency toward underentry competes with the business-stealing effect, with an indeterminate consequence for net social welfare. There could be too few firms in the market under this model, however, only because prices are too high from a social perspective. Allowing entry is an expensive means of achieving price reductions. If a price control could be administered efficiently, a greater number of consumers could be served without incurring these fixed costs. Although governmental experience suggests that direct price controls are administrative nightmares, there are other means of reducing prices besides price controls and increased entry. This is especially so in markets for copyrighted products, where a broad allowance of copying will reduce both entry and the

78. See supra text following note 47.
79. The balance would depend on the distribution of potential consumers' gross surplus. If there are many potential consumers who would have purchased the product at a price a bit lower than the equilibrium price, the underentry effect may be greater than the business-stealing effect. There would have to be a fair number of such consumers, however. All of these consumers receive relatively low consumer surplus from the product, because they are low-valuing consumers. Given that the business-stealing effect leads to twice as much entry as is socially optimal in the Salop model, the number of these consumers would have to dwarf the number who would have purchased anyway for the benefits of additional entry to dominate the business-stealing effect. Moreover, even some consumers whose gross consumer surplus is greater than the reduced price may not purchase the product because of transport costs. Consumers whose gross consumer surplus would be below the price even with additional entry, meanwhile, receive no benefit from additional entry.
average price that consumers will pay for the product, counting a price of zero for those who copy.\footnote{A fanciful example will help make the point. Let us assume that the Salop model accurately reflects the dynamics of a particular market, except that variations in gross consumer surplus make the existing number of firms optimal under rules that allow each firm to charge whatever it wants. Suppose that the government promulgates a new policy that firms can charge only marginal cost to citizens with even-numbered license plates, and suppose further that firms comply costlessly and that consumers do not engage in arbitrage. Recall that price in the Salop model is invariant to the number of consumers. \textit{See Salop, supra note 39, at 148.} Firms would charge approximately the same amount as before to citizens with odd-numbered license plates. Social welfare, however, unambiguously rises. Although the transfer from producers to consumers who would have made purchases anyway is irrelevant to the social welfare calculation, consumers with gross consumer surplus between the marginal cost and price now would receive the good if they had even-numbered license plates. The social welfare calculation must also take into account the consumers' increase in transport costs and the producers' increase in fixed costs associated with the decreased number of firms, but the Salop model already shows that this trade-off would increase social welfare. Although it reduces entry below the point that was optimal in its absence, the license plate policy both increases the number of consumers who receive a product and achieves a better balance between the fixed cost of entry and consumers' transport costs.}

2. Additional Modifications

The possibility of variability in gross consumer surplus is the most obvious and perhaps most significant modification to the Salop model. There are, however, a variety of other modifications that might make the model more realistic. This section will briefly consider several such possibilities. My purpose is not to exhaust the range of ways in which reality is more complicated than Salop's model, but rather simply to identify a few significant additional complications that could lead to underentry or optimal entry rather than excessive entry. This discussion is useful, lest readers conclude that overentry is inevitable and that any policies that reduce entry are necessarily welfare-improving. There are two reasons not to focus too much on the modifications that would be needed to perfect Salop's model. First, there are radically different industrial organization models that are also relevant to whether there is inadequate or excessive entry, and I will briefly discuss these to place Salop's model in economic context. Second, as shown above,\footnote{See \textit{supra} Part I.B.1.} policies that reduce entry may improve welfare even when there is not excessive entry initially. In the next section, I will return to this point, using a simulation analysis to demonstrate it more rigorously.

The Salop model is of products aligned along a circle, but, as suggested above, product characteristics rarely seem to fit along a
A slight improvement, albeit one that would be mathematically intractable, would be for producers to arrange themselves in two-dimensional space, for example in a checkerboard pattern. Even such a modest change could have significant implications for Salop’s model. Along the circle, each producer faces competition from only two neighbors, but in two-dimensional space, a producer competes with at least four neighbors. Conceivably, this increase in competition might lead to a lower price margin, and thus to reduced entry. The problem becomes even greater if producers are evenly arranged in three-dimensional space, and greater still in n-dimensional space. Products differ across countless dimensions, as attested by long lists of product characteristics that often accompany advertisements. Copyrighted works exist with no less diversity, although their characteristics may not be subject to equally objective measurement and reporting.

An additional, significant modification must be relaxation of the assumption that firms are all equally spaced from one another. Relaxation of this assumption makes derivation of a symmetric equilibrium impossible, because firms’ pricing decisions would depend on the distance of other firms to them. It may at first appear to be harmless, because some firms would end up charging more, and others less, with no inherent bias that would affect entry. The assumption, however, can have significant consequences when entry is sequential rather than simultaneous. In Salop’s model, all firms enter at once, or, alternatively, when a new firm enters, all firms reposition themselves so that equal spacing is retained. In reality, repositioning is likely to be impossible or at least expensive, and the wide product space between existing firms may produce what the literature has termed entry deterrence. For example, if the equilibrium number of firms in Salop’s model is seven with automatic repositioning, but the model is then adjusted to allow for sequential equilibrium without repositioning, then only four firms will enter, because a fifth would have to position itself between two of the existing firms and thus capture only one-eighth of the market.

83. See supra text following note 42.
84. For an article considering the extent to which the overentry result can be generalized to higher dimensions, see Robin Hanson, Location Discrimination in Circular City, Torus Town, and Beyond (1999) (unpublished manuscript, on file with author). Hanson concludes that “[o]verall, too much entry seems a more severe problem than too little.” Id. at 1.
85. Salop, supra note 39, at 145 n.3.
A final variable is quality. The Salop model assumes that products are homogeneous except as to their location in product space, but products may differ in ways that do not affect their position in product space. For example, there could be a range of Indian vegetarian cookbooks, with some that are simply better than others, with the best perhaps featuring color photographs, large numbers of recipes, and endorsements from the best chefs. Consumers are likely to sort themselves according to their gross consumer surplus, with the highest-valuing consumers choosing the products of the highest quality and the highest prices, and lower-valuing consumers choosing products of lower quality and lower prices.\(^8^7\) This is known in the literature as **vertical price differentiation**, with the differentiation in product space that we have considered so far known as **horizontal price differentiation**.\(^8^8\) The existence of quality variations might increase entry, by giving each firm less competition, but it also might decrease entry because firms that otherwise would be able to attract low-valuing consumers may expect to lose these consumers to cheap alternatives. Quality variations also complicate the notion of optimal entry, as there would not be just an optimal number, but also an optimal range of quality among those entrants.\(^8^9\) It is possible that a reduction in the number of copyright works might produce an increase in quality, as the author of each work will invest more to capture a larger market,\(^9^0\) though it is also conceivable that product diversity might spur quality improvements.

In the end, possible extensions to the Salop model may be of less concern than the possibility of wholly different models. Indeed,
there are countless theoretical models of product differentiation, with the Salop model belonging to the family of spatial models, sometimes also called address models or locational models. Perhaps the most significant alternatives to these models are representative consumer models, with a seminal contribution by Avinash Dixit and Joseph Stiglitz. Instead of placing differentiated products in product space, these models take the simpler approach of assuming that consumers have a taste for product diversity. As Dixit and Stiglitz explain, "a consumer who is indifferent between the quantities (1,0) and (0,1) of two commodities prefers the mix (1/2,1/2) to either extreme." The models conclude that although there could be excess entry, there also could be insufficient entry. The intuition is that the taste for product diversity produces a counterweight to the business-stealing effect, but the precise balance is left uncertain.

Representative consumer models thus advance the principal argument of this Article: because of the business-stealing effect, one cannot assume that increased incentives to produce copyrighted works are necessarily beneficial. These models have, however, been subject to considerable criticism. John Pettengill, in particular, questioned the general applicability of the assumption that all consumers consume some of each product. Indeed, the models seem least applicable to markets for some types of copyrighted works. "Some people do consume a large number of movies," Pettengill points out. "But very few consumers see all the movies available. And seeing half of twenty movies is not preferable to seeing all of ten movies ...." Models of product diversification applicable to beer or perhaps even to music thus might be less appropriate for movies or books. Dixit and Stiglitz reply that their model does not necessarily require individual consumers to consume a bit of each good, as long as variety turns out to be sufficiently desirable for society as a whole.

92. Id. at 297.
93. For a useful explanation, see TROLE, supra note 44, at 288.
95. "As we clearly stated what is at issue is the convexity of Samuelsonian social indifference curves, and that can arise just as easily (and probably more commonly) because different consumers use different product types." Avinash K. Dixit & Joseph E. Stiglitz,
the assumption that Dixit and Stiglitz make will hold in the absence of consumers each consuming some of each product. More significant for our purposes, they argue for the general superiority of address models over representative consumer models on the ground that the latter have explicit microeconomic foundations. A virtue of such foundations is that they allow for simulation modeling contingent on different parameters for consumers, producers, and product space, a task to which this Article will now turn.

3. A Simulation Study

To consider how variations in the Salop model might affect whether there is overentry or underentry in a particular market, I designed, programmed, and executed a simulation study. The simulation allows consumers randomly distributed in product space to make purchasing decisions (or choose not to purchase any particular good), and allows producers, who are also randomly distributed in product space, to adjust prices to maximize their profits. By calculating consumer and producer surplus in iterated runs with sets of parameter values, we can determine the equilibrium and socially optimal levels of producer entry. The purpose of this simulation is not to determine whether there is overentry or underentry in any particular real market. Although industrial organization scholars have begun to perform empirical studies that assess the optimality of entry in various markets, these studies are generally not based on simulation models. The parameter values that I plugged into the simulation model are not based on actual empirical studies, but the simulation nonetheless helps to test whether overentry is indeed possible with a model richer than the Salop model and whether permitting copying can increase social welfare.

The result of the simulation is reported in full in the Appendix. There are several points, however, that are worth summarizing here. First, depending on the parameter values, both overentry and underentry can occur in a market. Although this point challenges the complacent neoclassical assumption that entry into copyrighted markets is necessarily welfare-increasing, it also establishes that we

---


97. See infra Part III.
cannot assume that overentry is pervasive. Second, the simulation model helps illustrate the potential effects of business stealing. Additional entry by producers into the market consistently increased consumer surplus, but at a declining rate; the more works that already exist in a particular market for copyrighted works, the less any new work is likely to contribute to consumer welfare. Third, excess entry is more likely with low marginal cost, and insufficient entry is more likely with high marginal cost. This helps explain why a consideration of business stealing is particularly important in the intellectual property context. Fourth, even when entry is optimal, the increased availability of technology allowing consumers to copy rather than purchase works may increase social welfare. Above a certain point, however, copying may become sufficiently widespread that the depressive effect of copying will lower total welfare.

II. ADDITIONAL ECONOMIC AND NONECONOMIC CONSIDERATIONS

A. Other Economic Considerations

The Salop model and other models of product differentiation assume that social welfare is simply the sum of producer and consumer welfare. This Part considers two sets of arguments against any policy that would discourage, or do less to encourage, entry into copyright markets on grounds that social welfare is more complex than that. The first set of arguments is that distributional considerations might provide an argument for increased entry, and the second is that externalities might justify such entry. I address these arguments in part to challenge and refine the economic models on which this Article has relied, but more importantly to show how these models can challenge and refine existing scholarship. I will argue that negative consequences attributed to winner-take-all markets should more accurately be ascribed to demand diversion in markets for copyrighted works, and that the recent suggestion that copyright markets might be subject to congestion externalities analyzes the problem too narrowly.

1. Distribution

Wealth maximization is a central concern of positive economic analysis, and some argue that it should in fact be the sole concern.  

98. See infra Part II.A.1.b.
99. See infra Part II.A.2.b.
Yet other economists, as well as legal scholars with non-economic orientations, are willing to consider and evaluate the distributive implications of market arrangements. So far, I have labeled entry excessive when it does not maximize social welfare, but I have adopted the anodyne assumption that social welfare is simply the sum of consumer and producer welfare. We might, of course, care more about one of these categories than the other, and we might also care about distribution in ways that cut across these categories. This section evaluates this distributional axis as well as two more subtle issues associated with distributional concerns. One of these is the possibility that in some copyright markets, a small group of top performers might obtain almost all of the producer welfare, an issue with distributive and other implications. The second is the possibility that copyrighted works and other economic products may be "positional goods," desired not just for their intrinsic value, but also as weapons in an arms race in the social hierarchy.

a. Producers vs. Consumers

The fixed costs incurred by producers of copyrighted works are central to the thesis that excessive entry is possible. If it took no time or money to produce a copyrighted work, then the possibility of business stealing would have no welfare consequences, leaving only the distributional issue of established producers versus newcomers. When there are fixed costs to enter the market—the price of writing, editing, and publicizing a book, for example—business stealing can no longer be a matter of indifference, because such demand diversion makes it possible that someone will have an incentive to enter even if the total social benefit of entry is less than the fixed cost. This focus on fixed costs cannot be dismissed as reflecting a paternalistic interest in the welfare of producers. The problem is a classic tragedy of the commons, and the legal obstacles to self-regulation make the dilemma difficult to overcome. It might, however, seem that concern about the interests of producers is misplaced, that copyright law ought to focus solely on maximizing consumer welfare. We encourage production, the argument goes, because we value consumption. Additional entry can only enhance


price competition and consumer choice, therefore, it ought to be embraced, regardless of the effect on producers.

There is no reason in economics or philosophy to exclude the interests of producers altogether. The debate between natural law and utilitarian approaches to intellectual property is sometimes framed in such a way that it may seem to be a debate about whether the law should care about artists' rights or those of consumers. Against that framework, concern about overentry might seem to reflect an antique advocacy of the former. Although just as properly conceived natural law theories of intellectual property take into account the concerns of consumers, so too should utilitarian theories take into account value to producers. Economic advocates of strong property rights in intellectual property have paid little direct attention to the interests of producers. In the absence of concern about business stealing, there is no need to worry about producers per se, because in a simplified industrial organization framework, the marginal producer will serve a marginal consumer who otherwise would have been unserved and will make zero profit from doing so.

That the interests of producers should receive weight in a utilitarian calculus does not mean that each dollar of surplus should count the same for both producers and consumers. One argument for counting consumer welfare more than producer welfare would be that consumers are generally less wealthy than producers. Virtually all viewers of the latest Star Wars episode will have fewer material resources than George Lucas, but many consumers of copyrighted works seem like poor candidates for distributional concern. Distributive justice would seem to demand more concern for those who cannot afford movies and books than for those who own substantial compact disc collections. Moreover, media conglomerates are generally publicly owned, and so the same middle class individuals may have an interest in copyright policy as both consumers and producers via their stock portfolios. That is not to say that the average recipient of a dollar in producer profits is no more wealthy than the average consumer paying such a dollar. It does, however, suggest that if copyright policy is to be used to advance the goals of distributive justice, the changes will have to be targeted carefully to help consumers who are most in need of assistance. Even if producers were to receive no consideration at all in a welfare calculus, the fixed costs that they incur are still worth

102. See, e.g., Gordon, supra note 4, at 1555-60 (discussing the public's entitlements to intellectual property).
103. See infra Part III.B.1.
considering, because we have seen that legal policy can shift rents from one group to another. Even if consumers are always better off with additional entrants, all else being equal, they might still be better off if a tax reduced the number of entrants and were transferred to consumers. The possibility of redistributive taxation is a common argument for placing wealth maximization as a central objective of law outside the domain of policies primarily designed to achieve distributive goals. A limitation of such an argument is that a tax may be difficult to implement, either for political or practical reasons. The theoretical possibility of a tax on movies, books, or music does not answer the distributive concern if no legislature would enact it.

More realistically, legal doctrine might change to give greater rights to consumers at the expense of producers, for example, by giving consumers greater rights to make copies of copyrighted works. Even if consumers suffer from the decreased diversity attributable to a reduction in the number of producers, their overall welfare depends on how that reduction is achieved. If the legal vehicle for reducing the number of producers is a change in the law that is generally favorable to consumers with respect to works that are produced, then the benefits to consumers from this change might be greater than the costs to them from decreased diversity. In that case, even though the focus of this analysis is on producers' losses, one could offer no distributional complaint on behalf of consumers.

b. Winner-Take-All Markets

Though the producer-consumer axis is the most obvious along which to evaluate distributional issues, distribution within each of these groups is also of concern. This section addresses distribution among producers, while the next considers distribution among consumers. Authors, musicians, artists, actors, and other contributors to copyrighted works do not form monolithic groups. In each


105. See supra text accompanying notes 19-20.
category, some are far more successful than others. There can be no more than one Oprah, Britney Spears, Thomas Kinkade, or Keanu Reeves, and only a few who enjoy comparable success at the top of their fields, financially at least, whether or not on the basis of any intrinsic merit. There can, however, be many, many starving wannabes, waiting tables part-time to eke out a living. The primary concern here will not be with whether the distribution of rewards among such beneficiaries of copyright protection is fair. Rather, it will be how a market structure in which a few participants make off with large rewards affects the analysis of overentry. Equally significant, I will show how an appreciation of overentry should prompt a reconceptualization of economic theories concerning asymmetric distribution of rents among producers.

The implications of “winner-take-all markets,” which perhaps more accurately should be dubbed “winners-take-an-awful-lot markets,” are explored in Robert H. Frank and Philip J. Cook’s *The Winner-Take-All Society.* The book explores a wide variety of markets—including professions ranging from academics to athletics. Labor markets for producers of copyrighted works receive some attention in the book, for example in the perhaps overheated observation that “[book publishing is a lottery of the purest sort, with a handful of best-selling authors receiving more than $10 million per book while armies of equally talented writers earn next to nothing.” Similarly, they observe that in the arts and entertainment fields, “only about 2 percent (16,000 people) earned $120,000 or more in 1989.” Yet their primary concern, like mine, is not the fairness of this inequitable distribution but rather its effects on decisions whether to enter the markets in the first place.

A central component of the thesis of *The Winner-Take-All Society* might initially seem superficially similar to that advanced here. “[P]otential contestants in winner-take-all markets,” Frank and Cook observe, “generally ignore an important cost imposed on others by their entry—namely, that each additional contestant reduces the odds that someone already in the contest will win.” The result is an excess of contestants in winner-take-all markets.

107. See, e.g., id. at 11-14.
108. See id. at 29-30.
109. Id. at 9. I say “overheated” because of my assessment, which is consistent with most of the Frank-Cook argument, that the best-selling authors probably on average are more talented, at least at producing what consumers want, than the relevant armies.
110. Id. at 88.
111. Id. at 9.
112. Id. at 101-23.
Cook realize that increased numbers of contestants will increase quality, but they argue that "[i]f the least talented contestants were to drop out and become engineers, teachers, or production workers, the performance levels of the top performers in winner-take-all markets would not fall by much, if at all." A lottery ticket that offers a chance at superstardom may be worth more to some than a predictable salary in a more stable profession, even if the social value of joining the stable profession would be much higher than the social value of having someone else try for stardom.

A consideration of the analysis in this Article, however, suggests that Frank and Cook's identification of the excessive entry problem with winner-take-all markets is too narrow. The winner-take-all problem offers just a variant on the more general problem of business stealing. It makes no difference to the analysis whether a new entrant into the market diminishes other players' market share or their probabilities of market dominance. Suppose that the market for singers were far more equitable than it is now, perhaps because consumers developed an affirmative distaste for familiar voices, so each of thousands of singers sold a roughly equal number of compact discs instead of a few top performers virtually cornering the market. Each new entrant into this hypothetical singing market would still be stealing business from other singers and would have no reason to take this effect into account. As long as consumers can choose among various producers, business stealing will tend to lead to excessive investment regardless of whether the market is, or approaches, winner-take-all.

Indeed, all else being equal, the excessive entry problem is likely to be of greater concern in a market with relatively even payouts than in a winner-take-all market. The reason is risk aversion. People who are risk averse are by definition more hesitant to enter a winner-take-all market than one with equal payoffs, and that will lead fewer to enter such a market, dampening any excessive entry. Frank and Cook offer a response to the argument that risk aversion might reduce excessive entry in winner-take-all markets, albeit without acknowledging the possibility that excessive entry might not be unique to winner-take-all markets at all. They argue that "[p]rivate entrepreneurs can stimulate entry into winner-take-all markets when it is insufficient," for example, by entering into

113. Id. at 109. A more accurate, though less dramatic, statement would be that if the contestants who seem to be the least talented, based on their own evaluations or those of their backers, drop out, the loss would not be great. It is always possible, however, that the party dropping out would turn out to be extraordinarily successful.
114. Id. at 117.
cooperative arrangements in which contestants agree to share their winnings. Such arrangements, however, are likely to be beset by adverse selection and moral hazard.\textsuperscript{115} Even in the absence of these obstacles, private entrepreneurship cannot fully offset risk aversion, given the costs of organizing such cooperatives. There is no need for such entrepreneurship in a market with more equitable distribution, and so, unless potential entrants are in fact risk-prefering as a result of cognitive errors,\textsuperscript{116} risk aversion will make winner-take-all markets less susceptible to excessive entry than more equitable markets, all else being equal.

Excessive entry cannot be a consequence of winner-take-all markets, although I agree with Frank and Cook that, risk aversion notwithstanding, it is more likely to be present in winner-take-all markets than in other markets. The reason is that winner-take-all markets typically exhibit low marginal production costs. Frank and Cook recognize this association, and indeed they attribute the increase in the number of such markets to “increasing leverage for the talents of those who occupy top positions and correspondingly less room for others to find a lucrative niche,”\textsuperscript{117} for example, because a singer can perform in everyone’s living room instead of only a single location.\textsuperscript{118} The possibility of such “production cloning”\textsuperscript{119} not only tends to make markets winner-take-all, but also could make excessive entry a greater concern.

Low marginal cost may accentuate the business-stealing effect because entry is unlikely to increase the number of consumers who are served. When Yo-Yo Ma can be in everyone’s living room, there is less need to have dozens of other cellists than there would be in the absence of audio recording, and business stealing accordingly is less likely to have the side benefit of resulting in more consumers being served. There is, to be sure, a competing effect. With low

\begin{enumerate}
\item[115.] The adverse selection problem is that those most likely to be winners are least likely to enter into cooperative arrangements, and the moral hazard problem is that those who enter into the cooperative arrangements will have less of an incentive to perform well. See generally KENNETH S. ABRAHAM, DISTRIBUTING RISK: INSURANCE, LEGAL THEORY, AND PUBLIC POLICY 14-15 (1986) (defining “adverse selection” and “moral hazard”).
\item[117.] FRANK & COOK, supra note 106, at viii.
\item[118.] Id. at 32-33.
\item[119.] Id. at 32.
\end{enumerate}
marginal cost, more consumers can benefit from each additional entrant. In theory, all consumers can benefit from the thousandth cellist in a world of audio recording. This effect, however, is likely to dominate only when there are very few entrants. Though the addition of a second cellist might substantially improve consumers' welfare by allowing them to purchase compact discs of both performers, once the number of cellists is sufficiently high, the addition of a marginal cellist will not lead consumers to increase their compact disc budgets, but instead will result only in substitution of the new cellist's work by some consumers for that of other performers. Although it is possible that we are not at or near this point in some markets for copyrighted works, the vast number of available works in most markets provides some support for the intuition that the optimal number of works will be lower with relatively low marginal cost.

Frank and Cook's concern about redundant entry in winner-take-all markets is well founded, although only because production cloning may make markets both winner-take-all and susceptible to business stealing, not because winner-take-all markets are inherently susceptible to business stealing. This clarification has significant implications for the scope of Frank and Cook's project. Frank and Cook see winner-take-all markets almost everywhere, yet their least persuasive examples are those in which the "production cloning" protected by copyright law is not involved. For example, they cite Alan Dershowitz as an example of a winner\textsuperscript{120} and law more generally as a winner-take-all field,\textsuperscript{121} but the case seems far weaker than in, say, music or athletics. Although some lawyers undoubtedly earn far higher salaries than others, and some rainmaker partners control a relatively large amount of business for their firms, the scale of production is still considerably restricted because any one lawyer can oversee only so many cases.\textsuperscript{122} Frank and Cook claim that students enter law school because the education gives them lottery tickets that might turn into multi-million dollar jobs.\textsuperscript{123} They offer no evidence for this assertion, however, which seems inconsistent with the common intuition that, in general, it is the most risk averse students who enter law school, in

\textsuperscript{120} Id. at 223.

\textsuperscript{121} Id. at 16-17. Frank and Cook emphasize that litigation services are offered in a zero-sum game, but this is not a winner-take-all problem.

\textsuperscript{122} For an assessment of the degree to which the legal profession is winner-take-all, see REBECCA L. SANDEFUR & JOHN P. HEINZ, WINNER-TAKE-ALL MARKETS FOR LEGAL SERVICES AND LAWYERS' JOB SATISFACTION (Am. Bar Found., Working Paper No. 9906, 1999).

\textsuperscript{123} FRANK & COOK, supra note 106, at 97-98, 111.
search of steady but unspectacular success.\textsuperscript{124} Although microcosms of the winner-take-all phenomenon may be pervasive, with the most successful in every field from catering to construction earning considerably more than other performers, Frank and Cook’s argument would be stronger if it were focused specifically on labor markets producing copyrighted works, for low marginal cost is a more significant contributor to the excessive entry problem than the winner-take-all nature of markets. Although I may be more skeptical than Frank and Cook that there will be overentry in such markets, rather than entry that produces only a small amount of social welfare, such a focus might have prompted attention to the copyright trade-off between incentives and access, as considered in this Article.

Frank and Cook’s analysis, however, does highlight one important feature of winner-take-all markets that is also likely to be present in markets for copyrighted works and that supports this Article’s thesis: consumer welfare may depend greatly on relative performance. Using boxing as an example, Frank and Cook argue that although today’s heavyweights likely are “a little faster and stronger than the champions of earlier years,”\textsuperscript{125} this improvement has not made the sport of boxing any better. “What most fans really care about is seeing the best fighters in the game go all out for the title,”\textsuperscript{126} so boxing today would not be much less attractive in a parallel universe in which the top thousand fighters alive today had instead decided to become chiropractors. Fans in the parallel universe watching the boxers who they perceived to be the best would be unaware of the potential loss to chiropractics. The game would be almost as exciting as before, and chiropractics would gain some of its strongest practitioners. It may similarly be the case that consumers care about seeing the best new movie or hearing the hot new musical group, rather than about the absolute quality of the movie or group. Presumably, absolute quality matters in such markets as well.\textsuperscript{127} To the extent that relative performance does matter, however, reductions in entry will have less of an adverse

\textsuperscript{124} A more plausible case of a winner-take-all market can be made for entry by recent law school graduates into law firms. \textit{But see} Kevin A. Kordana, Note, \textit{Law Firms and Associate Careers: Tournament Theory Versus the Production-Imperative Model}, 104 \textit{Yale L.J.} 1907, 1908-09 (1995) (arguing that tournament theory fails to explain law firm organization).

\textsuperscript{125} \textit{Frank \& Cook}, \textit{supra} note 106, at 115.

\textsuperscript{126} \textit{Id.}

\textsuperscript{127} Frank and Cook acknowledge that consumer concerns about absolute and relative performance may coexist. \textit{See id.} (“A buyer’s satisfaction with his color television set ... depends not only on the absolute quality of its pictures but also on how that quality compares with other sets in use.”).
effect on consumer welfare and overentry—or alternatively, entry that has only a small social value—is a greater danger.

c. Positional Goods

The winner-take-all market illustrates the possibility that competition among producers to be the best might reduce social welfare. Positional goods offer a similar dynamic among consumers. A positional good is one that is valued because it is scarce and consequently conveys status. For example, I may want a red Porsche convertible in part because I like the way the wind messes up my hair when I drive at 100 m.p.h., but I might also like such a convertible because my neighbor Jones will be impressed, or perhaps even a bit jealous. The consumption of positional goods is a matter of concern because consumption by one person inherently makes someone else worse off. If everyone buys the same impressive car for reasons other than inherent utility, then no one will be impressed, and yet the result will be a Nash equilibrium because in such a world, no one would want to be the only one without such a car. Although, if everyone could agree to purchase a low-end Toyota or Ford, everyone who otherwise would have purchased the Porsche for positional reasons would be better off. More generally, consumers will tend to excessively consume positional goods and insufficiently consume nonpositional goods because they do not take into account the zero-sum nature of the positioning game.

An assessment of where copyrighted goods fit on the spectrum from positional to nonpositional goods is relevant to the consideration of the social value of marginal entrants into copyright markets. The apparent benefit of increased entry is additional consumer choice, and thus additional consumption of copyrighted goods. If copyrighted goods were purely positional, then this

128. Robert Frank explains that the value of positional goods "depends relatively strongly on how they compare with things owned by others." Robert H. Frank, The Demand for Unobservable and Other Nonpositional Goods, 75 AM. ECON. REV. 101, 101 (1985). Fred Hirsch, who originated the idea of positional goods, defined the term more broadly to include those items that are inherently scarce, even if they are not desired for status alone. See FRED HIRSCH, SOCIAL LIMITS TO GROWTH 27 (1976). For example, we cannot all have full-time human servants, because someone must be the servant, and so the services of such servants may be defined as positional even though someone might want servants for reasons other than status. See Richard H. McAdams, Relative Preferences, 102 YALE L.J. 1, 19 (1992). I, for one, would be embarrassed to have a butler, but I must admit that a butler would be convenient when I feel like eating crepes but do not wish to get off the couch.

129. See supra text accompanying note 43.

130. See generally ROBERT H. FRANK, CHOOSING THE RIGHT POND (1985) (describing how the quest for status leads people to compete for positional goods).
additional consumption would have no social value, and the case for reducing production incentives would be improved. Though the precise degree of positionality is an empirical question, it seems fair to intuit that copyrighted works have positional elements, but are far from sports cars. Books especially serve primarily utilitarian purposes, and although there are some collectors who take pride in the diversity of their libraries, they are in the minority. Positional aspects of books, however, are not altogether irrelevant. Many people who purchase books never read them. Although that might be in part because book purchases, like New Year’s resolutions and health club memberships, are often aspirational, it also might reflect that ownership of a well-stocked library is a matter of pride. Such a theory seems even more plausible with collections of compact discs, movies, or computer games. Nonetheless, there are undeniable utilitarian, nonpositional advantages to owning collections that require more than one shelf, chief among them reduction of boredom from being repeatedly subject to the same work over and over again.

There are, however, three reasons that we should be concerned about positional goods even if copyrighted goods are largely nonpositional. First, even if consumers derive substantial utility from nonpositional aspects of intellectual property, positional aspects of such goods may be significant in explaining why consumers choose one product over another. In particular, innovations in copyrighted goods may be significantly positional even if the good itself is largely nonpositional. Suppose, for example, that I want a vegetarian cookbook for prosaic reasons, because I like to eat eggplant when I go to restaurants but cannot figure out how to make it taste good at home. Even so, the reasons that I might prefer the newest cookbook with the most elegant cover to a heavily discounted alternative might be positional. I might not really believe that the newest cookbook is likely to instruct me how to produce tastier eggplant than an older one, but as long as I am buying a cookbook, I might as well buy a hip new one that will complement the overall image that I am trying to project with my kitchen. As the example shows, even a relatively small degree of positionality can lead to significant excess production, because the existing stock of copyrighted works often will be sufficient to satisfy nonpositional utilitarian desires. Although this argument is stronger for books than, say, for movies, even the average moviegoer missed many movies with interesting trailers from the year before and therefore it might seem that they ought to receive equal utility from viewing an old one. Part of the success of the newest movies
may be attributable to status associated with having seen the latest movies.\(^\text{131}\)

Second, even if the underlying good is not positional, product diversity may exist to satisfy positional desires. The economic models of product diversity described above\(^\text{132}\) posit a consumer located in some ideal point in product space, but it may be that a consumer's location in product space in fact depends on the location of other consumers. A consumer, for example, might want to occupy a unique niche in product space by purchasing a unique article of clothing that no one else is likely to wear to the prom. Or, a consumer may purchase an item because it is popular in a particular subculture with which the person wishes to identify. Though this theory seems to have greater explanatory power in fashion than for copyrighted works, the possession of unique or fashionable copyrighted works might convey status. The analysis here is more complicated than for classic positional goods, because the status benefits are not necessarily detriments to others. To the extent that product diversity brings relative status rather than improved utility, however, consumers are likely to value it excessively from a social perspective, and thus there is likely to be an excess of new works.

Third, and most importantly, any reforms that would make existing copyrighted goods more widely available to consumers might tend to reduce the extent to which copyrighted goods are positional. Imagine a world in which red convertibles could be produced at very low marginal cost. If such red convertibles also were sold at extraordinarily low prices, for example as indistinguishable knockoffs, then they would no longer be positional, because there would be no status advantage to owning them. At the same time, the population could obtain the nonpositional benefits of such automobiles, such as superior handling. This is almost surely a fantasy world, in part because it is difficult to imagine how one might cheaply copy a car. A regime permitting noncommercial copying of copyrighted goods, however, is feasible and it would make intellectual property much less positional.\(^\text{133}\) Any remaining positionality would be attributable to the status conveyed through ownership of an authorized rather than an unauthorized copy. Any

\(^{131}\) Relatedly, preference for new movies relative to old ones may reflect a network effect, because viewers want to see movies that others have seen recently to facilitate interesting conversations. See infra note 152.

\(^{132}\) See supra Part I.

\(^{133}\) It might, however, enhance the positionality of devices capable of performing such copying. See infra Part III.B.1 (noting possible adverse effects of a regime in which only some consumers can afford copying devices).
doctrinal change that would enhance access to intellectual property at the expense of producers and of product diversity would counteract any tendency of consumers to invest excessively in copyrighted goods for status reasons.

2. Externalities

The last section questioned the assumption that social welfare is equal to the sum of producer and consumer welfare on the basis of distributional consumers. This section questions that assumption for the independent reason that social welfare also depends on third-party effects. Perhaps my purchase of a book from you benefits or hurts someone who is not a party to the transaction. The analysis of winner-take-all markets and positional goods highlights specific types of externalities, but the issue is far broader. This Article cannot consider all possible externalities, and will, for example, pass over the environmental effects of consumer consumption of books. The most obvious type of externality from consumption of copyrighted goods, the informational externality, might seem to push toward underentry, but I will argue that copyright doctrine is an odd place to take such an externality into account. In addition, I will show how congestion externalities and network externalities strengthen the case that overentry might occur.

a. Information Externalities

A book is not like a pizza. If you consume a pizza, there is almost no conceivable cost or benefit to me, unless I have sold you the pizza. A book, however, is not simply consumed, because books teach, inform, and persuade. Some television programs do too, as do some movies and music, though probably to a lesser degree. If a copyrighted work changes you, then it may change how you interact with me. A cookbook may improve someone's ability to cook, and perhaps that person's guests will have an easier time not cringing when complimenting the chef's cooking. Books may also serve as reference sources or teaching tools in a variety of professions, and the quality of products or services provided by those in such professions will rise as a result of such uses, benefiting consumers. More subtly, a work of fiction or a movie may change the way someone thinks, perhaps by broadening the person's horizons in a way that will lead the person to be more sympathetic to those from different cultural backgrounds. Or, a computer game may warp a child's mind and lead that child on a violent shooting rampage.
The last of these would be a negative externality, while the rest are positive externalities. The theory that a reduction in incentives to produce copyrighted works would have negative third-party effects depends on the positive externalities of marginal copyrighted works being greater than the negative ones. This seems, on balance, like a close question. Although the positive externalities of the copyrighted works of any genre might well swamp the negative externalities, the effects on the margins may point in the other direction. Although marginal consumption of books might produce more positive than negative externalities, marginal consumption of movies, television shows, and music might produce more negative than positive externalities. If television programming suddenly became a bit less attractive, then the resulting decision of a television viewer to watch less television rather than more seems likely to lead that television viewer to spend more time on economic and family pursuits. Even if the viewer is worse off, an effect which is not an externality, others are likely to be better off, if affected at all. I do not mean to suggest that third parties would be affected at all, but if they were, it is hard to fathom how the effect for the vast majority of copyrighted works would be more negative than positive.

If information externalities are relevant, they probably will be relevant only for a narrow class of copyrighted works. Garden variety pop culture may well benefit society greatly, but the bulk of the benefit is in entertainment value to the consumer, not in the advancement of broader social welfare. This is a snobby position, and I imagine that one might develop an argument that pop culture is in fact an important shaper of social attitudes. Although I am skeptical that the effect tends to be more positive than negative, I am still more skeptical that the effect is substantial enough to merit significant concern about marginal changes in the volume of entertainment harming anyone other than consumers of those products. This still leaves works that are explicitly informative, such as nonfiction books, television news, and law review articles, for which there is a more plausible case of informational externalities. Perhaps, one might argue, a copyright doctrine that encourages the production of as many works as possible is worth it even if most

134. That the consumer might be worse off is, of course, a consideration that the Salop model directly considers. See supra Part I.A.
135. For a work embracing commercially produced culture generally, see TYLER COWEN, IN PRAISE OF COMMERCIAL CULTURE (1998).
copyrighted works are rubbish, because of the large beneficial effects associated with informational works.

This argument has substantial merit, and indeed it explains my intuition that many markets for copyrighted works probably do not have socially excessive entry, but the argument can easily be overstated. Even if informational works as a whole produce substantial third-party benefits, marginal effects are unlikely to matter much. Although I may benefit from your learning to cook, it probably will not have much of an effect on me if you use a slightly older cookbook rather than the newest one. Although the production of history books promotes historical knowledge among the populace, the level of the average person's historical knowledge is unlikely to depend much on the range of new copyrighted works available to that person. Of course, copyrighted works increase human knowledge, so even if substitution effects mean that the marginal production of one work has no effect on the average person's knowledge, increases in the overall store of knowledge may be significant. Copyright policy, however, is unlikely to be the best vehicle for increasing the store of human knowledge; direct funding of scientific and humanities research is a better tailored approach. Similarly, even if increasing individuals' knowledge and awareness is a social benefit, that social benefit is likely best achieved through education spending rather than through copyright policy, even if some of that education spending is used to purchase books and other copyrighted works.

b. Congestion Externalities

The effect of informational externalities is on third parties who need not be consumers of copyrighted works themselves. Congestion and network externalities affect sellers and purchasers of related copyrighted works. With a congestion externality, the existence of too many copyrighted works of a particular type lowers demand for that entire class of works. A congestion externality affects consumers individually, whereas network externalities depend on the interaction of consumers' consumption. A positive network externality exists when one individual's consumption of a copyrighted work increases the benefit to others of consuming that work. In contrast, a negative network externality exists when one individual's consumption of a copyrighted work decreases the benefit to others of consuming that work. This section considers congestion externalities, and the next focuses on network externalities.
Congestion externalities receive attention in William Landes and Judge Posner's recent article urging that a regime of indefinitely renewable copyrights replace the existing regime of time-limited copyrights. Their analysis of congestion externalities is important, independent of their conclusion. Landes and Posner criticize a suggestion of a group of intellectual property law professors that "[t]here can be no overgrazing of intellectual property ... because intellectual property is not destroyed or even diminished by consumption." Adapting a similar observation by Mark Grady in the right-of-publicity context, Landes and Posner suggest that "congestion externalities" are possible with copyrighted works. Explaining the trademark example, they write, "a celebrity's name or likeness has public good characteristics ... yet unlimited reproduction of the name or the likeness could prematurely exhaust the celebrity's commercial value, just as unlimited drilling from a common pool of oil or gas would deplete the pool prematurely." Just as Humphrey Bogart's value might decline if his name or likeness in advertising were overused, so too might Mickey Mouse's value, if, as a result of the absence of copyright protection, he appeared in too many comic strips, advertisements, and movies. "Not only would the public rapidly tire of Mickey Mouse, but his image would be blurred, as some authors portrayed him as a Casanova, others as catmeat, others as an animal-rights advocate, still others as the henpecked husband of Minnie." Landes and Posner's argument provides some support for this Article's observation that the number of copyrighted works may be excessive, but the scope of the problem that they identify might be quite small, and their focus on congestion obscures what I believe to be a more general point about demand diversion. Landes and Posner do not note the obvious, though insufficiently explored, point that one producer's use of a copyrighted character will make some customers likely to choose that producer over another. Rather, they

140. Landes & Posner, supra note 137, at 487.
141. Id.; see also Baird, supra note 139, at 364.
argue that the absence of a property right might lead to lower demand for the products of all producers, as they illustrate with a demand curve that shifts down in response to the absence of a property right. The theory goes that the value of Mickey Mouse will be optimized over time by making him relatively scarce initially, lest the "public rapidly tire" of him. Similarly, the value of Mickey Mouse will be optimized by ensuring that his image is kept sharp by resisting uses of him that might make him lose his identity.

These are relevant considerations, but the empirics are difficult to assess. Consider first the timing issue. It is possible that the best way to ensure future interest in Mickey Mouse might be to make sure that Mickey Mouse is omnipresent today. A purpose of advertising is to build product recognition, and the widespread presence of a product can be a profitable form of increasing market share in the future. Alternatively, the future consumption of Mickey Mouse might be so uncertain that the net value of the character is maximized by full exploitation today. ABC Television executives were surely aware of concerns that the public might tire of Who Wants to Be a Millionaire?, yet nonetheless filled the network's schedule with Regis Philbin. Perhaps this is a cautionary tale, or perhaps interest would have faded anyway and the network was smart to snag ratings while viewers were interested, even if the volume of programming decreased later interest in the show. The point is not that the immediate exploitation strategy is necessarily best, but simply that sometimes it might be.

The empirics are also uncertain even within a given time frame. It is possible that an inundation of Mickey Mouse images might increase the aggregate demand for such images. The exposure to my successful film will help popularize the character and encourage others to seek out everything Mickey, and additional production conceivably could increase the demand curve. Even if my production of a Mickey Mouse film hurts other producers of Mousiana, the amount of business that I receive could be greater than the amount of business that I take away from others. The presence of an additional Mickey Mouse product will increase aggregate demand for such products by allowing each customer to consume the product most closely tailored to her interests. This is the logic of the product differentiation literature, with differentiation making product space

143. Id. at 486 fig.1.
144. Id. at 487.
more dense, to the benefit of consumers. Landes and Posner’s scenario is empirically plausible, but in the ordinary course of events, increased product diversity will have no effect, nor will it increase aggregate demand rather than decrease it.

These observations, of course, do not diminish Landes and Posner’s recognition that a copyright owner will have appropriate incentives, inundating the market in one case or manufacturing scarcity by limiting use of a copyrighted work in another, and that a property right may encourage optimal use of the resource. If scarcity across product markets or time maximizes the value of intellectual property, then the absence of a property right might lead to excessive use because no individual producer has an incentive to take congestion externalities into account. The reality of scarcity does, however, suggest that congestion externalities in the form that Landes and Posner describe them are an unusual, or at least not a pervasive, phenomenon. Landes and Posner’s criticism is a narrow one, targeted at copyright in characters and the like.

Overdistribution of any particular copyrighted work seems less likely to produce a congestion externality. Although I may be willing to see It’s a Wonderful Life only a certain number of times or may not wish to see it for a year or so after I have last seen it, it is hard to believe that increased access to the production would decrease my demand for it on the whole. Surely I will see the film more if it is played often than if it is played seldom.

Congestion externalities, in any event, are unlikely to be a significant factor producing a tendency toward excessive production of works, because copyrighted works are far more economically important than uncopyrighted works. This conclusion, however, does not diminish the possibility of excessive production more broadly, a possibility of which Landes and Posner take no account. Indeed, in discussing congestion externalities, Landes and Posner

146. Property rights have long been understood to be important not only in providing optimal production incentives, but also to encourage optimal current uses. See Landes & Posner, supra note 137, at 484 & n.26 (citing Frank Knight, Some Fallacies in the Interpretation of Social Cost, 38 Q.J. ECON. 582, 586-92 (1924)).

147. Id. at 486-87.

148. I mention It’s a Wonderful Life because of the unusual state of its copyright. The work appeared to fall into the public domain because of a failure by the owner of the film to observe copyright formalities. The copyright owner, however, later argued that unauthorized distribution of the film would infringe the copyright on the short story on which the film was based and on the music in the film. See Steven Mitchell Schiffman, Movies in the Public Domain: A Threatened Species, 20 COLUM.-VLA J.L. & ARTS 663, 671-72 (1996).

149. I do not mean to imply that a copyright owner would ensure that It’s a Wonderful Life will be on television every night. There are opportunity costs to broadcasting a show, and I might prefer on some nights to see a rerun of Greatest Police Chases II.
emphasize that "we must distinguish between technological and pecuniary externalities," and they ignore the demand diversion phenomenon.\textsuperscript{150} As shown above, however, pecuniary externalities can matter in circumstances of imperfect competition.\textsuperscript{151} What Landes and Posner miss is the significance of investments in copyrighted works. Even if my decision to produce a new Mickey Mouse film has no effect on aggregate demand, or even increases it, the production may lower social welfare once the fixed costs of producing the film are taken into account. Although Landes and Posner recognize the possibility that congestion in product markets on occasion may lessen consumers' interest in those markets as a whole, they take no account of the social cost of producing the congestion in the first place.

c. Network Externalities

Whereas the analysis of congestion focuses on individual consumers confronted by a range of similar products, the network externality analysis highlights the effects of one consumer's consumption on another.\textsuperscript{152} The analysis of network externalities is particularly important in the software market, because one person's decision to use a particular brand of software makes that software brand more attractive to others.\textsuperscript{153} Network effects might exist to a lesser extent with consumers of books, movies, or music. My enjoyment of a book may depend in part on my ability to discuss it with others, so your decision to read the same book as me will produce a benefit to me.\textsuperscript{154} If two torts professors assign the same

\begin{itemize}
\item \textsuperscript{150} Landes & Posner, supra note 137, at 486.
\item \textsuperscript{151} See supra Part I.A.3.
\item \textsuperscript{152} I use the term "network externality" rather than "network effect" because I am analyzing whether nonoptimal entry may occur as a result of the effect of one consumer's consumption on another consumer. I recognize, however, that network externalities sometimes can be internalized and that network effects need not inherently lead to suboptimal outcomes. Some authors have suggested reserving the term "network externality" for markets in which these externalities lead to inefficiencies. \textit{See}, e.g., S.J. Liebowitz & Stephen E. Margolis, Network Externality: An Uncommon Tragedy, 8 J. ECON. PERSP. 133, 135 (1994).
\item \textsuperscript{153} For an analysis considering both software and other markets, see Mark A. Lemley & David McGowan, Legal Implications of Network Economic Effects, 86 CAL. L. REV. 479 (1998).
\item \textsuperscript{154} A book would thus be a solidarity good. Guy Pessach has recently used the phenomenon of solidarity goods to argue that copyright law may discourage even non-infringing works, particularly non-infringing works made by parties other than major media companies, which may never reach consumers as a result of the dominance of major media products. \textit{See} Guy Pessach, Copyright Law as a Silencing Restriction on Noninfringing Materials: Unveiling the Scope of Copyright's Diversity Externalities, 76 S. CAL. L. REV. 1067 (2003). In the terms of this section, the network benefits from solidarity goods may produce a type of path-dependence that prevents the marketing of alternative works.
\end{itemize}
casebook, students in different classes will find it easier to study together. Similarly, the tendency of many moviegoers to see movies as soon as the films arrive in theaters, rather than waiting for the crowds to thin or the price to drop, suggests that these effects may be important indeed. Finally, I may wish to exhibit familiarity with the same music that others enjoy.155

The increasing returns associated with network markets are, of course, beneficial to the participants in these markets. There are, however, at least two reasons that network externalities could lead to inefficient outcomes. First, realization of positive network externalities requires implicit coordination, and entrants into markets may not fully take into account that their entry might frustrate such coordination. Company A and Company B may produce two incompatible word processing programs, and all consumers would benefit if only they could settle on one company or the other. Because the companies' products are so similar in quality, the existence of rival programs may persist for a period of time, limiting the positive network benefits that consumers can receive. It is therefore possible that reduced rents to software companies might improve the utility of software by reducing the number of companies that decide to enter software markets. Analogous phenomena, though not as powerful, occur in other media. If I see movies because I like to discuss them with others, then the existence of a diverse array of movies may frustrate our attempts at conversation. If two good movies are released one weekend, but you and I each have time for only one and do not coordinate, then we may end up seeing different movies. Even if each of us benefited from the density of product space in the moviegoing experience itself, that same density may limit our ability to share our experiences. This consequence likely produces a tendency toward excess production, but it should not be exaggerated. People, after all, often do succeed in implicitly coordinating their behavior, as one movie, perhaps because of hype or word-of-mouth, becomes a focal point.156 Those who wish to discuss movies will see that specific movie rather than some other movie.

Second, network externalities may contribute to path dependence. The most popular example in the literature is the QWERTY

155. Of course, for the same reason, music might be characterized as a positional good. See supra Part II.A.1.c. Perhaps I invest in music to be in the cool crowd, but my investment may harm others by diluting their relative coolness quotient. Stated purely in network externality terms, network externalities that are positive because they cement in-group relations may also be characterized as negative because of their effect on those outside the group.

156. See generally THOMAS C. SCHELLING, THE STRATEGY OF CONFLICT 54-58 (1960) (discussing "tacit coordination" games where participants seek out a focal point).
keyboard, which, though it is allegedly an inferior layout, is the dominant standard.\textsuperscript{57} Keyboard users are unable to switch to a better standard because there are network benefits to using the same keyboard as others, or so the story goes. The welfare implications might seem to point to the production of an insufficient number of works, because a greater number of works may help prevent path dependence. Any benefits from a reduced number of works, however, come at the expense of network benefits. It seems unlikely that a decrease in the number of works will increase welfare by frustrating network effects. Perhaps it could happen in a rapidly growing market because the welfare of the initial users may be of much less significance than the welfare of subsequent users. In such a market, however, an innovative product might be able to overcome the network effects enjoyed by a dominant but inferior product. In any event, path dependence is only a concern with software, not with other copyrighted works. The network externalities analysis on the whole supports this Article's observation that an excessive number of copyrighted works may be produced.

\textbf{B. Differentiation and Democracy}

This Article focuses on the economics of copyright, but scholars in recent years increasingly have focused on copyright through the lens of democratic theory.\textsuperscript{58} Most prominently, Neil Netanel has analyzed copyright's importance to democracy in a series of articles,\textsuperscript{59} suggesting that copyright underwrites an expressive

\begin{footnotes}
\item[57] The inferiority, however, may be exaggerated. See, e.g., S.J. Liebowitz \& Stephen E. Margolis, \textit{The Fable of the Keys}, 33 J.L. \& ECON. 1 (1990).
sector and an independent press that play an integral role in
democratic governance. It might thus seem that even if economic
analysis suggests that overentry is likely to be a problem, these
corns would be swamped by democratic considerations. I do not
question the importance of copyright to democracy, and many of
Netanel's recommendations for copyright doctrine are consistent
with an understanding of overentry. Nonetheless, I will argue that
democratic considerations, though relevant to the resolution of some
doctrinal issues, do not offer a strong challenge to a focus on
demand diversion. This is so for two reasons, which I will explain in
the two subsections that follow. First, the democratic and economic
interests underlying copyright are, for the most part, likely to be
aligned on issues of copyright policy. Second, to the extent these
interests diverge, there is reason to believe that a reduction in the
number of works would have as significant democracy-enhancing as
democracy-harming effects.

1. Democracy vs. Economics

Netanel suggests several related vehicles through which copy-
right fosters a democratic civil society. First, the dissemination of
copyrighted works is "a fundamental building block of democratic
association," facilitating "the exchange of information and ideas" in
associations of like-minded individuals. Netanel, Democratic Civil Society, supra
note 159, at 348.

Second, copyright promotes education, allowing "citizens to articulate their interests"
and draw upon existing knowledge and ideas.

Third, "public communication ... serves as an independent, critical component of
civil society," providing "a locus of liberative discourse."

Fourth, copyright allows for "considerable independence from government
administrators and private patrons who would otherwise meddle in
expressive content."

Society] (presenting a comprehensive view of copyright's role in democratic governance); Neil
Weinstock Netanel, Locating Copyright Within the First Amendment Skein, 54 STAN. L. REV. 1 (2001) (considering the appropriate First Amendment treatment of copyright law); Neil
Weinstock Netanel, Market Hierarchy and Copyright in Our System of Free Expression, 53 VAND. L. REV. 1879, 1884 (2000) (arguing that concentration of media ownership may lead to
"the disproportionate power of wealthy speakers and audiences to determine the mix of speech
that comprises our public discourse"). For a critique of Netanel's work, and in particular of his
Market Hierarchy article, see Christopher S. Yoo, Copyright and Democracy: A Cautionary
Note, 53 VAND. L. REV. 1933 (2000). The focus here is on Netanel, Democratic Civil Society,
supra.

160. Netanel, Democratic Civil Society, supra note 159, at 348.
161. Id.
162. Id. at 349.
163. Id. at 352-53.
As all of these points suggest, deliberation is integral to democratic governance, and copyrighted works play important roles in such deliberation. The more difficult question is the extent to which, in the absence of copyright, works that may otherwise be copyrighted could serve much the same function. Democratic associations, for example, would have an incentive to communicate with their members even if third parties could copy the associations' newsletters. In a world without copyright, citizens would be at least as free to draw upon existing works and ideas, albeit from a smaller stockpile. Surely many forms of public communication would exist even in the absence of copyright, and indeed politically motivated speech might occupy a larger relative place, as profit is but one motivation for the production of such speech. Because free speech protection applies as much to uncopyrighted works as to copyrighted ones, those who create such works enjoy the same legal independence, if not an equal ability to make a living by engaging in speech. The volume of works on issues of public concern is so vast that even if copyright were abolished, there would likely remain a very large number of works to serve as foundations for democratic deliberation, far more than any individual could read, even if a fraction of the previous total. Academics and think tanks, after all, do not create work primarily for profit, and some form of press would likely exist even without copyright protection.\(^\text{164}\)

Of course, I do not mean to suggest that the world without copyright would be better than the world with it. Netanel presents a convincing argument that democracy would be relatively impoverished in a world without copyright, especially in emerging democracies,\(^\text{165}\) and I suspect that democratic discourse would be far less vibrant in the United States if speech were limited to those who had a noneconomic motive to engage in it. The difficulty of establishing an unequivocal democratic case for the existence of copyright at all should make us suspicious of any doctrinal recommendations that operate primarily on the margins. It is one thing to point out copyright's importance to democracy, but it is quite another to suggest that a marginal decrease in the number of works produced would impinge upon democratic deliberation. The question is whether economic and democratic considerations point in opposite directions at the margins, and although Netanel seems to imply that they might, his examples do not clearly demonstrate this.

\(^{164}\) Breyer, supra note 1, assesses the extent to which such first-mover advantages might be sufficient.

\(^{165}\) See Netanel, Global Arena, supra note 159.
Consider Netanel's discussion of the copyright term. Netanel argues that neoclassical economics "lends unreserved support to the lengthened copyright term," because neoclassical economists believe that "broad, fully transferable property rights are the best mechanism for putting existing works of authorship to their most socially valued uses." As a result, Netanel writes, neoclassical economists would favor copyright protection up to the point when the social benefit of a copyrighted work is less than the cost of obtaining permission for that work. The democratic paradigm, by contrast, would "support a richer vision of the public domain," recognizing that "works should at some point become a part of our common cultural heritage because they have considerable social value, not simply because of market failure." The democratic paradigm, however, should have no preference between the private and public domains as such. Rather, Netanel's analysis suggests that democratic theorists, like economists, should value both the production of new works and the distribution of existing works. If the neoclassical economists are correct in seeing property rights as "putting existing works of authorship to their most socially valued uses," then Netanel's insistence that the works be placed in the public domain nonetheless is perverse. Of course, the neoclassical economists might be wrong, but that is an argument on the economists' own terms.

Similarly, consider Netanel's position on "personal uses," such as reading, listening to, or copying existing works, in the context of digital works. Netanel rejects, perhaps rightly so, both the neoclassical economists' view that strong property rights in copyright owners will "achieve efficient resource allocation" and the minimalists' view that all free use tolerated in the hard copy world should be allowed as well in cyberspace. Netanel explains that "the democratic paradigm eschews the neoclassicist principle," but sees "no reason to cling to hard copy distinctions in the digital

166. I consider the copyright term further infra Part II.A.2.
167. Netanel, Democratic Civil Society, supra note 159, at 367-68.
168. Id. at 368 (citing Landes & Posner, supra note 2, at 361-62).
169. Id. at 368-69.
170. Id. at 368.
171. Rubenfeld makes a similar point, though not directly in response to Netanel's argument. See Rubenfeld, supra note 4, at 21-22 ("If copyright law gets the economics right, speech will be maximally incentivized, and copyright will therefore be constitutionally unobjectionable. From this point of view, the policy analysis is the First Amendment analysis.").
172. Netanel, Democratic Civil Society, supra note 159, at 371-76.
173. Id. at 372-73.
network environment,"¹⁷⁴ and further explains that "the democratic paradigm would not support author and publisher appropriation of a greater portion of the consumer surplus than is necessary to support self-reliant and diverse authorship."¹⁷⁵ Netanel gives no explanation, however, of why the amount "necessary to support self-reliant and diverse authorship" should be different from the optimal amount from an economic perspective. Indeed, the arguments that he provides fall well within the ambit of traditional welfare economics. For example, he claims that collective licensing organizations "are plagued by problems of monopoly power and pricing,"¹⁷⁶ which are quintessentially economic problems. That these problems have ramifications for democratic governance does not mean that the democratic balance would be any different from the economic one.

Netanel's argument might be stronger if he sought to identify where economic interests and democratic ones diverge. Economics is concerned with both the production of copyrighted works and their distribution, and Netanel is right to emphasize that both the production and distribution of copyrighted works are important for democratic purposes as well. What he needs to show to make the democratic paradigm significant is not that existing economic arguments ignore or overemphasize distribution or production, but that an aggregation of consumer and producer welfare is insufficient to capture the social optimum. Perhaps copyrighted works have, in addition to direct effects on the wealth and utility of consumers and producers, third-party effects—for example, by enriching public discourse even among those who have not purchased the work. If this is so, then the balance that economics strikes on a particular copyright issue between production and distribution might be different from what democratic theory would strike. An economist could correctly respond that this difference is just an example of a market failure, but an advocate of the democratic paradigm could retort that conventional economic tools offer no useful models for understanding or combating such a failure.

Netanel comes closest to making an argument about third-party effects in assessing the scope of the derivative right. "Given copyright owners' propensity to private censorship and systematic ability to demand supracompetitive license fees, copyright owners' expansive control over transformative uses unduly stifles the

¹⁷⁴. Id. at 373.
¹⁷⁵. Id. at 375.
¹⁷⁶. Id. at 376.
creative reformulation of existing expression," Netanel argues.\textsuperscript{177} His point about license fees is within the ambit of economics, but the censorship point may not be. A copyright owner's antidissemination motive may optimize consumer and producer welfare at the expense of potentially useful expression,\textsuperscript{178} and the democratic interest in producing criticism sometimes may be sufficiently strong to trump economic concerns about wasteful rent dissipation. This is an important caveat relevant to particular doctrinal issues,\textsuperscript{179} but it cannot form the basis for a broader attack on the point that there may be overentry in copyright markets. The example is anomalous, because the production goal of maximizing incentives to produce and the distribution goal of bringing a range of copyrighted works to consumers are in alignment with each other, though not necessarily with economic considerations more broadly.

The derivative right is thus a useful example of how democratic considerations might matter, but it tells us little about how to resolve cases in which both economic analysis and the democratic paradigm seek to achieve some optimal trade-off between the production and distribution goals. This Article's observation that the production goal might in fact point in the other direction, suggesting that the number of works may be in excess of the optimal number, does not offer an escape from the dilemma. Many of the doctrinal issues that Part I considered involve situations in which a change would both decrease the number of works and increase distribution. Even if democratic theorists would lament any decrease in the number of works, the attendant increase in distribution might not be worth it. Indeed, Netanel's emphasis on "diverse authorship"\textsuperscript{180} would suggest that he should be relatively indifferent about any reductions in the number of works if indeed demand diversion is pervasive.

Might a democratic theorist, however, offer an argument for production over distribution? One might argue that the third-party effects of copyrighted works are so great that production is far more important than distribution. For example, one might argue that critical commentary about the government has substantial value independent of how widely it is distributed, because the most

\textsuperscript{177} Id. at 378.
\textsuperscript{178} See, e.g., WILLIAM M. LANDES, COPYRIGHT, BORROWED IMAGES AND APPROPRIATION ART 15 (Univ. of Chicago, John M. Olin Law & Econ. Working Paper No. 113, 2001) (noting that copyright holders may voluntarily license transformative uses of their work only "if they approve of the way their images are used"), available at http://www.law.uchicago.edu/Lawecon/WkngPprs_101-25/113.WML.Copyright.pdf.
\textsuperscript{179} See supra Part I.B.2 (discussing parody).
\textsuperscript{180} Netanel, Democratic Civil Society, supra note 159, at 375.
relevant decision makers are likely to read it. Such arguments seem plausible, but they are merely another form of the informational externality arguments that I have already addressed. The same response is still applicable. If a policy goal is to increase human knowledge, copyright seems an inefficient vehicle. The point, however, becomes even clearer once we recognize the trade-off between production and distribution inherent in most copyright issues. Although we cannot eliminate the possibility that a different resolution of this trade-off might be appropriate given a democratic rather than an economic perspective, there is as yet no democratic criterion that would allow us to assess which way the distinction cuts. A reasonable presumption then is that democratic benefits are roughly proportional to economic welfare. Perhaps a democratic theorist might argue that producer surplus should be of less interest than consumer surplus, but Netanel at least emphasizes the value of a "self-reliant" productive sector. In any event, as I have argued, the attention that product differentiation pays to producer surplus need not be out of concern for producers per se, because policy levers may allow reallocation between producers and consumers.

2. A Democratic Assessment of Production Incentives

Even if there were no trade-off between production of new works and distribution of existing works in copyright law, there is substantial reason to doubt that democracy would be impoverished if there were fewer works, holding constant the distribution of works. One reason is simply that most works do not matter much for democracy. Democratic considerations are presumably more important in some areas than in others, and copyright law explicitly recognizes the particular importance of certain types of speech. Netanel asserts that copyright's role in democratic civil society is applicable not only to works specifically concerning "matters of political or social importance," but also to "creative works" and "works of popular culture." Art and popular culture are undoubtedly important democratic forces, but democratic considerations

181. See supra Part II.A.2.a.
182. Netanel, Democratic Civil Society, supra note 159, at 288.
183. See supra text accompanying notes 103-04.
184. See supra Part II.A.1 (discussing fair use).
185. Netanel, Democratic Civil Society, supra note 159, at 350. Netanel explains, "[o]ur public discourse ... is part entertainment, but as it entertains, it often reveals contested issues and deep fissures within our society, just as it may reinforce widely held beliefs and values." Id.
seem less salient with respect to a college football broadcast than to the publication of a news magazine that might reach approximately the same number of people. Moreover, any attempt to assess normatively whether the effects on culture of marginal changes in copyright doctrine would be for better or for worse is impossible. It does seem fair, though, to conclude that the effects would be small. The public discourse was not obviously less "rambunctious" and "effervescent" in the past than today,¹⁸⁶ even if the total number of copyrighted works created annually was lower then.¹⁸⁷

Even with respect to works of obvious social or political import, however, there is at least some reason to believe that public discourse might improve if there were fewer copyrighted works. In Republic.com, Cass Sunstein laments the potential of the Internet to increase group polarization and lessen shared experiences.¹⁸⁸ Increasingly, Sunstein observes, technology fuels "the growing power of consumers to filter what they see."¹⁸⁹ In a well-functioning democracy, Sunstein argues, citizens have shared experiences and are "exposed to materials that they would not have chosen in advance."¹⁹⁰ Public forums ensure that "[p]eople will get a glimpse, at least, of the lives of others," as well as "of the arguments being made by people with a particular point of view."¹⁹¹ In contrast, if citizens' views are formed by encounters with others who are initially like-minded, citizens are not only unlikely to change their views, but "are likely to move toward a more extreme point in the direction to which the group's members were originally inclined."¹⁹²

This group polarization phenomenon presents the danger that too many works may threaten democratic values. If liberals watch CNN while conservatives watch Fox News, if liberals read the

¹⁸⁶. Netanel uses these words to describe popular culture, but he makes no explicit claim that the quantity of works has a meaningful effect on the quantity of public discourse. Id.
¹⁸⁷. See supra text accompanying note 26. The one relevant caveat to this argument is that the growth of the Internet has created an entirely new form of discourse. But the Internet too seems to advance the case. Recent changes in the expanse of the Internet, whether as a result of the dot-com bust or as a result of the ever-increasing number of pages, may have made it more useful, but hardly can be said to have made it a less powerful or productive cultural force.
¹⁸⁹. Id. at 8 (emphasis omitted).
¹⁹⁰. Id. at 8-9.
¹⁹¹. Id. at 33.
¹⁹². Id. at 65 (emphasis omitted). Sunstein has explored this phenomenon of "group polarization" in several additional works. See, e.g., David Schkade et al., Deliberating About Dollars: The Severity Shift, 100 COLUM. L. REV. 1139, 1140 (2000); Cass R. Sunstein, Deliberative Trouble? Why Groups Go to Extremes, 110 YALE L.J. 71, 74 (2000); Cass R. Sunstein, Why They Hate Us: The Role of Social Dynamics, 25 HARV. J.L. & PUB. POL'Y 429, 429 (2002).
Washington Post while conservatives read the Washington Times, and if liberals listen to NPR while conservatives listen to Rush Limbaugh, the chance for democratic interaction, let alone consensus, declines. Neutral media, of course, would not solve the problem entirely. Even independent of media influences, Robert Huckfeldt and John Sprague have noted that Democrats tend to talk about politics with other Democrats, while Republicans tend to talk about politics with other Republicans. As it becomes increasingly easy to choose not only a form of media but also a particular channel or publication, however, the problem conceivably could get worse. Similarly, the more books that exist on education reform, the environment, criminal justice, or any other topic, the greater the chance that a reader will be able to find one that supports her preexisting conceptions on the topic, however complex these preconceptions might be.

I do not mean to conclude that a greater number of copyrighted works necessarily harms democracy. Sunstein recognizes that one reason that they might not is because “enclaves” of like-minded individuals might produce a broader range of ideas that ultimately challenge even those outside the particular enclaves. Another reason might be that the marginal effects of an increased number of copyrighted works may be opposite from the gross effects. Just as the likelihood that we are better off with existing copyright than with no copyright does not mean that a shrinking of copyright scope is necessarily bad; so too might a small increase in the number of works decrease group polarization. It seems unlikely that the number of media sources would decline sufficiently that the public would not continue to have a choice among liberal and conservative outlets. Perhaps marginal books therefore will be those that tend to take a middle position, because the first books may tend to be more extremist.

The democratic effects, like the economic ones, are likely to be small. As Mark Nadel has pointed out, citizens will continue to receive various forms of “unfiltered” commentary regardless of whether they receive customized copyrighted content. Technological and sociological changes affecting group polarization will probably swamp any effects from copyright law. Similarly, voter ignorance may be a substantial problem for democracy, but

194. Sunstein, supra note 188, at 75-79.
education is far more likely than copyright to give any hope of a solution. There are, after all, plenty of existing works—from sophisticated textbooks on economics to far simpler descriptions of how government works—that would alleviate ignorance if only people would read them. That the effects are uncertain and small, of course, does not make the issue irrelevant. The economic ramifications of changes in copyright law are perhaps almost as difficult to anticipate as the political ones, and whether marginal changes in copyright law occur will not have drastic economic ramifications either. Moreover, if Jed Rubenfeld is right that the First Amendment should be read as providing a right to imagine that trumps any economic considerations of copyright, then no balancing between economic and constitutional considerations is even appropriate. In the end, perhaps the most that can be said is that democratic theory is not so clear that we should cease paying attention to economics. This Article seeks to clarify the economics, and democratic theory offers no reason to think an economic point about product differentiation is more dangerous than any other economic consideration.

III. APPLICATIONS AND IMPLICATIONS

A. Applications

1. Peer-to-Peer Technology

Perhaps the most divisive issue in modern copyright law is the treatment of peer-to-peer technologies that allow computer users to share music and video files with other users across the Internet. The music industry has won some legal battles to shut down peer-to-peer services, although it has suffered at least one notable

---


197. One sign that the number of works may be of little importance relative to how those works are disseminated is that television networks’ decisions about which stories to report have significant effects on viewers’ conceptions of what the important issues are. See Shanto Iyengar et al., Experimental Demonstrations of the “Not-So-Minimal” Consequences of Television News Programs, 76 AM. POL. SCI. REV. 848, 848-49 (1982).

198. Rubenfeld, supra note 4, at 40 (arguing that imagination should be protected even if the right causes harm).

setback. Whatever the courts decide, technological and legislative fights are inevitable. My interest here, however, is not to conduct a doctrinal analysis, to predict the future of copyright law, or even to produce a confident normative conclusion about peer-to-peer technology. Rather, I mean to show how an understanding of the economics of product differentiation and of demand diversion can help clarify the existing debates and more clearly reveal what is at stake.

The content producers' positions on peer-to-peer technology are as straightforward as they are predictable. Peer-to-peer technology, when used to distribute copyrighted works without payment to content producers, facilitates stealing. This is primarily a moral claim, but content producers back it up with an economic one, that peer-to-peer technology threatens the profits of record companies.

The end result of this theory is that record companies will support fewer artists, who in turn will create less new music, reducing welfare both for consumers who illegally copied and for those who could not or chose not to do so. This argument represents a...

201. An emerging technological development is the creation of file-sharing networks that purport to make it impossible to trace the identities of file sharers. See, e.g., The Free Network Project (providing a network that "is entirely decentralized and publishers and consumers of information are anonymous"), available at http://freenet.sourceforge.net/ (last visited May 22, 2004). These networks, which randomly distribute files across large numbers of computers, have been slow and cumbersome in the past, but new technological developments may change that. See Will Knight, Interest in Anonymous File-Trading Grows, New Scientist, July 16, 2003, at http://www.newscientist.com/news/news.jsp?id=ns99993950. Some have claimed, however, that true anonymity is impossible, given the need to complete sharing transactions. See, e.g., Dawn C. Chmielewski, File Swappers Move Quickly to Cloak Users' Net Identities, SAN DIEGO UNION-TRIB., July 21, 2003, available at 2003 WL 6597632 (“Technologists working for the entertainment industry say these services are offering users a false sense of security. They say there's no way to remain anonymous when exchanging data—otherwise, like a letter without a postal address, the digital package would never arrive.”).
203. The American public is roughly evenly divided in opinion about whether file sharing is stealing and should be illegal. See Roper Ctr. for Public Opinion Research, PSRA Int'l/Newsweek Poll # 2003-NW13: Music Sharing, Sept. 11-12, 2003, at 7 (reporting the results of a 2000 survey indicating that 48% of Americans thought that file sharing was like stealing and should be illegal, while 48% thought that music was public property and that file sharing should not be illegal), available at ftp://ropercenter.uconn.edu/United_States%5CPSRA/USPSRA2003-NW13/version2/usprsa2003-nw13.pdf, and at WL POLL Database USPSRNEW.091303 R18.
204. See supra note 6.
205. For the Recording Industry Association of America's position on music piracy, see Recording Indus. Ass'n of Am., Anti-Piracy, at http://www.riaa.com/issues/piracy/default.asp (last visited July 23, 2003), which analogizes file sharing to piracy of the more ancient kind.
paradigmatic emphasis of the incentives part of the incentives-access paradigm. Without strong copyright protection, perhaps including even bans on technologies with at least some non-infringing uses, there will be inadequate incentives to create new works.

Some advocates of peer-to-peer technology have responded by focusing on the other part of the incentives-access trade-off, emphasizing that peer-to-peer technology increases access to copyrighted works. Others, however, have questioned the claim that peer-to-peer technology will have any adverse effect on incentives. Raymond Ku, for example, argues that Napster and other peer-to-peer programs are effecting a “creative destruction” of copyright by eliminating the need for middlemen record companies. Ku emphasizes that “the vast majority of musical artists do not earn any income in the form of royalties from the sale of music,” and indeed many end up “in debt to the recording industry for the costs of manufacturing, marketing, and distributing their music.” Less than one percent of audio releases generated sales of a million or more, the level that Ku identifies as being necessary for an artist to begin receiving royalties. The principal source of revenue for most artists is live performances, though artists may earn revenue from derivative works as well, such as concert T-shirts. Mark Nadel goes even farther than Ku, arguing that record companies’ revenues are generally used for marketing, a form of rent seeking that crowds out borderline creation. The result is that copyright law’s exclusive reproduction right may have a net negative effect on the production of copyrighted works.

These predictions that peer-to-peer technology would have no effect or even increase the production of music may well be faulty. That most artists earn no money directly from recordings does not mean that they are indifferent to the potential for such profits. Musicians may well be motivated by the slim chance that their recordings will reach the top of the charts, or at least that initial recordings will provide them publicity that subsequently will allow them to achieve massive sales with subsequent products. Just because the music industry has characteristics of a winner-take-all market does not mean that artists would continue to enter these markets if the prizes were taken away altogether.\footnote{Commentators on winner-take-all markets have indeed argued that too many people will compete for the prizes. See supra Part II.A.1.b.} Although many artists may receive marketing services in lieu of cash compensation, this remains a form of compensation, albeit a form that is reinvested in the market. Even if record companies ceased to exist, artists presumably would market their products in some fashion, though perhaps somewhat less than they do today. Though live performances probably serve as sufficient compensation for many artists, some might spend their time in other ways if there was no possibility of generating wealth from a popular compact disc.

Legalization of digital file sharing thus likely would have a negative effect on the amount of new music produced, though perhaps only a modest one. This idea returns us to the familiar imponderable of the incentives-access trade-off. Product differentiation theory alone cannot resolve this trade-off, but it can provide some useful clarification. The most obvious implication is that if there is a slight reduction in the rate at which new works are produced, consumer welfare will fall by considerably less than this percentage decrease. The artists most likely to drop out of the music business will on average be the ones least likely to succeed and thus most likely to provide the smallest increment to consumer welfare. Because the marginal works \textit{ex ante} are not necessarily the marginal works \textit{ex post}, some works that would have been successful will never be produced, but the music foregone will, on average, be less appealing to consumers than the music that remains. Moreover, consumers will substitute other musical works for the ones that are no longer produced, in part by listening to familiar songs more often, and in part by listening to what would otherwise have been unfamiliar ones. Product differentiation theory shows that if peer-to-peer technology imposes social welfare losses because of reduced production incentives, these losses are likely to be
smaller than would appear in the absence of product differentiation theory.

This Article's analysis suggests that peer-to-peer technology would have little effect on incentives, but that is only one half of the equation. Peer-to-peer technology certainly increases access to copyrighted works, but product differentiation theory suggests two caveats. First, just as the absence of one copyrighted work in the market may lead a consumer to substitute some other copyrighted work, so too may the absence of one copyrighted work in an individual consumer's music collection lead the consumer to substitute some other work in the collection. Just as doubling the size of a market for copyrighted works does not double consumer welfare, doubling the size of an individual user's music collection does not double that user's utility. The same logic that leads product differentiation theory to discount the significance of incentives thus must result in some discounting in the significance of access. This adjustment, however, is likely to be relatively modest, because peer-to-peer technology can result in dramatic increases in access. Although doubling a music collection may have only slightly beneficial welfare effects, a consumer who downloads thousands of songs but otherwise would have been able to purchase only a few compact discs may have dramatically increased welfare.

Second, the focus of product differentiation theory on the fixed costs associated with producing works clarifies that marginal cost is not the only criterion relevant to a welfare analysis. Peer-to-peer technology requires considerable fixed costs, particularly the increased investment in computers and telecommunications infrastructure used to share files. Many file sharers would use computers and high-speed Internet connections even if file sharing were impossible; that is at least true of many college students, who participate more than most in file sharing. Presumably, however, many people invest more in technology than they otherwise would in the absence of file sharing technology, and the aggregate effect of such investment counts as a social cost. This cost, plus the independent time and money marginal costs associated with

217. The music industry has targeted colleges in its enforcement efforts. See, e.g., Mike Snider, Lawmakers Say Colleges Failing to Curb Illegal File-Sharing, USA TODAY, Feb. 27, 2003, at D4 (noting that RIAA has sent notice to 2,500 colleges about specific illegal file-sharers).

218. CD burners are now standard equipment on most desktop computers. See Kevin Hunt, Record Industry Opens Attack on Consumer Rights, HARTFORD COURANT, May 23, 2002, at 21. Although these have substantial noninfringing uses, see id. (noting the use of CD burners to back up data), computer manufacturers might well not include CD burners if it were not possible to engage in file sharing. The resulting increased cost of computers is a fixed cost borne both by file sharers and by others.
downloading individual works and spoof files, must be lower than the benefits in terms of increased access that file sharers receive. When added to whatever reduction in consumer welfare is associated with the resulting reduction in the number of new works, however, these costs in theory might be greater than the benefits.

The theory of product differentiation helps clarify the costs and benefits of peer-to-peer technology, and the net effect is theoretically indeterminate. The theory nonetheless seems at least to provide some ammunition to support the legalization of sharing of digital works. The fundamental choice is whether it is worth having somewhat fewer new works and much greater access to existing works, and the theory of product differentiation especially casts doubt on the significance of the former. This conclusion, however, seems weaker for other media contexts, such as motion pictures. Movies cost far more to make than individual musical compositions, and in the long run, legalization of file sharing could have drastic effects on theater revenues. Movie theaters offer larger screens than even the most technologically advanced living rooms, and some movies earn considerable merchandising revenue, but these advantages might not be sufficient to support more than a fraction of the number of movies currently being produced. Regardless of the correctness of this analysis, it reveals that a welfare analysis of peer-to-peer technology is sensitive to the relevant facts about the particular market.

219. Spoof files are files placed by content producers and companies that they have hired, such as Overpeer, Inc., that purport to be actual copyrighted works but in fact are not. See, e.g., Benny Evangelista, Firm Sleuths Out Illegal File Sharers, S.F. CHRON., July 21, 2003, at E1.

220. The movie industry recently began an advertising campaign seeking to discourage file sharing by highlighting craftspeople whose livelihoods would be adversely affected. See Associated Press, Don't Pirate Movies ... Please! (July 22, 2003), available at http://www.cbsnews.com/stories/2003/07/22/entertainment/main564436.shtml (last visited May 22, 2004). It should not be surprising that the movie industry rather than the music industry has taken this approach. Consumers may have little sympathy for the most successful musical performers and may be skeptical that file sharing harms the relatively unsuccessful ones. Moreover, the most obvious supporting personnel for such a campaign in the music contexts work on live performances, and their jobs are therefore less susceptible to file sharing.

221. That product differentiation theory provides tentative support for legalizing some forms of file sharing, however, does not by itself suggest that existing file sharing is welfare-increasing. One problem with illegal file sharing is that such mass illegality breeds disrespect for the law. Cf. JANICE NADLER, FLOUTING THE LAW: DOES PERCEIVED INJUSTICE PROVOKE GENERAL NON-COMPLIANCE? 4 (Northwestern Law & Econ. Research Paper No. 02-9, Apr. 1, 2002) (providing experimental evidence for the proposition that observation of individuals violating the law makes others more likely to act similarly), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=353745. Moreover, there are troublesome distributive consequences to illegal file sharing. Those who violate the law have increased access to copyrighted works, both in terms of reduced availability of works and possibly in terms of greater prices.
2. The Copyright Term

Product differentiation theory can also inform the debate on the copyright term, though once again the issue is more complicated than may first appear. The Copyright Term Extension Act of 1998, upheld recently in Eldred v. Ashcroft, provides for a term of seventy years past the death of the author, with a similarly long term in the case of works for hire. As economists pointed out, the term extension for works not yet created will have only a tiny effect on production incentives, increasing the present value of a new work by no more than 0.33%. The first cut from product differentiation theory is that this number overstates the value created by the term extension. Any additional works created as a result will be the marginal works that are least likely to contribute to consumer surplus, and there likely will be many ready substitutes for them. The costs in terms of anticipated reduced access to works years in the future look even larger than they would appear in the absence of product differentiation theory.

Product differentiation theory can make this picture more nuanced. New works are created in part to compete with old works. Because newer works are more up-to-date than older works, they provide quality improvements, but much of the revenue associated with newer works comes at the expense of existing works. The incentive to create new works thus is in part business stealing. Some consumers, however, might on occasion prefer an older work priced at marginal cost to a newer work. With a very long copyright term, however, works in the public domain will tend to be so old that they will be unlikely to serve as effective substitutes, and older works still under copyright will be sold at some level above marginal cost, if at all. A shorter copyright term would make older works more effective substitutes for newer works, and it would change the calculus of producers of new works. Some marginal new works whose revenues come mostly at the expense of older works might not be produced. Thus, there exists an additional mechanism by which a long copyright term may increase the number of new works, and given the relatively small effect from increase in present value, this effect might be of considerably greater magnitude.

224. Id. § 302(c) (providing a term of 95 years from date of first publication or 120 years from creation, whichever is less).
225. Brief of Amici Curiae George A. Akerlof et al. at 6, Eldred v. Ashcroft, 537 U.S. 186 (2003) (No. 01-618). The 0.33% figure is based on an assumption that works will produce identical revenues each year.
Such an increase, however, does not provide a straightforward endorsement of a long copyright term, nor does it even necessarily make the incentives-access trade-off closer than would otherwise appear. After all, the works that will not be produced with a shorter copyright term will tend to be works whose anticipated profits with the longer copyright term stem more from demand diversion than from market expansion. The long copyright term may in fact tend to induce production of the very works that are least likely to contribute to social welfare. Even if this effect could be quantified, it does not exhaust the implications of the long copyright term. I have focused so far on the exclusive right to reproduce copyrighted works, but an additional important right is the right to prepare derivative works. In a separate paper, I argue that rent dissipation concerns, which are related to the product differentiation theory addressed here, may help justify a long copyright term, because derivative works will tend to be the most rent dissipating. For present purposes it will suffice to say that although product differentiation theory clarifies the economics of copyright, it may invite more lines of inquiry than it resolves.

B. Implications

1. Copyright and Distributive Justice

The concern for access manifested in the standard approach to copyright law’s incentives-access trade-off does not distinguish among consumers of copyrighted works. Although copyright law may provide greater or less access to copyrighted works, the consumers who will receive such access are never differentiated. Copyright scholars have made no attempts to link copyright policy to broader issues of distributive justice. In this Article, I have already explored distributional issues, by considering issues of distribution between consumers and producers and by recognizing that copyrighted works may have attributes of positional goods and that demand diversion may explain the winner-take-all nature of

227. Id. § 106(2).
These considerations strengthened the argument that marginal copyrighted works make only relatively small contributions to consumer welfare. They do not, however, directly address the connection between copyright policy and the distribution of society's wealth to the rich and poor.

The lack of attention among copyright scholars to distributive justice is surprising given the attention that the issue receives in patent law.231 This disparity is largely a result of the market for pharmaceutical products, where the availability of intellectual property is an issue of life and death, not merely of dollars and cents.232 The economics of copyright, however, are similar to the economics of patent. What makes issues concerning patents for prescription drugs so salient is not just that drugs can improve health, an observation that can cut either toward emphasizing incentives or toward emphasizing access; rather, what drives criticisms of the existing regime is that many patients cannot afford pharmaceuticals that have already been developed and could be produced at low marginal cost.233 Though the stakes are entertainment and information rather than health, much the same dynamic exists in the copyright context. Low-income individuals surely purchase some copyrighted works and enjoy free copyrighted works such as television programs, just as relatively poor people can afford relatively inexpensive drugs. Income, however, limits access to copyrighted works and results in low-income individuals not purchasing copyrighted works that they may value at more than marginal cost.

By refining the incentives-access paradigm, the product differentiation literature clarifies that the costs of self-conscious regulatory efforts to increase access to copyrighted works in low-income communities might be far less than the benefits. Copyright owners have some incentive to market to poor communities and to price discriminate in favor of the poor,234 but they will of course ordinarily

230. See supra Part II.A.1.b.
231. For a useful discussion of patent law and distributive justice, see Abraham Bell & Gideon Parchomovsky, Pliability Rules, 101 MICH. L. REV. 1, 68 (2002).
233. For an article emphasizing that drugs to treat AIDS exist but are too expensive for many people in the developing world, see Tina Rosenberg, Look at Brazil, N.Y. TIMES, Jan. 28, 2001, § 6 (Magazine), at 26.
234. See generally Meurer, supra note 12, at 91-92 (noting that price discrimination may, but need not always, favor relatively low income buyers).
do so only to the extent that it is profitable. Lowering price for the relatively poor too much may hurt copyright owners, both because of the danger of arbitrage and because poor individuals who would have purchased the relevant product in any event will no longer have to pay as much for it. The privately optimal level of discounts for the relatively poor might not be the socially optimal level. If copyright owners were required to grant discounts for the poor that were greater than whatever price discrimination they ordinarily would engage in, then there would be a negative effect on incentives to produce new works, but probably only a small effect given the relatively low purchasing power of the poor, and a positive effect on access. The rich-poor axis is a dimension on which conscious attempts by the designers of copyright law to increase access to copyrighted works would likely have only small costs.

Admittedly, it is difficult in most copyright contexts to determine just how copyright law could operationalize preferences for the poor. Perhaps fair use doctrine could take it into account, although this would make an already jumbled area of the law even less coherent. Regulation of broadcasters and telecommunications companies, however, might provide one means of increasing access. For example, suppose that the government required cable television companies in a large competitive market to offer service at cost in poor neighborhoods. This would surely reduce profits—some poor people, after all, would be willing to pay for cable service—and reduce entry as well. If different cable companies are differentiated products, the decreased diversity of offerings would drive up prices for other consumers, and some would drop out of the market. Nonetheless, the total number of consumers receiving cable television service, and perhaps even gross consumer surplus among all consumers, might increase.

235. Some patent owners, particularly owners of patents for pharmaceutical drugs, have started programs that may well lose money in an effort to ensure poor people access to the drugs. See, e.g., Merri Rosenberg, Free Medications for Uninsured Elderly, N.Y. TIMES, June 29, 2003, § 14WC, at 3 (describing one such program). Public relations is a better explanation for such attempts than benevolence.

236. Preferences for the poor, however, would fit into the dominant academic theory of fair use, which suggests that fair use is appropriate in conditions of market failure. See, e.g., Wendy J. Gordon, Fair Use as Market Failure: A Structural and Economic Analysis of the Betamax Case and Its Predecessors, 82 COLUM. L. REV. 1600 (1982). The costs of contracting and of verifying income may prevent copyright owners from giving price breaks to low income consumers, and these contracting costs are a type of market failure that commentators on fair use have considered. See id. at 1628-30.

237. The caveat is that wealthier consumers are likely to have higher gross consumer surpluses. A strict wealth maximization approach would thus have to count cable service for the wealthy as more important than cable service for the poor. Cf. David Copp, The Theory and Rationale of Cost-Benefit Analysis, 23 THEORY & DECISIONS 65, 74-77 (1987) (arguing that
Creation of such a regulatory regime would require the institution of a complex regulatory framework, but the case for a universal service mandate in some ways seems stronger for cable companies than for telephone companies, to which universal service mandates currently apply. An alternative approach could achieve a similar result through copyright law itself. For example, a provision might allow infringement by cable operators in relatively poor neighborhoods. With such a provision, individuals in qualifying neighborhoods would only have to pay for the cost of the wires and the service, not for the cost of the underlying copyrighted works. This approach might even have the beneficial effect of making low-income areas relatively more attractive places to live, slightly reducing concentrated poverty. Both of these approaches may well seem radical and politically infeasible, but this may be in part because copyright law is generally not seen as a vehicle for achieving distributive justice. This Article's analysis suggests that it is in some ways a particularly strong vehicle, because there is only a minimal social cost, in terms of reduced works produced, to free provision of copyrighted works to the poor.

Distributive justice is relevant to other copyright issues as well. A recent body of literature has developed concerning a possible resolution of the file-sharing controversy, under which the government would legalize file sharing and then compensate the owners of copyrighted works based on the number of times their works have been downloaded. A problem with such a regime is that only those cost-benefit analysis unfairly favors the wealthy). Allowance of wealth distribution as a relevant variable, however, might lead to the opposite conclusion.

238. The regulatory task would not be altogether unfamiliar, however, as much of the apparatus of natural monopoly regulation could be adopted. See generally KENNETH E. TRAIN, OPTIMAL REGULATION: THE ECONOMIC THEORY OF NATURAL MONOPOLY (1991) (providing an overview of the economics of natural monopoly regulation).

239. See generally William P. Cassidy, Jr., Comment, Universal Service in a Competitive Telecommunications Environment: The Current State of Universal Service in the European Union and United States, 25 N.C. J. INT'L L. & COM. REG. 107 (1999) (providing a comparative overview of universal service requirements). Telephone service, of course, may be more of a necessity than cable service. In the cable context, however, much of the cost of a universal service mandate ultimately will be reflected in a reduction in the number of copyrighted works, while universal service guarantees in other contexts simply shift costs from some consumers to others.


who can afford the relevant equipment would benefit. If it is feasible to create a reward system to compensate copyright owners for lost profits from file sharing,\textsuperscript{242} then it presumably also would be feasible to have a reward system compensate copyright owners for lost profits from other forms of copying. There may well be administrative challenges in creating reward systems,\textsuperscript{243} but one beneficial aspect of conventional reward system proposals is that they allow everyone access to the relevant intellectual property. A reward system that allowed benefits only to those able to invest in technology would have all of the limitations of a typical reward system, but also negative distributional effects. This Article's analysis suggests that any additional social loss from a broader reward system than one devoted to file sharing might be less than ordinarily would appear, even though copyright owners could not receive rewards equal to what they would have been able to obtain ordinarily.

2. Copyright Across Time

Justin Hughes and Joseph Liu recently offered independent suggestions that fair use doctrine should take into account the amount of time before the end of the copyright term on the infringed work.\textsuperscript{244} Hughes argued that as the economic justifications for fair use become stronger, the later in the copyright term an infringement occurs.\textsuperscript{245} In contrast, Liu emphasized that the incentives justification for copyright protection becomes weaker later in the copyright term.\textsuperscript{246} These analyses are startling because we are not accustomed to the notion that the intellectual property calculus changes over time, but they are consistent with the underlying justifications for copyright protection. Yet, if the case for allowing fair use may change over time with respect to a particular copyrighted work, might not the case for copyright protection as a whole change over time as well? This Article's analysis suggests that the answer may be yes. The more copyrighted works that exist, the more substitutes there are for any particular work, and the greater the emphasis that access should receive in the incentives-access

\textsuperscript{242} For my views on whether it would be feasible, see Michael Abramowicz, Copyrighted Works as Public Goods (2003) (unpublished manuscript, on file with author).

\textsuperscript{243} See, e.g., Michael Abramowicz, Perfecting Patent Prizes, 56 VAND. L. REV. 115 (2003) (discussing problems of existing proposals for reward systems, which focus on patent but also consider copyright in a few instances).

\textsuperscript{244} Justin Hughes, Fair Use Across Time, 50 UCLA L. REV. 775 (2003); Liu, supra note 1.

\textsuperscript{245} Hughes, supra note 244, at 778-84.

\textsuperscript{246} Liu, supra note 1, at 433 ("[T]he value of the additional incentive to the author decreases the further out we go on the copyright term.").
trade-off. Because the number of copyrighted works, and indeed the rate at which copyrighted works are produced, is growing over time,\textsuperscript{247} this argument suggests that copyright generally should become less strict over time.

There are at least two caveats to this conclusion. First, the world is becoming more complicated and specialized over time, so a greater number of works may not mean that there are more relevant substitutes for any particular work. That copyright provides incentives to fill new needs is indeed one of its virtues, but increasing complexity seems unlikely to explain all of the growth in availability of copyrighted works. Some of the increase in the number of copyrighted works is likely attributable simply to the increased size of the population. With an increased population should come some increase in the number of works, but there is no theoretical reason that society should enjoy the benefits of greater demand and supply of copyrighted works almost entirely on the incentives side of the incentives-access trade-off. In a world with a copyright regime that allowed greater access over time, we might enjoy both increased production of works over time and increased access to the works that are produced.

Second, copying technology has improved over time and is likely to continue to improve as computer technology becomes ever more commonplace in portable devices. A natural technological tendency will undermine copyright over time, and the increased expansiveness of copyright doctrine, especially with respect to technology-specific legislation like the Digital Millennium Copyright Act,\textsuperscript{248} may serve as a counterweight. This Article's analysis suggests that perhaps this counterweight may not be as necessary as we might otherwise believe. If increased copying merely slows the acceleration of production of copyrighted works, the access benefits may well be worthwhile. Of course, copying could become so pervasive that the number of new copyrighted works might actually decrease, making the case for an expanded copyright stronger. The product differentiation perspective, however, at least points to the economically relevant aspect of the incentives portion of the incentives-access trade-off, which is the number of works produced, not simply the profits of the producers.

\textsuperscript{247} See supra note 26.

CONCLUSION

This Article has challenged the standard law-and-economics account of copyright by relaxing the assumption that copyrighted works are produced in perfectly competitive markets. Copyrighted works are better understood as differentiated products, and this understanding highlights the fact that many copyrighted works are similar to other copyrighted works, and that part of the incentive for the production of a new work is that some consumers will purchase the new work instead of another work. In theory, such demand diversion may lead to overentry in markets for copyrighted works, but the phenomenon of demand diversion emphasizes that marginal copyrighted works are, on average, likely to produce less social value than inframarginal works. Changes in copyright policy or technological developments that would reduce the number of copyrighted works will thus reduce consumer welfare only by a smaller amount, and this loss may be worth bearing if these changes or developments increase consumers' access to copyrighted works. Product differentiation theory demands greater attention to the access part of copyright's incentives-access trade-off than would appear appropriate in the absence of this theory.

Any conclusions about specific aspects of copyright law must be tentative, relying on theoretical rather than empirical considerations. The tension between production of new works and dissemination of existing ones is already quite complex, and the consideration of demand diversion and rent dissipation adds another wrinkle. The recent empirical turn of industrial organization scholarship and development of both data sources and tools make the prospect of careful welfare analysis a plausible one. Industrial organization scholars have already analyzed entry into the markets for yellow pages directories and radio broadcasting.

249. This turn has been called the "new empirical industrial organization." E.g., www.aw-bc.com/info/waldman_jensen/book.html (advertising a new edition of an industrial organization textbook by emphasizing its treatment of the "new empirical industrial organization").

250. One new source that will be useful if made available to scholars is Nielsen's Bookscan data tracking retail sales of over 140,000 titles. See http://www.booktrack.co.uk (discussing the data source).


252. See Steven T. Berry & Joel Waldfogel, Free Entry and Social Inefficiency in Radio Broadcasting, 30 RAND J. ECON. 397 (1999). Berry and Waldfogel find a large business-stealing effect but note that the overentry from the producers' perspective might be optimal.
We should not have too much confidence that an answer will come shortly, let alone that the state of the art will soon develop to the point where economists could offer useful testimony in individual copyright cases. A recent cutting edge industrial organization article with a similar ambition analyzed the social welfare effects of the introduction of the minivan, and the diversity of copyrighted works is likely to make the analogous project considerably more challenging. Perhaps this Article’s safest claim is that the most significant future research on copyright will come not from legal scholars borrowing broad generalizations of economic theory, but from economists seeking to combine more nuanced theory with ever more sophisticated econometric tools. The literature on product differentiation provides a framework for this more refined analysis of copyright policy.

---


254. One challenge is that a welfare analysis requires data on revenue and costs. See Berry & Waldfogel, supra note 252, at 398 ("To calculate the optimal number of firms in an industry, one needs information on revenues and costs. In particular, one needs to know how revenue per firm changes with entry."). An additional challenge is that many attributes of consumer products are unobservable or at least not easily coded, and it is thus difficult to determine the extent to which products are substitutes for one another. See, e.g., Daniel A. Ackerberg & Marc Rysman, Unobserved Product Differentiation in Discrete Choice Models: Estimating Price Elasticities and Welfare Effects (Feb. 4, 2002) (unpublished manuscript, on file with author) (considering some of the econometric difficulties associated with unobserved product differentiation and biases that can result in attempts at estimation). A recent econometric technique that seeks to avoid this problem is to calculate the covariance of utility for different products across consumers. See, e.g., Ronald L. Goettler & Ron Shachar, Spatial Competition in the Network Television Industry, 32 RAND J. ECON. 624 (2001) (using this technique in assessing competition by television networks for viewers). A similar technique is likely to be helpful in analyzing markets for books, but the large number of books relative to the number of television shows on networks at any given time may make the project far more challenging.
This Appendix reports the results of a simulation study of entry into markets for copyrighted works. The simulation is designed to reveal how the values of different parameters, reflecting both the economics of the particular market and the possibility of copying, affect the degree of overentry or underentry into the market, as well as total social welfare.

The following is a step-by-step description of the algorithm for the simulation. Italics are used to indicate parameters that were varied to determine the effect on the outcome.

**Step 1: Consumer entry.** A group of `num_consumers` representative consumers is placed in a `dim`-dimensional address space. Each representative consumer represents 10,000 actual consumers, so a purchase by a representative consumer counts 10,000 times in the calculations of producer and consumer surplus that will be reported below. A random number generator is used to assign a variety of characteristics to each representative consumer, as follows:

**Location.** Each representative consumer is assigned to a random location in the address space. Each dimension in the address space is bounded by 0 and 10. The random number generator produces a uniform distribution among those values, and the selection of each dimension is independent. For example, if `dim = 2`, then a representative consumer is as likely to be positioned at (1.10, 1.10) as at (9.90, 5.60) or (1.34, 8.56).

**Gross consumer surplus.** Each representative consumer is randomly assigned a gross consumer surplus from a uniform distribution between `min_surplus` and `max_surplus`. A representative consumer's gross consumer surplus is the maximum amount that the representative consumer will pay for a work, counting both dollar costs and transport costs.

**Transport cost.** Each representative consumer is randomly assigned a transport cost from a uniform distribution between `min_transport` and `max_transport`. The transport cost reflects how costly in dollars it is to a consumer to purchase a work located in product space at a point some distance from the consumer's current location. For example, if a representative consumer's gross consumer surplus is 10.0, and the representative consumer's transport cost is 2.0, then the consumer will be willing to spend up to 4.0 to purchase a work located at a

---

255. The complete C++ source code for the simulation, as well as the full output from execution of the simulation, is available from the author.
distance of 3.0 from the consumer, assuming there is no better deal elsewhere. 

**Ability to copy.** Each representative consumer is randomly determined to be capable of copying works or incapable of doing so. The probability that a consumer is assigned to the group that is capable of copying works is `percent_can_copy`. 

**Quality concern.** Each representative consumer who is assigned to the group that is capable of copying works is randomly assigned a “quality concern” from a uniform distribution between 0 and `max_quality_concern`. This parameter interacts with a separate parameter, `quality_degrade`, which is selected for the entire simulation.

These parameters operate to affect how much gross consumer surplus a representative consumer obtains from a copy of the work. Gross consumer surplus is multiplied by \((1 - \text{quality concern} \times (1 - \text{quality_degrade}))\). For example, suppose a representative consumer’s gross consumer surplus is 10.0. If this representative consumer’s quality concern is 1.0 and `quality_degrade` is 0.8, then the gross surplus that a consumer would obtain from the copy is only 8.0. If the representative consumer’s quality concern were 0.5, keeping all other parameters the same, then the gross surplus that a consumer would obtain from the copy is 9.0. The higher `quality_degrade`, the greater the reduction a copy produces in gross consumer surplus for consumers in general, and the higher quality concern, the greater the reduction in gross consumer surplus for a particular consumer.

**Step 2: Producer entry.** A producer enters. The producer’s work is placed at a random point in address space, using the same algorithm used to place the representative consumers. To enter, the producer pays `fixed_cost`.

**Step 3: Producer price optimization.** After entry, the producer sets an initial price by anticipating the choices of the representative consumers. The producers have full information about the representative consumers and about other producers’ locations and prices. (Therefore, the producers perfectly anticipate the consumer purchases in Step 5, below.) No producer will ever set a price lower than `marginal_cost`, which will be charged to the producer for each purchase. In setting a price, the producers consider how many consumers will decide to purchase from the producer at each possible price. For simplicity, however, each producer assumes that the other producers will not change their prices. That is, no producer considers whether a change in its own price might lead one of its rivals to change its prices in turn.
Step 4: Repeated producer entry. Steps 2 and 3 are repeated four times, so that producers enter in groups of five before the consumers make their purchasing decisions.

Step 5: Tentative consumer purchases. Each representative consumer decides whether to make a purchase, a copy, or neither. To do this, the representative consumer first calculates the net surplus that it would obtain from purchasing from each producer. The net surplus is equal to gross consumer surplus – distance * transport cost – price. If the representative consumer is one who is randomly assigned to the group that can copy, then the representative consumer also calculates the net surplus that it would obtain from copying, taking into account the cost of copying, which reflects factors such as the time cost of downloading or duplicating copyrighted works. The net surplus from copying is equal to gross consumer surplus – distance * transport cost – cost of copying. If the net surplus from all possible copying and purchasing is less than zero, then the consumer will neither purchase nor copy any work (and thus receives a net consumer surplus of zero). Otherwise, the consumer maximizes net surplus in determining whether to purchase or copy and from whom.

Step 6: Reoptimization of producer prices. Based on these tentative consumer decisions, producers reoptimize their prices, as in Step 3. Producer decisions may change in part because of the entry of other producers.

Step 7: Consumer purchases. Consumers make their purchase decisions, as in Step 5. After these purchase decisions are made, the simulation calculates total producer and consumer surplus. The total producer surplus aggregates revenue from all consumers (10,000 per representative consumers), less fixed and marginal costs. The total consumer surplus aggregates the net consumer surplus of all consumers, according to the formulas indicated in Step 5. The simulation also calculates the marginal producer surplus, i.e., the producer surplus of the last producer to enter.

Step 8: Repeat. Steps 2 through 7 are repeated, until a total of 150 producers have entered.

Step 9: Iterate. Steps 1 through 8 are repeated, so that the simulation is run a total of 200 times. The simulation then calculates the optimal entry and equilibrium entry. The optimal entry is the number of producers that produce the highest total surplus. The equilibrium entry is the largest number of producers for which the marginal producer surplus is greater than zero. Note that because producers enter five at a time (to conserve computer processing
power) the equilibrium and optimal levels of entry will be reported as multiples of five.

Before reporting the results, there are several caveats worth mentioning. Even if we could ensure that each parameter represented the appropriate value for a particular market, the simulation model as a whole contains a number of significant simplifications. In a real market, variables like gross consumer surplus might not be distributed uniformly. Fixed and marginal costs might vary from producer to producer, and higher cost works might tend to be of higher quality. Instead of purchasing zero or one works, each consumer in a real market may produce any number of works, and a simulation taking that into account would need to feature a variety of parameters, including parameters reflecting the consumer's income, taste for the type of work in general, and taste for diversity of works. Producer pricing might not be based on complete information. Producers are likely to consider the price responses of their rivals to their pricing decisions. Moreover, although this simulation assumes one work per producer, a more realistic simulation would recognize that each producer might produce a number of works, and the relatively small number of producers to works might dampen price competition. The purpose of this simulation, however, is not to produce definitive conclusions, but to provide a richer framework than is possible within the confines of a particular economic model and to draw tentative conclusions about the effects of altering different parameters.

The following table reflects a single execution of the simulation with a baseline set of parameters. These parameters were selected in part because they seemed both computationally manageable and at least roughly reasonable for markets for typical copyright goods, and in part because in this combination, optimal and equilibrium entry were approximately equal. The purpose of this table is not to determine whether entry is excessive or inadequate; both results can be achieved with adjustment of different parameters. Rather, it is to provide a baseline from which to assess changes in different parameters. In particular, this baseline will help test the theory that even if entry is optimal, policy changes may still improve social welfare. Of course, any conclusions could be different with an alternative baseline, and with the number of parameters in this model, it is impossible to test all possibilities. I have, however, not found the principal conclusions to vary with reasonable changes in the parameters.
The parameter values for this simulation are as follows: num_consumers = 70, min_surplus = 5, max_surplus = 45, min_transport = 0.5, max_transport = 4.5, max_quality_concern = 1.0, fixed_cost = 45000, marginal_cost = 3.0, cost_of_copy = 3.0, quality_degrade = 0.7, percent_can_copy = 0.4, dim = 4. The columns, from left to right, are as follows: # indicates the number of producers, PS indicates total producer surplus per potential consumer, CS indicates total consumer surplus per potential consumer, TS indicates total surplus per potential consumer, S% indicates the percentage of potential consumers who make purchases, C% indicates the percentage of potential consumers who copy, AP indicates the average price paid by consumers who make purchases, and MPS indicates the producer surplus of the last producer to enter. All of these numbers are averages across 150 iterations. In this simulation, optimal entry and equilibrium entry both turn out to be 35 firms.

<table>
<thead>
<tr>
<th>#</th>
<th>PS</th>
<th>CS</th>
<th>TS</th>
<th>MPS</th>
<th>S%</th>
<th>C%</th>
<th>AP</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0.568</td>
<td>1.01</td>
<td>1.58</td>
<td>0.114</td>
<td>0.133</td>
<td>0.0472</td>
<td>9.99</td>
</tr>
<tr>
<td>10</td>
<td>0.634</td>
<td>1.54</td>
<td>2.18</td>
<td>0.0745</td>
<td>0.207</td>
<td>0.0509</td>
<td>9.33</td>
</tr>
<tr>
<td>15</td>
<td>0.614</td>
<td>1.97</td>
<td>2.58</td>
<td>0.0526</td>
<td>0.263</td>
<td>0.0539</td>
<td>9.10</td>
</tr>
<tr>
<td>20</td>
<td>0.498</td>
<td>2.24</td>
<td>2.74</td>
<td>0.0344</td>
<td>0.305</td>
<td>0.0531</td>
<td>8.93</td>
</tr>
<tr>
<td>25</td>
<td>0.362</td>
<td>2.47</td>
<td>2.84</td>
<td>0.0165</td>
<td>0.340</td>
<td>0.0501</td>
<td>8.84</td>
</tr>
<tr>
<td>30</td>
<td>0.234</td>
<td>2.68</td>
<td>2.92</td>
<td>0.0094</td>
<td>0.371</td>
<td>0.0499</td>
<td>8.87</td>
</tr>
<tr>
<td>35</td>
<td>0.0744</td>
<td>2.87</td>
<td>2.94</td>
<td>0.0126</td>
<td>0.399</td>
<td>0.0481</td>
<td>8.86</td>
</tr>
<tr>
<td>40</td>
<td>-0.0915</td>
<td>3.00</td>
<td>2.91</td>
<td>-0.00591</td>
<td>0.421</td>
<td>0.0476</td>
<td>8.92</td>
</tr>
<tr>
<td>45</td>
<td>-0.252</td>
<td>3.13</td>
<td>2.88</td>
<td>0.00084</td>
<td>0.442</td>
<td>0.0479</td>
<td>9.01</td>
</tr>
<tr>
<td>50</td>
<td>-0.463</td>
<td>3.26</td>
<td>2.80</td>
<td>-0.0119</td>
<td>0.463</td>
<td>0.0473</td>
<td>8.97</td>
</tr>
<tr>
<td>55</td>
<td>-0.677</td>
<td>3.40</td>
<td>2.72</td>
<td>-0.00959</td>
<td>0.482</td>
<td>0.0469</td>
<td>8.96</td>
</tr>
<tr>
<td>60</td>
<td>-0.883</td>
<td>3.51</td>
<td>2.63</td>
<td>-0.0189</td>
<td>0.498</td>
<td>0.0469</td>
<td>9.00</td>
</tr>
<tr>
<td>65</td>
<td>-1.11</td>
<td>3.59</td>
<td>2.48</td>
<td>-0.0159</td>
<td>0.512</td>
<td>0.0459</td>
<td>9.01</td>
</tr>
<tr>
<td>70</td>
<td>-1.37</td>
<td>3.68</td>
<td>2.31</td>
<td>-0.0141</td>
<td>0.525</td>
<td>0.0451</td>
<td>8.98</td>
</tr>
<tr>
<td>75</td>
<td>-1.57</td>
<td>3.76</td>
<td>2.19</td>
<td>-0.0203</td>
<td>0.538</td>
<td>0.0436</td>
<td>9.06</td>
</tr>
<tr>
<td>80</td>
<td>-1.81</td>
<td>3.84</td>
<td>2.04</td>
<td>-0.0219</td>
<td>0.550</td>
<td>0.0427</td>
<td>9.09</td>
</tr>
<tr>
<td>85</td>
<td>-2.05</td>
<td>3.92</td>
<td>1.88</td>
<td>-0.0151</td>
<td>0.561</td>
<td>0.0414</td>
<td>9.11</td>
</tr>
<tr>
<td>90</td>
<td>-2.28</td>
<td>3.99</td>
<td>1.71</td>
<td>-0.027</td>
<td>0.572</td>
<td>0.0404</td>
<td>9.15</td>
</tr>
<tr>
<td>95</td>
<td>-2.53</td>
<td>4.05</td>
<td>1.52</td>
<td>-0.022</td>
<td>0.583</td>
<td>0.0396</td>
<td>9.16</td>
</tr>
<tr>
<td>#</td>
<td>PS</td>
<td>CS</td>
<td>TS</td>
<td>MPS</td>
<td>S'</td>
<td>C'</td>
<td>AP</td>
</tr>
<tr>
<td>----</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>----</td>
<td>----</td>
<td>-----</td>
</tr>
<tr>
<td>10</td>
<td>-3.03</td>
<td>4.16</td>
<td>1.13</td>
<td>-0.0278</td>
<td>0.604</td>
<td>0.039</td>
<td>9.17</td>
</tr>
<tr>
<td>11</td>
<td>-3.28</td>
<td>4.21</td>
<td>0.939</td>
<td>-0.0262</td>
<td>0.612</td>
<td>0.0382</td>
<td>9.22</td>
</tr>
<tr>
<td>11</td>
<td>-3.56</td>
<td>4.27</td>
<td>0.717</td>
<td>-0.0357</td>
<td>0.620</td>
<td>0.0371</td>
<td>9.20</td>
</tr>
<tr>
<td>12</td>
<td>-3.79</td>
<td>4.33</td>
<td>0.534</td>
<td>-0.0144</td>
<td>0.629</td>
<td>0.0366</td>
<td>9.25</td>
</tr>
<tr>
<td>12</td>
<td>-4.04</td>
<td>4.37</td>
<td>0.330</td>
<td>-0.0253</td>
<td>0.638</td>
<td>0.0359</td>
<td>9.28</td>
</tr>
<tr>
<td>13</td>
<td>-4.30</td>
<td>4.41</td>
<td>0.113</td>
<td>-0.027</td>
<td>0.645</td>
<td>0.0355</td>
<td>9.30</td>
</tr>
<tr>
<td>13</td>
<td>-4.57</td>
<td>4.46</td>
<td>-0.110</td>
<td>-0.0361</td>
<td>0.652</td>
<td>0.0351</td>
<td>9.31</td>
</tr>
<tr>
<td>14</td>
<td>-4.85</td>
<td>4.51</td>
<td>-0.342</td>
<td>-0.0404</td>
<td>0.659</td>
<td>0.0347</td>
<td>9.31</td>
</tr>
<tr>
<td>14</td>
<td>-5.10</td>
<td>4.56</td>
<td>-0.540</td>
<td>-0.0369</td>
<td>0.667</td>
<td>0.0334</td>
<td>9.34</td>
</tr>
<tr>
<td>15</td>
<td>-5.36</td>
<td>4.60</td>
<td>-0.759</td>
<td>-0.0306</td>
<td>0.673</td>
<td>0.0326</td>
<td>9.37</td>
</tr>
</tbody>
</table>
This simulation reflects the central point of this Article, that the business stealing phenomenon means that marginal works will be of less economic importance than inframarginal works. (All parameter values that I have experimented with produce the same basic result.) This can be seen by considering changes in the number of producers on producer surplus, consumer surplus, and total surplus. As more producers enter the market, consumer surplus always rises, because consumers always benefit from increases in the number of works, but each increase is smaller than the last. As the number of producers rises from 0 to 5 to 10, consumer surplus increases from 0 to 1.01 to 1.54, but when the number of producers rises from 30 to 35, consumer surplus rises from 2.68 to just 2.87. At the same time, however, producer surplus quickly begins to fall, with a decline from 0.634 to 0.614 as the number of producers falls from 10 to 15. These numbers reflect the sum of all producers' surplus, so the benefit of entry to the 11th through 15th producers are less than the costs of such entry to the 1st through 10th. (Note that both the consumer and producer surplus numbers are expressed relative to a constant, the total number of potential consumers in the market, i.e., num_consumers * 10,000.) The total surplus (sum of producer and consumer surplus) begins to fall after 35 producers have entered, and the optimal number of firms is thus 35. The column indicating marginal producer surplus shows that the equilibrium number of firms is 35 as well.

The remaining columns of Table 1 further illustrate business stealing. Note that the percentage of consumers who make purchases rises dramatically initially as more producers enter, but then levels off. With 5 producers, 13.3% of potential consumers make purchases; with 10, 20.7%. As the number of producers increases from 30 to 35, the percentage of consumers making purchases rises from 37.1% to just 39.9%. Interestingly, the percentage of consumers who choose to copy in this model initially rises as the number of producers increases but then falls. The initial rise reflects that the cost of copying becomes increasingly worth bearing as consumers find works that are more precisely what they seek. The subsequent fall reflects that increased competition makes purchasing more attractive, and therefore some consumers decide to purchase instead of copying. The change in price is reflected in the average price column, which generally falls with increased numbers of producers, though at times the price rises. Price increases may be possible because once a producer loses its marginal customers, it
may raise its price so that it can obtain more revenue from its
inframarginal customers. (Idiosyncratic deviations from trend may
also reflect noise attributable to the random element of the
simulations.) It is striking, however, that the average price charged
to purchasing consumers never changes very much, staying always
between $8.84 and $9.99.

Let us now consider how changing various parameters of the
model affect the results. Consider, for example, Table 2, which
illustrates how changes in the principal parameters defining
representative consumers affect consumers. Each of the parameters
whose value is altered is represented in reverse print, along with
the different values of that variable simulated. All other parameters
besides the single variable tested are set to the same values as in
the baseline simulation in Table 1. In the rows beneath the top
row, the consumer surplus, producer surplus, and total surplus
associated with the equilibrium level of entry are reported. Each of
these values is provided for ease of comparability in terms of the
number of potential consumers, which is constant for all parameters
except, of course, for alterations in the num_consumers variable.
Below total surplus is listed the maximum total surplus, i.e., the
total surplus associated with optimal rather than equilibrium entry.
Finally, the last three rows indicate the optimal number of firms,
the number of firms that enter in equilibrium, and the difference
between these two numbers (positive for excess entry or negative for
insufficient entry).

---

256. In some columns, the parameter is set to the same value as in the baseline simulation. Nonetheless, because the simulations were generated anew to produce these tables, and thus the numbers reported here may differ slightly from those in Table 1 as a result of random factors.
Table 2: Effect of changes in consumer parameters

This table illustrates the effect of changes in the number of consumers, the maximum consumer surplus (the higher end of the consumer surplus range from which any given consumer's surplus is selected), and the maximum transport costs (the higher end of the range from which any given consumer's transport cost is selected).

<table>
<thead>
<tr>
<th>Item</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer surplus</td>
<td>1.34</td>
<td>2.00</td>
<td>2.04</td>
<td>2.49</td>
<td>2.75</td>
</tr>
<tr>
<td>Producer surplus</td>
<td>0.12</td>
<td>-0.11</td>
<td>0.16</td>
<td>0.06</td>
<td>-0.09</td>
</tr>
<tr>
<td>Total surplus</td>
<td>1.46</td>
<td>1.89</td>
<td>2.20</td>
<td>2.55</td>
<td>2.66</td>
</tr>
<tr>
<td>Max total surplus</td>
<td>1.48</td>
<td>1.90</td>
<td>2.20</td>
<td>2.55</td>
<td>2.66</td>
</tr>
<tr>
<td>Optimal entry</td>
<td>10</td>
<td>20</td>
<td>20</td>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>Equilibrium entry</td>
<td>10</td>
<td>20</td>
<td>20</td>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>Excess entry</td>
<td>-5</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>90</th>
<th>100</th>
<th>110</th>
<th>120</th>
<th>130</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer surplus</td>
<td>3.18</td>
<td>2.80</td>
<td>3.05</td>
<td>3.37</td>
<td>3.63</td>
</tr>
<tr>
<td>Producer surplus</td>
<td>-0.30</td>
<td>0.26</td>
<td>0.18</td>
<td>0.03</td>
<td>-0.01</td>
</tr>
<tr>
<td>Total surplus</td>
<td>2.88</td>
<td>3.06</td>
<td>3.23</td>
<td>3.40</td>
<td>3.62</td>
</tr>
<tr>
<td>Max total surplus</td>
<td>2.96</td>
<td>3.07</td>
<td>3.24</td>
<td>3.43</td>
<td>3.65</td>
</tr>
<tr>
<td>Optimal entry</td>
<td>40</td>
<td>50</td>
<td>55</td>
<td>60</td>
<td>70</td>
</tr>
<tr>
<td>Equilibrium entry</td>
<td>55</td>
<td>40</td>
<td>50</td>
<td>65</td>
<td>75</td>
</tr>
<tr>
<td>Excess entry</td>
<td>15</td>
<td>-10</td>
<td>-5</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>5</th>
<th>15</th>
<th>25</th>
<th>35</th>
<th>45</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer surplus</td>
<td>0.00</td>
<td>0.00</td>
<td>0.39</td>
<td>1.44</td>
<td>2.37</td>
</tr>
<tr>
<td>Producer surplus</td>
<td>0.00</td>
<td>0.00</td>
<td>0.09</td>
<td>-0.04</td>
<td>0.06</td>
</tr>
<tr>
<td>Total surplus</td>
<td>0.00</td>
<td>0.00</td>
<td>0.47</td>
<td>1.40</td>
<td>2.43</td>
</tr>
<tr>
<td>Max total surplus</td>
<td>0.00</td>
<td>0.04</td>
<td>0.55</td>
<td>1.40</td>
<td>2.43</td>
</tr>
<tr>
<td>Optimal entry</td>
<td>0</td>
<td>5</td>
<td>10</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Equilibrium entry</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Excess entry</td>
<td>0</td>
<td>-5</td>
<td>-5</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>55</th>
<th>65</th>
<th>75</th>
<th>85</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer surplus</td>
<td>3.64</td>
<td>4.63</td>
<td>6.72</td>
<td>8.02</td>
</tr>
<tr>
<td>Producer surplus</td>
<td>-0.08</td>
<td>0.28</td>
<td>-0.97</td>
<td>-0.69</td>
</tr>
<tr>
<td>Total surplus</td>
<td>3.56</td>
<td>4.91</td>
<td>5.75</td>
<td>7.34</td>
</tr>
<tr>
<td>Max total surplus</td>
<td>3.59</td>
<td>4.94</td>
<td>6.27</td>
<td>8.00</td>
</tr>
<tr>
<td>Optimal entry</td>
<td>40</td>
<td>45</td>
<td>65</td>
<td>70</td>
</tr>
<tr>
<td>Equilibrium entry</td>
<td>45</td>
<td>55</td>
<td>100</td>
<td>115</td>
</tr>
<tr>
<td>Excess entry</td>
<td>5</td>
<td>10</td>
<td>35</td>
<td>45</td>
</tr>
<tr>
<td>max transport</td>
<td>0.5</td>
<td>1.5</td>
<td>2.0</td>
<td>2.5</td>
</tr>
<tr>
<td>---------------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Consumer surplus</td>
<td>14.60</td>
<td>12.00</td>
<td>9.56</td>
<td>7.74</td>
</tr>
<tr>
<td>Producer surplus</td>
<td>-0.40</td>
<td>-0.30</td>
<td>-0.15</td>
<td>-0.11</td>
</tr>
<tr>
<td>Total surplus</td>
<td>14.20</td>
<td>11.70</td>
<td>9.42</td>
<td>7.64</td>
</tr>
<tr>
<td>Max total surplus</td>
<td>14.50</td>
<td>12.00</td>
<td>9.73</td>
<td>7.86</td>
</tr>
<tr>
<td>Optimal entry</td>
<td>30</td>
<td>40</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>Equilibrium entry</td>
<td>50</td>
<td>60</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>Excess entry</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>max transport</th>
<th>1.0</th>
<th>4.5</th>
<th>5.0</th>
<th>5.5</th>
<th>6.0</th>
<th>6.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer surplus</td>
<td>3.81</td>
<td>3.11</td>
<td>2.23</td>
<td>1.72</td>
<td>1.63</td>
<td>1.28</td>
</tr>
<tr>
<td>Producer surplus</td>
<td>-0.05</td>
<td>-0.13</td>
<td>0.26</td>
<td>0.19</td>
<td>0.05</td>
<td>0.13</td>
</tr>
<tr>
<td>Total surplus</td>
<td>3.76</td>
<td>2.99</td>
<td>2.49</td>
<td>1.91</td>
<td>1.68</td>
<td>1.41</td>
</tr>
<tr>
<td>Max total surplus</td>
<td>3.77</td>
<td>3.01</td>
<td>2.50</td>
<td>1.96</td>
<td>1.70</td>
<td>1.46</td>
</tr>
<tr>
<td>Optimal entry</td>
<td>40</td>
<td>35</td>
<td>30</td>
<td>25</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>Equilibrium entry</td>
<td>45</td>
<td>40</td>
<td>25</td>
<td>20</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>Excess entry</td>
<td>5</td>
<td>5</td>
<td>-5</td>
<td>-5</td>
<td>-5</td>
<td>-5</td>
</tr>
</tbody>
</table>
Table 3: Effect of changes in cost parameters

This table illustrates the effects of changes in the fixed cost of entering a market for a copyrighted work and in the marginal cost of producing an additional unit of the work.

<table>
<thead>
<tr>
<th>fixed cost</th>
<th>0</th>
<th>10,000</th>
<th>20,000</th>
<th>30,000</th>
<th>40,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer surplus</td>
<td>4.06</td>
<td>4.15</td>
<td>3.98</td>
<td>3.50</td>
<td>2.88</td>
</tr>
<tr>
<td>Producer surplus</td>
<td>3.81</td>
<td>1.67</td>
<td>0.02</td>
<td>-0.56</td>
<td>-0.15</td>
</tr>
<tr>
<td>Total surplus</td>
<td>7.87</td>
<td>5.83</td>
<td>4.00</td>
<td>2.94</td>
<td>2.73</td>
</tr>
<tr>
<td>Max total surplus</td>
<td>7.87</td>
<td>5.83</td>
<td>4.20</td>
<td>3.21</td>
<td>2.77</td>
</tr>
<tr>
<td>Optimal entry</td>
<td>150+</td>
<td>150+</td>
<td>85</td>
<td>45</td>
<td>40</td>
</tr>
<tr>
<td>Equilibrium entry</td>
<td>150+</td>
<td>150+</td>
<td>125</td>
<td>85</td>
<td>45</td>
</tr>
<tr>
<td>Excess entry</td>
<td>N/A</td>
<td>N/A</td>
<td>40</td>
<td>40</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>50,000</td>
<td>60,000</td>
<td>70,000</td>
<td>80,000</td>
<td>90,000</td>
</tr>
<tr>
<td>Consumer surplus</td>
<td>2.28</td>
<td>2.04</td>
<td>1.37</td>
<td>0.90</td>
<td>0.84</td>
</tr>
<tr>
<td>Producer surplus</td>
<td>0.02</td>
<td>-0.07</td>
<td>0.13</td>
<td>0.25</td>
<td>0.18</td>
</tr>
<tr>
<td>Total surplus</td>
<td>2.30</td>
<td>1.97</td>
<td>1.50</td>
<td>1.15</td>
<td>1.01</td>
</tr>
<tr>
<td>Max total surplus</td>
<td>2.30</td>
<td>1.97</td>
<td>1.62</td>
<td>1.45</td>
<td>1.19</td>
</tr>
<tr>
<td>Optimal entry</td>
<td>25</td>
<td>20</td>
<td>20</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Equilibrium entry</td>
<td>25</td>
<td>20</td>
<td>10</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Excess entry</td>
<td>0</td>
<td>0</td>
<td>-10</td>
<td>-10</td>
<td>-5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>marginal cost</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer surplus</td>
<td>3.92</td>
<td>3.21</td>
<td>2.86</td>
<td>2.41</td>
<td>2.08</td>
</tr>
<tr>
<td>Producer surplus</td>
<td>-0.22</td>
<td>0.07</td>
<td>-0.07</td>
<td>0.02</td>
<td>0.04</td>
</tr>
<tr>
<td>Total surplus</td>
<td>3.70</td>
<td>3.29</td>
<td>2.79</td>
<td>2.43</td>
<td>2.12</td>
</tr>
<tr>
<td>Max total surplus</td>
<td>4.04</td>
<td>3.35</td>
<td>2.86</td>
<td>2.43</td>
<td>2.15</td>
</tr>
<tr>
<td>Optimal entry</td>
<td>40</td>
<td>30</td>
<td>35</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Equilibrium entry</td>
<td>65</td>
<td>45</td>
<td>40</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>Excess entry</td>
<td>25</td>
<td>15</td>
<td>5</td>
<td>0</td>
<td>-5</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Consumer surplus</td>
<td>1.69</td>
<td>1.57</td>
<td>0.71</td>
<td>1.01</td>
<td>0.65</td>
</tr>
<tr>
<td>Producer surplus</td>
<td>-0.04</td>
<td>-0.10</td>
<td>0.19</td>
<td>0.05</td>
<td>0.08</td>
</tr>
<tr>
<td>Total surplus</td>
<td>1.65</td>
<td>1.48</td>
<td>0.90</td>
<td>1.05</td>
<td>0.73</td>
</tr>
<tr>
<td>Max total surplus</td>
<td>1.68</td>
<td>1.48</td>
<td>1.27</td>
<td>1.12</td>
<td>0.96</td>
</tr>
<tr>
<td>Optimal entry</td>
<td>25</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>Equilibrium entry</td>
<td>20</td>
<td>20</td>
<td>5</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Excess entry</td>
<td>-5</td>
<td>0</td>
<td>-15</td>
<td>-10</td>
<td>-10</td>
</tr>
</tbody>
</table>
Finally, Table 4 assesses the effect of changes in parameters related to copying. The table shows that increased potential for copying can increase social welfare. In the set of simulations for the `percent_can_copy` variable, optimal entry equaled equilibrium entry when 50% of consumers could copy. When 60%, 70%, or 80% of consumers could copy, there was insufficient entry, and yet total surplus increased. This establishes that some increase in copying can increase social welfare even in a market that has neither overentry or underentry and even if that copying might lead to underentry. The intuition is that broader copying increases consumer surplus, and the phenomenon of business stealing makes it more likely that this increase will be more than sufficient to offset any decrease in consumer surplus attributable to reduced entry. Of course, it does not establish that more copying necessarily will increase social welfare. Indeed, once 90% of consumers can copy, consumer surplus in this simulation falls dramatically. Moreover, changes in the `cost_of_copy` parameter have only modest effects on total surplus, and these effects are not consistent.

Finally, Table 4 also provides limited support for the proposition that some quality degradation in copying may be better than no quality degradation, because the quality degradation leads the consumers with the highest gross consumer surplus to purchase the product. When copying produces very little quality degradation, for example when `quality_degrade` = 0.90, total surplus is lower than when there is significant quality degradation, for example when `quality_degrade` = 0.40 or 0.50. The differences, however, are modest here as well, and no clear trend emerges from this data. The data on the `max_quality_concern` variable are still more difficult to interpret, with changes leading to relatively small, inconsistent effects. It is interesting, however, that total surplus drops to its lowest value when consumers have no concern about quality degradation from copying. This provides at least some support for the view that in a world in which many consumers unquestionably do care about quality, a copyright regime that allows for some copying and some degradation in quality may be optimal. For example, a regime in which consumers can obtain analog copies but not digital copies of works could be more efficient than either a regime that successfully prevented all copying or one that enabled or tolerated some degree of perfect copying of digital works.
Table 4: Effect of changes in copying parameters

This table illustrates the effects of changes in parameters affecting whether consumers copy copyrighted works. The parameters reflect the percentage of consumers who have the technical ability to copy, the quality degradation from copying (including any decrease associated with psychic costs of having a copy rather than an original), the maximum concern that a consumer could have about quality, and the cost of making a copy.

<table>
<thead>
<tr>
<th>percent_can_copy</th>
<th>0</th>
<th>0.10</th>
<th>0.20</th>
<th>0.30</th>
<th>0.40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer surplus</td>
<td>2.08</td>
<td>2.47</td>
<td>2.34</td>
<td>2.55</td>
<td>2.28</td>
</tr>
<tr>
<td>Producer surplus</td>
<td>-0.09</td>
<td>-0.58</td>
<td>0.00</td>
<td>-0.17</td>
<td>0.16</td>
</tr>
<tr>
<td>Total surplus</td>
<td>2.00</td>
<td>1.89</td>
<td>2.33</td>
<td>2.38</td>
<td>2.44</td>
</tr>
<tr>
<td>Max total surplus</td>
<td>2.37</td>
<td>2.38</td>
<td>2.42</td>
<td>2.49</td>
<td>2.46</td>
</tr>
<tr>
<td>Optimal entry</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Equilibrium entry</td>
<td>55</td>
<td>60</td>
<td>40</td>
<td>40</td>
<td>25</td>
</tr>
<tr>
<td>Excess entry</td>
<td>25</td>
<td>30</td>
<td>10</td>
<td>10</td>
<td>-5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>0.50</th>
<th>0.60</th>
<th>0.70</th>
<th>0.80</th>
<th>0.90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer surplus</td>
<td>2.35</td>
<td>2.47</td>
<td>2.74</td>
<td>2.60</td>
</tr>
<tr>
<td>Producer surplus</td>
<td>0.08</td>
<td>-0.13</td>
<td>-0.16</td>
<td>-0.11</td>
</tr>
<tr>
<td>Total surplus</td>
<td>2.43</td>
<td>2.33</td>
<td>2.58</td>
<td>2.49</td>
</tr>
<tr>
<td>Max total surplus</td>
<td>2.43</td>
<td>2.37</td>
<td>2.58</td>
<td>2.59</td>
</tr>
<tr>
<td>Optimal entry</td>
<td>25</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Equilibrium entry</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>Excess entry</td>
<td>0</td>
<td>-5</td>
<td>-5</td>
<td>-10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>quality_degrade</th>
<th>0</th>
<th>0.10</th>
<th>0.20</th>
<th>0.30</th>
<th>0.40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer surplus</td>
<td>2.22</td>
<td>2.21</td>
<td>2.40</td>
<td>2.39</td>
<td>2.30</td>
</tr>
<tr>
<td>Producer surplus</td>
<td>0.00</td>
<td>0.06</td>
<td>-0.31</td>
<td>-0.20</td>
<td>-0.01</td>
</tr>
<tr>
<td>Total surplus</td>
<td>2.22</td>
<td>2.27</td>
<td>2.09</td>
<td>2.19</td>
<td>2.29</td>
</tr>
<tr>
<td>Max total surplus</td>
<td>2.38</td>
<td>2.39</td>
<td>2.32</td>
<td>2.34</td>
<td>2.41</td>
</tr>
<tr>
<td>Optimal entry</td>
<td>30</td>
<td>30</td>
<td>35</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Equilibrium entry</td>
<td>45</td>
<td>45</td>
<td>50</td>
<td>45</td>
<td>40</td>
</tr>
<tr>
<td>Excess entry</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>0.50</th>
<th>0.60</th>
<th>0.70</th>
<th>0.80</th>
<th>0.90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer surplus</td>
<td>2.59</td>
<td>2.54</td>
<td>2.54</td>
<td>2.12</td>
</tr>
<tr>
<td>Producer surplus</td>
<td>-0.26</td>
<td>-0.29</td>
<td>-0.15</td>
<td>0.16</td>
</tr>
<tr>
<td>Total surplus</td>
<td>2.33</td>
<td>2.25</td>
<td>2.39</td>
<td>2.28</td>
</tr>
<tr>
<td>Max total surplus</td>
<td>2.45</td>
<td>2.36</td>
<td>2.41</td>
<td>2.37</td>
</tr>
<tr>
<td>Optimal entry</td>
<td>35</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Equilibrium entry</td>
<td>45</td>
<td>40</td>
<td>35</td>
<td>20</td>
</tr>
<tr>
<td>Excess entry</td>
<td>10</td>
<td>10</td>
<td>5</td>
<td>-10</td>
</tr>
<tr>
<td>max_quality concern</td>
<td>0</td>
<td>0.10</td>
<td>0.20</td>
<td>0.30</td>
</tr>
<tr>
<td>--------------------</td>
<td>-----</td>
<td>------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Consumer surplus</td>
<td>1.85</td>
<td>2.21</td>
<td>2.43</td>
<td>2.05</td>
</tr>
<tr>
<td>Producer surplus</td>
<td>0.16</td>
<td>0.07</td>
<td>-0.03</td>
<td>0.08</td>
</tr>
<tr>
<td>Total surplus</td>
<td>2.01</td>
<td>2.28</td>
<td>2.40</td>
<td>2.13</td>
</tr>
<tr>
<td>Max total surplus</td>
<td>2.56</td>
<td>2.54</td>
<td>2.54</td>
<td>2.41</td>
</tr>
<tr>
<td>Optimal entry</td>
<td>30</td>
<td>30</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Equilibrium entry</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>Excess entry</td>
<td>-20</td>
<td>-15</td>
<td>-15</td>
<td>-20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>0.50</th>
<th>0.60</th>
<th>0.70</th>
<th>0.80</th>
<th>0.90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer surplus</td>
<td>2.48</td>
<td>2.26</td>
<td>2.11</td>
<td>2.63</td>
</tr>
<tr>
<td>Producer surplus</td>
<td>0.10</td>
<td>0.16</td>
<td>0.18</td>
<td>-0.10</td>
</tr>
<tr>
<td>Total surplus</td>
<td>2.39</td>
<td>2.41</td>
<td>2.29</td>
<td>2.53</td>
</tr>
<tr>
<td>Max total surplus</td>
<td>2.41</td>
<td>2.53</td>
<td>2.42</td>
<td>2.53</td>
</tr>
<tr>
<td>Optimal entry</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Equilibrium entry</td>
<td>25</td>
<td>20</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Excess entry</td>
<td>-5</td>
<td>-10</td>
<td>-10</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>cost_of_copy</th>
<th>0</th>
<th>0.5</th>
<th>1.0</th>
<th>1.5</th>
<th>2.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer surplus</td>
<td>2.25</td>
<td>2.68</td>
<td>2.22</td>
<td>2.16</td>
<td>2.39</td>
</tr>
<tr>
<td>Producer surplus</td>
<td>0.19</td>
<td>-0.12</td>
<td>0.20</td>
<td>0.23</td>
<td>0.06</td>
</tr>
<tr>
<td>Total surplus</td>
<td>2.44</td>
<td>2.56</td>
<td>2.42</td>
<td>2.39</td>
<td>2.44</td>
</tr>
<tr>
<td>Max total surplus</td>
<td>2.53</td>
<td>2.56</td>
<td>2.53</td>
<td>2.48</td>
<td>2.48</td>
</tr>
<tr>
<td>Optimal entry</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Equilibrium entry</td>
<td>20</td>
<td>30</td>
<td>20</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>Excess entry</td>
<td>-10</td>
<td>0</td>
<td>-10</td>
<td>-10</td>
<td>-5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.5</th>
<th>3.0</th>
<th>3.5</th>
<th>4.0</th>
<th>4.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer surplus</td>
<td>2.83</td>
<td>2.49</td>
<td>2.27</td>
<td>2.78</td>
</tr>
<tr>
<td>Producer surplus</td>
<td>-0.36</td>
<td>-0.03</td>
<td>0.04</td>
<td>-0.57</td>
</tr>
<tr>
<td>Total surplus</td>
<td>2.48</td>
<td>2.46</td>
<td>2.32</td>
<td>2.22</td>
</tr>
<tr>
<td>Max total surplus</td>
<td>2.52</td>
<td>2.46</td>
<td>2.32</td>
<td>2.47</td>
</tr>
<tr>
<td>Optimal entry</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Equilibrium entry</td>
<td>40</td>
<td>30</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>Excess entry</td>
<td>10</td>
<td>0</td>
<td>20</td>
<td>10</td>
</tr>
</tbody>
</table>