

A Unified Framework for Competition Policy and Innovation Policy

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I. Introduction

In most legal systems, competition policy and innovation policy are developed and applied within separate spheres. In the United States, one executive branch department—the Antitrust Division of the Justice Department—and one federal agency—the Federal Trade Commission—enforce the federal antitrust laws. Another federal agency, the Patent and Trademark Office, grants patents and registers trademarks. No one suggests that these agencies should adopt a common regulatory policy.

However, competition and innovation policies are inextricably intertwined. The prominent U.S. government antitrust cases of recent years have been brought against innovative firms in the technology industry—including Microsoft, Google, and Apple.¹ Throughout the history of antitrust enforcement, firms that have gained market power through innovation have often been targets of antitrust litigation. Defendants in the most important antitrust cases shaping monopolization law—Standard Oil, United States Steel, and Alcoa²—became dominant primarily through innovation in technology and business methods.

A common theory of innovation, dating to Schumpeter, is that it creates temporary monopoly power, enabling the innovator to earn a supra-competitive profit

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¹ United States v. Microsoft Corp., 253 F.3d 34 (D.C. Cir. 2001); Google, Inc. v. United States, 95 Fed. Cl. 661 (Fed. Cl. 2011); *In re Apple iPhone Antitrust Litig.*, 874 F. Supp. 2d 889 (N.D. Cal. 2012).

² Standard Oil Co. of N.J. v. United States, 221 U.S. 1 (1911); United States v. U.S. Steel Corp., 251 U.S. 417 (1920); United States v. Aluminum Co. of Am., 148 F.2d 416 (2d Cir. 1945).

as a rent on innovation until competitors copy the innovation and drive profits back down to the long-run competitive equilibrium level.³ The potential for a temporary monopoly spurs innovation. Innovation leads to monopoly. Monopoly leads to entry. Entry restores competitive pricing. To the extent that this theory explains a great deal of innovation observed in competitive markets, it implies that the same set of economic concerns should drive both the regulation of competition and the regulation of innovation.

In this article, Part II describes a model of competition law enforcement that treats competition and innovation policy as the inseparable partners they ought to be. The enforcement authority determines an optimal punishment knowing that if it sets the penalty too high, it will reduce firms' incentives to invest in innovation, and if firms do not invest, new goods and new markets will not be created. The authority therefore moderates the penalty in order to maintain investment incentives. This is distinguishable from the efficiency-based analysis associated with the Chicago School of Antitrust.⁴ Efficiency, in the sense of reducing supply-side costs or enhancing demand-side value to consumers, has been accepted by antitrust courts and enforcement agencies since the Chicago revolution as a reason for moderating antitrust penalties.⁵ Innovation, by contrast, remains a topic that is viewed as too speculative by the enforcement agencies to serve as a justification for moderating penalties.⁶

The implications of this framework for competition policy and innovation policy are quite different from what is commonly observed today. Optimal antitrust enforcement of monopolization law is more lenient when dynamic competition—primarily the innovation incentive—is taken into account. The optimal penalty is less than the level that internalizes consumer harm, the efficient penalty under the Chicago School model.⁷ Under certain conditions, subsidization of the monopolist

³ Antonella Laino, *Innovation and Monopoly: The Position of Schumpeter* 2–3 (Munich Pers. RePEc Archive, Paper No. 35321, 2011), available at <http://mpira.ub.uni-muenchen.de/35321/>.

⁴ See INGO L.O. SCHMIDT & JAN B. RITTALER, A CRITICAL EVALUATION OF THE CHICAGO SCHOOL OF ANTITRUST ANALYSIS 105–13 (1989) (examining the efficiency-based analysis of the Chicago School of Antitrust).

⁵ *Id.*

⁶ Douglas H. Ginsburg & Joshua D. Wright, *Dynamic Analysis and the Limits of Antitrust Institutions*, 78 ANTITRUST L.J. 1, 10–11 (2012) (noting that the extent to which innovation concerns should influence antitrust enforcement policy is a long-standing issue). See also JOSEPH A. SCHUMPETER, CAPITALISM, SOCIALISM, AND DEMOCRACY (3d ed. 1950); Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, in THE RATE AND DIRECTION OF INVENTIVE ACTIVITY: ECONOMIC AND SOCIAL FACTORS 609, 614–22 (1962) (analyzing the utility of antitrust enforcement in terms of monopoly and innovation); Jonathan B. Baker, *Beyond Schumpeter vs. Arrow: How Antitrust Fosters Innovation*, 74 ANTITRUST L.J. 575 (2007) (discussing whether allowing antitrust enforcement to serve as a price control method positively influences innovation); Keith N. Hylton, *Brown Shoe Versus the Horizontal Merger Guidelines*, 39 REV. OF INDUS. ORG. 95 (2011) (noting that innovation is treated as a basis for enhancing antitrust enforcement in the most recent horizontal merger guidelines).

⁷ See Keith N. Hylton & Haizhen Lin, *Innovation and Optimal Punishment, with Antitrust Applications*, 10 J. COMP. LAW & ECON. 1 (2014) (examining the efficiency difference between the optimal penalty and the efficiency penalty of the Chicago School of Antitrust efficiency-based analysis).

is an optimal policy. As for innovation policy, one possible response to a patent application is granting the patent and giving the patent holder a monetary prize as well.

In some respects, this model turns modern competition policy—which emphasizes the short-run welfare of consumers—on its head. Under the model’s prescriptions, enforcement authorities should give considerably more attention to innovation concerns than they do now. Much of current antitrust enforcement in the United States and the European Union adopts policies that are inconsistent with the recommended enforcement policies of this framework.⁸

Part II presents two models of antitrust enforcement. The first, which this article refers to as the static enforcement model, is the now-standard efficiency theory of antitrust enforcement. Under the static model, antitrust enforcement should aim to internalize consumer harm. In the second model, which incorporates innovation, the internalization policy is observed to be too punitive and reduces overall welfare relative to a more lenient policy. The relative leniency results because punishment must be constrained in order to maintain innovation incentives.

Part III discusses some implications for modern antitrust policy, as exemplified by the Supreme Court’s decision in *FTC v. Actavis, Inc.* and recent enforcement policies of the United States and the European Union.⁹ From the perspective of this article’s framework, modern antitrust policy is in many respects misguided. The innovation implications of antitrust enforcement received little consideration in *Actavis*, and current enforcement policies on matters such as patent infringement litigation reflect the same failure.

II. Models of Antitrust Enforcement

This section describes two models of antitrust enforcement. The first is called the static model, and it considers the tradeoff between consumer harm and productive efficiency. The key source for the static model is Becker’s theory of law enforcement, which as a byproduct provides a formal version of the Chicago model of antitrust enforcement.¹⁰ The Becker theory recommends a shift away from an enforcement policy that seeks to eliminate any prospect of gain to the offender—the dominant punishment policy from the time of Bentham—toward an enforcement policy of internalizing the social harm caused by the offender’s conduct.¹¹ In the antitrust setting, this implies that consumer harm should be internalized by the monopolizing firm.

⁸ Not all of antitrust law is opposed to this framework. In fact, David Evans and I have argued that the dynamic enforcement model provides a positive theory of Section 2 doctrine, which is otherwise puzzlingly lenient. David S. Evans & Keith N. Hylton, *The Lawful Acquisition and Exercise of Monopoly Power and Its Implications for the Objectives of Antitrust*, 4 COMPETITION POL’Y INT’L 203 (2008).

⁹ *FTC v. Actavis, Inc.*, 133 S. Ct. 2223 (2013).

¹⁰ Gary S. Becker & George J. Stigler, *Law Enforcement, Malfeasance, and Compensation of Enforcers*, 3 J. LEGAL STUD. 1 (1974).

¹¹ *Id.*

The second model is called the dynamic model, and it offers a simple method of incorporating innovation into the enforcement theory.¹² When innovation is incorporated, the internalization policy of Becker is excessively punitive. The optimal antitrust penalty in the dynamic model is unambiguously less than the internalizing penalty.

The dynamic competition view of antitrust enforcement has been in existence for a long time. It can be dated to Schumpeter.¹³ Still, there has been little effort to incorporate innovation concerns into models of antitrust enforcement. The dynamic framework described here was initially described informally by Evans and Hylton,¹⁴ and formalized in an article by Hylton and Lin.¹⁵

A. Static Antitrust Enforcement Model

Firms have a choice over whether to perform a monopolizing act.¹⁶ The act could be a decision to enter into an exclusivity contract or to tie one product to another. The monopolizing act allows the firm to increase its price, leading to a transfer (T) of consumer surplus to the firm. The price increase also leads to a reduction in output to a level below the competitive level and an associated loss in consumer welfare (D), which this article will also refer to as “deadweight loss.” After the monopolizing act, consumers are left with the residual surplus (W).

The firm’s monopolizing act may have efficiency consequences. For example, an exclusive dealing contract with a key input supplier could have a monopolizing effect by excluding rival firms from access to the supplier, but it could also enhance efficiency by reducing supply costs.¹⁷ The efficiency gain (E) is realized in the form of a reduction of average cost from c_0 to c_1 . The new cost curve (c_1) is shown with a dotted line because it assumes that the efficiency gain is a random event that may or may not materialize. The efficiency gain could be greater than the

¹² Evans & Hylton, *supra* note 9; Hylton & Lin, *supra* note 8.

¹³ Baker, *supra* note 7.

¹⁴ Evans & Hylton, *supra* note 9 (analyzing American antitrust laws and their framework and offering a new dynamic framework).

¹⁵ Hylton & Lin, *supra* note 8.

¹⁶ This can play out in the FRAND context. See Rebecca Haw Allensworth, *Casting a FRAND Shadow: The Importance of Legally Defining “Fair and Reasonable” and How Microsoft v. Motorola Missed the Mark*, 22 TEX. INTELL. PROP. L.J. (forthcoming 2014) (discussing the fair and reasonable standard within the scope of monopolization through essential patents); Roger D. Blair & Thomas Knight, *Problems in Sharing the Surplus*, 22 TEX. INTELL. PROP. L.J. (forthcoming 2014) (discussing the FRAND limitations on monopolization and its effect on sharing the surplus); Thomas F. Cotter, *The Comparative Law and Economics of Standard-Essential Patents and FRAND Royalties*, 22 TEX. INTELL. PROP. L.J. (forthcoming 2014) (discussing FRAND limitations on monopolization with essential patents); William H. Page, *Judging Monopolistic Pricing: F/RAND and Antitrust Injury*, 22 TEX. INTELL. PROP. L.J. (forthcoming 2014) (discussing pricing in a monopolization under FRAND limits); D. Daniel Sokol & Wentong Zheng, *FRAND in China*, 22 TEX. INTELL. PROP. L.J. (forthcoming 2014) (discussing the implications of patent monopolization under FRAND in China); Christopher S. Yoo, *Standard-Setting, FRAND, and Opportunism*, 22 TEX. INTELL. PROP. L.J. (forthcoming 2014) (discussing the role of FRAND in monopolization through essential patents).

¹⁷ For a review of the efficiency consequences of vertical contracting, see Andy C. M. Chen and Keith N. Hylton, *Procompetitive Theories of Vertical Control*, 50 HASTINGS L. J. 573 (1999).

deadweight loss ($E > D$). If so, then the firm's monopolizing act would enhance social welfare.

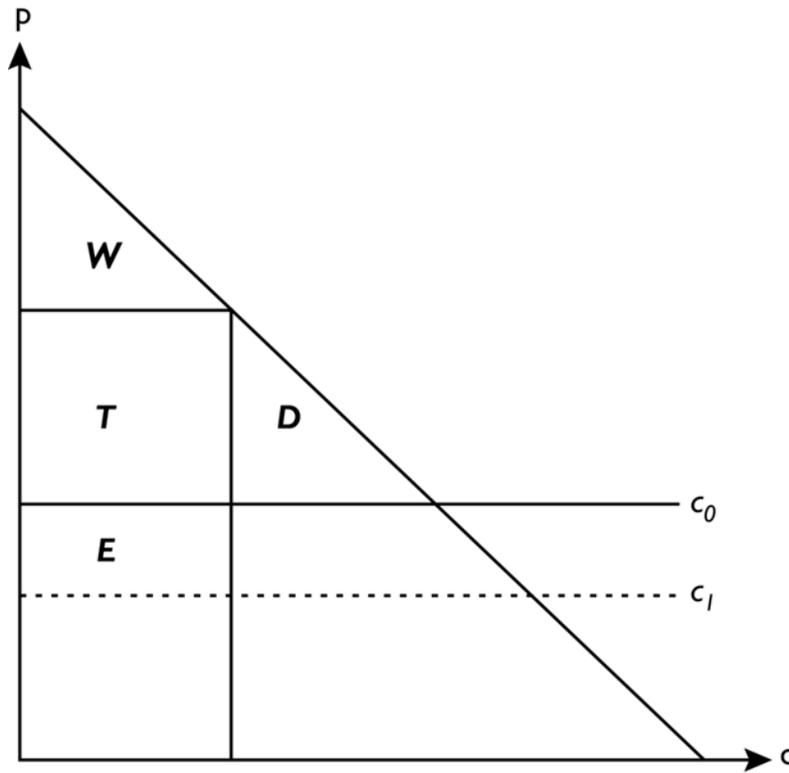


Figure 1: Welfare consequences of monopolizing act that also reduces costs.¹⁸

W: residual surplus left with the consumer

T: transfer of consumer surplus to the firm

D: loss in consumer welfare from an increased price

E: efficiency gain

c_0 : original cost curve c_1 : new cost curve

Based on these assumptions, the efficient enforcement policy internalizes the social costs of the monopolizing firm's conduct.¹⁹ Under the internalization ap-

¹⁸ Keith N. Hylton & Haizhen Lin, *Optimal Antitrust Enforcement, Dynamic Competition, and Changing Economic Conditions*, 77 ANTITRUST L.J. 247 (2010).

¹⁹ Gary S. Becker, *Crime and Punishment: An Economic Approach*, 76 J. Pol. Econ. 169 (1968). "Internalization results in 'first-best' deterrence—in the sense that the monopolization decision will be made when and only when it increases social welfare. We are equating first-best deterrence with optimal deterrence, but the two can be distinguished in some settings. For example, if enforcement agents have discretion over whether to bring an action in court or in an administrative proceeding, an optimal enforcement regime might discourage costly types of litigation or weak claims." Hylton & Lin, *supra* note 19, at 251 n.12. See also Keith N. Hylton & Thomas J. Miceli,

proach, the firm would choose to perform a monopolizing act when and only when the gain to the firm exceeds the loss to consumers. Efficient conduct would not be prohibited. The internalization rule generates a simple recommendation for the optimal monetary penalty: if enforcement is perfect and costless, the penalty should be set equal to the sum of the transfer from consumers and the foregone consumer surplus ($T+D$).

If the enforcement authority is unlikely to detect and bring an enforcement action in every instance of a monopolizing act, the optimal penalty will include a multiplier. Additionally, if enforcement is expensive, the cost should be internalized to the firm.²⁰ If the probability of enforcement is P , and the enforcement cost is C , then the optimal antitrust penalty is $(T+D)/P+C$, which I will refer to as the *static penalty*,²¹ because my description of the enforcement problem does not incorporate any consideration of the innovation effects of antitrust enforcement.

This model is, for the most part, suggestive because it treats enforcement as an exclusively public sector activity. When private enforcement actions are modeled, a link is found between the probability of a private action and the profitability of a lawsuit.²² If the multiplier is set at a level that induces all victims to bring suit, the probability of an enforcement action will be 100 percent. However, once the probability of a private enforcement action reaches 100 percent, there will no longer be a need to multiply damages. It follows that the optimal multiplier for private lawsuits efficiently balances the supply of lawsuits with the number required by the optimal deterrence goal.²³

B. Dynamic Antitrust Enforcement Model

This section describes an innovation-sensitive enforcement model. Return to Figure 1 and suppose that there are two time periods. In the first, the firm decides whether to invest in an activity that generates the market. In the second, the firm decides whether to perform the monopolizing act.

Should Tort Damages Be Multiplied?, 21 J.L. ECON. & ORG. 388, 410 (2005) (discussing first-best and optimal deterrence in the private enforcement setting).

²⁰ The assumption that enforcement is a natural byproduct of an offense simplifies matters, but it is not necessarily valid. Suppose the enforcement agency decides each case by comparing the gain from enforcement to its cost. In that case, an optimal scheme might shift the enforcement cost to the agency in order to generate efficient enforcement decisions.

²¹ KEITH N. HYLTON, *ANTITRUST LAW: ECONOMIC THEORY AND COMMON LAW EVOLUTION* 43–52 (2003); William M. Landes, *Optimal Sanctions for Antitrust Violations*, 50 U. CHI. L. REV. 652, 653–57 (1983).

²² Hylton & Miceli, *supra* note 20 (discussing links between damage recovery in private lawsuits and the level of enforcement).

²³ *Id.*

For example, suppose the firm designs and produces a new, superior type of artificial tooth during the first period.²⁴ The firm cannot get a patent on the design and the tooth is easily replicable. Facing the risk of immediate competition from firms that copy its design, the firm may choose to take an action that excludes rivals for some period of time necessary to recoup investment costs. For example, the firm might enter into exclusivity contracts with the most important downstream sellers of dental products.²⁵

In this dynamic story, some surplus is transferred to the firm (T) and some is destroyed (D), but the firm's conduct also rewards consumers with the residual surplus that remains after the monopolizing conduct (W). If not for the firm's first-period investment, which was undertaken because of anticipation of profits generated from second-period exclusionary conduct, consumers would never have received the residual surplus.

The optimal antitrust penalty has to be designed to reconcile conflicting welfare concerns. There is the static welfare concern addressed earlier, under which the monopolizing firm should be forced to regurgitate the transfer and pay for the destroyed surplus in order to optimally regulate its incentive to monopolize. However, the penalty will also affect investment incentives. In order to optimally regulate investment incentives in isolation, the ideal penalty would be negative—a subsidy equal to the residual surplus. The private benefit of the firm's investment is simply the transfer (T). The social benefit is the sum of the transfer and the residual surplus ($T+W$). In order to align private incentives with social incentives, the firm should be awarded a bounty equal to the residual surplus (W).²⁶

To find the optimal penalty, consider the objective function that a social planner would maximize. Although the expression for the objective function is set out in the margins, this article tries to explain it in the text with sufficient intuition to make the footnoted material unnecessary to follow the argument.

From Figure 1, the gain from monopolization is the sum of the transfer and the efficiency gain ($T+E$). Recall that the monopolizing act generates both a wealth transfer from consumers and an efficiency gain at the same time. To simplify, let M represent this total gain ($M = T+E$). Since the efficiency gain is a random variable, so is M . Because the firm will monopolize whenever its total gain is greater than the expected penalty (PF), the probability that monopolization will occur is

²⁴ David S. Evans & Keith N. Hylton, *The Lawful Acquisition and Exercise of Monopoly Power and Its Implications for the Objectives of Antitrust*, 4 COMPETITION POL'Y INT'L 203, 233 (2008) (proposing the example based on *United States v. Dentsply Int'l, Inc.*, 399 F.3d 181 (3d Cir. 2005)).

²⁵ *Id.*

²⁶ I assume that the monopolizing firm cannot engage in price discrimination. If the firm implements perfect price discrimination in the monopolization stage, charging each consumer the maximum that he is willing to pay, there will be no economic basis for imposing a penalty or providing a subsidy. The perfectly discriminating monopolist will not destroy any surplus. Given this, there will be no need to impose the static penalty in order to regulate the monopolization incentive. And since the perfectly discriminating monopolist will not externalize any surplus that it generates from innovation to consumers, there will be no need to provide a subsidy in order to optimally regulate the investment incentive.

just the probability that $M > PF$, and the probability that monopolization will not occur is the probability that $M < PF$.²⁷

The firm will invest before knowing the value of the total gain (M) that will be realized. After all, if the efficiency gain results from a cost reduction due to a new technology, the innovating firm will not know how great its total gain is until the technology is in place. The firm will invest if the expected gain from monopolization, net of the penalty, is greater than the investment cost. If the investment cost is a random variable, then there is a cutoff cost level equal to the expected return from monopolization—above which the firm will not invest and below which the firm will invest. The probability that the firm will invest is then the probability that the cost of investment is below the cutoff value.²⁸

The objective of the enforcement authority is to choose the optimal fine to maximize the net benefit to society. The net benefit consists of several separable components. First, there is the benefit that is internal to the business enterprise. That benefit is simply the expected profit from investment—the difference between the expected gain from monopolization and the cost of investment given that the firm chooses to invest. The expected penalty is not subtracted off the expected profit because the penalty is simply a transfer of resources within society.²⁹

Second, the enforcement authority would consider the gain to consumers if the firm decides to invest and monopolize, which is the residual surplus that remains after monopolization. However, given that the firm monopolizes, and society will bear an expected enforcement cost, the net gain to society, under this set of events, is the residual surplus to consumers less the expected enforcement cost.³⁰ Raising the fine for monopolization reduces this gain to society as long as the residual surplus is greater than the cost of enforcing the law. If the residual surplus is less than the expected cost of enforcement, then consumers do not gain anything when the firm monopolizes; in other words, the gain is not worth the cost from the perspective of the consumer. This implies that the authority should be willing to increase the fine when innovation offers little in the form of residual surplus to consumers. This would discourage monopolization, thereby preserving more of the potential innovation surplus for society.

Third, the enforcement authority would consider the benefit to society if the firm invests and then chooses not to monopolize after observing its total gain (M) in relation to the expected penalty.³¹ This is a possible outcome because the firm in-

²⁷ Assume M is governed by the probability distribution $H(M)$. Since the expected fine is equal to the probability of enforcement multiplied by the fine, the firm will monopolize whenever $M > PF$. Since the probability that the firm will not monopolize because $M < PF$ is given by $H(PF)$, the probability that the firm will monopolize is $1 - H(PF)$.

²⁸ Let the investment cost (k_o) be governed by the probability distribution Ψ with corresponding density ψ . The potential offender invests when $k_o < k_o = (1 - H(PF))[E(M | M > PF) - PF]$ and the probability of investment is $\Psi(\bar{k}_o)$.

²⁹ In technical terms, $\Psi(\bar{k}_o) \{[(1 - H(PF))E(M | M > PF) - E(k_o | k_o < \bar{k}_o)]\}$.

³⁰ In technical terms, this component of the authority's objective function is $\Psi(\bar{k}_o)(1 - H(PF))(W - PC)$.

³¹ $\Psi(\bar{k}_o)H(PF)S$.

vests without knowing its total gain. The firm then observes its total gain after investment and decides whether to monopolize. Thus, a firm may invest and then choose not to monopolize because the realized gain is too low relative to the expected penalty for monopolization.

The third outcome is the ideal one for the enforcement authority because it entails society getting the innovation surplus and the allocatively efficient outcome *ex post*. One way the authority could secure this result is to promise not to punish the firm before it invests, and then surprise the firm by imposing an extremely harsh punishment after it invests. However, such an approach would work only once. Firms would wise up and refuse to invest in the future after one firm was snookered in such a fashion by the enforcement agency. The authority will have to commit to an enforcement policy.

The optimal penalty maximizes the enforcement authority's objective function, which consists of the three components just mentioned.³² The optimal antitrust penalty in the dynamic setting is of the form $(1-\theta)(\textit{Static Penalty}) + \theta(\textit{Innovation Subsidy})$, where $\textit{Static Penalty} = (T+D)/P+C$, $\textit{Innovation Subsidy} = -W/P+C$, and the subsidy weight is $0 < \theta \leq 1$.³³

Put more plainly, the optimal dynamic penalty is a weighted average of the static penalty and a subsidy based on the residual surplus. Moreover, since the subsidy weight is positive, the optimal dynamic penalty is unambiguously less than the static (internalizing) penalty.

The subsidy weight (θ), itself an increasing function of the penalty, varies with the relative responsiveness of the firm's monopolization and investment incentives to changes in the penalty. If a change in the penalty would have no effect on *ex ante* investment, while discouraging the monopolizing act, the subsidy weight would be close to zero and the dynamic penalty would be roughly the same as the static penalty. This might be observed if the firm's discount rate is so high that a change in the penalty has little effect on *ex ante* investment incentives. If the change in the penalty has a big impact on *ex ante* investment, the subsidy weight will be close to 1, and the optimal penalty is likely to be negative—specifically, a subsidy based on the residual consumer surplus.

The sign and size of the optimal antitrust penalty depends on several factors. If the expected enforcement cost is greater than the residual surplus ($PC > W$), then the optimal penalty is always positive. This is the case in which the administrative cost of enforcement is larger than the residual surplus from innovation—the residual value to consumers is too small to justify the administrative costs of the assess-

³² Putting all of the components described so far together, the authority's objective function is $NB = \{[(1-H(PF))E(M|M > PF) - E(k_o | k_o < k_o)] + (1-H(PF))(W-PC) + H(PF)S\}$.

³³ Hylton & Lin, *supra* note 8. If F represents a fine, then a more precise description of the optimal penalty is as follows:

$$F^* = (1-\theta)\left(\frac{T+D}{P}\right) + \theta\left(\frac{-W}{P}\right) + C$$

where θ is a discontinuous function of F with the properties $\theta > 0$; $\theta = 1$ for $F^* \leq 0$, and $\theta(F^*) > 0$ for $F^* > 0$.

ment process. The penalty in this case is never as large as the static penalty. Its size is determined by that of the subsidy weight, which itself is determined by the relative elasticities of investment and monopolization with respect to the penalty. As the elasticity of monopolization increases relative to the elasticity of innovation, the optimal penalty approaches the static penalty.

If the expected enforcement cost is less than the residual surplus ($PC < W$), the optimal dynamic penalty could be a penalty or a subsidy depending on the elasticities that determine the subsidy weight. If the elasticity of innovation is greater at every penalty level than the elasticity of monopolization, the optimal subsidy weight will be equal to 1, and the optimal penalty will be negative. If the elasticity of innovation is not greater than the elasticity of monopolization, the optimal penalty will be positive.

As a result, the regulatory program suggested by this analysis looks roughly as follows. If the expected enforcement cost exceeds the residual surplus, the penalty is positive, but not as high as the static penalty. There is no need to subsidize in this case because there is no benefit externalized by the innovation. The entire benefit from innovation is enjoyed by the firm. Still, since there is a benefit from innovation, the optimal policy is lenient relative to the static enforcement policy.

If the expected enforcement cost is less than the residual surplus, then there is an external benefit resulting from innovation, even after monopolization occurs. The decision to penalize or to subsidize depends on the comparative sensitivities of investment and monopolization to changes in the penalty. If investment is more sensitive to the penalty than monopolization is, then a subsidy is the solution. If monopolization is more sensitive than investment, penalization is optimal. The reason is intuitive. The authorities want to enhance society's wealth as much as possible at the lowest cost in terms of diminished investment.³⁴ If investment is very sensitive, then the authority will have to subsidize. If monopolization is most sensitive, then the authority can maintain investment while discouraging monopolization.

Although the pure innovation subsidy ($-W/P + C$) is a potentially optimal policy given the right set of parameter values (1. residual surplus greater than expected enforcement cost, and 2. elasticity of investment greater than elasticity of monopolization), the penalty that internalizes consumer harm ($(T+D)/P$) is never an optimal policy in the dynamic setting. The dynamic enforcement model puts a greater emphasis on internalizing the residual surplus from innovation than on internalizing the consumer harm.

The asymmetric treatment of the innovation benefit and the consumer harm is a reflection of the relative importance of innovation to social welfare. Innovation is necessary in order for any consumer benefit to be realized. The model thus implies

³⁴ Robert H. Lande, *Wealth Transfers as the Original and Primary Concern of Antitrust: The Efficiency Interpretation Challenged*, 34 HASTINGS L.J. 65, 65 (1982).

that the optimal penalty should be constrained in order to maintain the innovation incentive.

III. Patent Policy

This article has emphasized the antitrust application of this model, but it applies equally well to intellectual property. The model suggests a process that the enforcement authority should implement for the issuance of patents.

Instead of assuming that the firm takes some exclusionary act after investment, assume now that the firm approaches the enforcement authority to ask for a patent. In this story, the firm invests and then approaches the enforcement authority. The enforcement authority charges a fee, or perhaps awards a subsidy (negative fee). The probability of enforcement can remain in the model, on the assumption that there is a chance ($1-P$) that the authority will simply grant the patent without charging a fee.

If the residual surplus to consumers is less than the expected administrative cost, the enforcement authority will charge a positive fee for the patent. The fee is designed to reduce the likelihood that the firm will choose to pursue the patent. In other words, the scenario envisioned under this sequence of events is as follows: (1) the firm invests in innovation, (2) the firm approaches the authority to seek a patent, disclosing its innovation (if necessary for replication), (3) the authority states a fee for the patent, and (4) after comparing the fee to the return from the patent, the firm decides whether to pursue the patent.

If the residual surplus exceeds the expected administrative cost, the authority may give a monetary award or impose a fee, depending on the comparative elasticities of investment and monopolization with respect to the penalty. In this scenario: (1) the firm invests in innovation, (2) the firm seeks a patent and discloses, (3) the authority offers a monetary award with the patent (an award that internalizes the residual surplus of consumers); and (4) the firm accepts the patent and the award.

A. Observations and Implications

This is a good point at which to compare the implications of the static and dynamic enforcement models. In antitrust enforcement, the dynamic model is obviously lenient relative to the static model. The static policy requires the imposition of a penalty that internalizes consumer harm. The dynamic model imposes a penalty that falls short of internalizing consumer harm because it is a weighted average of the penalty that internalizes consumer harm and an innovation subsidy. Moreover, under some conditions, the dynamic model provides an award or subsidy to the monopolizing firm rather than a penalty. The possibility of subsidizing a monopolizing firm is a regulatory option that has not been considered by any antitrust enforcement authority.

In innovation policy, the standard approaches have considered patents and prizes as alternatives. In this model, one regulatory option is to award a patent and a prize to the firm. Again, this is a regulatory option that does not appear to have been adopted in any intellectual property regime.

Where are subsidies or prizes most likely to be efficient? This model implies that there are two areas of inquiry in determining the efficiency of a prize to the monopolizing firm. The first is whether the residual surplus to consumers—that is, the consumer surplus that remains after the firm has monopolized—is greater than the average administrative cost of enforcing the law. If the residual surplus is less than the average administrative cost, then the authority should impose a penalty, never a prize. The simple reason is that monopolization offers relatively little to consumers, even though it enhances the profits of the firm, so the authority should discourage it more aggressively than in the case where the innovation benefits consumers even after administrative costs are taken into account.

If the residual surplus is high, the second line inquiry is an examination of the relative sensitivities of investment and monopolization to the size of the penalty. If raising the penalty significantly harms investment incentives while having a comparatively mild effect on the monopolization incentive, then a subsidy may be efficient. The reason is that it is better to have the innovation, even if it comes with a monopoly, than to not have it at all. Conversely, if the monopolization elasticity is much greater than the investment elasticity, then a penalty is likely to be optimal because the penalty will not greatly dampen investment incentives but will dampen the likelihood of monopolization.

Putting these observations together suggests that subsidization is likely to be the optimal response when the firm's innovation is especially valuable to the consumer. For potentially life-saving products, consumers are likely to be willing to pay considerably more than the monopoly price for the product, which means that the residual surplus after monopolization is likely to be high. The other consideration is the sensitivity of investment to the penalty, which is equivalent to considering the sensitivity of investment to the firm's profits. Research and development expenditure appears to be sensitive to cash flow in the pharmaceutical industry.³⁵ These observations suggest the pharmaceutical industry as a candidate for the subsidization policy.

The current direction of antitrust and innovation policy appears to be directly opposed to the sort of protection of innovation incentives suggested in this framework. Much antitrust litigation is directed toward the technology, healthcare, medical drug, and medical device industries. Patent exploitation methods are increasingly challenged on antitrust grounds.³⁶ Based on news accounts, actors in the medical and high technology sectors seem to face an ever-increasing risk of antitrust litigation, from consumers and from the government. Much modern scholarship questions the value of protecting innovation profits relative to the value of in-

³⁵ Sean Nicholson, *Financing Research and Development*, in THE OXFORD HANDBOOK OF THE ECONOMICS OF THE BIOPHARMACEUTICAL INDUSTRY 47, 59–60 (Patricia M. Danzon & Sean Nicholson eds., 2012).

³⁶ See, e.g., Douglas H. Ginsburg & Joshua D. Wright, *Dynamic Analysis and the Limits of Antitrust Institutions*, 78 ANTITRUST L.J. 1 (2012).

creasing access to drugs and technological innovations.³⁷ The increasing burden of antitrust litigation and regulatory expropriation probably has worked to dampen incentives to innovate.

One example is the Supreme Court's decision in *FTC v. Actavis, Inc.*, a pharmaceutical patent infringement case.³⁸ The Court held that the rule-of-reason test applies to reverse payment settlements, overturning the scope-of-patent test adopted by most courts.³⁹ Under the scope-of-patent test, an agreement to settle a patent infringement dispute would be upheld if the terms of the agreement were within the scope of the challenged patent.⁴⁰ For example, if a patent holder and an alleged infringer settled a dispute by forming an agreement in which the alleged infringer would not attempt to enter the market until several years after the expiration of the patent, such an agreement would violate the scope-of-patent test. However, if the settlement granted no more protection from competition to the patent holder than was already promised by the patent, then the agreement would not violate the anti-trust laws.

It is not immediately clear that the rule-of-reason test will ultimately result in a substantially greater risk of antitrust liability to patent holders than the scope-of-patent test. A carefully executed rule-of-reason evaluation of a patent settlement involves an analysis of several complicated issues, and it is unclear how they will be resolved at this stage.⁴¹ Still, courts may over time develop rules that make it difficult for parties to bring successful antitrust challenges to reverse payment settlements of patent infringement disputes. The rules may make success under the rule-of-reason test just as difficult as under the scope-of-patent rule. In that case, potential complainants will be reluctant to file antitrust challenges. In the short run, the switch from the scope-of-patent test to the rule-of-reason test kicks up a thick cloud of uncertainty. Patent holders will be unable to predict the rule that courts might apply, especially given the difficulty of the analysis. This uncertainty will generate litigation and multiply the uncertainty surrounding the costs of patent infringement litigation. Since patent infringement litigation is one of the costs of holding a patent, the switch to the rule-of-reason test effectively reduces the value of patents, especially in the pharmaceutical industry, where many of the reverse payment settlements occur.

The court's analysis of the issues in *Actavis* reflects the view that every dollar of consumer surplus transferred to the patent holder as a result of the patent right reduces consumer surplus by the same amount. This view misses the fact that up to the level of protection necessary to bring the innovation to market, there is no such dollar-for-dollar tradeoff. The patent is what brings the product's market into ex-

³⁷ See generally, RONALD A. CASS & KEITH N. HYLTON, *LAWS OF CREATION: PROPERTY RIGHTS IN THE WORLD OF IDEAS* (2013).

³⁸ *FTC v. Actavis, Inc.*, 133 S. Ct. 2223 (2013).

³⁹ *Id.*

⁴⁰ *Id.*

⁴¹ Keith N. Hylton & Sungjoon Cho, *Injunctive and Reverse Settlements in Competition-Blocking Litigation*, 36 *EUR. J.L. & ECON.* 243 (2013).

istence. In the absence of the patent, there is no market in the product, and no consumer surplus. This is the reason why the need to maintain incentives to innovate sets a limit on the extent to which consumer harm can be internalized under the dynamic enforcement model.

The fallacy reflected in the reasoning of the *Actavis* majority is the notion that because rents from innovation and the surplus to consumers both come from the same fixed lump of potential consumer surplus ($W+T+D$ in Figure 1), enhancing protection of the rents from innovation necessarily implies a reduction in value to consumers. In actuality, there is no lump of surplus to distribute to consumers if firms do not innovate. The protection of incentives to innovate should therefore be given a higher priority than the enhancement of the share of the innovation surplus going to consumers. A legal rule, such as that announced in *Actavis*, that attempts to enhance the share of innovation surplus going to consumers at the expense of reducing innovation incentives is likely to reduce both consumer surplus and innovation incentives in the long run.

On a more general level, *Actavis* calls for an accommodation of patent and antitrust policies in areas in which the scope of either area of law may be contested. In this article's framework, the same economic issues are at stake, whether one refers to an issue as one of patent policy or one of antitrust policy. Within a framework that addresses those issues squarely, a consistent set of policies emerges. Under such a set of policies, there would be no point in treating antitrust and patent policies as if they are in conflict with one another.

There are other recent examples in which courts and enforcement authorities, like the Supreme Court in *Actavis*, have treated the tradeoff between innovation rents and consumer surplus as having a zero sum. The Federal Trade Commission and the European Commission have both expressed the view that antitrust law constrains the enforcement of patents, especially standard-essential patents, through injunctions.⁴² Standard-essential patents are often accompanied by a commitment to license on "fair, reasonable, and nondiscriminatory terms" (FRAND). It appears to be the policy of both the Federal Trade Commission and the European Commission that any effort to enforce a standard-essential patent through the use of an injunction may be an antitrust violation, especially if the patent is encumbered by a FRAND commitment.⁴³

The insertion of antitrust law into the patent enforcement process is a questionable expansion of the writ of antitrust enforcement agencies.⁴⁴ The decision to

⁴² See, e.g., Neal R. Stoll and Shepard Goldfein, *Setting the Standard for Product Innovation*, NYLJ, vol. 249, No. 28 (Feb. 11, 2013), available at http://www.skadden.com/sites/default/files/publications/Setting_the_Standard_For_Product_Innovation.pdf; Melissa Lipman, *EU Antitrust Unit May Fight More Cos. On Standard Patents* (Jan. 30, 2013), available at <http://www.law360.com/articles/411319/eu-antitrust-unit-may-fight-more-cos-on-standard-patents>.

⁴³ See, e.g., Lipman, *supra* note 43.

⁴⁴ See Joshua D. Wright & Douglas H. Ginsburg, *Whither Symmetry? Antitrust Analysis of Intellectual Property Rights at the FTC and DOJ*, 9 COMPETITION POL'Y INT'L 41 (2013).

enforce a patent through seeking an injunction has historically been a matter of patent law. If the patent is judged invalid, the holder loses his infringement suit. The FRAND commitment layers a contractual obligation on top of this procedure. A firm that is sued for infringement has the option of bringing a breach of contract claim against the patent holder when he has violated the FRAND commitment. Inserting antitrust law into this process adds a layer of additional legal complexity, untethered to the policies of patent law and contract law. To the extent that antitrust laws provide anything novel here, it is as a source of rules that might support a decision that is inconsistent with either patent law or contract law—either taking property granted under the patent law or finding contractual obligations where contract law would not. This observation alone does not imply that the application of antitrust law in this setting is socially undesirable. However, it does suggest that the application carries a cost, in terms of uncertainty, that could distort innovation incentives unless cabined or constrained within relatively clear lines.

The United States enforcement authorities and the European Commission adopt the view that a FRAND commitment is equivalent to a waiver of the right to seek an injunction.⁴⁵ This is an example of a phantom contractual obligation, created by antitrust law, that is not an implication of either contract law or patent law. Sure, a commitment to license on FRAND terms is a contractual commitment to negotiate on such terms before seeking an injunction, but if the potential licensee demands terms that are more favorable to itself than the FRAND commitment implies (e.g., a license fee of zero), then the threat to seek an injunction should be viewed as one of the weapons in the arsenal of the patent holder.

The Federal Trade Commission may now view it as routine to require holders of standard-essential patents to agree not to enforce the patents through an injunction when they seek agency approval of a proposed merger.⁴⁶ The firms that have agreed to such terms have done so in order to complete a proposed merger, so they presumably have concluded that the merger is more valuable than the right to enforce their patents through injunction threats. The question, though, is whether the Federal Trade Commission's policy of disarmament is socially desirable. To the extent that it reduces the value of patents, and in turn, the reward from innovation, it is unlikely to be socially desirable. Additionally, there is the question of whether the Federal Trade Commission should be permitted, as a matter of policy and of constitutional law, to condition the right to merge on the forfeiture of a property right.

Antitrust law, in the view of the enforcement agencies, focuses primarily on the enhancement of short-run consumer surplus.⁴⁷ The dynamic effect, also known

⁴⁵ See Sharis Pozen, *Antitrust Agencies Will Remain Focused On Patent Conduct* (Feb. 4, 2013), available at <http://www.law360.com/articles/411620/antitrust-agencies-will-remain-focused-on-patent-conduct>.

⁴⁶ See Donald Martin, *SEP Antitrust Analysis – More Complex Than It Seems* (Dec. 19, 2012), available at <http://www.law360.com/articles/401810/sep-antitrust-analysis-more-complex-than-it-seems>.

⁴⁷ Lande, *supra* note 35.

as innovation tradeoff, is not part of the agencies' analysis. The intervention of antitrust policy would be acceptable if it took into consideration the same concerns as the patent law. Its failure to do so may harm consumers in the long run. At the least, some effort should be made in the enforcement process to balance innovation effects with consumer welfare effects.

This article has only scratched the surface of the many ways in which antitrust under the static enforcement framework conflicts with innovation incentives. The areas of conflict are so numerous that a suitably funded enforcement agency could supplant the work of the patent courts. For example, suppose a firm lawfully acquires a patent. What prevents the Federal Trade Commission from suing the firm on the ground that its patent was based on something the agency views as a trivial technological innovation and the primary effect of the patent is to extract welfare from consumers in violation of the antitrust laws? There may not yet have been such a bold assertion by an enforcement agency, but it seems to be the logical endpoint of current enforcement policy.⁴⁸

IV. Conclusion

Competition and innovation policies are equally implicated in many cases, especially under Section 2 of the Sherman Act. The Chicago School analysis, largely of the 1970s and 1980s, advanced antitrust policy by making efficiency an important matter of concern in antitrust enforcement. The antitrust revolution that remains to occur is a movement toward a policy that takes innovation incentives seriously. The enforcement agencies appear to be moving in the opposite direction, displacing innovation policies of the intellectual property laws with antitrust policies aimed at increasing the share of innovation surplus going to consumers. Although the model presented here has been applied in a short and preliminary manner, it suggests that this policy is shortsighted.

Benjamin Franklin famously said that those "who can give up essential liberty to obtain a little temporary safety, deserve neither liberty nor safety."⁴⁹ Similarly, an antitrust policy of sacrificing innovation incentives to redistribute innovation surplus is likely to be an impoverishing policy for consumers in the long run.

⁴⁸ See *Walker Process Equip., Inc. v. Food Mach. & Chem. Corp.*, 382 U.S. 172 (1965) (holding that antitrust law applies when a firm uses a fraudulently obtained patent to exclude rivals). There is nothing in the model of this article that suggests that the fraudulent use of intellectual property protection—patent or trademark protection—should not be treated as an antitrust violation. The example I offer in the text is an enforcement action in response to lawfully acquired intellectual property protection.

⁴⁹ 6 BENJAMIN FRANKLIN, *Pennsylvania Assembly: Reply to the Governor* (1755), reprinted in *THE PAPERS OF BENJAMIN FRANKLIN* 238, 242 (1963).

