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INNOVATION AND INCARCERATION: AN ECONOMIC ANALYSIS OF CRIMINAL INTELLECTUAL PROPERTY LAW

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Innovation and Incarceration: An Economic Analysis of Criminal Intellectual Property Law

Christopher Buccafusco^{*}

&

Jonathan S. Masur[♦]

INTRODUCTION

The scope and enforcement of intellectual property (IP) laws are becoming salient, for the first time, to a wide cohort of U.S. and international communities. National and international legislation, including the Stop Online Piracy Act (SOPA),¹ the PROTECT IP Act (PIPA),² and the Anti-Counterfeiting Trade Agreement (ACTA),³ have generated protests online and in the streets by people who are concerned about the expansion of IP rights. Common to each of these proposals was an expansion in the use of criminal sanctions to deter IP violations.⁴ Many copyright owners and the associations that represent them support criminal enforcement of IP, including the use of imprisonment, to combat the threat of increased IP piracy on the internet and throughout a globalized economy. Others, including a heterogeneous coalition of scholars, activists, and internet based companies like Google and Wikipedia, fear that using criminal

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¹ Stop Online Piracy Act, H.R. 3261, 112th Cong. § 103(a)(1)(B) (1st Sess. 2011).

² Preventing Real Online Threats to Economic Creativity and Theft of Intellectual Property Act of 2011

(PROTECT IP), S. 968, 112th Cong. § 3(a)(1)(B) (1st Sess. 2011).

³ Anti-Counterfeiting Trade Agreement, at E-1, Oct. 1, 2011, 50 I.L.M. 239, 243 (2011).

⁴ See Christophe Geiger, *The Anti-Counterfeiting Trade Agreement and Criminal Enforcement of Intellectual Property: What Consequences for the European Union?*, in *IP RIGHTS AT THE CROSSROADS OF TRADE* (J. Rosen ed., 2012); Michael A. Carrier, *SOPA, PIPA, ACTA, TPP: An Alphabet Soup of Innovation-Stifling Copyright Legislation and Agreement*, 11 *NW. J. TECH. & INTELL. PROP.* 1 (2013).

sanctions to protect IP will expand already overgrown rights and chill valuable expressive and inventive behavior.⁵

There is likely some truth in both of these positions. The internet and global markets do make infringing IP easier and detection of infringement more difficult. Accordingly, the deterrent effect of civil sanctions for IP violation may be weakeningweakening. Enhanced criminal sanctions could, however, tilt the balance between owners and users of IP too far towards owners, thereby limiting the opportunities for creative and innovative developments in the future. They might also impose unnecessary costs upon the convicted infringers themselves, channeling resources toward incarceration rather than research and development. In situations where proposed rules present both costs and benefits, economic analysis of law can play an important role in policymaking.⁶

This Article offers an economic analysis of the use of criminal liability in two areas of IP: copyright law and patent law.⁷ Our goal is to analyze the relative costs and benefits of criminal sanctions for IP violations. Economic analysis is particularly appropriate to this discussion for a number of reasons. Copyright and patent law are widely recognized as resting on utilitarian foundations of promoting social welfare by incentivizing investment in informational goods.⁸ They do this by providing exclusive rights to creators of IP that allow them to charge prices for use that are above marginal cost. Yet IP's commitment to incentives to create must be balanced by the costs that those rights have for others who want to use or further develop the works and inventions that have been created. Economic analysis's explicit focus on utilitarian welfare calculus, which compares the costs and benefits of legal rules, can aid in striking the correct balance.

⁵ Mike Masnick, *An Updated Analysis: Why SOPA & PIPA Are A Bad Idea, Dangerous & Unnecessary*,

TECHDIRT (Jan. 18, 2012, 7:32 AM),

[http://www.techdirt.com/articles/20120117/23002717445/updatedanalysis-](http://www.techdirt.com/articles/20120117/23002717445/updatedanalysis-why-sopa-pipa-are-bad-idea-dangerous-unnecessary.shtml)

[why-sopa-pipa-are-bad-idea-dangerous-unnecessary.shtml](http://www.techdirt.com/articles/20120117/23002717445/updatedanalysis-why-sopa-pipa-are-bad-idea-dangerous-unnecessary.shtml); Michael A. Carrier, *The Proposed New Copyright Crime of "Aiding and Abetting,"* OUPBLOG (Oct. 28, 2010, 2:30 PM), <http://blog.oup.com/2010/10/copyrightcrime/>.

⁶ See John Bronsteen, Christopher Buccafusco & Jonathan Masur, *Well-Being Analysis vs. Cost-Benefit Analysis*, DUKE L. J. (forthcoming 2013).

⁷ This Article does not discuss trademark law although criminal liability is used to combat counterfeit goods. The principal reason we have excluded trademark law from this discussion is that the underlying economic rationale for trademark protection—avoiding consumer confusion—is different from the underlying economic rationale for copyright and patent law—solving a public goods problem for informational goods.

⁸ See WILLIAM M. LANDES & RICHARD A. POSNER, *THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW* (2005). *But see* ROBERT MERGES, *JUSTIFYING INTELLECTUAL PROPERTY* (2012) (proposing a Lockean foundation for IP protection).

An explicitly economic focus on criminal sanctions in IP—to the exclusion of other normative methodologies—is important for an additional reason. Many IP stakeholders and scholars have operated under the assumption that there is an economic case for criminal IP sanctions.⁹ Criminal sanctions for IP infringement are thought to be justified by the possibility of deterring or incapacitating would-be infringers. When criminal IP sanctions have been criticized, the criticism has usually come from a normative position outside of economics—moral rights, for instance.¹⁰ The economic case for criminal sanctions is usually treated as unassailable.

In this article, we mean to assail it. We do not believe that the case for criminal sanctions in IP is nearly as strong as many have treated it. Indeed, we will argue that criminal liability may be justified only in one small corner of IP law, in response to one discrete type of infringement. We believe that our analysis is particularly important because it undermines the economic case for criminal sanctions at its very foundation. There is no need to engage in complicated and frequently unresolvable debates about economic versus moral norms if both modes of thought militate equally against criminal IP penalties. Even without venturing into the deep waters of normative debate, we believe the range of economically justifiable criminal IP sanctions is quite narrow.

Additionally, as we will explain below, our analysis in this article generally accepts the assumptions of traditional law and economics about intellectual property law. That is, we assume for purposes of this paper that IP is necessary to solve the public goods problem in information, that it incentivizes people to create, and that the government will do an appropriate job of balancing the rights of creators with the rights of users. The assumptions have all been subjected to withering critiques by scholars (including the authors of this article). We believe, however, that it is important to keep these assumptions intact as an initial matter. If the case for criminal IP sanctions is weak when the assumptions are accepted, it will only be weaker once those assumptions have been relaxed.

According to our analysis, there is a limited and tentative case for the use of criminal liability, including imprisonment and alternative sanctions, for only some types of copyright infringement—and none at all for patent infringement.

⁹ See e.g. I. Trotter Hardy, *Criminal Copyright Infringement*, 11 WM. & MARY BILL RTS. J. 305, 315 (2002) (hereinafter *Criminal Copyright*).

¹⁰ Miriam Bitton, *Rethinking the Anti-Counterfeiting Trade Agreement's Criminal Copyright Infringement Measures*, 102 J. CRIM. L. & CRIMINOLOGY 67 (2012); Irina D. Manta, *The Puzzle of Criminal Sanctions for Intellectual Property Infringement*, 24 HARV. J. L. & TECH. 469 (2011); Stuart P. Green, *Plagiarism, Norms, and the Limits of Theft Law: Some Observations on the Use of Criminal Sanctions in Enforcing Intellectual Property Rights*, 54 HASTINGS L. J. 167, 240 (2002); Geraldine Szott Moohr, *The Crime of Copyright Infringement: An Inquiry Based on Morality, Harm, and Criminal Theory*, 83 B.U. L. REV. 731 (2003).

Because of the large scale of some copyright violations and the difficulty of detecting them, civil remedies with punitive damages will create insufficient deterrence. In response, copyright owners will resort to self-help, using digital rights management (DRM) technologies to prevent unauthorized copying. But DRM tends to be overbroad and eliminate much socially valuable copying. Thus, criminal sanctions could provide a way of deterring harmful copying while keeping valuable copying free from the restrictions of DRM. Imprisoning a few people whose behavior is inarguably harmful may free up opportunities for others who are engaging in welfare-enhancing expression. As we explain, however, it is difficult to predict whether criminal sanctions will have these intended effects. The behaviors of various parties are difficult to anticipate and may not coincide with the assumptions of economic analysis.

The situation in patent law is different. Patent violations tend to be easier to detect than copyright violations. More importantly, unlike many copyright infringers, typical patent infringers will have sufficient resources to be able to satisfy judgments against them. This means that civil remedies should produce adequate deterrence and there is little need for liberty deprivations associated with criminal sanctions.

The Article is organized in three Parts. In Part I, we introduce the standard economic analysis of criminal law. Part II applies this analysis to copyright law. We first consider whether any case can be made for incorporating criminal sanctions into copyright law. After determining that such a case exists, we next discuss the appropriate scope of criminal copyright law. Part III applies economic analysis to the possibility of criminal patent law. Our analysis suggests that criminal liability is unnecessary to deter patent violations.

I. THE ECONOMICS OF INTELLECTUAL PROPERTY AND CRIMINAL LAW

In this Part we present an overview of the economic theories of intellectual property and criminal punishment. Although the economic theory of IP may be familiar to many readers, we offer a brief synopsis here in the interest of completeness. We then explain why criminal laws, and sanctions such as incarceration, are often necessary despite the availability of civil damages. And we explain the economic rationale for the criminalization of property offenses despite the lack of any obvious economic loss. These explanations are offered with an eye towards intellectual property crimes, which will be the focus of the succeeding Parts.

A. The Economics of Intellectual Property

We offer here a simple snapshot of the economics of intellectual property. Much important work has been done on this subject, and we will not attempt to summarize all of it.¹¹ For our purposes, a baseline understanding of the economic theory surrounding IP law is sufficient.

Inventive ideas and creative works are public goods: once they have been created, they can be shared (copied) among many individuals to the benefit of all of them simultaneously.¹² In this respect, they are also nonrival goods: multiple people can make use of an idea or a creative work without depriving one another of the enjoyment and use of that work.¹³ Two firms can sell DVD players that use the same technology simultaneously, and multiple people can read *War and Peace* simultaneously without interfering with one another. Because intellectual and creative ideas are public goods, they are liable to be under-produced. The first individual to think of an invention or a creative work bears all the costs of creating, while others can copy the idea or the work and dissipate the creator's advantage.¹⁴ The threat that the creator will bear all of the costs and only reap a fraction of the benefits raises the possibility that creators might not think it worth their time and resources to create in the first place.

Intellectual property rights exist in order to solve this public goods problem and to encourage the production of innovative and creative goods.¹⁵ Property rights in inventions and creative works allow their creators to capture all of the rents from the creation of those goods. Without having to fear that their profits will be dissipated, creators will have greater incentives to innovate in the first place.¹⁶ However, these property rights simultaneously allow their owners to charge monopoly prices. This leads to deadweight losses as some consumers who would consume the goods if they were priced competitively cannot afford the

¹¹ See, e.g., Edmund Kitch, *Nature and Function of the Patent System*, 20 J. L. & ECON. 265, 267-71 (1977) (proposing a patent prospect theory); Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839 (1990) (offering a New Institutional Economics approach to patent law); LANDES & POSNER, *supra* note 8; Mark F. Grady, *Patent Law and Rent Dissipation*, 78 VA. L. REV. 305 (1992) (proposing a rent dissipation theory of patent law).

¹² Mark A. Lemley, *Ex Ante Versus Ex Post Justifications for Intellectual Property*, 71 U. CHI. L. REV. 129, 129 (2004) (“Ideas are public goods: they can be copied freely and used by anyone who is aware of them without depriving others of their use.”).

¹³ See Peter Lee, *The Accession Insight and Patent Infringement Remedies*, 110 MICH. L. REV. 175, 240 (2011) (detailing the nonrival nature of intellectual property rights).

¹⁴ See Lemley, *supra* note 12, at 129-33 (laying out the standard justification for intellectual property).

¹⁵ *Id.* at 132 (explaining how IP rights solve the public goods problem in ideas).

¹⁶ *Id.* at 133 (same).

monopoly prices. Intellectual property is thus thought to trade off dynamic efficiency—greater innovation and creativity—against static inefficiency, namely deadweight losses.¹⁷

Efficiently solving the public goods problem does not, however, mean that creators and innovators should be given maximal rights in their contributions. In addition to creating static inefficiencies, strong IP rights also prevent others from making welfare enhancing uses of protected works and inventions. Others may wish to create derivative works of a copyrighted play or new improvements of a patented machine. These contributions are more expensive when the underlying contribution is protected by an IP right that must be licensed. In addition, there is a concern that some socially valuable behavior will not be generated at all because the IP owner may refuse to license it. For example, owners of copyrights may be unwilling to license parodies and critical reviews of their works.

For these reasons, the duration and scope of IP rights should be limited. IP law's goal is to balance the incentives provided to creators with the interests of the public and of subsequent creators. The current generation of creators and inventors should only be given enough rights in their contributions to ensure that they can recapture sufficient profits to make creating them worthwhile. Giving additional rights to these people produces inefficiencies both through deadweight losses and by increasing the costs of creating and inventing in subsequent generations.

One final point bears emphasis. Many scholars believe that intellectual property rights do not encourage substantially greater invention or creativity, at least in some contexts.¹⁸ In addition, many believe that current IP laws are not efficiently balanced, because they provide excessive incentives to the current generation of creators at the expense of the public and subsequent creators. (We count ourselves among this group to some extent.) However, adopting that view here would render the inquiry we seek to undertake far too easy. If intellectual property rights are not necessary to induce innovation or creativity, then there is no economic justification for intellectual property rights and they should simply be eliminated.¹⁹ Or, in lieu of eliminating IP rights, there should be no remedy—

¹⁷ Ian Ayres & Gideon Parchomovsky, *Tradable Patent Rights to Innovation*, 60 STAN. L. REV. 863, 867 (2007) (explaining that patents “involve[] a fundamental tradeoff between dynamic and static efficiency: patents spur innovation but only at the cost” of higher prices for current consumers).

¹⁸ See MARK A. LEMLEY & DAN L. BURK, *THE PATENT CRISIS AND HOW THE COURTS CAN SOLVE IT* 137-45 (2009) (detailing the many industries in which patents may do more harm than good and describing the few instances in which patent rights may be socially valuable).

¹⁹ Michael Abramowicz & John F. Duffy, *The Inducement Standard of Patentability*, 120 YALE L.J. 1590 (2011) (explaining the economic value of patents and proposing when they should and should not be granted).

civil or criminal—for infringement. If creators and inventors are already getting inappropriately strong rights in their works, enhancing their rights through greater enforcement will only further tip the balance in their favor.

We do not mean to minimize these concerns—as noted, we agree with them to some extent. Nonetheless, we think that it is important to take the basic economic assumptions seriously as an initial matter. First, if economic analysis does not support criminal sanctions in a world that behaves according to economic theory, then we need not even bother analyzing those sanctions when adherence to economic theory is relaxed. This, as we noted above, we believe to be the case for criminal patent sanctions. Second, we and others may be wrong to doubt the importance of intellectual property in inducing research, development, and creativity. If that is the case, it will be necessary to consider what remedies should be applied in the event of infringement. Accordingly, we will proceed as if patent and copyright law play some role in incentivizing innovation (as they are meant to) and Congress has properly balanced the interests of creators and the public. On this account, IP infringement will harm both the IP owner and society at large (which will lose some benefits from future creativity), though it is difficult to know to what degree.

B. The Economics of Criminal Law: Incarceration, Damages, and Deterrence

The economic goal of any set of laws is to produce the greatest possible benefits at the lowest possible cost—in other words, to generate the maximum achievable net benefits.²⁰ Criminal and tort laws are of course directed at deterring costly behavior, and so the “benefits” produced by these laws come in the form of crimes and accidents that have been avoided.²¹ The law’s objective is to deter as much harm as possible while imposing the fewest costs.²² From an economic perspective, criminal law and punitive incarceration at first seem to present puzzles. Prison time generates very substantial economic costs, costs that are imposed upon the prisoner, his²³ friends and family, and the government that

²⁰ A. MITCHELL POLINSKY, AN INTRODUCTION TO LAW AND ECONOMICS 7 (1983) (outlining a utilitarian theory of law centered on the maximization of net benefits).

²¹ See RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 167-71 (describing the theory of optimal tort damages).

²² Stephen P. Garvey, *Can Shaming Punishments Educate?*, 65 U. CHI. L. REV. 733, 762 (1998) (“Utilitarianism, for example, encourages architects of punishment to get the most deterrence at the lowest possible cost.”).

²³ Because the vast majority of incarcerated prisoners are male, we will employ the male pronoun here though it is not standard convention.

is charged with imprisoning him.²⁴ The principal economic objective of punishment is deterrence, and tort law should be able to efficiently deter misconduct through monetary sanctions alone. Moreover, while tort lawsuits might involve significant transactions costs, the civil fines themselves are not economic costs but rather transfer payments from one party to another that involve little or no efficiency loss.²⁵ On this account, prison sentences would seem unnecessarily wasteful.²⁶ The economic justification for criminal law lies with the possibility that defendants will be insolvent or otherwise judgment-proof.

Consider a straightforward case of assault. An assault victim might suffer damages in the tens or even hundreds of thousands of dollars in medical bills and lost wages, not to mention pain and suffering. The perpetrator of an assault may not have assets worth nearly that much, and thus it might be impossible to collect the necessary measure of damages. (This is the reason that many states require automobile drivers to have insurance—in order to guard against otherwise judgment-proof defendants.) If the amount of damages is set at a figure that exceeds the perpetrator's ability to pay, there is no reason for him to avoid committing the act. The judgment-proof defendant cannot be effectively deterred. This problem is of course much more severe for more serious harms, such as murder, and it is accentuated by the fact that not every harm is detected and punished.

In order to achieve optimal deterrence, standard economic theory suggests that the expected penalty imposed upon the defendant must be equivalent to the defendant's likely gain from the crime.²⁷ The expected penalty is the likelihood

²⁴ See John Bronsteen, Christopher Buccafusco & Jonathan Masur, *Happiness and Punishment*, 76 U. CHI. L. REV. 1037, 1039-44 (2009) (hereinafter *Happiness and Punishment*) (describing the hedonic costs of incarceration).

²⁵ See Charles Silver, "We're Scared to Death": *Class Certification and Blackmail*, 78 N.Y.U. L. REV. 1357, 1418 (2003) ("the payment is a transfer made to satisfy a demand, and thus is not an economic loss").

²⁶ The contrast we draw in this article is between monetary penalties and incarceration. We realize that this contrast does not map perfectly onto the line between criminal and civil penalties: criminal fines are quite common, and non-punitive civil incarceration exists as well. In some cases there will be important differences between civil tort damages and criminal fines. However, the distinction between monetary penalties and incarceration is the most stark and important contrast between criminal and civil law, and it is the one that matters most from an economic perspective because the two types of penalties are experienced so differently by offenders. Accordingly, we focus our attention upon this critical distinction while acknowledging the nuance involved in both civil and criminal sanctions. Henceforth, when we refer to "criminal" penalties we primarily mean incarceration, and when we refer to "civil" penalties we mean monetary sanctions. In this Part we will also refer to some alternative criminal sanctions that might deter infringement, as we did in Part II with respect to copyright.

²⁷ Gary S. Becker, *Crime and Punishment: An Economic Approach*, 76 J. POL. ECON. 169, 181-184 (1968).

that a defendant will be detected, apprehended, and fined, multiplied by the magnitude of the sanction that will be imposed.²⁸ Imagine that it is worth \$10,000 to a hypothetical perpetrator of assault to be able to commit that act, but the perpetrator has only a 40% chance of being caught. To deter the assault, the law would have to set the sanction at \$25,000 ($\$10,000 / 0.40$), an amount that many assault defendants may not possess.

As the foregoing discussion indicates, criminal damages are set not by the harm done to the victim—as tort damages are—but by the benefit from the crime to the perpetrator.²⁹ Because the majority of torts involve unintentional harms, tort damages must be equal to the expected harm in order to induce potential tortfeasors to take all efficient precautions. On the other hand, many crimes involve intentional conduct, and the issue is not the level of precaution but the criminal's conscious decision to commit the crime in the first instance. Accordingly, the penalty need only be high enough such that the criminal will be in a better situation if he refrains from committing the crime than if he commits it. In many cases, this means that surprisingly low criminal penalties may be appropriate. For instance, the appropriate penalty for some murders might be only a few years in prison, despite the terrible harm involved in murder. The reason is that many murderers might gain very little benefit from their crimes, and murderers are apprehended and prosecuted at relatively high rates. Accordingly, in economic terms, it is not necessary that the punishment match the crime.

However, this analysis is muddled somewhat when one considers optimal activity and precaution levels. One goal of tort law is to avoid over-deterrence: it makes no sense for potential tortfeasors to take precautions that are more expensive than the damages that they might cause.³⁰ For instance, imagine that an automobile driver has a 10% chance of causing an accident that will result in \$10,000 in damages. Suppose, however, that tort damages are set at \$50,000, rather than \$10,000, in the event of an accident. The driver would now have an incentive to take a precaution costing \$5,000 ($\$50,000 \times 0.10$) despite the fact that

²⁸ Emmett H. Miller III, *Federal Sentencing Guidelines for Organizational Defendants*, 46 VAND. L. REV. 197, 206 (1993) (“Thus, under both approaches, the expected gain or harm represents the actual gain or harm resulting from the offense multiplied by the probability of detection and conviction.”).

²⁹ Jeremy Bentham, *Principles of Penal Law*, Pt. II, bk. 1, ch. 3, in J. BENTHAM’S WORKS 396, 402 (J. Bowring ed., 1843) (“If the apparent magnitude, or rather value of that pain be greater than the apparent magnitude or value of the pleasure or good he expects to be the consequence of the act, he will be absolutely prevented from performing it.”).

³⁰ Kyle D. Logue, *Coordinating Sanctions in Tort*, 31 CARDOZO L. REV. 2313, 2324 (2010) (explaining that tort law seeks to avoid over-deterrence).

the expected cost of the damage that this driver will cause is only \$1000 ($\$10,000 \times 0.10$). Excessive tort damages lead to inefficient behavior.³¹

But while this analysis applies straightforwardly to accidents and cases of negligence, its application to intentional harms is not nearly so clear. Society is willing to accept that some accidents may occur in the course of lawful driving because it would be too expensive to take every precaution necessary to prevent them entirely. Accordingly, the optimal level of accidents is non-zero.³² Yet it may be that there is no “precaution” against intentional murder that is not worth taking. That is, there is nothing that an individual could do to guard against committing an intentional crime—that is, in deciding not to commit the crime—that *would not* be less costly than committing that crime. Accordingly, the optimal level of intentional murder might be exactly zero. If this is the case, damages for murder and other serious intentional crimes should be infinite. Indeed, the strongest economic argument typically made against very high penalties for serious intentional crimes is the need for marginal deterrence, not the desire to avoid over-deterrence.

Marginal deterrence is the idea that more serious crimes should be punished more harshly than less serious crimes in order to deter criminals who might cause a less serious harm from instead causing a more serious harm.³³ For instance, if assault and murder were both punished by life in prison, a criminal who has committed assault would have no incentive not to commit murder (in an attempt to flee, for instance) because he would face no greater penalty.³⁴ The necessity of marginal deterrence means that the penalty for very serious crimes such as aggravated assault (the optimal level of which is zero) should not, in fact, be as serious as the penalty for murder.

Marginal deterrence also provides some of the reason that policymakers have turned to expensive criminal sanctions like imprisonment, rather than relying solely on monetary penalties. If someone is contemplating causing \$100,000 worth of harm but only has the means to pay a \$50,000 judgment, then there is no incentive for him not to cause \$200,000 worth of harm—he will reap the extra benefit without being subject to any additional risk. The threat of a prison

³¹ See RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* § 6.1 (7th ed. 2007) (describing a general theory of tort law and efficient behavior).

³² Jennifer H. Arlen & William J. Carney, *Vicarious Liability for Fraud on Securities Markets: Theory and Evidence*, 1992 U. ILL. L. REV. 691, 718 (“In standard torts cases, the optimal level of accidents is not zero.”).

³³ Eyal Zadir and Barak Medina, *Law, Morality, and Economics: Integrating Moral Constraints with Economic Analysis*, 96 CAL. L. REV. 323, 379 n. 211 (2008) (noting that economic theory requires marginal deterrence if a criminal is to have an incentive not to commit a more serious crime).

³⁴ *Id.*

sentence, which will take from him a resource of which he has a significant stock—his liberty—will reintroduce a deterrent effect that will prevent the greater harm. Because prison sentences can be scaled in terms of their length and their severity, the law can create marginal deterrence along a much wider spectrum of harm-causing behavior.

Finally, even if every potential defendant were properly capitalized and able to pay the full measure of damages required after causing harm, there might nonetheless be some individuals who could not be deterred. This could be due to mental instability, a tendency to succumb to fits of rage, over-optimism (regarding the chances of being caught), or any number of other factors that cause the individual to fall short of perfect rational calculation.³⁵ Incapacitation is the proper remedy with respect to such individuals.³⁶ And of course incapacitation can only be achieved via incarceration, not monetary damages.

Accordingly, carceral criminal sanctions are justifiable from an economic perspective because of difficulties in properly deterring potential offenders, most frequently because they are insolvent or unable to pay the full judgments against them. This central point will inform much of the discussion that follows.

C. Property (and Intellectual Property) Crimes

The foregoing discussion focused on harms involving injury to a person. This is appropriate, as these are the most serious types of crime and present the clearest case for criminal incarceration. Yet our true focus is on property crimes. This is an Article about intellectual property, and property crimes such as theft demand a separate economic justification. Unlike harms involving personal injuries, there is no obvious economic harm when someone commits a property crime. Destroying someone's home or wrecking a car would certainly create economic harm, but if a thief merely steals a piece of property, nothing of value is destroyed—the property still exists. Perhaps the theft is just a transfer from one user to another, not an efficiency loss. If there is no economic harm from theft, then there is no economic reason to punish it with criminal sanctions.

Although this reasoning may seem intuitive, there are nonetheless powerful arguments that theft creates economic harm. The first is that theft may result in an item being transferred from a higher-value user to a lower-value user,

³⁵ See Jonathan S. Masur et al., *For General Deterrence*, in CRIMINAL LAW CONVERSATIONS (Paul Robinson et al., eds.) (2009) (describing the types of criminals who cannot be deterred through rational means).

³⁶ See SANFORD H. KADISH ET AL., CRIMINAL LAW AND ITS PROCESSES: CASES AND MATERIALS 120-22 (9th ed. 2012) (explaining a general theory of incapacitation).

which decreases overall welfare.³⁷ If an automobile is worth \$10,000 to its owner and only \$5,000 to the thief who steals it, then the theft destroys \$5,000 in value just by virtue of the fact that the automobile is transferred from the owner to the thief. By blocking these types of involuntary transactions, the law forces individuals into the world of voluntary transactions through which property finds its way to the highest-value user. Because inventions and creative works are non-rival, however, this argument does not apply in the context of intellectual property. “Theft” of intellectual property does not deprive the original owner of its use, so there can be no fear that a higher-value owner has been deprived. We must, accordingly, look elsewhere for economic justifications for (intellectual) property crimes.

Theft may also create economic harm by reducing incentives to efficiently maintain or improve property.³⁸ If property owners have to fear that their property might imminently be stolen, they will have no reason to invest in improving that property, even when it is efficient to do so.³⁹ Individuals might even shy away from acquiring property in the first place, even if they would be higher-value users than the current owners. This argument has particular resonance for IP. If someone “steals” intellectual property—that is, infringe it without having to pay royalties to the owner—the owner will be able to earn only competitive returns, rather than monopoly profits. As noted above, economic theory justifies the ability to earn monopoly profits on copyrighted works and patented inventions because competitive returns will be inadequate to incentivize intellectual property owners to create and commercialize their ideas. Accordingly, IP “theft” could reduce incentives to invent or create IP, just as theft of real or chattel property might reduce incentives to acquire or improve that property. This would frustrate the economic rationales underlying intellectual property.

The third and final argument that theft causes economic harm relates to the steps that owners will take to protect their property from theft. Imagine a country that decriminalized theft (or that had unreliable police, prosecutors, and courts). Without the state to protect their property, citizens of that country would understand that their property was at risk of being taken if they did not protect it

³⁷ Richard A. Posner, *Economic Theory of the Criminal Law*, 85 COLUM. L. REV. 1193, 1196 (1985) (“[Property is] less valuable in an economic sense in [the] hands [of a thief.]”).

³⁸ See Manta, *supra* note **Error! Bookmark not defined.**, at 477 (“The most obvious harm[] caused by violations such as theft . . . [is] the potential disincentive for . . . owners to engage in future productive and socially beneficial endeavors because their resulting profits are at risk of being stolen.”).

³⁹ *Id.* (describing the incentives of property owners in a world where theft is rampant).

themselves.⁴⁰ Consequently, they would build high walls around their homes, install security systems, hire armed guards, train vicious guard dogs, and so forth.⁴¹ These are socially wasteful activities. They produce little social value, and they exist only to prevent the transfer of property from one user to another. Economists thus view the criminal prohibition on theft as a less costly means of protecting property.⁴² Rather than giving private property owners incentives to invest in wasteful self-help, economists favor centralizing the task of protecting property in the government, a body that can take advantage of economies of scale.⁴³

This rationale also has relevance for IP law. Copyright owners have a number of available avenues of self-help, including (perhaps most importantly) digital rights management (DRM).⁴⁴ For patent owners, the mechanism for engaging in self-help is to shift from patents to trade secrets—literally locking innovation secrets away behind closed doors instead of disclosing them to the public.⁴⁵ We will discuss these mechanisms in much greater detail below. For now, the general point is that IP owners, like other property owners, may use expensive self-help as an alternative if legal prohibitions on theft appear inadequate.

⁴⁰ See George P. Fletcher, *The Metamorphosis of Larceny*, 89 HARV. L. REV. 469, 474 (1976) (“[T]he thief upset[s] the social order not only by threatening property, but by violating the general sense of security and well-being of the community; . . . theft [is] feared as a socially unnerving event.”).

⁴¹ Posner, *supra* note 37, at 1196 (“[I]f [a thief is] allowed to take the car [of his neighbor, his] neighbor will have an incentive to expend resources on preventing it from being taken, and these expenditures considered as a whole, yield no social product.”); see also Robert P. Merges, Peter Seth Menell & Mark A. Lemley, *Intellectual Property in the New Technological Age* (6th ed. 2012) (making this point about trade secrets).

⁴² *Id.* (arguing the role of the criminal law is discouraging market bypassing); see also William E. Nelson, *Emerging Notions of Modern Criminal Law in the Revolutionary Era: An Historical Perspective*, 42 N.Y.U. L. REV. 450, 465 (1967) (examining criminal law’s historical development from an instrument enforcing the community’s moral values to one focused on “deter[ring] attacks on property”).

⁴³ See e.g., Polinsky, *Private versus Public Enforcement of Fines*, 9 J. LEGAL STUD. 105, 107 (“[T]he benefits from coordinating enforcement—for example, avoiding duplication of investigative effort and exploiting economies of scale in information processing—are obtained under public enforcement and monopolistic enforcement, but not under competitive enforcement.”). Cf. Amitai Aviram, *Allocating Regulatory Resources*, 37 J. CORP. L. 739, 765 (2012) (“[P]rivate actors are often poor enforcers because they lack the economies of scale (such as investigative expertise and litigation experience) that come with repeated enforcement, and because most people have fewer financial means to pursue enforcement than public actors.”).

⁴⁴ See *infra* Part II.

⁴⁵ J. Jonas Anderson, *Secret Inventions*, 26 BERKELEY TECH. L.J. 917, 923 (2011) (describing the tradeoffs between trade secret and patent protection and the decisions faced by innovators).

There is one final distinctive feature of property crimes worth addressing, and it is the likelihood that a thief (as opposed to, say, a murderer) would be able to pay off a civil judgment. At first glance it might appear that property criminals are less likely to be judgment-proof than criminals who have injured a person. One reason is that property crimes often cause less harm than personal injury crimes. Another reason is that a thief will often have one asset that can be used to pay the judgment: the stolen property itself. This is not a panacea; as we explained above, the proper measure of damages for a crime might well be many times greater than the actual harm caused if the probability of detection and punishment is low. But it nevertheless places property criminals on a somewhat different footing than criminals who injure other people.

* * *

We have identified a number of factors relevant to the question of whether criminal penalties should be applied to prevent some type of undesirable activity. In the interest of clarity, we summarize those factors here:

1. What is the magnitude of the economic harm from the activity, and what are the benefits to the infringer?
2. What is the probability that violations will be detected and prosecuted?
3. Will the defendant likely have sufficient funds to pay a judgment?
4. Is the economically efficient activity level zero or greater than zero?
5. Will it be desirable to incapacitate offenders?

In the Parts that follow, we consider the issue of criminal sanctions for copyright and patent infringement through the economic lens of these factors.

II. THE LIMITED CASE FOR CRIMINAL COPYRIGHT LIABILITY

Over the course of the last century, the availability of criminal sanctions for copyright infringement has expanded dramatically.⁴⁶ Driven in large part by

⁴⁶ I. Trotter Hardy, *Criminal Copyright Infringement*, 11 WM. & MARY BILL RTS. J. 305, 315 (2002) (hereinafter *Criminal Copyright*). Congress enacted the first criminal copyright statute in 1897. It applied only to the unauthorized performance of plays and music. See Act of Jan. 6, 1897, ch. 4, 29 Stat. 481. In 1909, Congress expanded liability to cover all copyrightable works.

lobbying from the Recording Industry Association of American (RIAA) and the Motion Picture Association of America (MPAA), criminal copyright law has grown to cover a wider variety of content and behavior, and the penalties for violations have multiplied.⁴⁷ According to these advocacy groups, criminal sanctions, including substantial imprisonment terms, are needed to deter the rising tide of copyright “theft.”⁴⁸

This Part addresses those arguments from the perspective of economic analysis of law. We suggest that, according to the standard economic account of criminal law, there might be narrow situations in which criminal sanctions could be theoretically justified for deterring copyright violations and improving overall social welfare. Below, we describe when criminal copyright liability might be valuable and when it might not, and we assess current U.S. copyright law in light of our findings.

A. The Harm of Copyright Infringement

Economic analysis suggests that criminal law can be valuable in situations where people must be deterred from conduct that reduces overall social welfare.⁴⁹ When people steal, rape, and kill the reduction in social welfare and the need for deterrence is obvious. In Part I, we explained how and when criminal sanctions can be used to reduce occurrences of these behaviors. But in what way is illegally downloading a song or streaming a bootlegged signal of a soccer match equivalent to these heinous acts? How is watching a pre-release version of the latest blockbuster movie a crime? From an economic perspective, the answer

See Copyright Act of 1090, ch. 320, 35 Stat. 1075. Over the last quarter of the twentieth century, Congress further expanded criminal liability and enhanced the magnitude of criminal penalties. Copyright infringement could result in felony convictions, defendants could be found guilty even in the absence of a purpose for financial gain, and maximum sentence lengths grew. Piracy and Counterfeiting Amendments Act of 1982, Pub. L. No. 97-180, 96 Stat. 91 (creating felony liability for copyright violations); No Electronic Theft (NET) Act of 1997, Pub. L. NO. 105-147, 111 Stat. 2678-80 (amending the criminal provisions to allow criminal conviction in the absence of a showing that the defendant was motivated by commercial purpose or financial gain); Sentencing Reform Act of 1984, Pub. L. No. 98-473, 98 Stat. 1987 (extending maximum sentence length for criminal copyright violation from two to five years of imprisonment).

⁴⁷ See Brian P. Heneghan, *The NET Act, Fair Use, and Willfulness – Is Congress Making a Scarecrow of the Law?*, 1 J. HIGH TECH. L. 27, 28 (2002) (noting that the Net Act “enjoys strong support from the Software Publishers Association, U.S. Copyright Office, the Department of Justice, Adobe Software, Microsoft Corporation, the Recording Industry of America, and the Motion Picture Association of America”).

⁴⁸ On property metaphors in copyright, see WILLIAM PATRY, *MORAL PANICS AND THE COPYRIGHT WARS* (2009).

⁴⁹ See *supra* Part I.

depends on the extent to which copyright infringement causes harm that cannot be deterred by other means. Copyright infringement can enter the domain of criminal law when other mechanisms for deterring socially harmful conduct, including civil sanctions and self-help remedies, are either too costly or unsuccessful.⁵⁰

1. *Copyright Infringement and Incentives*

In order to determine the extent to which deterrence, whether criminal or otherwise, is appropriate, we must first understand the harms caused by the unauthorized copying of creative works. Although copyright is a form of intellectual property, and although many people refer to copyright infringement as “theft,”⁵¹ infringement is importantly different from theft of real or personal property.⁵² With copyright infringement, the original owner is not deprived of the use of the infringed content.⁵³ When someone illegally photocopies a novel, the copyright owner is not prevented from reading the novel herself. But the issue is not with the copyright owner’s use of the novel but with her incentives to write it in the first place. The harm of unauthorized copying arises from the public goods problem in IP and the law’s solution to that problem.⁵⁴ When someone downloads a song for free off the internet rather than paying for it on iTunes, the creator’s *ex ante* incentives to create diminish. For every person who opts out of an available market transaction for the song, the creator will tend to invest that much less in the quality and quantity of new songs she produces. And if enough

⁵⁰ Moohr, *Overcriminalization*, *supra* note **Error! Bookmark not defined.**, at 7-8 (“Whether criminal penalties are an appropriate way to deal with copyright infringement depends on whether the strategy confers a net social benefit, which is found in intellectual property policy.”).

⁵¹ During Congressional hearings on the NET Act, Senator Patrick Leahy declared, “Just as we will not tolerate the theft of software, CDs or books from a store, so we will not tolerate the stealing of intellectual property over the Internet.” Copyright Piracy on the Internet: Hearing on H.R. 2265 before the House Subcomm. On Courts and Intellectual Property of the Comm. on the Judiciary, 105th Cong. (1997). *See also* Green, *supra* note **Error! Bookmark not defined.**, at 240 (noting that many recently enacted criminal IP laws have in common “at least a literal commitment to the idea that intellectual property of various sorts might be subject to ‘theft’ or to being ‘stolen.’”).

⁵² The U.S. Supreme Court has recognized the difference between copyright infringement and theft of real or personal property. In *Dowling v. U.S.*, 473 U.S. 207, 216 (1985), the Court rejected the government’s interpretation of the National Stolen Property Act that “would make theft, conversion, or fraud equivalent to wrongful appropriation of statutorily protected rights in copyright.”

⁵³ *Dowling v. U.S.*, 473 U.S. at 216 (“The copyright owner...holds no ordinary chattel. A copyright, like other intellectual property, comprises a series of carefully defined and carefully delimited interests to which the law affords correspondingly exact protections.”).

⁵⁴ *See supra* Part I.A.

people download songs for free rather than paying for them, the creator may cease making music altogether. To ensure that the appropriate level of incentives remains, people must be deterred from making unauthorized copies of works.

2. *The Efficient Level of Copying*

Like theft and murder, unauthorized copying of expressive works can create harm and reduce overall social welfare. But unlike theft and murder, where the optimal amount of those behaviors is at or very near zero, the optimal amount of unauthorized copying may be significantly greater than zero. Certain kinds of copying may be beneficial, and deterring them would be harmful.⁵⁵

First, as we noted in Part I.A, the ability to charge monopoly prices above marginal cost creates deadweight losses that can be inefficient. For example, imagine that the marginal cost of producing a copy of a movie is \$2. Because the copyright owner has an exclusive right to copy the movie, she can charge \$10 for a copy of the movie. The owner's ability to sell the movie at \$10 to the many people who value having a copy of the movie at \$10 or greater provides the owner with the opportunity to recoup her investment. But what if some person values the movie at \$5? He is unwilling to pay the price for the movie, and, without the ability for the owner to price discriminate,⁵⁶ the difference between what he is willing to pay and the marginal cost of the copy represents inefficient, deadweight loss.⁵⁷

The situation here is different from that of theft of real property. As William Landes and Richard Posner explain:

⁵⁵ William M. Landes & Richard A. Posner, *An Economic Analysis of Copyright Law*, 18 J. LEGAL STUD. 325, 335 (1989) ("Some copyright protection is necessary to generate the incentives to incur the costs of creating easily copied works, but too much protection can raise the costs of creation for subsequent authors to the point where those authors cannot cover them even though they have complete copyright protection for their own originality.").

⁵⁶ Price discrimination can occur in some situations involving copyrightable works. For example, copyright owners charge higher prices for hardback editions and first-run movies because some people value being able to consume the work rapidly. See LANDES & POSNER, *ECONOMIC STRUCTURE*, *supra* note 8, at 39. Price discrimination is also possible through the use of digital rights management technologies (DRM), which we discuss *infra* at Part II.B.1.

⁵⁷ See Eric Goldman, *A Road to No Warez: The No Electronic Theft Act and Criminal Copyright Infringement*, 82 OR. L. REV. 369, 426-31 (2003); Stan J. Liebowitz & Stephen Margolis, *Seventeen Famous Economists Weigh in on Copyright: The Role of Theory, Empirics, and Network Effects*, 18 HARV. J. L. TECH. 435, 440-41 (2005) ("Copyright engenders a deadweight loss as a by-product of the incentives to create that it provides. A system of private ownership providing the incentive for creation cannot give a reward to the creator without also having an apparent deadweight loss in the consumption market.").

If a thief steals a Rolls-Royce from the dealer's lot, it is no consolation to the dealer that the thief was not a potential customer because he could not afford to pay the dealer's price; the theft deprived the dealer the opportunity to sell the Rolls to someone else. But when the purchaser of a software program makes a copy for someone else, he does not reduce the number of copies in the software producer's inventory. If the someone else was not a potential purchaser from the producer, the producer loses nothing from the unauthorized copying."⁵⁸

Thus, if the owner is able to sufficiently recoup her investment in the movie, deterring people who value the work at above marginal cost but below the copyright owner's price may be unnecessary or even counter-productive.

Second, and more importantly, some unauthorized uses of a work might be efficient and socially valuable but nonetheless fail to arise due to market failures. Although economic analysis generally trusts markets to efficiently allocate goods to valuable uses,⁵⁹ some users of copyrighted works engage in a variety of behaviors that are unlikely to result in market transactions. For example, authors of copyrighted works are unlikely to license use of their works to others for criticism and parody, yet these are generally believed to be socially beneficial activities.⁶⁰ In other situations, transaction costs may prevent otherwise efficient bargains from arising.⁶¹ Someone wishing to transform a work or use it in a way that creates significant value that she is unable to capture may be unwilling to pay the necessary licensing fee. In these situations, the "fair use" provisions of the U.S. copyright act allow others the right to freely use copyrighted works, because those uses are considered to be welfare-enhancing and because market transactions are unlikely to provide them in sufficient quantity.⁶²

⁵⁸ See LANDES & POSNER, *ECONOMIC STRUCTURE*, *supra* note 8, at 47. The authors give the example of weak demand for AIDS drugs in Africa.

⁵⁹ See Ronald H. Coase, *The Problem of Social Cost*, 3 J. L. & Econ. 1 (1960) (explaining how, in a world without transaction costs, voluntary market transactions will result in entitlements being owned by their highest valuing user).

⁶⁰ See Alfred C. Yen, *When Authors Won't Sell: Parody, Fair Use, and Efficiency in Copyright Law*, 62 U. COLO. L. REV. 79, 85-90 (1991).

⁶¹ See Christopher Buccafusco & Christopher Jon Sprigman, *The Creativity Effect*, 78 U. CHI. L. REV. 31 (2011) (describing inefficiencies in IP markets that may arise from biased assessments of a work's value); Christopher Buccafusco & Christopher Sprigman, *Valuing Intellectual Property: An Experiment*, 96 CORNELL L. REV. 1 (2010) (same).

⁶² See 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, 1604-05 (1982).

Deterring the behaviors discussed above is not valuable.⁶³ They tend to create significant benefits with relatively little harm to creators' incentives. Uses of a copyrighted work for criticism, parody, or education make many people's lives better off, and the inability to charge for them is unlikely to deter creation.⁶⁴ Although they may marginally decrease incentives to create, the optimal amount of these behaviors is decidedly above zero.

Other uses of a work, however, will tend to generate little benefit but have significant social costs. When people download copies of movies or songs for free when they would have been willing to pay the copyright owner's price they are creating inefficiencies. Assuming that the law has properly balanced the costs and benefits of copyright protection,⁶⁵ this diminution in the copyright owner's ability to recoup her investment costs is harmful.⁶⁶

B. The Economics of Deterring Copyright Infringement

The unauthorized copying of expressive works, at least in some instances, can harm social welfare by undermining the incentives of authors to invest in their creations. Deterring these cases of unauthorized copying would be valuable. Economic analysis describes the various tools that might be brought to bear to do so, including private self-help and public law solutions.⁶⁷ This section explores

⁶³ Landes & Posner, *JLS*, *supra* note 55, at 340 (“An increase in copyright protection is likely to reduce the welfare benefits (consumer plus producer surplus) generated by a given work—assuming it will be created.”).

⁶⁴ See Amy Kapczynski, *The Cost of Price: Why and How to Get Beyond Intellectual Property Internalism*, 59 *UCLA L. Rev.* 970 (2012).

⁶⁵ As noted above, we believe that Congress has done a poor job of balancing the incentives of authors with the rights of the public. Copyright terms are far too long, and the scope of copyright holders' rights is far too broad. See Christopher Buccafusco & Paul Heald, *Do Bad Things Happen When Works Enter the Public Domain?: Empirical Tests of Copyright Term Extension*, *BERK. TECH. L. J.* (forthcoming 2013) (presenting empirical data which suggest that the works suffer little economic harm when they enter the public domain); Liebowitz & Margolis, *supra* note 57.

⁶⁶ Recent empirical research on the effects of music and movie downloading on sales has suggested significant decreases in sales as a result of downloading. Stan Liebowitz, *File-sharing: Creative Destruction or Just Plain Destruction?: J. L. & ECON.* 1 (2006). We wish to emphasize again, however, that a mere decrease in sales does not alone show that overall social welfare has been diminished. See also Felix Oberholzer-Gee & Koleman Strumpf, *The Effect of File Sharing on Record Sales: An Empirical Analysis*, 115 *J. POL. ECON.* 1 (2007). Irina Manta compares the harm of copyright infringement to vandalism. Manta, *Puzzle*, *supra* note **Error! Bookmark not defined.**, at 475.

⁶⁷ As Trotter Hardy notes, owners of informational goods do not necessarily require copyright protection. They have a variety of techniques available to them. Hardy describes four different types of protection against unauthorized copying: “1) entitlement-like protection; 2) contract-like protection; 3) state-of-the-art limitations; and 4) special purpose technical limitations.” Trotter

the effectiveness and desirability of self-help and civil law sanctions in the copyright context.

1. Self-help and DRM

Like owners of real property who attempt to prevent others from trespassing on their land by building fences, copyright owners who seek to deter unauthorized copying can attempt to limit access or use of their works. Traditionally, this was a difficult task for copyright owners. Once a book was put into circulation, there was little the copyright owner could do to prevent others from copying it, lending it, or performing it publicly. Copyright law and the civil sanctions it creates are a response to this problem. With the rise of digital copies of expressive works that are embodied in computer software and hardware, however, copyright owners can create technological limits on the things that users can do with copies. Known as digital rights management (DRM), these technological measures can limit the ability of users to make copies of a work, to transfer the work between different devices, or to modify the work.⁶⁸

DRM can be very attractive to copyright owners because it can provide almost total control over the behavior of users.⁶⁹ For example, if the copyright owner of a movie makes copies of the movie available in video cassettes, a purchaser of a video cassette could easily copy the movie for a number of her friends with only limited loss in quality. Some of these friends might have been potential purchasers of the movie, and their ability to get the free copy could harm the copyright owner. Now, however, the copyright owner can release the movie on a DVD that is coded with DRM software that prevents the purchaser from making copies.⁷⁰ The same is potentially true for purchasers of ebooks, CDs, software, and other digital content that is downloaded online.

Although DRM seems like an efficient self-help measure to prevent unauthorized copying, its use is highly controversial,⁷¹ and its overall effect on social welfare is probably negative. DRM's principal economic benefit is that it

Hardy, *Property (and Copyright) in Cyberspace*, 1996 U. CHI. LEG. F. 217, 223. Our analysis will primarily focus on the first and fourth techniques that Hardy mentions.

⁶⁸ Stefan Bechtold, *The Present and Future of Digital Rights Management: Musings on Emerging Legal Problems*, in DIGITAL RIGHTS MANAGEMENT: TECHNOLOGICAL, ECONOMIC, LEGAL AND POLITICAL ASPECTS 597 (Eberhard Becker et al., eds. 2003).

⁶⁹ Dan L. Burk, *Anti-Circumvention Misuse*, 50 UCLA L. REV. 1095, 1100 (2003) ("Copyright holders might prefer a world in which the rights granted under statute or asserted via license became self-enforcing. Something close to this can be achieved through the employment of technological devices accompanying copies of a work as they are distributed.").

⁷⁰ *Id.*

⁷¹ See Bechtold, *supra* note 68, at 598.

can be relatively cheaply created and implemented. Coding DRM software is not difficult, and, once created, including the DRM code in copies of a work is effectively costless for the producer.⁷² Accordingly, it is unlike the relatively costly self-help measures that property owners must create and maintain to prevent trespass or theft.⁷³ To prevent someone from stealing a book from a store, the owner must pay security personnel or install other physical detection devices in each copy. To prevent someone from making unauthorized copies of an ebook, the producer simply needs to include a string of code in the ebook digital file.⁷⁴

Despite its ease and low cost, DRM might be an inefficient solution to the problem of unauthorized copying of expressive works.⁷⁵ First, users of many kinds of products object to the limitations that DRM establishes. Consumers of music, movies, and software have developed norms about the kinds of uses that should be allowed, and they balk when content providers attempt to restrict those uses. Recently, in response to consumer complaints, Apple's iTunes service and other online music distributors have dramatically scaled back their use of DRM. Similarly, consumers have expressed dismay at Microsoft's announcement that it will include highly restrictive DRM provisions in the release of its new Xbox game console.⁷⁶ Although DRM still places a major role in attempting to protect against unauthorized uses of movies, ebooks, and computer software, there is reason to think that negative consumer responses will increasingly limit its effectiveness. In addition, DRM has proven less valuable than was hoped, because the code can be circumvented. Programmers who desire to use a work in a way that is forbidden by DRM can "hack" the code and nullify its effectiveness.⁷⁷ As with

⁷² Of course, consumers may prefer to own copies of works that are not encrypted with DRM, so the amount they are willing to pay for DRM-encrypted copies will be less. Consumer resistance to DRM likely had some effect on Apple's decision to release music on iTunes in "DRM-free" versions. Yet even these versions are not truly DRM free as they only allow purchasers to play songs on a limited number of devices.

⁷³ See *supra* note Part I.B.

⁷⁴ See Bechtold, *supra* note 68, at 598.

⁷⁵ Julie E. Cohen, Lochner in Cyberspace: The New Economic Orthodoxy of "Rights Management," 97 MICH. L. REV. 462, 471 (1998) ("Digital technologies allow more effective fencing of intellectual property, and thus cure some of the market failure problems associated with creative and informational works—although...they have the potential to create market failures of a different sort."); Burk, *supra* note 69, at 1097 (arguing that "the anticircumvention right is being, and will continue to be, abused.").

⁷⁶ Anthony Tosie, Nintendo Disagrees with Microsoft's DRM Policies, Neowin (June 13, 2013) available at <http://www.neowin.net/news/nintendo-disagrees-with-microsofts-drm-policies>.

⁷⁷ Burk, *supra* note 69, at 1102 ("The drawback to reliance primarily upon technological controls is that technically sophisticated users may find ways to circumvent or disable the control system, and

real or personal property, this leads to an inefficient “arms race” between content producers and hackers as they each expend costly resources attempting to alternately protect and break DRM code. Although initially creating and installing the DRM is inexpensive, creating multiple iterations of the code to outpace hackers can get very expensive. In the U.S., the law has attempted to avert this arms race by prohibiting the circumvention of technological barriers to use. The Digital Millennium Copyright Act (DMCA) prohibits the use or distribution of circumvention measures and subjects violators to civil and criminal penalties.⁷⁸

While the DMCA minimizes the risk of an inefficient arms race between content providers and hackers, DRM-based self-help creates other significant inefficiencies. As noted above, not all unauthorized copying of expressive works is harmful to social welfare. Many unauthorized uses of copyrighted works, especially those classified as fair uses under the copyright act, significantly enhance social welfare. As yet, and perhaps inevitably, DRM technology is unable to distinguish between infringing and noninfringing uses of protected works.⁷⁹ DRM affects the professor who wants to excerpt a portion of a book for educational purposes in class just as much as it does the e-book purchaser who wants to make copies of the file for all of his friends. While the latter use is welfare diminishing, the former is welfare enhancing, but both are prohibited by DRM.

Users who wish to make socially valuable fair uses of a DRM-protected work can attempt to circumvent the technological protection, but they do so at considerable risk. First, although the Librarian of Congress exempts certain uses of copyrighted works from the anti-circumvention provisions of the DMCA,⁸⁰ U.S. courts have not agreed about whether every fair use of a copyrighted work is exempt.⁸¹ Accordingly, unless users fall within one of the express exemptions

may even assist unsophisticated users in doing so. A skilled user may be able to ‘hack around’ the controls built into technological content systems.”)

⁷⁸ 17 U.S.C. § 1201(a). It is important to note that violation of the DMCA anti-circumvention provisions is not considered violation of copyright. DMCA violations create independent civil and criminal liability. Hardy, *Criminal Copyright*, *supra* note 46, at 322.

⁷⁹ Stefan Bechtold discusses the possibility of creating DRM technologies that can distinguish between appropriate and inappropriate uses of a protected work. Bechtold, *supra* note 68, at 604.

⁸⁰ Burk, *supra* note 69, at 1104.

⁸¹ Court opinions have differed on the relationship between DMCA and fair use. *Compare* Storage Tech. Corp. v. Custom Hardware Eng'g & Consulting, Inc., 421 F.3d 1307, 1318-19 (Fed. Cir. 2005) (holding that a copyright holder must show a connection to copyright infringement in order to succeed in a claim under the DMCA); *Chamberlain Group, Inc. v. Skylink Technologies, Inc.* 381 F.3d 1178 (Fed. Cir. 2004) (holding that distribution of a circumvention device--in that case a garage door opener--did not violate the anti-circumvention provisions because its use did not lead to any copyright violation) *with* *Universal City Studios v. Reimerdes*, 111 F. Supp. 2d

(which appear to change annually), they risk being subject to heavy civil and criminal fines and possibly imprisonment. Second, even if circumvention of DRM is acceptable for fair use of a work, the contours of the fair use doctrine are notoriously fuzzy. Whether a given behavior is copyright infringement or fair use depends on a difficult-to-predict balancing of multiple factors. Risk averse parties whose conduct lies on the boundaries of fair use may elect to avoid engaging in potentially valuable behavior to avoid liability under the DMCA.⁸²

Individuals' willingness and ability to circumvent DRM creates a perverse effect on the kinds of copying that does and does not get prevented by DRM. Law-abiding individuals who wish to make fair or personal uses of copyrighted content will generally also be those who are unable or unwilling to circumvent DRM technology, while those individuals who engage in large scale direct copying of works for economic or reputational reasons will tend to be able and willing to hack DRM code. This means that DRM tends to have its greatest deterrent effect on socially valuable conduct and only limited effect on harmful conduct, thereby shifting the costs generated by harmful copiers to beneficial copiers.

A final, and significant, concern about the use of DRM self-help is that it can be used to protect content that does not enjoy copyright protection.⁸³ For example, DRM can be applied to works whose copyright terms have expired and should be freely available in the public domain. DRM might also be inappropriately applied to content that fails to meet the requirements of copyrightability, including nonoriginal data.⁸⁴ The balance copyright law creates between creator incentives and public uses is threatened if content providers respond to the risk of unauthorized copying by protecting these works with DRM.

It is difficult to judge the net welfare effects of DRM self-help. In its favor are low cost and ease of use, but set against these are the significant chilling effects that DRM has on valuable behaviors. DRM prevents many important uses of expressive works, and the penalties attached to DRM circumvention likely diminish behaviors that are at the core of human well-being. Given the risks of DRM, it is appropriate to consider other methods for deterring harmful unauthorized copying.

294, 322 (S.D.N.Y. 2000) ("[i]f Congress had meant the fair use defense to apply to such actions, it would have said so.").

⁸² James Gibson, *Risk Aversion and Rights Accretion in Intellectual Property Law*, 116 YALE L.J. 882, 887-906 (2007).

⁸³ See Burk, *supra* note 69, at 1102 ("Indeed, content owners may prefer to rely on anticircumvention laws to prohibit tampering with the technological controls, leaving the technology to prohibit whichever uses the content owner unilaterally chooses, rather than relying on copyright law to prohibit certain statutorily determined uses of the work.").

⁸⁴ *Id.*

2. *Civil Sanctions and Deterrence*

The standard economic response to costly self-help is the provision of civil sanctions with penalties sufficient to deter harmful behavior.⁸⁵ According to economic theory, people will be deterred from engaging in harmful activities if the law establishes penalties that equal or exceed the magnitude of the benefits violators can hope to achieve from their conduct. Copyright law does precisely this. Infringement of a copyright owner's exclusive rights subjects the violator to civil liability that is intended to deter such violations. For a number of reasons, however, the effectiveness of civil remedies in certain situations is doubtful.

a. Comparing Benefits and Harms

Economic theory predicts that the law can deter undesirable conduct, including copyright infringement, by creating penalties that exceed the benefits that can be obtained from engaging in the conduct. For example, if someone is contemplating either purchasing or illegally downloading for free \$100 worth of music, the existence of a fine of \$100 or more for the illegal behavior will result in her choosing to purchase the music rather than violate the law. The benefits of violating the law to the would-be infringer are smaller than the costs of doing so, and a rational person would be deterred from downloading the music.

Typically, economic analysis assumes that the magnitude of the penalty sufficient to achieve deterrence is marginally higher than the value of the harm done to the victim. Thus, if the penalty for stealing a \$10,000 car is \$10,001, rational people will prefer to purchase the car rather than steal it. The benefits to the violator are generally considered to be equivalent to the harms of the victim (plus any additional social harm). In the context of copyright infringement, however, this may not be the case. First, as mentioned above, much copyright infringement is the result of people who value the work at a price between the marginal cost of producing it and the monopoly price charged by the copyright owner. If, for example, someone illegally downloads ten albums that cost \$10 each, but if she only values those albums at \$5 each, setting the penalty for infringement at \$100 will lead to overdeterrence of behavior that is not costly.

More difficult still is the situation involving the large category of copyright infringement that is mostly divorced from economic considerations. Much large-scale copyright infringement on the internet does not appear to be motivated by a desire to obtain works for free.⁸⁶ Many hackers and members of

⁸⁵ See Part I.A *supra*.

⁸⁶ See Goldman, *supra* note 57.

“warez” communities derive benefits from copyright infringement from the reputational effects of successfully circumventing DRM and providing copies of works for free on the internet.⁸⁷ Comparing the magnitude of the benefits these hackers experience with the harms to copyright owners is extremely difficult. On one hand, the market-based values that hackers experience are likely much smaller than the net value of the infringements that result from the hackers’ conduct. On the other hand, the emotional and reputational benefits that they experience may be very great indeed and thus difficult to deter.⁸⁸ Accordingly, setting the appropriate magnitude of civil sanctions necessary for deterrence of copyright violation will be challenging.

b. Detection, Punitive Damages, and Judgment Proof Infringers

By far the most problematic issue with the use of civil remedies to deter copyright infringement involves the difficulty of detecting infringing behavior. As we described in Part I, setting the magnitude of the penalty equal to a potential lawbreaker’s benefits will only achieve deterrence when the probability of a violation being detected is one hundred percent. If the penalty equals the lawbreaker’s benefits and if detection is imperfect, the expected benefits of violating the law will exceed the expected harms. In order to solve this problem, economic theory suggests that the law rely on punitive (or augmented⁸⁹) damages to create a damages multiplier that will account for imperfect detection.⁹⁰ Copyright law, with the availability of statutory damages,⁹¹ provides something

⁸⁷ *Id.* at 370 (defining a “warez trader” as “an individual who copies and distributes computer software simply for self-aggrandizement—the reputation, the thrill, the ‘fun’ of having the latest programs or the biggest ‘library’ of ‘warez’ title.”) (internal quotations omitted).

⁸⁸ Lydia Pallas Loren, Digitization, *Commodification, Criminalization: The Evolution of Criminal Copyright Infringement and the Importance of the Willfulness Requirement*, 77 WASH. U. L. Q. 835, 855 (1999) (noting, “the damage done by non-commercially motivated infringers can equal and sometimes surpass the damage done by infringers engaged in reproduction and distribution for financial gain”); Wechsler, *supra* note **Error! Bookmark not defined.**, at 15 (“...selected cases of criminal enforcement have shown that infringers – such as the world’s most resilient bittorrent site, Pirate Bay – with a policy agenda beyond economic costs and benefits might still not be deterred”).

⁸⁹ Thomas C. Galligan, Jr., *Augmented Awards: The Efficient Evolution of Punitive Damages*, 51 LA. L. REV. 3, 7 (1990).

⁹⁰ A. Mitchell Polinsky & Steven Shavell, *Punitive Damages: An Economic Analysis*, 111 HARV. L. REV. 869, 874 (1998) (“punitive damages should be awarded if, and only if, an injurer has a chance of escaping liability for the harm he causes”)

⁹¹ 17 U.S.C. § 504(b). A successful plaintiff in a civil copyright suit can recover actual damages or statutory damages up to \$30,000 for any one work.

similar to this, but for a number of reasons it is unlikely to create sufficient deterrence.⁹²

Deterring copyright infringement is different in the digital age.⁹³ When making an unauthorized copy of a work required expensive professional machinery to print books or copy film strips, detecting infringement was relatively easy.⁹⁴ Now, millions of people own devices that can instantly create and distribute infringing copies around the world. Successfully policing all of these people is impossible, and the likelihood that any individual infringement will be detected is infinitesimal.⁹⁵ Even large scale infringements of multiple works are unlikely to be detected at levels significantly above zero. In addition, even if copyright owners are able to detect the existence of an infringement, connecting it to a specific person will be incredibly difficult. Potential infringers are spread out around the world and hidden behind IP addresses that mask their identities.

From the perspective of economic analysis, the damages multiplier that would be necessary to raise expected penalties from infringement above expected benefits will be very large. If only one-tenth of one percent of copyright infringements are detected (probably a generous figure),⁹⁶ the damages multiplier is 1000. This means that if an infringer causes \$200 worth of harm, she will be responsible for \$200,000 in damages.

Copyright infringement damages of this magnitude create will tend not to have the appropriate effect on marginal deterrence, because many defendants will be judgment proof for these amounts. In the past, significant resources were

⁹² A successful plaintiff in a civil copyright suit can recover actual damages or statutory damages up to \$30,000 for any one work. 17 U.S.C. § 504(b). In addition, if the violation was willful, the plaintiff can receive an additional \$750 to \$150,000 per work. 17 U.S.C. § 504(c)(2).

⁹³ Wechsler, *supra* note **Error! Bookmark not defined.**, at 10 (“It is, in particular, IP crimes in a digital environment where infringers are intentionally evasive that are most difficult to detect – a problem that is corroborated by the increasing sophistication of organized crime.”).

⁹⁴ We should note that there are some copyrightable works the infringement of which may not be very difficult to detect. Infringement of architectural works will likely be relatively easy to detect. Infringement of sculptural works may currently be easy to detect, but the rise of 3D printing may make it easier to copy and share sculptural works online. Michael Weinberg, *It Will Be Awesome if They Don't Screw it Up: 3D Printing, Intellectual Property, and the Fight Over the Next Great Disruptive Technology*, Public Knowledge (Nov. 10, 2010), [http:// www.publicknowledge.org/it-will-be-awesome-if-they-dont-screw-it-up](http://www.publicknowledge.org/it-will-be-awesome-if-they-dont-screw-it-up).

⁹⁵ Hardy, *Criminal Copyright*, *supra* note 46, at 313 (“In many cases of copyright infringement today, the chance that an infringer will be caught is substantially less than fifty percent. For many individuals using the Internet, for example, the chance of being caught for occasionally downloading a copyrighted song, or uploading a copyrighted piece of software, is almost zero.”).

⁹⁶ Tom Tyler lists the objective probabilities of being caught, convicted, and imprisoned for burglary and larceny at one percent. Tom R. Tyler, *Compliance with Intellectual Property Laws: A Psychological Perspective*, 29 N.Y.U. J. INT’L L. & POL. 219, 222 (1996).

necessary to engage in large scale copyright infringement.⁹⁷ The commercial enterprises that were capable of producing many copies of bootlegged recordings or unauthorized books would generally have been able to pay significant infringement damages. Now, when an eighteen-year-old college student can infringe thousands, or even hundreds of thousands of dollars' worth of copyrights, the likelihood that defendants will have the resources necessary to compensate plaintiffs is low.⁹⁸ Since the magnitude of copyright liability will often exceed infringers' ability to pay,⁹⁹ impecunious infringers will not be subject to significant deterrence. If a potential infringer is unable to pay \$2,000,000 worth of damages, there is nothing deterring him from causing \$3,000,000 worth of harm.

Thus, for certain classes of copyright infringers—private actors with limited resources engaged in large scale infringement—the threat of civil sanctions may be insufficient to establish deterrence. These actors will tend not to have the capital available to meet the kinds of high magnitude damage awards that low levels of detection necessitate.

3. *Secondary Liability*

Although individual infringers may not have the resources necessary to satisfy large civil damages awards, many of them use intermediaries to distribute unauthorized copies of works. By suing these intermediaries, including file-sharing websites and internet service providers (ISPs), can copyright holders efficiently deter infringement?¹⁰⁰ In theory, subjecting intermediaries to

⁹⁷ ADRIAN JOHNS, *PIRACY: THE INTELLECTUAL PROPERTY WARS FROM GUTENBERG TO GATES* (2009).

⁹⁸ Manta, *Puzzle*, *supra* note **Error! Bookmark not defined.**, at 503 (“Copyright infringers also often do not have ‘deep pockets,’ so it is difficult for owners to recover much in civil litigation compared to the amounts spent on attorneys’ fees and other litigation costs.”).

⁹⁹ Consider the sanctions in the *Tenenbaum* and *Thomas-Rasset* cases mentioned *supra* notes **Error! Bookmark not defined.**-**Error! Bookmark not defined.** Damages awards in the hundreds of thousands of dollars might well have exceeded the defendants’ resources.

¹⁰⁰ See Lital Helman, *Pull Too Hard and the Rope May Break: On the Secondary Liability of Technology Providers for Copyright Infringement*, 6 (2010), available at <http://ssrn.com/abstract=1539627>. Helman writes:

Secondary liability of technology providers is designed as a vehicle to promote effective and efficient copyright enforcement, through three main objectives. First, to provide a cost-effective litigation mechanism, compared with the alternative path of suing countless direct infringers. Second, to generate adequate compensation to plaintiffs through the ‘deep pockets’ of technology companies. Third, to position technologies as gatekeepers who can hinder infringement, by designing technologies in a copyright-friendly fashion, as well as utilize their service fees to both distribute revenues to copyright owners and discourage infringement.

secondary liability can lower the costs of detecting and suing individual infringers. It also attaches liability to parties that are less likely to be judgment proof and creates incentives for intermediaries to monitor the behavior of users.¹⁰¹ Copyright law's secondary liability doctrines of contributory infringement and vicarious liability enable such lawsuits, but, as with all such strategies, we must determine whether they generate more benefits than costs.¹⁰² We suspect that enhanced use of secondary liability will not deter enough harmful behavior to offset its potential effects on legitimate behavior.

First, although file-sharing websites like Napster and Grokster and content hosting platforms like YouTube have been largely responsible for the expansion in unauthorized copying in the digital age,¹⁰³ much copyright infringement still occurs without intermediaries. Parties who produce bootlegged copies of CDs and DVDs to sell on street corners and over the internet typically do not rely on intermediaries to distribute content. When they do, the intermediary's relationship to the infringing behavior will often be too insignificant to trigger secondary liability.¹⁰⁴ In these circumstances, secondary liability simply does not reach the infringing content.

Second, many intermediaries would suffer from the deterrence problems that arise for individual infringers, i.e., that they are undercapitalized relative to the magnitudes of judgments and that they are often run by groups with political rather than economic motivations that make them hard to deter.¹⁰⁵ The cost of the infrastructure necessary to run a file-sharing website consisting of servers and other hardware, while not inconsiderable, is still relatively small compared to the size of a judgment that could be levied against it. The value of the infringing content shared on a website like BitTorrent, even ignoring the availability of statutory damages, likely dwarfs that of the resources used to make it available.

Finally, secondary liability doctrines, which make intermediaries responsible for the behavior of their users, could chill valuable speech. Although much of the behavior taking place on BitTorrent websites involves socially harmful unauthorized copying, there is considerable activity on websites like YouTube that is socially beneficial. To the extent that intermediaries are subject

¹⁰¹ *Id.*

¹⁰² See Douglas Lichtman & William Landes, *Indirect Liability for Copyright Infringement: An Economic Perspective*, 16 HARV. J.L. & TECH. 395 (2003).

¹⁰³ See Helman, *supra* note 100.

¹⁰⁴ Contributory infringement requires that the defendant "knowingly" induces, causes, or otherwise materially contributes to the infringing conduct of another. *Gershwin Publishing Corp. v. Columbia Artists Management*, 443 F.2d 1159, 1162 (2d Cir. 1971). Vicarious liability requires that the defendant have a direct financial stake in the infringing behavior. *Shapiro, Bernstein & Co. v. H.L. Green Co.*, 316 F.2d 304, 307 (2d Cir. 1963).

¹⁰⁵ See Goldman, *supra* note 57.

to liability for copyright violations of their users, they are likely to be risk averse in the face of threatened lawsuits and thus readily limit access for users who are engaging in valuable speech at the boundary of infringement.¹⁰⁶ For example, although the DMCA creates “safe harbor” provisions that shield intermediaries who respond to copyright takedown notices sent by content owners, those intermediaries have very little interest in carefully screening contested claims of unauthorized use.¹⁰⁷ It is easier and less risky for them to simply remove the contested content. Accordingly, we fear that expanded use of secondary liability might be more costly in terms of overall social welfare.

C. The Theoretical Case for Criminal Copyright Sanctions

Deterring socially harmful copyright infringement with DRM and civil sanctions may be difficult and costly in some settings. Creating deterrence for judgment-proof infringers using civil sanctions alone may be impossible. In response, copyright owners can turn to technological measures to prevent infringement in the first place. But as we have shown, reliance on self-help can itself create social costs. DRM will tend to protect uncopyrightable content, and it will prevent fair and valuable uses of copyrightable material. Accordingly, it is worth considering the possible value of criminal sanctions, including imprisonment, as a deterrent to harmful copyright infringement. In this section, we propose a limited scope for the efficient use of criminal sanctions in copyright law. In addition, we discuss some possible caveats to our proposal, and we address some arguments in favor of criminal copyright liability that we believe are incorrect.

1. The Benefits of Criminal Sanctions

As we explained in Part I, economic analysis recognizes certain cases when criminal penalties can be more efficient than other mechanisms for deterring harmful conduct. Criminal penalties are valuable when self-help is costly and when civil remedies are insufficient to deter behavior. These two factors are likely true for some kinds of copyright infringement. Yet the existence of some deterrence benefits does not necessarily mean that criminal sanctions are efficient. They should only be adopted if the deterrence benefits exceed the costs of their use.

When a rock star infringes the copyright of another singer’s song, criminal sanctions will not be necessary. The likelihood that the infringement will be

¹⁰⁶ See Neal Katyal, *Criminal Law in Cyberspace*, 149 U. PA. L. REV. 1003, 1007-08 (2001).

¹⁰⁷ *Id.*

detected is high, and the rock star will probably be able to pay the resulting damages award. This is not the case, however, for a private person who uploads hundreds of copyrighted files onto the internet. Detection of these behaviors is low, so the magnitude of the damages award necessary to create deterrence will almost certainly swamp the person's assets. A potential infringer may not be dissuaded at all by the threat of a judgment so large that it can never be paid.¹⁰⁸ And high-magnitude damages awards eliminate the possibility of marginal deterrence—once the damages award exceeds the infringer's present and future resources, there is nothing stopping her from infringing further.

Because monetary damages are unlikely to deter individual large scale infringers, criminal sanctions may be appropriate. The threat of imprisonment or some type of alternative sanction may create the necessary deterrence against socially harmful copyright violations.¹⁰⁹ The alternative sanctions that we have in mind are those that have often been used in cybercrime prosecutions—prohibitions on the ownership or use of technologies that are capable of violating copyrights.¹¹⁰ This means that for some period of time, people convicted of criminal copyright infringement would be subject to prohibitions or limitations on their use of computers, cell phones, tablets, and other electronic devices.¹¹¹ For deterrence purposes, alternative sanctions will be cheaper to enforce than incarceration, and they may have an important deterrent bite between potentially underdetering civil sanctions and potentially overdetering incarceration. Perhaps more important than their deterrent effect, however, is the incapacitative effect of alternative sanctions. If enforced, these sanctions should prohibit

¹⁰⁸ Some copyright infringement judgments may be dischargeable in bankruptcy if the infringements were not “willful and malicious.” 11 U.S.C. § 523(a)(6). The Ninth Circuit has recently indicated that the “willful and malicious” inquiry in bankruptcy law is not equivalent to the “willfulness” inquiry in copyright law, and that the former must be established separately by a bankruptcy court. *In re Barboza*, 545 F.3d 702, 707 (2009) (requiring separate analysis of whether copyright infringement was willful and malicious as those terms are understood in bankruptcy law for determining whether discharge is suitable).

¹⁰⁹ Hardy, *Criminal Copyright*, *supra* note 46, at 314.

¹¹⁰ See Dept. of Justice, Prosecuting Computer Crimes, 146 *available at* <http://www.justice.gov/criminal/cybercrime/docs/ccmanual.pdf> (“Where a networked computer has been used to perpetrate online fraud, to receive contraband such as child pornography or stolen credit card numbers, or as the instrument of intrusions into or attacks on other computers, these considerations may militate in favor of imposing a restriction on computer use as a condition of supervised release.”).

¹¹¹ See *e.g.* *U.S. v. Holm*, 326 F.3d 872, 878-79 (7th Cir. 2003) (overturning a one-year ban on the use of the internet by a convicted child pornographer but allowing more narrowly tailored restrictions on internet use, including random searches and filtering software). See generally Robin Miller, *Validity of Condition on Probation, Supervised Release, or Parole Restricting Computer Use or Internet Access*, 4 A.L.R. 6th 1 (2005).

offenders from engaging in future copyright infringements. Incapacitation will be particularly valuable from an economic perspective for those defendants, like warez traders and the ringleaders of file sharing sites, who are difficult to deter because of their political beliefs. If they are causing harm and other penalties do not deter them, incapacitation through imprisonment or alternative sanctions can prevent the harmful behavior.

The recently implemented Copyright Alert System may go a significant way towards creating the kinds of deterrence and incapacitation that alternative criminal sanctions would.¹¹² The system, which was implemented in February 2013 by the Center for Copyright Information, tracks the online behavior of users of BitTorrent websites. Users who are detected engaging in illegal file sharing will receive multiple notifications of their detection and warnings against continued file sharing. After the fifth or sixth such alert, users may be subject to severe temporary limitations on their internet bandwidth that would prevent more file sharing. Although the Copyright Alert System has received criticism from some academics and the Electronic Frontier Foundation,¹¹³ its use may be less controversial and more efficient than the alternative of highly punitive civil or criminal sanctions.

Before discussing the costs of criminal copyright liability, we should address one argument in favor of criminal liability that we do not find persuasive in this context. As noted in Part I, public detection and prosecution of harmful conduct can be more efficient than private enforcement because economies of scale favor a single police force and because private individuals may struggle to enforce laws on their own. If two people are both robbed, it is inefficient for both of them to investigate the crime when the police could combine the investigations. Owners of copyrights, however, are well organized and represented by major industry associations that can devote the necessary resources to detecting and litigating infringements. So although a single infringer may be violating copyrights of many different owners, the RIAA and MPAA appear willing and able to police this conduct. In fact, much of the criminal investigation performed

¹¹² Bridy, Annemarie (2012). "[Graduated Response American Style: "Six Strikes" Measured Against Five Norms](#)". *Fordham Intellectual Property, Media & Entertainment Law Journal* **23**: 1–66.

¹¹³ Id.; Mary LaFrance, Graduated Response by Industry Compact: Piercing the Black Box, 30 *Cardozo Arts & Ent. L. J.* 165 (2012); Abigail Phillips, The Content Industries and ISPs Announce a "Common Framework for Copyright Alerts": What Does It Mean for Users?, Electronic Frontier Foundation (July 7, 2012), available at <https://www.eff.org/deeplinks/2011/07/content-industry-and-isps-announce-common>.

by the Justice Department occurs following notification of infringing behavior by these associations.¹¹⁴

2. *The Costs of Criminal Sanctions*

Although imposing criminal penalties for copyright infringement may have some deterrent benefits, it is not without costs. The most obvious costs of criminal copyright infringement are the costs of detection, enforcement, prosecution, and sanction. The costs of detecting and prosecuting copyright infringement are typically shared by the public (via the Department of Justice) and organizations that represent the victims (the RIAA, MPAA, and software organizations and companies). These costs are often steep. In addition, imprisoning offenders creates significant costs: prisons are expensive to operate, inmates are no longer productive members of society, and imprisonment creates a variety of additional harms to offenders and society.¹¹⁵ The social harms caused by unauthorized copying would have to be extremely large in order to justify the significant costs of detecting, prosecuting, and imprisoning copyright infringers. Accordingly, if the technological prohibitions mentioned above have significant deterrent effect, they will be much less costly to administer.

Infringement liability is intended to deter people from engaging in socially harmful unauthorized copying, but because copying can also serve socially valuable purposes, enhanced penalties risk chilling some beneficial conduct.¹¹⁶ Some people may refrain from valuable but legally questionable conduct if the penalties for infringement increase.¹¹⁷ The likelihood of this happening will depend on the similarity between acceptable and unacceptable conduct and the difficulty of predicting *ex ante* whether certain behaviors are legal or not.¹¹⁸

As we describe above, one of the principal benefits of civil or criminal sanctions to deter copyright infringement is the reduction in socially wasteful self-help. If criminal sanctions lead to improved deterrence of copyright infringement, copyright holders would no longer need to rely on DRM to prevent infringement. The reduction in overbroad DRM usage that eliminates (or at least makes more costly) much socially valuable conduct is the chief goal of enhanced deterrence. Whether content owners would refrain from using DRM is, however, unclear.

¹¹⁴ Kim F. Natividad, *Stepping It UP and Taking It to the Streets: Changing Civil and Criminal Copyright Enforcement Tactics*, 23 BERKELEY TECH. L.J. 469, 480-2 (2008).

¹¹⁵ Bronsteen, Buccafusco & Masur, *Happiness and Punishment*, *supra* note 24.

¹¹⁶ See Moohr, *Overcriminalization*, *supra* note **Error! Bookmark not defined.**, at 26 (“...criminal enforcement, to the extent it deters infringing activity, may also deter socially valuable conduct that is not unlawful.”).

¹¹⁷ Manta, *supra* note **Error! Bookmark not defined.**, at 499.

¹¹⁸ See Moohr, *Overcriminalization*, *supra* note **Error! Bookmark not defined.**, at 26-27.

The creation and use of DRM code is relatively cheap for content owners, and this is especially true because the DMCA minimizes the costs of an arms race with hackers. Moreover, DRM generates significant benefits for copyright holders in addition to preventing illegal copying. DRM enables copyright holders to protect works beyond their copyright term and to protect content that is not an appropriate subject for copyright law. DRM also can significantly increase the costs of fair use. As we described, circumventing DRM for fair uses may not be exempted from the DMCA, and even if it is, the uncertainty of whether conduct is in fact fair use will deter many risk-averse users. This may be entirely consistent with the preferences of copyright holders: much fair use, especially criticism and parody, will be objectionable to copyright owners. Since the reduction in DRM usage is the main benefit we anticipate from criminal liability, it is important to know whether it would actually occur.

One solution to this problem is for Congress to disallow DRM entirely. Since DRM can be socially harmful, and since the justification for the costs of criminal sanctions is the reduction of DRM usage, Congress could simply prevent the distribution of copyright works in media that include technological protection measures.

A final category of costs worth mentioning includes the possible effects of imposing criminal liability on conduct that many people believe does not warrant it. There is considerable variation in people's beliefs about the harms of copyright infringement.¹¹⁹ Many people believe that downloading music and movies from the internet is not harmful at all and certainly should not subject offenders to imprisonment.¹²⁰ Stark divergence between social norms about behavior and legal rules governing it can be very costly.¹²¹ When norms and law diverge, people's respect for the law decreases, and their compliance rate declines.¹²² Thus, if people believe that criminal sanctions are inappropriate for copyright infringement, the benefits of deterrence will be weaker.¹²³ As with

¹¹⁹ Hardy, *Criminal Copyright*, *supra* note 46, at 326 ("We are witnessing, then, a growing split between the government and various copyright-dependent industries, like music, computer software, and motion pictures,

on the one hand, and highly critical copyright consumers and Internet users on the other.").

¹²⁰ *Id.* at 314 ("...the trend toward greater deterrence through greater punishment of infringement, especially criminal punishment, seems increasingly at odds with the public's perception of what is fair and what is consistent with the American tradition of individual liberty.").

¹²¹ See Tyler, *supra* note 96, at 219.

¹²² Moohr, *Overcriminalization*, *supra* note **Error! Bookmark not defined.**, at 29 ("Respect and legitimacy are threatened when a community norm that condemns prohibited conduct is not yet in place.").

¹²³ See TOM R. TYLER, WHY PEOPLE OBEY THE LAW 64 (1990); Moohr, *Overcriminalization*, *supra* note **Error! Bookmark not defined.**, at 16 ("Under any theory of deterrence, it is more difficult to induce law-abiding behavior when underlying social norms do not support the law.").

DRM, however, the precise effect of criminal copyright liability on norms is difficult to predict. It is also possible that the imposition and effective enforcement of criminal sanctions for violating copyright law could help people understand the harm of copyright infringement, resulting in greater convergence between social attitudes and the law.

Subject to these important qualifications, there is a sound, if limited, economic case for the use of criminal penalties to deter some copyright infringement. Civil sanctions alone appear ineffective at deterring some socially harmful copying. In response, copyright owners will increasingly turn to DRM to combat this behavior. But while DRM can be used to prevent socially harmful copying, it will also tend to limit socially beneficial uses of copyrighted works. If criminal sanctions can deter harmful conduct that would not have been deterred by civil sanctions alone, copyright owners should be willing (or compelled) to forego DRM, thereby decreasing the costs of valuable behavior. The chief economic rationale for criminal copyright law is not that it will allow copyright holders to capture more rents, but rather the expectation that deterring some harmful copying will generate more beneficial behavior.

D. What Kind of Criminal Liability Could be Desirable?

Part II.C made the theoretical case for using criminal sanctions to deter copyright infringement. We believe that some kind of criminal copyright liability may be economically justified. In this section, we describe the nature of the criminal sanctions that are mostly likely to be beneficial. The use of criminal sanctions to deter copyright infringement offers significant benefits but also considerable costs. As with most such projects, accurately estimating the costs and benefits is difficult. This is especially true given the empirical uncertainty surrounding some of the most important issues. In the face of this uncertainty, the use of criminal sanctions for copyright violation should be narrowly circumscribed and limited to situations that are likely to produce the highest benefits at the lowest costs.

Criminal liability is especially important with respect to individual or poorly capitalized infringers of large quantities of copyrighted material who are difficult to detect and identify. Accordingly, criminal liability should focus on these situations. It would certainly be objectionable to disproportionately prosecute and imprison poor offenders. Yet focusing prosecutorial effort on those acts of infringement which are the most costly and most difficult to detect makes economic sense. Additionally, infringement prosecutions should address large scale counterfeiting operations that market bootlegged music, movies, and software. These behaviors likely cause the most social harm, and these are the violators for whom criminal liability will pack the most deterrent punch.

Imposing criminal liability risks chilling valuable conduct, so criminal sanctions should be reserved for behavior that is most clearly harmful. This is the case for exact duplication of copyrighted works that will directly substitute for legitimately available copies. Although copyright law gives authors the exclusive right to make derivative works and substantially similar copies of their works, a great deal of behavior that falls into these categories also could constitute fair use.¹²⁴ By contrast, there will be an extremely limited number of situations when exact duplication of copyrighted works can constitute fair use. By confining criminal liability to the latter cases, the risks of chilling socially valuable behavior can be minimized.

These risks can be further minimized by including a strict *mens rea* requirement for criminal liability. *Mens rea* standards can be helpful in distinguishing harmful from valuable conduct. Accordingly, criminal copyright infringement should condition liability on proof that the defendant intentionally violated a known copyright. That is, the prosecution should have to prove that the defendant knew that the infringed works were protected by copyright and that he knew that his conduct was unlawful. Good faith belief that his behavior was not copyright infringement or constituted fair use should preclude criminal liability.

Finally, in order to further guard against deterring socially valuable behavior, the DMCA should be amended to clearly exempt defendants from liability when their circumvention of technological protective measures is done for purposes of fair use or to obtain access to content that is not protected by copyright.¹²⁵ In theory, perfect enforcement of copyright law would eliminate the need for technological protections, but perfect enforcement is not possible in practice and, given the cost of achieving it, is not warranted. Thus, the use of DRM can help prevent harmful copyright violations, but users who circumvent it for valuable reasons should not be subject to liability.

E. Assessing Current U.S. Criminal Copyright Law

Having made the limited and tentative economic case for criminal sanctions for some copyright infringement, it remains to assess the extent to which current U.S. law conforms to our judgments. For the most part, it matches

¹²⁴ Moohr, *Overcriminalization*, *supra* note **Error! Bookmark not defined.**, at 27 (“Most copyrighted works are based, directly or indirectly, on the work of others. Potential creators may be reluctant to use copyrighted work, which is a sort of ‘raw material’ for new work, when the potential cost of doing so is very high.”).

¹²⁵ See Jacqueline Lipton, *Information Property: Rights and Responsibilities*, 56 FLA. L. REV. 135, 159 (2004) (“The legal status of fair use and the scope of the fair use defense might be clarified for the digital age if Congress amends the DMCA so that copyright holders are not permitted to deny access to fair users.”).

our prescriptions fairly well. The provisions of criminal copyright law and the enforcement efforts of the Department of Justice generally comport with our analysis of when such liability is appropriate. We do have some concerns about the monetary thresholds for criminal liability, however.

1. Current Criminal Copyright Law

U.S. copyright law provides for the use of criminal sanctions to deter copyright infringement in 17 U.S.C. § 506. The law provides for punishment of any person “who willfully infringes a copyright...if the infringement was committed (A) for purposed of commercial advantage or private financial gain; [or] (B) by the reproduction or distribution, including by electronic means, during any 180-day period, of one or more copies or phonorecords of one or more copyrighted works, which have a total retail value of more than \$1,000.”¹²⁶ Thus, to be found liable, a defendant must be shown to have acted willfully and to have been motivated by commercial advantage or to have met the damages threshold established in the second provision of the statute.

The *mens rea* requirement of willfulness is helpful in limiting the potential for chilling valuable copying behavior. Courts have generally interpreted this requirement to require proof of a voluntary, intentional violation of a known legal duty.¹²⁷ This typically means that the defendant subjectively knew that the infringed works were subject to copyright and that his conduct was unlawful. Merely intending to copy is insufficient. Given this fairly strict requirement, it is unlikely that the existence of criminal sanctions will deter fair use.

We are less confident that the thresholds for criminal liability in subsections (A) and (B) are sufficient to limit criminal liability to those cases when it is most effective. The requirement in (A) that the defendant be motivated by commercial gain or profit covers much conduct where civil liability would be sufficient. Selling a copy of a CD to a friend for \$10 would meet the requirement, but there is no reason to think that the apparatus of the criminal law is necessary to deter this behavior. Even with the low likelihood of detection, the harm it causes is slight.

Subsection (B)’s requirement, which was added by the No Electronic Theft (NET) Act of 1997, removes the necessity of proving the defendant’s motive, but it does add a monetary threshold. It is difficult to predict whether \$1000 is the appropriate place to set this limit. The answer will turn on the probability of detection and the availability of a damages multiplier in civil suits.

¹²⁶ 17 U.S.C. § 506.

¹²⁷ Rebecca E. Hatch, *Criminal Infringement of Copyright Under 17 U.S.C.A. § 506*, 120 AM. JUR. PROOF OF FACTS 3D 181, §3 (2011).

If a defendant willfully infringes \$1,000 worth of copyrighted works, he may be liable for statutory damages of up to \$30,000 per infringed work and up to \$150,000 in enhanced damages for willfulness.¹²⁸ If the total civil damages award for the \$1,000 infringement is \$200,000, then a rational person will only be deterred from infringing if the probability of detection is at least 0.005 (one-half of one percent). If the damages multipliers cannot be constitutionally raised to reflect likelihoods of detection that are lower than this, the \$1,000 threshold may be set close to the optimal value. In addition, defendants who cannot pay such large judgments also might not be deterred by civil fines, in which case criminal penalties could be necessary.

The penalties for criminal copyright infringement are specified in 18 U.S.C. § 2319. Defendants found guilty under 17 U.S.C. § 506(a)(1)(A) (the commercial gain or profit subsection) are subject to imprisonment for not more than five years if they reproduce or distribute at least ten copies of one or more works with a total retail value of more than \$2,500 in any 180-day period.¹²⁹ The maximum prison term doubles upon subsequent convictions.¹³⁰ For defendants found guilty under subsection (B) (the monetary threshold section), the maximum prison term is three years for a first offense and six years for subsequent offenses.¹³¹

In addition, some courts have been willing to employ computer use restrictions and other alternative sanctions as conditions of probation and supervised release. One defendant was subjected to three years of probation during which he “shall maintain a daily log of all addresses he accesses via any personal computer or other computer used by him, other than for authorized employment, and he shall make this log available to the Probation Officer.” Additionally, “the defendant shall refrain from accessing, via a computer, any ‘material’ that relates to the activity in which he was engaged while committing the instant offense, namely, [Internet Relay Chat] channels; e-mail and instant messaging that relate to warez activities; and any internet warez related web sites, channels, and private sites.”¹³² Although monitoring these sanctions may be difficult, that is always the case with probation and supervised release. If they are backed with the threat of a return to prison, they may nonetheless be successful even if they are not perfectly enforced.

¹²⁸ 17 U.S.C. § 504.

¹²⁹ 18 U.S.C. § 2319(b)(1).

¹³⁰ 18 U.S.C. § 2319(b)(2).

¹³¹ 18 U.S.C. § 2319(c)(1); 18 U.S.C. § 2319(c)(2).

¹³² See *U.S. v. Fong*, 2006 WL 5388953 (N.D. Cal. Nov. 2, 2006). See also *U.S. v. Bailey*, 286 Fed. Appx. 678, 679 (11th Cir. 2008) (where the defendant’s supervised release was revoked for failure to adhere to computer restrictions).

As always, it is difficult to say whether the penalties imposed for copyright infringement are well-balanced to maximize their deterrent benefit and minimize social costs. Sending people to prison is very expensive. Moreover, as we have argued elsewhere, longer terms of imprisonment may have diminished deterrent capacity relative to their length and cost.¹³³ Given the high social cost of imprisonment, terms exceeding a few years are probably not efficiently deterring copyright infringement. The use of alternative sanctions such as technological use limitations is worth exploring.¹³⁴ The threat of having limited internet and cell phone access for five years may be sufficient to deter many twenty-year-olds from engaging in large scale copyright infringement. And the costs of imposing such sanctions are relatively low: only monitoring costs and the productivity losses from limiting offenders' use of communications technologies. In addition, many copyright violators who are not motivated by economic gain, especially those whose behavior is politically motivated, may be difficult or impossible to deter with any size sanction.¹³⁵ Accordingly, alternative sanctions that prevent them from engaging in violations in the first place may have valuable incapacitative effects. Without access to technology that enables infringement, these offenders will be less likely to cause harm. Although alternative sanctions impinge upon offenders' free speech rights, they are almost certainly less extreme than the liberty losses associated with imprisonment.¹³⁶

2. Criminal IP Enforcement

Although the scope and magnitude of criminal penalties for copyright infringement may be overbroad, the behavior of prosecutors and judges seems generally consistent with efficient deterrence. The Department of Justice tends to prosecute between 50 and 100 cases each year,¹³⁷ and the defendants are typically those engaged in the kinds of conduct that is most appropriate for criminal liability—large-scale counterfeiting that is difficult to detect. Most recently, for example, the leaders of the internet piracy group “IMAGiNE” were convicted of running “an organized online piracy ring that sought to become the premier group

¹³³ Bronsteen, Buccafusco & Masur, *Happiness and Punishment*, *supra* note 24.

¹³⁴ See Sam Cowin, *You Don't Have Mail: The Permissibility of Internet-Use Bans in Child Pornography Cases and the Need for Uniformity across the Circuits*, 80 GEO. WASH. L. REV. 885 (2012).

¹³⁵ See Goldman, *supra* note 57.

¹³⁶ U.S. v. Holm, 326 F.3d at 878 (noting that “such a ban renders modern life—in which, for example, the government strongly encourages taxpayers to file their returns electronically, where more and more commerce is conducted on-line, and where vast amounts of government information are communicated via website—exceptionally difficult).

¹³⁷ Hatch, *supra* note 127, at § 1.

to first release Internet copies of movies only showing in theaters.”¹³⁸ The defendants received sentences ranging from 23 to 60 months.¹³⁹ In another recent case, the defendant was convicted of producing and selling thousands of counterfeit music CDs and movie DVDs at flea markets in California. The estimated retail value of the counterfeit goods was \$2.6 million. The lead defendant in the case received a four-year sentence.¹⁴⁰

These are the kinds of defendants against whom criminal liability will be most valuable.¹⁴¹ Their behavior is hard to detect and occurs on a large scale. If they were subject only to civil liability, the magnitude of the damages awards would almost certainly exceed their ability to pay. Moreover, their behavior—counterfeiting music, movies, and software—is the kind that creates substantial social harm and little, if any, social benefit. The fact that someone was convicted

¹³⁸ U.S. Dept. of Justice, *Leader of Internet Piracy Group “IMAGiNE” Sentenced in Virginia to 60 Months in Prison for Criminal Copyright Conspiracy* (2013), available at <http://www.justice.gov/opa/pr/2013/January/13-crm-010.html>.

¹³⁹ *Id.*

¹⁴⁰ U.S. Dept. of Justice, *San Jose Man Sentenced To Prison For Extensive Conspiracy To Sell Counterfeit Media* (2012), available at <http://www.justice.gov/usao/cae/news/docs/2012/11-2012/11-19-12colorado.html>.

¹⁴¹ See also Department of Justice, *Annandale Man Sentenced to 36 Months for \$2.5 Million in Software Piracy* (2012), available at <http://www.justice.gov/usao/vae/news/2012/11/20121108nguyennr.html> (The defendant pled guilty to copyright infringement for selling \$2.5 million in copyright-infringing computer software and defrauding more than 2,000 customers. He was sentenced to 36 months in prison, followed by three years of supervised release. Additionally, he was “ordered to pay restitution of \$2.5 million and a forfeiture money judgment of \$1.4 million.”); Department of Justice, *Internet Businessman from New York Sentenced for Infringing Copyrights* (2012), available at <http://www.justice.gov/usao/vae/news/2012/12/20121203newsomenr.html> (The defendant pleaded guilty to four counts of criminal copyright infringement and was sentenced to eleven months in prison followed by three years of supervised release which includes nine months of home confinement. As an additional part of his sentence, the defendant forfeited “assorted computers, hard drives, and other electronic equipment. The defendant owned and operated an online business selling copyrighted computer software, education, and training materials worth approximately \$345,021.68. A civil copyright infringement suit was previously filed against the defendant in 2006.); Department of Justice, *Leader of NinjaVideo.Net Website Sentenced to 22 Months in Prison for Criminal Copyright Conspiracy* (2012), available at <http://www.justice.gov/criminal/cybercrime/press-releases/2012/besharaSent.pdf> (The leader of NinjaVideo.net Website was sentenced to twenty-two months in prison followed by two years of supervised release following her prison stay, and she must complete 500 hours of community service. In addition, the defendant must “repay \$209,826.95 that she personally obtained from her work at NinjaVideo.net and forfeit to the United States several financial accounts and computer equipment involved in the crimes. The website which operated from February 2008 until June 2010 enabled visitors to view movies still in the theaters, movies not yet released, as well as newly aired television shows.).

and sentenced for selling thousands of copies of bootlegged music is unlikely to deter others who are engaged in conduct that is socially valuable.

* * *

This Part has analyzed the theoretical economic case for imposing criminal sanctions on copyright infringers and found that criminal penalties may be warranted to deter some behaviors that might otherwise go unchecked by civil sanctions or DRM. The existence of criminal penalties for copyright infringement could minimize copyright owners' reliance on DRM thereby reducing the costs of socially beneficial uses of copyrighted works. Deterring socially harmful copying while promoting socially beneficial copying promotes overall welfare. As noted, however, important questions about the precise effects of criminal liability remain unanswered and unanswerable with current data.

III. CRIMINAL PATENT LAW?

Although we believe that there is a limited economic case for criminal copyright sanctions, this does not automatically mean that the same is true for patent law. The economics of patents and inventions are very different from those of copyrights and creative works. Accordingly, this Part applies the economic theory discussed in Part I to the unique issues that arise for patent law.

A. The Economic Harm from Patent Infringement

In order to determine whether criminal sanctions would be economically beneficial in patent law, we must first determine what (if any) economic harm is caused when a firm or individual infringes a patent. There are two possible sources of harm. The first is the reduction in the patent holder's incentives to commercialize, improve, or create the invention in the first place—that is, the reduced incentives to innovate in light of the reduced returns to owning a patent.¹⁴² These costs are extremely difficult to calculate because they require answering a hypothetical counterfactual: how much innovative work would the patent-holding firm have done had they known that their patent rights would be infringed by a competitor? This in turn implicates the question of how much other firms will reduce their innovative efforts in the future if they have reason to believe that their future patent rights will not be secure. As we did with copyright

¹⁴² See *supra* Part I.B. (describing an economic theory of patent rights as an inducement to innovation).

law, though, we will treat some forms of patent infringement as causing social welfare losses.¹⁴³

The second potential source of harm from patent infringement lies with the possibility of expensive self-help by the patent holder. What form might that self-help take in the patent context? The kinds of technological measures that are available for copyrighted works will generally not be available to prevent unauthorized use of new inventions. Innovators could, however, switch from patents to trade secrets, thereby preventing unauthorized use of the invention by refusing to share it publicly.¹⁴⁴ Inventors could try to limit others' ability to know essential aspects of an invention, giving them a competitive advantage. A trade secret is the IP equivalent of building high walls around a piece of property. (Some trade secrets are in fact protected by high walls.) Trade secrets are privately costly because they require private expenditures to secure them; the owner of a trade secret must expend resources protecting that secret via technological measures (such as walls, both physical and electronic) and nondisclosure agreements.¹⁴⁵ They may also be socially costly (compared with patents) precisely because information surrounding the technological advance is kept secret rather than shared with the public.¹⁴⁶ One of the principal benefits of the patent system is the anticipated *quid pro quo* between inventors and the public—in return for getting exclusive rights in their inventions, inventors must disclose those inventions to the public who benefit from the opportunities for further innovation.¹⁴⁷

We suspect, however, that the risk of firms electing trade secrets over patents is relatively small, even in an environment in which patent infringement goes under-deterred. Many inventions will simply be impossible to protect with trade secrets.¹⁴⁸ When an invention is commercialized and sold, competitors will

¹⁴³ As with copyright law, there will be some authorized uses of patents that will not be socially costly. Again, when infringers fall in the category of deadweight losses, their infringement (at least without effective price discrimination) does not cause social welfare harms. Additionally, as discussed *infra*, some forms of patent infringement, such as “inventing around” a patent, may create net social benefits (analogously to fair use of copyrighted works).

¹⁴⁴ Anderson, *supra* note 45, at 923-24 (describing the options available to innovators choosing between different forms of intellectual property protection).

¹⁴⁵ Mark A. Lemley, *The Surprising Virtues of Treating Trade Secrets as IP Rights*, 61 STAN. L. REV. 311, 332 (2008) (describing trade secret law and the requirements it places on owners of trade secrets).

¹⁴⁶ *Id.* at 341 (analyzing the social losses that accompany decisions to opt for trade secrets over patents).

¹⁴⁷ Jeanne C. Fromer, *Patent Disclosure*, 94 IOWA L. REV. 539, 542 (2009) (describing the benefits of patent disclosure and the tradeoffs at the heart of intellectual property).

¹⁴⁸ See Lemley, *supra* note 145, at 315 (making this point about the difficulty of protecting trade secrets for commercial products).

be able to reverse-engineer the product and reveal the innovation underlying it.¹⁴⁹ Reverse engineering is not prohibited by trade secret law, so competitors will quickly gain access to the underlying invention.¹⁵⁰ This will be true for nearly all pharmaceuticals and biotechnology (whose chemical formulae are discernible from the drugs themselves), medical devices, and machinery, as well as many electronics, and semi-conductor inventions. Inventions of processes that can be practiced behind closed doors, the fruits of which can then be sold without revealing the secrets, may still be protectable as trade secrets. (Ironically, business methods and software—the most commonly cited examples of bad patents—may often fall into this category.¹⁵¹) And certainly there will be some inventions that are too complex or opaque to be successfully reverse-engineered. But by and large, the types of innovations that are currently protected by patent law will not be protectable by trade secrets.

Of course, the harm that patent infringement will do is only part of the equation. Although the existence of meaningful harm is necessary in order answer the threshold question of whether sanctions for infringement are worthwhile, determining the appropriate level of those sanctions will require understanding the value of the infringement to the infringer. Here, the story is somewhat clearer. The benefit to an infringer from patent infringement is just the profit that the infringer received from the infringement, over and above whatever profit the infringer might have made had it sold a non-infringing product instead.¹⁵² This is similar to the inquiry that a court must conduct when determining the “reasonable royalty” that an infringer must pay to a patent holder that has prevailed in court.¹⁵³ For the most part, it depends upon the number of sales that the infringer has made and the profits per sale. This inquiry can be quite technically difficult, as it often involves answering a complicated counterfactual.¹⁵⁴ But it is at least conceptually straightforward, and a court will often be able to compute the measure to within a reasonable approximation.

B. Likelihood of Detection

¹⁴⁹ *Dunlop Holdings, Ltd. V. Ram Golf Corp.*, 524 F.2d 33 (7th Cir. 1975) (Stevens, J.) (discussing the possibility of reverse-engineering commercial products).

¹⁵⁰ Lemley, *supra* note 145, at 315 (discussing reverse engineering).

¹⁵¹ See BURK & LEMLEY, *supra* note 18, at 203 (describing the arguments typically leveled against software and business method patents).

¹⁵² *LaserDynamics, Inc. v. Quanta Computer, Inc.*, 694 F.3d 51, 54 (2012) (describing the proper measure of damages in patent cases).

¹⁵³ *Id.* at 55 (discussing the reasonable royalty measure of damages).

¹⁵⁴ See *id.* at 57 (illustrating the difficulties inherent to properly calculating a running royalty).

As we noted above, the deterrent power of sanctions and their appropriate magnitude will depend on how often harmful behavior will be detected. How likely is detection of patent infringement? Here it is useful to separate two types of infringers: those who infringe accidentally and would prefer to negotiate licenses, and those who infringe deliberately (and could more accurately be characterized as engaging in theft). Patent owners will always have incentives to search for possible infringers. Unintentional infringers—the first group—would have similar incentives to search for patents that their products might infringe, in order to secure licenses.¹⁵⁵ They would also have no incentives to attempt to hide or disguise their products or to obscure the fact that those products are infringing. These unintentional infringers are thus quite likely to be detected (at least eventually) by patent owners.

For intentional infringers who do not wish to be caught, the picture is not quite so clear. These parties will attempt to hide their infringement, and the onus will be entirely upon patent holders to locate them.¹⁵⁶ This increases the search burden placed upon patent holders, but does it mean that these infringers are unlikely to be discovered? We suspect that the answer is generally no. Most infringing products that are placed on the shelves and sold openly are quite likely to be detected due to the strong incentives that patent holder have to police their property rights. It is always possible that a domestic black market for innovative goods could develop, much like the black market in pirated CDs and DVDs. (We will discuss international markets below.) But no significant such market appears to exist, and we think that is unsurprising for several reasons. First, the cost of producing patented products is typically much higher than the cost of copying copyrighted works.¹⁵⁷ Any individual with a computer and the right software can produce burned DVD copies, but it would take a factory to make the computer used to burn the DVD. The same holds true for semiconductors, biotechnology, and the like. The second, related reason is that quality is much more at issue in patented products than it is for copyrighted works. Partly because it is so easy to produce pirated copyright works, and partly because they are so inexpensive, purchasers do not typically worry about receiving a copy of unusable quality. But this is not the case for drugs or electronics, for example, where obtaining a low-quality copy would be expensive and even potentially harmful. Accordingly,

¹⁵⁵ See Jonathan S. Masur, *Patent Liability Rules as Search Rules*, 78 U. CHI. L. REV. 187, 193 (2011) (analyzing patentee and infringer search incentives).

¹⁵⁶ *Id.* at 194 (discussing this case).

¹⁵⁷ See Ted Sichelman, *Commercializing Patents*, 62 STAN. L. REV. 341, 367 (2010) (explaining the economics of bringing a patented invention from the laboratory to the marketplace).

consumers will tend to opt for purchasing patentable goods from trusted sources, not on the black market.¹⁵⁸

The greatest likelihood of infringement going undetected involves patents on processes, including software patents, that can be performed behind closed doors. Just as these processes are easiest to conceal, and thus lend themselves most directly to the use of trade secrets, so too are they easiest to infringe in secret without detection.¹⁵⁹ A patent holder could always study the products or services being performed by a competitor and deduce that the competitor must be violating its patent; or it could take a guess, file an action alleging infringement, and then seek discovery that would reveal the competitor firm's secret activities. Accordingly, even secret infringing activity is by no means impossible to detect. But there is at least a chance that it could go undetected for a meaningful length of time. The result is symmetry between infringers' and patent holders' actions: it is easier to infringe a process patent than a product patent without being detected, and it is easier to use trade secrets to protect a process than to protect a product, making innovators significantly more likely to opt out of the patent system and into trade secret protection when their innovations take the form of processes. This trend will be heightened when patent holders view infringement remedies as inadequate. The case for criminal penalties for patent violations is thus strongest with respect to process patents, particularly patents on inventions that could conceivably be practiced in secret.

While we believe that infringing activities are generally likely to be detected, findings of liability are another matter entirely. Federal district court judges find patent law notoriously difficult,¹⁶⁰ and the Federal Circuit has itself been widely criticized for issuing confusing decisions, promulgating ambiguous doctrines, and simply deciding cases incorrectly.¹⁶¹ One of us has separately suggested that courts should award heightened damages to patent owners that prevail at trial (and assess penalties against patent owners that fail) in order to compensate parties for the risk that their cases will be decided incorrectly.¹⁶² The risk that an infringer will be discovered but not sanctioned is thus very real.

¹⁵⁸ See *id.* at 378 (discussing marketplaces for inventive goods).

¹⁵⁹ *W. L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983) (describing the use of a patented process in secret, in a fashion that did not inform the public).

¹⁶⁰ David L. Schwartz, *Practice Makes Perfect? An Empirical Study of Claim Construction Reversal Rates in Patent Cases*, 107 MICH. L. REV. 223 (2008) (demonstrating that even experienced patent judges have nearly 50% of their claim construction opinions reversed).

¹⁶¹ Jonathan S. Masur, *Patent Inflation*, 121 YALE L.J. 470, 478 (2011) (listing the various criticisms that have been leveled at the Federal Circuit).

¹⁶² Anup Malani & Jonathan S. Masur, *Raising the Stakes in Patent Cases*, GEO. L.J. (forthcoming 2013) (suggesting a mechanism for compensating patent holders for the risk of error in the courts).

But the risk may not be all that great. Even if patent courts are no better than a coin flip, there is still a 50% chance that an infringer will be sanctioned. That is much better odds than exist for most crimes, where criminals are caught and sentenced to prison at a far lower rate. A 50% rate would require only that damages be doubled, which is not insignificant but is again far lower than the types of multiples typically contemplated for other crimes, including copyright infringement. But we suspect that patent courts, for all of their flaws, are actually better than a coin flip. This will decrease the necessary multiples accordingly. If, for instance, patent courts are 75% accurate, then the necessary multiple would be 4/3, a relatively modest figure.

Of course, patent law awards heightened damages, but not to compensate for the possibility that infringement will go undetected or unpunished. Rather, judges in patent trials can award up to treble damages in cases of “willful” infringement: those instances in which a party knowingly and deliberately infringed a patent.¹⁶³ It should be clear from the preceding paragraphs that this practice makes little sense from the perspective of optimal deterrence, at least on its face. However, as we will explain below, there is one respect in which enhanced damages for willful infringement tracks a rational economic theory of sanctions for intellectual property violations.

C. Judgment-Proof Patent Defendants?

The next issue is whether patent defendants would typically be able to pay judgments levied against them if those judgments took the form of monetary sanctions, or whether they would in a significant number of cases be insolvent or judgment-proof. In section III.A, we noted that the benefit to an infringer from infringing a patent is equal to the infringer’s profits from the sale or use of the patented product. These profits could in theory be quite substantial: if a firm sold a patented drug on the black market for a price just below the monopoly price, it could earn tens or even hundreds of millions of dollars. Profits from the infringement of less valuable inventions would likely be smaller but could still be significant.

However, in section III.B we observed that patent infringement will generally be easy to detect, with some notable but limited exceptions. Because most infringement will be detected, it will not be necessary to substantially increase the sanctions to account for the likelihood of non-detection in order to achieve appropriate deterrence. There may have to be some multiplier to account for the fact that “conviction” is never certain in a patent court. Nonetheless, the

¹⁶³ 35 U.S.C. § 284.

proper measure of sanctions for infringement will typically hover near the measure of infringer profits. With rare exceptions, then, the overall sanction should be at or near the level of profits earned by the infringer.

We believe that patent infringers will tend not to be judgment-proof and will be able to afford this measure of damages. We reach this conclusion for two reasons. First, as we noted above, manufacturing a patented product for sale is often quite expensive.¹⁶⁴ A firm that wishes to sell computers, or smartphones, or any other type of consumer electronics will require a factory of some sort to assemble those computers, and even a pharmaceutical infringer will need a significant operation to produce prescription drugs in any quantity. To be sure, some inventions, such as software, can be duplicated with a minimum of capital investment.¹⁶⁵ But the median patented product will require a far greater investment of resources to produce in quantity than will the median copyrighted DVD or CD. Accordingly, patent infringers will generally be larger, better-capitalized operations with substantial resources that can be seized in order to pay judgments. Against such firms, monetary damages will create adequate deterrence.

Of course, there is always the possibility that an infringer will be a foreign firm whose assets cannot be seized by American courts. To the extent that black markets for patented products have developed, they have typically been foreign-based, for precisely this reason.¹⁶⁶ But if American courts cannot reach a firm's assets, they will not be able to reach the persons running those firms for purposes of criminal penalties either. Thus, while deterrence may be an issue with regard to infringers operating abroad, imposing criminal penalties in cases of patent infringement will not ameliorate the problem.

The second and even more general reason that patent infringers will not be judgment-proof is that they will have the profits they have earned from the infringement available to them. Simple disgorgement of these profits should be nearly adequate to deter firms from infringing a patent. Recall that this is not the case in many instances of standard property crimes. In a typical property crime, the property may be damaged or spoiled before it is recovered, or it may never be recovered at all.¹⁶⁷ In addition, because property criminals are caught and prosecuted at low rates, it is necessary to multiply the punishment imposed upon

¹⁶⁴ See *supra* Part III.B.

¹⁶⁵ See *supra* Part II.

¹⁶⁶ See Planet Money, *Black Market Pharmacies and the Spam Empire Behind Them*, Jan. 15, 2013, available at <http://www.npr.org/blogs/money/2013/01/15/169424047/episode-430-black-market-pharmacies-and-the-spam-empire-behind-them> (describing the internet black market for patented drugs and how it operates abroad).

¹⁶⁷ See *supra* Part I.C (describing the effects of property crimes on property).

them many times in order to achieve adequate deterrence.¹⁶⁸ This means that forcing the wrongdoer to disgorge the stolen property, by itself, cannot serve as an adequate sanction. It is of course possible that patent infringers might “spoil” the profits they have stolen by absconding with them or investing them in an asset that has lost value. But this is much less of an issue with respect to monetary profits that will often be recoverable as cash than it is with respect to stolen property that might have been fenced, destroyed, or otherwise reduced in value. By consequence, we believe it is quite likely that patent infringers will be able to pay the monetary judgments against them, even when those judgments are large enough to induce deterrence.

D. Optimal Activity Levels and Incapacitation

Before we can reach any final conclusions regarding the propriety of criminal sanctions for patent infringement, there are two other questions we must consider. The first is the optimal level of patent infringement: should there be zero infringement, or more than zero? Of course, in a utopian world there would in fact be zero patent infringement, but the question is whether the level of precaution necessary to bring that about would be more or less socially costly than the harm of infringement itself. Put another way, the question is: how close is patent infringement to socially valuable conduct? Returning to the explanation we offered in Part I, it would be extremely costly if every person were to drive his or her car so carefully that no automobile accidents ever occurred. Because driving is (typically) a socially valuable activity that should be allowed to take place, society tolerates some number of accidents in order to enable individuals to drive without having to bear the costs of excessively costly precautions. On the other hand, intentional murder bears no resemblance to any socially useful activity, and thus there is no precaution too costly. The optimal rate of murder is zero, even accounting for the costs of precautions, and that is why the penalty for murder is infinite or close to infinite—the death penalty or life in prison—in many jurisdictions.

It should be clear from this brief exposition that the socially optimal level of patent infringement is well above zero. Engaging in innovative research and development is immensely valuable, and it would be tremendously costly for inventors to take the precautions necessary to ensure that they are never violating an existing patent.¹⁶⁹ Merely searching through the existing stores of patents is an

¹⁶⁸ *See id.*

¹⁶⁹ *See* ADAM B. JAFFE & JOSH LERNER, INNOVATION AND ITS DISCONTENTS 37-43 (2006) (describing cases of simultaneous invention and the difficulties that even honest firms have in avoiding accidental patent infringement).

immensely costly endeavor; determining what technologies those patents actually cover is even costlier.¹⁷⁰ Demanding that a firm never infringe a patent would almost certainly mean asking that firm to cease operations entirely.¹⁷¹

The case for tolerating some instances of patent infringement may be even stronger than it is for automobile accidents. Conduct that presses against the line between permissible and impermissible may be socially productive in the patent context, where it is generally not in others. Consider efforts to “engineer around” a patent. When a firm understands the boundaries of a patent and tries to evade that patent by developing a process or product that does not infringe it, sometimes it is merely trying to deny another patent holder its due rewards. But much of the time the research and development that go into engineering around a patent are highly socially valuable and result in a superior alternative to the patented invention.¹⁷² In the course of engineering around, a firm might discover a cheaper or more efficient way to produce a good or process, or it might hit upon an improvement to the invention that carries additional benefits. This is activity that society should encourage, not ban. More generally, much of patent infringement is inadvertent and occurs in the course of otherwise productive activity. It would be inappropriate to increase the penalties for infringement to a level at which they would discourage these types of innovative activities. Unlike crimes like murder, there is generally no case for assessing penalties for infringement beyond the minimum needed to ensure deterrence.

It might appear to some observers that willful infringement describes a category of cases for which the optimal activity level is conceivably zero. Perhaps, they might argue, there is no reason infringers who know that they are using another party’s intellectual property should be allowed to do so without licensing it.¹⁷³ The patent owners are being deprived of the just rewards for their inventions, and the infringers are not engaging in any useful research and development of their own. Damages for such an activity should be set at an extremely high level, or perhaps criminal penalties should even be imposed. According to this line of argument, patent law is right to impose heightened damages in precisely these cases.

Yet we do not believe the story is so simple. First, many cases of willful infringement start out as non-willful infringement and only transform into willful

¹⁷⁰ See Jonathan S. Masur, *Costly Screens and Patent Examination*, 2 J. OF LEGAL ANALYSIS 687, 715 (2011) (describing the costs created by the “patent thicket” as firms search for patents they might be infringing).

¹⁷¹ See Manta, *supra* note 10, at 498-99.

¹⁷² See Masur & Malani, *supra* note 162, at 34 (describing the virtues of engineering around as a socially beneficial activity).

¹⁷³ See *In re Seagate Technology, LLC*, 497 F.3d 1360, 1365 (Fed. Cir. 2007) (en banc) (describing willfully infringing conduct and explaining the arguments against tolerating it).

infringement when the patent owner notifies the infringer of the existence of the patent.¹⁷⁴ In these “mixed” cases only the part of the infringement that occurred after the infringer gained notice of the infringement should count as willful, and often this is the minority of the activity. Second, in many cases an infringer will have attempted to obtain a license from the patent owner but failed. Bargaining breakdowns in bilateral monopoly situations are common and well-understood. The patent owner may also be making unreasonable demands or be in a position to hold up the infringer for significant rents. Under these circumstances, one cannot say that the optimal level of infringement is zero: the concessions by an infringer necessary to negotiate a license in every case may well be more socially costly than the infringement itself, particularly when the patent owner has the right to seek an injunction to halt the infringing conduct entirely.¹⁷⁵ That is, it may be more socially costly for the infringer to either cease activity entirely or pay the patent holder’s ransom than it is for the infringement to have taken place.

That is not to say that patent holders should not be compensated for willful (or any other type of) infringement. A thief is not entitled to steal a car just because the owner of the car refuses to sell it for the thief’s price. But it is to say that even willful infringement can occur under circumstances in which it could be very costly to prevent. Accordingly, the case for even greater damages—beyond what is necessary for standard deterrence—is weak even with respect to willful infringement.

The final question is whether individuals who infringe patents should be incapacitated—that is, whether they should be actively prevented from committing further acts of infringement, rather than deterred.¹⁷⁶ This question relates to the preceding discussion because it raises the issue of whether infringement can ever resemble a socially productive activity, or whether it is purely harmful. If we believe that infringers merely create social costs, and we believe that an individual who has infringed once is likely to do so again, then

¹⁷⁴ See *Underwater Devices, Inc. v. Morrison-Knudsen Co.*, 717 F.2d 1380 (Fed. Cir. 1983) (detailing the practice of patentees using letters to inform potential infringers that they might be infringing and thereby create the knowledge necessary to trigger liability for willful infringement).

¹⁷⁵ 35 U.S.C. § 283.

¹⁷⁶ This raises interesting questions regarding how the government would go about incapacitating a corporation, if that is the entity that is found to infringe. We thank Mark Lemley for raising this point. The corporation itself could be liquidated, though that seems highly overbroad. More likely, we imagine that the corporate employees involved in the infringement—the scientists who developed the innovation, and the executives or general counsel who authorized the infringement—could be imprisoned, or even prevented from working in an innovation-related field after being released. This penalty would mirror the criminal sanctions in securities fraud cases. There, guilty parties are often prohibited from working in the financial industry.

This penalty may strike the reader as excessive. It certainly strikes us that way, and in the discussion that follows we will reject it.

there is an argument for using incapacitation. Better directly to block the person from engaging in future acts of infringement than to rely upon deterrence—which failed once—to accomplish the same task.

As the foregoing paragraphs should make clear, we do not believe that this is an accurate depiction of infringing activities. Individuals who infringe once are not necessarily likely to do so again. The infringement might have been based upon a mistake or a lack of information.¹⁷⁷ Or it might have been the result of innovative activity, activity that generally should not be quashed. The individuals involved in the infringement might also be especially talented, innovative, or productive members of society, the types of individuals whom it would be most costly to incarcerate. At some level this is an empirical question about which we can only offer an educated guess—it might be that there are serial patent infringers who seem to have no regard for others’ intellectual property rights. But we suspect that infringement is typically a byproduct of normal innovative and commercial activities, and if this is the case then incarceration would be too heavy a cudgel to employ.

Moreover, even if we are entirely wrong about this analysis, there are less costly ways to prevent an individual from infringing in the future than incarcerating that person. Depending on the individual’s prior activities, she could be barred from serving as an officer or director of a corporation, or even prevented from working in a particular technological field. This is analogous to the sanction of taking away an individual’s computer that we discussed in Part II. Such a measure would no doubt be costly, but not nearly so costly as actually locking the individual behind bars. It should serve only as an absolute last step—but that means that prison need not be any type of step at all.

* * *

Because the benefit to a patent infringer is capped at the measure of profits, because patent infringement is likely to be detected, and because the vast majority of infringers will be capitalized firms that have access to the profits they have just reaped from the infringement, the case for criminal sanctions for patent infringement is especially weak. Arguments regarding activity levels or the need for incapacitation have no greater purchase. Accordingly, we believe it is appropriate from an economic perspective that American law imposes no criminal penalties for any acts related to patent infringement.¹⁷⁸ The only area in which we feel that criminal penalties might conceivably be desirable involves secret infringement of patented processes. Even here, where detection is much less

¹⁷⁷ See *supra* notes 170-174 and accompanying text.

¹⁷⁸ See 35 U.S.C. § 101 et seq. (Patent Act as amended).

certain, criminal penalties should be used extremely sparingly, if at all. The economic structure of patents, and the economic realities of innovation and commercialization, provide superior alternatives.

CONCLUSION

Scholars and stakeholders have been wrong to assume that criminal sanctions for IP infringement are justified on economic grounds. It is true that criminal sanctions could play an important role in preventing harmful behavior that cannot be deterred through other means. But imposing criminal sanctions is costly. For patent infringement, the costs of imposing criminal sanctions are very unlikely to exceed its benefits. Civil sanctions will probably be sufficient for creating the optimal amount of infringing behavior. For copyright infringement, civil sanctions alone should be sufficient to deter nearly all types of harmful conduct. There is an economic case for imposing criminal sanctions for copyright infringement only with respect to a discrete set of activities: massive reproduction and sales of commercially valuable works. We have arrived at the conclusion that the case for criminal IP sanctions is weak or non-existent while putting to one side both non-economic considerations, such as moral or deontological objections to criminal IP sanctions, and economic concerns about the efficacy of IP in promoting innovation. Once those considerations are added to the calculus, we suspect that the argument for criminal sanctions for IP infringement will disintegrate almost entirely.

Readers with comments should address them to:

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