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Risky IP

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This Article challenges a standard proposition in intellectual property theory: creators are risk averse and, by extension, IP risk is undesirable. The interdisciplinary field of creativity research suggests that this proposition is wrong. A willingness to take risks appears to be an essential part of the creative personality, and creative individuals may even prefer risk to certainty. Creativity research also indicates that risk might be an environmental factor facilitating creativity, whether or not creators themselves prefer it. As a result, IP scholars should not generally assume that creators are risk averse; instead, the most plausible starting point is that creators are risk seeking, at least compared to the general population and perhaps even in absolute terms. More generally, IP scholars must take a more nuanced approach to the impact of IP risk than the simplified risk-preference approach they have pursued thus far.

The analysis here has significant implications for many persistent questions in IP law and policy. Uncertain doctrines, like the fair use defense in copyright law, might not be as problematic as ordinarily assumed. And efforts to make IP more predictable, like the Supreme Court's recent opinion in Nautilus v. Biosig, *may have hidden costs. Most fundamentally, the analysis suggests that patents and copyrights—rewards of uncertain value—are better able to stimulate creativity than more predictable mechanisms like grants or salaries.*

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INTRODUCTION

Intellectual property is supposed to provide incentives to artists and inventors.[1] This is ultimately an empirical claim about the effects of IP law. Intellectual property scholars accordingly spend a significant amount of time trying to assess whether IP actually encourages creators to produce and disclose inventions, or to fix expressive works in tangible media of expression.[2] And because IP is not the only way to support these activities—salaries, grants, and prizes might be used instead of or in addition to IP—these assessments are relative.[3]

Despite increased attention to these issues, we do not yet have a complete answer regarding which mechanism is best; or, perhaps more precisely, under what circumstances one mechanism is better than any other. Still, we can make progress by focusing on particular dimensions along which to compare IP and its alternatives.[4] In this Article, I focus on two dimensions in particular: risk and creativity.

First, I focus on the risk associated with the IP system.[5] The premise of IP is that creators will decide to create at least in part because doing so will entitle them to the risky rewards associated with IP rights. But other incentive mechanisms like salaries or grants might present less risk than

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1. At least, that is the standard view. *See infra* text accompanying notes 26–30 (describing incentive thesis and alternatives). I use "IP" and "intellectual property" interchangeably as the prose demands. Also, I use these terms to refer to the areas of law that are primarily concerned with promoting creativity—patent and copyright law—even though trademark law can fall under the heading of IP too, and creativity likely plays some role matter in that body of law as well. *See generally* Laura A. Heymann, *A Name I Call Myself: Creativity and Naming*, 2 U.C. IRVINE L. REV. 585 (2012) (exploring the intersection of creativity, copyright law, and trademark law in naming practices).

2. I will refer to artists and inventors collectively as "creators."

3. For a sampling of a large literature, see generally Daniel J. Hemel & Lisa Larrimore Ouellette, *Beyond the Patents-Prizes Debate*, 92 TEX. L. REV. 303 (2013); Amy Kapczynski, *The Cost of Price: Why and How to Get Beyond Intellectual Property Internalism*, 59 UCLA L. REV. 970 (2012); Benjamin N. Roin, *Intellectual Property Versus Prizes: Reframing the Debate*, 81 U. CHI. L. REV. 999 (2014).

4. *See, e.g.*, Michael Carroll, *One Size Does Not Fit All*, 70 OHIO ST. L.J. 1361, 1373–79 (2009) (noting a tradeoff between IP's ability to rely on private information about the value of potential works against its distributionally undesirable channeling of resources to the creation of goods demanded by those with greater ability, rather than willingness, to pay).

5. I use *risk* as an umbrella term to refer to any situation in which more than one outcome is possible, and we cannot know for sure which outcome will occur. I do not follow a common, though not universal, tendency to reserve the term *risk* for scenarios in which the probabilities can be quantified. *See infra* Part I.B (developing a terminology designed to facilitate interdisciplinary research on risk). For now, note only that (1) I attach a more capacious meaning to the term *risk* than is common in the law and economics literature; and (2) my usage of the term *risk* is consistent with much of the IP literature regarding risk aversion. *See, e.g.*, James Gibson, *Risk Aversion and Rights Accretion in Intellectual Property Law*, 116 YALE L.J. 882, 890–91 (2007) (describing as *risk* the indeterminacy associated with copyright law's fair use doctrine).

do IP rights; at a minimum, the value of a salary or a grant is ordinarily known in advance. So it is important to know whether IP's risky character matters.

Second, I focus on the effect that IP has on creativity. I adopt here the definition of creativity most commonly applied by sociologists and psychologists that study the phenomenon: creativity is the creation of things that are both novel and appropriate.[6] IP's constitutionally mandated purpose—"promot[ing] the Progress of Science and useful Arts"—is not coextensive with promoting creativity.[7] But creativity is nonetheless an essential ingredient in the work that inventors and artists do.[8] We therefore need to understand how the IP system affects creativity in order to assess how well IP is furthering its constitutional purpose.

My focus on creativity and risk raises the question at the heart of this Article: How does IP risk affect creativity? Although the importance of risk has not escaped the attention of IP scholars, existing treatments are insufficient. The most common approach—usually drawing on economic research regarding how the general population responds to risk—is to treat creators as risk averse in most relevant scenarios.[9] This approach fails to consider the possibility that creators may behave differently from the general population when faced with risk.

IP scholars have also at times distinguished creators from intermediaries—the employers, financiers, producers, and distributors that, in the current system, typically own IP rights. The underlying premise is that what ultimately matters is the decision making and risk behavior of intermediaries, not creators. While such an approach is valuable given the important role that intermediaries play in the production and distribution of IP, it is at best incomplete. And it is importantly incomplete to the extent that we wish to understand how creators might operate in an ecosystem in which intermediaries play less significant roles than they do today.

In short, IP theory needs a better understanding of how creators

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6. See Part II.A, for a fuller elaboration of this definition.

7. U.S. CONST. art. I, § 8, cl. 8.

8. *See* Julie E. Cohen, *Creativity and Culture in Copyright Theory*, 40 U.C. DAVIS L. REV. 1151, 1151 (2007) ("Creativity is universally agreed to be a good that copyright law should seek to promote . . . ."); Gregory N. Mandel, *To Promote the Creative Process: Intellectual Property Law and the Psychology of Creativity*, 86 NOTRE DAME L. REV. 1999, 1999 (2011) ("Because innovation usually requires some form of creativity as an antecedent, intellectual property law generally should also promote, and certainly should not impede, creativity."); *see also* Jeanne C. Fromer, *A Psychology of Intellectual Property*, 104 NW. U. L. REV. 1441, 1457–59 (2010) (explaining the relevance of creativity research for IP law and theory).

9. *See infra* Part I.C (noting the literature's treatment of risk preferences).

specifically respond to risk. To develop that understanding, I turn to the interdisciplinary study of creativity.[10] This field offers important insights into the psychological and social determinants of creative behavior, providing a basis for generating accurate predictions about how IP law will affect the creators it (ostensibly) seeks to influence.

Contrary to the standard approach in the IP literature, the creativity literature does not support the view that creators are risk averse.[11] Instead, theoretical analyses of creativity commonly suggest that creators are risk seeking.[12] Creators produce novel products without knowing in advance what the outcome of such work will be. As a result, creativity researchers theorize that creators must be comfortable with, and perhaps even enjoy, risk. Though the empirical evidence to date is less uniform than the theoretical literature, it indicates that creators are more likely to prefer risk than to avoid it.[13]

To see how this might inform the analysis of IP risk, consider rapper Big Sean's track "Control (HOF)."[14] That song contained several samples and a verse from Kendrick Lamar. The label, however, could not obtain copyright clearance for the samples used.[15] Releasing the song would therefore expose the label, Big Sean, and Lamar to the risk of liability for copyright infringement. And that risk might affect the odds that the song would be released.

Assume that the label, Big Sean, and Lamar predict that if the song were released, (1) there would be a small chance it would be a hit, resulting in an extremely large gain enabled by the copyrights in the song; and (2) there would also be a modest chance that the holders of the samples' copyrights would sue for infringement, resulting in a modest

10. In doing so, I join a growing number of IP scholars. *See* Fromer, *supra* note 8, at 1457–59 (explaining the relevance of creativity research for IP law and theory). For some examples of this rapidly expanding literature, see generally JESSICA SILBEY, THE EUREKA MYTH: CREATORS, INNOVATORS AND EVERYDAY INTELLECTUAL PROPERTY (2015); Christopher Buccafusco & Christopher Jon Sprigman, *The Creativity Effect*, 78 U. CHI. L. REV. 31 (2011); Cohen, *supra* note 8, at 1151; Rochelle Cooper Dreyfuss, *The Creative Employee and the Copyright Act of 1976*, 54 U. CHI. L. REV. 590 (1987); Joseph P. Fishman, *Creating Around Copyright*, 128 HARV. L. REV. 1333 (2015); Andrew Gilden, *Raw Materials and the Creative Process*, 104 GEO. L.J. 355 (2016); Gregory N. Mandel, *Left-Brain Versus Right-Brain: Competing Conceptions of Creativity in Intellectual Property Law*, 44 U.C. DAVIS L. REV. 283 (2010); Rebecca Tushnet, *Economies of Desire: Fair Use and Marketplace Assumptions*, 51 WM. & MARY L. REV. 513 (2009).

11. *Infra* Part II.

12. *Infra* Part III.B.

13. *Infra* Part III.B.

14. At least, that is the label's position. *The Blast Radius of Kendrick Lamar's Control Verse*, NPR (Aug. 22, 2013, 1:30 PM), http://www.npr.org/blogs/therecord/2013/08/21/214145432/the-blast-radius-of-kendrick-lamars-control-verse.

15. *Id.*

loss. According to the standard IP position, this should be the end of the story: because these risk-averse creators worry too much about possible copyright liability, they would not release "Control (HOF)." The creators would underweight the small chance of an extremely large gain, such that the expected utility of releasing the song could be negative, even if its expected value were positive. And even if Big Sean and Lamar wanted to release the song, the intermediary—that is, the label—would be the real decision maker, and its risk aversion would stop "Control (HOF)" from seeing the light of day. Indeed, as it turns out, the label refused to release the song.

But Big Sean and Lamar were not so easily deterred. Big Sean handed the song to Funkmaster Flex on New York's Hot 97, and "Control (HOF)" subsequently rocketed Lamar to the top of the rap hierarchy, where he has since remained.[16]

There are multiple plausible explanations for why the prediction generated by standard IP theory would have been wrong here.[17] At least one, and one that the conventional wisdom overlooks, is that Big Sean and Lamar simply have greater tolerance for risk than others do, and their responses to risk matter too.

Note that this anecdotal insensitivity to risks is not limited to artists—scientists and engineers also appear to ignore risks that might deter others. Albert Einstein famously loved sailing, and was rumored to especially enjoy sailing in dangerous weather. The twist: he could not swim.[18]

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16. *See The 50 Best Songs of 2013*, COMPLEX (Dec. 2, 2013), http://www.complex.com/music/2013/12/best-songs-of-2013/big-sean-kendrick-lamar-control ("No matter which verse you prefer it's hard to deny that 'Control' will go down in history as a milestone in hip-hop, and easily ranks as one of 2013's most important records."). Apologies to Kanye, Drake, Future, and others. *Compare* KENDRICK LAMAR, TO PIMP A BUTTERFLY (Interscope 2015), *with* KANYE WEST, THE LIFE OF PABLO (G.O.O.D. Music 2016); DRAKE, IF YOU'RE READING THIS IT'S TOO LATE (Cash Money Records 2015); FUTURE, DS2 (Epic Records 2015). Nearly every major music publication deemed Lamar's most recent album, *To Pimp a Butterfly*, the best album of the year. *See To Pimp a Butterfly*, https://en.wikipedia.org/wiki/To_Pimp_a_Butterfly (last visited Feb. 18, 2016). Then again, Beyoncé dropped *Formation* as I was getting this Article ready for submission, so, see Beyoncé, *Formation* (Feb. 27, 2016), http://www.beyonce.com/formation-dirty/.

17. This example, which highlights the underlying intuitions without a numerical illustration, naturally obscures some alternate explanations. Maybe the payoff structure I articulated at the outset was wrong—maybe the expected utility of releasing the song was simply positive, so all parties wanted to release it, and the label just pretended to refuse so that it could limit its own liability in the event of a lawsuit. Or maybe the payoffs to the label were different than the ones to the artists—maybe Big Sean and Lamar's downside risk was limited by their (relatively) shallow pockets, and the label placed a low value on the reputational benefits that would accrue largely to Lamar. For the moment, I set aside these and other complications to simply illustrate the intuitions. I account for factors that complicate these scenarios in Part IV.

18. Steven Kotler, *Einstein at the Beach*, PSYCHOL. TODAY (Oct. 17, 2012),

Creators not only seem to seek risks in general, but they also appear insensitive to legal risks in particular. Consider Steve Jobs and Steve Wozniak—among their first projects was the design and construction of "blue boxes," illegal devices used to make free phone calls worldwide.[19] And with respect to filmmakers, musicians, or novelists running legal risks, well, there are books that tell those stories better than I ever could.[20]

While these anecdotes cast doubt on the standard IP assumption that creators are risk averse, there are nonetheless many unanswered questions regarding the relationship between risk and creativity. Most prominently, it is unclear whether creators are risk seeking in an absolute sense (i.e., they prefer risky prospects to certain ones) or only in a comparative sense (i.e., they tolerate riskier propositions than does a baseline population). Creativity researchers have also increasingly turned their focus from individual personality differences to the environmental conditions that affect creative performance. And it is an unresolved theoretical and empirical question how risk as an environmental variable influences creative performance. Until these questions are resolved, IP scholars cannot reach firm conclusions about how creators will respond to IP risk.

Furthermore, several factors will complicate generalizations about the real-world impact of IP risk on creativity. There might be systematic differences in how various subsets of the creative population respond to risk: artists might differ from engineers, filmmakers might differ from novelists, and David Foster Wallace might differ from Tom Clancy.[21] Creators might respond uniformly to risks in different domains, or they might have domain-specific risk behaviors.[22] Intermediaries might shield creators from risk.[23] And there is a range of general decision-making phenomena that might apply, including optimism bias, affective inputs to risky decisions, and a preference for skill-based uncertainty over luck-based uncertainty.[24] All of these factors constitute fruitful areas for further research into the impact of IP risk on creativity.

Still, we already know enough to discard the conventional assumption

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http://www.psychologytoday.com/blog/the-playing-field/201210/einstein-the-beach.

19. Seth Fiegerman, *Bad Apples: Steve Jobs and the Woz Started Out by Making Illegal Phones*, OPENING LINES (Sept. 14, 2010), http://openinglines.org/2010/09/14/bad-apples-steve-jobs-and-the-woz-started-out-by-making-illegal-phones/.

20. *See generally* PETER BISKIND, EASY RIDERS, RAGING BULLS: HOW THE SEX, DRUGS, AND ROCK 'N' ROLL GENERATION SAVED HOLLYWOOD (1998) (describing the illicit activities of Hollywood filmmakers and actors); KEITH RICHARDS, LIFE (2010) (describing the illicit activities of the Rolling Stones); JACK KEROUAC, ON THE ROAD (1957) (obviously).

21. *Infra* Part IV.A.1.

22. *Infra* Part IV.A.2.

23. *Infra* Part IV.A.3.

24. *Infra* Part IV.A.5.

that creators are risk averse, and to begin exploring what the answers to persistent IP questions would look like in a world with risk-seeking creators. Perhaps most fundamentally, this analysis reveals an underappreciated virtue of IP rights over more predictable mechanisms for stimulating creativity, like salaries and grants. While the value of a salary is known in advance, the value of a patent or copyright is risky—it depends on the outcome of the creative work that results in an invention or expressive work, and therefore cannot be known at the moment an individual decides to engage in creative activity. If risk attracts creators, an IP right would accordingly result in more creativity than a salary of equivalent expected value, precisely because the IP right is risky and the salary is not. In weighing IP against proposed alternatives, then, the risky character of IP would count as a mark in its favor.

There are also potential, though less straightforward, implications for the finer details of the IP system. Many areas of IP are criticized for their unpredictability: patent law's claim construction process and its written description requirement, for example, or copyright law's fair use and substantial similarity rules, for a couple more.[25] While these critiques often rely on the supposed risk aversion of the relevant actors to gain traction, the analysis in this Article suggests that the evaluation of these doctrines will depend on a complicated range of factors.

Thus, for example, the uncertainty associated with claim construction might dissuade some inventors. But that uncertainty might also alter the mix of inventors who participate in any given technological field. And that mix may, in turn, influence the creativity of that field's output as a whole. Or consider that some uncertainty in IP law occurs where the normative goals are contested in ways that might render IP's effects on creativity less important than other effects. So even if a risky fair use doctrine has a positive effect on creativity because of the manner in which more creative individuals respond to that risk, it may still have a negative effect on less creative uses of copyrighted materials that society wants to encourage, like political expression or critical commentary. While we

25. *See* JAMES BESSEN & MICHAEL J. MEURER, PATENT FAILURE: HOW JUDGES, BUREAUCRATS, AND LAWYERS PUT INNOVATORS AT RISK 82–84 (2008) (describing the uncertain boundaries of patents); Gibson, *supra* note 5, at 887–91 (illustrating the indeterminacy associated with the fair use defense and other copyright doctrines); Michael J. Meurer & Craig Allen Nard, *Invention, Refinement, and Patent Claim Scope: A New Perspective on the Doctrine of Equivalents*, 93 GEO. L.J. 1947, 1953–54 (2005) (arguing that patent law's inherent uncertainty undermines its notice function and promotes "opportunistic and anticompetitive patent lawsuits"); Gideon Parchomovsky & R. Polk Wagner, *Patent Portfolios*, 154 U. PA. L. REV. 1, 39–41 (2005) (discussing the uncertainty that pervades patent law); Henry E. Smith, *Intellectual Property as Property: Delineating Entitlements in Information*, 116 YALE L.J. 1742, 1818–19 (2007) (recognizing concerns about inadvertent infringement of patents that occurs because "the edges of a claim are not always well defined ex ante").

should not too quickly conclude that IP risk is harmful, the upshot is that we should be careful not to rush to the conclusion that it is helpful either.

Part I of this Article demonstrates that risk is central to intellectual property law and theory, and reviews the existing treatment of risk in IP scholarship. Part II explains how leading creativity theories treat risk. Building on those theories, Part III articulates three core hypotheses regarding the influence of IP risk on creativity, and explains the implications of those hypotheses for the big question in IP: Under what conditions are IP rights better than alternative mechanisms for stimulating work in technology and the arts? Part IV then extends the analysis to other IP questions and accounts for some simplifying assumptions made in Part III.

I. RISK, UNCERTAINTY, AND INTELLECTUAL PROPERTY

Part I first shows that risk occupies a central role in intellectual property law. This Part then develops a terminology that bridges conversations about risk in the legal, economic, and psychological literatures. Finally, this Part surveys the current treatment of risk by IP scholars.

A. The (Un?)bearable Riskiness of IP

The leading justification for IP in the United States is the incentive thesis.[26] According to the incentive thesis, creators need rewards in order

26. This thesis can be found pretty much anywhere you care to look in the American IP world. For a sampling of the extensive literature, see Shyamkrishna Balganesh, *Foreseeability and Copyright Incentives*, 122 HARV. L. REV. 1569, 1577–81 (2009) (citing sources); Jeanne C. Fromer, *Expressive Incentives in Intellectual Property*, 98 VA. L. REV. 1745, 1750–52 (2012) (same); Mark A. Lemley, *Ex Ante Versus Ex Post Justifications for Intellectual Property*, 71 U. CHI. L. REV. 129, 129–30 (2004). The incentive thesis is not without its critics. *See generally* Eric E. Johnson, *Intellectual Property and the Incentive Fallacy*, 39 FLA. ST. U. L. REV. 623 (2012) (arguing that the incentive theory is mistaken and that technology and the arts will flourish without external rewards); Madhavi Sunder, *IP*^{3}, 59 STAN. L. REV. 257, 321–22 (2010) (arguing that the "intellectual-property-as-incentives approach fails to account for the wide range of values at stake in global intellectual production today"); Diane Leenheer Zimmerman, *Copyrights as Incentives: Did We Just Imagine That?*, 12 THEORETICAL INQUIRIES L. 29 (2011) (arguing that the incentive thesis fails to account for the fact that creators value intrinsic factors more than extrinsic factors such as monetary rewards). There are also alternatives, including the view that IP is best justified as a kind of moral right of creators. *See, e.g.*, Fromer, *supra*, at 1771–81 (describing personhood and labor interests of inventors); Roberta Rosenthal Kwall, *Inspiration and Innovation: The Intrinsic Dimension of the Artistic Soul*, 81 NOTRE DAME L. REV. 1945, 1992–95 (2006) (describing the landscape of moral rights); Katherine J. Strandburg, *Users as Innovators: Implications for Patent Doctrine*, 79 U. COLO. L. REV. 467, 499 (2008) (suggesting that the rise of user innovators might increase the salience of moral rights in patent law). For a recent exploration of the normative foundations of intellectual property, see generally ROBERT P. MERGES, JUSTIFYING INTELLECTUAL PROPERTY (2011).

to engage in creative activity.[27] These rewards are required because creative activity is costly to the creator and—in the absence of government intervention—the outputs of creative activity are easily appropriated by free riders.[28] In short, the result of creative work is a public good, and private actors underinvest in the production of public goods.

The Constitution contemplates one particular solution to this underinvestment problem: the granting of an "exclusive Right" to the product of the creator's effort—a copyright for an expressive work, a patent for an invention.[29] The constitutional premise is that these exclusive rights will function as rewards that induce creators to pursue creative work.[30] The IP system that has been built in accordance with this premise has two primary sources of risk; one arising from the nature of the rights awarded to creators under it, and the arising from the particular doctrinal implementations of the system.

The first source of IP risk results from the fact that the value of a copyright or patent cannot be determined until after the expressive work or invention is created.[31] If demand for the creative good turns out to be high, then the reward will be valuable; if demand turns out to be low or nonexistent, the reward will be worthless.[32] Indeed, most copyrights and patents turn out to be worthless, while only a small number prove to be

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27. WILLIAM M. LANDES & RICHARD A. POSNER, THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW 37–41, 294–97 (2003).

28. *See* Johnson, *supra* note 26, at 628–34 (describing the logic of the incentive theory and its purpose to limit the ability of people to "take a free ride on the labor of persons who create public goods").

29. U.S. CONST. art. I, § 8, cl. 8 (granting Congress the power to "promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries").

30. *See* Mazer v. Stein, 347 U.S. 201, 219 (1954) ("The economic philosophy behind the clause empowering Congress to grant patents and copyrights is the conviction that encouragement of individual effort by personal gain is the best way to advance public welfare through the talents of authors and inventors.").

31. *See* Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, *in* THE RATE AND DIRECTION OF INVENTIVE ACTIVITY: ECONOMIC AND SOCIAL FACTORS 609, 616 (Richard Nelson ed., 1962) (describing uncertainty regarding the value of inventions); *see also* Anthony J. Casey & Andres Sawicki, *Copyright in Teams*, 80 U. CHI. L. REV. 1683, 1701 (2013) (describing uncertainty regarding the value of expressive works); Mark A. Lemley & Carl Shapiro, *Probabilistic Patents*, 19 J. ECON. PERSP. 75, 76 (2005) (describing uncertainty regarding the value of patents).

32. There are a number of complications to this simple story. *See, e.g.*, Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, SCIENCE, May 1, 1998, at 698 (explaining how anticommons can enable patentees to extract value even where the demand for the individual invention is low or nonexistent). But the simple story works for present purposes.

highly valuable.[33] While creators can generate predictions about possible demand, there is no way to know for sure what it will be ex ante. The IP system established by the Constitution is therefore necessarily risky because it uses rewards of unknown value to entice creators to pursue creative work.

The risky nature of IP rewards means that creators' responses to risk will influence the efficacy of the IP system. All else equal, if creators respond positively to risk, then the fact that the IP system relies on risky rewards to elicit creative work is an advantage. If, however, creators respond negatively, then it is a disadvantage.

As an example, suppose Claire is a mid-level associate at a law firm. She wants to record an album. To do so, she will have to quit her job at the firm. Claire must therefore choose between: (1) a certain option (stay at the firm and earn a known salary); and (2) a risky one (record the album and earn an amount Claire cannot know ex ante).

To see why Claire's taste for risk matters, imagine that her salary at the firm is $200,000. The salary is contingent on her performing acceptable work, but she can pretty much control whether she performs acceptably, and the amount of the salary is fixed. Claire also predicts that, if she records her album, she will obtain a copyright that has a 50 percent chance of being worth $400,000, and a 50 percent chance of being worth $0.[34] In an expected value framework, where the value of a risky option is defined as the probability-weighted sum of the value of each possible outcome, these options are equivalent—Claire should treat each option as if it were worth $200,000.

But Claire might not make her decision as the expected value model predicts.[35] Instead, she will take account of many factors, including the degree of risk associated with each option. Rather than model Claire's decision using an expected *value* analysis (in which she compares the monetary amounts she anticipates receiving from each option), we should

33. *See* F.M. Scherer, *The Innovation Lottery*, *in* EXPANDING THE BOUNDARIES OF INTELLECTUAL PROPERTY 3, 7–9 (Rochelle Cooper Dreyfuss et al. eds., 2001) (presenting data regarding patent and copyright distributions of value, including that approximately 10 percent of a sample of renewed German patents accounted for 88 percent of the sample's total value and that the seventy best-selling music albums of 1997 accounted for 21 percent of total album sales).

34. Claire would most likely not directly own the copyright, which she would likely transfer to a record label that produces and distributes the album. For analytical clarity and ease of exposition, I assume here that Claire is interacting directly with the IP system, rather than through an intermediary. I relax that assumption in Part IV.A.4.

35. For a helpful explanation of the differences between expected value and expected utility models, see Sarah B. Lawsky, *Modeling Uncertainty in Tax Law*, 65 STAN. L. REV. 241, 249–57 (2013).

therefore model her decision using an expected *utility* analysis (in which she compares the utility or satisfaction she anticipates receiving from each option).[36] If she likes risk—because, say, she is excited about the possibility of massive success—then she would prefer to record the album, even though in expected-value terms this option is worth no more than staying at the firm. On the other hand, if she dislikes risk—because, say, she is anxious about the possibility of utter failure—Claire would prefer to stay at the firm, even though in expected-value terms this option is worth no more than recording the album. Claire's response to the IP reward thus turns in part on her response to risk.

While the first source of IP risk results from the basic nature of the IP system, the second flows from the particular implementations of that system.[37] Consider a documentary filmmaker who is editing a scene in which "a homeless former factory worker spontaneously sings a lyric from a Bruce Springsteen song."[38] If the documentarian keeps the scene in her film, she runs the risk of a copyright infringement lawsuit.[39] She might then turn to the fair use doctrine, which excuses from liability otherwise infringing acts when they pass a multi-factor balancing test.[40] This doctrine is, however, famous for its ambiguity.[41] It would be

36. Expected utility is the standard economic way to model decision making under risk. *See* Mark J. Machina, *Expected Utility Hypothesis*, *in* NEW PALGRAVE DICTIONARY OF ECONOMICS 130, 130–37 (Steven N. Durlauf & Lawrence E. Blume eds., 2008). The utility function is typically taken to be a monotonic concave downward function. *See* Jan Werner, *Risk Aversion*, *in* NEW PALGRAVE DICTIONARY OF ECONOMICS, *supra*, at 197, 197. Income then has declining marginal utility—each extra dollar of income produces less additional utility than did the one before it—producing choices consistent with what we would observe if actors were risk averse. Although declining marginal utility can therefore form an independent basis for observed risk aversion, the implied degree of risk aversion has been critiqued as implausibly large. Matthew Rabin & Richard H. Thaler, *Anomalies: Risk Aversion*, 15 J. ECON. PERSP. 219, 220–22 (2001).

37. Although the above example relates to copyright law, similar points can be made about the implementation of patent law's tradeoffs between upstream and downstream contributors to a creative good. *See generally* F. Scott Kieff, *Coordination, Property & Intellectual Property: An Unconventional Approach to Anticompetitive Effects & Downstream Access*, 56 EMORY L.J. 327 (2006); Robert Merges, *Intellectual Property Rights and Bargaining Breakdown: The Case of Blocking Patents*, 62 TENN. L. REV. 75 (1994).

38. This example is drawn from Gibson, *supra* note 5, at 887–88.

39. *Id.* It is possible that these incidental uses of prior works do not infringe. *Id.* The key point is that the filmmaker cannot be sure whether her work infringes.

40. The test considers (1) "the purpose and character of the use"; (2) "the nature of the copyrighted work"; (3) "the amount and substantiality of the portion used in relation to the copyrighted work as a whole"; and (4) "the effect of the use upon the potential market for or value of the copyrighted work." 17 U.S.C. § 107 (2014).

41. Gibson, *supra* note 5, at 888–90; Gideon Parchomovsky & Philip J. Weiser, *Beyond Fair Use*, 96 CORNELL L. REV. 91, 99–101 (2010); *but see generally* Matthew Sag, *Predicting Fair Use*, 73 OHIO ST. L.J. 47 (2012) (presenting quantitative data undermining the conventional view that fair use is unpredictable).

difficult, if not impossible, to say with certainty whether the documentarian's conduct satisfies any of the fair use factors in isolation, or the test as a whole.[42]

As a result, the documentarian must make a decision whether to pursue a riskier option—that is, include the scene, wait to see whether any of the copyright holders pursue an infringement action against her, and then hope that the fair use doctrine will excuse her from liability—or a less risky option—that is, simply omit the scene entirely (or find the copyright holders and pay them for a license). Even if the riskier option has a larger expected value because the scene makes the movie that much better and the odds of a lawsuit are low, she might prefer the less risky alternative of omitting the scene or paying for a license. We cannot evaluate the actual effect of the fair use doctrine without an accurate understanding of the documentarian's response to risk.

In sum, risk is inevitably part of the IP system writ large. And risk pervades many features of IP system design. Accordingly, IP scholars must attend to the impact of risk on creativity if we are to understand how well IP achieves its core goal of stimulating work in technology and the arts.

B. Notes on Terminology

One of the many challenges in writing about risk, especially from an interdisciplinary perspective, is terminological inconsistency: the same words mean different things in different disciplines. For purposes of this Article, I develop a terminology that maximizes consistency with the disciplines that form the primary basis for the analysis: law, economics, and psychology. Still, because those disciplines do not entirely coincide in their terminologies, I will necessarily depart from usages common to one or another.

I use the term *risk* to refer to any situation in which more than one outcome is possible, and we cannot know for sure which outcome will occur. As an example, consider a scenario in which a pharmaceutical company is trying to decide which of two projects to fund. The first project will evaluate a substance that might be useful in treating Alzheimer's disease; the second will evaluate a different substance that might be useful in preventing post-surgical infections. The firm cannot assign quantitative probabilities of success to each project because the investigations are still in their very early stages. Nor does the firm know how much it would earn from each drug if it were successfully developed,

42. Gibson, *supra* note 5, at 888–90.

although it does have some estimates of the potential market size. This situation poses *risk* as I will use the term.[43]

Economists often limit the term *risk* to scenarios in which probabilities are "exogenously specified or scientifically calculable."[44] To capture this meaning, I use the term *quantitative risk*. Thus, a bet on a fair coin flip offering a $10 payoff if it lands heads, and $0 if it lands tails, poses *quantitative risk* because each of the possible outcomes—heads or tails—has an objective probability. There is a 50 percent chance the coin lands heads and the bet pays $10, and a 50 percent chance the coin lands tails and the bet pays $0. When it is important to specify that the probabilities associated with each outcome can be quantified, I will use the term *quantitative risk*.

Economists distinguish the *quantitative risk* posed by the coin flip from the *uncertainty* that exists in scenarios in which the probabilities associated with particular outcomes cannot be quantified.[45] As an example, suppose a person must draw a ball from an urn, which contains one hundred balls, some red and others white. A person in this scenario confronts *uncertainty* because there are two outcomes—red ball or white ball—but she cannot know the probability that either outcome will occur.[46] I will use *uncertainty* whenever it is important to note that the

43. I do not follow Frank Knight's usage reserving *risk* only for situations where the outcomes are associated with known probabilities, and *uncertainty* for situations where the outcomes are associated with unknown probabilities; that usage is common, though not universal. *See, e.g.*, Daniel A. Farber, *Uncertainty*, 99 GEO. L.J. 901, 903 (2011) (citing FRANK KNIGHT, RISK, UNCERTAINTY, AND PROFIT (1921)) (distinguishing "what the economist Frank Knight classified as 'uncertainty' (where the likelihood of the peril is non-quantifiable) as opposed to 'risk' (where the likelihood is quantifiable)"). My usage is broader than the economic usage of the term, which is limited to scenarios in which we know (or at least can, in principle, know) the probabilities associated with all possible outcomes. *See* Mark J. Machina & Michael Rothschild, *Risk*, *in* THE NEW PALGRAVE DICTIONARY OF ECONOMICS, *supra* note 36, at 190, 190 (discussing the economic usage of *risk*). For an example of the economic usage, consider a bet that pays out $10 if a fair coin lands on heads and nothing if it lands on tails. Two outcomes are possible, each occurring with a 50 percent possibility. This scenario poses what an economist would call "risk." The scenario described in the preceding paragraph—in which a pharmaceutical company must choose which of two projects to fund without being able to quantify the odds of success for each project, or the amount it stands to gain—poses what an economist would call *uncertainty*.

44. Machina & Rothschild, *supra* note 43, at 190.

45. *See* Peter P. Wakker, *Uncertainty*, *in* THE NEW PALGRAVE DICTIONARY OF ECONOMICS, *supra* note 36, at 428 (noting that only some risks can be quantified).

46. *Id.* Economists sometimes also use the term "ambiguity" to refer to this scenario. *See generally* Ken Binmore et al., *How Much Ambiguity Aversion?*, 45 J. RISK & UNCERTAINTY 215 (2012). I will avoid that usage because it conflicts with the psychological construct "tolerance of ambiguity," which describes how "an individual (or group) perceives and processes information about ambiguous situations or stimuli when confronted by an array of unfamiliar, complex, or incongruent clues." Adrian Furnham & Tracy Ribchester, *Tolerance of Ambiguity: A Review of the Concept, its Measurement and Applications*, 14 CURRENT PSYCHOL. 179, 179 (1995).

probabilities cannot be quantified.

Like my usage (and unlike that of economists), psychologists do not restrict the term *risk* to scenarios in which the values and probabilities are known.[47] My usage does, however, depart from a common psychological usage that limits the term *risk* to scenarios presenting the possibility of a negative outcome (e.g., the possibility of being injured in a car accident).[48] I am using *risk* here as an umbrella term for all scenarios in which it cannot be determined in advance which outcome will occur, whether or not probabilities or values can be quantified, and whether or not the outcomes are positive or negative.

The growing field of behavioral economics, sitting at the intersection of psychology and economics, has drawn attention to the fact that responses to risk are context dependent. Particularly prominent in this literature is Daniel Kahneman and Amos Tversky's work on prospect theory. Kahneman and Tversky proposed that individuals behave differently in the face of potential gains than in the face of potential losses; in their framework, then, risk may influence behavior differently when the potential outcomes are positive than when the potential outcomes are negative.[49] Where relevant to the analysis, I will use the modifier *upside* for scenarios presenting potential gains or positive outcomes, and the modifier *downside* for scenarios presenting potential losses or negative outcomes.

To summarize this Article's terminology by illustration, an individual faces *downside uncertainty* if there is a possibility that she will be involved in a car accident, and the likelihood of the accident cannot be quantified. An individual faces *upside quantitative risk* when she holds a lottery ticket with a 1 in 1000 chance of winning $1,000,000. And both scenarios present *risk*, which, again, I use as an umbrella term to cover all situations in which more than one outcome is possible.

Although a scenario presenting outcomes with unknown probabilities may be ambiguous in the sense of this construct because it includes unfamiliar or complex clues, there may be uncertain scenarios that are accompanied by familiar and simple clues and therefore do not meaningfully implicate the tolerance of ambiguity construct. For example, it may be uncertain whether a traffic light we cannot see is red, but we might take the familiar and simple clues of cars slowing down to tell us something about whether the traffic light is red.

47. *See, e.g.*, George Loewenstein et al., *Risk as Feelings*, 127 PSYCHOL. BULL. 267, 274 (describing as "risky options" the alternatives to either stay in a cab after discovering that the driver is drunk or getting out and walking).

48. *See, e.g.*, Ellen M. Peters, *An Emotion-Based Model of Risk Perception and Stigma Susceptibility*, 24 RISK ANALYSIS 1349, 1350 (2004) (distinguishing between risks—potential negative consequences—and benefits—potential positive consequences).

49. Daniel Kahneman & Amos Tversky, *Prospect Theory: An Analysis of Decision Under Risk*, 47 ECONOMETRICA 263, 263 (1979).

C. IP Literature's Treatment of Risk Preferences

The conventional wisdom in the IP literature is that the relevant actors behave in a risk-averse manner.[50] As an example, consider Thomas Cotter's analysis of patent law's inequitable conduct doctrine.[51] That doctrine bars enforcement of issued patents when it is later discovered that the patentee breached a duty of candor during the patent application process.[52] Cotter first develops a formal model evaluating how the doctrine influences a risk-neutral applicant's incentives to disclose information.[53] He then adjusts the model to account for the "more realistic assumption . . . that the [patent] applicant (or her agent) is to some degree risk-averse."[54] This analysis illustrates two tendencies common in the IP literature: it applies to creators the general microeconomic finding that people typically make risk-averse decisions, and it treats creators as indistinguishable from intermediaries.[55]

There are, however, some exceptions to these tendencies.[56] First, IP

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50. *See* Parchomovsky & Wagner, *supra* note 25, at 25.

51. Thomas F. Cotter, *An Economic Analysis of Patent Law's Inequitable Conduct Defense*, 53 ARIZ. L. REV. 735, 757 (2011).

52. Therasense, Inc. v. Becton, Dickinson & Co., 649 F.3d 1276, 1309 (Fed. Cir. 2011).

53. Cotter, *supra* note 51, at 757–62.

54. *Id.* at 774 n.126 (citing WALTER NICHOLSON, MICROECONOMIC THEORY: BASIC PRINCIPLES AND EXTENSIONS 538 (9th ed. 2004); ROBERT S. PINDYCK & DANIEL L. RUBINFELD, MICROECONOMICS 158 (5th ed. 2001)).

55. For a sampling of the large literature following these tendencies, see PAUL KRUGMAN & ROBIN WELLS, ECONOMICS 545–49 (2009)) (evaluating the effects of copyright's termination right on risk-averse authors and noting that "[i]n general, individuals are assumed to be risk averse"); Kate Darling, *Occupy Copyright: A Law & Economic Analysis of U.S. Author Termination Rights*, 63 BUFF. L. REV. 147, 178–81 (2015) (referencing Milton Friedman & L.J. Savage, *The Utility Analysis of Choices Involving Risk*, 56 J. POL. ECON. 279, 279–80 (1948)); Kurt Glitzenstein, *A Normative and Positive Analysis of the Scope of the Doctrine of Equivalents*, 7 HARV. J.L. & TECH. 281, 327–28, 330–31 (1994) (analyzing the effects of patent law's doctrine of equivalents on risk-averse inventors in light of the general tendency toward risk aversion); *see also* Clark Asay, *Copyright's Technological Interdependencies*, 18 STAN. TECH. L. REV. 189, 234 (2015); Karen L. Boyd, *Nonobviousness and the Biotechnology Industry: A Proposal for a Doctrine of Economic Nonobviousness*, 12 BERKELEY TECH. L.J. 311, 339 (1997); Tun-Jen Chiang, *Fixing Patent Boundaries*, 108 MICH. L. REV. 523, 546 (2010); Daniel A. Crane, *Exit Payments in Settlement of Patent Infringement Lawsuits: Antitrust Rules and Economic Implications*, 54 FLA. L. REV. 747, 761–67 (2002); Alan Devlin, *The Misunderstood Function of Disclosure in Patent Law*, 23 HARV. J.L. TECH. 401, 429 (2010); Kristelia Garcia, *Penalty Default Licenses: A Case for Uncertainty*, 89 N.Y.U. L. REV. 1117, 1131 (2014); F. Scott Kieff, *The Case for Registering Patents and the Law and Economics of Present Patent-Obtaining Rules*, 45 B.C. L. REV. 55, 62–63 (2003); Brian J. Love & Christopher B. Seaman, *Best Mode Trade Secrets*, 15 YALE J.L. & TECH. 1, 12–13 (2012-13); J.H. Reichman, *Goldstein on Copyright Law: A Realist's Approach to a Technological Age*, 43 STAN. L. REV. 943, 947 (1991).

56. There are also instances where the relevant actors are taken to be risk neutral, with an acknowledgement that the analysis would have to be modified if the actors were risk averse. *See, e.g.*, Ian Ayres & Paul Klemperer, *Limiting Patentees' Market Power Without Reducing Innovation*

scholars have identified industry-specific contexts in which the risk behavior of intermediaries differs from that of creators themselves. Such analyses still typically conclude that the relevant actors are risk averse. James Gibson, for example, argues that the people who actually make decisions about copyright issues are risk averse, and their decisions expand the substantive scope of copyright protection through doctrinal feedback mechanisms that incorporate industry practices.[57] One kind of risk-averse decision maker is the artist who creates the work.[58] But according to Gibson, even if the artist is not risk averse, one of the "downstream players"—publishers, distributors, record labels, movie studies, or investors—will be.[59]

Similarly, in an evaluation of economic research on responses to risk by innovative firms, Robert Merges posits that the decision makers at these firms are risk averse.[60] As a result, the patent system ought to "create some extra incentive to offset the inventor's lower perceived utility."[61] Merges recognizes the possibility that "inventors are not risk averse" and are instead "risk-takers," but does not fully explore the implications of this possibility for IP more generally because his analysis focuses on large research and development firms, where risk-averse managers ordinarily decide whether to pursue a project.[62]

Behavioral economics has made its way into this literature too. Here, as in the standard IP literature approach, but unlike the industry-specific approach of Gibson and Merges, creators are treated as if they are no different from the general population. But because behavioral

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Incentives: The Perverse Benefits of Uncertainty and Non-Injunctive Remedies, 97 MICH. L. REV. 985, 1013 n.68 (1998) (adding the possibility that a patentee could be risk averse to the list of caveats to the main argument in favor of uncertainty in the patent system); Katherine J. Strandburg, *What Does the Public Get? Experimental Use and the Patent Bargain*, 2004 WIS. L. REV. 81, 109 n.115 (noting that the expectations of inventors "should be discounted to deal with risk aversion and averaged over all possible outcomes").

57. Gibson, *supra* note 5, at 891. For another example of an industry-specific analysis that concludes that both creators and intermediaries are risk averse, but to varying degrees, see Derek E. Bambauer, *Faulty Math: The Economics of Legalizing the Grey Album*, 59 ALA. L. REV. 345, 390 (2008) (suggesting that "creators . . . are likely more risk averse than large corporations").

58. Gibson, *supra* note 5, at 887–91.

59. *Id.* at 893.

60. Robert Merges, *Uncertainty and the Standard of Patentability*, 7 HIGH TECH. L.J. 1, 47 (1992).

61. The "extra incentive" in Merges' proposal is to use the cost of a research project as a plus factor favoring a finding of nonobviousness. *Id.* at 43–50.

62. *Id.* at 50–55; *see also* Sean T. Carnathan, *Patent Priority Disputes—A Proposed Re-Definition of "First-to-Invent,"* 49 ALA. L. REV. 755, 808 (1998) (noting in passing that inventors are "likely among the least risk-averse people on the planet," but nonetheless argues that "the greater [patent-related] uncertainty becomes, the less likely people are to try to create").

economists have shown that people sometimes act as if they are risk seeking, IP scholars applying these insights have similarly argued that creators might sometimes be risk seeking too.

Thus, for example, Steven Horowitz begins with the behavioral economic finding of prospect theory: "People tend to be risk seeking for potential losses and risk averse for potential gains, except when the stakes are low."[63] Horowitz then argues that creators view copyright law from two perspectives or frames: (1) as "copyright holders" when they are motivated to create by the prospect of gains flowing from copyright's exclusive reproduction right; and (2) as "potential users" when they face potential losses due to infringement liability arising from their "use[s of] preexisting works to create novel expression."[64] Horowitz concludes that because copyright holders face potential gains, they will be risk averse; because copyright users (including downstream creators) face potential losses, they will be risk seeking.[65]

Similarly, Dennis Crouch begins with the behavioral economics finding that people overweight long odds.[66] Crouch reasons that the overweighting of long odds suggests that potential innovators, especially individual inventors, will participate in innovative activity offering a very low chance of a large reward.[67] Patent policy will therefore be more effective when it modifies the size of the potential reward, rather than its probability.[68]

In other instances, IP scholars consider the combined impact of risk aversion and other decision-making phenomena. For example, in their analysis of alternative mechanisms for stimulating innovation, Daniel Hemel and Lisa Ouellette rely on the general economic finding that "individual decision makers tend to be risk averse."[69] They

63. Steven J. Horowitz, *Copyright's Asymmetric Uncertainty*, 79 U. CHI. L. REV. 331, 360, nn.139–40 (2012); *see also* Michael Abramowicz, *A Theory of Copyright's Derivative Right and Related Doctrines*, 90 MINN. L. REV. 317, 349 (2005) (doubting that competition for IP prospects will dissipate rents "if some of the participants are risk averse, as behavioral economics would predict at least when individuals are racing to capture a gain rather than avoid a loss").

64. Horowitz, *supra* note 63, at 337–55.

65. *Id.* at 355–72.

66. *See* Dennis Crouch, *The Patent Lottery: Exploiting Behavioral Economics for the Common Good*, 16 GEO. MASON L. REV. 141, 144 n.15 (2008) (citing literature exploring why people appear to treat outcomes that have very small probabilities of occurring as being more likely to occur than they actually are). This sort of misperception of probabilities is distinct from risk preferences. *See infra* text accompanying notes 258–259 (describing how mistaken evaluation of risk may drive behavior).

67. Crouch, *supra* note 66, at 161.

68. *Id.* at 162–65.

69. Hemel & Ouellette, *supra* note 3, at 340–42, 340 n.172.

acknowledge, however, that creators might also be subject to optimism bias.[70] Still, Hemel and Ouellette conclude that risk aversion will be the dominant influence on creators' behavior, with the net effect being that "potential innovators will be more responsive to ex ante mechanisms that provide an immediate, certain transfer than to ex post mechanisms that provide a speculative payout in the future."[71]

In sum, the existing IP literature suffers from three shortcomings. First, notwithstanding the exceptions described above, the standard approach is to simply assert that creators are risk averse, relying on microeconomic results regarding the general population and eliding any differences between creators and intermediaries. Second, scholars who have applied results from behavioral economics continue to treat creators as though they follow the general population's tendencies with respect to risk. And third, when differences between creators and intermediaries are noted, the analyses emphasize the risk preferences of the intermediaries, rather than the creators.

IP scholars have not yet considered psychological and sociological research regarding the impact of risk on creativity.[72] Because of this neglect, the IP literature too readily predicts that IP risk hinders, rather

70. *Id.* at 340.

71. *Id.* at 340–42.

72. This is not to say that IP scholars have entirely overlooked the sociological and psychological research on creativity; to the contrary, a growing literature has drawn from that research to provide novel and important insights into IP. *See, e.g.*, Fromer, *supra* note 8, at 1483. But this literature has not seriously considered what creativity research has to say about IP risk. *See id.* at 1460 n.117 (noting in passing that "[p]ersonality studies demonstrate that certain characteristics are common to the creative person," including "risk taking," but not evaluating what that possibility might mean for IP). Joseph Fishman, for example, relies on creativity research to argue that constraints, including those imposed by law, can stimulate creativity by foreclosing familiar paths and forcing creators to pursue novel approaches instead. Fishman, *supra* note 10, at 1339. Although he recognizes that some creators might prefer risk, Fishman treats them as a deviation from the majority of creators who would prefer the "familiar solutions [that] tend to be safer." *Id.* at 1374–76 (reasoning that "the problem of managing risk" will lead to reliance on familiar and less creative work like "sequels, film adaptations, and spinoffs"). He therefore concludes that uncertainty arising from unclear legal doctrines will stifle creativity. *Id.* at 1385–88. Similarly, Christopher Buccafusco, Christopher Sprigman, and various colleagues have embarked on an intriguing series of experiments aimed at exploring the impact of IP law on creativity. *See* Buccafusco & Sprigman, *supra* note 10, at 31 (identifying a "creativity effect" whereby creators systematically value their creations more than do owners or buyers of those creations); *see also* Christopher Buccafusco et al., *Experimental Tests of IP Laws' Creativity Thresholds*, 92 TEX. L. REV. 1921, 1923 (2014) (showing that higher thresholds for IP protection may stimulate creativity). But even when their subjects engage in behavior that could plausibly be explained by a preference for risk, they have too readily dismissed the possibility. Buccafusco & Sprigman, *supra* note 10, at 42 n.43 (noting that their subjects' behavior "could also be characterized as a propensity to seek risk" but stating that their questions "did not focus on attraction to risk unlinked to anticipated regret following potential loss").

than promotes, "the Progress of Science and useful Arts."[73] As explained below, the creativity literature raises precisely the opposite possibility.

II. THE VIEW FROM THE CREATIVITY LITERATURE

This Part begins by explaining why creativity research matters to intellectual property law. It then describes what leading theories of creativity have to say about the relationship between risk and creativity.

A. From Economics to Creativity

The standard view of intellectual property emphasizes economic constraints on the creation and distribution of inventions and expressive works: IP law is thought to influence creators' incentives to invest time and money in the production of certain kinds of public goods.[74] Creators may lack access to the capital required to build and test prototypes or pay a film crew. Creators may also require pecuniary motivation to spend their time producing information, or to acquire the human capital needed to do so successfully. IP law helps answer the economic question why anyone would invest in these activities.

The production of inventions and expressive works is, however, subject to multiple constraints. And perhaps the most fundamental constraint is the creativity of the inventor or artist—without that creativity, there is simply no invention or expressive work to speak of. IP might be the best way to facilitate the acquisition of capital to produce inventions and expressive works, or to internalize the benefits of those works, but still be undesirable on net because it stifles the very creativity required to produce them. So even if IP answers some economic questions, at its core, IP might also or better be understood as answering social and psychological questions: viewed through this lens, IP scholars must ask whether intellectual property promotes the social and psychological phenomenon we know as creativity.[75]

Promoting creativity is, of course, not coextensive with producing inventions and expressive works. Some inventions may be the result more of technical expertise than creativity. Similarly, the expressive

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73. U.S. CONST. art. I, § 8, cl. 8.

74. *See* LANDES & POSNER, *supra* note 27, at 37–41 (describing the basic economic case for copyright law); *id.* at 294–97 (describing the basic economic case for patent law).

75. *See* Fromer, *supra* note 8, at 1457–59 (arguing that "it is crucial to explore the psychology of creativity to learn . . . how the stimulation of creativity relates to and ought to influence intellectual property laws"). There is a considerable and growing overlap between economics and psychology. *See generally* Lex Borghans et al., *The Economics and Psychology of Personality Traits*, 43 J. HUM. RESOURCES 972 (2008) (exploring "the interface between personality psychology and economics").

works that copyright law protects include everything from highly creative novels to routine news articles. Still, creativity is a crucial ingredient in much of the work that IP seeks to motivate. And that makes urgent the need to understand how IP affects creativity.[76]

B. Theories of Creativity and Risk

To generate hypotheses about the potential responses of creators to IP risk, I turn to the interdisciplinary study of creativity. The modern field of creativity research traces its origin to J.P. Guilford's 1950 presidential address to the American Psychological Association.[77] Researchers in this tradition consistently identify two criteria as essential to creativity: novelty and appropriateness.[78] Novelty requires that the thing be new.[79] Appropriateness demands that the thing be suitable or valuable for some purpose, so as to distinguish the creative from the randomly or nonsensically new.[80] While this definition of creativity masks some nuances and controversies, it captures the core of the phenomenon.[81]

Today, creativity theories are commonly divided among the four P's: person, process, product, and place.[82] Person theories try to identify the

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76. Fromer, *supra* note 8, at 1457–59.

77. J.P. Guilford, *Creativity*, 5 AM. PSYCHOL. 444 (1950). For examples Guilford's influence, see Jonathan A. Plucker & Joseph S. Renzulli, *Psychometric Approaches to the Study of Human Creativity*, *in* HANDBOOK OF CREATIVITY 35, 36 (Robert J. Sternberg ed., 1999); Frank Barron & David M. Harrington, *Creativity, Intelligence, and Personality*, 32 ANN. REV. PSYCHOL. 439, 440 (1981); *see also* Mark A. Runco & Robert S. Albert, *Creativity Research: A Historical View*, *in* THE CAMBRIDGE HANDBOOK OF CREATIVITY 3 (James C. Kaufman & Robert J. Sternberg eds., 2010) (providing an overview of work leading up to Guilford's address).

78. Robert J. Sternberg & Todd I. Lubart, *The Concept of Creativity: Prospects and Paradigms*, *in* HANDBOOK OF CREATIVITY, *supra* note 77, at 3, 3; Gregory J. Feist, *A Meta-Analysis of Personality in Scientific and Artistic Creativity*, 2 PERSONALITY & SOC. PSYCHOL. REV. 290, 290–91 (1998) (noting thirty years of consensus on the definition of creativity); Dean Keith Simonton, *Taking the U.S. Patent Office Criteria Seriously: A Quantitative Three-Criterion Creativity Definition and its Implications*, 24 CREATIVITY RES. J. 97, 97 (2012) ("By far the most common statement entails some version of the two-criterion definition: Creativity requires (a) novelty or originality and (b) utility or usefulness.").

79. Sternberg & Lubart, *supra* note 78, at 3.

80. *Id.* at 3.

81. Creativity researchers have, for example, questioned the suitability of a novelty requirement for technological work and an appropriateness requirement for artistic work. Mark Batey & Adrian Furnham, *Creativity, Intelligence, and Personality: A Critical Review of the Scattered Literature*, 132 GENETIC SOC. & GEN. PSYCHOL. MONOGRAPHS 355, 360 (2006). For an introduction to some of these complexities, see *id.* at 358–61 (describing, *inter alia*, the disagreement about whether it is enough that a product "be new for the creator," or instead, that the "product is new and useful" to society).

82. *Id.* at 358; Aaron Kozbelt et al., *Theories of Creativity*, *in* THE CAMBRIDGE HANDBOOK OF CREATIVITY, *supra* note 77, at 20, 24–25. The distinctions drawn by this taxonomy are not inviolable. Systems theories of creativity, for example, "take the view that creativity is best

distinguishing characteristics of creative individuals.[83] Process theories examine the mental mechanisms typical of creative thinking.[84] Product theories concentrate on the results of creative work—books, films, new light bulbs, and novel chemical substances.[85] And place theories seek to understand the contexts in which creativity commonly occurs.[86]

Person, process, and place theories could help answer this Article's core question: How does IP risk affect creativity in the fields covered by copyright and patent law? (I set aside product theories because of their focus on why a given object or idea is deemed creative, as opposed to how or why such an object or idea is produced). As described in detail below, prevailing creativity theories—whether emphasizing person, process, or place—suggest that there may be a positive relationship between risk and creativity.

1. The Creative Person

Creative person theories posit that creativity is best understood as a function of particular personality and intellectual characteristics.[87] One of those characteristics may be a preference for risk because, insofar as

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conceptualized not as a single entity, but as emerging from a complex system with interacting subcomponents—all of which must be taken into account for a rich, meaningful, and valid understanding of creativity." Kozbelt et al., *supra,* at 38–40. Nor are these categories necessarily exhaustive—Dean Simonton (persuasion) and Mark Runco (performance/potential) have each proposed adding an additional "P" to the traditional four. *Id.* at 24–25. Furthermore, creativity researchers sometimes distinguish among different degrees of creativity. So-called little-c creativity refers to the minor sorts of novel and appropriate things produced on a day-to-day basis by all individuals. *Id.* at 23. Big-C creativity, on the other hand, refers to the major contributions associated with people like Picasso. *Id.* In between lies Pro-C creativity, which covers the work done by creative professionals—like those that make a living as artists and engineers—that do not reach the lofty heights that Picasso or the Wright Brothers did. *Id.* at 24. Pro-C is of primary interest to IP scholars, encompassing as it does the kind of contributions covered by copyright and patent law. But at least some little-c and Big-C also lie within our area of interest, and surely some Pro-C also lies without. These distinctions, however, do not often arise in existing theoretical and empirical assessments of the influence of risk on creativity, so for the moment note only that these distinctions can in principle be applied in subsequent testing of the hypotheses articulated below.

83. Batey & Furnham, *supra* note 81, at 357–58; Kozbelt et al., *supra* note 82, at 25.

84. Batey & Furnham, *supra* note 81, at 358; Kozbelt et al., *supra* note 82, at 24.

85. Teresa M. Amabile, *The Social Psychology of Creativity: A Componential Conceptualization*, 45 J. PERSONALITY & SOC. PSYCHOL. 357, 358 (1983); Batey & Furnham, *supra* note 81, at 358; Kozbelt et al., *supra* note 82, at 24–25.

86. Batey & Furnham, *supra* note 81, at 358; Kozbelt et al., *supra* note 82, at 25.

87. While modern creativity research began with the search for the creative person, there are perhaps no more pure creative person theories in the sense that no serious theory of creativity holds that a creative personality is the sole determinant of creativity. *Cf.* Amabile, *supra* note 85, at 358 (suggesting in 1983 that "[p]erhaps a social psychology of creativity has failed to develop in part because empirical creativity research has long been dominated by a trait approach, an attempt to precisely identify the personality differences between creative and noncreative individuals").

creative work is systematically riskier than uncreative work, an individual who prefers risk may more readily pursue creative kinds of work. That is, creative people might have a preference for creative work in part because they enjoy the risk with which it is associated.[88] Alternatively, the personality characteristics that facilitate creativity may also predispose individuals to prefer risk, even if risk preference has no direct role in creativity.[89] For example, a taste for novelty may underlie both a preference for creative work (to the extent that more creative work involves more novelty than less creative work) and a preference for risk (to the extent that novel situations are systematically riskier than familiar ones).

One version of this view of creativity—centered on personality and intellectual characteristics—can be found in Robert Sternberg and Thomas Lubart's investment model of creativity.[90] This approach models creativity as the investment of resources in projects, where the basic strategy is to buy low (i.e., choose unknown or disfavored projects) and sell high (i.e., move on to other projects once an initial one has been appropriately recognized).[91] Sternberg and Lubart argue that creativity results from the interaction of six resources: "intellectual processes, knowledge, intellectual styles, personality, motivation, and environmental context."[92] These resources are of varying importance across different domains of creative work, such that creativity is neither a domain-general skill (i.e., applicable throughout the arts and sciences), nor a domain-specific one (i.e., applicable to only one art form or one technological field); instead, creativity results from the confluence of these resources in a particular context.[93]

A willingness to take risks is one of the five attributes that Sternberg

88. I do not mean to suggest that individuals are either "creative" or "uncreative"; instead, each individual might have more or less creative potential that might be expressed to greater or lesser degrees in particular contexts. In other words, individuals might fall on a continuum of creativity, rather than within one of two categorical types. I use phrases like "creative person" and "uncreative person" for expositional convenience—those phrases should be understood to refer to different ends of the continuum, rather than categorical distinctions.

89. *See* Plucker & Renzulli, *supra* note 77, at 42 (identifying "risk taking" as one among several "personality correlates of creative behavior" without articulating an explicit role for risk taking in creative activity).

90. Todd I. Lubart & Robert J. Sternberg, *An Investment Approach to Creativity: Theory and Data*, *in* THE CREATIVE COGNITION APPROACH 271, 276–77 (S.M. Smith et al. eds., 1995) (arguing that "different aspects of creativity are best studied together").

91. *Id.* at 271.

92. *Id.* at 271; Robert J. Sternberg & Todd I. Lubart, *An Investment Theory of Creativity and Its Development*, 34 HUM. DEV. 1, 4 (1991).

93. Lubart & Sternberg, *supra* note 90, at 276.

and Lubart deem "essential" to the creative personality.[94] Individuals must often choose between more creative and less creative options.[95] For example, an artist may need to make choices about topic, development, materials, and style; each choice might present a more creative option and a less creative one.[96] More creative options are associated with higher risk because their novelty frustrates efforts to predict outcomes; less creative options are associated with lower risk because the possible outcomes are better established and therefore easier to predict.[97] In this framework, a willingness to take risks is a personality trait that influences which options an individual tends to choose: the creative, risky ones or the routine, safe ones.[98]

Sternberg and Lubart include both internal rewards (like the feeling of competence when a creative task is completed) and external ones (like financial bonuses) as possible gains from creative work.[99] Moreover, creative work can result in losses like criticism or wasted time.[100] Thus, although the risks associated with creativity "tend to be intellectual ones," they "carry social and monetary ramifications."[101] The taste for risk identified by Sternberg and Lubart as essential to creativity therefore includes a willingness to take not only intellectual risks, but also, at least, social and financial ones.[102]

2. The Creative Process

Creative process theories view particular cognitive mechanisms as the essential determinants of creativity.[103] The premise is that these mechanisms produce creative ideas, which lead to creative products. Both risk and creativity require the mind to process the unpredictable; it is therefore possible that the cognitive mechanisms used when engaged

94. *Id.* at 274.

95. *Id.* at 291.

96. *Id.*

97. *Id.*

98. *See id.* (proposing that "[w]illingness to take risk, a personality trait, guides" whether a person chooses a "low risk-low payoff" route or a "high risk-high payoff" one). This is not to say that a creative person will always pursue high-risk options; instead, the theory predicts that "creators balance risk with diversification," pursuing some high-risk options and some low-risk ones. Sternberg & Lubart, *supra* note 92, at 14.

99. Lubart & Sternberg, *supra* note 90, at 274.

100. *Id.*

101. *Id.* at 291.

102. They also speculate that the "general aversion to risk" seen in general decision-making studies might therefore "partially account[] for the infrequency of creative performance." *Id.* at 291.

103. Kozbelt et al., *supra* note 82, at 24.

in creative work are related to those used when confronting risk. On this view, people who are relatively better able to deal with risk will also be relatively more capable of creativity.

As an example, consider Dean Keith Simonton's chance-configuration theory.[104] Simonton's theory posits that the creative process begins with chance permutations of mental elements; these chance permutations are fleeting combinations of facts, ideas, concepts, and so on, which provide the variation necessary for creativity.[105] When a chance permutation "significantly augment[s] the efficiency of thought," it is retained as what the theory labels a stable "configuration."[106] Individuals then communicate configurations to communities, which accept and preserve them (or not) as a result of social and cultural factors.[107] Creativity is the production and acceptance of these newly adopted configurations.

The chance-configuration theory proposes that risk preferences are part of an individual's cognitive style, and a person's cognitive style will influence her creativity by rendering her more or less suited to the chance-configuration process. Thus, Simonton argues that the "capacity to play with ideas is facilitated by impulsiveness, flexibility, independence, and a risk-taking disposition."[108] While Simonton's focus is on intellectual risks,[109] it is possible that intellectual risk taking is correlated with risk taking in other domains.[110]

3. The Creative Place

Place theories explain creativity as an interaction between an individual and the social environment in which such an individual is attempting to perform a creative task.[111] Creators run the risk that they might fail to produce creative products, or that society might reject those products. As a result, a creative place theory could indicate that creators need to be especially willing or able to run such risks. But unlike a

104. *See generally* DEAN KEITH SIMONTON, SCIENTIFIC GENIUS: A PSYCHOLOGY OF SCIENCE (1988). As with Sternberg and Lubart's investment theory, Simonton's is not a pure process theory in the sense of treating processes as the only elements relevant to creativity. Simonton's work also considers the influence of person and place factors. *Id.* at 41–59, 107–134. Still, his chance-configuration theory is a process theory to the extent that it emphasizes the role of cognitive mechanisms in creativity.

105. *Id.* at 6–8.

106. *Id.* at 8–16.

107. *Id.* at 16–21.

108. *Id.* at 43.

109. *Id.*

110. *See infra* Part IV.A.2 (discussing research regarding whether risk preferences are domain specific).

111. Kozbelt et al., *supra* note 82, at 25.

creative person theory—which would propose that this willingness or ability is a function of individual, relatively stable, personality traits—a creative place theory would posit that creators' willingness or ability to run such risks depends on the interaction between such traits and the social environment in which creators act.[112] In a creative place theory, a single person may be likely to produce creative work in one environment and unlikely to do so in another because of factors external to the person.

The most prominent example of this approach is Teresa Amabile's componential theory.[113] The theory explains creativity as a function of three components, each of which is necessary to creativity: domain-relevant skills, creativity-relevant skills, and task motivation.[114] Amabile's central contribution was to emphasize the influence of task motivation on creativity. Task motivation is an individual's desire to engage with a task or activity, and can be driven by intrinsic factors or extrinsic ones.[115] Intrinsic factors derive from the individual's engagement with the task itself.[116] Extrinsic factors are those that arise from the context in which the individual works on the task.[117]

The links between creativity and risk in Amabile's theory are more complex than the simple positive relationship proposed by creative person theories. Risk is perhaps best understood as an extrinsic factor influencing task motivation.[118] Under Amabile's original theory, extrinsic factors invariably undermine intrinsic motivation,[119] so risk would then have a negative impact on creativity. Subsequent work has revealed, however, that intrinsic and extrinsic motivation can be additive,

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112. *Id.*

113. For the seminal paper introducing Amabile's componential theory, see generally Amabile, *supra* note 85. For the full elaboration of the theory, see generally TERESA M. AMABILE, CREATIVITY IN CONTEXT (1996).

114. Amabile, *supra* note 85, at 357. Domain-relevant skills are those that pertain to the subject matter of the creative work (consider a visual artist's ability to physically control paintbrushes and perceive colors, or an electrical engineer's knowledge of Ohm's Law or Boolean logic). *Id.* at 363–64. Creativity-relevant skills are the cognitive and personality characteristics relating to things like independence and risk taking. *Id.*

115. AMABILE, *supra* note 113, at 108–09; Amabile, *supra* note 85, at 365–66; Beth A. Hennessey & Teresa M. Amabile, *Creativity*, 61 ANN. REV. PSYCHOL. 569, 581 (2010).

116. AMABILE, *supra* note 113, at 108–09.

117. *Id.* To summarize Amabile's original core proposition: "[T]he intrinsically motivated state is conducive to creativity, whereas the extrinsically motivated state is detrimental." *Id.* at 107; *see also* Hennessey & Amabile, *supra* note 115, at 581.

118. Amabile, *supra* note 85, at 369, 373.

119. AMABILE, *supra* note 113, at 107 (arguing that "the intrinsically motivated state is conducive to creativity" and "the extrinsically motivated state is detrimental"); Hennessey & Amabile, *supra* note 115, at 581 (summarizing the early view that "as extrinsic motivators and constraints were imposed, intrinsic motivation (and creativity) would necessarily decrease").

depending on the particular nature of the extrinsic factor.[120] In Amabile's revised theory,[121] risk would therefore have a highly context-specific influence on task motivation and, by extension, creativity: in some instances, risk will have a positive effect, and in others, a negative one.

Amabile's theory also suggests potential insights for how personality and the environment interact to affect creativity. First, Amabile recognizes that a "personality disposition related to . . . "risk taking" may be an individual-difference variable contributing to creativity.[122] This willingness to take risks can mediate the influence of intrinsic motivation on creativity.[123] From this perspective, Amabile's theory points toward the possibility that creative individuals differ from the general population in their responses to risks of all kinds.

Second, Amabile proposes that creative individuals are more able than less creative individuals to avoid the ordinarily negative effects of extrinsic constraints.[124] From this perspective, risk is an extrinsic factor that can reduce task motivation, but because creative people can easily ignore extrinsic factors, they are relatively unaffected by it. And intrinsically based task motivation can then enhance "a willingness to take risks with [the] particular [creative] task."[125]

As an example, imagine a composer must produce a creative melody for a musical, but will be fired if the producer deems it inadequate. For most individuals, this context would reduce task motivation and thereby make it difficult to produce the creative melody. But the effect of this kind of extrinsic factor may be less severe (or simply non-existent) for more creative individuals because such individuals are better able to focus on the intrinsic pleasure they derive from the task itself. So a

120. Hennessey & Amabile, *supra* note 115, at 581. For more on the influence of extrinsic factors on intrinsic motivation, see Beth A. Hennessey, *The Creativity-Motivation Connection*, *in* THE CAMBRIDGE HANDBOOK OF CREATIVITY, *supra* note 77, at 342, 348–53 (describing the influence of Self-Determination Theory on social psychology of creativity research); Richard M. Ryan & Edward L. Deci, *Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being*, 55 AM. PSYCHOL. 68, 73 (2000).

121. *See* AMABILE, *supra* note 113, at 115–18 (revising the original theory to account for evidence showing additive effects of intrinsic and extrinsic motivators in particular contexts).

122. Amabile, *supra* note 85, at 372.

123. Hennessey & Amabile, *supra* note 115, at 581.

124. Amabile, *supra* note 85, at 366; *see* AMABILE, *supra* note 113, at 92 (proposing that "an individual's ability to cognitively minimize the salience of such extrinsic constraints[] might influence task motivation"). This ability to ignore extrinsic factors may be applicable only with respect to particular activities or it may be a general personality characteristic. Amabile, *supra* note 85, at 372.

125. *Id.* at 368; *see also* Todd Dewett, *Linking Intrinsic Motivation, Risk Taking, and Employee Creativity in an R&D Environment*, 37 R&D MGMT. 197, 199 (2007) ("[I]t has become commonly accepted that intrinsically motivated behaviors result in risk taking.").

creative individual's task motivation may be (relatively) unaffected by the risk of getting fired if the producer is not satisfied, and she is accordingly able to produce creative melodies just as easily in response to the producer's ultimatum as without it. On this view, legal, financial, and other risks associated with the IP system may be the sorts of extrinsic factors that creative people can "tune out" better than others.

To be sure, not every creativity theory points toward a positive relationship between creativity and risk. In many, risk simply has no bearing on the theory's central concerns, and we might therefore conclude that, to the extent the theory is a useful way to understand creativity, it tells us that there is nothing special about creators' responses to IP risk.[126] Still, many of the leading creativity theories indicate that the relationship between risk and creativity is generally positive. The next step is to understand how IP risk in particular affects creativity.

III. THE IMPACT OF IP RISK ON CREATIVITY

This Part first frames the analysis of IP risk by elaborating on a central question for IP scholars: How does the impact of risk on creativity affect the comparison between IP and alternative mechanisms for stimulating technology and the arts? Building on the theories of creativity described above, this Part then articulates three hypotheses regarding the effect of IP risk on creativity.

A. IP, Prizes, Grants, and Other Tools

The big empirical question IP scholars must answer is whether intellectual property rights, in fact and on net, stimulate the production of inventions and expressive works.[127] On the standard view, artists and inventors underinvest in producing art and inventions because such works are public goods.[128] IP rights make these public goods excludable,

126. *See generally* MIHALY CSIKSZENTMIHALYI, FLOW: THE PSYCHOLOGY OF OPTIMAL EXPERIENCE (1990) (arguing that creativity is a product of an intensely focused mental state); HOWARD E. GRUBER, DARWIN ON MAN: A PSYCHOLOGICAL STUDY OF SCIENTIFIC CREATIVITY (1981) (arguing that creativity is best understood as the result of evolving subsystems of knowledge, purpose, and affect within the creative person).

127. Although this question has long resisted efforts to approach an answer, recent work has begun to make progress. For an overview, see generally John M. Golden et al., *The Path of IP Studies: Growth, Diversification, and Hope*, 92 TEX. L. REV. 1757 (2014). This is the big question within the prevailing normative framework; we might, of course, ask whether this is the right normative framework and that would naturally be a pretty big question too. For a notable recent exploration of this question, see generally MERGES, *supra* note 26.

128. LANDES & POSNER, *supra* note 27, at 37–41; *see also* Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1580 (2003) (noting that "legal restraints on patentable inventions are justifiable if they offer a net benefit to society, trading the disutility of

thereby making it possible for creators to appropriate the value of their work.[129] But IP rights have a well-known downside: they enable creators to price their goods above marginal cost.[130] As a result, IP forces a difficult tradeoff between static inefficiency—limiting consumption of goods that have negligible marginal costs—and dynamic efficiency—providing incentives for creators to produce such goods in the first instance.[131]

It is hard enough to determine whether this tradeoff is worthwhile on its own terms. The task for IP scholars is still more complicated because IP is just one of several mechanisms for stimulating work in technology and the arts. Even if we agree that the incentive thesis has identified a significant problem—the need to provide rewards for creative work—we need not agree that the ideal solution is to offer rewards in the form of exclusive rights.[132] For example, the government can directly employ inventors and artists, paying them a salary in exchange for their ongoing inventive and artistic work. It can provide grants to inventors and artists for work on more specific projects that the government deems desirable. The government may also award prizes to those who satisfy particular criteria. And the government may indirectly encourage investments in technology and the arts through tax policy, or otherwise regulate these fields so as to influence the costs of producing, copying, and distributing inventions and expressive works.[133] The big empirical question is accordingly a relative one: How much better is IP—or in what circumstances is it better—than other tools we could use to "promote the Progress of Science and useful Arts"?[134]

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restricted output and higher prices for the greater social utility of inventions that might otherwise not be produced"); Parchomovsky & Wagner, *supra* note 25, at 12–13 (relying on the public good characteristics of innovative products to justify patent law).

129. LANDES & POSNER, *supra* note 27, at 37–41, 294–97.

130. William Hubbard, *The Debilitating Effect of Exclusive Rights: Patents and Productive Inefficiency*, 66 FLA. L. REV. 2045, 2056–57 (2014); Mark A. Lemley, *The Myth of the Sole Inventor*, 110 MICH. L. REV. 710, 736 (2011).

131. Mark A. Lemley, *The Economics of Improvement in Intellectual Property Law*, 75 TEX. L. REV. 989, 990 (1997); Mark A. Lemley, *Property, Intellectual Property, and Free Riding*, 83 TEX. L. REV. 1031, 1031 (2005); Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839, 916 (1990).

132. For just a few examples from a large literature discussing alternatives, see Carroll, *supra* note 4, at 1369; Hemel & Ouellette, *supra* note 3, at 267; *see generally* Michael Abramowicz, *Perfecting Patent Prizes*, 56 VAND. L. REV. 115 (2003). The list that follows is drawn from Carroll, *supra* note 4, at 1369–70.

133. An example of this policy mechanism can be found in the Digital Millennium Copyright Act's prohibition of technology that circumvents measures taken to prevent copying of copyrighted works. *Id.*

134. U.S. CONST. art. I, § 8, cl. 8. For an argument that the Constitution might limit recourse

While there are different sources of IP risk, I focus in this Part on the risk related to the financial value of IP rights and its alternatives. The starkest comparison might be between IP rights and salaries. When an inventor or artist relies on IP rights to justify working on a creative project, she will not know how much the resulting IP rights will be worth. Conversely, when an inventor or artist is paid a salary for her work on a creative project, she will know with some precision how much she will receive.

The impact of risk itself will be obscured in real-world settings because IP rights might not only be riskier than salaries, but also provide significantly greater incentives. Simply put, IP rights might reward individuals for creative performance in (rough) proportion to the value of their contributions, while salaries might reward individuals independent of the value of their contributions. If so, then IP rights might outperform salaries simply because IP rights give creators some reason to create, while salaries give them none.

This possibility, however, depends on the particular conditions under which the individual receives the IP rights or the salaries. For example, imagine a salary set equal to the expected value of the IP rights corresponding to the creator's output, but contingent on the creator's observed effort.[135] In such a scenario, the salary would provide the

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to other solutions, see Jeanne C. Fromer, *The Intellectual Property Clause's External Limitations*, 61 DUKE L.J. 1329 (2012). There are also smaller but still important IP questions for which the risk-creativity relationship matters. We could imagine particular implementations of IP law that involve less risk than does the actual implementation we have chosen. Our actual implementation of IP comprises many unclear doctrines, including (among other things) a difficult-to-predict fair use doctrine; indeed, there have been countless proposals to reduce the risk associated with the fair use doctrine. *See generally* Ann Bartow, *Educational Fair Use in Copyright: Reclaiming the Right to Photocopy Freely*, 60 U. PITT. L. REV. 149 (1998); Michael W. Carroll, *Fixing Fair Use*, 85 N.C. L. REV. 1087 (2007); David Fagundes, *Crystals in the Public Domain*, 50 B.C. L. REV. 139, 175–78 (2009); Gideon Parchomovsky & Kevin A. Goldman, *Fair Use Harbors*, 93 VA. L. REV. 1483 (2007). To be sure, these proposals often have multiple effects, usually not only reducing risk, but also making it possible for individuals to avoid liability entirely. Nevertheless, from a conceptual standpoint, it is possible to distinguish the (potential) harms flowing from risk, and the (potential) harms flowing from the imposition of liability. Fair use is a classic example of a flexible standard, and a move to a more rule-like version of fair use could, at least in principle, reduce risk while keeping constant the expected liability to which the documentarian (and other individuals relying on fair use) would be exposed. *See* Fagundes, *supra*, at 175 (describing fair use as an example of a standard in copyright law that could be converted into more rule-like form); Horowitz, *supra* note 63, at 357-59 (distinguishing between effects of copyright fair use proposals on risk and effects of those proposals on the scope of entitlements). The overall policy choices here involve difficult tradeoffs between initial creators and follow-on creators. Peter S. Menell & Ben Depoorter, *Using Fee Shifting to Promote Fair Use and Fair Licensing*, 102 CALIF. L. REV. 53, 74 (2014). To choose among these options, though, we need an accurate understanding of the impact of IP risk on creativity.

135. This assumption is not unrealistic—employment is ordinarily at will, and an employee in

creator with an incentive to create because, unless she provides an appropriate quantity of (observable) effort, she will not receive the salary. The two rewards would still differ, however, with respect to their risk profiles—the salary will equal a fixed amount (equivalent to the expected value of the IP rights), while the IP rights will range over some set of possible values. And that difference in risk profile may itself influence the creator's response. Of course, even in this scenario, IP rights might provide greater incentives if their value is more closely tied to the creator's actual effort. Still, the point is simply that it is possible to conceptually distinguish the influence of incentives on creativity from the influence of risk.

We might then ask the question: If society had a dollar to spend on either an IP system or on a salary for a creator, which would return the highest creative value?[136] There are many reasons we might get more from that dollar by spending it on a copyright system instead of a salary.[137] But hold everything else constant, and focus here on one key dimension of the comparison: How does the risk associated with IP affect the creativity required to produce inventions and expressive works?

B. Hypotheses Regarding IP Risk and Creativity

This Part draws on leading creativity theories to generate three core hypotheses regarding the effect of IP risk on creativity. For each hypothesis, this Part articulates its theoretical basis, provides an

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a position demanding creativity will lose her job and, by extension, her salary, if she fails to perform. As a practical matter, it may be impossible to observe creative effort. But suppose it is at least possible to observe enough to provide the creator an incentive to work. *See* Casey & Sawicki, *supra* note 31, at 1702–06 (describing problems of and solutions to unobservability of creative effort).

136. Although it is easier to see how society would "spend" on salaries, we can think of the copyright system as forcing society to incur a set of costs—ranging from the costs of passing laws, establishing courts to enforce them, and bearing deadweight losses from limited access—and those costs are the dollars society "spends" on the copyright system. Of course, there are hard questions here regarding, for example, the ability to make marginal spending decisions given the fixed costs involved in running a copyright system: 17 U.S.C. § 101 is written, after all.

137. *See* Carroll, *supra* note 4, at 1373–79 (describing the "consensus view among economically-oriented commentators" that IP rights are better than prize systems because the IP system "is driven by the marginally superior private information that innovators enjoy"); Hemel & Ouellette, *supra* note 3, at 327–33 (arguing that research and development tax incentives can, like patents and unlike government-administered prizes, rely on private information about the costs and benefits of particular research investments); Amy Kapczynski & Talha Syed, *The Continuum of Excludability and the Limits of Patents*, 122 YALE L.J. 1900, 1908–21 (2013) (arguing that inventions exist on a continuum of excludability that is not correlated with social value, and that this undermines Harold Demsetz's argument that patents are superior to government prizes and grants because of their ability to "make use of private information about the value of prospective inventions").

illustration of what it would mean for the hypothesis to be true, reviews existing empirical work relevant to the hypothesis, and analyzes what it would mean for IP law if subsequent empirical work supports the hypothesis.

In developing the hypotheses, I focus on a stylized world for analytical clarity. Although I have already adverted to some of the assumptions underlying this world, I state them explicitly here to clarify when and how they need to be accounted for in subsequent empirical research. First, I assume that the effects of risk are consistent across risk domain—that is, individuals respond to health risks in the same way that they respond to financial or social risks.[138] Second, I assume that the relationship between risk and creativity is the same regardless of the domain of creative work—risk influences creativity in similar ways regardless of whether we are evaluating creativity in literature, film, drug development, software design, or nanotechnology.[139] Third, I assume that creators are operating independently and interacting directly with the relevant risks—in other words, there are no firms or other intermediaries.[140] Fourth, I assume that differences between quantitative risk and uncertainty do not matter to the analysis.[141] Finally, I assume that contextual variables do not affect the influence of risk on creativity—it does not matter, for example, whether risk flows from possible upside outcomes or downside outcomes.[142]

Although I explore these assumptions more fully in Part IV, the first and third assumptions bear a bit more elaboration here. The creativity theories discussed in the preceding Part focus, naturally enough, on creative risks. An engineer, for example, cannot be certain whether her proposed design for a battery will be efficient in powering a cellular phone. The novelty of her design will frustrate efforts to predict whether it will work. And it is how creators respond to this kind of risk that forms the primary basis for the theoretically positive relationship between risk

138. *See infra* Part IV.A.2 (relaxing the assumption of uniform responses across risk domain).

139. *See infra* Part IV.A.1 (acknowledging plausibility of some variation across domains of creative work and within particular domains, but also describing theoretical support for domain-independent effects). Relatedly, I assume that the relationship between risk and creativity is the same at all levels of creative work within a given domain—that is, all authors respond to risk in the same way, whether they are Nobel Prize winners or pulp novelists.

140. *See infra* Part IV.A.3 (explaining that intermediaries often shift risk away from creators, and raise the possibility that such arrangements might have socially undesirable implications).

141. *See infra* Part IV.A.4 (describing the need to account for the difference between quantitative risk and uncertainty in empirical investigations).

142. *See infra* Part IV.A.5 (identifying several behavioral economics findings, including but not limited to the framing effects described in Kahneman and Tversky's prospect theory, that may influence empirical research design).

and creativity. One might therefore question the relevance for IP law of proposed links in creativity theory between risk and creativity.

But even focusing solely on the risks associated with creative work reveals that the positive relationship between risk and creativity might not be limited to creative risks; it also plausibly extends to things like financial or social risks. Indeed, the potential outcomes of designing a new kind of cellular phone battery include not only the possibilities that the battery will or will not work, but also that it will be a financial success or failure, or that the engineer may enjoy the acclaim or suffer the ridicule of her peers.[143] In other words, creative work entails not only creative risk, but also at least financial and social risk, and creativity theories frequently consider those kinds of risks as well as ones that might be understood as more narrowly related to the creative work.

The emphasis in this Part is on IP's financial risk—that is, the risk associated with the value of an IP right—because this is the essential and inescapable IP risk. Part IV extends this analysis to other kinds of IP risk. For now, the important points are simply that (1) creative risks are the primary, but not exclusive, basis for the positive relationship between risk and creativity proposed by creativity theorists; and (2) this relationship may extend to other kinds of risks.

This project is also complicated by the fact that creators rarely experience the effects of IP directly. Instead, creators often interact with the IP system through a number of intermediaries.[144] But we should not treat these arrangements as exogenous to the IP system. Creators may enter into these kinds of arrangements to finance and distribute their work because, among many other things, we have an IP system that relies on ex post rewards as incentives. Moreover, technological changes may change the role of intermediaries, and the IP system may then need to respond in kind. We should therefore ask whether such arrangements are desirable and, depending on the answer to that question, structure the IP system to facilitate or discourage them.

For the analysis in this Article, this means that we should first understand how creators would respond to IP risk directly before we determine how creators' common (though by no means universal)

143. *See* Lubart & Sternberg, *supra* note 90, at 274 (identifying the possible gains and losses of creative work).

144. Because employers typically acquire their employees' patent rights, and then compensate the employees in some manner (whether as part of their base compensation or through bonuses tied to the number or value of patents associated with an inventor's work), inventors often experience the effects of the patent system only indirectly. Similarly, artists in a range of fields usually interact only indirectly with the copyright system; producers and distributors of artistic works—movie studios, record labels, and book publishers own, enforce, and collect royalties on copyrights, which they then distribute (or not) to the actual creators.

arrangements with intermediaries affect those responses. Doing so will enable us to evaluate the desirability of those arrangements by comparing the impacts of IP risk on creativity in a world in which creators interact with IP *directly* to the impacts of IP risk on creativity in a world in which creators interact with IP *indirectly*.

1. Creative Individuals Prefer Risk to Certainty

The first hypothesis is that creative individuals prefer risk to certainty.[145] Recall that person theories of creativity, like Sternberg and Lubart's investment theory, hold that some people have distinct personality characteristics that facilitate creativity.[146] The intuition is that because more creative work is systematically riskier than less creative work, personality characteristics that lead people to make riskier choices will lead them to make more creative ones too. One such personality characteristic is a simple preference for risk over certainty.[147] Similarly, process theories indicate that creative individuals prefer risk as part of an overall cognitive style that renders them suited to creative thinking.[148] Thus, this hypothesis proposes that, all else equal, creative people faced with two options will prefer the one associated with more risk over the one associated with less risk.

Suppose, for example, that Claire is a musician. She is preparing for a concert and must decide which songs to play. Claire could play a well-known song that she has played many times before, like The Beatles' "Hey Jude."[149] Or she could write and play a new song; call it "Venus

145. Such a preference for risk is most plausibly understood as occurring only over some interval because it would otherwise imply that the utility function is potentially infinite. Infinite utility is, to put it lightly, unlikely. *See* Robert J. Aumann, *The St. Petersburg Paradox: A Discussion of Some Recent Comments*, 14 J. ECON. THEORY 443, 444 (1977) (arguing that the St. Petersburg Paradox, which shows that people are unwilling to pay infinite amounts for a lottery of infinite expected value, is best resolved by concluding "that utility must be bounded," especially because the lottery outcome could include "religious, aesthetic, or emotional experiences"); *but see* CADDYSHACK (Orion Pictures 1980) ("So we finish the 18th and he's gonna stiff me. And I say, 'Hey, Lama, hey, how about a little something, you know, for the effort, you know.' And he says, 'Oh, uh, there won't be any money, but when you die, on your deathbed, you will receive total consciousness.' So I got that goin' for me, which is nice."). This hypothesis is therefore more precisely understood as saying that creative people prefer risk over some interval or for certain decisions, not that their utility functions are convex everywhere. For ease of exposition, though, the text will refer simply to the hypothesis that creators prefer risk.

146. *Supra* Part II.B.

147. *Id.*; *see also* Nigel Nicholson et al., *Personality and Domain-Specific Risk Taking*, 8 J. RISK RES. 157, 170 (2005) (recognizing that some individuals find risks "attractive because they stimulate and excite").

148. *Supra* Part II.B.

149. THE BEATLES, *Hey Jude*, *on* HEY JUDE (Apple Records 1968).

Fly." If she plays "Hey Jude," she has a pretty good idea how the audience will react. But if she chooses to write and play "Venus Fly," she has very little idea how the audience will receive it—the audience may give her a standing ovation or boo her off the stage. One of the things that Claire, as a creative person, might find appealing about "Venus Fly" is precisely this risk regarding how the audience will react.[150]

Perhaps surprisingly, this hypothesis has not been directly tested. Creativity studies tend to use relative measures of risk preference (i.e., how does one individual's taste for risk compare to another's) rather than absolute measures of an individual's taste for options presenting risk or certainty.[151] While such studies shed light on the second hypothesis—that creative individuals have greater *tolerance* for risk than does the general population—they do not directly inform this first hypothesis—that creative individuals *prefer* risk to certainty.[152]

One indirect line of evidence can be found in the distribution of rewards in fields requiring creative effort. Skewed reward distributions are pervasive in the technology and entertainment industries. Surveys of the value of renewed patents in Germany and the royalties earned by United States university patents show that a few patents generate extremely large returns, while most earn modest or negligible amounts.[153] Rewards in the entertainment industries are similarly

150. We can think of Claire's decision as a choice between the following two options. The first option is to receive a $10 bill. This is the "Hey Jude" option. The second is a lottery. This is the "Venus Fly" option. She has a 50 percent chance of winning, in which case she receives $20, and a 50 percent chance of losing, in which case she gets nothing. So if this first hypothesis were true, Claire would choose the lottery because it is characterized by risk, which she prefers to the certainty of receiving a $10 bill, even though both options have the same ex ante expected value: $10. When thinking of the decision this way, the risk is posed in terms of quantitative risk. This is not, however, necessary for purposes of this hypothesis. Posing the example in the form of quantitative risk helps highlight, however, the possibility that it is the risk itself that the creative person finds appealing.

151. *Infra* text accompanying notes 173–180. This tendency mirrors the prevailing approach in personality psychology. *See, e.g.*, Ronnie L. McGhee et al., *The Relation Between Five Factor Personality Traits and Risk-Taking Behavior in Preadolescents*, 3 PSYCHOL. 558, 558 (2012) (describing a model in which "degrees of risk-taking are a function of self-regulatory aspects of personality").

152. If comparative risk preference studies showed either that creative individuals do not differ from the general population or that such individuals are more risk averse than the general population, then we would be able to reject this first hypothesis on the basis of that kind of study. But, as I explain *infra*, text accompanying notes 173–180, the studies indicate that creative individuals have greater comparative risk preference, which could be consistent with either the first or second hypothesis.

153. Scherer, *supra* note 33, at 7–12 (presenting data regarding patent and copyright distributions of value, including that approximately 10 percent of a sample of renewed German

distributed, although with less skew than in the technology industries.[154] But because these are observational studies of entire industries, they violate the assumption that creators directly experience the risk. Intermediaries, like the universities that own the patents, might smooth out the reward distributions such that inventors do not experience the skewed distributions reported in this line of research.[155]

At least one study, though, avoids this issue. Thomas Astebro has reported that Canadian independent inventors invest in developing inventions for which they might have predicted negative expected returns.[156] Because the study focused on independent inventors, it is consistent with the assumption that creators interact directly with the IP system, rather than through an organizational filter that converts risky IP rights into predictable salaries.[157] The creators in this study tended to pursue a lower-valued risky option—developing an invention with plausibly below zero expected value—rather than a higher-valued certain one—abandoning the invention and keeping the money that would have otherwise been spent on development.[158] One plausible explanation for their development of such inventions is that the inventors were risk seeking.[159]

Interpreting these studies is, however, complicated. One way to interpret them is to note that these patterns run contrary to the standard

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patents accounted for 88 percent of the sample's total value).

154. *Id.* at 12–15.

155. *See id.* at 20 (contrasting "individual high-technology entrepreneurs," who may be skewness-lovers, with "the employed inventor," who will not reap the outsize rewards at the right-hand tail of the distribution).

156. The inventors in this study "behave[d] like buyers of unfair lotteries, where the expected value is negative but there is a small chance of a large gain." Thomas Astebro, *The Return to Independent Invention: Evidence of Unrealistic Optimism, Risk Seeking or Skewness Loving?*, 113 ECON. J. 226, 227 (2003).

157. The sample likely included individuals who invented on their own account, but also had other jobs; few appear to have been "professional" inventors because "only 2% submitted more than one invention for review." *Id.* at 228.

158. *Id.* at 236–37. The study focused on a program at a nonprofit—the Canadian Innovation Centre ("CIC")—that serves independent inventors by rating the commercial potential of submitted inventions. *Id.* at 227–28 (describing rating system from "A—invention is worth commercialising by full-time entrepreneur" to "E—unacceptable, strongly advise project termination"). Inventors pursued development of almost half of the inventions that the CIC rated as either "D—doubtful, one or more factors strongly unfavourable, advise project termination" or "E—unacceptable, strongly advise project termination." *Id.* at 229 (reporting that 51 percent of those receiving D grades pursued development efforts, as did 47 percent of those receiving E grades). The pooled return on inventions with D or E ratings was negative; because the rating was applied before development, this risk could have been predicted ex ante. *Id.* at 236–37.

159. *Id.* at 236–37 (proposing risk seeking, unrealistic optimism, and skewness loving as potential explanations for the observed behavior).

IP proposition that creators are risk averse.[160] This interpretation depends on the validity of a revealed preference approach—in other words, taking the observed choices of individuals as a basis for making inferences about those individuals' underlying preferences.[161] But it is unclear from studies regarding the existing distributions of rewards that people are in fact making what they understand to be risky choices. Perhaps individuals who enter creative fields underestimate the likelihood that they will end up on the bottom end of the reward distribution, making the choice to be an inventor or an artist seem less risky than it actually is; from this perspective, risky behavior by people performing creative work is a function of misperception of risk, rather than a function of preference for risk.[162] Or perhaps they enter these fields despite the risks they present, rather than because of them; if this were true, then we might prefer incentive mechanisms that reduce the overall risk they face, rather than those that increase it. Additional empirical work is needed to rule out (or confirm) these alternative explanations.

If subsequent research demonstrates that this hypothesis—creative individuals prefer risk to certainty—is true, it would have significant implications for IP law. Most fundamentally, it would indicate that, all else equal, we should prefer riskier mechanisms for stimulating creative work rather than less risky ones. Because patents and copyrights are inherently risky, a dollar spent on IP rights would buy more creativity than a dollar spent on salaries for inventors and artists. The conventional wisdom would therefore be exactly backwards: while IP scholars typically view risk as a problem limiting the potential benefits of IP, confirmation of this hypothesis would transform risk into one of IP's key advantages over alternative mechanisms for stimulating creativity in technology and the arts.

This effect might be seen at three margins.[163] First, it may be that an

160. *Cf.* Scherer, *supra* note 33, at 15 ("If innovation requires investment and investors are risk averse, how can a highly skew distribution of rewards be conducive to innovation?").

161. *Preferences*, STAN. ENCYCLOPEDIA PHIL., http://plato.stanford.edu/archives/win2012/entries/preferences/ (last updated Sep. 6, 2011).

162. *See infra*, text accompanying notes 258–259 (distinguishing risk preferences from optimism bias and overconfidence).

163. Alternatively, we can think of the possible effect of IP on creators as trying to influence the answers to three questions: (1) should I create a marginal information good?; (2) how much marginal creativity (or value) should I incorporate into a given informational good?; and (3) what career path should the marginal employee follow—one which produces marginally more or marginally fewer informational goods? Note that if creators are making decisions before the salary is available, it might have an effect similar to a prize because the creator might view the salary as a potential financial award. Thus, imagine a college freshman deciding whether to major in a field

individual creator produces a greater quantity of work exceeding some threshold of creativity in response to IP rewards rather than salaries. Second, it may be that an individual creator imbues any given work with more creativity in response to IP rewards rather than salaries. Finally, it may be that creative individuals more often choose careers presenting opportunities for creative work when they are compensated with IP rights for pursuing such careers than when they are compensated with salaries.

It is not clear which of these margins we should focus on—all three of them might serve IP's normative aim of stimulating technology and the arts. Whichever margin we look at, though, this hypothesis suggests that increasing reliance on IP over alternative mechanisms would serve the constitutionally prescribed goal of the IP system.

That said, two caveats are in order. First, even if this hypothesis were true, it need not be true for all degrees of risk. Once the risk in a particular context exceeds some threshold, creators might prefer less risk rather than more. It is unlikely, to say the least, that creators would prefer a scenario in which failure is punished by death and success is rewarded with the granting of three wishes, over a scenario in which failure is punished by a $100 fine and success is rewarded with a $10 prize. For any plausible version of this hypothesis, then, we should expect the effect to hold only within some range.

Second, this hypothesis may be true only for particular periods in a creator's lifetime or career. Perhaps it applies when creators are young and looking to make a name for themselves, but not when they have a reputation to protect and a mortgage to pay. Or perhaps it applies when they are established and want to push their boundaries, but not when they are just getting started and do not have a financial or reputational safety net to fall back on. In any event, these possibilities constitute fruitful areas for empirical analysis.

2. Creative Individuals Have a Greater Tolerance for Risk than the General Population

The second hypothesis is that creative individuals have a greater tolerance for risk than does the general population. In Sternberg and Lubart's theory, creators "will often balance risks; high-risk projects are

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that promises a salary, upon graduation, of $100,000 per year (with appropriate raises). She might view her choice as equivalent to choosing a major that promises a prize, upon graduation, equivalent to the discounted present value of her lifetime earnings from the salary. Salaries may, from this perspective, simply shift risk to an earlier point in time relative to prizes, rather than eliminate risk entirely. But for purposes of the analysis, suppose that the salary is available immediately and thereby represents a certain present payment.

pursued simultaneously or in close succession with low-risk ones."[164] Sternberg and Lubart's theory therefore does not require that creative people *always* prefer risky, creative options—just that they do so more often than noncreative people do. So although Sternberg and Lubart identify a willingness to take risks as an "essential" characteristic of the creative personality,[165] this willingness may simply be relative to the "general aversion to risk [that] partially accounts for the infrequency of creative performance."[166] Similarly, Simonton's process theory proposes that more creative individuals have greater cognitive facility with risk; this raises the possibility that they will be more comfortable facing risk than others.[167] In other words, while most people have a strong tendency to prefer certain options rather than riskier ones, creative people might have only a more modest tendency to do so.[168]

For an example, return to the choice that Claire, the musician, faced: Should she sing a standard like "Hey Jude" or write a new song, "Venus Fly," and sing that instead? Now imagine that not only Claire, but also Joe, faced this choice. While Claire is very creative, Joe is more of a technically accomplished musician than a creative one.[169] Both Claire and Joe will take many factors into consideration when choosing whether to sing "Hey Jude" or "Venus Fly." For example, they may each derive some intrinsic satisfaction from the process of writing a new song—hearing the melody take shape over time—and from the sense of ownership that results from creating something new.[170] Suppose that taking account of all factors aside from risk, both Claire and Joe would prefer to sing "Venus Fly" rather than "Hey Jude."

Now consider the role that risk could play in each of their decisions. Joe intensely prefers certainty to risk. This preference is so strong that

164. Sternberg & Lubart, *supra* note 92, at 14.

165. Lubart & Sternberg, *supra* note 90, at 274.

166. *Id.* at 291; *see also* Amabile, *supra* note 85, at 368 (theorizing that creativity involves a willingness to take risks).

167. SIMONTON, *supra* note 104, at 57.

168. *See* Nicholson et al., *supra* note 147, at 170 (arguing that most people view risk as undesirable and simply tolerate it as part of the pursuit of other goals).

169. Of course, the execution of a familiar work may be imbued with varying degrees of creativity. For examples of creative covers of familiar songs, see JOE COCKER, *With a Little Help from My Friends*, *on* WITH A LITTLE HELP FROM MY FRIENDS (UMG Recordings 1969); JIMI HENDRIX, *The Star-Spangled Banner*, *on* LIVE AT WOODSTOCK (Sony Music Entertainment 1999); JANIS JOPLIN, *Me and Bobby McGee*, *on* PEARL (Sony BMG 1971); THE CLASH, *I Fought the Law*, *on* THE CLASH (Epic 1979). But stipulate for the hypothetical that in this instance, there is more creativity associated with writing a new song than covering an existing one.

170. *Cf.* Buccafusco & Sprigman, *supra* note 10, at 31 (documenting the tendency of creators to place a higher value on rights to works they have created than do those who merely own or offer to buy such rights).

the certainty associated with singing "Hey Jude" and the risk associated with singing "Venus Fly" is sufficient to lead Joe to sing "Hey Jude," even though he would, setting risk aside, prefer to sing "Venus Fly."

Claire also prefers certainty to risk, but she has only a slight preference for certainty, rather than an intense one—she can tolerate more risk than Joe can. Accordingly, even though the difference in the risk associated with each song makes this a more difficult choice for Claire, she still decides she would rather sing "Venus Fly" than "Hey Jude," even after taking risk into account. For uncreative people like Joe, risk is so undesirable that it leads them to pursue uncreative options rather than otherwise more appealing creative ones. For creative people like Claire, on the other hand, the undesirability of risk is not enough to lead them to abandon creative options.[171]

Existing empirical work provides some support for this hypothesis, although it is inconclusive.[172] One line of research has sought to correlate comparative risk preference to creativity. An early investigation by John Glover and Fred Sautter, for example, found that subjects categorized as high risk takers[173] scored higher on two measures of the Torrance Tests of Creative Thinking ("TTCT") than did those who were categorized as low risk takers.[174] But the low risk takers scored higher on a third

171. Here, we can think of Claire's and Joe's choices in the following terms. Suppose each has the right to participate in a lottery that has a 50 percent chance of winning $20. Claire and Joe are then each asked the minimum amount they would accept to sell the right to participate in the lottery. Selling the right to participate allows Claire and Joe to name the certain value that has a utility equal to the utility that they would derive from participating in the lottery. Because this second hypothesis proposes that creative people, like people more generally, prefer certainty to risk, the minimum acceptable price for both Claire and Joe ought to be less than $10—the expected value of participating in the lottery. We can furthermore view the difference between the sale price and $10 as a measure of an individual's tolerance for risk; the smaller the difference, the more an individual is willing to take on risk, even if she would prefer certainty. The second hypothesis thus proposes that Claire would sell her right to participate in the lottery in exchange for (say) $7, while Joe would be willing to do so for only $5.

172. *See, e.g.*, Lubart & Sternberg, *supra* note 90, at 298 (concluding that "the relationship between risk taking and creative performance needs to be studied more completely").

173. The sample comprised sixty-six educational psychology students. John A. Glover & Fred Sautter, *Relation of Four Components of Creativity to Risk-Taking Preferences*, 41 PSYCHOL. REP. 227, 228 (1977). Risk preference was measured with the Choice Dilemma Questionnaire, which asks subjects to choose the lowest quantitative odds they would accept in order to pursue a specified high risk option in a described scenario. *Id.* Because risk preference was measured relative to other subjects in the study, the results could not confirm the first hypothesis—that creative people prefer risk to certainty—although they are consistent with it. For other early work, see generally D.C. McClelland, *The Calculated Risk: An Aspect of Scientific Performance*, *in* THE 1955 UNIVERSITY OF UTAH RESEARCH CONFERENCE ON THE IDENTIFICATION OF CREATIVE SCIENTIFIC TALENT 96 (Univ. Utah Press 1956); John A. Glover, *Risky Shift & Creativity*, 5 SOC. BEHAV. & PERSONALITY 317 (1977).

174. The Torrance Tests of Creative Thinking ("TTCT") instrument is a common test of

measure of the TTCT, and there were no significant differences in performance on a fourth measure.[175]

For more recent work, consider Sternberg and Lubart's test of their investment theory.[176] Subjects who produced more creative drawings entered a riskier tournament and made riskier choices in domain-specific hypothetical scenarios than did those who produced less creative drawings.[177] But there were few correlations with self-reported items of risky behavior.[178] And there were no statistically significant results relating performance on a creative writing task to any measure of risk preference.[179] Efforts to correlate relative risk preference to creativity have thus produced only mixed results so far.[180]

Another line of research has tried to correlate creativity to more general personality characteristics,[181] some of which have, in turn, been related to comparative risk preferences. The seminal paper is George Feist's meta-analysis of eighty-three studies of the creative personality.[182] Feist explains that "a consistent and clear portrait of the creative personality in science and art has emerged: Creative people are more autonomous,

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creativity. Hennessey, *supra* note 120, at 343. High risk takers scored higher on the flexibility and originality measures of the TTCT, low risk takers scored higher on elaboration, and there was no significant difference in scores on fluency. Glover & Sautter, *supra* note 173, at 229.

175. *See id.* (concluding that "[a]pparently risk taking is a function of some aspects of creative ability but the number of subjects is as yet too small to draw conclusions").

176. Lubart & Sternberg, *supra* note 90, at 298. These tests are more precisely understood as measuring risk behavior; inferences about underlying preferences drawn from such behavior are therefore subject to caveats similar to those noted *supra*, text accompanying notes 160–162.

177. Lubart & Sternberg, supra note 90, at 295–96. Creative performance was measured using a variant of Amabile's consensual assessment technique that employed peer rather than expert judges. *Id.* at 280, 292. Follow-up analyses with "expert" judges produced what Sternberg and Lubart appear to have deemed more accurate assessments, *id.* at 295–96, but the post hoc character of these assessments makes it difficult to rely on them. The study incorporated three measures of risk preference: two tournament choices, a series of hypothetical scenarios, and a self-report questionnaire. *Id.* at 292–93.

178. *Id.* at 296.

179. *Id.*

180. For more recent work of this kind, see generally Christine A. Toh & Scarlett R. Miller, *The Role of Individual Risk Attitudes on the Selection of Creative Concepts in Engineering Design*, *in* PROC. ASME INTERNATIONAL DESIGN ENGINEERING TECHNICAL CONF. & COMPUTERS INFO. ENGINEERING CONF. 1 (Aug. 17–20, 2014) (concluding that risk preference was positively correlated with creative idea selection but not with creative idea generation).

181. The dominant framework adopted from the personality psychology literature is the Big 5 model, which identifies five factors into which various aspects of personality fit: Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. *See generally* Robert R. McCrae & Paul T. Costa, *Validation of the Five-Factor Model of Personality Across Instruments and Observers*, 52 J. PERSONALITY & SOC. PSYCHOL. 81 (1987) (presenting evidence supporting the validity of the Big 5 model).

182. Feist, *supra* note 78, at 290.

introverted, open to new experiences, norm-doubting, self-confident, self-accepting, driven, ambitious, dominant, hostile, and impulsive."[183] Of these, openness to experience has "the most empirical support in relation to creativity."[184] Openness to experience, in turn, has been linked to risk taking.[185] Other work has found that both creativity and risk taking are correlated with the personality psychology construct sensation seeking.[186]

If this hypothesis—that creative individuals have a less intense distaste for risk than does the general population—were confirmed, it would again carry important implications for the choice among mechanisms for stimulating creativity in technology and the arts. But the implications would be less straightforward than they were for the hypothesis that creative individuals prefer risk to certainty. Here, as the conventional wisdom suggests, creators would prefer to avoid IP risk. And IP risk would therefore have at least some negative impact on creative output.

Still, the conventional wisdom would be overlooking a subtle, but important point: differential tolerance of risk may increase the percentage of creative individuals in technology and the arts. This is because IP risk would serve as a stronger deterrent for uncreative people than for creative ones.

Imagine, for example, that the pool of people who might potentially pursue theatrical careers consists of one hundred creative individuals and one hundred uncreative ones. Without IP risk, assume that all of them

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183. *Id.* at 299. Feist's reference to science and the arts requires some elaboration. Artists are defined to include "students majoring in or studying art, or anyone earning an income in any of the following domains: writing, painting, photography, cinematography, dance, music, or poetry." *Id.* at 294. Scientists are defined to include "any sample from junior high school on through adulthood that showed special talent in science, majored in science, or that worked professionally in academic or commercial science." *Id.* Science is defined broadly to include not only "natural and biological sciences, but [also] the social sciences (i.e., anthropology, psychology, sociology), invention, engineering, and mathematics." *Id.*

184. *Id.* at 303. For more recent work in this vein, see generally Scott Barry Kaufman et al., *Openness to Experience and Intellect Differentially Predict Creative Achievement in the Arts and Sciences*, 82 J. PERSONALITY 248 (2015); Harald A. Meig et al., *How Emotional Stability and Openness to Experience Support Invention: A Study of German Independent Inventors*, 243 CREATIVITY RES. J. 200 (2012).

185. *See* McGhee et al., *supra* note 151, at 560 (2012) (concluding that openness to experience "accounted for the greatest variance when predicting risk-taking behavior" by adolescents in a laboratory decision-making task); Nicholson et al., *supra* note 147, at 166 (reporting positive correlations between openness to experience and reported frequency of risk behavior in recreation, health, career, finance, safety, and social contexts).

186. *See* MARVIN ZUCKERMAN, BEHAVIORAL EXPRESSIONS AND BIOSOCIAL BASES OF SENSATION SEEKING 369–72 (1994) (describing the relationship between sensation seeking and risk taking); Nicholson et al., *supra* note 147, 167 (2005) (reporting data confirming hypothesis that sensation seeking "would be associated significantly with risk taking").

would pursue careers in theater. The theater industry would then consist of 50 percent creative individuals and 50 percent uncreative ones.

With IP risk, though, some of these individuals would decide to pursue other careers. That effect will be stronger for the uncreative individuals than the creative ones. Out of the one hundred uncreative individuals, perhaps ninety decide to abandon their Broadway dreams and become lawyers instead, while only ten of the one hundred creative individuals do so. Now, creative people comprise 90 percent of the theater industry,[187] instead of the 50 percent they comprised when there was no IP risk.

The question whether IP risk is, on net, a good or bad thing would therefore turn on a difficult question about the relative magnitude of two effects. First, how much do we lose from the creative people who decide to abandon the field? Second, how much do we gain from increasing the relative representation of creative individuals in the field?

This second effect—and the tradeoff it represents—bears a bit more elaboration. Creativity is a social phenomenon,[188] and the mixing of professionals within a creative field might influence the quality of output in that field.[189] It therefore seems plausible that increasing the creativity of potential collaborators in a creative field could increase the overall creativity of work in that field. The intuition is that if all the actors Tim Burton directs were uncreative, the quality of his films would suffer. And so the question would be whether, as a result of IP risk, we lose more from the Tim Burtons that abandon directorial careers than we gain from Tim Burton having lots of Johnny Depps to work with (or, similarly, if we lose more from the Orville Wrights that abandon engineering careers than we gain from Orville Wright having lots of Wilbur Wrights to work with). This is a difficult empirical question, and one that IP scholars have yet to recognize, much less explore.

187. In this example, there are ten uncreative people left in theater, and ninety creative ones.

188. *See generally* Amabile, *supra* note 85 (highlighting the importance of social and environmental influences on creativity and developing a framework to consider how social factors might contribute to different stages of the creative process); Stefan Wuchty et al., *The Increasing Dominance of Teams in the Production of Knowledge*, 316 SCI. 103 (2007) (exploring shifts from an individual approach to discovery to a teamwork model in science, engineering, and arts & humanities).

189. *See generally* Brian Uzzi & Jarrett Spiro, *Collaboration and Creativity: The Small World Problem*, 111 AM. J. SOC'Y 447 (2005) (presenting evidence that the quality of Broadway output is a U-shaped function of small world network characteristics).

3. Riskier Environments Are More Conducive to Creativity than Less Risky Ones

The third hypothesis is that environments characterized by high degrees of risk are more conducive to creativity than those characterized by low degrees of risk. The first two hypotheses relate to risk preferences, so their implications for IP depend in part on the extent to which the hypothesized risk preferences influence risk behavior.[190] This hypothesis, however, relates to how people behave in the presence of risk without regard for how they feel about risk.

The hypothesis builds on creative place theories, which hold that the key to understanding creative performance lies in understanding the social environment in which creativity occurs.[191] In the leading creative place theory—Amabile's componential theory—the social environment influences creative performance through its effect on task motivation.[192] As noted above, task motivation is the desire an individual has to engage with a task in a particular instance, and it results from a combination of intrinsic and extrinsic motivation.[193] Intrinsic motivation "arises from the individual's positive reaction to qualities of the task itself."[194] In this framework, creativity is generally understood to be a positive function of intrinsic motivation.[195]

There is a long-standing debate, however, about the effects of extrinsic factors. For purposes of this Article, the most important aspect of this debate concerns the effect of rewards on intrinsic motivation and creativity.[196] Both perspectives agree that "rewards undermine intrinsic motivation and creativity when they lead people to feel controlled by the situation."[197] They also agree that rewards can "enhance intrinsic

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190. *Cf.* Sim B. Sitkin & Amy L. Pablo, *Reconceptualizing the Determinants of Risk Behavior*, 17 ACAD. MGMT. REV. 9 (1992) (proposing a model in which risk behavior is a function of, *inter alia*, risk preference, risk perception, and risk propensity).

191. *Supra* Part II.B.3.

192. *See* Amabile, *supra* note 85, at 366 (identifying task motivation as "the most important determinant of the difference between what a person *can* do and what he or she *will* do" (emphasis added)).

193. *Id.* at 365–66.

194. AMABILE, *supra* note 113, at 115.

195. Intrinsic motivation might facilitate creativity by focusing the individual on the problem or task itself, rather than making the problem or task secondary to the achievement of an external goal. *Id.* at 366. It also might facilitate creativity by emphasizing self-evaluation of the work rather than external evaluation. *Id.* at 371–72.

196. In addition to the debate about rewards described in the text, other extrinsic motivators or constraints that have attracted significant attention include "expected evaluation, surveillance, competition, and restricted choice." Hennessey & Amabile, *supra* note 115, at 581.

197. Amabile, *supra* note 85, at 370; Robert Eisenberger & Judy Cameron, *Detrimental Effects of Reward: Reality or Myth?*, 51 AM. PSYCHOL. 1153, 1162–63 (1996); Hennessey & Amabile,

motivation and creativity when they confirm competence, provide useful information in a supportive way, or enable people to do something that they were already intrinsically motivated to do."[198]

The disagreement focuses on how often rewards undermine or support intrinsic motivation and, by extension, creativity. The dominant view is that rewards almost always lead people to "feel controlled by the situation"; rewards would therefore ordinarily undermine creativity.[199] A dissenting view holds that the "negative effects of reward on task interest and creativity" occur only under conditions that "are limited and easily remedied"; rewards would therefore typically support creativity.[200]

On either view, any given reward might take one of three forms. The first is a "performance-independent reward," which is earned "for simply taking part in an activity," regardless of whether the activity is completed or successful.[201] The second is a "completion-dependent reward," which is earned "for completing a task."[202] These two kinds of rewards are typically understood to have negative effects on creativity because they are perceived as controlling the individual's behavior—the individual views herself as participating in the activity because of the offered reward, rather than because of her own desire to do so.[203]

Finally, there is a "quality-dependent reward," which is contingent on "performance relative to some normative information or standard."[204] This kind of reward, like the other two, can decrease intrinsic motivation by making individuals view their own behavior as being controlled by external factors. But only quality-dependent rewards have a potential upside: they could "increase one's feelings of competence because of informational feedback concerning one's performance relative to that of

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supra note 115, at 581.

198. Hennessey & Amabile, *supra* note 115, at 581. *See also* AMABILE, *supra* note 113, at 119 (describing social-environmental factors, such as those supporting autonomy, competence, and task involvement, that can influence creativity); Eisenberger & Cameron, *supra* note 197, at 1163–64 (concluding that there is "little evidence that reward reduced intrinsic task interest").

199. Hennessey & Amabile, *supra* note 115, at 581–82.

200. Eisenberger & Cameron, *supra* note 197, at 1154. For more on this debate, see generally Robert Eisenberger & Judith Cameron, *Reward, Intrinsic Interest, and Creativity: New Findings*, 53 AM. PSYCHOL. 676 (1998); Beth A. Hennessey & Teresa M. Amabile, *Reality, Intrinsic Motivation, and Creativity*, 53 AM. PSYCHOL. 674 (1998); Mark R. Lepper, *A Whole Much Less than the Sum of its Parts*, 53 AM. PSYCHOL. 675 (1998); Carol Sansone & Judith M. Harackiewicz, *"Reality" Is Complicated*, 53 AM. PSYCHOL. 673 (1998).

201. Eisenberger & Cameron, *supra* note 197, at 1155.

202. *Id.*

203. *Id.*

204. *Id.*

other individuals."[205] Quality-dependent rewards will therefore increase creativity when the positive effects of increases in perceived competence outweigh the negative effects of increases in perceived extrinsic control. The debate about the general effects of rewards on creativity can accordingly be understood as, in part, a debate about how difficult it is to design effective quality-dependent rewards and how powerful the potential increases in perceived competence might be.[206]

Even without resolving this debate, it seems clear that the effects of rewards on creativity are likely to be highly context dependent. In any given context, the effects will depend on whether individuals perceive the reward primarily as (1) a controlling influence, or (2) an informative, competence-confirming one. Empirical research on this hypothesis will therefore have to carefully distinguish among types of IP risks and the contexts in which creators confront them.

For an example of what it would mean for this hypothesis to be true, return again to Claire. Suppose she is offered $1,000 to write a song—we will stick with "Venus Fly."[207] Claire may find the process of songwriting intrinsically appealing. But in this particular context, she will discount her internal motivation for writing the song and overweight her external motivation for doing so. Because she now feels controlled by her circumstances, she will be less able to engage creative processes that depend on feelings of autonomy and freedom from external constraint.[208] As a result, the version of "Venus Fly" she writes is rote and uncreative.

Now suppose Claire is offered a $1,000 reward if she writes a song that makes Pitchfork's "Best New Music" list (or the Billboard Top Ten, or some other appropriate metric).[209] This reward, like the prior one, will lead Claire to feel controlled by her circumstances and thereby impede the creative process. But it will also have the beneficial effect of serving

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205. *Id.*

206. *Compare id.* at 1164 (concluding that "the decremental effects of reward [on creativity] occur under limited conditions that are easily avoided"), *with* Hennessey & Amabile, *supra* note 115, at 581–82 (arguing that research indicating ease of designing rewards that do not negatively impact in fact shows positive effects of instructions rather than rewards, and citing research that "also calls into question the purported ease of enhancing creativity through use of reward").

207. This would be a "completion-dependent" reward because it is "delivered for completing a task." Eisenberger & Cameron, *supra* note 197, at 1155.

208. *See* Ryan & Deci, *supra* note 120, at 68 (arguing that when an individual's sense of competence, autonomy, and relatedness are reduced, "diminished motivation and well-being" results).

209. This would be a "quality-dependent" reward because it "involves the quality of one's performance relative to some normative information or standard." *See* Eisenberger & Cameron, *supra* note 197, at 1155 (internal quotation marks omitted).

as a (potential) signal to Claire of her competence, which makes it easier for Claire to engage in creative processes that depend on feelings of mastery.[210] The theoretical arguments are indeterminate with respect to which effect will dominate—the negative effect of making the creator feel controlled by extrinsic constraints, or the positive effect of making the creator feel competent in light of extrinsic motivators. But it is at least plausible that this kind of reward will have a net positive effect on Claire's creative performance. If so, then the reward would lead Claire to write a more creative version of "Venus Fly" than she would without it.

To date, the empirical evidence on this hypothesis is ambiguous. Aneika Simmons and Run Ren, for example, posed a series of hypothetical problems to students and compared the creativity of solutions offered in both high-risk and low-risk contexts.[211] In the high-risk context, participants were told they would lose extra credit if their solutions were insufficiently creative.[212] In the low-risk context, participants were told they would receive extra credit regardless of the solutions they offered.[213] The solutions offered in the high-risk context were deemed significantly more creative than those in the low-risk context.[214] One challenge in interpreting this result is that the low-risk context appeared to not only present less (or no) *risk*, it also appeared to present less (or no) *incentive*. Participants in the low-risk condition had no (extrinsic) motivation to do well, so perhaps that, rather than the absence of risk *per se*, resulted in their less creative performance.

Other work indicates that risk in the environment might inhibit creativity. For example, Amabile asked female elementary school students to produce collages; one group was promised that the three "best" collages would win a prize, and the other group was promised that all participants would enter a raffle for one of three prizes.[215] The first group can be viewed as a riskier context for creative work because creative performance itself influenced the odds of success, while in the second group the odds of winning a prize were independent of the

210. Eisenberger & Cameron, *supra* note 197, at 1155.

211. Aneika L. Simmons & Run Ren, *The Influence of Goal Orientation and Risk on Creativity*, 21 CREATIVITY RES. J. 400, 401 (2009).

212. *Id.* at 405.

213. *Id.*

214. *Id.* at 406.

215. AMABILE, *supra* note 113, at 239; *see also id.* at 210–11 (reporting an experiment indicating that work environments where employment is stable appear to be more conducive to creativity).

work.[216] In this experiment, students in the less risky group produced more creative drawings.[217] Subsequent experiments have, however, called these results into question, indicating that the effect may be reversed for males (i.e., males produced more creative work in the riskier condition), and that between-group competition—which carries with it the risk of losing the competition—is associated with high levels of creativity.[218]

While the empirical research remains unresolved, it is worth considering in the meantime the implications of this hypothesis for the choice of mechanisms available for stimulating creativity. Salaries appear to do poorly, insofar as they resemble completion-dependent rewards. Individuals typically receive salaries so long as they complete their work—this is true at least for ordinary private sector salaries in which employment is at-will—so they might undermine the intrinsic motivation that is essential to creativity.

The case might be better for salaries of tenured research faculty, or employees in other jobs that they have no fear of losing. While such salaries might be viewed as performance-independent rewards, which have negative effects on creativity, it is also possible that in these kinds of cases, the connection between the salary and the creative work is simply not salient. The negative effects on creativity that we would otherwise expect from performance-independent rewards might therefore be absent.

IP rights, meanwhile, also stand on unstable ground.[219] To the extent that the value of a patent or copyright reflects the value of the underlying invention or expressive work, IP rights would plausibly be characterized

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216. *Id.* at 239. This experimental design also may have confounded the influence of skill-based versus chance-based uncertainty. *See generally* Chip Heath & Amos Tversky, *Preference and Belief: Ambiguity and Competence in Choice under Uncertainty*, 4 J. RISK & UNCERTAINTY 5 (1991) (reporting results of experiments indicating differences in the ways individuals respond to uncertainty when the outcomes depend on skill as compared to when the outcomes depend on chance).

217. *Id.*

218. *Id.* at 240.

219. I focus in the text on IP risk of the kind associated with the financial value of the IP right. But it is worth pausing here to note some other implications of this hypothesis for IP, although to do so, I must relax the assumption that all kinds of IP risk have the same effects. In some instances—such as when the United States Patent and Trademark Office determines whether a patent application meets some threshold of nonobviousness—risk can be informative because it communicates to the creator something about the quality of the outcome of the creative process. In other instances—such as when a musician risks an infringement suit for including a common melodic phrase in a song—risk can be controlling because it forces the creator to consider changing the way she approaches the task of writing the song for reasons unrelated to the task of writing the song itself.

as quality-dependent rewards conveying useful information about creators' competence. But it seems more likely that the signal here is too noisy—the value of an IP right will turn on many factors, only one of which is the value of the underlying invention or expressive work (let alone the creativity associated with the underlying invention or expressive work).[220]

Furthermore, another mechanism for eliciting creativity—prizes—might perform substantially better than either IP rights or salaries. Prizes hold the potential to provide explicit information to creators about desired characteristics and thereby enhance creativity. Of course, much of the prize devil is in the details.[221] Among other things, prizes for inventions might be awarded earlier or later in the invention and commercialization timeline; they can be awarded for making general progress in broad technological areas or for meeting specific benchmarks to achieve particular goals; and they might be awarded in a winner-take-all or a shared fashion.[222] Still, holding all else equal, if empirical research indicated that the ability to convey information to creators through quality-dependent rewards typically enhanced creativity, it should add a thumb to the scale in favor of prizes over IP rights, and (maybe) to IP rights over salaries.

IV. MAPPING HYPOTHESES TO REALITY

In Part III, I used a stylized world to emphasize the key conceptual implications that flow from applying the creativity literature's insights to the analysis of IP risk. This Part probes the assumptions underlying that stylized world. This Part also extends the analysis from the central question of IP compared to alternative mechanisms for stimulating creativity to less central, but still important, questions regarding the particular doctrines that implement IP.

220. *See* Fishman, *supra* note 10, at 1374 ("Markets for cultural goods are susceptible to herd behavior and information cascades in which successes and failures are driven more by social influence than by the goods' innate quality.").

221. *See* Abramowicz, *supra* note 132, at 170–211 (2003) (describing implementation difficulties for prize systems). Or consider how voting rules influence the outcome of prizes for artistic works awarded by The Recording Academy and by the Academy of Motion Picture Arts and Sciences. *See generally* Kelsey McKinney, *The Grammy Voting Process Is Completely Ridiculous*, VOX (Feb. 15, 2016), http://www.vox.com/2015/2/4/7976729/grammy-voting-process; Todd VanDerWerff, *The Oscars' Messed-Up Voting Process, Explained*, VOX (Feb. 22, 2015), http://www.vox.com/2015/2/22/8084239/oscars-2015-ballot.

222. Abramowicz, *supra* note 132, at 211–35.

A. Exploring Assumptions

1. Variations Across and Within Creative Fields

The analysis thus far has referred generally to creators, rather than separately to artists and inventors. It is possible, however, that there are systematic differences in the way IP risk affects artists and the way it affects inventors. Although there appears to be a creative personality that is common across domains of creative work, some personality differences between artists and scientists have been identified.[223] Testing of the core hypotheses must therefore also test whether the personality differences between artists and inventors (and between filmmakers and photographers, or programmers and biomedical engineers) extend to their risk preferences.

Moreover, even if it turns out that IP risk has a positive effect on creativity for artists and inventors generally, within any given creative field there will be individuals for whom that effect is attenuated or even reversed. We should not be surprised that some programmers prefer to launch their own start-ups, others prefer to work at Google or Facebook, and still others at Microsoft or IBM. Those choices are plausibly driven in part by differences in risk preferences. Whatever the overall effect of IP risk on creativity, we should anticipate that it will vary for particular individuals and in particular contexts.

Nevertheless, to the extent that creativity theories support the view that IP risk has a positive impact on creativity, they do so in a domain-general way. The theorized relationships between risk and creativity do not depend on whether the creativity is being expressed in literature or mechanical engineering. Thus, for example, Amabile draws a distinction between domain-relevant skills—the knowledge and talents particular to the field in which the work will occur—and creativity-relevant skills—a set of skills that influence across domains the extent to which the creator's work will be creative.[224] A "willingness to take risks" is a personality trait contributing to these creativity-relevant skills; in other words, Amabile proposes that personality traits related to a willingness to take risks have a positive effect on creativity across domains of creative endeavor.[225] The initial hypothesis therefore ought to be that the effects of risk on creativity are consistent across domains; although other factors may influence the magnitude of the observed effects, the directions

223. *See* Feist, *supra* note 78, at 299–300 ("[A] consistent and clear portrait of the creative personality in science and art has emerged . . . [but] creative people in art and science do not completely share the same unique personality profiles.").

224. AMABILE, *supra* note 113, at 85–90.

225. *Id.* at 90.

should be the same.

2. Domain-Specificity of Creativity-Risk Relationship

I have so far assumed that creators' responses to risk do not depend on the type of risk. But individuals face many different kinds of risk, including financial, safety, social, or ethical risks.[226] Even if risk has a positive impact on creativity, it may be that the effect is limited to risks of a particular type. Perhaps artistic risk—the unpredictability associated with whether an artwork will succeed on aesthetic grounds—has a positive impact on the creativity of an artist's work. Meanwhile, legal risk—the unpredictability associated with whether the artist will lose an infringement suit—might have a negative impact. And maybe financial risk—the unpredictability associated with whether the artist will recover her investment of time and resources in creating the work—has no impact. It is possible, then, that creators have positive responses to some risks, but negative responses to IP risk.

Research regarding the impact of risk on creativity does not adequately investigate the possibility of domain specificity.[227] Meanwhile, research on the domain specificity of the general population's risk preferences supports both possibilities: some people exhibit risk behavior that is consistent across domains, and other people exhibit domain-specific risk behavior.[228]

Importantly, even if creators have domain-specific responses to risk, they may still have non-uniform responses to IP risk. This is because IP risk itself imposes risks in different domains. It imposes financial risk to the extent that the value of the IP right cannot be known in advance.[229] But IP also imposes ethical risk to the extent that people view compliance with the law as an ethical directive, and they cannot predict whether a given act complies with IP law's requirements.[230] It imposes social risk to the extent that peers in a creative field may ostracize those who use IP

226. Elke U. Weber et al., *A Domain-Specific Risk-Attitude Scale: Measuring Risk Perceptions and Risk Behaviors*, 15 J. BEHAV. DECISION MAKING 263, 267 (2002).

227. *See, e.g.*, Simmons & Ren, *supra* note 211, at 404 (measuring creativity of problem solving in a scenario presenting risk regarding extra class credits). Lubart and Sternberg included measures of risks from different domains in their empirical research, but the results were inconclusive. *See generally* Lubart & Sternberg, *supra* note 90 (including measures that distinguish between task-specific and general risks, but not distinguishing among different kinds of general risks like financial and ethical ones).

228. Nicholson et al., *supra* note 147, at 159; Weber et al., *supra* note 226, at 263.

229. It is this kind of IP risk that was the focus of Part III.

230. *Cf.* Christopher Buccafusco & David Fagundes, *The Moral Psychology of Copyright Infringement*, 100 MINN. L. REV. 2437, 2459 (2016) (applying the moral foundations theory to explain the motivations of copyright plaintiffs).

law in socially unacceptable ways by, for example, making aggressive assertions of infringement that do not comport with accepted norms in that field.

Moreover, there is a good reason to hesitate before concluding that creators' responses to risk are domain specific: creators plausibly have domain-general responses to risk because creativity in practice requires creators to run risks across many domains.[231] Suppose, for example, that an individual decides to create a film version of *Heart of Darkness*, set during the Vietnam War rather than colonial Africa.[232] Most plainly, the individual will run some creative risks in doing so: the resulting film may be good or bad from an artistic perspective. He will also, however, run social risks: he may be celebrated or ridiculed for the work, whether or not it is an artistic success. Financial risks loom large too: the film will cost millions of dollars, but he does not know whether he will see a return on that investment. Even health and safety risks can arise as a result of the film: he may contract illnesses while filming in remote locations, or injure himself performing stunts.

Subsequent research must accordingly explore two possibilities. First, it must determine the extent to which the risk-creativity relationship is domain general or domain specific. Second, if the risk-creativity relationship is domain specific, empirical research must determine the extent to which IP imposes meaningful risks in that domain.

3. Risk Intermediaries

Thus far, I have assumed that a single creator acts alone to produce a creative work. This assumption is common, though not universal, in the IP literature.[233] By taking this assumption as true, the analysis isolated the direct impact of IP risk on creators.

But creators typically do not act alone to produce creative work. Instead, creators often work within, or alongside, larger organizations devoted to financing and distributing the creative product. Musicians sign deals with record labels, authors with book publishers, and directors

231. *See* Lubart & Sternberg, *supra* note 90, at 291 (arguing that creativity involves the possibility of gains, like external rewards, and losses, like criticism or wasted time).

232. HEARTS OF DARKNESS: A FILMMAKER'S APOCALYPSE (American Zoetrope 1991).

233. *See* LANDES & POSNER, *supra* note 27, at 38 ("We shall generally ignore differences in costs or incentives between authors and publishers, instead using 'author' or 'creator' to mean both."); Jonathan Barnett, *Copyright Without Creators*, 9 REV. L. & ECON. 389, 394 (2014) (describing the typical model of "the author-based incentive case for [and against] copyright" as a "stylized environment" in which there is a "single act of authorial creation, which then generates a creative work immediately ready for consumption by the end-user").

with film studios.[234] Most engineers and other inventors work as employees of corporate entities that finance their inventive activities.[235] Although there are exceptions, these arrangements are pervasive.

There are three basic economic reasons proposed for the pervasiveness of these arrangements.[236] First, the creative work itself might be expensive—think of big-budget Hollywood blockbusters or pharmaceutical drug development—and firms may have cheaper access to the capital required to finance it.[237] Second, even if the creative work itself is cheap to produce, there are capital-intensive tasks associated with bringing creative work to the market, again leading creators to rely on intermediaries for less expensive capital.[238] Third, these arrangements allow creators to shift project-specific risk (which is typically high in the context of creative work) to entities positioned to spread it across multiple projects.[239]

The ubiquity of these arrangements challenges the plausibility of the first hypothesis articulated in Part III.[240] After all, if creators prefer risk to certainty and firms are either risk neutral or risk averse, then all else equal, we should observe arrangements that transfer risk from firms to creators, rather than the other way around. So if the first hypothesis is true, other factors must account for the tendency of creators to shift risk

234. Barnett, *supra* note 233, at 405.

235. *See generally* Robert P. Merges, *The Law and Economics of Employee Inventions*, 13 HARV. J.L. & TECH. 1 (1999) (defending default rules and contractual enforcement presumptions by which firms ordinarily obtain ownership of inventions their employees invent).

236. These functions are so crucial and widespread that some have argued that IP law ought to be understood as providing incentives for intermediaries to perform these tasks, rather than providing incentives for creators to create the works in the first instance. Barnett, *supra* note 233, at 404–14 (arguing that the primary effect of copyright law should be understood to be the provision of incentives to intermediaries); Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265, 267–71 (1977) (proposing that patent rights be awarded as prospects that provide their holders incentives to engage in the commercialization and development of inventions); *but see* Wendy J. Gordon, *The Core of Copyright: Authors, Not Publishers*, 52 HOUS. L. REV. 613, 668–71 (2014) (questioning the arguments for altering copyright "to give intermediaries strengths not given to other industries"); Lemley, *supra* note 26, at 129–31 (evaluating the effects of incentivizing creators).

237. Barnett, *supra* note 233, at 394–98, 401–02.

238. *Id.* at 401–02. Intermediaries will have access to internal capital from their portfolios of earlier creative works, and that internal sources of capital will be cheaper than external sources that suffer from valuation problems associated with the unpredictability of creative work. *Id.*

239. *Id.* at 398–402; Guy A. Rub, *Stronger than Kryptonite? Inalienable Profit-Sharing Schemes in Copyright Law*, 27 HARV. J.L. & TECH. 49, 54 (2013).

240. They might also be thought to challenge the relevance of these hypotheses. But as explained previously, the effect of IP risk directly on creators matters because the arrangements between creators and intermediaries are not exogenous to the system's legal regimes, nor are they necessarily invariant over time. *See supra* text accompanying notes 145–163.

to intermediaries.

On the other hand, the arrangements are consistent with the second hypothesis. Even though there may be socially preferred sorting implications from IP risk, the second hypothesis proposes that creators, like most people, prefer certainty to risk. This could explain their observed tendency to shift risk to intermediaries. The arrangements are also consistent with the third hypothesis, which proposes that creators may not prefer risk but nonetheless produce more creative work in its presence.[241] If so, then the risk-pooling function of intermediaries is privately preferred but socially costly. Creators and intermediaries can enter into mutually beneficial arrangements that shift risk from the creator to the intermediary, even though such arrangements result in less creativity. As a result, intermediaries may interfere with the positive effect of risk on creativity.

We might more generally think that creators and intermediaries already optimize the influence of these arrangements on creativity. Assuming intermediaries are rational, perfectly informed, and profit-maximizing, it would seem that, to the extent that optimizing creativity would maximize profits, intermediaries would design contracts with creators that optimize creativity. But creative work is likely to generate positive externalities—inventions and expressive works are both associated with large spillovers.[242] If so, then intermediary-creator arrangements would not optimize creativity because intermediaries would be unable to appropriate anything close to the full social value associated with creativity.[243] Thus, even if creators would prefer to be exposed to more risk, intermediaries would refuse to allow them such exposure. Put slightly differently, creators who have the greatest preference for risk (and correspondingly greatest potential for creative work) might be undesirable partners for intermediaries precisely because their comparative advantage is in work the value of which the

241. *Supra* Part III.

242. *See* Brett M. Frischmann, *Evaluating the Demsetzian Trend in Copyright Law*, 3 REV. L. & ECON. 649, 659–61 (2007) (describing ubiquity of spillovers from expressive works); Brett M. Frischmann & Mark A. Lemley, *Spillovers*, 107 COLUM. L. REV. 257, 258–61 (2007) (describing ubiquity of spillovers from innovation). While this point is not restricted to the influence of risk on creativity (it applies more generally to intermediaries' incentives to invest in creative work), it would plausibly impact the nature of intermediary-creator relationships in ways that are central to this Article's analysis.

243. I do not here express an opinion on the question regarding the magnitude of positive externalities associated with creative work; for an introduction to the issue, see Frischmann & Lemley, *supra* note 242, at 264–68 (describing the conventional wisdom regarding the detrimental effects of innovation spillovers on incentives to invest in innovation); *id.* at 268–84 (arguing that the presence of spillovers promotes innovation); *see also* Frischmann, *supra* note 242 (making similar arguments in the context of copyright law).

intermediary will be less capable of internalizing.

Finally, as explored in greater detail below, creators' decisions likely deviate from rational choice models. Framing effects, loss aversion, and other influences on behavior limit the viability of a revealed preference approach to understanding how IP risk influences creators.

In sum, we should hesitate before reading too much into existing private arrangements between creators and intermediaries. Testing of the hypotheses developed in this Article will inform the question of how we ought to respond to the prevalence of intermediaries in creative production.

4. Quantitative Risk and Uncertainty

The analysis so far has used risk as an umbrella concept encompassing both quantitative risk and uncertainty. Doing so helped emphasize implications that flow from the role that indeterminate outcomes—whether in the form of quantitative risk or uncertainty—play in creativity. But empirical investigations of the effects of risk on creativity will have to attend to differences between quantitative risk and uncertainty because the tools used to model choice under quantitative risk only apply to choice under uncertainty if certain conditions—unlikely to be met here—are satisfied.[244]

The standard approach to modeling choice under quantitative risk is the expected utility framework.[245] In that framework, an individual evaluating a quantitatively risky option determines the utility she would receive from that option by adding the utility she would receive from each possible outcome, discounted by the probability distribution describing the likelihood of it occurring.[246] The individual then chooses among risky options by picking whichever one maximizes expected utility. So long as the probability distributions associated with outcomes conform to some basic axioms, the expected utility framework can be used to predict choices among risky options. And those axioms are readily satisfied in cases presenting quantitative risk.

But the scenarios creators face are unlikely to present quantitative risk.

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244. This empirical work will also have to attend to the mathematical operationalization of risk. Although it is common to operationalize risk as variance, that is just one way to describe a distribution of possible outcomes, and it may be that the models should account for other descriptions of the distribution, like skewness or kurtosis. *See generally* James Ming Chen, *Momentary Lapses of Reason: The Psychophysics of Law and Behavior*, 2016 MICH. ST. L. REV. 607 (proposing a four-moment capital-asset-pricing model to account for affective inputs to decision making under risk).

245. Machina, *supra* note 36, at 130.

246. Elke U. Weber, *Risk Attitude and Preference*, 1 COGNITIVE SCI. 79, 79 (2010).

In the real world, quantitative risk can rarely be found outside a casino.[247] Creators, however, are not playing roulette. Instead, they confront uncertainty because the likelihoods associated with the possible outcomes they face are not "exogenously specified or scientifically calculable."[248]

That creators face uncertainty does not necessarily require that we abandon the expected-utility framework. Creators might assign subjective probabilities to possible outcomes. People do a version of this when they say, for example, that the Golden State Warriors have a 90 percent chance of winning the title this year. So long as individuals estimate subjective probabilities for uncertain outcomes, and those probabilities conform to certain axioms, the expected utility framework can be applied to choice under uncertainty just as it is applied to choice under quantitative risk.[249]

As Daniel Ellsberg famously argued, however, those axioms are unlikely to be satisfied. People making choices under uncertainty appear to violate both the complete ordering requirement and the Sure Thing Principle—two of the axioms that subjective probabilities must satisfy for the expected utility framework to apply.[250] As a result, standard expected utility approaches will not be well suited to modeling the decisions of creators under IP risk, and one of a number of alternative approaches should be adopted instead.[251] Choosing among those

247. Players know before the wheel spins that there is a 46.37 percent chance that a bet on black will pay off. At least, if you are playing on an American roulette table (i.e., with double zeros). J. Andrew Archer, *The Odds Meet the Great Martingale*, 69 MATHEMATICS TCHR. 234, 235 (1976).

248. Machina & Rothschild, *supra* note 43, at 190; *see also* Daniel Ellsberg, *Risk, Ambiguity, and the Savage Axioms*, 75 Q.J. ECON. 643, 661, 666 (1961) (identifying "the results of Research and Development" and "the outcome of a proposed innovation" as situations posing uncertainty rather than quantitative risk) (emphasis omitted)); Heath & Tversky, *supra* note 216, at 6 (explaining that Ellsberg's research presents "a serious problem for expected utility theory . . . because, with the notable exception of games of chance, most decisions in the real world depend on uncertain events whose probabilities cannot be precisely assessed").

249. For the formal argument, see generally Leonard J. Savage, THE FOUNDATIONS OF STATISTICS (1954). For a summary, see generally Machina, *supra* note 36.

250. *See* Ellsberg, *supra* note 248, at 647–56. The complete ordering requirement demands that a person (1) prefer uncertain option A to uncertain option B; (2) prefer B to A; or (3) be indifferent between the two. *Id.* at 648. The Sure Thing Principle demands that a person who prefers A to B also prefers $A + C$ to $B + C$. Ellsberg showed that individuals' decisions tend to violate these axioms when asked to compare choices involving drawing colored balls from urns with known and unknown distributions. *Id.*; David Schmeidler, *Subjective Probability and Expected Utility Without Additivity*, 57 ECONOMETRICA 571, 572, 585 (1989).

251. *See, e.g.*, Binmore et al., *supra* note 46, at 233 (concluding that the principle of insufficient reason better predicted choices in an experiment involving choices between quantitatively risky and uncertain options than did alternative models); Farber, *supra* note 43, at 927–35 (comparing tools to model uncertainty).

approaches requires answering normative and empirical questions that are beyond the scope of this Article, but that will ultimately have to be resolved.

5. Framing, Affect, and Other Contextual Factors

I have so far set aside context-specific variables so as to derive some hypotheses concerning the general risk-creativity relationship. But since Daniel Kahneman and Amos Tversky's introduction of prospect theory, a wealth of empirical evidence has shown that many context-specific variables influence decision making under risk.[252] Here, I identify four variables that are likely to play an important role in empirical tests of the risk-creativity relationship.

First, individuals respond differently to prospective gains than they do to prospective losses.[253] People are loss averse—they dislike prospective losses more intensely than they enjoy prospective gains of equivalent value.[254] And while they are usually risk averse with respect to potential gains, they are also ordinarily risk seeking with respect to potential losses.[255] This means that creators' responses to IP risk will depend on the framing of any given risky option from a reference point that determines whether it is viewed as presenting possible gains or possible losses.

One plausible framing is that IP rights represent potential gains for an initial creator (and soon-to-be rights-holder) who hopes to earn royalties or supracompetitive profits. Another is that IP rights represent potential losses from the perspective of a user (or subsequent creator) who worries about possible infringement liability.[256] If these framings accurately reflect how creators and users view their decisions, then IP rights may lead to relatively risk-averse behavior by creators and relatively risk-seeking behavior by users (including subsequent creators who consciously draw on the protected works of others).

Importantly, however, this framing is not inevitable.[257] Thus, a user

252. *See* Kahneman & Tversky, *supra* note 49, at 264 (proposing prospect theory as a model of choice under risk to account for observed deviations from classic expected utility theory, including overweighting certain outcomes and differential treatment of prospective gains as compared to prospective losses).

253. *Id.*

254. *Id.*

255. *Id.* That is, they prefer an option that carries an expected loss of x to the certainty of losing something less than x.

256. *See* Horowitz, *supra* note 63, at 331 (arguing that people who want to use copyrights owned by others will view the copyright as posing potential losses).

257. *Cf. id.* at 354 n.116 (recognizing that framing is malleable, but nonetheless adopting the standard framing of "copyright holders seeking gains" and "users as facing losses," and expressing intuition that it is likely correct).

may view the IP right of another as imposing potential losses to the extent that she takes the applicable reference point to be a scenario in which she has used the material covered by the IP right and all that is left is to determine whether she infringed and must pay damages. Alternatively, she may include the IP right of another as part of her estimate of potential gains if she frames her decision as whether to use the material in the first instance. In this alternative framing, her estimate of the utility she anticipates from the use would include both the benefits she expects to receive—making her own creation more valuable or intrinsically satisfying—and the costs she expects to incur—having to pay damages if she is held liable for infringement. The point is not to say that one or another of these frames is necessarily correct; instead, it is to highlight that framing is contingent, and the chosen framing may influence whether IP rights are viewed as imposing potential gains or potential losses, even in logically equivalent scenarios.

Second, optimism bias and overconfidence may also influence the risk-creativity relationship. Optimism bias refers to a decision maker's overestimation of the probabilities associated with positive outcomes, and underestimation of the probabilities associated with negative outcomes.[258] If creators think that positive results are more likely to occur than they actually are, their behavior may be driven more by a mistaken evaluation of the risks involved, rather than by an actual preference for risk. Overconfidence, meanwhile, refers to a decision maker's exaggerated view of her own abilities.[259] If a creator correctly perceives that the odds of success are low, but wrongly thinks that her own abilities will enable her to overcome those odds, then apparently risk-seeking behavior will be driven not by her preference for risk, but by her misevaluation of her own ability. And these are not mutually exclusive possibilities. To the contrary, it is most likely the case that these effects interact with each other. As a result, empirical work will have to carefully distinguish the contributions that each of these phenomena—risk preferences, optimism bias, and overconfidence—make to observed risk behavior.

Third, individuals making decisions under uncertainty may prefer

258. Hemel & Ouellette, *supra* note 3, at 340; Alain Samson, *Selected Behavioral Science Concepts*, *in* THE BEHAVIORAL ECONOMICS GUIDE 28, 37 (Alain Samson ed., 2015).

259. Russell B. Korobkin & Thomas S. Ulen, *Law and Behavioral Science: Removing the Rationality Assumption from Law and Economics*, 88 CALIF. L. REV. 1051, 1091–95 (2000); *see also* Don A. Moore & Paul J. Healy, *The Trouble with Overconfidence*, 115 PSYCHOL. REV. 502, 502–03 (2008) (distinguishing among three types of overconfidence: (1) overestimation of one's own abilities or chances of success; (2) mistaken belief in one's placement on a distribution relative to peers; and (3) excessive confidence in "the accuracy of one's beliefs").

choices where the uncertainty is connected to skill rather than to randomness.[260] Thus, IP risk that manifests itself as related to the ability of the creator—like the risk associated with the value of the IP right—may have a positive relationship to creativity, while IP risk that manifests itself as essentially random—like the risk associated with a jury's determination of whether a musical work is substantially similar to another—may have a negative relationship to creativity.

Finally, affect may influence decision-making.[261] Although standard approaches include anticipated emotions in the utility function, they typically omit the role of anticipatory emotions in the decision-making process.[262] That is, standard approaches recognize that the emotions an individual *expects to feel if an outcome occurs* (or does not occur) will influence her estimate of the utility she will derive from that outcome. But they typically ignore the role played by emotions that an individual *feels while making a decision*, and those emotions may influence decisions independent of cognitively-relevant factors like the probability of an outcome and its expected utility.[263] For example, the anxiety induced by contemplating uncertainty may partly explain risk-averse decision making.[264] As a result, tests of these hypotheses may need to account for the role that affect plays in different kinds of IP-relevant decisions—maybe creators are happy while they are in the midst of creating, but anxious when making career decisions that force them to consider the risk profiles of possible incomes—and these different emotional valences result in distinct effects of IP risk on creativity.

B. Applications to IP Doctrine

There are potentially widespread implications for IP if subsequent tests support the hypotheses articulated in this Article. Although it would be premature to provide a complete assessment of these implications without empirical results to guide the analysis, the brief sketch below serves to

260. *See generally* Heath & Tversky, *supra* note 216 (presenting results of experiments indicating that people prefer betting on events where their skill or knowledge allows them to take credit for success and insulate against blame for failure, as opposed to events where lack of skill or ignorance mean that success will be attributed to luck and failure to incompetence).

261. *See generally* Loewenstein et al., *supra* note 47 (arguing that decision making under risk is influenced by "anticipatory emotions"—that is, emotions like dread or anxiety that are felt when confronting risk).

262. *Id.* at 267–68.

263. *Id.* at 271.

264. *Id.* at 272–74. For another illustration, consider that feeling hungry while shopping induces people to spend more at a supermarket, even though they will not consume the food until much later. *See* RICHARD THALER, MISBEHAVING: THE MAKING OF BEHAVIORAL ECONOMICS 6–7 (2015).

motivate research in this area by highlighting its potential importance for how we understand the effects of IP doctrines.

1. Implications for Patent Law: The Example of Definiteness

For an example of how risky IP doctrines might affect creativity, consider patent law's rules regarding the clarity required of a claim.[265] A patent ends with a set of claims purporting to define the boundaries of a patentee's right to exclude.[266] But those claims are notoriously difficult to interpret, resulting in significant risk regarding the scope of a patentee's rights.[267]

The Supreme Court has recently weighed in on one of the core doctrines dealing with claim clarity: the definiteness requirement of 35 U.S.C. § 112. The statute requires that a patent "conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the [applicant] . . . regards as the invention."[268] The Federal Circuit had long held that statutory language to demand only that the claims not be "insolubly ambiguous"; so long as it was possible to come up with some interpretation of the claims, the definiteness requirement was met, even if it was difficult to determine which among multiple plausible interpretations to adopt.[269] In *Nautilus v. Biosig*, the Supreme Court replaced that permissive standard with the more stringent requirement that claims "inform those skilled in the art about the scope of the invention with reasonable certainty."[270] The Court did so in part because it worried that the Federal Circuit's standard resulted in vague patent claims, creating "a zone of uncertainty" that deterred innovative activity.[271] On the standard view regarding IP risk, *Nautilus*' more

265. For the most recent Supreme Court articulation of the definiteness standard, see *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014) (concluding that a patent claim is indefinite when it "fail[s] to inform, with reasonable certainty, those skilled in the art about the scope of the invention").

266. 35 U.S.C. § 112 (providing that a patent "specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention").

267. *See* BESSEN & MEURER, *supra* note 25, at 8–10 (criticizing patent law for failing to provide adequate notice of patent scope); Dan L. Burk & Mark A. Lemley, *Fence Posts or Sign Posts? Rethinking Patent Claim Construction*, 157 U. PA. L. REV. 1743, 1745 (2009) (criticizing modern peripheral claiming approach as "inherently indeterminate"); Greg Reilly, *Completing the Picture of Uncertain Patent Scope*, 91 WASH. U. L. REV. 1353, 1353 (2014) (describing contributions of indefiniteness and claim construction doctrines to uncertainty regarding patent rights).

268. 35 U.S.C. § 112.

269. Datamize, LLC v. Plumtree Software, Inc., 417 F.3d 1342, 1347 (Fed. Cir. 2005).

270. *Nautilus*, 134 S. Ct. at 2129; Dow Chem. Co. v. Nova Chem. Corp., 803 F.3d 620, 630–31 (Fed. Cir. 2015) (recognizing that *Nautilus* adopted a stricter indefiniteness standard).

271. *Nautilus*, 134 S. Ct. at 2129.

stringent definiteness requirement should have a salutary effect on inventors' incentives.[272]

But the analysis presented here suggests that we need to consider other possibilities. If the first hypothesis—that creators prefer risk to certainty—is confirmed, then *Nautilus* could undermine inventive activity by: (1) reducing the amount of creativity inventors incorporate into a given work; (2) reducing the number of creative works inventors produce; or (3) making inventive careers less attractive to inventors. If the second hypothesis—that creators tolerate risk more than the general population—is confirmed, then *Nautilus* could have ambiguous effects on inventive activity. Inventors may well be encouraged by the increased certainty with which they can determine the scope of patent claims (which allows them to better predict whether a proposed invention infringes on the patent of another). This beneficial effect would have to be compared to the negative effect of encouraging less creative individuals to enter inventive fields by reducing the uncertainty that previously deterred them to a greater extent than it deterred more creative individuals. And if the third hypothesis—that risk increases creativity even if creators themselves dislike it— is confirmed, then we might worry that inventors' positive reaction to *Nautilus* carries with it underappreciated social costs.

Moreover, as the exploration of the assumptions above indicated, the actual impact of a case like *Nautilus* will be difficult to sort out. Some inventors will see *Nautilus* as affecting their prospective gains from patents and others as affecting prospective losses; independent inventors may respond to it differently than those working within intermediaries; and inventors with stronger affective inputs to decision making may respond differently than those with weaker ones. Nor is definiteness the only patent doctrine where these kinds of influences will arise. Instead, we should expect that similar things might be said about the claim construction process more generally,[273] the rules for determining damages associated with infringement,[274] and the application of disclosure doctrines like the written description requirement.[275] The

272. *See* Reilly, *supra* note 267, at 1353–54 (summarizing commentary describing benefits of increased certainty from *Nautilus*'s stricter indefiniteness standard).

273. *See generally* Reilly, *supra* note 267 (describing general uncertainty associated with claim construction post-*Nautilus*).

274. *See* Jonathan S. Masur, *The Use and Misuse of Patent Licenses*, 110 NW. U. L. REV. 115, 117–19 (2015) (describing the challenges courts face in calculating damages for patent infringement).

275. Ariad Pharmaceuticals, Inc. v. Eli Lilly & Co., 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc) (holding that Section 112 includes a written description requirement distinct from the

lesson for now is simply that even apparently salutary developments like *Nautilus* will have complex effects on innovative activity.

2. Implications for Copyright Law: The Example of Fair Use

Courts and commentators have long struggled to make sense of copyright's fair use doctrine.[276] The common thread in these efforts has been a sense that the doctrine's unpredictability prevents it from achieving its aim of protecting (some) otherwise infringing uses—because it is too difficult to determine whether a given use is fair, creators who would otherwise rely on fair use avoid creating at all.[277] The analysis in this Article suggests that the situation must be treated with significantly more nuance than it has been so far.

Empirical research may show that the risk associated with the fair use doctrine appeals to creative individuals.[278] Or maybe it drives out many more uncreative individuals than creative ones, with the result that the mix of people producing expressive works is more creative than it would be if we had an easy-to-predict fair use doctrine. Or perhaps the uncertainty associated with fair use is part of a risky environment that is conducive to creativity, even though the creators themselves dislike it.

This example also highlights that the ultimate prescriptive implications of such research will depend on resolving difficult normative questions. I have throughout taken as a premise that one goal of patent and copyright law is to promote creativity in technology and the arts. While this is a fairly uncontroversial (though not inevitable) premise, it is also surely the case that other goals may have more normative appeal in particular circumstances. And the fair use doctrine highlights one area where the normative foundations of the law may diverge from the promotion of creativity.[279]

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enablement requirement, applicable to both amended and original claims, and requiring that "the disclosure of the application . . . reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date"); *see also* Allen K. Yu, *The En Banc Federal Circuit's Written Description Requirement: Time for the Supreme Court to Reverse Again?*, 33 CARDOZO L. REV. 895, 911–13 (2012) (criticizing the Federal Circuit's written description law for being unpredictable).

276. *See* Gibson, *supra* note 5, at 889 (arguing that "160 years of case law" on fair use have been "particularly unhelpful," rendering fair use "too ambiguous to provide much ex ante guidance" to a prospective defendant).

277. *See supra* notes 37–42 (citing sources).

278. *Cf.* 2 LIVE CREW, AS CLEAN AS THEY WANNA BE (Lil' Joe Records, Inc. 1989); DANGER MOUSE, THE GREY ALBUM (Danger Mouse 2004); GIRL TALK, NIGHT RIPPER (Illegal Art 2006).

279. But note that promoting creativity is at least part of the Supreme Court's understanding of why we have a fair use doctrine. *See* Stewart v. Abend, 495 U.S. 207, 236 (1990) (noting that fair use "permits courts to avoid rigid application of the copyright statute when, on occasion, it would

Specifically, the fair use doctrine may try to further expression without regard to its creativity: central to this doctrine is the promotion of expressions like criticism, political debate, and news commentary that, if not entirely lacking in creativity, surely fall on a different part of the creative spectrum than do things like novels, songs, and abstract art.[280] To the extent that the beneficial effects of fair use risk are limited to the more creative kinds of works, then increasing (or maintaining) fair use risk would have a detrimental impact on core copyrightable expressions like criticism, political debate, and news commentary. In short, even if IP risk has the beneficial effects hypothesized here, it will likely continue to have downsides with respect to other aims, perhaps forcing difficult tradeoffs among conflicting normative goals. Resolving those conflicts is, however, a project for another day.

CONCLUSION

IP scholars have been too quick to conclude that creators are risk averse and that, as a result, IP risk is harmful. But it would also be too soon to conclude that IP risk is a good thing. In this Article, I have articulated the most plausible hypotheses regarding how IP risk affects creativity. Subsequent testing of these hypotheses will improve efforts to use the law to stimulate creativity. IP scholars must push further into this uncertain territory than we have so far. If we do not, we run the risk of continuing to implement IP policies that inhibit the creative minds responsible for everything from the airplane to, well, *Airplane*!

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stifle the very creativity which that law is designed to foster" (internal quotation marks and citations omitted)).

280. *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, 1630–35 (1982) (explaining that externalities associated with, for example, teaching, scholarship, historical analysis, and political speech will frustrate efficient market transactions over copyrighted expression, justifying reliance on fair use instead).