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Valuing Intellectual Property: An Experiment

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Christopher J. Buccafusco
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Abstract

In this article we report on the results of an experiment we performed to determine whether transactions in intellectual property (IP) are subject to the valuation anomalies commonly referred to as “endowment effects”. Traditional conceptions of the value of IP rely on assumptions about human rationality derived from classical economics. The law assumes that when people make decisions about buying, selling, and licensing IP they do so with fixed, context-independent preferences. Over the past several decades, this rational actor model of classical economics has come under attack by behavioral data showing that people do not always make strictly rational decisions. Perhaps the most important research in this field is that related to the “endowment effect” – the discovery that, contrary to economic predictions, people value the same object more when they own it than when they do not.

To date, the endowment effect has been observed for a variety of goods including mugs, lottery tickets, and hunting permits. Our experiment establishes a substantial valuation asymmetry between authors of poems and potential purchasers of them. As we explain in detail in the article, we constructed a market for the poems that was modeled on a market for licensing IP. The observed differences in valuation indicate that IP licensing markets may be substantially less efficient than previously believed. Our results suggest that (1) the preferences of IP creators, owners, and purchasers are unstable and dependent on the initial distribution of property rights in creative works, and (2) large gaps arise between purchasers’ willingness to pay and sellers’ willingness to accept even though the poems are non-rival property and the contemplated alienation of the property is therefore only partial.

Our findings suggest that private transactions in creative goods may face significant transaction costs arising from cognitive biases that drive the price that creators and owners of IP are likely to demand for transfers considerably higher than what buyers will, on average, be willing to pay. This does not mean, of course, that transactions in IP will not take place – we see such transactions happening out in the world every day. Our research suggests, however, that IP transactions may occur at a level that is significantly suboptimal, and that the baleful effect of cognitive and affective biases is likely to be more serious for transactions in works of relatively low commercial value, or for which no well-established custom or pattern helps to inform valuation. These results have considerable implications for the structuring of IP rights, IP formalities, IP licensing, and fair use.

Valuing Intellectual Property: An Experiment

Christopher Sprigman & Christopher Buccafusco*

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Over the past few decades, important new research in behavioral psychology and experimental economics has challenged fundamental social scientific assumptions about individual rationality and the efficient functioning of markets.¹ The “rational actor” model of classical economics, which assumes that people have stable preferences and make decisions that maximize their utility, is being eroded in favor of a more nuanced and empirically robust view of human decision-making as “boundedly rational.” According to this view, people’s preferences are often highly unstable such that they value the same goods differently depending on the way the goods are presented to them. In addition, due to a number of cognitive and affective biases, people often fail to choose the things that make them most happy.²

Recently, legal scholars³ and even some courts⁴ have applied these findings to the law, causing them to rethink essential features of tort,⁵ contract,⁶ property,⁷ and criminal law,⁸ among others. Surprisingly, however, there has been relatively little discussion of the implications this research has for intellectual property (IP) law.⁹ We say surprisingly because IP, perhaps more than any other substantive area of law, is grounded in the

¹ See Russell B. Korobkin & Thomas S. Ulen, *Law and Behavioral Science: Removing the Rationality Assumption from Law and Economics*, 88 CAL. L. REV. 1051 (2000).

² See John Bronsteen, Christopher Buccafusco, and Jonathan S. Masur, *Well-Being Analysis*, GEO. L. J. (forthcoming 2010).

³ See CASS R. SUNSTEIN ED., *BEHAVIORAL LAW AND ECONOMICS* (2000).

⁴ See *Centro Espirita Beneficiente Uniao Do Vegetal Udv-Usa v. Ashcroft*, 389 F.3d 973 (10th Cir. 2004) (McConnell, J. concurring).

⁵ See John Bronsteen, Christopher Buccafusco, and Jonathan S. Masur, *Hedonic Adaptation and the Settlement of Civil Law Suits*, 109 COLUM. L. REV. 1516 (2008).

⁶ See Russell B. Korobkin, *The Status Quo Bias and Contract Default Rules*, 83 CORNELL L. REV. 608 (1998).

⁷ See e.g. Jonathan R. Nash & Stephanie Stern, *Property Frames*, WASH U. L. REV. (forthcoming 2010).

⁸ See John Bronsteen, Christopher Buccafusco, and Jonathan S. Masur, *Happiness and Punishment*, 76 UNIV. CHIC. L. REV. 1037 (2009).

⁹ For exceptions, see *infra* note __.

rational actor model that undergirds classical economics.¹⁰ According to the economic account of IP, the monopolistic rights granted by copyrights and patents exist to provide economic incentives to creators, and the initial distribution of IP rights, the formalities for the vesting of those rights, and the rules regarding fair use are all based on IP law's assumptions that individual actors with stable preferences will maximize both personal and social utility through efficient bargaining.¹¹ In previous research, we have begun to challenge some of these ideas, especially the need for strong IP protection to incentivize creativity.¹² In this paper we report on an experiment that undermines another – that creators and purchasers of IP have stable, wealth maximizing preferences.

Perhaps the most important contribution of the behavioral research is the discovery that people's valuations of goods or states of affairs is highly dependent on the way those goods are framed.¹³ Whereas classical economic theory assumes that the value a person attaches to an item is endogenous (i.e., based on the person's internal preferences), a mountain of survey and experimental data have shown that people attach substantially higher value to goods if they own them than if they are considering purchasing them.¹⁴ People are reluctant to part with their property, and the amount that they are willing to accept (WTA) to sell it generally far exceeds the amount that others are willing to pay (WTP) for it. This WTP/WTA gap has been termed the "endowment effect," and it has been detected for an astounding variety of forms of property.¹⁵

As yet, however, no study has explored the existence of an endowment effect for property that, like intellectual property, (1) was actually *created by* the owners and (2) is *non-rival* (i.e., a good where consumption by one person does not prevent consumption by another). In this Article, we report an experiment demonstrating a substantial valuation

¹⁰ See WILLIAM M. LANDES & RICHARD A. POSNER, *THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW* (2003); John P. Conley & Christopher S. Yoo, *Nonrivalry and Price Discrimination in Copyright Economics*, 157 UNIV. OF PENN. L. REV. 1 (forthcoming May 2009) (noting that although arguments about copyright have settled into polar extremes "both sides generally frame the argument in largely economic terms.").

¹¹ *Mazer v. Stein*, 347 U.S. 201, 219 (1954) (noting, "[t]he 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 in 'Science and useful Arts.'"); Shyamkrishna Balganesh, *Foreseeability and Copyright Incentives*, 122 HARV. L. REV. 1569, 1579 (2009); LANDES & POSNER, *supra* note 10.

¹² Dotan Oliar & Christopher Sprigman, *There's No Free Laugh (Anymore): The Emergence of Intellectual Property Norms and the Transformation of Stand-Up Comedy*, 94 VA. L. REV. 1787 (2008); Kal Raustiala & Christopher Sprigman, *The Piracy Paradox: Innovation and Intellectual Property in Fashion Design*, 92 VA. L. REV. 1687 (2006); Christopher J. Buccafusco, *On the Legal Consequences of Sauces: Should Thomas Keller's Recipes Be Per Se Copyrightable?*, 24 CARDOZO ARTS & ENT. L.J. 1121 (2006) See also Rebecca Tushnet, *Economies of Desire: Fair Use and Marketplace Assumptions*, 51 Wm. & Mary L. Rev. 513 (2009) ("Creativity, as lived, is more than a response to incentives, working from fixed and random preferences.").

¹³ Russell B. Korobkin, *The Endowment Effect and Legal Analysis*, 97 NW. L. REV. 1227, 1229 (2003) (hereinafter *Endowment Effect*); Samuel Issacharoff, *Can There Be a Behavioral Law and Economics?*, 51 VAND. L. REV. 1729, 1735 (1998).

¹⁴ For a review see Korobkin, *Endowment Effect*, *supra* note 13, at 1230-40.

¹⁵ *Id.*

asymmetry between authors of poems and potential purchasers of them. As we explain below, we constructed a market for the poems that was modeled on a market for licensing IP. The observed differences in valuation indicate that IP licensing markets may be substantially less efficient than previously believed. Our results suggest that (1) the preferences of IP creators, owners, and purchasers are unstable and dependent on the initial distribution of property rights in creative works, and (2) large gaps arise between WTP and WTA even though the poems are non-rival property and the contemplated alienation of the property is therefore only partial.

Our findings suggest that private transactions in creative goods may face significant transaction costs arising from cognitive biases that drive the price that creators and owners of IP are likely to demand for transfers considerably higher than what buyers will, on average, be willing to pay. This does not mean, of course, that transactions in IP will not take place – we see such transactions happening out in the world every day. Our research suggests, however, that IP transactions may occur at a level that is significantly suboptimal,¹⁶ and that the baleful effect of cognitive and affective biases is likely to be more serious for transactions in works of relatively low commercial value, or for which no well-established custom or pattern helps to inform valuation. These results have considerable implications for the structuring of IP rights, IP formalities, IP licensing, and fair use.

Part I of this Article describes the orthodox account of IP law and its basis in classical economic theory. It then discusses research on the endowment effect, its causes, and its application in other areas of legal scholarship. It concludes with a description of our hypothesis. Part II describes our experiment, including the methods and results of three different experimental conditions. In short, we find a substantial valuation asymmetry between creators and purchasers of IP with creators valuing their work more than twice as high as potential buyers do. Importantly, we were unable to diminish the asymmetry either by using transaction intermediaries or providing additional market information. Part III discusses our results and the likely psychological mechanisms that are driving them. In Part IV we address the implications of our results for IP law and theory, and we explore possible legal solutions to the inefficiencies that the endowment effect seems to create.

I. THE BEHAVIORAL ECONOMICS OF INTELLECTUAL PROPERTY LAW

A. *Classical Economics and Intellectual Property*

Intellectual property (“IP”) law relies heavily on legal rights structured as “property rules” – i.e., rules establishing an owner’s ability to exclude others – as distinguished from “liability rules”, which permit access to an owner’s property but mandate some payment to the rightsholder.¹⁷ The decision to formulate most IP rules as providing rights to exclude is

¹⁶ By “suboptimal” we mean that fewer mutually beneficial transactions will take place because of endowment effects than would in the absence of such biases.

¹⁷ For the canonical formulation of property and liability rules, see Guido Calabresi & Douglas A. Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089 (1971).

based in large part on a belief that individuals engaged in market transactions will do a better job relative to government (i.e., courts, agencies, and legislatures) at setting prices for access to IP.¹⁸ If the law gives rightsholders a right to exclude, the price for access is set according to private negotiations. If, on the other hand, the law establishes a liability rule, then the price of access will have to be determined by some public rule-maker, most likely a legislature, agency, or court.

IP law's deeply-rooted preference for market price-setting is based on an even more fundamental presumption that underlies classical economic theory in general – viz., that people act as rational agents who make choices based on their own stable and well-defined preferences.¹⁹ In particular, economic theory posits that, when making decisions, people rationally weigh the utility they will derive from different choices and assign monetary values to the options based on the anticipated utility these choices will provide. This supposition, which has been labeled the “rational choice model,” is so fundamental to the structure of intellectual property law that it is often simply taken for granted.²⁰ Although the right to exclude conveyed by a copyright or patent very often locates an initial entitlement in a party poorly situated to exploit a particular expressive work or scientific invention (i.e., the work's author (copyright) or inventor (patent)), the law does not concern itself overmuch with this possibility. It presumes, instead, that parties will negotiate to transfer property rights in creative goods to those who might best exploit them. Negotiation is, of course, potentially burdened by a number of different transaction costs, but at the abstract level of economic thinking that drives most intellectual property policymaking, private negotiations are presumed to be efficacious in most instances.²¹ This confidence is bolstered by an unreflective²² application of the Coase theorem, which holds that in the absence of transaction costs, the initial entitlement of property rights will not affect their final allocation²³ because efficient transactions will occur such that property rights will end up in the hands of the party who values them the most.²⁴ This prediction

¹⁸ Robert P. Merges, *Contracting into Liability Rules: Intellectual Property Rights and Collective Rights Organizations*, 84 CAL. L. REV. 1293 (1996) (“[Intellectual Property Rights] liability rules are set by Congress through compulsory licensing schemes and are not precisely-tailored valuations.”); LANDES & POSNER, *supra* note 10, at 414 (“Markets and property rights go hand in hand. Property rights provide the basic incentives for private economic activity and also the starting point for transactions whereby resources are shifted to their most valuable use.”).

¹⁹ Daniel Kahneman et al., *Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias*, 5 J. ECON. PERSP. 193, 193 (1991).

²⁰ See Note, *Designing the Public Domain*, 122 HARV. L. REV. 1489, 1496 (“The standard economic theory of intellectual property includes the simplifying assumption that humans are selfish rational actors.”).

²¹ To the extent that transaction costs are recognized in orthodox IP scholarship, they tend to be those costs associated with bargaining, hold-outs, and information rather than the costs associated with irrationalities. See Merges, *supra* note 18, at 2658-62 (discussing costs associated with bargaining, valuation, and detection).

²² We say “unreflective” because of the tendency to overlook Coase’s main insight – that transaction costs are almost never zero and are usually considerably positive. See Robert D. Cooter, *Coase Theorem*, in 1 THE NEW PALGRAVE: A DICTIONARY OF ECONOMICS 457, 458 (John Eatwell et al. eds., 1987).

²³ Ronald H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1, 8 (1960).

²⁴ *Id.* at 7–8.

itself leans heavily on the rational choice model – i.e., it relies on the assumption that preferences are stable and that transacting parties will value an asset or right the same whether they are considering buying or selling it.²⁵

B. Behavioral Challenges to the Rational Choice Model – The Endowment Effect

In recent decades, interdisciplinary research in the social sciences has challenged many of the core assumptions of the rational choice model of classical economics.²⁶ Instead of acting like rational utility maximizers, people appear to be beset by a number of systematic cognitive and emotional biases that lead them to act in ways that depart substantially from what the rational choice model predicts. Research has shown that people do a poor job of predicting what will make them happy,²⁷ that they rely on a variety of quasi-rational heuristic shortcuts when making decisions,²⁸ and that the situations people find themselves in profoundly affect the choices that they make.²⁹ Most importantly for IP law is the considerable evidence that people’s preferences and their valuations of those preferences are unstable and subject to substantial manipulation by situational variables.³⁰ Accordingly, small changes in the context of a decision can have enormous effects on how much people value a good or a right.³¹

Perhaps the most significant variable affecting valuation of a good is ownership of the good itself. The first evidence for a systematic ownership bias was uncovered in surveys conducted in the 1970s in an attempt to place a monetary value on public goods such as environmental protection.³² Investigators noticed that subjects had a tendency to demand a higher selling price for a commodity that they owned than they were willing to pay to acquire the same good as a buyer.³³ Additionally, the discrepancy was not only consistently present, but could also be quite large. For instance, one study found that people demanded on average \$143 to sell a hunting permit that they owned, yet they would

²⁵ Stephanie Jacques, *Award-Winning Undergraduate Paper: The Endowment Effect and the Coase Theorem*, 74 AM. J. AGRIC. ECON. 1316, 1316 (1990).

²⁶ See Korobkin & Ulen, *supra* note 1, at 1051.

²⁷ For a review, see Bronsteen, Buccafusco & Masur, *supra* note 2, at 10.

²⁸ See GERD GIGERENZER & CHRISTOPHER ENGEL, EDs., *HEURISTICS AND THE LAW* (2006).

²⁹ See DANIEL KAHNEMAN ET AL., EDs., *CHOICES, VALUES, AND FRAMES* (2000).

³⁰ See e.g. Gretchen B. Chapman & Eric J. Johnson, *Incorporating the Irrelevant: Anchors in Judgments of Belief and Value*, in *HEURISTICS AND BIASES: THE PSYCHOLOGY OF INTUITIVE JUDGMENT* 120 (Thomas Gilovich et al., eds. 2002) (describing how people’s valuations of gambles are affected by irrelevant cues).

³¹ See Richard Thaler, *Toward a Positive Theory of Consumer Choice*, 1 J. ECON. BEHAV. & ORG. 39 (1980) (showing that people respond differently to a situation referred to as a “cash discount” than to an identical one labeled a “credit card surcharge”); Amos Tversky & Daniel Kahneman, *The Framing of Decisions and the Psychology of Choice*, 211 SCI. 453 (1981) (showing that people’s preferences for an identical situation change depending on whether people imagine saving lives or allowing people to die).

³² Korobkin, *Endowment Effect*, *supra* note 13, at 1232.

³³ David R. Mandel, *Beyond Mere Ownership: Transaction Demand as a Moderator of the Endowment Effect*, 88 ORG. BEH. & HUM. DEC. PROCESSES 737, 737 (2002).

only be willing to pay \$31 to acquire that same hunting permit.³⁴ Thus, there appeared to be a significant discrepancy between the maximum price that people were willing to pay to acquire a certain right (WTP) and the minimum price they were willing to accept to give up that same right (WTA). This difference in ask versus bid prices was posited to arise from an “endowment effect” – i.e., a tendency for people to value that which they own more highly than opportunities to obtain goods or services of equivalent value.³⁵

This type of behavior was highly problematic for classical economic theory. The rational choice model predicts that if an individual decides that the marginal value of some good is \$5, then, if given the opportunity, she will purchase it for any price up to that amount. Similarly, if she owns the good and is offered any amount of money beyond \$5, she will happily sell it. The early evidence for an endowment effect, indicating that an individual’s preferences changed based on conditions of ownership, challenged this assumption.

After these initial observations and the formulation of the endowment effect, economists and psychologists embarked on a variety of experiments aimed at testing the existence and strength of this anomaly. Daniel Kahneman, Richard Thaler, and colleagues conducted the initial laboratory experiments by simulating markets using undergraduate volunteers.³⁶ In the best-known early experiment, they gave coffee mugs emblazoned with the university’s logo to half of the subjects in a classroom and directed all of the subjects to examine the mugs (whether it was their own or their neighbor’s). The students to whom the mugs were given were asked to indicate the minimum price at which they would be willing to sell their mug, and the students without the mugs were asked to indicate how much they would be willing to pay to purchase the mug.³⁷ The investigators attempted to keep the valuations honest by informing the participants that one of every four subject pairs would be randomly selected as a “real” transaction – i.e., those buyers that bid higher than the market clearing price would purchase a mug and those owners who valued it lower than the clearing price would give theirs up.³⁸ According to classical economic theory, the valuations assigned by the sellers and the buyers should have been similar, and approximately half of the mugs should have changed hands.³⁹ After conducting several

³⁴ Ziv Carmon & Dan Ariely, *Focusing on the Forgone: How Value Can Appear So Different to Buyers and Sellers*, 27 J. CONSUMER RES. 360, 360 (2000).

³⁵ Thaler, *supra* note 31, at xx. As Kathryn Zeiler notes, the use of the term “endowment effect” for the observation of a WTA-WTP gap creates biases of its own as it imports an explanation of the gap into the description of the behavior – i.e., that the valuation gap is due to sellers’ attachment to the good based in their ownership of it. See Kathryn Zeiler, *The Endowment Effect: Implications of Recent Empirical Developments for Legal Theory*, at 10, n. 32 (2008), available at www.ssrn.com. Nonetheless, we choose to employ the phrase through this Article because it has been widely adopted by most commentators on the literature.

³⁶ Daniel Kahneman, Jack L. Knetsch & Richard H. Thaler, *Experimental Tests of the Endowment Effect and the Coase Theorem*, 98 J. OF POL. ECON. 1325 (1990).

³⁷ *Id.* at 1330-31.

³⁸ *Id.* at 1330.

³⁹ Although different subjects might rationally value the mugs at different amounts, there was no reason to think that those who valued the mugs more highly were in one group rather than the other. Because the

rounds of the experiment, however, the investigators found that the median selling price was more than twice the median buying price and that only about a quarter of the mugs were exchanged.⁴⁰

This experiment, along with others reported by Kahneman and his colleagues, provided direct evidence of the presence of an endowment effect. As a result, social scientists began conducting experiments designed to both test the limits of the endowment effect and figure out whether and to what extent it affected particular types of transactions. While it is not necessary to detail every aspect of this research,⁴¹ it will be beneficial to review a few of the main findings.

1. The Strength of the Endowment Effect

First, the magnitude of the endowment effect appears to vary depending on the type of goods involved. A survey of endowment effect experiments found that the discrepancy between WTP and WTA tends to be highest for public and non-market goods such as health and safety measures, lower for ordinary private goods such as mugs and candy bars, and even lower for objects that are based on money payments, such as lottery tickets.⁴² Importantly, however, even when it comes to a good, like a lottery ticket, for which the calculation of a “rational” value should be straightforward, an endowment effect seems to exist. For instance, in one experiment, researchers distributed raffle tickets to half of the members of an undergraduate classroom and gave the other half an opportunity to purchase a ticket to participate in the raffle for \$2.⁴³ Additionally, the experimenters asked those who initially received a ticket whether they would be willing to sell the ticket for \$2.⁴⁴ While fifty percent of subjects given the opportunity to buy into the raffle for \$2 chose to do so, only twenty-six percent of the people offered \$2 in exchange for their lottery ticket accepted it.⁴⁵ In other words, while half of the potential buyers valued the raffle ticket at a sum exceeding \$2, seventy-six percent of the original owners placed a value on their ticket that was more than \$2.⁴⁶ These results suggest that even when a subject is only endowed with a probabilistic opportunity to receive some good, she is likely to value *the chance* more highly than she otherwise would.

mugs were distributed randomly, the students valuing the mugs above the mean should have been equally distributed between buyers and sellers thereby leading to an exchange of approximately half of the mugs.

⁴⁰ *Id.* at 1332.

⁴¹ For a comprehensive account of many of the experiments that have been carried out, see generally Korobkin, *Endowment Effect*, *supra* note 13. For an analysis of a survey conducted of the experiments, see generally John K. Horowitz & Kenneth E. McConnell, *A Review of WTA/WTP Studies*, 44 J. ENV'T ECON. & MGMT. 427 (2002).

⁴² Horowitz & McConnell, *supra* note 41, at 433–34.

⁴³ Jack L. Knetsch & J.A. Sinden, *Willingness to Pay and Compensation Demanded: Experimental Evidence of an Unexpected Disparity in Measures of Value*, 99 Q. J. ECON. 507, 510 (1984).

⁴⁴ *Id.*

⁴⁵ *Id.* at 511.

⁴⁶ *Id.*

In addition to the type of good, the subject's relationship to the entitlement has a significant effect on the intensity of the endowment effect.⁴⁷ In one set of studies, members of a group who believed they received goods as a result of their good performance on a test valued them more highly than those who had merely obtained the goods by chance.⁴⁸ Thus, the experimenters concluded that those who had earned the goods attached more value to them compared with subjects who had merely been given the goods and that the manner by which an object is obtained generally affects how highly the owner values it.⁴⁹

Related to the issue of endowment effect magnitude is the unresolved issue regarding the extent to which the effect can be diminished substantially or entirely through market experience. If overvaluation is simply the result of irrational, heuristic processing on the part of owners of goods, it seems reasonable to think that consistent experience in the relevant market will provide a signal to owners indicating the good's actual value. Indeed, several experiments have found evidence that the endowment effect shrinks as an owner gains market experience.⁵⁰

Importantly, however, some experiments question the ability of market experience to limit the endowment effect. First, several experiments have failed to find that market experience leads to a decrease in the endowment effect.⁵¹ There is more work to be done on this point, but for the moment it seems fair to say that while the idea that valuation divergences will decrease as subjects become familiar with a market may be "intuitively compelling ... the evidence is weak."⁵² Second, and importantly, market experience appears to limit the endowment effect only in markets featuring substitutable goods. Increased experience in a market that consists of goods with readily available substitutes (e.g., coffee mugs or candy bars) will result in a convergence of the values that owners and buyers attribute to a certain good, but where there are no close substitutes for the good, valuation divergences seem to persist regardless of market experience.⁵³ Creative goods are highly

⁴⁷ See Jochen Reb & Terry Connolly, *Possession, Feeling of Ownership and the Endowment Effect*, 2 JUDGMENT & DECISION MAKING 107, 107 (2007) ("...there is more to the endowment effect than simple factual ownership.").

⁴⁸ George Loewenstein & Samuel Issacharoff, *Source Dependence in the Valuation of Objects*, 7 J. BEHAV. DEC. MAKING 157, 160 (1994).

⁴⁹ *Id.* at 165. Other factors influencing the magnitude of endowment effects include duration of ownership and whether the good is valued primarily for use or for exchange. See Kahneman, Knetsch & Thaler, *supra* note 36, at 1342; Mandel, *supra* note 33, at 745. Studies have found that owners do not anticipate the same sense of loss for goods they are holding for exchange relative to goods they are planning to use.⁴⁹ As a result, owners value goods held for exchange less highly than they do goods that they use and are more likely to exchange the former than they are the latter.

⁵⁰ John A. List, *Does Market Experience Eliminate Market Anomalies?*, 118 Q. J. ECON. 41, 41-42 (2003) [hereinafter List, *Market Experience*]; see also Don L. Coursey, John L. Hovis & William D. Schulze, *The Disparity Between Willingness to Accept and Willingness to Pay Measures of Value*, 102 Q. J. ECON. 679 (1987); John A. List, *Neoclassical Theory Versus Prospect Theory: Evidence from the Marketplace*, 72 ECONOMETRICA 615 (2004).

⁵¹ Kahneman, Knetsch & Thaler, *supra* note 36, at 1332.

⁵² Horowitz & McConnell, *supra* note 41, at 442.

⁵³ Jason F. Shogren et al., *Resolving Differences in Willingness to Pay and Willingness to Accept*, 84 AM. ECON. REV. 255, 256-57 (1994).

differentiated and tend to lack close substitutes, so the ability of market experience to resolve valuation anomalies will be constrained. Third, even if the endowment effect decreases with market experience, many parties involved in real-life transactions have no significant market experience and will not gain any.⁵⁴ This is true of many transactions in creative goods, where authors, inventors, and other rightsholders often lack market experience. Finally, it is important to note that the behaviors associated with the endowment effect have been studied almost exclusively in the context of individual decision-making. Accordingly, it is difficult to predict how they might be altered by group decision-making or decisions where non-owners exercise oversight.⁵⁵

2. Psychological Mechanisms Behind the Endowment Effect

Although the evidence for the existence of endowment effects is quite robust, a number of important questions remain unanswered. Most importantly, the precise psychological mechanism underlying the effect is not fully understood. A number of explanations have been suggested. Some researchers have asserted that the endowment effect is an example of a broader “ownership effect”⁵⁶ The ownership effect posits that because people tend to see themselves in a positive light, and because they see objects they own as extensions of themselves, people are prone to find objects to be more attractive when they own them than when they do not.⁵⁷ According to one group of researchers, “People may demand a lot for their [goods] because they actually *like* them, and they may like them simply because they are theirs.”⁵⁸ The ownership effect helps explain experimental results demonstrating more pronounced effects for goods that are easy to associate with the self or that people believe they have earned.⁵⁹

Another explanation of the endowment effect focuses on the pervasive human aversion to loss.⁶⁰ Specifically, most people value the acquisition of a good or right much less than they fear losing that same item.⁶¹ As a result, people have a “strong tendency to

⁵⁴ *Id.*

⁵⁵ See Andreas Glöckner et al., *The Endowment Effect in Strategic Groups*, at 6-7, available at www.ssrn.com; Jennifer Arlen et al., *Endowment Effects Within Corporate Agency Relationships*, 31 J. LEG. STUD. 1 (2002) (finding diminished endowment effects in principal-agent relationship).

⁵⁶ Mandel, *supra* note 33, at 737.

⁵⁷ James K. Beggan, *On the Social Nature of Nonsocial Perception: The Mere Ownership Effect*, 62 J. PERSONALITY & SOC. PSYCHOL. 229, 235 (1992).

⁵⁸ Carey K. Morewedge et al., *Bad Riddance or Good Rubbish? Ownership and Not Loss Aversion Causes the Endowment Effect*, 45 J. EXPERIMENTAL SOC. PSYCHOL. 947, 948 (2009).

⁵⁹ *Id.* at 950.

⁶⁰ Amos Tversky & Daniel Kahneman, *Loss Aversion in Riskless Choice*, 106 Q. J. ECON. 1039, 1054 (1991); Ian Bateman et al., *Testing Competing Models of Loss Aversion: An Adversarial Collaboration*, 89 J. PUB. ECON. 1561, 1562 (2005).

⁶¹ Tversky & Kahneman, *supra* note 60, at 1041. Additionally, it has been found that people experience a feeling of loss even when they never actually had possession of a particular good or right. For instance, in one experiment, it was found that consumers who have to choose between several options (e.g., which car to buy),

remain at the status quo, because the disadvantages of leaving it loom larger than advantages.”⁶² Thus, owners of a right typically demand more money to forfeit it than they would be willing to pay to purchase it in an effort to compensate for the discomfort that they feel after giving it up.⁶³ These feelings may be particularly acute in studies involving lottery tickets where subjects contemplate the regret they will feel if they sold what turned out to be the winning ticket.⁶⁴ People are fearful of feeling regret, and therefore they are often willing to pay substantial premiums to avoid it.⁶⁵

Relatedly, it appears that differences between buyer and seller valuations may stem from variations in cognitive and emotional processes. When considering a transaction, buyers and sellers tend to focus on different aspects of the entitlement.⁶⁶ Specifically, while buyers tend to focus their attention what they are forgoing to acquire the good or right (i.e., money), the seller tends to focus on the benefits that are enjoyed through ownership of the item (e.g., the pleasure expected from use of a ticket to a sporting event).⁶⁷ Consequently, while the buyer’s willingness to pay tends to center around market values, the seller’s valuation tends to include subjective value, which raises the price that the seller will demand to transfer the property.

C. *The Endowment Effect in Legal Scholarship*

In a recent review, Russell Korobkin argues that the endowment effect is “undoubtedly the most significant finding from behavioral economics for legal analysis to date.”⁶⁸ Considering the number of references to the phenomenon in legal literature – more than 800 law review articles mention the endowment effect⁶⁹ – his assertion hardly seems unwarranted. Since its initial formulation, the endowment effect has been applied to a growing body of substantive and procedural legal fields, encompassing most aspects of public and private law,⁷⁰

experience a feeling of discomfort after they make their decision and even find the forgone options to be more attractive after they have given them up. Ziv Carmon et al., *Option Attachment: When Deliberating Makes Choosing Feel Like Losing*, 30 J. CONSUMER RES. 15, 16 (2003).

⁶² Kahneman et al., *supra* note 19, at 197–98.

⁶³ See Deborah A. Kermer et al., *Loss Aversion is an Affective Forecasting Error*, 17 PSYCHOL. SCI. 649 (2006).

⁶⁴ See Maya Bar-Hillel & Efrat Neter, *Why are People Reluctant to Exchange Lottery Tickets?*, 70 J. Personality & Soc. Psychol. 17 (1996).

⁶⁵ See Daniel T. Gilbert et al., *Looking Forward to Looking Backward: The Misprediction of Regret*, 15 PSYCHOL. SCI. 346, 346 (2004).

⁶⁶ Carmon & Ariely, *supra* note 34, at 360.

⁶⁷ *Id.* at 365–66.

⁶⁸ Korobkin, *Endowment Effect*, *supra* note 13, at 1229.

⁶⁹ A search of the Journals and Law Reviews database (JLR) on Westlaw for “endowment effect” on January 20, 2010 returned 867 matches.

⁷⁰ Korobkin, *Endowment Effect*, *supra* note 13, at 1229.

Recognition of the systematic discrepancy between owner and purchaser valuations has caused legal scholars to reevaluate many areas of the law where Coasean bargaining has been influential. For example, scholars have suggested that the WTA-WTP gap might lead to inefficiencies in valuations of risks and losses in fields such as tort or environmental law. They have debated whether appropriate compensation for an increased risk of illness or disability is best measured by someone's willingness to pay to avoid the risk or the much higher amount of money that she would be willing to accept to confront the risk.⁷¹ In contract law, the attachment that parties may exhibit towards default or mandatory provisions might lead to inefficient bargaining.⁷² Recently, Richard Thaler and Cass Sunstein have developed an extensive normative argument – that they call “libertarian paternalism” – to capitalize on the stickiness of default rules to encourage people to make welfare-maximizing choices while maintaining freedom of choice.⁷³

The endowment effect's legal implications have been most richly explored in property law.⁷⁴ The efficient use and transfer of land was at the center of Coase's initial insight, so it is no surprise that the behavioral challenges to the Coase theorem should focus on property. For Coase, the initial distribution of property rights is irrelevant in a world without transaction costs, because parties will bargain until the property ends up in the hands of the highest valuing user. The account supposes that parties' valuations are stable and endogenous. Behavioral evidence on the endowment effect, however, suggests that the initial distribution of rights plays a major role in constructing parties' valuations. Primary owners will tend to overvalue their property, and transactions will be inefficiently low – just as in Thaler's mug study.⁷⁵ Accordingly, legal scholars have cast a critical eye on classical economic accounts of regulatory takings,⁷⁶ adverse possession,⁷⁷ and property remedies.⁷⁸

⁷¹ See e.g., Edward J. McCaffery, Daniel J. Kahneman, & Matthew L. Spitzer, *Framing the Jury: Cognitive Perspectives on Pain and Suffering Awards*, 81 VA. L. REV. 1341 (1995); Mark Geistfeld, *Placing a Price on Pain and Suffering: A Method for Helping Juries Determine Tort Damages for Nonmonetary Injuries*, 83 CAL. L. REV. 773 (1995); Jack L. Knetsch, *Biased Valuations, Damage Assessments, and Policy Choices: The Choice of Measure Matters*, 63 ECOL. ECON. 684 (2007).

⁷² See Korobkin, *Status Quo Bias*, *supra* note 6; Cass R. Sunstein, *Switching the Default Rule*, 77 N.Y.U. L. REV. 106, 112 (2002). According to Sunstein, “Where the Coase Theorem fails is in suggesting that no matter the initial allocation of the entitlement, people will bargain to the same result. The Coase Theorem fails to account for the fact that the initial allocation seems to create an endowment effect. When the endowment effect is at work, those who initially receive a legal right value it more than they would if the initial allocation had given the right to someone else.” *Id.*

⁷³ See Cass R. Sunstein & Richard H. Thaler, *Libertarian Paternalism is Not an Oxymoron*, 70 U. CHI. L. REV. 1159 (2003); RICHARD H. THALER & CASS R. SUNSTEIN, *NUDGE: IMPROVING DECISIONS ABOUT HEALTH, WEALTH, AND HAPPINESS* (2008).

⁷⁴ See Korobkin, *Endowment Effect*, *supra* note 13; Jeremy A. Blumenthal, “*To Be Human*”: *A Psychological Perspective on Property Law*, 83 TULANE L. REV. (forthcoming 2009); Owen D. Jones & Sarah F. Brosnan, *Law, Biology, and Property: A New Theory of the Endowment Effect*, 49 WM. & MARY L. REV. 1935, 1988 (2008).

⁷⁵ See Thaler, *supra* note 31.

⁷⁶ William A. Fischel, *The Offer/Ask Disparity and Just Compensation For Takings: A Constitutional Choice Perspective*, 15 INT. REV. L. & ECON. 187 (1995).

Most important for this Article is an experiment conducted by Jeffrey Rachlinski and Forest Jourden.⁷⁹ They noted that previous endowment effect studies confounded ownership of a property right with a property-rule style *remedy* that enabled owners to refuse to sell their rights if they so chose. Rachlinski and Jourden speculated that the choice to refuse to sell may be a “critical psychological component of ownership,” and that manipulation of this component could substantially affect valuation.⁸⁰ They presented subjects with scenarios describing property rights protected either by injunctive relief (property rules) or by damages remedies (liability rules), and they asked buyers and sellers a question intended to elicit their valuation of the rights.⁸¹ Only when the rights were protected by property rules was an endowment effect observed.⁸² According to the authors, their findings offer the law a valuable tool for promoting efficient trade in the face of inefficiencies created by the endowment effect simply by favoring liability rules.⁸³ Because the ability to refuse to sell plays a key role in people’s valuation of property, eliminating that ability can reduce the endowment effect.⁸⁴

Although legal scholars are increasingly turning their attention to the endowment effect’s implications for a variety of legal fields, relatively little attention has been paid to its likely impact on intellectual property law.⁸⁵ To help fill this lacuna, we performed the first test of the endowment effect in a setting intended to mirror an intellectual property market.

⁷⁷ Jeffrey Evans Stake, *The Uneasy Case for Adverse Possession*, 89 GEO. L.J. 2419 (2001) (adverse possession should be approached with consideration to the fact that “by investing will in the land, the adverse possessor develops an attachment in land which is critical to their identity”).

⁷⁸ Nash & Stern, *supra* note 7; Stephanie Stern, *Residential Protectionism and the Legal Mythology of Home*, 107 MICH. L. REV. 1093 (2009).

⁷⁹ Jeffrey J. Rachlinski & Forest Jourden, *Remedies and the Psychology of Ownership*, 51 VAND. L. REV. 1541 (1998).

⁸⁰ *Id.* at 1542.

⁸¹ *Id.* at 1561-66.

⁸² *Id.* at 1566.

⁸³ *Id.* at 1574.

⁸⁴ *Id.* at 1572 (“The power to refuse to sell a right seems to be psychologically important to ownership. Property is not truly owned if someone can willfully appropriate it upon payment of a fee.”). For an argument that liability rules will create larger endowment effects than property rules, see Daphna Lewinsohn-Zamir, *The Choice Between Property Rules and Liability Rules Revisited: Critical Observations from Behavioral Studies*, 80 TEX. L. REV. 219, 254 (2001).

⁸⁵ For exceptions see Alfred C. Yen, *Restoring the Natural Law: Copyright as Labor and Possession*, 51 OHIO ST. L. J. 517, 545 (1990); Frank P. Darr, *Testing an Economic Theory of Copyright: Historical Materials and Fair Use*, 32 B.C. L. REV. 1027, 1046 (1991); Laura R. Bradford, *Parody and Perception: Using Cognitive Research to Expand Fair Use in Copyright*, 46 B.C. L. REV. 705 (2005); Raymond Shih Ray Ku, *Grokking Grokster*, 2005 WISC. L. REV. 1217; Wendy J. Gordon, *Trespass-Copyright Parallels and the Harm-Benefit Distinction*, 122 HARV. L. REV. FORUM 62 (2009); Ben Depoorter, *Technology and Uncertainty: The Shaping Effect on Copyright Law*, 157 U. PENN. L. REV. 1831 (2009).

D. Our Hypothesis

While the endowment effect has been empirically tested for over two decades, one area that has yet to be probed is whether the endowment effect extends to goods that an owner has *created*. In all previous experiments, the owners have either simply been given the good that they are then asked to value or, occasionally, have done something to earn them. None of the previous experiments ask subjects to actually create an object and then value it. Our experiment is the first to do so.

The prior experimental evidence on the endowment effect – especially the studies documenting powerful endowment effects for “earned” goods – suggests that endowment effects might be particularly strong in the context of personally created goods. On the other hand, most – but not all – creative goods are non-rival: i.e., transfer of rights in a creative work such as a poem, novel, screenplay, or even most photographs and other graphic arts does not deprive the original rightsholder of possession of a copy of the work. Thus, transactions in these non-rivalrous forms of property involve only partial alienation, and therefore may give rise to reduced endowment effects. (The same is not true of certain works of fine art, which exist only as a single copy and are therefore fully rivalrous both as legal rights of ownership and as physical objects. In such a case, transfer of the work usually involves full alienation.)

We set out to determine whether and to what extent endowment effects attend transactions in non-rivalrous creative works. As we explain in more detail below, for purposes of this experiment we conceive of the value of an IP right as a probabilistic measure of the right’s likelihood of returning rents.⁸⁶ In this sense, IP rights function as weighted lottery tickets, with the rights associated with better works more heavily weighted (and, hence, more valuable) than for those associated with poor quality works. Prior research has demonstrated endowment effects associated with lottery tickets,⁸⁷ so it seems reasonable to think that they will also be associated with goods traded in probabilistically-valued markets. Moreover, other studies have shown that the endowment effect is enhanced when subjects feel like they earned the good compared to when they have simply been given the good.⁸⁸ The emotions associated with creating a good should be at least as strong as those associated with have earned a good, so it seems likely that created goods will be particularly overvalued by their creators.

We anticipated that creators of new works would experience substantial endowment effects causing them to systematically overvalue their works when compared with potential buyers of the works. Moreover, we speculated that creators would exhibit even greater valuation differences from buyers than would non-creators who were simply

⁸⁶ Because we are interested here solely in the economic model of IP, we bracket a variety of other “values” that might associated with creation and ownership of intellectual property including prestige, attribution, personality, tenure, etc. In future experiments, we hope to measure the effects of these as well. On alternative values in IP, see Jennifer Rothman, *Copyright Beyond Free Speech*, 95 CORNELL L. REV. (forthcoming 2010).

⁸⁷ See *supra* notes 43-46.

⁸⁸ See *supra* notes 48-49.

endowed with others' creative works. That is to say, the magnitude of the endowment effect for creators was predicted to be greater than that for mere owners of the works.

Assessing whether authorship and/or ownership of intellectual property has a distinctive effect on an owner/creator's valuation of his work is extremely important, especially in the modern technological environment where the role of IP law has been increasingly discussed. Specifically, when debating whether current IP law provides an efficient allocation and structure of legal rights, the potential role of endowment effects must be taken into account. Current IP law relies on property rules and private transactions to efficiently allocate rights. And yet if substantial endowment effects attend created goods, we must worry about the efficacy of private transactions.⁸⁹ In particular, the Coase theorem relies upon the assumption that parties value rights the same whether they are initially endowed with them or not. Consequently, contrary to one of the main presumptions of the Coase theorem, initial entitlements could matter because the "rate of exchange between goods can be quite different depending on which is acquired and which is given up, even in the absence of transaction costs or income effects."⁹⁰ As a result, we might overestimate the number of transactions that will take place since the owner of a right will typically value it more than the potential buyer will. Hence, instead of the right reliably ending up in the hands of the party that will use it most efficiently, it is much more likely that the party that is initially assigned the right will retain it.⁹¹

II. MODELING AN IP MARKET

To test our hypotheses about the existence of endowment effects for created property, we organized a series of experiments intended to simulate a market for buying and selling creative works. Because we are interested in the implications of endowment effects for economic accounts of IP law, however, we attempted to create an informal model of the types of transactions that occur when IP changes hands. Unlike with traditional property law where transactions result in exchanges of more or less tangible goods or land, most IP transactions are based on exchanges of intangible rights of exclusion.⁹² Whereas property rights in real or personal property derive their value primarily from use and exchange, the exclusive rights granted by IP law are, in essence, monopolistic opportunities for rent-seeking from other potential users, licensors, etc.⁹³ The general value of owning an IP right is the ability, granted by the statutory monopoly, to

⁸⁹ Rachlinski & Jourden, *supra* note 79.

⁹⁰ Tversky & Kahneman, *supra* note 60, at 1039.

⁹¹ Kahneman, Knetsch & Thaler, *supra* note 36, at 1339-40. As an example, in one set of studies on preserving land from development, it was found that seven times more land would be preserved if the rights were held by the general public than if the land was originally deeded to the landowner and had to be purchased by the public. Horowitz & McConnell, *supra* note 41, at 428.

⁹² An exception would be transactions for works of fine art, where the object and the right change hands in the same exchange. We are currently thinking about ways to test valuation effects for this type of transaction.

⁹³ LANDES & POSNER, *supra* note 10, at 17.

exact fees for use of the work over some period of time. The value of any particular, individual IP right, then, is simply *the probabilistic value of the rents that can be obtained from holding the right to a given work*.⁹⁴ Thus, the ex ante value of a copyright in a newly created work can be measured by multiplying the amount of money that the copyright holder could obtain through using, selling, or licensing the work in the market by the probability that it will succeed in generating that money.⁹⁵

Imagine the following situation: A publishing house can estimate with reasonable certainty that there is a market for novels worth \$100 million in profits. The publisher would like to capture some of that money, and it is considering purchasing the rights for one of two different novels. Novel 1 is quite good, and the publisher believes that it has a 60% chance of successfully capturing the market. Novel 2 is less good, and the publisher believes it has only a 10% chance of capturing the market. Accordingly, a rational publisher would be willing to pay anything less than \$60 million for the rights to Novel 1 or anything less than \$10 million for the rights on Novel 2. The value of each novel to the publisher (or to the author) is just the value of the total rents multiplied by its chance of returning them to the rightsholder.

Of course, actual markets do not exhibit this kind of binary success or failure. Instead, individual works may have a probability of capturing varying portions of a total market. It is worth noting, however, that the fundamentally probabilistic nature is unchanged and that, for our purposes, creating a more ecologically valid market would be experimentally intractable. In addition, while in many markets, determining these figures may prove difficult, there is reason to believe that a similar method of valuation operates in many markets for IP.⁹⁶ Indeed, many movie studios appear to be performing nearly identical calculations when deciding which films to make.⁹⁷

⁹⁴ Mark Lemley and Carl Shapiro have suggested something similar in the context of patent valuation. Mark A. Lemley & Carl Shapiro, *Probabilistic Patents*, 19 J. ECON. PERSPECTIVES 75, 81 (2005) (suggesting that patents can be thought of as lottery tickets). They note that patent valuation may be uncertain due to both uncertainty about the patent's commercial significance and about its validity and scope. *Id.* at 76. We are concerned solely about the former. See also Jonathan S. Masur, *Costly Screens and Valuation Asymmetries*, at 33 (2009) available at ssrn.com.

⁹⁵ The rents that can be extracted from the work are effectively the profits that can be generated through ownership of the IP right after subtracting for fixed costs of creation. On fixed versus marginal costs of creating IP, see *id.* at 37. In addition, we are setting aside any benefits the author may receive outside of royalties including increased prestige, salary, etc.

⁹⁶ See John R. Allison et al., *Valuable Patents*, 92 GEO. L. J. 435 (2004).

⁹⁷ See Thomas H. Davenport & Jeanne G. Harris, *What People Want (and How to Predict It)*, 50 MIT SLOAN MANAGEMENT REV. 23, 29 (2009) (describing movie studios' use of neural network analysis to make predictions about a film's likelihood of market success). According to the website of Epagogix, one of the leading companies assisting movie studios in risky decision-making, "Investing in and developing the wrong film properties is the biggest risk that faces studio heads. Parent companies and investor groups place studios under ever-increasing pressure to deliver Returns on Investment across an annual portfolio of films. Epagogix's approach helps management of this most critical financial risk through **accurate predictive analysis** of the Box Office value of film scripts." www.epagogix.com (emphasis in original).

A. *The Contest – “Eyes Closed”*

In an attempt to model this system while preserving maximal ecological validity, this experiment created a quality-based contest resulting in a payout of known value. We solicited subjects from the Charlottesville, VA area via fliers, emails, and online advertisements. Most of our subjects were undergraduate students at the University of Virginia; other participants were solicited from the broader Charlottesville community.⁹⁸ All subjects were paid \$15 for participation. The subjects were divided into three groups based on their order of recruitment: the first third became Authors, the middle third Bidders, and the final third Owners. Completion of the study took subjects about thirty minutes in a computer lab on the UVA campus. Data collection lasted approximately two months.

1. Contest “Eyes Closed” Method

First, the Authors were invited to the lab in groups. Each Author was seated at a computer and asked to provide some demographic information. They were then told that they would be competing in a haiku writing competition with nine other subjects. At the end of the task, a poetry expert would choose the best poem, and its writer would receive a \$50 prize. The subjects were given instructions on writing haikus along with a sample poem. They were then given time to compose their poems. After completing their poems, the Authors were told that there were an additional ten subjects, the Bidders, who would be given an opportunity to buy the Authors’ chance of winning the prize should their poem be chosen. Each Author was informed that her poem would be assigned to a Bidder who would indicate the most amount of money (in whole dollars) that he would be willing to pay to purchase the Author’s chance to win, and that the Author should indicate (in whole dollars) the least amount that she would be willing to accept to sell her chance. The Author was told that if the Bidder’s amount was higher than the Author’s amount, the Bidder would pay the amount of the bid to the Author in return for the Author’s chance at the prize money. The Authors were reminded in italics that they were only exchanging their chance to win the money and that the poem itself, which would be emailed to them, would still be theirs. We hoped that this reminder would help focus Authors’ attention solely on the poem’s value as an entry in the contest rather than on any additional personal or use value that they might attach to it. Each Author then entered a WTA amount and answered some follow-up questions including ratings of their poem and predictions of its probability of winning the prize.⁹⁹

After the data from the Authors had been gathered, Bidders were brought into the computer lab. The Bidders were told that the experimenters were holding a contest between ten poems written by other subjects for a \$50 prize. They were informed that they would be shown one of the poems and that they would have the opportunity to

⁹⁸ Demographics: Mean age = 24, mode age = 22, 207 women, 287 students.

⁹⁹ The follow-up questions asked the subjects to indicate why they chose the amount they did, the probability that their poem would win the prize, and a series of questions about their abilities as creative artists.

purchase that poem's chance of winning the prize.¹⁰⁰ They were told to indicate the most amount of money that they would be willing to pay to purchase the poem's chance of winning from its author. If the amount they indicated was equal to or greater than the amount that the Author indicated, they would pay the Author the amount that they bid. The Bidders then entered a WTP amount and answered the same follow-up questions.

Finally the group of Owners was brought into the lab. They were told that the experimenters were hosting a \$50 poetry contest. They were told that they would be assigned one of the ten poems in the contest and that they would have an opportunity to sell their chance to win to another subject acting as a Bidder. The instructions given to the Owners about the bidding were similar to those given to the Authors. Each Owner was randomly assigned one of the poems previously written by an Author. The Owners then entered a WTP amount and answered the follow-up questions.

2. Contest "Eyes Closed" Results

We observed a significant gap between the Authors' and Owners' WTA and Bidder WTP. The minimum amount that Authors would accept, on average, to transfer their chance of winning the contest was \$22.90 (with 40 Ps Authors = 23.88). For Owners, the comparable figure was \$21.23 (with 40 Ps Owners = 20.80). These amounts are within the range of standard error, and so the difference between them is not statistically significant at a .05 confidence level. The Bidders' average WTP, however, was, at \$10.38 (with 40 Ps Buyers = 8.50), lower by an amount that clearly is statistically significant at that same confidence level versus the mean valuations of both Authors and Owners.¹⁰¹ Indeed, the WTA/WTP gap observed in this experiment is quite large – more than two-to-one – especially considering that the property at issue is non-rival and the experimental protocol involved the possibility of only partial alienation (i.e., alienation of the possibility of winning the content, rather than the poem itself).

¹⁰⁰ For simplicity's sake, we chose to make the information available to buyers and sellers of creative works symmetrical, with each having identical knowledge about the nature of the market. In many IP markets, however, the buyers of IP rights (publishers, movie studios, etc.) will have substantially greater information about the market. Our experimental protocol is setup to work with asymmetrical markets as well, and we hope to publish that data soon.

¹⁰¹ Including ALL 52 participants... Contest – Eyes Closed results:

A one-way Analysis of Variance (ANOVA) revealed a significant effect of role, $F(2,153) = 14.04, p < .0005$, with follow-up t tests showing that Bidders' mean valuations were significantly lower than those of both Authors, $t(102) = 4.92, p < .0005$, and Owners, $t(102) = 4.57, p < .0005$. Authors' and Owners' valuations did not significantly differ, $t(102) < 1$.

Including ONLY 40 participants... Contest – Eyes Closed results:

A univariate Analysis of Variance (ANOVA) revealed a significant effect of role, $F(2,117) = 17.15, p < .0005$, with follow-up t tests showing that Bidders' mean valuations were significantly lower than those of both Authors, $t(78) = 5.62, p < .0005$, and Owners, $t(78) = 5.18, p < .0005$. Authors' and Owners' valuations did not significantly differ, $t(78) < 1$.

B. Contest – “Eyes Open”

In an attempt to learn more about the psychological mechanisms underlying our findings, we performed a second experiment based on the initial Contest experiment. In the second experiment, however, instead of just being shown the poem that they were allowed to buy or sell, subjects were shown all ten poems that would be competing in the contest. We hypothesized that if quality judgments were affecting subjects’ valuations, those judgments might be differentially affected by the subjects’ relation to the poem. We predicted that viewing the competition would decrease the quality ratings and valuations of Owners and Bidders but that those of Authors would be largely unaffected.

Our findings did not confirm these hypotheses. We observed no statistically significant changes in the behavior of subjects in any of the roles. In short, additional information seemed to have little effect on the WTA/WTP gap. The minimum amount that “eyes open” Authors would accept, on average, to transfer their chance of winning the contest was \$20.18. For Owners, the comparable figure was \$23.95. The Bidders’ average WTP was, at \$9.17, lower by an amount that clearly is statistically significant at the .05 confidence level versus the mean valuations of both Authors and Owners. Again, the WTA/WTP gap observed in this round of the experiment is quite large – more than two-to-one. These results are not significantly different from those in the “eyes closed” contest.¹⁰²

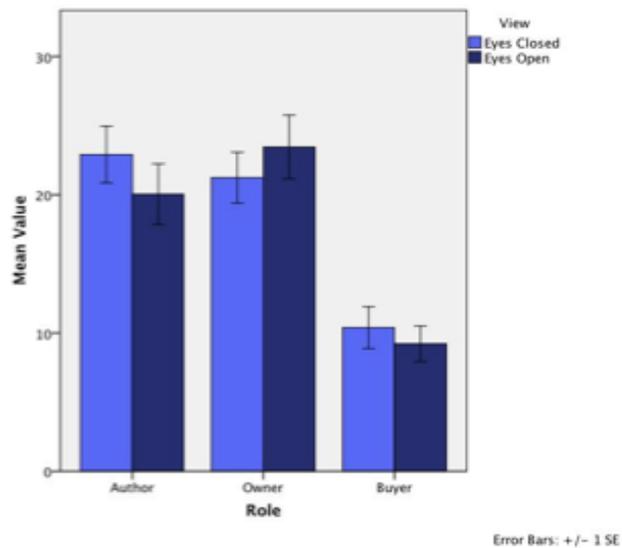
We have summarized the results for our “eyes closed” and “eyes open” contest conditions in the figures below. Both figures illustrate a significant gap between seller and buyer valuations, as well as the absence of a significant difference between authors and owners, and between the “eyes open” and “eyes closed” conditions.

¹⁰² The Contest – Eyes Open data were analyzed using an ANCOVA with “rating of poem,” “rating of oneself as poet,” and “predicted probability of winning” as covariates. The covariate “predicted probability of winning” was significantly related to mean valuation, $F(1,114) = 9.71, p < .005$. After controlling for the effects of the three covariates, we again found a significant effect of role on mean valuations, $F(2,114) = 12.45, p < .0005$. Follow-up t tests showed that Buyers’ mean valuations were significantly lower than both Authors’ and Owners’, $t(78) = 4.20, p < .0005, t(78) = 5.20, p < .0005$, respectively. Authors and Owners, however, did not significantly differ in their mean valuations, $t(78) = -1.16, p > .05$.

CONTEST: EYES CLOSED VS. EYES OPEN

Role	EYES CLOSED		EYES OPEN	
	Mean Value Assigned to Poem	Standard Error	Mean Value Assigned to Poem	Standard Error
Author	22.90	2.05	20.05	2.19
Owner	21.23	1.84	23.45	2.30
Buyer	10.38	1.51	9.21	1.30

CONTEST: EYES CLOSED VS. EYES OPEN



C. The Lottery – “Blind”

The difference between Author and Owner WTA and Bidder WTP perceived in our initial study might have resulted for a number of reasons. Perhaps the Authors and Owners, being initially endowed with the chance to win the prize were motivated by a strong sense of regret aversion causing them to insist on greater compensation for the risk

of missing out on the prize.¹⁰³ Owners of lottery tickets have been shown to be unwilling to part with their tickets for rational values because they fear the disutility they will experience if their ticket turns out to be the winner.¹⁰⁴ Perhaps additionally or alternatively, the Authors and Owners might be subject to a version of the “optimism bias” or “wishful thinking” making them feel like their chances of winning the prize were greater than they actually were.¹⁰⁵ For example, often lottery participants know the odds against them but nonetheless believe that they are personally more likely to win than the odds suggest.¹⁰⁶

1. Lottery Method

In order to test whether the WTA-WTP gaps were the result of either or both of these phenomena, we ran a follow-up study that substituted the quality-based contest of the initial study for a random lottery. If loss aversion or optimism bias were motivating the Authors’ and Owners’ higher asking prices, the WTA-WTP gaps in the initial and follow-up studies should have been identical. As with the initial study, participants were recruited from the Charlottesville, VA area and assigned to the same three conditions of Author, Bidder, and Owner. In the follow-up, however, instead of being told that the poems would be entered into a contest based on quality, the subjects were informed that one of the ten poems would be selected *at random* to receive the \$50 prize. All other aspects of the study were identical.

2. Lottery Results

We again observed a significant gap between the Authors’ and Owners’ WTA and Bidder WTP. The minimum amount that Authors would accept, on average, to transfer their chance of winning the contest was \$18.93. For Owners, the comparable figure was \$15.98. The difference between mean Author and Owner valuations is just on the borderline of statistical significance at the .05 confidence level. The Bidders’ average WTP, was, at \$5.60, lower by an amount that clearly is statistically significant versus the mean valuations of both Authors and Owners.¹⁰⁷ Indeed, the WTA/WTP gap observed in this

¹⁰³ See Dale T. Miller & Brian R. Taylor, *Counterfactual Thought, Regret, and Superstition: How to Avoid Kicking Yourself*, in *HEURISTICS AND BIASES: THE PSYCHOLOGY OF INTUITIVE JUDGMENT* 367, 372-3 (Thomas Gilovich et al., eds. 2002).

¹⁰⁴ See Bar-Hillel & Neter, *supra* note 64.

¹⁰⁵ See David A. Armor & Shelley E. Taylor, *When Predictions Fail: The Dilemma of Unrealistic Optimism*, in *HEURISTICS AND BIASES*, *supra* note __, at 334, 334 (“By a number of metrics and across a variety of domains, people have been found to assign higher probabilities to their attainment of desirable outcomes than either objective criteria or logical analysis warrants.”); Zlatan Krizan & Paul D. Windschitl, *The Influence of Outcome Desirability on Optimism*, 133 *PSYCOL. BULL.* 95 (2007).

¹⁰⁶ See Ellen Langer, *The Illusion of Control*, 32 *J. PERSONALITY & SOC. PSYCHOL.* 311 (1975). Another possibility for the reluctance to exchange lottery tickets is that owners of the tickets superstitiously believe that by selling a ticket they are tempting fate and increasing the likelihood that their former ticket will win. See Jane L. Risen & Thomas Gilovich, *Another Look at Why People are Reluctant to Exchange Lottery Tickets*, 93 *J. PERSONALITY & SOC. PSYCHOL.* 12 (2007).

¹⁰⁷ The lottery data were analyzed using an Analysis of Covariance (ANCOVA) with “rating of poem,” “rating of oneself as poet,” and “predicted probability of winning” as covariates. The covariate “predicted probability of

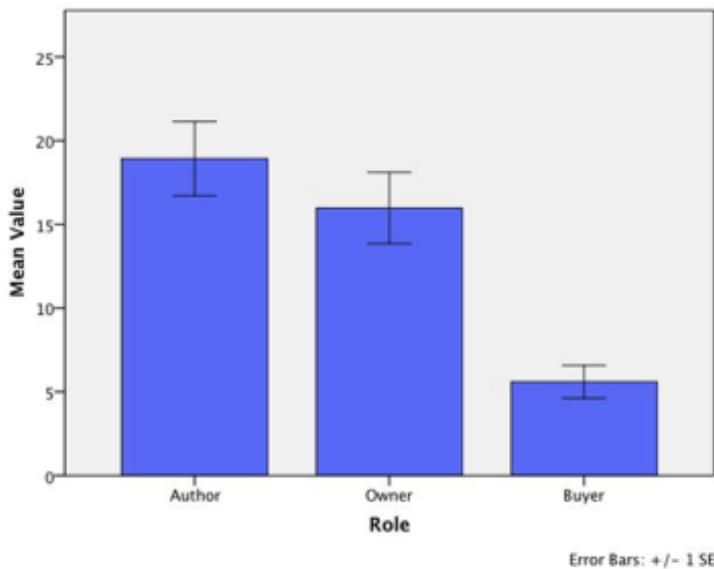
experiment is even larger than in the contest condition – more than three-to-one versus Authors, and almost three-to-one versus Owners. Importantly, however, for each of the roles, valuations in the Lottery are significantly lower than they are in either of the Contest scenarios. These figures illustrate our results in the lottery condition.

winning” was significantly related to mean valuation, $F(1,114) = 4.77, p < .05$. There was also a significant effect of role on mean valuations after controlling for the effects of the three covariates, $F(2,114) = 11.68, p < .0005$. Follow-up t tests revealed the same pattern found in the Contest – Eyes Closed condition: mean valuations given by Buyers were significantly lower than those given by both Authors and Owners, $t(78) = 5.51, p < .0005, t(78) = 4.43, p < .0005$, respectively. The difference in valuations between Authors and Owners failed to reach significance, $t(78) < 1$.

LOTTERY

Role	Mean Value Assigned to Poem	Standard Error
Author	18.92	2.21
Owner	15.98	2.13
Buyer	5.60	.98

LOTTERY



In summary, across all of our experiments, we detect substantial valuation asymmetries between poem Authors and Buyers. Authors generally request more than twice the amount to sell their poems than Buyers are willing to pay for them. This suggests the existence of a considerable endowment effect for intellectual property. In addition, we found no significant differences between Authors' valuations and Owners'. Finally, in the Lottery condition where poem quality should not have mattered, Authors' and Owners' valuations were lower than they were in the Contest conditions, but they were still

substantially higher than classical probability and economics would predict. In the following two Parts, we explore both the psychological mechanisms that are driving our results and their implications for IP law and policy.

III. UNDERSTANDING CREATORS' BEHAVIOR: INTERPRETING OUR RESULTS

In order to generate normative proposals from our findings, it is first necessary to interpret the results and to isolate, as much as possible, the psychological effects generating them. There might be a variety of causes of WTA-WTP discrepancies, each with different legal implications.¹⁰⁸

We begin by noting that the subjects in our experiment generally followed the prescriptions of classical probability theory – as their beliefs about the probability of winning the prize rose, so did their valuations of the poems.¹⁰⁹ Similarly, poems that were rated higher in the Contest were more highly valued by Authors, Owners, and Bidders. Thus, we feel confident that the subjects understood the task and behaved accordingly.

Although the subjects' valuation responses generally tracked their subjective assessments of the probability of winning the prize, their valuations and predictions diverged considerably from the objective probabilities of winning. In a contest with 10 poems and a \$50 prize, each poem would have a baseline 10% chance of winning and, accordingly, an expected value of \$5 (10% x \$50 = \$5). Depending on the quality of the poem compared with its competitors, its expected value would increase or decrease from the \$5 baseline. But because the Contest is a zero-sum game, the mean valuation of the 10 poems would remain \$5. And although the subjects do not have perfect knowledge of their weighted chance to win, any errors that they make would be expected to be randomly distributed around the mean. For the Lottery, because poem quality will not affect probability of winning, the expected value of each poem remains \$5. Accordingly, the "rational actor" account of the market would predict similar valuation means around \$5 for all subjects in both the Contest and Lottery scenarios.¹¹⁰

This is, of course, not what we see. Contest Authors and Owners want more than \$20 to sell their chance to the win the prize, and Contest Buyers are willing to pay about \$10 to buy a chance. These are particularly large valuation asymmetries especially considering the nature of the endowment. Recall that Authors and Owners were not alienating the entire poem but instead only their chance to win the prize, in keeping with the non-rival nature of IP licenses and transfers. Thus, results demonstrating such a large WTA-WTP gap *for only partial alienation* suggest a rather strong endowment effect. These

¹⁰⁸ See Korobkin, *Endowment Effect*, *supra* note 13, at 1242 ("In order to draw normative conclusions about legal policy in light of the endowment effect,...it is important to understand what causes individuals to place a higher value on an entitlement if they are endowed with it than if they are not...").

¹⁰⁹ See *supra* notes 102; 107.

¹¹⁰ Authors and Owners might be slightly higher than \$5 and Bidders slightly lower due to strategic bargaining, but 1) bargaining was not possible in this study and 2) the differences would be minor.

results confirm that endowment effects attend transactions in creative goods. These results also confirm that endowment effects attend transactions in non-rival goods. Of particular interest, the non-rivalrousness of the poems did not appear substantially to reduce the size of the pricing anomaly observed – the gap between WTA and WTP was quite large – more than two-to-one in the contest condition and approximately three-to-one in the lottery condition. These are very substantial valuation anomalies by any measure, and they are especially striking given that the experimental protocol involves (a) a payout of known value, in exchange (b) for only partial alienation of non-rival property.

These results raise a deeper question – what causes the endowment effect we observe in our study? We believe that our results are *the effect of both regret aversion and an optimism/ownership bias*. Regret aversion stems from people’s desire to avoid feeling like they acted foolishly and could have made a better decision. People often anticipate that they will feel unhappy if they choose to act in a way that turns out poorly, and they are willing to pay or demand a premium to avoid that feeling.¹¹¹ Thus, people may demand more than a lottery ticket’s expected value to sell it in order to avoid or compensate for the regret they would experience if it turns out that they had sold winning ticket. Separately, people have a well-documented tendency to prefer things associated with themselves and, accordingly, to value those things more highly. In some cases, this ownership effect may become apparent in the overly sanguine estimates people make of their own chances of success – a phenomenon we refer to here as “optimism bias”. Even though people understand the objective probabilities of marriages ending in divorce or receiving grades at the bottom of curve, they overestimate their own likelihood of success.

Our data suggest that both regret aversion and optimism bias have considerable roles to play in the valuation asymmetry. In many endowment effect studies, regret aversion and ownership/optimism effects are confounded such that the individual contributions of each are undetectable.¹¹² Our experimental design provides a method for distinguishing the effects of regret aversion and optimism. We can compare subjects’ predicted probabilities of winning with the valuation they assigned the poem in both the Contest and Lottery. To begin with, subjects in all of the roles in the Contests substantially overestimated the chances that their poem would win the prize (Authors = 28%; Owners = 26%; Buyers = 16%), so it seems clear that optimism bias is driving some of the result. Importantly, the divergences from the objective probabilities in the Contest are much higher than they are for the Lottery where quality should not count at all (Authors = 17%; Owners = 12%; Buyers = 11%). Accordingly, it seems as if all of the roles in the Contest and the Authors in the Lottery feel unduly confident in their chances of winning the prize. When subjects are confronted with uncertain probabilities of success, they express elevated confidence in their chance of winning. Additionally, stronger relationships with the goods are associated with higher levels of optimism within scenarios.¹¹³

¹¹¹ See Gilbert, *Looking Forward*, *supra* note 65, at 350.

¹¹² See Morewedge, *supra* note 58, at 948.

¹¹³ We speculate that the higher than expected probability ratings of Contest Bidders are based on a feeling that the poem they have been assigned is “theirs” in some way.

It is possible that the valuation asymmetries are accounted for by more than excessive optimism, however. To determine if this is the case, we can look at the *subjective expected value* of a poem, i.e., the predicted probability of winning multiplied by the amount of the prize. If the subjective expected value of a poem (predicted probability x prize) is equivalent to value assigned to the poem, then any difference from the objective expected value is likely due only to optimistic assessments of probabilities. But if the value assigned to the poem exceeds the subjective expected value, the difference may be based on subjects insisting on a premium to avoid feelings of regret. The latter explanation is supported by the data. For Authors and Owners in the Contest, the assigned value substantially exceeds the expected value based on their predicted probability of winning (Authors = \$21 - \$14 = \$7; Owners = \$22 - \$13 = \$9).¹¹⁴ An Author who thought she had a 28% chance of winning the contest should value it at \$14, so the difference between her WTA (\$21) and this number presumably indicates the amount of money (\$7) that it would take to compensate her for the disutility she would feel if she sold the winning poem.¹¹⁵ This suggests that Authors' and Owners' valuations are products both of over-optimistic predictions and regret aversion.¹¹⁶ Interestingly, for Contest Buyers, the assigned value and the expected value are quite similar although above the amount dictated by the objective probability, suggesting that Buyers seem to experience optimism bias but not regret aversion. This finding is consistent with other experimental evidence suggesting that regret aversion is stronger when people act (e.g. selling the winning lottery ticket) than when they fail to act (e.g. not buying the winning lottery ticket), which is of course another way in which the distribution of initial entitlements tends to drive behavior that does not conform to the classical rational choice model.¹¹⁷

Finally, it is worth pointing out an important aspect of our results. A surprisingly high number of Authors and Owners in the Contest reported a WTA price of \$50 indicating that they refused to sell their chance to win the prize. Although it may seem wildly irrational to refuse to sell a 10% chance at \$50 for \$45, these data may point to the high regard that some people have for property rules that protect their right to reject transfers.

Having examined the psychological effects underlying our results, a couple of curious issues remain to be explored. First, our prediction that Authors would exhibit greater valuation biases than Owners failed to materialize. We anticipated that Authors would have a greater attachment to the poems they had written than Owners would to poems that had been given to them and that this attachment would result in higher WTA values. So what happened? We have three thoughts. One possibility is that the creativity effect that we initially posited simply may not exist. This is possible, but we cannot say with confidence that it is accurate. A second possibility is that the lack of a difference is

¹¹⁴ These figures blend the "eyes open" and "blind" contest valuations.

¹¹⁵ We are not suggesting that subjects make these calculations explicitly or consciously.

¹¹⁶ The same regret aversion is visible in the Lottery condition. Mean Valuation - Subjective Expected Value (Authors = \$17 - \$8 = \$9; Owners = \$16 - \$6 = \$10). These results are consistent with other studies showing that owners of lottery tickets insist on a premium price to avoid the feeling of regret. See *supra* note __.

¹¹⁷ See Thomas Gilovich & V. H. Medvec, *The Experience of Regret: What, When, and Why*, 93 PSYCHOL. REV. 136 (1995).

more likely an artifact of our experimental design. In most real world settings, creativity is primarily internally motivated by the desire to create (contrary to most economic accounts),¹¹⁸ whereas in our experiment, Authors were told to write their poems and did so without the “spark” of creative motivation. Additionally, the size of the creative effort in our study was quite small. The five to ten minutes that subjects took to write their three-line poems is not equivalent to the effort that goes into painting a portrait, writing a concerto, or filming a movie. At this level of creativity, we may simply have missed important aspects of real-life authors’ preferences functions that might distinguish them from third-party owners. Thus, our experiment does not rule out the possibility that a distinctive creativity effect may occur in extended, internally motivated creative endeavors.¹¹⁹ Finally, we note that our Owners, who were meant in our experimental design to stand in for the intermediaries or agents who serve authors and inventors in real markets, differ from these actors in one very important way – unlike real-world agents, our Owners lack any meaningful market experience. To the extent that previous scholarship suggests that market experience reduces endowment effects (at least for goods that trade regularly and have ready substitutes – conditions which, we should emphasize, do not characterize our poems), we did not see any such reduction in our data for our inexperienced Owners, and this would tend to make the endowment effects exhibited in the conduct of Authors and Owners appear more similar than they are likely to be in real-world markets.

Another unexpected result was the similarity between valuations in the Eyes-Closed and Eyes-Open versions of the Contest. We expected that subjects with more information about the relevant market would make more “rational” choices about their odds of winning, yet getting to see the other poems in the competition did not affect the results. A couple of explanations present themselves. Because much of the valuation bias seems to be based on regret aversion, knowing more about competition may not reduce subjects’ fear of feeling regret. Perhaps more likely is the possibility that the combination of regret aversion and optimism bias is simply too strong to be eliminated by the additional information.

In summary, our experiment demonstrates a large valuation asymmetry between creators of new works and potential buyers. Authors and Owners in the Contest condition value their work at a rate more than four times higher than rational choice theory would predict and more than twice as high as Bidders are willing to pay. Authors and Owners in the lottery condition value their work at a rate more than three times higher than rational choice theory would predict, and approximately three times as high as Bidders are willing to pay. These substantial discrepancies are particularly strikingly considering that Authors and Owners were selling non-rival goods for which feelings of both ownership and the regret associated with loss (because “loss” does not involve full alienation) might have been lower. Additionally, the subjects’ exaggerated valuations appear to be the results of

¹¹⁸ See Tushnet, *supra* note 12, at 521; Anne Barron, *Copyright Infringement, ‘Free-Riding’ and the Lifeworld*, (London Sch. of Econ. & Pol. Sci, Law, Soc’y & Econ., Working Paper No. 17, 2008), available at <http://ssrn.com/abstract=1280893>.

¹¹⁹ We are about to begin data collection in a follow-up experiment that tests this hypothesis.

both optimism/ownership biases and regret aversion. Poem authors are overly optimistic about their chances of winning the prize, and they are willing to pay a substantial premium to avoid feeling regret about having sold the winning poem. Finally, two expected methods of debiasing creators may have no or limited effect. We did not find an effect either for increased market information (the “eyes-open” condition) or the use of third-party intermediaries (the Owners). We caution against reading too much into this last conclusion – our Owners lack the type of market experience that real-world agents possess. Use of intermediaries likely provides some benefit, but given the magnitude of the pricing anomalies that we observed, we doubt that they are a panacea.

IV. IMPLICATIONS FOR INTELLECTUAL PROPERTY LAW AND POLICY

Having explored the likely psychological mechanisms that account for our results, in this Part we turn to their implications for IP law and policy. Although valuation asymmetries may exist, the law may not always want to eliminate them. In general, only when we are confident that the asymmetries are the result of cognitive biases and not just idiosyncratic preferences should we consider attempts at debiasing. Similarly, debiasing techniques have costs, both in their implementation and in their effects on other social values.¹²⁰ So only when the benefits of debiasing exceed its costs should the law take action. First, we examine whether the optimism and regret aversion at the heart of our valuation asymmetries are indeed welfare-reducing biases. Concluding that they are to some considerable extent, we next turn to methods for mitigating their effects.

A. Do the Endowment Effects We Observe Lead to Inefficiency?

To begin the task of assessing the importance of our findings for IP law and policy, we must first address an overarching conceptual question. Are the endowment effects we observe in our study inconsistent with the rational choice model or not? Or, to put it another way, are our observed endowment effects likely to lead to outcomes that the rational choice model would recognize as inefficient? There is an argument that endowment effects – at least those that arise as a result of regret aversion – are in fact not anomalous but are rather consistent with a more fully-realized account of the rational choice model. A person’s desire to avoid feelings of regret, this argument maintains, is simply another preference, and when people factor their regret aversion into a pricing decision, they are acting according to what the rational choice model would predict if it had a better account of their preferences in the first place. Thus, regret aversion may widen the gap between sellers’ minimum WTA and buyers’ maximum WTP and reduce the number of completed transactions, but result neither in a suboptimal number of transactions nor any

¹²⁰ See Jonathan Klick & Gregory Mitchell, *Government Regulation of Irrationality: Moral and Cognitive Hazard*, 90 MINN. L. REV. 1620 (2005).

inefficiency. Rather, the outcome will faithfully reflect the parties' preferences, which are simply taken as a given.¹²¹

We believe that our study and other relevant scholarship show this argument to be weak in the IP context, for two principal reasons. First, a substantial increment of the endowment effect that appears in our study's contest conditions is the result of optimism bias rather than regret aversion. The contest conditions are, in our view, the most ecologically relevant branch of our study – in most IP markets, quality is an important criterion of success. And endowment effects that grow out of optimism bias are correctly understood to lead to inefficiency and behavior departing from what the rational choice model would predict. Failing to sell a \$5 lottery ticket for anything less than \$20 because you inaccurately believe it has a higher chance to win is inefficient. This is true whether we think of optimism bias as a form of imperfect information, or simply as a failure to respond to the information that is available.

Our study suggests that optimism bias arises from the latter cause – our subjects did not behave very differently when presented with more complete information in the “eyes open” version of our contest condition. But whatever the cause, the tendency of would-be sellers systematically to overestimate a proposed transaction's likely payout leads them to formulate a minimum WTA that exceeds the WTA they might indicate if they were able to engage in a more neutral calculation of the odds of success. And because optimism bias affects sellers more than buyers (we see this differential effect reflected in our data), we can expect this bias to lead to a sub-optimal number of transactions. This is an important point, not least because IP markets that are characterized by optimism biases are subject to a systematic form of mispricing that our study suggests is difficult to address via provision of more information about the likelihood of success. Our “eyes-open” condition gave subjects more complete information about their likelihood of success than participants in a real-world IP market are ever likely to enjoy, and yet we saw only marginal reduction of subjects' optimism bias.

This brings us, secondly, to the increment of the endowment effect observed in our study which we assign to regret aversion. Does this portion of the effect lead to inefficiency?¹²² The answer here is less clear, but we believe there is a strong argument that large endowment effects arising from regret aversion are distorting from within the rational choice framework. According to the rational choice model, when people make risky choices in activities like gambles and lotteries they make estimates based on how the possible outcomes are likely to make them feel. It might be that in our experiment, Authors and Owners were accurately estimating that the negative emotion they would feel at having sold what turned out to be the winning poem would not be sufficiently offset by gain from

¹²¹ In order to make this argument, of course, supporters of the rational choice model would have to relax the assumption regarding context-independent preferences. Regret will be most strongly felt when in the position of a seller giving up, so this updated model would have to allow for valuation asymmetry based on ownership status.

¹²² See JONATHAN BARON, THINKING AND DECIDING 280 (4th ed. 2008) (describing different possibilities for whether valuations based on regret are rational).

receiving the poem's probabilistic value.¹²³ For example, they might have believed that on some measure of well-being or happiness, the regret that they would feel selling the winning poem would equal -8 and that the benefit they would receive from selling the poem for \$5 would be +2. Thus, they might correctly believe that they would need to sell the poem for at least \$20 to offset their regret. If people make these predictions accurately, then regret aversion may not create additional problems for the rational actor model.

So how good are people at making predictions about future hedonic states? A growing body of social scientific research suggests that the answer is "not very good at all."¹²⁴ When predicting how they will feel after an event, people tend to overestimate both the intensity and the duration of their negative emotional responses.¹²⁵ People fail to account for their ability to adapt to new situations and thus predict that bad experiences will feel worse and last longer than they actually do. These "affective forecasting errors" have been demonstrated for a variety of events including losing a romantic partner, failing an exam, and becoming disabled.¹²⁶ In addition, a recent experiment indicates that they exist for risky gambles as well.¹²⁷ Subjects predicted that losing the gamble would have significantly more emotional impact than winning, even though no actual difference was observed.¹²⁸ They also substantially overestimated the amount that losing would make them feel bad.¹²⁹ Although the gamble differs in some ways from our experiment,¹³⁰ there is good reason to think that if people are paying premiums to avoid regret (by inflating their WTA amounts) they are failing to maximize either their wealth or their happiness.¹³¹

B. The Debate Between Property Rules and Liability Rules

If endowment effects lead to inefficiency, then our study suggests that organizing IP law as a set of strong property rights (i.e., rights to exclude) might impose substantial costs, and that these costs must be evaluated as part of the wider debate regarding whether the law should be reorganized in whole or in part around liability rules (i.e., rules that allow users access without the need to ask permission, but require payment).¹³² If the wide

¹²³ *Id.*

¹²⁴ See Bronsteen, Buccafusco, & Masur, *supra* note 2, at 9-12.

¹²⁵ See Timothy D. Wilson & Daniel T. Gilbert, *Affective Forecasting: Knowing What to Want*, 14 CURRENT DIRECTIONS IN PSYCHOL. SCI. 131 (2005).

¹²⁶ *Id.*

¹²⁷ Kermer, *supra* note 63, at 650-51.

¹²⁸ *Id.*

¹²⁹ *Id.*

¹³⁰ For example, the emotional impact of seeing someone else win a prize with "your" poem might be greater than that of simply losing a standard bet of similar magnitude.

¹³¹ *Id.*

¹³² See Jerry H. Reichman, *Legal Hybrids Between the Patent and Copyright Paradigm*, 94 COLUM. L. REV. 1501 (1994) (favoring liability rules); Merges, *supra* note 18 (favoring property rules); A. Mitchell Polinsky,

disparities between Buyers' willingness to pay and Authors' and Owners' willingness to accept that we found in our study characterize a range of IP transactions, then parties seeking to license or otherwise transfer ownership of creative works will face substantial negotiation costs arising from the need to bridge wide differences in valuation.

This should be troubling, because the efficacy of rights transfer via negotiation is crucially important to IP law as it is currently structured. In both the copyright and patent contexts, initial rights holders (usually authors on the case of copyright,¹³³ and inventors¹³⁴ in patent) often are not particularly well-positioned to exploit their work.¹³⁵ The novelist's prospects for successful commercialization of his work depend on the very different skills and resources of the publisher. The same is true, in the patent context, of the engineer and the venture capitalist.

Given the gap between initial entitlement and commercial exploitation, an efficient IP law must provide a smooth transition between the initial rightsholder and the eventual transferee or licensee. There is, however, little empirical evidence bearing on whether the current law creates an environment in which such transfers may be accomplished with reasonable efficiency.¹³⁶ Thus far the law's preference for property rules is based primarily on a *presumption* that markets and arms-length negotiations will allocate rights more efficiently than the alternative; i.e., a legal regime based in liability rules, in which users are free to take, and the price of use is set not via private negotiation, but by a legislature, court, or government agency.¹³⁷

Our study undercuts that presumption. It is true that liability rules require non-market price setting, which is beset by its own costs and is likely to lead to misallocation in some cases.¹³⁸ On the other hand, IP's strong property rules may sometimes lead to

Resolving Nuisance Disputes: The Simple Economics of Injunctive and Damage Remedies, 32 STAN. L. REV. 1075, 1112 (1980) (favoring property rules).

¹³³ Copyrights arise in a work's natural author, 17 U.S.C. § 201(a), unless the work is recognized as a "work made for hire" – i.e., either the work of an employee acting within the scope of his/her employment, or a "sponsored work" within certain categories and denominated a work made for hire via a written instrument signed by both parties – in which case initial ownership of the work vests in the employer. See 17 U.S.C. §§ 201(b), 101 (defining "work made for hire").

¹³⁴ U.S. patent law contains a strong "inventorship" requirement – patents may be applied for and granted to only by the actual inventor. See 35 U.S.C. § 102(f).

¹³⁵ Merges, *supra* note 18, at 1307 ("Assigning an entitlement to its most efficient holder is generally not possible in the complex field of intellectual property, where creative works have many uses requiring multiple transactions.").

¹³⁶ In fact, the evidence that does exist suggests that IP rights often hinder efficient transactions. See MICHAEL HELLER, *THE GRIDLOCK ECONOMY* (2009) (describing the bargaining problems associated with anticommons effects).

¹³⁷ Merges, *supra* note 18, at 1308. Current IP law does include some liability rules; for example, under U.S. copyright law one may re-record a musical composition (i.e., make a "cover" version) without the need to ask permission, and subject to a royalty set by a government agency. See 17 U.S.C. § 115 (establishing compulsory license for "mechanical reproduction" of copyrighted musical compositions).

¹³⁸ See Merges, *supra* note 18, at 1299.

significant pricing anomalies that hinder transactions and impose separate inefficiencies that liability rules may not create.¹³⁹ The valuation asymmetries that we have identified add a significant and previously unrecognized layer to the transaction costs associated with IP bargaining. The parties' very different starting positions will result in both higher costs of bargaining and fewer otherwise valuable transactions taking place.¹⁴⁰ The inefficiencies created by property rules are neither different in kind nor necessarily less severe than those created by liability rules. As a consequence, if our confidence in the IP law's preference for strong property rules is to be sustained, it must be done on the basis of better evidence about the costs and associated inefficiencies of negotiation, versus the costs and associated inefficiencies of liability rules. These questions are empirical, not theoretical or ideological, and the answers may vary for different types of creativity and different markets. To make a start, we need more studies inquiring into whether pricing anomalies attend IP markets in a variety of circumstances, how large the WTA/WTP gaps are likely to be, and what can be done to shrink them.

C. Formalities as a Trigger for Property Rules

We suspect that the relative efficiency of property rules versus liability rules will vary depending on the particular form of creativity at issue and, importantly, the value of the work that is the subject of a particular transaction. For copyrighted and patented works with significant commercial value, there are various tools that parties may use to reduce the effect of valuation anomalies. The parties may use an intermediary to strike deals. If the intermediary has substantial market experience and the good has ready substitutes, we might expect a reduction in the gap between WTP and WTA and a consequent increase in the number of transactions to a point closer to optimality.

Additionally, although most of the situations discussed above are based on outright purchases or licenses of IP, not all IP deals are structured in this fashion. Parties may instead structure licenses as running royalties, and this alternative may serve to mitigate endowment effects. The running royalty – i.e., an arrangement where periodic payments are made according to some percentage of sales or revenues – is a way of effectively “agreeing to disagree” over the value of a creative work. In cases where an author or inventor believes that the work is likely to produce substantially more revenue than the purchaser, use of a running royalty may allow both parties to structure a deal that matches their expectations and that reduces inefficiencies caused by optimism or regret aversion.

We should emphasize that we cannot be sure how effective running royalties will be at mitigating endowment effects. Surprisingly little empirical research has been performed on the negotiation of royalties, so it is difficult for us to predict how endowment effects will

¹³⁹ See Rachlinski & Jourden, *supra* note 79.

¹⁴⁰ See Russell B. Korobkin, *Who Wins in Settlement Negotiations*, 11 AM. L. & ECON. REV. 162 (2009) (showing that the distance between parties' initial offers is inversely correlated with the likelihood of successful bargaining).

affect royalty bargaining.¹⁴¹ It is possible, as we have noted, that royalties might reduce the effects of optimism by allowing the parties to move forward without resolving their differences regarding the likely return on the transaction. But it also seems plausible that the substantial differences in estimates of likely success will continue to hinder parties' ability to agree on an acceptable split of the profits – the seller's inaccurately high estimate of the likelihood of the work's success may feed into a conviction that he deserves a more advantageous split of projected revenues. Similarly, royalty payments may protect the creator's feelings of attachment to the work because she will still be compensated if the work is successful thereby mitigating regret aversion. Or, the parties may continue to disagree over valuation, because the seller's valuation impounds an increment to compensate for anticipated loss that is nowhere reflected in the buyer's valuation. Thus, the seller is likely to demand a rate for a running royalty that is calculated to produce a payment larger than the buyer will be willing to provide. Indeed, these questions present another level of complexity: in many IP contexts the royalty rate will not be subject to bargaining, because it will be set by industry norms. Again, it is difficult to predict in settings where bargaining is impossible or unlikely whether the inability to bargain and the strength of norms will undermine endowment effects. Inability to bargain may result in an exercise of buy-side market power that partially or wholly offsets endowment effects. Or, it may simply result in a negotiation failure.

Even if the use of running royalties can play a role in mitigating endowment effects, it is very unlikely to be a complete answer to the problem of valuation. Running royalties are expensive to negotiate, implement, and administer. They involve the necessity of ongoing monitoring and periodic payments. As a result, running royalties are appropriate only for transactions that are valuable enough to bear the transaction costs of the running royalty arrangement. Importantly, the transactions that are not valuable enough to warrant the expense of royalties are also likely to be those for which endowment effects are most prominent – those created by one-time individual players. And while individually these creations might not generate impressive value, their aggregate value is substantial – witness, for example, the litigation and settlement disputes surrounding the Google Book Search project. There, Google and the Authors Guild have attempted to bind a huge number of individual authors in a class settlement agreement that gives Google rights to use the works of the class authors in their online tool for searching the contents of books. In order for the Google search tool to be valuable, it must encompass as many published books as possible; absent the settlement – and at the time of this writing it is far from clear that the settlement will be approved – Google would be obliged either to negotiate with a huge number of individual authors, or rely on a chancy fair use argument. Were Google to follow the negotiation route, each individual deal may be for little value, but aggregated the value would be very large. The Google Book Search settlement can be seen, in this light, as an attempt to construct, through very creative use of the class action mechanism, an effective private liability rule for Google's use of books.¹⁴² We express no view on the desirability of

¹⁴¹ We hope that future experiments will illuminate this unexplored area.

¹⁴² In this way, it mirrors some of the bargaining to liability rules discussed by Merges. See Merges, *supra* note 18.

the Google Book settlement. Along with our results, it does, however, suggest that it may make sense to restrict IP law's property rules only to works that are likely to trade above a certain minimum value.

In the patent context, that work is to some extent already done. Patents are granted only after an examination procedure to ensure that rights are created only in inventions that are novel, non-obvious, and useful. The process does not always work – every year many patents are granted that should not have been. The examination procedure does nonetheless provide a screen that is useful for our purposes – because it is expensive (on average, \$22,000), the patent examination requirement tends to filter out inventions that are commercially valueless.¹⁴³ The same is true of the patent system's maintenance fees: all utility patents are subject to maintenance fees which must be paid 3.5, 7.5, and 11.5 years from the patent's date of issue.¹⁴⁴ The fees are substantial and rise at each increment (\$980, \$2,480, and \$4,110, respectively).¹⁴⁵ The effect of the maintenance fees is to move out of patent inventions that may have initially been thought to have significant commercial value, but turn out not to. We should be clear that we are not denying that there are commercially valueless patents – there are many. They tend, however, not to be licensed. For the patents that are licensed, there tends to be some non-de minimis commercial value.

The same is not true in the case of copyright – or, to be more accurate, is no longer true.¹⁴⁶ The U.S. copyright system traditionally made the grant and maintenance of copyright subject to a set of mandatory requirements that together became known as copyright's "formalities". At copyright's inception in 1790 and for almost 200 years thereafter, the initial grant of copyright was made subject either to a requirement that the author enter the work on the official copyright registry, or that he mark all published copies with notice of copyright (or both). In addition, traditionally the copyright system required authors to renew (effectively, to re-register) their works after a relatively short initial term. Failure to comply with registration and/or notice formalities meant that the work entered the public domain without a copyright ever arising. Failure to comply with the renewal requirement means that the work moved into the public domain after the expiration of the initial term of copyright.¹⁴⁷ There were, in addition, fees associated with

¹⁴³ See Masur, *Costly Screens*, *supra* note 94, at 2. Masur writes, "The high costs of prosecuting a patent force inventors to determine *ex ante* whether the property rights they might acquire are genuinely worth the expense. This *ex ante* private cost creates a type of costly screen: the patent applicant must decide whether the expected benefits of obtaining a patent, discounted to present value, exceed the costs of navigating the patent office process. This price barrier forces potential applicants to draw upon private information about the value of their inventions, information that the patent office is otherwise unable to obtain." *Id.* at 2-3 (citations omitted).

¹⁴⁴ See 35 U.S.C. § 41(b) (establishing maintenance fees).

¹⁴⁵ For fee schedule, see <http://www.uspto.gov/web/offices/ac/qs/ope/fee2009september15.htm>.

¹⁴⁶ See David Fagundes & Jonathan Masur, *Costly Intellectual Property* (arguing that the lack of costly screening mechanisms in copyright might be socially beneficial).

¹⁴⁷ For a summary of the details and effect of the traditional system of copyright formalities, see Christopher Jon Sprigman, *Reform(alizing) Copyright*, 57 STAN. L. REV. 485 (2004).

the registration and renewal formalities, and these fees served as a filter – similar to those operating today in the patent system – that tended to restrict copyright to works with some substantial commercial value.¹⁴⁸

Following the Copyright Act of 1976, however, mandatory formalities have been removed from the law. Copyright now arises automatically and indiscriminately whenever a creative work is fixed in any tangible medium of expression.¹⁴⁹ There is now no screen that limits the application of copyright's strong property rights to works with some substantial commercial value. As a consequence, many – indeed, the vast majority – of works that are subject to copyright's property rule have no substantial commercial value. Until recently, that hardly would have mattered – the economics of distribution meant that few uses could effectively be made of works with low commercial value. But as the Google Book Search project – and other efforts involving mass digitization, such as the Internet Archive's Million Books Project – show, in the current environment of very low-cost digital distribution of works, a wide range of uses of works of otherwise low commercial value become possible. These contemplated uses, which may produce social value, may, however, often be insufficiently valuable (at least with respect to individual works) to bear the significant negotiation costs required to overcome the valuation anomalies arising from endowment effects, in addition to other negotiation costs and the risk of strategic behavior. And again, these transactions are likely to involve the kind of sellers most subject to valuation biases.

We are not free, however, simply to reintroduce into the copyright law the traditional formalities. As a signatory to the Berne Convention, the leading international agreement governing copyright law, the U.S. is forbidden from implementing formalities that affect the “exercise and enjoyment” of copyright,¹⁵⁰ and the traditional formalities, which remove all rights in a work upon non-compliance, are squarely within the forbidden territory. We can, however, obtain many of the benefits of the traditional formalities without offending Berne. One direct way would be to construct an effective liability rule through a revised set of copyright remedies. Current copyright law provides both compensatory remedies and disgorgement of any profits realized by the infringer that are related to the infringement,¹⁵¹ as well as readily-available injunctive relief.¹⁵² In addition, current law provides the option of significant statutory damages (i.e., damages awarded without regard to any showing of actual harm) and an award of attorneys fees in infringement actions involving works registered prior to defendant's commencement of infringement.¹⁵³ Copyright's remedies provisions are aimed squarely at deterrence – even for unregistered works, the combination of compensation, disgorgement, and freely-granted equitable relief are consistent with copyright's strong property rule.

¹⁴⁸ See *id.* at 502.

¹⁴⁹ See 17 U.S.C. § 102(a) (defining copyrightable subject matter).

¹⁵⁰ See Sprigman, *Reform(aliz)ing*, at 147.

¹⁵¹ See 17 U.S.C. § 502(b) (providing for award of actual damages).

¹⁵² See 17 U.S.C. § 502 (providing for injunctive relief).

¹⁵³ See 17 U.S.C. §§ 504(c) (providing for statutory damages), 505 (providing for costs and attorneys fees).

But there is nothing inevitable about this consistency between a legal rule and the remedies available for its breach. Indeed, copyright's sister legal regime, patent, features substantive rights that are structured as strong property rules but also remedies provisions that are oriented more directly at compensation, rather than deterrence. The Patent Act, in particular, limits monetary damages to a reasonable royalty.¹⁵⁴ The award may be trebled for willful infringement,¹⁵⁵ but courts do this sparingly. Similarly, awards of attorneys' fees are limited to "exceptional cases" and are, relative to the rate at which they are awarded in copyright infringement lawsuits, rarely ordered.¹⁵⁶ The Patent Act also provides for preliminary and permanent injunctions,¹⁵⁷ but since the Supreme Court's opinion in *eBay Inc. v. MercExchange, L.L.C.*,¹⁵⁸ it has been clear that injunctions are not available as a matter of course but rather the need for relief beyond monetary compensation must be established by the plaintiff according to traditional rules of equity. In short, patent's remedies regime does not faithfully reflect patent's strong property rules – indeed, patent law provides remedies that, at least in cases where damages are limited to those required to compensate, and equitable relief is held inappropriate, are effectively equivalent to a liability rule.

Our results suggest that – at least for unregistered works – copyright's remedies regime should move closer to patent's. Current law already limits the award of statutory damages and attorneys fees to works registered before the commencement of the infringement at issue. If we treat registration as a rough proxy for works with some commercial value, then we could improve copyright's remedies regime by also conditioning the availability of disgorgement and injunctive relief on timely registration. There is reason to believe that even very low cost formalities could have a substantial effect on the nature and extent of copyright protection. These formalities would return the U.S. to an opt-in regime for copyright. Although economic theory predicts that the nature of the default rule will not affect choice outcomes when the costs of choosing are minimal, a growing body of empirical data suggest that defaults are incredibly "sticky."¹⁵⁹ Thus, even if the costs of opting into full copyright protection were very close to zero, many authors might still choose not to participate. Accordingly, copyright would not have to adopt the expensive screens used in patent law to achieve a significant shift in the nature of ownership. The result of such a shift would be to expose low-value works to the effective equivalent of a liability rule. The low-value works are precisely those for which various means for reducing endowment effects – e.g., use of intermediaries or running royalties – are least likely to be used, due to their high cost relative to the low value of the transaction.

¹⁵⁴ See 35 U.S.C. § 284 ("Upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court.")

¹⁵⁵ *Id.*

¹⁵⁶ See 35 U.S.C. § 285.

¹⁵⁷ See 17 U.S.C. § 283.

¹⁵⁸ 547 U.S. 388 (2006).

¹⁵⁹ See THALER & SUNSTEIN, *supra* note 73; Korobkin, *Status Quo Bias*, *supra* note 6.

D. Behavioral Biases and the Market Failure Theory of Fair Use

In copyright law, the fair use doctrine exists to exempt from liability some uses of a work that would otherwise infringe an owner's copyright. Although a variety of accounts of fair use doctrine exist,¹⁶⁰ one of the leading scholarly theories of fair use focuses on the doctrine's application to market failures that prevent socially beneficial uses.¹⁶¹ On this account, the existence of markets for creative works generally ensure that secondary users are able to license works when licensing will lead to beneficial uses. In a number of situations, however, markets may fail to function properly, impeding valuable transfers. When this happens, courts should apply the fair use doctrine to enable secondary uses.¹⁶²

Previous accounts of the market failure theory have focused on failures that arise from market barriers, bargaining costs, externalities, and anti-dissemination motives.¹⁶³ Our experiment suggests that, in addition, otherwise mutually beneficial transfers may not occur due to biased valuations of creative works even where functioning markets exist. If authors and owners of copyrighted works make irrational demands that prevent the licensing of their work, then secondary works with surplus social value may not get made. For example, the owner of a musical composition copyright might demand, in part due to an endowment effect, an irrational amount of money to license her song to another user who wants to use part of the song as a sample in a new work.

In such a case, if a court could reliably detect the presence of significant endowment effects, it might consider declaring the secondary use fair and thus not infringing. For courts to be able more reliably to detect the presence and assess the likely magnitude of endowment effects, there must first be more research modeling a variety of IP transactions, both in terms of different forms of creativity, and in different institutional settings where intermediaries and community norms may have differing effects on valuation. Even if courts face difficulties in determining whether endowment effects frustrate socially productive licensing in particular cases, however, the mere threat of fair use declarations based on irrational valuations may help de-bias owners to begin with. When secondary uses are declared fair, original owners receive no compensation, so under this regime, regret averse owners might actually be encouraged to bargain. As we begin to learn more about the existence of endowment effects in IP markets, we should be able to recognize

¹⁶⁰ See e.g. Edward Lee, *Technological Fair Use*, S. CAL. L. REV. (forthcoming 2010).

¹⁶¹ Wendy J. Gordon, *Fair Use as Market Failure: A Structural and Economic Analysis of the Betamax Case and its Predecessors*, 82 COLUM. L. REV. 1600 (1982).

¹⁶² *Id.* The market failure theory is not uniformly accepted. See Glynn S. Lunney, Jr., *Fair Use and Market Failure: Sony Revisited*, 82 B.U. L. REV. 975 (2002); Wendy J. Gordon, *Market Failure and Intellectual Property: A Response to Professor Lunney*, 82 B.U. L. REV. 1031 (2002); Lydia Pallas Loren, *Redefining the Market Failure Approach to Fair use in an Era of Copyright Permission Systems*, 5 J. INTELL. PROP. L. 1 (1997); Raymond Shih Ray Ku, *Consumers and Creative Destruction: Fair Use beyond Market Failure*, 18 BERKELEY TECH. L.J. 539 (2003).

¹⁶³ See Gordon, *supra* note 161, at 1627-35.

situations in which valuation biases lead to market failure.¹⁶⁴ That knowledge will be valuable to courts when determining whether certain uses should be allowed.

CONCLUSION

In this experiment we have established the likely presence of substantial endowment effects in transactions involving intellectual property. This is a significant finding for two reasons. First, the endowment effects literature to date has been limited to transactions involving property which subjects are simply given, rather than property which subjects create. Our study extends the literature to show that the pricing anomalies referred to as the endowment effect extend to created goods. Second, our study shows that endowment effects attend transactions in non-rival property. Again, this is a new addition to the literature, which previously studied these pricing anomalies in the context of fully-rivalrous property. Most IP transactions involve non-rival goods.

In addition to establishing the effect's existence for IP transactions, our experiment shows that the pricing anomalies that we observed are due to a combination of optimism bias and regret aversion. We believe that endowment effects arising from both causes lead to inefficiencies within the rational choice framework.

Finally, we advance some suggestions for how our results might affect IP policy. Most broadly, we believe that our results should inform the ongoing debate over whether IP law is best structured around property rules or liability rules. Additionally, our results point, we argue, toward the advisability of copyright reformalization – perhaps best achieved not directly, but via reformulation of copyright's remedies provisions to limit owners of works that are unregistered (and therefore presumptively of low commercial value) to the effective equivalent of a liability rule. Finally, our findings should inform copyright's fair use doctrine. Many courts considering the fair use defense already base their analysis, in part, on the presence of significant transaction costs, which lower the likelihood that the parties would have negotiated a license and therefore make fair use more appropriate. In light of our findings, courts should consider whether a license for the use at issue in a particular case would likely be subject to significant endowment effects. If so, it is less likely that the parties would have struck a deal as an alternative to unauthorized use, and a finding of fair use is therefore more appropriate.

Future research will, we hope, extend this experiment in a variety of directions. Will authors' valuations differ from owners' when the creative effort is more substantial and externally motivated? What role do royalties and bargaining play in mitigating valuation asymmetries? Might those asymmetries increase if we introduce other valuable aspects of creative property, including attribution, prestige, and the like? These and other questions remain unanswered.

¹⁶⁴ Something like this appears to be happening in the market for sound recording licensing for music sampling. See Peter DiCola, *Sequential Music Creation and Sample Licensing*, available at <http://www.chicagoip.com/>.