

# Valuing Intellectual Property: An Experiment

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In recent decades, research in behavioral psychology and experimental economics has undermined some of the fundamental principles of the “rational choice” model of neoclassical economics—in particular, the assumption that decision-makers have stable preferences. A large volume of data shows that people’s preferences are subject to a variety of cognitive biases and framing effects. In particular, people attach substantially higher value to the same goods if they own them than if they are considering purchasing them. Scholars have detected this “endowment effect,” the gap between what people selling property are willing to accept (WTA) and the amount others are willing to pay (WTP), for an astounding variety of forms of property. While legal scholars and some courts have applied these findings in rethinking features of tort, contract, property, and criminal law, there has been surprisingly little discussion of their implications for intellectual property (IP).

The Article on which this Editorial is based is the first to extend the endowment-effects research to property that, like intellectual property, (1) was actually *created by* the owners and (2) is *nonrival* (i.e., consumption by one person does not prevent consumption by another). Our study suggests that the preferences of IP creators, owners, and purchasers are unstable and dependent on the initial distribution of property rights. Additionally, large gaps arise between WTA and WTP even where goods are nonrival and the contemplated alienation of the property is therefore only partial. In the second installment of this research, we show that the existence of a separate *creativity effect*—a valuation anomaly tied to creative authorship—further enlarges the WTA–WTP gap.<sup>1</sup> These results have considerable implications for structuring IP rights.

In our first experiment, the “Eyes Closed Contest,” we simulated the economic market for intellectual property rights by giving subjects the opportunity to buy and sell chances to win a known contest prize. These chances model the value of IP rights, which depend primarily on rent-seeking opportunities. To create the Contest, we randomly assigned subjects roles as Authors, Owners, and Bidders. We told the Authors that they would be competing in a haiku writing competition with nine other subjects. A poetry expert would select the best poem, and its writer would receive a \$50 prize. We then told the Authors that an additional ten subjects, the Bidders, would receive an opportunity to buy the Author’s chance of winning the prize. We also told the authors that each Author’s poem would be assigned to a Bidder who would indicate the greatest amount of money he would be willing to pay to purchase the Author’s chance to win, and that the Author should indicate the least amount she would be willing to accept. To focus participants on the rent-producing opportunities of the property, we reminded the Authors that they would be selling only the chance to win the prize, not the poem itself. Each Author entered a WTA amount and answered some follow-up questions including ratings of their poem and predictions of its probability of winning the prize. We showed the Bidders a poem and told them to indicate the greatest amount of money that they would be willing to pay to purchase its chance

to win the prize. The Bidders then answered the same follow-up questions. We told the Owners 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. We told each Owner to enter a WTA amount and asked them to answer the follow-up questions.

We observed a significant gap between the Authors' and Owners' WTA and the Bidders' WTP. On average, the Authors' minimum WTA was \$22.90. The Bidders' average WTP, at \$10.38, was lower by a clearly statistically significant amount at a .05 confidence level. Indeed, the WTA/WTP gap we observed in this experiment is quite large—more than two to one—especially considering that the property at issue is nonrival and the experimental protocol involved the possibility of only partial alienation (i.e., alienation of the possibility of winning the Contest, rather than the poem itself). We had anticipated that Authors would value their poems more highly than mere Owners. This is not what we see. The difference between Authors' and Owners' WTA amounts (\$22.90 and \$21.23, respectively) is not statistically significant at a .05 confidence level.

In a variation on this experiment, the “Eyes Open Contest,” we repeated the “Eyes Closed” protocol but allowed subjects to see all ten poems that would be competing in the Contest. We hypothesized that if quality judgments were affecting subjects' valuations, the subjects' relation to the poem might differentially affect those judgments. We predicted that viewing the competition would decrease the quality of ratings of Owners and Bidders but that those of Authors would remain largely unaffected. Our findings did not confirm these hypotheses. The additional information seemed to have no effect on the WTA–WTP gap, which remained quite large—more than two to one.

The difference between Author and Owner WTA and Bidder WTP that we perceived in our study might have occurred 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, which caused them to insist on greater compensation for the risk of missing out on the prize. Additionally, or alternatively, the Authors and Owners might be subject to a version of “optimism bias” or “wishful thinking,” making them feel as though their chances of winning the prize were greater than they actually were. To test whether the WTA/WTP gaps were the result of either or both of these phenomena, we conducted 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. Nevertheless, we again observed a significant gap between the Authors' and Owners' WTA and Bidders' 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 rests on the borderline of statistical significance at the .05 confidence level. The Bidders' average WTP, at \$5.60, was lower than the mean valuations of both Authors and Owners by an amount that clearly is statistically significant.<sup>2</sup> Indeed, the WTA/WTP gap observed in this 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 were significantly lower than they were in either

of the Contest scenarios. The difference in results between the Contest and Lottery conditions suggests to us that our results are the effect of both regret aversion and optimism bias.

With respect to optimism bias, subjects in all of the roles in the Contests substantially overestimated their chance of winning the prize (Authors = 28%; Owners = 26%; Buyers = 16%), thus illustrating that optimism bias drives 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, all of the roles in the Contest and the Authors in the Lottery seem to feel unduly confident in their chances of winning the prize. When subjects confront uncertain probabilities of success, they express elevated confidence in their chance of winning. Additionally, stronger relationships with the goods correlate with higher levels of optimism.

With respect to regret aversion, we examined 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 is equivalent to the value a subject assigns to the poem, any difference from the objective expected value is likely due only to optimistic assessments of probabilities. But, if the value a subject assigns to the poem exceeds the subjective expected value, the difference may result from subjects' insisting on a premium to avoid feelings of regret. The data support the latter explanation. For Authors and Owners in the Contest, the assigned value substantially exceeds the expected value based on their predicted probability of winning (for Authors,  $\$21 - \$14 = \$7$ ; for Owners,  $\$22 - \$13 = \$9$ ).<sup>3</sup> An Author who thought she had a 28% chance of winning the Contest should value it at \$14; the difference between her WTA (\$21) and this number could indicate the amount of money (\$7) that would compensate her for the disutility she would feel if she sold the winning poem.<sup>4</sup> This suggests that Authors' and Owners' valuations are products of both overly optimistic predictions and regret aversion.

## THE SECOND STUDY

We had hypothesized that the creativity effect would result in Authors expressing a greater attachment to the poems they had written, and thus a higher WTA than Owners. This prediction did not materialize in this study. Why didn't we observe the creativity effect in this study? One possibility is that the hypothesized creativity effect simply does not exist. An alternative possibility, which subsequent research supports, is that the absence of an apparent creativity effect is an artifact of our experimental design. In most real-world settings, the desire to create internally motivates creativity, whereas in our experiment, we instructed Authors to write poems and they did so without the "spark" of creative motivation. Additionally, our study required minimal creative effort. Our subjects spent only five to ten minutes writing a three-line poem. This is not equivalent to the effort that goes into painting a portrait or filming a movie.

In a separate study, which is forthcoming in the *University of Chicago Law Review*, we constructed an experiment designed to remove these limitations from the protocol. We designed the experiments in the second installment to determine whether creators who are (1) internally motivated, at least in part, and (2) expend significant creative effort on their works, manifest a significantly larger WTA/WTP gap relative to the gap that transactions involving mere owners produce. If so, this would be a distinctive valuation anomaly tied to creative authorship.

We solicited painting students from the School of the Art Institute (SAIC) in Chicago as subjects. We invited the subjects to choose a medium-sized painting for entry into a contest for a \$100 prize. We received twenty submissions and held two contests of ten paintings each. A faculty member of SAIC judged the paintings.

Following the protocol we used in the previous experiments, we told the subjects that they would be competing with the nine other Painters for a \$100 prize based on the quality of the paintings as judged by an expert. We next told them that they would be matched with one of ten additional subjects known as “the Buyers” who would make them a cash offer for their chance to win the prize. After viewing all ten paintings, we told the Painters to indicate the lowest amount they would accept. We reminded the Painters that they were not transferring the painting itself or any rights in it other than the chance to win the prize. We then asked the Painters to estimate (1) the probability that the expert would choose their painting as the winner, (2) the quality of the painting, (3) the number of hours they spent on the work, (4) the amount of emotional attachment they felt toward the work, and (5) the amount of regret they would feel if they sold the winning painting’s chance to win.

We recruited forty students to be randomly assigned to either the role of Buyer or Owner. We told the Buyers that they would be matched with one of ten Painters and that they would be able to make an offer to purchase the Painter’s chance to win the prize. We told them to indicate the most they would be willing to pay to buy the Painter’s chance to win. We told the Owners that they had been assigned to own one of ten paintings that had been entered into a contest for \$100. If “their” painting were chosen, they would receive \$100. We then told them that a Buyer would make them a cash offer for the chance to win the prize, and that if the Buyer’s offer exceeded the least amount the Owner was willing to accept, the Owner would receive the cash offer in exchange for the chance to win. After viewing all ten paintings and indicating a WTP amount, we asked the Buyers and Owners the same questions about probability, quality, and regret.

The subjects’ predictions of their paintings’ probability of winning significantly predicted their valuation. This indicates that they understood the task, but it does not mean that they always behaved rationally. Neoclassical economic theory dictates that the mean valuation of the paintings should be \$10. This is not what we saw. The Painters’ mean WTA was \$74.53, while the Owners’ mean WTA was \$40.66 and Buyers’ mean WTP was only \$17.88. These differences are all statistically significant. These results strongly suggest the existence of a creativity effect. When internally motivated and engaged in considerable creative work, creators seem to value their works substantially more than do mere owners or potential buyers of the works.

We considered three possible explanations for this result: emotional attachment to the work, biased optimism of the likelihood of winning the Contest, and anticipated regret at having sold the winning painting. Creators’ ratings of emotional attachment to their paintings did not predict their valuation. Relatedly, the number of hours the painter spent on the painting was also uncorrelated with the painter’s valuation. Optimism bias, however, appeared to have the largest effect on creators’ overvaluations of their likelihood of winning the prize. This resulted in creators refusing to sell their chance for anything close to its objective probabilistic value. Finally, although regret was close to being a significant predictor of valuations when controlling

for variance in role, we detected no difference in predicted regret based on subjects' role. We are accordingly hesitant to ascribe too much weight to the impact of regret on the creativity effect.

## IMPLICATIONS

The findings from our first and second studies have important implications for IP law, which assumes that markets and arms-length negotiations will allocate rights more efficiently than a legal regime based in liability rules in which users are free to consume at a price that a legislature, court, or government agency sets. Our study undercuts that presumption and adds a significant and previously unrecognized layer to the transaction costs associated with IP bargaining. The tendency of would-be sellers to systematically overestimate a proposed transaction's likely payout leads them to formulate an irrationally high WTA amount. This will likely result in a suboptimal number of transactions.

Because we believe that the valuation anomalies we detected stem from irrational demands by authors and owners of creative works, we propose that contracting parties and IP law consider possibilities for diminishing the effect. A running royalty—an arrangement where periodic payments are made according to some percentage of sales or revenues—could mitigate the problems of strong property rules. The running royalty may allow both parties to structure a deal that matches their expectations and reduces inefficiencies that optimism or regret aversion cause. The cost of using running royalties makes them appropriate only for transactions valuable enough to bear the costs. Importantly, the transactions that are not valuable enough to warrant the expense of royalties are also likely to be those for which creativity effects are most prominent—those that one-time individual players create.

This observation suggests that restricting property rules to works that are likely to trade above a certain minimum value makes sense. In the patent context, in which patents are restricted to inventions that are novel and useful, this already occurs to some extent. One way to achieve similar benefits for copyright law is to reformulate copyright's remedies provision to limit owners of works that are unregistered (and therefore presumptively of low commercial value) to the equivalent of a liability rule.

Our data suggest that, on average, we can expect that transacting will be more efficient when rights to creative goods are in the hands of intermediaries rather than authors or inventors. Thus, expanding rules that vest rights in third parties, rather than exclusively in creators, makes sense. In the copyright context, this could include enlarging the scope of the "work made for hire" doctrine, which allows ownership of a work to vest in some person or firm other than the creator. In the patent context, this could include expanding current law's very strict "inventorship" requirement.

A final way to encourage optimal IP transaction occurrence is through the fair use doctrine, which exempts from liability some uses that would otherwise infringe on an owner's copyright. A leading theory of the doctrine asserts that, when markets impede transfers that will allow a beneficial use of a work, courts should apply the fair use doctrine to enable secondary uses. Our experiment suggests that courts should also apply the doctrine where the presence of significant

creativity and endowment effects impede transfers that would allow beneficial use of a work. More research is needed to enable courts to detect the presence and magnitude of endowment effects.

In conclusion, our research shows that the endowment effect impacts the valuation of goods that, like intellectual property, are created and nonrival. A separate creativity effect compounds this valuation anomaly, resulting in an overvaluation by owners who are internally motivated and expend significant creative effort on their works. Together, the endowment and creativity effects create transaction costs above those IP law's property rules contemplate. It is therefore appropriate to reconsider the current structure of IP rights. ❖

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1. For a full report of this study, see Christopher Buccafusco & Christopher Jon Sprigman, *The Creativity Effect*, \_\_\_\_ U. CHI. L. REV. \_\_\_\_ (forthcoming 2010) [↵](#)
2. We analyzed the Lottery data 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 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 that Buyers gave were significantly lower than those Authors and Owners gave,  $t(78) = 5.51, p < .0005, t(78) = 4.43, p < .0005$ , respectively. The difference in valuations between Authors and Owners failed to reach significance,  $t(78) < 1$ . [↵](#)
3. These figures blend the "Eyes Open" and "Blind" Contest valuations. [↵](#)
4. We are not suggesting that subjects make these calculations explicitly or consciously. [↵](#)