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Does Copyright Law Promote Creativity?
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Modern copyright law is based upon a theory: increase copyright protection and you increase the number of creative works available to society. This theory has been the driving force behind an economic vision that has expanded, beyond all recognition, the original law created by the Statute of Anne. And with this expansion, we are told that the costs associated with copyright are worthwhile because of the bounty it produces. What if this theory could be tested? After all, this is not a question of faith or morality, nor is it a statement on how humans should behave; it is a theory about how humans do behave. In this article, we use statistical analysis to test the theory that increasing copyright protection usually increases the number of new creative works. Relying upon U.S. copyright registrations from 1870 through 2006 as a proxy for the number of works created, we considered how four variables, population, the economy, law changes, and technology influenced subsequent copyright registrations. Based upon this data, our findings cast serious doubt on the idea that with copyright law, one size fits all. While individual law changes may be associated with changes in subsequent copyright registrations, overall, the relationship between law changes and registrations is neither consistent nor completely predictable.

I. Introduction

In 1841 Thomas Babington Macaulay delivered a speech in the British Parliament in which he famously described copyright as “a tax on readers for the purpose of giving a bounty to writers.” While critics of copyright law often use this quote as a general objection to copyright, that was not the intent. Macaulay was not opposed to copyright per se. Instead, he was skeptical that a proposal to increase the length of copyright protection would yield much in return. Following this famous quote, Macaulay goes on to say that:

I admit, however, the necessity of giving a bounty to genius and learning. In order to give such a bounty, I willingly submit even to this severe and burdensome tax. Nay, I am ready to increase the tax, if it can be shown that by so

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doing I should proportionally increase the bounty. My complaint is, that my honourable and learned friend doubles, triples, quadruples, the tax, and makes scarcely any perceptible addition to the bounty.

As such, the problem was not copyright itself, nor even the monopoly costs associated with copyright, which he described in that same speech as a necessary evil, but whether changing copyright law and expanding copyright’s exclusive rights would provide the public with any real benefit. While Macaulay was successful in defeating the 1841 effort to expand copyright, more often than not, lawmakers have not shared his skepticism.

In the United States, the history of copyright law is one of expansion. For example, in 1790, copyright originally provided authors the exclusive right to vend books and maps for fourteen years with an additional fourteen years of protection if renewed. Currently, copyright protects all original expression fixed in a tangible medium of expression which includes among other works: books, motion pictures, sound recordings, broadcasts of sporting events, and video games, provides authors the exclusive right to control almost all uses of their writings including the ability to create new works based upon the original, and protection lasts for the life of the author plus an additional seventy years.

The logic behind this expansion is straightforward. Copyright law provides authors with exclusive rights in their works. In turn, these exclusive rights allow successful authors to obtain financial reward for their work by creating a market for those works without resort to private or government patronage. The greater the protection, the greater the reward; the greater the reward, the greater the incentive to create new works; and the greater the incentive to create new works, the greater the number of new works created. To paraphrase Macaulay, by increasing the financial bounty available to authors, we ultimately increase the public’s bounty of new works of authorship. In other words, copyright law promotes creativity. [So the argument goes,] if a little copyright is good, more is better. While logical, this position is still a theory and, like all theories, can be tested. Unfortunately, even though copyright has existed and continuously expanded for hundreds of years, there has been little research done to test the theoretical basis for copyright’s expansion. In fact, so little has been done in this area that one author specifically pled for more empirical research. This study responds to this need.

In this study, we use statistical analysis to examine whether changes in copyright law influence the number of new works created. Relying upon U.S. copyright registrations from 1870 through 2006 as a proxy for the number of works created, we considered how four

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4 I use this term loosely, and it would be more accurate to say that copyright encourages or rewards creativity.
5 See, e.g., WILLIAM M. LANDES & RICHARD A. POSNER, THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW (2003) (hereinafter ECONOMIC STRUCTURE); Eldred v. Ashcroft, Brief of George A. Akerlof, Kenneth J. Arrow, et. al (May 20, 2002). See also Paul J. Heald, Property Rights and the Efficient Exploitation of Copyrighted Fiction Bestsellers, 92 Minn. L. Rev. 1031 (2008) (analyzing whether lack of copyright protection led to underutilization of fictional books). While some have argued against the need for any copyright protection, see Stephen Breyer, The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies, and Computer Programs, 84 Harv. L. Rev. 281 (1970); MICHELE BOLDRIN AND DAVID K LEVINE, AGAINST INTELLECTUAL MONOPOLY (2008), our study does not address that question. Instead it examines whether changes to copyright law after 1870 affect subsequent copyright registrations.
variables – population, the economy, law changes both legislative and judicial, and technology – influenced new copyright registrations. From this data, we test the following hypotheses. The major hypothesis is that any change in copyright protection will result in changes in the number of works produced. The related minor hypotheses are that increasing copyright protection will increase the number of works produced, and its corollary that decreasing copyright protection will reduce the number of works produced. Despite the logic of the theory that increasing copyright protection will increase the number of copyrighted works, the data show that’s not true in many cases. Instead, our findings demonstrate that the historic growth in new copyrighted works is largely a function of population and its sharp changes are mostly due to procedural changes in copyright registration, such as those created by the Berne Implementation Act in 1989.

This is the first comprehensive study examining the relationship between changes in copyright law and changes in new copyright registrations. It employs statistical change-point analysis, parametric time-series regression and nonparametric regression with simultaneous confidence bounds around the registration growth curves. It relies upon the most complete set of data for U.S. copyright registrations up to date, examines the relationship of law changes with respect to individual categories of works, including monographs and sound recordings, and subcategories of works, such as performing arts, rather than rely entirely upon overall registration data, and considers all 56 Congressional and Supreme Court decisions that occurred between 1870-2006 together with other concurrent variables including population, economy, registration fees and technology changes. The only published work to date considered five law changes anecdotally and observed that two laws extending the length of copyright protection considered in their study yielded no statistically significant changes in the number of new works produced. Nonetheless, the authors of that study, William Landes and Richard Posner, continue to contend that increasing copyright protection should generally increase the number of new works produced, arguing that term extension is an aberration, “because the expected commercial life of a copyrighted work is so much shorter than the copyright term that it makes a lengthening of the term irrelevant to most potential registrations.” Presumably, laws that expand the subject matter of copyright to new works, grant authors new rights, remedies, and penalties are more likely to influence authors because they increase the opportunities and markets that successful copyright owners may exploit during the commercial life of the work. In other words, increasing the length of copyright increases the amount of time an author may benefit from a particular revenue stream, while change in the breadth of copyright increases the number and reliability of revenue streams. If one views copyright’s incentive regime as analogous to a lottery, by adding the right to control public performances, digital distribution, and derivate works based upon a copyrighted work, the law effectively expands the size of the copyright jackpot. Likewise, changes to the remedies available for violations of copyright law, providing copyright owners with statutory damages or increasing the prison time for criminal infringement, help assure authors that their payoffs will be protected.

7 ECONOMIC STRUCTURE, supra note __ at 247.
8 Id. at 79-84, 247.
Contrary to Landes and Posner’s suggestion, our study reveals that their anecdotal observations regarding term extension are not aberrational. Instead, our findings demonstrate that statistically, there is no uniform or fully predictable relationship between laws that increase copyright term, subject matter, rights, or criminal penalties and the number of new works registered in general. Overall, the most that can be expected is a 38% chance that a law increasing copyright protection will be associated with an increase in the number of new registrations for a single, unknown category of copyrighted work. In contrast, lawmakers are more likely to find a relationship between laws that reduce or otherwise limit copyright protection and a subsequent increase in the number of new works. Even then, the relationship is far from uniform or predictable. As such, the data suggests that these relationships may be essentially random. Population is uniformly and consistently the best predictor of the number of new works produced. So while increasing copyright protection may increase the rewards available to authors, it does little to change their incentives overall.

Consequently, this study provides valuable insight into the relationship between law and human behavior. A growing body of research in law, psychology, and economics asks the question, does law actually influence individual decision-making and behavior? In other words, when and under what circumstances does law matter? When law does influence individual behavior, how do individuals react to the rewards and penalties created by law? For example, social norms theorists have focused upon the relationship between law and social norms, and behavioralists have studied, among other things, whether the death penalty actually serves as a deterrent to crime. While the traditional economic model of human behavior has formed the theoretical basis for the proposition that increasing legal protection for copyrighted works should increase the number of new works created, this article argues not only that there is little empirical support for that uniform proposition, but that when properly understood, the rational, wealth-maximizing model itself does not predict such a change in behavior. This insight is critically important for evaluating copyright policy and the balance of costs and benefits associated with copyright protection, and contributes to our understanding of how individuals respond to legally created incentives. Specifically, this study increases our understanding of when and under what circumstances individuals will more likely change their behavior (in this case by producing more creative works) in response to changes in the potential rewards made possible by legally created rights.

Part II of this article discusses copyright’s historic growth and the incentive justification for copyright’s expansion including the central role that the incentive justification played in the United States Supreme Court’s decision in Eldred v. Ashcroft, which upheld Congress’ decision to extend copyright protection by an additional twenty years. Part III reviews the existing empirical research, and explains how this study adds to this underdeveloped body of literature. Part IV explains our study including a general description of our methodology and our findings. A detailed discussion of the statistical methodology, modeling, and results is included separately. Based upon this analysis, part IV concludes that the data do not support the major or minor hypotheses let alone the proposition that increasing copyright protection always

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13 See Appendix 1.
increases the number of new copyrighted works produced. Part V explains why many of the changes to copyright law do not appear to influence the number of new works produced by authors, and argues that our understanding of the existing economic model predicting such a change is incomplete and, more fundamentally, relies upon two dubious assumptions. As such, part V argues that even a basic economic model of human behavior does not support the proposition that increasing copyright protection will increase the number of new works produced in the current society. While increasing copyright protection provides authors with the opportunity to obtain greater rewards, these law changes are not creating additional incentives to create new works. Having concluded that there is scant empirical or theoretical support for expanding copyright protection as a reliable strategy for increasing the number of new copyrightable works, part VI of this article concludes by outlining four general strategies for increasing the number of such works in the future.

II. Expansion & Explanation

A. Copyright’s Growth

It is often said that death and taxes are the only guarantees in life. After even a cursory examination of the history of copyright law, one might add that the expansion of copyright law is guaranteed as well. As discussed earlier, in the United States, copyright originally provided authors the exclusive right to vend books and maps for fourteen years with an additional fourteen years of protection if renewed. Currently, copyright protects all original expression fixed in a tangible medium of expression which includes among other works: books, motion pictures, sound recordings, broadcasts of sporting events, and video games, provides authors the exclusive right to control almost all uses of their writings including the ability to create new works based upon the original, and protection lasts for the life of the author plus an additional seventy years. This expansion did not happen all at once. Instead, as illustrated by Chart 1, it is the product of the gradual accretion of copyright protection as the result of both legislative and judicial judgments. As Chart 1 illustrates, Congress has consistently given copyright owners control over additional uses of their works and increased the length of time during which they might exercise such control.14

14 Two important areas of copyright expansion are not represented in Chart 1. The first involves the term of copyright protection. Originally, the length of copyright protection was divided into an original term and a renewal term. In order to benefit from the renewal term copyright owners were required to file a renewal registration. Failure to file such a registration meant that copyright law would no longer protect the work. As part of Congress’ revision of copyright law in 1976, copyrighted works created after January 1, 1978 are now subject to a unitary term. As such, the chart notes the potential maximum length of protection without regard to renewals. The chart also does not note the changes in copyright formalities such as registration, notice, and deposit that also affect the substantive rights that may be enjoyed by copyright owners.
While the scope of copyright has expanded over time, it is equally true that, as a general matter, the number of copyrighted works produced each year has increased as well. Charts 2 and 3 illustrate this increase in the number of copyrighted works produced. Chart 2 illustrates the aggregate number of copyright registrations, including renewal registrations, filed each year from 1870 to 2006. Chart 3 illustrates the total number of new registrations filed by various subcategories. At first blush, it would appear that there is a relationship between copyright’s expansion and the number of new works created. Likewise, it would also appear that there is some support for the claim that new technologies including digital technologies and the Internet may have disrupted the otherwise, steady growth of creative works.
After all, when one looks at overall registrations, following 1991 (which some may characterize as the time the most recent array of disruptive technologies began to be introduced) there is a precipitous drop in the number of copyright registrations. Likewise, following that time period, the number of copyright registrations becomes increasingly volatile. While the remainder of the paper is dedicated to analyzing the first claim, the claim that new technologies are hurting creativity can be challenged rather quickly.

First, as illustrated in Chart 3, the drop in serial registrations – that is, registrations for newspapers, magazines, and other periodicals – accounts for a substantial portion of the drop in overall registrations. Prior to 1991, these registrations were on par with the number of registrations for monographs. After 1991, these registrations began to decline rapidly to the point that serial registrations currently represent less than 1/4th the number of registrations for monographs. While this might be explained by the changing nature of the market for such works including industry consolidation and competition from competing media outlets such as cable television (and subsequently, the Internet) or increased copyright infringement, it may also be directly linked to changes in copyright office policy. For works published after January 7, 1991, the Copyright Office began to allow copyright owners to file group registrations rather than individual registrations for serials published at intervals of one week or longer. Similarly, the Copyright Office began to allow daily newspapers to file group registrations effective September 1, 1992, and daily newsletters to file group registrations for their works as well after July 1, 1999. As a result of these changes in the rules for registration, the decrease in serials registrations may not reflect a decrease in the number of serials produced, but instead, a decrease...

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18 64 FR 29522-01 (Jun. 1999).
in the number of registrations filed. So while changing markets and technology may still be factors, they are by no means the only or even the best explanation for the decline in serial and, therefore, overall registrations.

Second, the increased volatility in registrations after 1991 illustrated in both Charts 2 and 3 similarly may be the result of procedural changes regarding copyright registrations as well. As will be discussed in greater detail, the overall rules regarding the filing of copyright registrations were dramatically altered as a result of the United States’ accession to the Berne Convention for the Protection of Literary and Artistic Works and the following adoption of the Berne Convention Implementation Act which went into effect in 1989. Among other things, the Implementation Act eliminated any need for non-U.S. works protected under the Berne Convention to file copyright registrations. As such, at least some of the instability following 1991 may be the result of a reduction in the number of foreign works seeking copyright protection in the United States under the Berne Convention, and a general perception (even if erroneous) that as a party to the Berne Convention all formalities, including copyright registration, are no longer required to receive copyright protection in the United States. Once again, while disruptive technologies and piracy may have depressed the number of new copyrighted works created after 1991, there are other potential explanations for these changes as well.

B. Justification

As discussed earlier, providing creators with economic incentives to create new works is one of the principal justifications, if not the justification, for copyright’s expansion. As the U.S. Supreme Court noted, “The immediate effect of our copyright law is to secure a fair return for an ‘author’s’ creative labor. But the ultimate aim is, by this incentive, to stimulate artistic creativity for the general public good.” But what level of incentives is appropriate? Many scholars have argued that Copyright Laws need only “provide the owner sufficient incentives to produce such property,” and that means “something less than ‘perfect control’.” Otherwise, the benefits of increased copyright protection may be offset by the harms created by denying the public access to creative works and/or the opportunity to create their own works. These scholars, of which I am one, have bemoaned the fact that whether in response to new technology and economic

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20 Twentieth Century Music Corp. v Aiken, 422 U.S. 151, 156 (1975). See also Stewart E. Sterk, Rhetoric and Reality in Copyright Law, 94 Mich. L. Rev. 1197, 1203 (1996) (“[I]t is incentive language that pervades the Supreme Court’s copyright jurisprudence…”).
opportunities or simply at the behest of copyright stakeholders, Congress essentially employs, “a one way ratchet, increasing the subject matter, scope, and duration of copyright with every amendment.”

One reason for this distress among copyright scholars is that the logic and rhetorical force of the expansionist position is difficult to dismiss. The greater the protection afforded by copyright, the greater the potential reward to creators, the greater the reward, the greater the incentive to create new works, and the greater the incentive to create new works, the greater the number of new works created. To paraphrase Macaulay, by increasing the financial bounty available to authors, we ultimately increase the public’s bounty of new works of authorship. So the argument goes, if a little copyright is good, more is better. As Sara Stadler observes, this argument does “tend to the tautological.” Nevertheless, it is quite powerful, and cannot be dismissed out of hand especially when one considers that there is little agreement on what incentives are “sufficient” and the inherent difficulty in determining the economically optimal level of copyright protection.

Consider the argument for giving copyright owners the exclusive right to control derivative works (i.e. works that are based upon and incorporate an existing work). According to Paul Goldstein, allowing the copyright owner of the original work to control such uses should increase the number of new works created because “The publisher who knows that it can license, and obtain payment for, the translation, serialization, condensation and motion picture rights for a novel will invest more in purchasing, producing and marketing the novel than it would if its returns were limited to revenues from book sales in the English language.” We are told that this greater investment will mean not only increased access to the original work but the licensed derivative works as well. In some cases, this may be important because of high initial costs for creating the original work, or because the ability to exclusively exploit these alternative sources of revenue allows investment in so-called “riskier” projects. For example, the argument goes that a motion picture studio is more likely to invest in both big budget and avant garde films (or films that are not perceived to have mainstream appeal at the box office) when it can obtain exclusive rights to downstream revenue sources including hotel, cable, satellite, and broadcast retransmission, DVD sales and rentals, digital downloads, books, and associated merchandising.

Assuming that people are capable of evaluating the additional incentives provided by the right to control derivative works and are motivated by these new incentives, expanding copyright

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23 See Jane C. Ginsburg, Essay: How Copyright Got a Bad Name for Itself, 26 Colum. J. L. & Arts 61, 64 (2002) (arguing that congress “appropriately reached out to address new problems prompted by new technologies, so as to strike a happier balance”).
25 Jessica Litman, War Stories, 20 Cardozo Arts & Ent. L. J. 337, 344 (2002). See also Dennis S. Karjala, Copyright Protection of Operating Software, Copyright Misuses, and Antitrust, 9 Cornell J. L. & Pub. Pol’y 161, 163 (1999) (“Congress has a ratchet for copyright protection that sends it in only one direction – more for owners of existing copyrights and less for current and future authors and for the public generally.”); David McGowan, Why the First Amendment Cannot Dictate Copyright Policy, 65 U. Pitt. L. Rev. 281, 292 (2004) (“Many copyright scholars object to the way Congress deals with their subject. With good reason, the feel Congress wields a copyright ratchet: terms get longer, the scope of rights gets wider, but never the reverse.”); Rebecca Tushnet, Copy This Essay: How Fair Use Doctrine Harms Free Speech and How Copyright Serves It, 114 Yale L. J. 535, 543 (2004) (“Legally, then, copyright has been a one-way ratchet covering more works and granting more rights for a longer time.”).
to include the right to control derivative works sounds reasonable. In fact, as Jessica Litman notes, assuming that this model accurately describes how people behave, the answer to the question of “whether an increase in copyright protection will lead to the production of more or better works,” is always yes, and “there is no good reason why copyrights should not cover everything and last forever.”

Framed in these terms whether Congress should or should not expand copyright depends upon how one weighs the relative benefit of additional creative works against the costs associated with expanding copyright law. As illustrated by the U.S. Supreme Court’s decision in Eldred v. Ashcroft, in the absence of a compelling justification to do so, courts are not inclined to second-guess Congress under these circumstances.

In Eldred, plaintiffs challenged Congress’ decision to extend the length of copyright protection by an additional twenty years. They argued that the Copyright Term Extension Act (CTEA) passed in 1998 violated both the Copyright Clause’s “Limited Times” prescription and the First Amendment guarantee of freedom of speech. In upholding the CTEA, the Supreme Court concluded, among other things that, “The CTEA reflects judgments of a kind we cannot dismiss as outside the Legislature’s domain.” According to the Court, Congress “rationally credited projections that longer terms would encourage copyright holders to invest in … their works” because of the incentives created by term extension. The Court noted that in reaching this conclusion Congress relied upon the testimony of a number of artists including Quincy Jones, Bob Dylan, Don Henley, and Carlos Santana as well as the Register of Copyrights Marybeth Peters and others who expressed the belief that the CTEA would provide valuable additional incentives to create. According to the Register, extending copyright could “provide additional income that would finance the production and publication of new works.”

Reminiscent of Macaulay, Justice Breyer argued in dissent that the CTEA “will not act as an economic spur encouraging authors to create new works.” According to Justice Breyer, “the incentive-related numbers are far too small for Congress to have concluded rationally, even with respect to new works, that the extension’s economic incentive effect could justify the serious expression-related harms created by term extension.” In reaching this conclusion, Justice Breyer relied upon studies that found that: 1) very few works survive long enough for term extension to matter (only 2% of all copyrights retain any commercial value after 55 to 75 years), and 2) even if it were reasonable for an artist to believe that her work may be one of those few, the present value to her would amount to less than seven cents. As such he opined, “What potential Shakespeare, Wharton, or Hemingway would be moved by such a sum?” Moreover, even if “somehow, somewhere, some potential author might be moved by the thought of great-grandchildren receiving copyright royalties a century hence, so might some potential author also be moved by the thought of royalties being paid for two centuries, five centuries, 1,000 years,

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31 Id. at 193.
32 Id. at 205.
33 Id. at 207.
34 Id. at 207 n. 15.
35 Eldred, 537 U.S. at 207 n. 15.
36 Id. at 254 (Breyer, J. diss.).
37 Id. at 257.
38 Id. at 254-55.
39 Id. at 255.
“‘til the End of Time.” In other words, the logic of this position would not only justify the CTEA; it would justify perpetual copyrights rendering the incentive argument “difficult to square with the Constitution’s insistence on ‘limited Times.’” Nonetheless, the seven member majority concluded that Congress’ decision was rational, and consistent with the proposition that it is primarily for Congress to calibrate “rational economic incentives …” In short, the Supreme Court was unwilling to question Congress’ reliance upon the logic that increasing incentives increases the number of new works created even when those increases are so small they could be considered illusory. While logical, this position is still a theory and, like all theories, can be tested.

III. Existing Empirical Research

Even though copyright has existed, and continuously expanded, for hundreds of years, there has been little empirical research done to test the logic behind copyright’s expansion. As Eldred illustrates, copyright’s expansion is largely based upon the testimony of those who would benefit from such an expansion – artists and industry – and the common sense judgment that increasing financial incentives, even small increases, will lead to more new works. As I have argued elsewhere, this omission may be explained because the financial incentives created by copyright traditionally encouraged the creation AND distribution of creative works. And, until the widespread adoption of digital technology and the global distribution made possible by the Internet, copyright was considered necessary to encourage the widespread distribution of creative works even if those works would have been created without copyright. Because these technologies essentially represent a new distribution paradigm in which the continued enforcement of copyright’s exclusive rights leads to the under-distribution of creative works, attention is now being paid to law’s role in the creation of creative works.

One analysis conducted by Landes and Posner attempted to infer the optimal duration of copyrights. This study focused primarily on copyright renewals and the depreciation value of works in an effort to estimate the expected economic life of copyrighted works and the impact of term extension upon that value. In conducting this analysis, Landes and Posner also examined the relationship between statutory law changes upon total registrations from 1910-2000. In their analysis, the authors also considered year-to-year changes, the impact of copyright registration and renewal fees, the expected life of the copyright, and annual recreational expenditures. Relying upon logarithmic models, the authors found statistically significant year-to-year growth in the rate of copyright registrations based upon what they concluded to be changes in the “demand for expressive activities rather than with changes in fees, the law, or other policy variables.” They also found a “negative and highly significant effect of

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40 Eldred, 537 U.S. at 255.
41 Id. at 256.
42 Id. at 207 n. 15.
43 To date, empirical studies in this area have focused primarily upon the commercial value of copyrighted works and the relationship between piracy and the sale of copyrighted works. See, e.g.,
45 Grokking Grokster, supra note ___ at 1251-1259.
46 ECONOMIC STRUCTURE, supra note ___ at 245.
registration fees” on registrations and that the number of registrations is “highly responsive to expected commercial life of a work.”

With respect to law changes, Landes and Posner found that only two of the five law changes examined, the 1976 Copyright Act and 1988 Berne Convention, had statistically significant effects on registrations. They estimated that the Berne Convention was associated with approximately a 10 percent increase in registrations. With respect to the 1976 Copyright Act, Landes and Posner initially found that the law change reduced the number of registrations by about 14 percent. However, after discounting for a sharp drop in total registrations the year after the 1976 Act took effect, the authors estimated a 16 percent increase in registrations associated with the Act. While their study found that statutory changes regarding term extension were positively associated with total applications, the results were statistically insignificant, and concluded that this was consistent with the fact that the expected commercial life of a copyrighted work is “much shorter” than the copyright term. Finally, Landes and Posner’s study included year as a time trend variable. As such, the year variable would “pick up increases in population, income, wealth, and education that are positively correlated with time…” In so doing, they find that year is positively correlated with registrations.

In two related studies, Baker and Cunningham examined the impact of copyright law changes first with respect to how quarterly changes to the breadth of copyright affect the market valuation of business equity from 1985-1998 and second how those changes impacted copyright applications in both the U.S. and Canada from 1985-2005. For both studies, Baker and Cunningham relied upon U.S. Circuit Court and Supreme Court decisions and statutory law changes. With respect to equity markets, the authors constructed a logarithmic model and found that both statutory and court decisions are associated with an increase in equity returns with statutory changes and Supreme Court decisions having larger impacts on firm equity than lower court decisions. Moreover, Baker and Cunningham found that law changes broadening copyright protection were associated with increases in firm equity while law changes narrowing copyright protection were associated with decreases in firm equity. In other words, changes in copyright law impact the public’s valuation of firms that rely upon copyright law.

More importantly for this analysis, Baker and Cunningham’s next study examined whether these law changes impact quarterly copyright applications in both the U.S. and Canada from 1985-2005. In this analysis, they relied upon a linear model which included law changes, among other variables such as the growth rate of real GDP, the openness of markets as a function of exports plus imports divided by GDP, population, expected and real application fees, statutory changes and case law, the number of Internet subscribers per thousand, the number of personal computers per thousand as well as a variable capturing the relationship between personal

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47 Id. at 245-46.
48 Id. at 247.
49 Id. at 247.
50 Id. at 247.
51 ECONOMIC STRUCTURE, supra note ___ at 245.
52 Id. at 245.
54 Id. at 584.
55 As shown in Chart 3 and our nonparametric regression analyses in Appendix 1, a single linear model does not fit our data well.
computers and Internet subscribers. With respect to statutory changes, the authors examined the contemporaneous and lagged values of the net number of statutes broadening copyright and when that is added to the analysis found “no strong evidence that statutory changes significantly impact the flow of applications.” With respect to cases, Baker and Cunningham examined the contemporaneous and lagged values of the net number of court decisions broadening copyright, and found the coefficient on contemporaneous value of cases to be “small, negative, and insignificant” while “copyright applications increase by approximately 370 one quarter after a high court decision strengthens copyright protection.” However, when the authors examine the impact of cases utilizing an Ordinary Least Squares estimator for the U.S. alone, they found no statistically significant relationship between any law changes and applications. Furthermore, like Landes and Posner, Baker and Cunningham also found that increases in application fees are associated with a decrease in copyright applications.

Lastly, Png and Wang examined the relationship between copyright duration and the production of motion pictures. In that study, the authors examined the number of movies produced in twenty-six countries of which nineteen at various times between 1991-2002 extended the length of copyright protection from the author’s life plus 50 years to the author’s life plus 70 years. The authors constructed a least-squares regression model with the dependent variable being the number of movies produced in that country/year based upon information available in the Internet Movie Database and independent variables including changes to copyright duration, GDP per capita, population, time trend, country fixed effects, and copyright piracy. Based upon their analysis, Png and Wang conclude that extending the term of copyright was associated with a statistically significant increase in movie production and that the increase was higher in countries where piracy was lower.

Accordingly, the existing efforts to examine the question “does copyright law promote creativity?” have been limited in scope. Landes and Posner examined only five law changes. Baker and Cunningham examined only a twenty-year time period. Moreover, both of these studies examined the impact of law changes upon total registrations including copyright renewals rather than for each separate category of work, and treat registrations as essentially the same despite the 1988 Berne Implementation Act and other major changes to copyrighted registration rules. As discussed below, the parameters of these studies leave open the possibility that the statistical models do not fully capture the relationship between law and the creation of creative works. For example, while we also find a statistically significant association between the 1976 Copyright Act and total registrations, individual categories of registrations responded differently including no association at all. While Png and Wang avoid these difficulties by relying upon the Internet movie database, their study is limited to motion pictures and copyright term extension, and the authors themselves admit, their findings are contrary to the received wisdom as evidenced in part by the other two studies. Consequently, the relationship between changes in

56 Mathew J. Baker and Brendan M. Cunningham, Law and Innovation in Copyright Industries 8-10 (July 25, 2006).
57 Id. at 12.
58 Id. at 13
59 Id. at 15.
60 Id. at 11-12.
62 Id. at 8-9.
63 Id. at 10.
64 Id. at 3.
copyright law and the creation of new works demands further analysis. Moreover, as will become apparent the results of our study differ significantly from these prior works.

IV. Our Study

A. Methodology

To examine the relationship between law and human creativity, we use U.S. copyright registrations as the dependent variable and as a proxy for new works created in a given year. These registrations are published annually by the U.S. Copyright Office and are available by subject matter from 1870 to the present. Copyright registrations are proxies for works of authorship such as stories, poems, songs, pictures, videos, etc., for two basic reasons. First, registration is not a prerequisite for obtaining copyright protection. Accordingly, authors who may intend to protect their works under copyright law may nonetheless choose not to register their works. As we will see, registration is not a costless process and the registration fee itself, currently $45 for paper filing, $35 for electronic filing, may deter individuals from filing a registration. Second, not all authors create with the intention or even aspiration to prevent others from copying their work. As such, there is a large and unknown number of creative works that exist entirely outside of copyright law that are not represented by copyright registrations.

Nonetheless, copyright registrations are useful proxies for this analysis for two reasons. First, while registration is not required to have one’s work fall under the auspices of copyright law, registration has its advantages. The most important of these is that until 1989, registration was a prerequisite to filing a copyright infringement lawsuit for all works, and registration was required to occur before the alleged infringement or within three months of first publication. As such, until 1989, anyone hoping to preserve a legal remedy for copyright infringement was required to register. And, this rule still applies for U.S. works. Timely registration is also required if the copyright owner wishes to seek statutory damages or attorney’s fees. Otherwise, the copyright owner would be limited to actual damages, which in some instances would not be financially worth the cost of litigation. A certificate of registration also serves as prima facie evidence that the copyrighted work is both original and of the facts stated in the certificate. Lastly, registration entitles the owner to file with the U.S. Customs Service for protection against infringing imports.

Second, while registered works do not encompass the entire universe of creative works, they represent the authors and types of works that should be most sensitive to changes in copyright law. In other words, while there are authors who may not be concerned with copyright law, whose behavior may or may not be affected by changes in the law, those interested in benefiting from the full scope of copyright law available to protect their creative efforts and investment and those creators at the margins whose decisions would be influenced by changes to copyright law should be represented by those who register their works. In short, registrants care

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65 17 U.S.C. §§ 408-412. See also, MELVILLE B. NIMMER & DAVID NIMMER, NIMMER ON COPYRIGHT § 7.16 (discussing the significance of registration).
about copyright. Consequently, if there is a group of authors or investors that would be especially responsive to changes in copyright law, it should be those who register.70

For the purpose of this study, we examine individual categories of copyright registrations rather than rely upon total registrations. Total registrations are unreliable because variations in aggregate copyright registrations may be influenced by changes unrelated to the scope of copyright protection. For example, the total number of registrations would be influenced by the addition of new categories of copyrighted works such as the addition of motion pictures, sound recordings, and computer programs. Total registrations also include renewal registrations, which do not represent new works, and would also reflect the subsequent elimination of the requirement to file renewal registrations for works subject to dual copyright terms. While we collected data and analyzed every category of copyrighted work collected by the copyright office, this article reports our results for six categories of copyright registrations – monographs, serials, performing arts,71 visual arts,72 sound recordings, and motion pictures. Our findings with regard to these categories are representative of the results for all copyrighted works, and these six categories are not only of interest but are representative of the broad range of copyright works.

With respect to performing arts and visual arts we were forced to combine formerly separate categories of works such as motion pictures, musical compositions, sculptures, etc. into the broader categories because beginning in 1978, the Copyright Office changed how these registrations were filed. As a result of that change, the Copyright Office grouped these separate categories into the broader categories of performing arts and visual arts. As such, we were unable to obtain specific registration numbers for individual works, such as motion pictures, because they are now subsumed into the broader categories. Unable to obtain additional data much further beyond that point, we decided in favor of analyzing the umbrella categories in order to examine the influence of our independent variable over a longer period of time (1870-2006). However, because we are using umbrella categories, they are not entirely immune from changes brought about by the addition of new subcategories of works, as would be the case for performing arts and motion pictures. And, in the case of motion pictures, we still report that category separately, though for a shorter time period.

Moreover, because the Berne Implementation Act changed the importance of registering non-U.S. works, we divided our analysis into two time periods each of which represents a separate registration regime. In addition to the actual legal change, the choice of 1989 as the relevant demarcation was confirmed by a statistical change point analysis that tests the existence of change points and estimates the locations of change points if there are any. Accordingly, with respect to monographs, serials, performing arts, and visual arts we examined the impact of the independent variables in two separate time periods: 1870-1989 and 1989-2006. This allowed us to separate changes in registration based upon the rules regarding registration changes due to the

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70 This is not to say that other authors would not be concerned or impacted by copyright law. To the extent that Congress and courts expand the scope of copyright, even authors that do not seek copyright protection for their own works either because they do not wish to commercially exploit those works or because they do not desire to exclude others from using those works are and should be concerned because they may be the targets of copyright litigation to the extent that there works are based upon, use, or even reference other works.

71 The copyright office defines performing arts works as works intended to be “performed” directly before an audience or indirectly “by means of any device or process.” Included are (1) musical works, including any accompanying words; (2) dramatic works, such as scripts, including any accompanying music; (3) pantomimes and choreographic works; and (4) motion pictures and other audiovisual works.

72 The copyright office defines visual arts as pictorial, graphic, or sculptural works, including 2-dimensional and 3-dimensional works of fine, graphic, and applied art.
scope of copyright. Our treatment of sound recordings and motion pictures are the exceptions to this approach. We only had motion pictures specific data between 1913-1983, before the Berne Implementation Act became effective. Because sound recordings were not protected until 1972, we evaluated those registrations in two periods from 1972-1989 and 1990-2006.

In order to determine whether changes in copyright registration were influenced by changes in copyright law we compiled a table of both legislative enactments and Supreme Court decisions that altered copyright protection. These include the recognition of new rights including the right to control derivative works, new penalties such as the addition of criminal liability, as well as increases in copyright terms. These law changes are listed by year in Appendix 2. We chose not to include lower court decisions for several reasons.73 First, such decisions are generally limited in their geographical reach. Second, we considered it unlikely that individuals beyond the parties themselves would be sufficiently aware of such decisions for such decisions to influence their behavior, and third, the relative number and frequency of such decisions per year create dimensionality issues that would mask the important factors whether they are major law changes or other variables that change each year. In addition to law changes, we examined other independent variables simultaneously including changes in copyright registration fees, population,74 the economy as a function of real gross domestic product (GDP), and technological milestones. The list of technological milestones by year appears in Appendix 3. With respect to law changes and technological milestones, we considered their contemporaneous and lagged associations for one, two, and three years. Ultimately, we concluded that a one-year lag more accurately reflected the timeframe in which a would-be registrant would take to respond to these changes, and more accurately fit the statistical model.

In our statistical analyses, we found many law and technology-change variables (coded as dummy variables) insignificant, and therefore nuisance covariates. Too many nuisance covariates may render a standard statistical analysis invalid.75 How many is too many? Therefore, we also conducted simulation experiments to see the effects of nuisance dummy variables (coded as "one" continuously after a year from its onset time) as the number of the dummy variables increased. For the models that are similar to ours in sample size, dimension and structure, the truly significant dummy variables were found extremely significant while some nuisance dummy variables had a small probability to be found slightly significant (i.e. with a p-value less than 0.05 but quite bigger than those truly significant ones) or marginally significant (i.e. with a p-value between 0.05 and 0.15, such as 0.09). This confirms that our analyses are conservative (i.e. the significant variables will be found significant) and that most law changes do not have their expected outcomes because the law variables found to be

73 We did include one Court of Appeals level decision, Nichols, in this framework because of its overall importance to copyright doctrine.
74 Actually we also considered the time trend, i.e. the Year variable in our study, as Landes and Poser did. However, it was obvious from the data that the population size and the Year had almost a perfect linear relationship except a tiny dent around 1940 corresponding to the World War II. Hence the population and year variables are statistical multi-collinear, and only one of them should be entered in a sensible regression analysis. We therefore retained population in our study since it makes more sense as an independent variable, but will be mindful about the association of population and year in our interpretation of statistical results.
significant in our study (including the marginally significant ones) only constitute a subset of all law and technology changes.

Finally, in conducting our analysis we considered three statistical models in each of the time periods separated by the change point 1989: general linear, logarithmic linear, and non-parametric. For both the linear and logarithmic linear models, we were able to use law changes and technology milestones as standard dummy variables, and as discussed above considered the contemporaneous and lagged association between these variables and copyright registrations. For our multiple regression analysis, the logarithmic model represented the closest fit. For the non-parametric model, we relied upon observations based upon our calculated simultaneous confidence bounds of registration as a function of population and changes to that relationship, if any, graphically noted by law changes that expanded and decreased the scope of copyright protection. While the non-parametric model does not suffer a possible model misspecification by a parametric model and provides the best fit with regard to the relationship between copyright registrations and population, the relationship between law changes and creativity is comparable across all three models. Among the two parametric models, our fitted logarithmic linear model is closer to the nonparametric fit than the linear model is. Thus, the findings reported below are based on the best logarithmic linear model that also incorporates appropriate correlations among the data points.

B. Findings

As discussed earlier, this study tests two hypotheses. The major hypothesis is that legal changes in copyright protection will result in changes in the number of works produced. The minor hypothesis focuses upon the relationship between these changes. In other words, increasing copyright protection will increase the number of works produced and decreasing copyright protection will reduce the number of works produced at least until an optimal level of copyright protection is reached. As we demonstrate below, we find little empirical support for either the major or minor hypotheses. While we find some significantly statistical association between some individual law changes and certain categories of works, many do not have any association and hence the significance of an association is not predictable or uniform across law changes or across works as predicted by the major hypothesis. With respect to the minor hypothesis, there is no consistent directional relationship between the number of works registered and the law changes associated with subsequent changes in copyright registrations, as a law intended for. This conclusion holds true not only for individual law changes, but for categories of law changes as well including extending the length of copyright protection, increasing civil and criminal penalties, changes to the subject matter of copyright, and for restrictions upon copyright. Instead, we find that the number of works produced is mainly a function of population, and, in the case of monographs and serials, a function of the economy as well.

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76 We iterate here the importance of analyzing the monograph, serials, performing arts and visual arts and sound recording registration data in two separate time periods, before and post 1989.
77 A detailed discussion of our statistical methodology is attached as Appendix 1.
Chart 4 graphically illustrates the results of our multiple regression analysis based upon an “optimal” log-transformed model. The coefficients have been transformed back into the individual law change’s percentage influence on registrations by category. In other words, this chart illustrates the estimated influence of each law change in consideration of the concurrent influences (if significant) of other variables including other law changes and non-law factors including population, economy and registration fees. Years in which there are no bars represent law changes that did not yield a statistically significant relationship with any of the categories of works we studied. The years in bold are years in which the law change limited or reduced copyright protection, and the years in bold and underlined represent years in which law changes both increased and decreased copyright protection.

78 The non-parametric results for each of the categories as well as for overall registrations can be found in Appendix 1. We also created linear and quadratic models, but concluded that the log-transformed model was the best fitting parametric model.

79 For the purposes of this analysis, we did not include two changes in registration associated with the 1870 law change. These associations were so high, a 100% reduction in the case of serials, that we considered them to be an unreliable byproduct of being so closely associated with the starting/intercept point for the model.
1. By Work

With regard to books registered between 1870-1989, we found 6 law changes out of a possible 29 to have a statistically significant connection to changes in the number of works subsequently registered.\textsuperscript{80} In other words, 21% of the law changes during this time period significantly contributed to changes in the number of new works. From 1989-2006, our research revealed only 6 law changes out of a possible 13 (46%) to have had a statistically significant contribution.\textsuperscript{81} Overall, 29% of law changes bore a measurable contribution to the number of new books created, when all other possible influential factors were also taken into consideration. In addition to these law changes, population and GDP were statistically significant with population being the most dominant variable. Growth in population is consistently associated with increases in the number of new books. Meanwhile, growth in GDP was positively associated with new books registered between 1870-1989, but it took a turn after 1989. The estimated regression coefficient for GDP between 1989-2006 became negative, although it is in a much smaller scale than that of the positive coefficient for population between 1989-2006. This indicates that the Berne Implementation Act had a profound influence in 1989. The negative value is the contribution of GDP to the \textit{remaining} unexplained variation in the number of registered works after the contributions by other factors have been counted. Indeed, as shown by data, population and GDP were positively correlated, both growths when each acted alone should have positive association with the growth of new works (call it simple regression). However, population and GDP did not grow in isolation; when the contribution or association of population had been counted, the contribution of GDP to registered works had already been partially counted; the coefficient for the GDP provided an additional contribution or association (if it had the same sign as the simple regression) or an adjustment (if it has a different sign) to what is already explained by other factors. Registration fees did not have a statistically significant association in either time period.

The largest increase in book registrations (35%), the third largest increase overall, is associated with the No Electronic Theft Act, which provided for criminal liability even when the infringer does not seek financial gain in 1997. The No Electronic Theft Act was passed in response the electronic distribution of computer software, which can be registered as monographs. This was followed closely by the second largest increase in book registrations (34%) following the Supreme Court’s decision in \textit{Eldred v Ashcroft} upholding Congress’ decision to increase the length of copyright protection. The largest decrease of monograph registrations (27%), the second largest decrease overall is associated with three law changes occurring in 1990, the Visual Artists Rights Act, the Architectural Works Copyright Protection Act, and the Supreme Court’s decision regarding copyright renewal in \textit{Stewart v Abend}. The next largest decline in book registrations (26%), the third largest decrease overall, is associated with the 1909 Act. With 13 associated law changes, books were the most sensitive category of copyrighted works in our study.

With serials we find statistically significant associations between population GDP, and registration fees and subsequent serial registrations though the direction of these associations varies. From 1870-1989, population growth is associated with an increase in the number of new

\textsuperscript{80} See Table 4, Appendix 1.
\textsuperscript{81} See Table 5, Appendix 1.
serials, but from 1989-2006, the regression coefficient for population is negative as an adjustment factor. The regression coefficient for GDP is negative from 1870-1989, but has no statistically significant relationship after 1989. Registration fees are negatively associated before 1989, but have no statistically significant relationship after 1989. And, from 1870-1989, we found 7 out of a possible 29 law changes (24%) to have a statistically significant connection to the number of works subsequently registered. From 1989-2006, we found 3 law changes out of a possible 13 (23%) to have such a relationship. The two largest increases to serial registrations (30%) are associated with law changes in 1994 and 2003. The year 1994 included both an international agreement extending copyright to protect live musical performances and a U.S. Supreme Court decision recognizing parody as a potential fair use of copyrighted works. In 2003, the U.S. Supreme Court upheld the extension of the length of copyright protection. The largest decrease in serial registrations (18%) followed the Second Circuit’s decision in Nichols v Universal Pictures Corp., which recognized the importance of protecting copyrighted works beyond literal copying. This analysis and result reaffirm our theory that the Berne Implementation Act made a sharp change that either slowed down the increase of registered work or turned the number of registrations to decrease. The effects of significant law changes both before and after 1989 on the number of copyright registrations are tiny in comparison to the effect of the population or the time trend.

With regard to the performing arts, between 1870-1989, we found 10 law changes out of a possible 29 law changes (34%) to have a statistically significant relationship to the number of new works subsequently registered, and one law change out of a potential 13 (8%) to have had a statistically significant association between 1989-2006. Overall, a little more than 1 in 4 law changes were related to the number of new works of performing arts registered. With regard to performing arts, population was an important if not the dominant variable before 1989 though with no measurable relationship after 1989. GDP and registration fees were not statistically relevant in either time period. The two largest increases of performing arts registrations (33%), the fifth largest increase overall, was associated with the Supreme Court’s 1879 decision limiting copyright to the protection of expression and not ideas. The next two largest increase of performing arts registrations (24%) were associated with the extension of recording and performing rights to non-dramatic literary works in 1952 and the U.S. joining the Berne Convention and the Satellite Home Viewing Act in 1988. Decreases in performing arts registrations were associated with the protection of motion pictures in 1912 (13%) and the Supreme Court’s decision requiring copyrighted works to have at least a minimal degree of creativity (24%).

While motion pictures are generally treated as a subcategory of performing arts as a result of the Copyright Office’s registration policies, we had motion pictures specific data between 1913-1983. During that time period, we found 3 out of 15 law changes (20%) to have a statistically significant relationship to new copyright registrations. Motion picture registrations were also positively associated with growth in population and negatively correlated with increases in registration fees. The 1930 law change resulting from Nichols v. Universal Pictures in which the Second Circuit expanded copyright protection to non-literal copying was associated

82 See Table 6, Appendix 1.
83 See Table 7, Appendix 1.
84 See Table 8, Appendix 1.
85 See Table 9, Appendix 1.
86 See Table 10, Appendix 1.
with a 31% decrease in registrations, the largest decrease in our study. The 1971 law change was the largest increase in registrations in our study associated with a 47% increase in motion picture registrations. In that year, the United States protected sound recordings and was a member to the revision of the Universal Copyright Convention strengthening international protection for copyrighted works. The 1976 act was associated with a 28% increase in motion picture registrations.

Finally, with regard to sound recordings, which only became eligible for copyright protection in 1972, we found 4 out of 22 law changes (14%) to have a statistically significant association with subsequent sound recording registrations through 2006. Two of these occurred before 1989 and 2 after 1989. Population was positively associated with new sound recordings before 1989, and no statistically relevant afterwards. Registration fees were positively associated with sound recording registrations before 1989, but were not statistically relevant afterwards. GDP was not statistically relevant in either time period. The Supreme Court’s decision upholding Congress’ decision to increase the length of copyright protection is associated with the largest increase in sound recording registrations (36%), the second largest increase overall. Congress decision to increase criminal penalties is associated with the second largest increase in sound recording registrations and the fifth largest increase overall at 33%. The passage of both the Copyright Term Extension Act and the Digital Millennium Copyright Act is associated with a 23% increase in sound recording registrations. Both the Berne Implementation Act and the Satellite Home Viewer Act are associated with an 18% decrease in sound recording registrations. Both motion pictures and sound recordings appear to be less sensitive to law changes than the other works in this study.

2. Across Categories

The lack of consistency and uniformity between changes in copyright law and copyright registrations can also be seen when law changes are considered across categories. Overall, the relationship between law changes and new registrations increases in frequency when we examine whether a law change is associated with at least one category of work. As shown by Table 12, 24 out of 42 law changes had at least one such association. In other words, a little more than half of all law changes had a statistically significant association with a subsequent change in copyright registrations. However, these associations occur 24% of the time when all of the individual categories of works are considered. Of those relationships, 27 were positives and 13

87 See Table 11, Appendix 1.
88 Because the distribution of visual arts registrations did not fit a parametric model (i.e., linear, quadratic, or log transformed), we did not conduct a multiple regression analysis measuring the association between law changes and technological milestones upon those registrations using those models. Our non-parametric results suggest that following an initial bump in registrations most likely due to the practice of copyrighting individual frames of motion pictures until motion pictures were entitled to their own separate protection, visual art registrations are consistent with the other categories in this study with population being the most important variable. See Appendix 1.
89 Some may question this analysis because the denominator includes all of the categories of works in our study. In some cases, we may not expect a relationship as a law change may be directed towards a specific category of work such as the addition of motion pictures as a category of protected work, treating computer software as literary works, or the regulation of live musical performances, and one might suggest that such law changes should not influence other creative works. I would like to thank Justin Hughes for raising this point. We chose not to limit our analysis on the assumption that category specific law changes should only be analyzed for that category. First, it is possible that changes in protection for one kind of work may impact the investment and time spent on other works. If so, we wanted to be able to examine that crossover effect. Consider the 1912 addition of motion pictures to the category of
negative. Given these results, historically law changes were associated with an increase in at least one category of registrations 41% of the time. This falls to 38% when only laws expanding copyright protection are considered. Not a single law change between 1870-2006 had a statistically significant association across all of the categories studied.

3. By Type of Law Change

When we organize law changes into subcategories a slightly different picture appears. We grouped law changes into those that increased the length of copyright protection, expanded the subject matter capable of being copyrighted, recognized new rights for copyrighted works, increased civil and criminal penalties, and reduced or otherwise limited copyright protection. Because our variable for law change is the year in which the change occurred, when more than one law change occurred in the same year, we are unable to isolate the effects of any given law change. As such, when different subcategories of law changes occurred in the same year, we add that year to each subcategory.

works protected by copyright. One might argue that we should limit our analysis of that law change to motion picture registrations because it is only directly relevant to motion pictures. However, this position ignores the fact that changes with regard to one type of creative work may have indirect consequences both positive and negative for other copyrighted works. For example, protecting motion pictures may very well encourage more people to write books and short stories let alone screenplays to provide the story for motion pictures. Moreover, with the advent of sound in motion pictures, it may encourage people to write and perform more music. However, the addition of motion pictures may also hurt music and other performing arts by competing for the public’s limited time and dollars. Second, a more narrow focus would ignore the signaling aspects of law changes. In other words, a song writer may be encouraged to write more songs as a result of Congress’s decision to protect motion pictures because it signals the importance of copyright in general, or simply because the song writer might expect similar favorable treatment in the future. If we had limited our analysis to motion pictures, we would have missed the statistically significant association with books, serials, and works of performing arts.
Of the eight laws changing the length of copyright protection, all of which increased the length of protection in this study, four had a statistically significant relationship with at least one category of creative works (i.e. 4 of 8 times (50%)).\textsuperscript{90} Two of those law changes were the major revisions of copyright law in 1909 and 1976, which did more than just increase the length of copyright protection. When all categories of registrations are considered, term changes impacted registrations 31% of the time. The 1909 Act is associated with a 26% reduction in book registrations. The 1976 Act is associated with a 10% increase in performing arts, 10% increase in serials, and a 28% increase in motion pictures registrations. The Copyright Term Extension Act passed the same years as the Digital Millennium Copyright Act is associated with a 27% increase in monograph, 15% increase in serial, and 23% increase in sound recording registrations. The Supreme Court’s 2003 decision in \textit{Eldred} is associated with a 34% increase in monograph, a 30% increase in serial, and a 36% increase in sound recording registrations. Accordingly, laws increasing copyright protection had a 45% probability of increasing registrations in at least one category and a 5% probability of decreasing registrations in at least one category.

Of the fifteen laws that increased the legal rights available to copyright owners, such as the right to control derivative works or to publicly display works, ten are associated with changes in registrations for at least one category of work.\textsuperscript{91} In other words, 67% of law changes that gave copyright owners a new right had a statistically significant association with at least one category of work. This figure drops to 27% when all categories are considered. Of the 16 instances in which a statistically significant association was found 13 were positive and 3 were negative. Every category of creative works exhibited at least one association with laws expanding the legal rights available under copyright. For motion pictures the 1976 Act is associated with a 28%

\textsuperscript{90} See Table 13, Appendix 1.

\textsuperscript{91} See Table 14, Appendix 1. Again, we excluded the 1870 Revision.
increase in registrations. For sound recordings, the CTEA and DMCA are associated with a 23% increase in registrations, and the Berne Implementation Act and Satellite Home Viewer Act are associated with an 18% decrease in registrations. For books, the 1909 Act is associated with a 26% decrease in registrations and the Visual Artists Rights Act and Architectural Works Copyright Protection Act are associated with a 27% decrease in registrations. The Digital Performance Right in Sound Recordings Act is associated with a 22% increase in book registrations, and the CTEA and DMCA in 1998 are associated with a 27% increase. For performing arts, all five associations are positive. The Act of 1897 is associated with a 15% increase, the Act of 1952 a 24% increase, the 1976 Act a 10% increase, the cluster of law changes in 1984 including the Semiconductor Chip Protection Act, Record Rental Amendment, and the Supreme Court’s decision in *Sony Corp. of America v Universal City Studios, Inc*, are associated with a 10% increase, and the 1988 Berne Convention Implementation Act and Satellite Home Viewer Act are associated with a 24% increase. Overall, laws granting copyright owners new rights over their works had a 54% probability being associated with an increase in registration in at least one category of work, and a 13% probability of decreasing registrations.

Six laws changed criminal or civil penalties, all of which created or increased penalties during the period of this study. Four of these law changes correlated with at least one change in subsequent copyright registrations (i.e., 4 of 6 times (67%)). However, laws increasing criminal penalties were only associated with changes in copyright registrations 6 out of 23 times (26%) with regard to all creative works studied. These law changes were associated with increases in registrations in 4 instances, performing arts (15%), monographs twice (14% and 35%), and sound recordings (33%), and two decreases in registrations for monographs (26%) and serials (10%). The 1982 law change was the only law change that exclusively addressed penalties, and had the broadest relationship, as it was associated with three categories of works: books (14%), serials (-10%), and sound recordings (33%). Motion picture registrations did not exhibit any statistically significant relationship with laws increasing criminal or civil penalties. Given these results, laws increasing copyright penalties had a 44% probability of being

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92 See Table 15, Appendix 1.
associated with at least one subsequent increase in registrations, and 22% chance of decreasing registrations.

During the time period of this study, eight laws expanded the subject matter of copyright, laws that expanded the kinds of expression capable of being copyrighted. Six of these laws (75%) were associated with a change in registrations in at least one category of work. Subject matter law changes were associated with changes in the registrations of all creative works studied 9 times out of 33 overall (27%), and those were almost evenly split between 5 positive and 6 negative associations. The 1971 law changes, protecting sound recordings and revising the Universal Copyright Convention, produced the largest change in registrations in this category with a 47% increase in motion picture registrations. Monograph registrations also saw an increase of 6% associated with the 1971 changes. Monographs also exhibited the largest decrease in registrations in the category with a 27% decrease associated with the law changes in 1990, the VARA, AWCPA, and Stewart v Abend. The Supreme Court’s decision protecting advertisements based upon the principle of non-discrimination is associated with a 12% decrease in serial registrations. The extension of copyright to protect motion pictures resulted in a 5% increase in monograph registrations and a 13% decrease in performing arts registrations. Counter-intuitively, the 1980 law change, protecting computer software as a literary work, is associated with a 7% decrease in the registration of monographs even though software was being added to that category. And, the protection of semiconductor chips, the regulation of record rentals, and the Supreme Court’s betamax decision which occurred in 1984 are associated with a 9% increase is serial and 10% increase in performing arts registrations. As a category, only sound recordings did not exhibit any relationship with laws expanding copyrightable subject matter. Given this data, there is a 42% probability that a law expanding the subject matter of copyright will be associated with some increase in registrations, and a 50% probability of decreasing registrations.

93 The 1870 Revision would fall under this category, but once again, we are excluding it for statistical purposes.
94 See Table 16, Appendix 1.
The most consistently positive associations were found with laws that reduced or otherwise limited copyright protection. Of the seven law changes that reduced or otherwise limited copyright protection, five (71%) were associated with changes in registration for at least one category of creative works. When the relationship of these law changes is considered with respect to all categories, we find 7 associations out of a possible 27 (26%). In the instances in which registration are associated with laws limiting copyright protection, six of those associations represented increases in registrations and only one a decrease. The Supreme Court’s seminal decision in 1879 establishing the idea/expression dichotomy was associated with a 12% increase in serial registrations and a 33% increase in performing arts registrations. The Supreme Court’s affirmance of a lower court’s conclusion that the photocopying of scientific journal articles was fair use is associated with a 15% increase in performing arts registrations. The protection of semiconductor chips, the regulation of record rentals, and the Supreme Court’s betamax decision which occurred in 1984 are associated with a 9% increase in serial and 10% increase in performing arts registrations. The Supreme Court’s 1991 decision requiring a minimal degree of creativity for a work to be protected under copyright accounted for the only decrease in registrations with a 24% decrease in performing arts registrations. The 1994 protection of live musical performances and the Supreme Court’s decision recognizing parody as fair use are associated with 30% increase in the registration of serials. Books, motion picture, and sound recording registrations exhibited no associations with these law changes. Given these associations, there is a 61% chance that a law decreasing copyright protection will be associated with an increase in copyright registrations, and a 10% chance of decreasing registrations. If we exclude the 1964 preemption decisions and Feist, the percentages respectively change to 80% and zero.

95 See Table 17, Appendix 1.
96 The 1964 law changes involved two Supreme Court decisions addressing the federal preemption of state law with regard to intellectual property claims. Even though these decisions have implications for copyrights because they specifically involved patent law, the lack of association with copyright registrations may not be unexpected.
C. Does Law Inspire Creativity?

What develops from this data is a complex picture of the relationship between changes in copyright law and the registration of new works. At the very least, our findings cast serious doubt on the idea that with copyright law, one size fits all. In other words, there is little support for the broad proposition that one may expect changes in copyright law to have a predictable and uniform affect across all creative works whether those works are books, sound recordings, musical compositions, etc. Interpreted in the light most favorable to either the major or minor hypothesis, the evidence suggests that it is at best slightly better than a coin toss as to whether a law change will have any effect upon even a single category of creative works. Likewise, there is no support for the minor hypotheses that increasing copyright protection increases the number of works produced while decreasing copyright protection decreases the number of works produced. The data indicates that one cannot reliably predict \( \text{ex ante} \) whether a law change will have a positive or negative relationship with the number of new works produced. In many instances, the same law change is associated with an increase in registrations in one category and a decrease in another without any substantive reason for the different outcomes. Moreover, our data suggests that laws increasing copyright protection AND reducing copyright protection are both likely to be positively associated with changes in the number of new works registered.

The study demonstrates that the different categories of copyrighted works differ in sensitivity to law changes. Monographs were the most sensitive with 12 associations. Performing arts had 11 associations, and serials 10 associations. In contrast, both motion pictures and sound recordings appeared less sensitive to law changes with 3 and 4 associations respectively though these associations were also over a shorter time period than the other categories.

Our study also illustrates differences in likely outcomes based upon the type of law change. The probability of increasing copyright registrations is: 45% for increasing the length of copyright protection, 42% when expanding the subject matter protected by copyright, 54% when granting copyright owners new rights over their works, and 67% when creating or increasing penalties for copyright infringement. In contrast, laws decreasing or limiting copyright protection have either a 61% or 80% change of increasing copyright registrations depending upon which law changes are included in this category.

While laws increasing the length of copyright protection are less likely to increase registrations, they are also the least likely to decrease registrations (5% of the time). There is a 13% probability that increasing rights will decrease registrations, a 22% probability that increasing penalties will decrease registrations, and a 50% probability that expanding copyrightable subject matter will decrease registrations. With regard to laws decreasing copyright protection, there is either a 10% chance or almost no possibility that such laws will decrease registrations. Relatively this means that laws increasing copyright terms were 9 times

Likewise, the Supreme Court’s decision in \textit{Feist} differs from the other laws in this category because it does not decrease copyright protection allowing others to create new works outside the original copyright owner’s control. Instead, it categorically denies protection for works lacking sufficient creativity, and could be considered a sufficiently different in kind to justify separate treatment.

more likely to increase registrations than decrease them. Laws expanding rights were 4 times more likely to increase than decrease registrations. Increasing penalties was twice as likely to increase registrations than decrease them. Expanding the subject matter of copyright was more likely to decrease registrations than to increase them. Lastly, decreasing copyright protection was either 6 times more likely to increase than decrease registrations or almost guaranteed to increase registrations if there was any association at all.

From an institutional perspective, there is very little difference between the sources of the law change. Acts of Congress are slightly more likely to be associated with a change in registrations than are Supreme Court decision. Sixty-one percent of Acts of Congress were associated with at least one change in registration compared to fifty-eight percent of Supreme Court decisions. Likewise Acts of Congress were slightly more consistent with a 26% association across all categories compared to 22% for Supreme Court decisions. These figures include years in which the Supreme Court and Congress were both responsible for law changes. When those mixed years are excluded, Supreme Court decisions are associated with changes registration in at least one category 57% of the time and 23% across all categories compared to 61% and 27% respectively for Acts of Congress.

In addition to these general observations, some more tentative observations may be made with regard to three types of law changes. First, laws limiting or decreasing copyright protection appear more likely and more consistently to be associated with an increase in the number of new works registered. Second, changes to the length of copyright protection appear to be the least likely to result in a statistically significant relationship to changes in the number of works registered. Third, laws expanding the subject matter protected by copyright appear to be the most likely to reduce subsequent copyright registrations. And fourth, increases in copyright registration fees are associated with a reduction in the number new works registered though this relationship is not constant across all categories of works. While increases in registration fees are associated with a decrease in copyright registrations for serials and motion pictures, we found no statistically significant associations between registration fees and monograph or performing arts registrations. We also found a positive association between an increase in registration fees and sound recording registrations.

This does not mean that individual law changes may not influence changes in the number of new works created only that it is extremely difficult to predict: 1) whether any given law change will have such an effect, 2) what category of works or work will be affected, and 3) when there is a relationship, whether that relationship will be positive or negative, though our data show that the relationship has been more likely to be positive regardless especially when the law change decreases copyright protection. Furthermore our results should not be interpreted to suggest that some individuals are not in fact influenced by these law changes to create new works. The artists who testify before Congress in favor of increases in copyright protection, among others, may very well be influenced to create new works because of those law changes. Our findings merely suggest that there is no statistically significant relationship in the aggregate. This may be because for every individual motivated to higher levels of productivity a similar number may be deterred by the change in the law.

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98 These last two observations are consistent with Landes and Posner results with a much more complete and detailed data and by subcategories rather than all copyright registration combined.
99 A Simpson’s paradox occurs when the results of subgroup studies contradict to that of a combined study in which the subgroup data are lumped together. This is not statistically surprising because what happens in a subgroup may
In the end, population was the only variable consistently associated with changes in the number of new copyright registrations. Once we controlled for the change in registration rules, growth in population is consistently associated with increases in copyright registrations for all the categories of works studied. Population as a variable is also consistently sturdier than law changes. In the most extreme case, performing arts registrations, population exhibited a t-value of 178.5619 compared to the highest t-value (5.1495) for a law change, the Supreme Court’s *Burrow-Giles v Sarony* decision in 1884.\(^{100}\)

In their study, Landes and Posner hypothesized that the importance of population could be explained as a function of the size of the market for copyrighted works. In other words, as population increases, the number of people interested in access to creative works grows. This increase in demand leads to a corresponding increase in supply. While this is certainly one possible explanation, changes in population may also affect the supply side of the equation as well. In other words, a growing population may produce more artists, or as some have more recently described it, a larger creative class, and these artists may produce creative works regardless of the legally created incentives available or even actual demand. Accordingly, as society grows, we may find more Edgar Allen Poes\(^ {101}\) in our midst who are willing to create regardless of the circumstances or opportunities for success and remuneration. More likely the relationship between population and new works is a combination of the two with population growth expanding both the creative class and the individuals that make up the market for creative works. Consequently, our research suggests that there is little empirical support for the proposition that increasing copyright protection yields a greater bounty of copyrighted works. In fact, the data tentatively suggests the opposite – to the extent that law changes matter – laws reducing copyright protection are more likely to increase the number of new copyrighted works.

In summary, our study demonstrates that the effect of law changes on copyright registrations is neither predictable nor uniform. While individual law changes have historically been associated with changes in copyright registrations, it is extremely difficult to predict: 1) whether any given law change will have such an effect, 2) what category of works or work will be affected, and 3) when there is a relationship, whether that relationship will be positive or negative, though our study suggests that the relationship is more likely to be positive especially when the law change reduces or otherwise limits copyright protection. In other words, when lawmakers consider whether to expand copyright law, in general, the most they can expect is at best a 38% chance that the new law will increase the number of new registrations for some unknown category of work. This percentage changes depending upon the type of law change at issue. The least effective strategy appears to be expanding the subject matter of copyright, as this type of law change is more likely to reduce registrations rather than increase them. If they wish to decrease the number of works registered, increasing copyright registration fees is likely to produce that result. Instead, if lawmakers wish to increase the number of new works registered, the best strategy appears to be limiting or otherwise decreasing copyright protection, and even then the result is far from guaranteed.

\(^{100}\) See Table 6, Appendix 1.

\(^{101}\) Poe is often considered one of the first American authors to attempt to make a living as a writer and suffered great financial difficulty as a result. See Jeffrey Myers, Edgar Allan Poe: His Life and Legacy 138 (1992); Arthur Hobson Quinn, Edgar Allan Poe: A Critical Biography 305 (1941).
V. Why the Disconnect?

In order to understand why changes in copyright law do not have the relationship with creative output that one might expect, this section explains why the principal economic model is incomplete. However, before beginning this discussion, it is important to emphasize what this study does not suggest. First, this study does not suggest that copyright has no relationship to creativity, or that the same or even greater number of creative works would exist in a world without copyright law. Some form of copyright protection has existed in the United States since 1783, and our study begins with registrations in 1870 so the existence of copyright law is a baseline for this study. Our study, therefore, focused upon whether changes to that baseline relate to changes in the number of new works registered. Second, our results do not suggest that the individuals who testified before Congress were lying or otherwise behaving in a strategic manner. As a statistical matter, it is quite possible that those individuals not only genuinely believed that changes in copyright law would lead to a change in their behavior, those changes may have occurred. As discussed earlier, as a statistical matter, our findings may well represent another example of Simpson’s Paradox where the relationship between variables at the subgroup level is different from those relationships in the aggregate. For example, for every individual genuinely moved by the new incentives, there may be an equal number deterred. In this section, we discuss why the traditional economic model upon which the common sense assumption is based is incomplete, and why even under a wealth maximizing, rational actor model, increasing copyright protection is unlikely to increase the number of new works produced.102

Consider the traditional economic model of copyright. In an earlier work, Landes and Posner provided this succinct description: “For a new work to be created, the expected return – typically, and we shall assume exclusively, from the sale of copies – must exceed the expected cost.”103 And, the cost of creating the work “consists primarily of the author’s time and effort plus the cost to the publisher of soliciting the manuscript and setting it in type.”104 Accordingly, the rational individual seeking to increase her wealth would measure these costs against the expected return. By preventing free riding, copyright law makes it possible for an author to secure the necessary expected return from a successful work. This is considered necessary because if individuals were free to copy the author’s work without incurring the cost of creating the work, competition would drive down the expected return of the work to a point that the author would be unable to recoup those costs, and thus, would be unwilling to create the work in the first instance. As discussed earlier, based upon this model, arguments for increasing copyright protection are essentially – increasing copyright protection increases incentives to create new works. When Congress or the courts increase the amount of copyright protection available to authors, a rational author seeking to increase her wealth will respond by creating more works. While this model does a good job of describing the public goods nature of creative

102 This discussion assumes that there is no distinction between creators of copyrighted works and the owners of copyrights. As such, some of the disconnect between law changes and behavior may be the result of a disjunction between authors and copyright owners either because their interests are not aligned or because the reality of who actually owns the copyright obscures both the perceived and actual rewards available to creators as a result of the law change.
104 Id. at 327.
works and how those works may be under-produced as a result of piracy, it does not accurately represent the decision to create a work in the first instance.

An initial criticism of this analysis is that this model does not factor into the analysis the fact that copyright law represents a potential cost in the creation of new works. Because no author creates in a vacuum, increasing copyright protection is a double-edged sword. While new laws may increase the potential reward for creating, they simultaneously increase the cost of creating. This cost is created in two ways. In order to create a new work following a change in copyright law, the author of a new work may be required to obtain permission from another copyright owner thus incurring transaction costs and potentially the cost of a license or payment of a royalty. Correspondingly, an author may decide to alter her work or create an entirely different work from the one she intended to avoid incurring those expenses or potential liability. Under either circumstance, the additional costs created as a result of increasing copyright protection may be sufficient to deter the creation of new works. Recognizing this limitation, Landes and Posner more recently set forth a model taking the cost of copyright law into account. According to the authors, “The intuition behind these results is straightforward. Some copyright protection is necessary to generate incentives to incur the costs of creating easily copied works. But too much protection can raise the costs of creation to a point at which current authors cannot cover their costs even though they have complete copyright protection for their own originality.” Assuming that Landes and Posner’s more detailed model better reflects the costs and benefits associated with changes in copyright law, two points arise.

First, while Landes and Posner consider the possibility that increasing copyright protection could ultimately “raise the costs of creation to a point at which current authors cannot cover their costs,” they do not consider the possibility that the increase in costs may offset marginal increases in incentives. In other words, while a little copyright is good and a lot may be bad, anything in between may be meaningless when it comes to incentives. Recall the example of term extension raised by Justice Breyer in Eldred in which he noted that the estimated present day value of increasing the length of copyright protection for even the most successful copyrighted works is seven cents. When one considers that one of the least expensive licensing fees, the mechanical royalty rate for a compulsory license to cover another author’s song, is 9.1 cents, it is not difficult to imagine that the new costs created by the law change will offset any new reward.

Second, to the extent that changes in copyright protection apply to both existing works and new works, law changes may not increase the number of new works because they favor a strategy of exploiting existing works rather than creating new ones. Having already created the initial work, an author does not need to consider whether to create a different work in response to

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105 “The supply of works will equal N = N(R, z) where N_R > 0 and N_z < 0.

106 Id. at 74.

107 See <http://www.copyright.gov/carp/m200a.html>.
the law change, and as such, does not incur costs associated with steering clear of potential liability. Similarly, in those instances when existing works may be rendered infringing because of subsequent changes in the law, Congress has often accommodated those works either creating specific exemptions for their continued exploitation or through compulsory licensing. As such, law changes generate lower transaction costs for authors of existing works. Lastly, it is always less costly to copy than to create something new especially when one copies oneself. Consequently, an argument can be made that increasing copyright protection may not produce increases in the number of new works because the costs associated with law changes may lead wealth maximizing copyright owners to prefer licensing over creation. This should come as no surprise to those versed in economics because this behavior is generally referred to as rent seeking. However, because the economic model assumes that the question facing authors is a simple binary question of to create or not create this strategy does not appear.

More fundamentally, however, the existing economic model is incomplete because it is premised upon two erroneous assumptions: 1) that the new work will be successful in the marketplace, and 2) that authors are currently creating fewer works than they are capable of producing. To demonstrate that copyright is a useful response to the public goods nature of creative works even Landes and Posner’s more detailed economic model examines an author’s incentives in response to copying by competitors by assuming demand for the work. Under these circumstances, what their model is actually predicting is that increasing copyright protection will increase the revenues available to copyright owners and increase the incentive to produce more copies of the same work when competing against copiers. While related, this is not the same as modeling an individual author’s decision whether to create a new work in a functioning market protected by copyright law or how changes in copyright law will influence that decision. Any model examining whether changes in copyright law influence individual behavior to create new works must consider the possibility that there may be no demand, no market for the work at all.

Even under a profit-maximizing model, one must discount potential revenues based upon the likelihood that the public will desire the work. After all, some works are just as undesirable at half the price, and some may not find an audience even when given away for free. In other words, a new work (N) will be created if the anticipated income created by copyright law (R(z)) discounted by the probability that the public will actually desire the work (P) is greater than the cost of the work (C). Cost is a function of opportunity costs (O), materials (M), and copyright law (z).

\[ \text{If } P(R(z)) > C(O,M,z), \text{ then } N \text{ will be produced.} \]

Consider how this decision-making process applies to new authors and established authors. Whether one believes the odds of being published are the equivalent of winning the lottery or because new authors simply do not know whether the public will find their work interesting and of sufficient quality, new or unknown authors are in the most difficult decision-making position. Even assuming that the basic costs of creating a new work and the potential revenues are essentially the same as established authors, new authors are subject to greater uncertainty and are likely to discount the revenue side of the equation at a higher rate. As a new author, \( P \) is an unknown quantity and could range anywhere from 0 to 1. In response, one
strategy could be to keep costs down to a minimum and consider only whether one’s time is better spent creating rather than engaging in some other revenue producing labor. Even then under a wealth maximizing theory, no new works should be created because a rational wealth maximizer would not engage in what is essentially a gamble. In other words, for a new author, the creative process is a gamble because the costs or losses are guaranteed while the payoff is uncertain. For example, let’s assume that it takes 365 days to write a book working 10-hour days. Let’s also assume that the writer would have earned $10/hour working at another job instead of writing. Assuming no additional costs, writing the book cost the writer $36,500. At a royalty rate of $2.50 per book, the author would need to sell 14,600 books to break even, and there is no guarantee that the author will sell even a single copy. While the author can do more to improve her probability of success, researching successful works, rewriting her work, attending seminars, seeking out agents, learning more about the publication process, these steps are guaranteed to increase her costs while the payoff remains unchanged and uncertain. While changes in copyright law may change both costs and potential payoff, they do little to change the fact that for a new author, (P) the probability of success is unknown (and for most new authors extremely low). As such, changes in copyright law should have little impact on the number of new works produced under this model by unknown authors.

Next, consider the decision-making process for established authors. Unlike the new author, we can assume for purposes of this discussion that the established author’s P or probability of success is more certain and may even approach 1 (or near certainty) as would be the case when an established author obtains an advance from a publisher sufficient to cover the author’s costs. Under these circumstances, for changes in copyright law to have an effect on an established author’s productivity, one must assume that the author is currently working under capacity. In other words, the established author is producing fewer works than she is actually capable of producing. As such, increasing the potential rewards available should induce the author to be more productive. The difficulty with this assumption is that it is inconsistent with the basic economic model behind copyright law. If copyright law has done its job against free riders and provided profit-maximizing authors with the opportunity to recoup their costs for a given work, those authors should already be producing the maximum number of works they are capable of producing without sacrificing quality. In other words, the financial incentive to create new works already exists because copyright law already creates those incentives by addressing the underproduction created by free riding. From an incentive perspective, any additional rewards created by increasing copyright protection would represent a windfall to copyright owners from consumers. Under these circumstances, the only way to increase the number of works produced is to increase productivity. Generally, increases in productivity are brought

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110 Of course, this is a very limited model of human behavior and economists in general would look to utility rather than simply wealth. In other words, an author may simply prefer to spend time writing rather than working for $10/hour or prefers that activity to competing leisure activities. This will be discussed in greater detail later. However, once we move beyond the profit maximizing preferences, the persuasiveness of the economic incentive justification for copyright protection diminishes accordingly. In other words, if an artist creates because she values the act of creation regardless of or beyond the financial rewards associated with creation, then it is no longer meaningful to speak in terms of the need for law to create financial incentives to encourage creation. Instead, it is arguably more meaningful to speak in terms of law’s role in giving such individuals opportunities for creation.

111 For comparison purposes, by one estimate, it is possible to have a New York Times best seller by selling 5,000 hardcover copies in a single week. http://tessgerritsen.com/blog/2007/07/18/how-many-copies-sold-is-a-bestseller/

112 This assumes that creativity is purely a function of labor rather than talent, insight, or inspiration.
about by changes in technology and pharmacology, not law because if the economic opportunity already exists the economic model assumes that *homoeconomicus* will exploit it.

Astute readers will have recognized by now that if people actually behaved like *homoeconomicus*, risk adverse and seeking only to maximize wealth, there would be no creative works except those funded in advance through some system of patronage. Nonetheless, people continue to create even when they are unknown and their likelihood of success is small. One might explain this behavior by rejecting the rational actor model and posit that individuals create for reasons beyond financial remuneration and/or that individuals are subject to bounded rationality (in other words, that individuals do not always behave rationally). While I believe both of these factors are at play in the decision to create, one need not abandon the rational economic actor model for the purposes of this discussion. Even if one accepts that under certain circumstances, this behavior can still be considered rational, changes in copyright protection are still unlikely to change individual behavior. Consider the case of lotteries. Edward McCaffery argues that even playing the lottery is a rational decision because for some individuals after other preferences such as food, clothing, and shelter are met; playing the lottery is the only legally available means of obtaining greater economic freedom and those individuals prefer playing the lottery over other uses of their money. In other words, while it may be irrational to starve or freeze to death because of one’s love of music or poetry, after one’s basic needs are met it may well be rational to spend one’s spare time creating. Not only may authorship be what one prefers to do, it may also be the best strategy for dramatically improving one’s economic wellbeing. So should changes in copyright law change the behavior of new authors under these circumstances? The answer is once again no, but the reason is now the same as that for established authors. In order to encourage more creativity from these individuals, one must once again assume that prior to the law change they were creatively underproductive. In other words, one must assume that before the law change, individuals who have the talent and inclination to spend their time creating works of authorship and who realize that succeeding as an author is really their only strategy for obtaining greater economic freedom, did not have sufficient motivation to create or weren’t working hard enough after waiting tables, working at the assembly line, or sitting in front of a computer monitor. Once again, so long as copyright law responds to the public goods problem of creative works, the law already makes it possible for these individuals to escape their current financial conditions, and rational individuals in their situation should already be creating as much as their circumstances allow. Put differently, if I know that by spending my evenings writing a book, I could become a billionaire like J.K. Rowling, but I choose to watch television instead, why would changing copyright law, even expanding copyright protection, change my behavior? Fully understood, even the wealth maximizing, rational actor model of copyright does not support the idea that increasing copyright protection, beyond the protection necessary to address the public goods problem, will increase the number of copyrighted works produced. While increasing copyright law will provide greater financial rewards to authors, it does little to change their incentives to create new works.

VI. Conclusion: Can Law Encourage Greater Creativity?

Till now, the logic that increasing copyright protection increases incentives to produce more new works and, therefore, leads to the production of more works (even when those new incentives are so small they could be considered illusory) has been largely untested. In this

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article, we tested this theory, and using statistical analysis demonstrate that one cannot predict when a law change will be associated with a change in copyright registrations, and argue that the theoretical model upon which this hypothesized relationship was based is incomplete. Instead, our study suggests that when lawmakers consider whether to expand copyright law, there is little empirical or theoretical support for the position that increasing copyright protection will increase the number of new works created. Based upon the historic data, the most that can be expected is at best a 38% chance that the new law will be associated with an increase in the number of new registrations for some unknown category of work. In contrast, lawmakers are more likely to find a relationship between an increase the number of new works and laws that reduce or otherwise limit copyright protection, and even then the relationship is far from guaranteed. Expecting a law change to increase the number of new copyrighted works is akin to shooting a gun with both live ammunition and blanks at targets moving in the dark. You will occasionally hit a target, but you will not know when this will happen or which target you are going to hit. Instead, population is uniformly and consistently, the best predictor of the number of new works produced.

Given these findings, one might be tempted to jump to the conclusion that copyright law does not matter. Nothing, however, could be further from the truth. While changes in copyright law may have little to do with the number of new copyrighted works created, this does not mean that copyright law has no impact. First, copyright law clearly plays a role with regard to the creation and distribution of wealth. By one estimate, in 2005, the value added to U.S. GDP by the “core” copyright industries was $760.49 billion, and $1.38 trillion for all copyright industries, and these industries employed 5.38 million and 11.32 million individuals respectively. Copyright law clearly helps create and protect this wealth and these jobs. Likewise, the recent $100 million judgment in favor of Mattel’s Barbie dolls against the manufacturer of Bratz dolls illustrates that the stakes even in individual copyright cases can be quite high. So while increases in copyright protection may not provide greater incentives, it certainly forms the basis for distributing wealth in society. Second, because our data began with changes to copyright law following 1870, our study only examines whether those changes influenced the number of new works subsequently produced, and it does not address whether those works would have been created absent copyright or under a less protective regime. And, while creativity may occur absent copyright law, our model does not question the position that a basic level of copyright protection is necessary to combat the underproduction of creative works that is likely to result from piracy (i.e., the sale of unauthorized duplicates of a copyrighted work). Third, because this study focused upon copyright registrations and there is a large body of creative works outside the copyright registration regime, we do not know the impact of copyright’s expansion on those works. To the extent that creators of these works fear liability and criminal prosecution, copyright’s expansion, especially its more recent well-publicized expansion, may be deterring an unknown number of valuable creative works. Or, copyright may have absolutely no affect on these works at all, we simply do not know.

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116 There may very well be good and sound public policy reasons for providing authors with greater rewards. Our study, however, casts serious doubt on the idea that the incentives argument can reasonably be considered one of them.
117 See, e.g., Greg Sandoval, YouTube Users Caught in Warner Music Spat, CNET News (Jan. 27 2009) (reporting some of the copyright problems created by YouTube videos).
If increasing copyright protection is unlikely to increase the number of new works created, what can society do to encourage creativity? While a full discussion of these strategies is beyond the scope of this article, we can outline four suggestions.

1) Improve the likelihood of success – if we want people to create more works, we could take steps to make it more worth their while. Rather than focus on expanding the jackpot, we could take steps to improve the odds making it more likely for authors to recoup their investment in creativity even if the rewards are smaller. This could occur by increasing direct funding for the arts and/or increasing the number of prizes available for new works. We could also facilitate the distribution and accessibility of creative works making it easier for authors to reach even small audiences. To the extent that copyright law and its theories of secondary liability stand in the way, they should be amended. To the extent that incumbent businesses place roadblocks in the way, they should be removed.

2) Reduce the cost of creation – related to improving the likelihood of success is the strategy of reducing the cost of creation. The easier it is to create, the more likely people are to create. Teach people to create, provide them with the skills and expertise, provide them with the physical tools, and provide them with the opportunity to create. Take advantage of technologies that reduce the cost of creation, communication, and interaction, reduce copyright protection when it is a barrier to creativity, and reduce transactions costs including the registration fee.

3) Recognize the saliency and optimism bias – if our preceding strategies are to improve the actual likelihood of “success,” this strategy is to influence the perceived likelihood of “success.” Researchers in the cognitive sciences have identified two important aspects of human decision that are relevant here. First, individuals tend to be overly optimistic about their chances for success, and second, individuals tend to judge the probability of something occurring by how easy it is to recall something similar. While we should not exploit these biases as a means of manipulation, we should recognize the problems created by bounded rationality and take steps to ensure that people have the opportunity to satisfy their genuine preferences. This can be achieved in part through suggestion four.

4) Genuinely value creativity and the arts – If the intent behind copyright law’s expansion is to send a message that society values creativity, that message is far from clear. Copyright expansions and the changes associated with that expansion are more likely to signal that some forms of creativity are favored and others disfavored, or simply that some groups in society are favored and others disfavored. Because copyright law works in the negative, do not use this work, do not copy this work, do not imitate this work, we are not sending a message that society values the creation of new works, only that we should stay away from those already created. Instead, by taking the steps outlined in 1 and 2, we would send a clear message that we value creativity. Moreover, recognizing the issues of bounded rationality outlined in 3, that message should be reinforced publicly, prominently, and regularly by honoring and recognizing the creators
among us making it easier for people to recall the success stories of authors, and, therefore, more likely that they may choose to become authors themselves.

These outlines are not easy, but neither is creativity. For hundreds of years, the logic of copyright's expansion has been so compelling, and the means seemingly so inexpensive and simple, that lawmakers have not seriously contemplated other methods for encouraging creativity. Unfortunately, our study suggests, that the logic behind copyright’s expansion is flawed and the evidence strongly suggests that the means do not achieve the desired ends. While increasing copyright protection provides authors with greater financial rewards, it does little to change their incentives to create new works. If we truly want to encourage the creation of new works, we must rethink and re-envision the relationship between law and human creativity, and ensure that copyright law provides bounty not booty.