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**COPYRIGHT LAW AND DIGITAL PIRACY:
AN ECONOMETRIC GLOBAL CROSS-NATIONAL STUDY**

Antoni Terra^{*}

Digital piracy is a worldwide concern. Both very high and very low rates of intellectual property infringement threaten innovation, thus implying that some level of effective copyright regulation is required to incentivize the creation of original works. However, although Article 27 of the Universal Declaration of Human Rights advocates for social access to culture as well as the protection of copyright, many countries do not yet have an economic and legal balance between authors and consumers.

This article aims to identify which copyright law measures are more related to low/high digital piracy rates. To address that question, the author presents a picture of how the world of copyright is today. The empirical law and economics methodology used in this paper thus consists of a content analysis of significantly selected copyright law measures that have been more or less broadly implemented, or that have been dismissed by 108 countries in their current national copyright statutes. After processing the resultant database (or coding scheme) with econometric and descriptive statistical tools, the findings suggest that: (1) the legal measures correlated to high digital piracy rates include the sweat of the brow doctrine and secondary liability

^{*} Doctor of the Science of Law (J.S.D.) candidate, Stanford Law School. I would like to thank Professor Phillip R. Malone for his time and sound advice in supervising this research. I would also like to express my appreciation for the useful comments, received at different stages of this paper, from Diego Gil McCawley as well as my gratitude for the suggestions and support from Professor Paul Goldstein, Professor Deborah R. Hensler, Professor Mark A. Lemley, Professor A. Mitchell Polinsky, Vanessa Casado-Pérez, Shawn Miller, Jef Pearlman, Fernán Restrepo, and the entire SPILS/J.S.D. community at Stanford Law School. A special note goes to Dr. Pablo Salvador Coderch as none of this would have been possible without his mentorship. Finally, I am also particularly thankful to “la Caixa” Foundation for its inspiring generosity. All mistakes and omissions are mine.

rules for Internet Service Providers (“ISPs”); (2) the measures most connected to low piracy rates are private copying and fair use provisions; (3) statutes that favor copyright holders are associated with greater rates of digital piracy; and (4) richer countries show lower levels of copyright infringement, which validates the development economics theory. Because there is no extant literature on this topic, these results constitute the first step toward a comprehensive cross-national quantitative study on comparative copyright law and digital piracy, both in descriptive and explanatory terms.

Without doubt, this project will excite scholars in economics and intellectual property but will also intrigue international policymakers as the outcomes of this study provide core policy guidelines on copyright that legislatures and governments around the world can implement. These interdisciplinary recommendations are in line with designing a new and economically viable regulatory copyright model which aims to reduce piracy rates and to solve the global tension between authors and consumers in the digital era.

*From the earliest days at Apple, I realized that we thrived
when we created intellectual property.*

If people copied or stole our software, we’d be out of business.

*If it weren’t protected, there’d be no incentive for us
to make new software or product designs.*

*If protection of intellectual property begins to disappear,
creative companies will disappear or never get started.*

*But there’s a simpler reason: It’s wrong to steal.
It hurts other people. And it hurts your own character.*

Steve Jobs¹

I. INTRODUCTION

Technological advances expand society’s capabilities to new frontiers previously unimaginable. The classic contemporary

¹ WALTER ISAACSON, STEVE JOBS 396 (2011).

example is the Malthusian problem² that governed the world since the dawn of man and was shattered by the technological developments which stimulated the Industrial Revolution.³ Approximately two hundred years later, the Digital Revolution, reinvigorated in the 1960s by Jack Kilby's⁴ invention of the microchip, has given new momentum to technological advancements intended to enhance our quality and enjoyment of life. It is clear that technology enhances human progress; however, its power can threaten creativity if not effectively regulated through intellectual property laws. This field, lying at the intersection of law, economics, science, and technology, has experienced a dramatic shift since the birth of the Internet, enabling copyright infringement in ways never before conceived. Hence, to fight against digital piracy, the proper treatment of copyright must become a legal policy priority issue which integrates an economic perspective.⁵

² THOMAS ROBERT MALTHUS, AN ESSAY ON THE PRINCIPLE OF POPULATION, 13–17 (J. Johnson, London 1798) (exhibiting Malthus' analysis on how humanity would survive if the population increased in geometric progression while agricultural output grew arithmetically).

³ See GREGORY CLARK, A FAREWELL TO ALMS: A BRIEF ECONOMIC HISTORY OF THE WORLD, 2 Fig. 1.1 (Joel Mokyr ed., 2007), http://wiki.dpi.inpe.br/lib/exe/fetch.php?media=ser457-cst310:a_clark_farewell_to_alms.pdf. It was precisely the transformation in production and energy that occurred between 1760 and 1830, *id.* at 3, that allowed society to escape the “Malthusian trap,” in which discoveries did not necessarily yield improvements in quality of life as the overall increase in wealth was offset by the increase in population *Id.* at 1–3. It was only after the Industrial Revolution that society had the necessary mechanisms to trigger the per capita income growth and the chance to finally start living better. *Id.*

⁴ *The Nobel Prize in Physics 2000*, NOBEL MEDIA, https://www.nobelprize.org/nobel_prizes/physics/laureates/2000/ (last visited Sept. 12, 2016) (“The Nobel Prize in Physics 2000 was awarded . . . to Jack S. Kilby for his part in the invention of the integrated circuit.”).

⁵ See *Green Paper: Unlocking the Potential of Cultural and Creative Industries*, 2-3, COM (2010) 183 final (Apr. 27, 2010). The “cultural and creative industries” (“CCI”) accounted for 2.6% of the European Union's GDP in 2010, and they provided employment to approximately five million people within the EU. *Id.* In the United States, CCI, known as “core copyright industries,” represented 6.4% of its GDP in 2010, and accounted for 3.9% of

The former Associate Justice of the United States Supreme Court Sandra Day O'Connor (1981-2006) rightly emphasized in *Feist Publications, Inc. v. Rural Telephone Service Co.*⁶ that the existence of an economic and legal balance between authors and consumers should be the guiding principle of any copyright legislation:

The primary objective of copyright is not to reward the labor of authors, but '[t]o promote the Progress of Science and useful Arts' [Article I, Section 8, Clause 8 of the U.S. Constitution]. To this end, copyright assures authors the right to their original expression, but encourages others to build freely upon the ideas and information conveyed by a work. This result is neither unfair nor unfortunate. It is the means by which copyright advances the progress of science and art.⁷

Professor Neil W. Netanel complemented Justice O'Connor's vision with no less erudition: "Copyright law's perennial dilemma is to determine where [authors'] exclusive rights should end and unrestrained public access should begin."⁸

The United States implemented the 1976 Copyright Act and subsequent amendments to achieve a fair compromise between authors and consumers to incentivize creativity, innovation, and originality; nonetheless, many countries have not yet reached this point. Thus, although Article 27 of the Universal Declaration of Human Rights advocates for cultural participation as well as the protection of copyright,⁹ digital piracy unfortunately remains a

employment. Stephen E. Siwek, *Copyright Industries in the U.S. Economy: The 2011 Report*, 5-10, International Intellectual Property Alliance 13 (2011).

⁶ 499 U.S. 340, 349 (1991).

⁷ *Id.*

⁸ Neil W. Netanel, *Copyright and a Democratic Civil Society*, 106 YALE L.J. 283, 285 (1996).

⁹ Universal Declaration of Human Rights, G.A. Res. 217A (III), U.N. Doc. A/810 Art. 27 (1948), "1. Everyone has the right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits. 2. Everyone has the right to the protection of the

worldwide concern. For instance, according to the *BSA Global Software Survey 2016*,¹⁰ whose numbers are illustrative but probably overestimated, the world unlicensed PC software installation rate is 39%. Moreover, for the top 20 economies in commercial value of unlicensed PC software, the differences are striking: 17–24% for the United States, Japan, Australia, Germany, the United Kingdom, Canada, and the Netherlands; 34–52% for France, South Korea, Spain, Italy, Brazil, and Mexico; and 58–84% for India, Russia, Argentina, Thailand, China, Vietnam, and Indonesia.¹¹ As will be later measured, unlicensed software installation rates are statistically greater for younger industrialized countries.

Hence, to shed light on the global piracy rate problem, which is of an empirical nature but has policy implications, the research question that this article aims to answer is explanatory-based: “which copyright law measures are more related to low/high digital piracy rates?” This analysis relies primarily on data from WIPO Lex,¹² the BSA Software Alliance (“BSA”),¹³ and the World Bank¹⁴ and represents a picture of how the copyright universe is

moral and material interests resulting from any scientific, literary or artistic production of which he is the author.”

¹⁰ *Seizing Opportunity Through License Compliance: BSA Global Software Survey 2016*, BSA, THE SOFTWARE ALLIANCE, 7, (May 2016), http://globalstudy.bsa.org/2016/downloads/studies/BSA_GSS_US.pdf; see also *Piracy of Digital Content*, OECD, <http://www.oecd.org/industry/ind/piracyofdigitalcontent.htm>; David Price, *Sizing the piracy universe*, NETNAMES (Sept. 2013), <http://copyrightalliance.org/sites/default/files/2013-netnames-piracy.pdf>. But see Ivan P. L. Png, *On the Reliability of Software Piracy Statistics* (Electronic Commerce Research and Applications, Working Paper No. 5), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1099325.

¹¹ *Seizing Opportunity Through License Compliance: BSA Global Software Survey 2016*, *supra* note 10.

¹² WIPO LEX, <http://www.wipo.int/wipolex/en/> (last visited Sept. 12, 2016).

¹³ THE SOFTWARE ALLIANCE, *BSA Global Software Survey: The Compliance Gap*, http://globalstudy.bsa.org/2013/downloads/studies/2013GlobalSurvey_Study_en.pdf (last visited Sept. 12, 2016).

¹⁴ WORLD BANK OPEN DATA, <http://data.worldbank.org> (last visited Sept. 12, 2016).

today. Thus, the empirical law and economics methodology employed here (*see infra* Section II) consists of a content analysis of significantly selected copyright law measures that have been more or less broadly implemented, or that have been dismissed, by 108 countries in their current national copyright statutes.

This article is divided in three main sections: literature review, methodology, and analysis-results. Regarding the latter, after a descriptive statistics note (Section III.A) the resultant database is processed with econometric tools to (1) identify the copyright law mechanisms (and/or control variables) that are more related to low/high digital piracy rates (Section III.B.1),¹⁵ and (2) assess whether statutes that generally favor copyright holders or those that favor consumers are associated with lower or higher rates of digital piracy (Section III.B.2). Therefore, based on its econometric results on copyright law mechanisms and/or control variables that are more related to low digital piracy rates, this article provides strategic guidelines and recommendations to intellectual property policymakers worldwide (Section III.C). That way, legislatures and governments have up-to-date empirical data to build a new and economically viable copyright model to correct the global tension between authors and consumers in the digital era, which would lead society to greater heights of wellbeing. Finally, to test their accuracy, the proposed policy guidelines are applied to the particular cases of the United States and Spain (Section III.D).

Because there is no existing literature in the field with the scope that this article offers (*see* Section I), these results constitute the first step toward a comprehensive cross-national quantitative study on comparative copyright law and digital piracy, both in descriptive and explanatory terms.

II. LITERATURE REVIEW

There are no econometric studies assessing the relation between piracy rates, copyright laws, and socioeconomic variables

¹⁵ The author coded, for instance, how broad the fair use doctrine or secondary liability rules for ISPs are in the selected 108 jurisdictions, and then used econometrics to observe their relationship with the respective national digital piracy rate.

across countries in a quantitative and internationally comprehensive fashion. Thus, one of the main contributions of this project is to fill the gap in the extant literature. However, papers addressing some *particular* issues of what this article directly or indirectly covers have been published. One can identify at least three lines of research in the previous literature that are significant for our purposes: the first, central, and still very unexplored line assesses the relationship between copyright law and digital piracy (it also aims tangentially at copyright regulation and sales). The second category focuses on development economics and its effect on intellectual property infringement. Finally, the third group is devoted to works that explain why individuals decide whether to engage in digital piracy. Moreover, this literature review includes a broadly examined field regarding digital piracy and sales as well as a final section about general reflections on copyright. These two latter areas of knowledge are not part of this article, but they have been included in the interest of completeness.

A. Effects of Copyright Law on Digital Piracy and Sales

One of the relevant trends in this field analyzes how strengthening laws against copyright infringement affects digital piracy, which is one of the main concerns of this project. Thus far in the literature, this issue has only been examined from an ad hoc perspective or from a theoretical standpoint. This paper combines both a comprehensive and an empirical approach to address whether harsher laws and their enforcement mechanisms are related to lower piracy rates.

On the one hand, for the nature of this research, explanatory conclusions are not achievable through qualitative comparative studies on copyright, as the studies are much more suitable to understand the nuances of this discipline from a descriptive angle.¹⁶

¹⁶ Sanjeev Chaswal, *Comparative Study of the Main Features of Copyright Law in India*, INDIAN LAW INSTITUTE (2012); ALKA CHAWLA, *LAW OF COPYRIGHT: COMPARATIVE PERSPECTIVES* (2013) (analyzing India, United Kingdom, United States, and the European Union); Shruti Rana, *The Global Battle Over Copyright Reform: Developing the Rule of Law in the Chinese Business Context*, UNIVERSITY OF MARYLAND FRANCIS KING CAREY SCHOOL OF LAW LEGAL STUDIES RESEARCH PAPER SERIES (2013) (analyzing United States,

On the other hand, the ad hoc econometric papers on copyright provide contradictory evidence on whether tougher laws to fight copyright infringement increase or decrease digital piracy. This article addresses this issue in Section III.B. For instance, the 2009 implementation of the HADOPI law in France,¹⁷ which was later revoked on July 8, 2013, is one of the best-known recent examples of this kind of literature. HADOPI introduced a graduated response in an attempt to increase compliance with copyright laws, the so-called “three strikes” where individuals received a warning the first

Japan, and Taiwan); Phil Sherrell (Ed.), *International Comparative Legal Guide to Copyright 2015*, GLOBAL LEGAL GROUP (2014) (analyzing 23 countries); COPYRIGHT INTERNATIONAL ENCYCLOPEDIA OF COMPARATIVE LAW, VOL. XIV, (Eugen Ulmer & Gerhard Schrickler eds., 2007) (using qualitative studies to compare different national copyright laws).

There are also works within this qualitative category focused on specific matters, such as copyright clearance (Nusta Nina, *Final Guidelines on Copyright Clearance and IPR Management* (eContentplus, ECP-2007-DILI-517006, 2010)), copyright limitations (Tatiana Brazhnik, *How to Balance Interests: Comparative Legal Aspects on the Limitation of Copyright in International Law* (National Research University Higher School of Economics, Working Paper No. WP BRP 41/LAW/2014, 2014)), linking and framing (Ignacio Garrote, *Linking, Framing and Copyright: A Comparative Law Approach* (2001)), peer-to-peer file-sharing and third party liability (Guy Pessach, *An International-Comparative Perspective on Peer-to-Peer File-Sharing and Third Party Liability in Copyright Law: Framing the Past, Present, and Next Generations' Questions*, 40 *Vand. J. Transnat'l L.* 1, 87–133 (2007) (analyzing Australia, Canada, and United States)), and video games (ANDY RAMOS, ET AL., *THE LEGAL STATUS OF VIDEO GAMES: COMPARATIVE ANALYSIS IN NATIONAL APPROACHES* (2013) (analyzing 24 countries)). The International Comparative Legal Guide to Copyright 2015 edited by Sherrell includes the following 23 jurisdictions: Australia, Austria, Belgium, Canada, Finland, France, Germany, Japan, Luxembourg, Malaysia, Morocco, Netherlands, Nigeria, Norway, Philippines, Russia, Spain, Switzerland, Taiwan, Turkey, Ukraine, United Kingdom, and United States. The study on the legal status of video games prepared by Ramos, López, Rodríguez, Meng, and Abrams covers 24 countries: Argentina, Belgium, Brazil, Canada, China, Denmark, Egypt, France, Germany, India, Israel, Italy, Japan, Kenya, Russia, Rwanda, Senegal, Singapore, South Africa, South Korea, Spain, Sweden, Uruguay, and United States.

¹⁷ Loi n°2009-669 du 12 juin 2009 favorisant la diffusion et la protection de la création sur internet [Law 2009-669 of June 12, 2009], LEGIFRANCE <http://legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000020735432&d ateTexte=&categorieLien=id> (promoting the distribution and protection of creative works on the Internet).

two times they were detected illegally sharing content through peer to peer (“P2P”) networks, and only when a third violation was identified was legal action taken.¹⁸ Applying a difference-in-difference approach to a panel of iTunes sales data from the four major music labels (Universal Music, Warner Music, EMI Music, and Sony Music) across a broad set of European countries, Danaher et al. found that “increased consumer awareness of HADOPI caused French iTunes music sales to increase by 22-25%.”¹⁹ However, Arnold et al., using survey data from French Internet users, concluded that the HADOPI law did not have a substantial deterrent effect on individuals’ decision to engage in digital piracy for the first time.²⁰ Instead, he argued that “the increased [iTunes sales in France were] likely to have been caused by public educational efforts and increased information about legal channels that coincided with the introduction of that law.”²¹ Similarly, Gavaldà-Miralles et al.²² analyzed a two-year-long user-level trace of download activity of over 38,000 people from around

¹⁸ ACT TO PROMOTE THE DISSEMINATION AND PROTECTION OF CREATION ON THE INTERNET, <http://www.senat.fr/dossier-legislatif/pjl07-405.html> (last visited Sept. 12, 2016).

¹⁹ Brett Danaher, Michael D. Smith, Rahul Telang & Siwen Chen, *The Effect of Graduated Response Anti-Piracy Laws on Music Sales: Evidence From an Event Study in France*, 62 J. OF INDUS. ECON., 541, 541 (2014), <http://onlinelibrary.wiley.com/doi/10.1111/joie.12056/pdf>; but see Will Tovey, *An Analysis of Claimed Relationships between iTunes Sales in France and Hadopi*, LEGAL PIRACY, (2012), <https://legalpiracy.files.wordpress.com/2012/03/hadopi-and-itunes1.pdf> (expressing doubts about the reliability of the study when analyzing its 2012 version due to its economic methodology and in the interpretation of its results).

²⁰ Michael Arnold, Eric Darmon, Sylvain Dejean, & Thierry Penard, *Graduated Response Policy and the Behavior of Digital Pirates: Evidence from the French Three-strike (Hadopi) Law*, Univ. of Del. Alfred Lerner College of Business & Econ., Dept. of Econ., Working Paper No. 2014-07, at 4 (2014), <http://www.lerner.udel.edu/sites/default/files/ECON/PDFs/RePEc/dlw/WorkingPapers/2014/UDWP2014-07.pdf>.

²¹ *Id.*

²² Arnau Gavaldà-Miralles, John S. Otto, Fabián E. Bustamante, Luis A.N. Amaral, Jordi Duch, & Roger Guimerà, *User Behavior and Change: File-sharers and Copyright Laws*, PROC. OF THE 10TH ACM INT’L CONF. ON EMERGING NETWORKING EXPERIMENTS AND TECH., 319–324 (2014), <http://dl.acm.org/citation.cfm?doid=2674005.2675009>.

the world. One of their most interesting outcomes was that when the New Zealand “three-strikes” law took effect, the reduction in file-sharing activity of copyrighted content lasted only two months.²³ After that initial period, digital piracy returned to the level observed prior to the law being enacted.

Joining this more pessimistic view on how copyright laws can influence digital piracy, Orme analyzed the short- and long-term effectiveness of six major U.S. anti-piracy government actions on the box-office revenues of the motion-picture industry.²⁴ His results showed that, “with one notable exception [the NET Act],²⁵ these laws have either been ineffective or counter-productive from the perspective of the film studios.”²⁶ Thus, according to the author, those stricter policies designed to limit piracy actually decreased box-office revenue, perhaps because they unintentionally fostered an increase in the number of downloads of films.²⁷

However, again, there are other papers that seem more confident in the positive effects of copyright law (and related government and judicial policies) to reduce digital piracy: Bhattacharjee et al. found that the Recording Industry Association of America’s highly publicized lawsuits against P2P sharers significantly reduced the availability of pirated files.²⁸ In addition,

²³ COPYRIGHT AMENDMENT ACT 2011 (N.Z.) NEW ZEALAND LEGISLATION, <http://www.legislation.govt.nz/act/public/2011/0011/latest/DLM3331813.html> (last visited Sept. 12, 2016).

²⁴ Tylor Orme, *The Short- And Long-Term Effectiveness of Anti-Piracy Laws and Enforcement Actions*, 38 J. OF CULTURAL ECON. 351, 354–356 (2014), <http://link.springer.com/article/10.1007%2Fs10824-014-9225-2>.

²⁵ The United States No Electronic Theft (NET) Act, Pub. L. No. 105–147 (enabling criminal prosecution of individuals who engage in copyright infringement, effective since December 16, 1997).

²⁶ Orme *supra* note 24, at 367.

²⁷ *Id.* (“[I]t appears that shutting down Web sites, seemingly the most direct method of reducing illegal access to copyrighted materials, does not have any noticeable impact on the revenues received by the US film industry.”).

²⁸ Sudip Bhattacharjee, Ram D. Gopal, Kaveepan Lertwachara, James R. Marsden, & Rahul Telang, *The Effect of Digital Sharing Technologies on Music Markets: A Survival Analysis of Albums on Ranking Charts*, 53 MGMT. SCI., 1359, 1374 (2007), http://www.heinz.cmu.edu/~rtelang/digital_sharing_MS.pdf.

McKenzie and Walls indicated that several Australian court cases significantly diminished the number of unlawful downloads of films.²⁹ However, these authors focused on the media coverage devoted to cases involving copyright enforcement and effects in reducing digital piracy, instead of the specific relationship between the implementation of laws and the flow of illegal content online.

Specifically regarding the role of the copyright enforcement, Varian provides a concise summary of this topic from an economic perspective.³⁰ Such a theoretical law and economics approach to the relationship between digital piracy and copyright remedies—and its legal enforcement—is also found in Margolis.³¹ Two pieces of conventional wisdom within this field are that most anti-piracy policies do not have a dramatic impact on actual downloads because of the unenforceable nature of much of online copyright law,³² and also that most anti-piracy strategies dilute over time because of evolving technologies for sharing files online.³³

In short, although the literature mostly agrees that legal enforcement drives copyright infringement downward, even with the difficulties of implementation, there is conflicting evidence regarding the effects of copyright law on digital piracy. This article will shed light on this issue by signaling which copyright law measures are more highly correlated to low/high digital piracy rates worldwide.

²⁹ Jordi McKenzie & W. David Walls, *File-Sharing and Film Revenues: An Empirical Analysis* (University of Sydney, Economics Working Paper Series, 2014), <http://ses.library.usyd.edu.au/bitstream/2123/9271/1/ECON%202013-14.pdf>.

³⁰ Hal R. Varian, *Copying and Copyright*, 19 J. OF ECON. PERSP., 121, 138 (2005) <https://www.amherst.edu/system/files/media/0657/VarianCopy.pdf>.

³¹ STEPHEN E. MARGOLIS, *Law and Economics of Copyright Remedies*, HANDBOOK ON THE ECONOMICS OF COPYRIGHT, 241-263 (Richard Watt, ed., 2014).

³² Brian P. Heneghan, *The NET Act, Fair Use, and Willfulness-Is Congress Making a Scarecrow of the Law?*, J. OF HIGH TECH. L., 1, 27, 46 (2002), <https://www.highbeam.com/doc/1G1-172599151.html>.

³³ Hasshi Sudler, *Effectiveness of Anti-Piracy Technology: Finding Appropriate Solutions for Evolving Online Piracy*, 56 BUS. HORIZONS, 149, 157 (2002), www.sciencedirect.com/science/article/pii/S0007681312001577.

B. Effects of Development Economics on Intellectual Property Infringement

One of the basic ideas of this paper is that, along with or instead of copyright law mechanisms, there may be socioeconomic reasons (defined as control variables in the econometric specification) that also explain digital piracy rates. General works on development economics³⁴ have explored in depth the determinants that make countries rich or poor. Associated with this branch of knowledge, there is a growing interest in linking economic development with digital piracy rates. For instance, Karaganis states that “the first determinant of access to media markets is income. [Then,] the general assumption [is] that countries ‘grow’ themselves out of high piracy levels as the number of high-income consumers increases (and, correspondingly, as formal markets crowd out informal ones).”³⁵ In other words, digital piracy is inversely correlated to wider measures of socioeconomic development: the richer the country, the lower its piracy rate. Multiple empirical research studies support this claim.³⁶ It is thus even clearer that such socioeconomic indicators must be included as control variables for a dual purpose:

³⁴ See, e.g., DARON ACEMOGLU & JAMES A. ROBINSON, *WHY NATIONS FAIL: THE ORIGINS OF POWER, PROSPERITY, AND POVERTY* (2012); Jared Diamond, *What Makes Countries Rich or Poor?*, THE NEW YORK REVIEW OF BOOKS, (June 7, 2012), www.nybooks.com/articles/archives/2012/jun/07/what-makes-countries-rich-or-poor; SATYA THALLAM, INTERNATIONAL PROPERTY RIGHTS INDEX (2008), <http://www.libinst.ch/publikationen/LI-2008-IPRI-Report.pdf>.

³⁵ SOCIAL SCIENCE RESEARCH COUNCIL, *MEDIA PIRACY IN EMERGING ECONOMIES*, 10 (Joe Karaganis ed., 2011), <http://piracy.americanassembly.org/wp-content/uploads/2011/06/MPEE-PDF-1.0.4.pdf>; see also Varian *supra* note 30 at 124-125.

³⁶ Andrew E. Burke, *How Effective Are International Copyright Conventions In the Music Industry*, 20 J. OF CULTURAL ECON., 51, 66 (1996), <http://link.springer.com/article/10.1007/s10824-005-1060-z>; Trisha L. Bezmen & Craig A. Depken, II, *Influences On Software Piracy: Evidence From the Various United States*, 90 ECON. LETTERS, 356, 356-361 (2006), <http://www.sciencedirect.com/science/journal/01651765/90>; Arnau Gavaldà-Miralles, et al., *Impact of Heterogeneity and Socioeconomic Factors on Individual Behavior in Decentralized Sharing Ecosystems*, 111 PROC. OF THE NAT'L ACADEMY OF SCI. OF THE U.S. OF AMERICA, 15322, 15327 (2006), <http://www.pnas.org/content/111/43/15322>.

to check whether those previous findings can actually be replicated in this study and to reduce the omitted variable bias and obtain a cleaner legislative effect on the piracy rate. Sections III.B.1 and .3 explain in detail whether empirical results validate or refute that development economics theory.³⁷

C. Digital Piracy and Individual Choice

As described above, there have been very few—and narrowly focused—studies empirically assessing the relation between copyright law and digital piracy, and many more academic works that have been published showing that piracy may hurt sales. The latter area is not within the scope of this article, but the literature states almost unanimously that copyright infringement has no positive effects on sales (they are either neutral or negative³⁸).³⁹

³⁷ Complementing the development economics literature, another one of my key control variables targets the relationship between good, legal sources for online content (iTunes, Netflix, Spotify) and—decreasing—piracy rates. See Will Page, *Adventures in the Netherlands: Spotify, Piracy and the New Dutch Experience*, SPOTIFY (2013), <https://press.spotify.com/us/2013/07/17/adventures-in-netherlands/> (describing how Spotify's launch in the Netherlands in 2010 substantially decreased copyright infringement for music).

³⁸ See Luis Aguiar & Bertin Martens, *Digital Music Consumption on the Internet: Evidence from Clickstream Data*, *Digital Economy Working Paper 2013/04* (Institute for Prospective Technological Studies, Joint Research Centre of the European Commission, Working Paper JRC79605 2013); Tin Cheuk Leung, *Music Piracy: Bad for Record Sales but Good for the iPod?* (Chinese University of Hong Kong, Working Paper 2012); Brett Danaher, Samita Dhanasobhon, Michael D. Smith, & Rahul Telang, *Converting Pirates without Cannibalizing Purchasers: The Impact of Digital Distribution on Physical Sales and Internet Piracy*, 29 *MARKETING SCI.*, 1138, 1149-50 (2010); Brett Danaher, Michael D. Smith, & Rahul Telang, *Piracy and Copyright Enforcement Mechanisms* (National Bureau of Economic Research, Working Paper No. 19150 2013); Arthur S. DeVany & W. David Walls, *Estimating the Effects of Movie Piracy on Box-office Revenue*, 30 *REV. OF INDUS. ORG.*, 291, 299 (2007); Kai-Lung Hui & Ivan Png, *Piracy and the Legitimate Demand for Recorded Music*, 2 *CONTRIBUTIONS TO ECON. ANALYSIS & POL'Y*, Art. 11, 19 (2003); Stan J. Liebowitz, *File-Sharing: Creative Destruction or Just Plain Destruction?*, 49 *J. L. & ECON.*, 1, 21 (2006); Rafael Rob & Joel Waldfogel, *Piracy on the High C's: Music Downloading, Sales Displacement, and Social Welfare in a Sample of College Students*, 49 *J. L. & ECON.*, 29, 61 (2006); Alejandro Zentner, *File Sharing and International Sales of Copyrighted Music: An Empirical Analysis*

Nevertheless, it is also true that even though the substitutability⁴⁰ between a pirated and an original copy unambiguously harms the industry, there are other considerations at stake, such as the “sampling effect”⁴¹ or the fact that copyright industries are producing more content than ever before.⁴²

In a much wider scope, which is not covered by this study, there is extensive literature on the debate regarding copyright regulations, piracy, and incentives toward creativity. Such general reflections on copyright will be addressed in this article through its three basic theoretical assumptions (discussed in Section II, *infra*).⁴³

with a Panel of Countries, 5 TOPICS IN ECON. ANALYSIS & POL’Y, Art. 21 (2005); Alejandro Zentner, *Measuring the Effect of File Sharing on Music Purchases*, 49 J. L. & ECON., 63 (2006).

³⁹ But see Robert G. Hammond, *Profit Leak? Pre-Release File Sharing and the Music Industry*, 81 S. ECON. J., 387, 389 (2014) (showing that some individual artists may benefit from piracy); Felix Oberholzer-Gee & Koleman Strumpf, *The Effect of File Sharing on Record Sales: An Empirical Analysis*, 115 J. OF POL. ECON., 1, 38-40 (2007) (finding a small positive effect between piracy and sales); and Martin Peitz & Patrick Waelbroeck, *The Effect of Internet Piracy on Music Sales: Cross-Section Evidence*, 1 REV. OF ECON. RES. ON COPYRIGHT ISSUES, 71, 78 (2004) (suggesting antithetical evidence about the magnitude of that causal relation).

⁴⁰ In economics, when two products (such as pirated and original goods) are substitutes, they have a positive cross elasticity of demand, which measures how quantity demanded for a good changes with respect to variations in the price of another good.

⁴¹ Piracy could allow a consumer to discover new songs that then induce him or her to purchase the entire album or other songs from that artist, which otherwise might have not been bought. See Stan J. Liebowitz, *File-Sharing: Creative Destruction or Just Plain Destruction?*, 49 J OF .L. & ECON., 1, 17-18 (2006).

⁴² See MEDIA PIRACY IN EMERGING ECONOMIES, (Joe Karaganis ed. 2011), <http://piracy.americanassembly.org/wp-content/uploads/2011/06/MPEE-PDF-1.0.4.pdf>; Mark A. Lemley, *IP in a World Without Scarcity*, 90 N.Y. L REV., 460, 515 (2015) <http://www.nyulawreview.org/issues/volume-90-number-2/ip-world-without-scarcity>.

⁴³ For the sake of the avid reader though, see MICHELE BOLDRIN & DAVID K. LEVINE, *AGAINST INTELLECTUAL MONOPOLY* (2008); Christian Handke, *Plain Destruction or Creative Destruction? Copyright Erosion and the Evolution of the Record Industry*, 3 REV. OF ECON. RES. ON COPYRIGHT ISSUES, 29-51 (2006); ROB VAN DER NOLL, ET AL., *FLEXIBLE COPYRIGHT: THE LAW AND*

Finally, although it is beyond the reach of this project, for the benefit of fullness, other interesting papers with empirical support relate either digital piracy or sales to digital rights management (“DRM”) technologies,⁴⁴ “poisoning” strategies,⁴⁵ digital

ECONOMICS OF INTRODUCING AN OPEN NORM IN THE NETHERLANDS (2012); THE INTELLECTUAL PROPERTY DEBATE. PERSPECTIVES FROM LAW, ECONOMICS AND POLITICAL ECONOMY (Meir Perez Pugatch ed. 2006), MATTHEW RIMMER, DIGITAL COPYRIGHT AND THE CONSUMER REVOLUTION: HANDS OFF MY IPOD (2007) SUZANNE SCOTCHMER, INNOVATION AND INCENTIVES (2004), HANDBOOK ON THE DIGITAL CREATIVE ECONOMY (Ruth Towse & Christian Handke eds. 2013). Of course, from an American and European normative standpoint, it is essential to cite PAUL GOLDSTEIN, GOLDSTEIN ON COPYRIGHT (Aspen, New York, 3d ed. 2013); PAUL GOLDSTEIN & R. ANTHONY REESE, COPYRIGHT, PATENT, TRADEMARK AND RELATED STATE DOCTRINES: CASES AND MATERIALS ON THE LAW OF INTELLECTUAL PROPERTY (7th ed. 2013); MARTIN PEITZ AND PATRICK WAELBROECK, *The Effect of Internet Piracy on Music Sales: Cross-Section Evidence*, 1-2 REV. OF ECON. RES. ON COPYRIGHT ISSUES 71-79 (2004); EDWARD ELGAR, CHELTENHAM COPYRIGHT LAW IN THE EUROPEAN UNION: A COMMENTARY ON EU LEGAL INSTRUMENTS (Irin A. Stamatoudi & Paul Torremans eds. 2014); THE WITTEM PROJECT: EUROPEAN COPYRIGHT CODE (April 2010),

http://www.copyrightcode.eu/Wittem_European_copyright_code_21%20april%202010.pdf (last visited Sept. 12, 2016). There are also interesting papers mainly devoted to the future of copyright; GIUSEPPINA D’AGOSTINO, COPYRIGHT, CONTRACTS, CREATORS: NEW MEDIA, NEW RULES (2010), RESEARCH HANDBOOK ON THE FUTURE OF EU COPYRIGHT (Edward Elgar, Cheltenham; Estelle Derclaye, eds. 2009), 1-6 NEW DIRECTIONS IN COPYRIGHT LAW (Fiona Macmillan ed. 2005-2007), Ian Novos & Michael Waldman, *Piracy of Intellectual Property: Past, Present, and Future*, 10 REV. OF ECON. RES. ON COPYRIGHT ISSUES (2013).

⁴⁴ See Rajiv K. Sinha, Fenando S. Machado, & Collin Sellman, *Don’t Think Twice, It’s All Right: Music Piracy and Pricing in a DRM-Free Environment*, 74 J. OF MARKETING, 40-54 (2010); Dinah A. Vernik, Devavrat Purohit, & Preyas S. Desai, *Music Downloads and the Flip Side of Digital Rights Management*, 30 MARKETING SCI., 1011, 1027 (2011). DRM is a group of technologies to control the use of digital content and devices after sale. Those authors argue that the use of DRM may increase piracy by making the content less usable for end-users.

⁴⁵ See Nicholas Christin, Andreas S. Weigend, & John Chuang, *Content Availability, Pollution, and Poisoning in File Sharing Peer-to-Peer Networks*, PROC. OF THE 6TH ACM CONF. ON ELECTRONIC COM., 68-77 (2005), <http://dl.acm.org/citation.cfm?id=1064017>. They found that file sharing “poisoning” strategies, that is placing a few intentional decoys of pirated content, can influence perceived availability of content in the networks.

distribution channels,⁴⁶ pricing policies,⁴⁷ or optimal copyright lengths.⁴⁸

III. METHODOLOGY

An empirical law and economics methodology is deployed to answer this article's research question—that is, “which copyright law measures are more related to low/high digital piracy rates?” It consists of a content analysis of significantly selected copyright law measures that have been more or less broadly implemented, or that have been dismissed, by the current national copyright statutes of 108 targeted countries (data from WIPO Lex). It represents a picture of how the world of copyright is *today*. Considering (1) the explanatory essence of the research question, (2) the data collection conducted (secondary analysis of extant datasets and content analysis of national copyright laws), (3) the number of countries considered, and (4) the quantitative data analysis,

⁴⁶ See Brett Danaher, Samita Dhanasobhon, Michael D. Smith & Rahul Telang, *Converting Pirates without Cannibalizing Purchasers: The Impact of Digital Distribution on Physical Sales and Internet Piracy*, 29 *MARKETING SCI.*, 1138-1151 (2010) (reviewing iTunes distribution of TV content, sales of DVD box sets, and piracy levels); Barbara Deleersnyder, Inge Geyskens, Katrijn Gielens & Marnik G. Dekimpe, *How Cannibalistic is the Internet Channel? A Study of the Newspaper Industry in the United Kingdom and The Netherlands*, 19 *INT'L J. OF RES. IN MARKETING*, 337-348 (2002) (digital news and sales physical newspapers); Yu Jeffrey Hu & Michael D. Smith, *The Impact of Ebook Distribution on Print Sales: Analysis of a Natural Experiment* (Carnegie Mellon University Working Paper 2013) (comparing sales of Kindle e-books and print books); Joel Waldfogel, *Music File Sharing and Sales Displacement in the iTunes Era*, 22 *INFO. ECON. & POLICY*, 306, 314 (2010) (analyzing YouTube viewing of television content and TV viewership levels).

⁴⁷ See Ramnath K. Chellappa, Yuanyuan Chen & Sriram Venkataraman, *An Empirical Examination of Global Software Piracy: Implications for Pricing and Policy*, (unpublished manuscript) (on file with author); Yooki Park and Suzanne Scotchmer, *Digital Rights Management and the Pricing of Digital Products*, NBER WORKING PAPER SERIES, (2005); Edward Elgar, *Copying and the Pricing of Information Goods*, *HANDBOOK ON THE ECON. OF COPYRIGHT*, 207-224 (Richard Watt, ed. 2014).

⁴⁸ See Nodir Adilov and Michael Waldman, *Optimal Copyright Length and Ex Post Investment: A Mickey Mouse Approach*, 51 *ECON. INQUIRY*, 1101-1122 (2013); William M. Landes and Richard R. Posner, *Indefinitely Renewable Copyright*, 70 *U. OF CHI. L. REV.*, 471-518 (2013).

econometric modeling is the only⁴⁹ suitable research strategy for this paper.

A. Theoretical Assumptions

Three basic (and modest) theoretical assumptions drive the whole project:

(1) Both very high and very low rates of digital piracy pose concerns for innovation, thus implying that *some* level of (effective) copyright regulation is required to incentivize the creation of original works.

This research in no way seeks to create a regulatory copyright model that implies a 0% piracy rate: this is neither viable nor optimal, as trying to completely eliminate digital piracy would require extremely aggressive copyright protection measures that would probably reduce lawful market demand. This negative impact on demand would lower both the equilibrium price and quantity to suboptimal levels that would likely cause a deadweight loss of social welfare—and, in turn, of efficiency—due to the reduced size of the digital entertainment market.⁵⁰ In other words, understanding that the demand for digital products is relatively elastic (i.e., there is a high substitution effect⁵¹), a minimum piracy rate must be accepted, as this maximizes the value of the authorized market.

(2) In comparative terms, digital piracy rates are the best available indicator of the level of respect for copyright.

(3) Inadequate national copyright laws are linked *in part* to high digital piracy rates, but there are, of course, other reasons that may explain that level of copyright infringement, such as collective values, business frameworks or legal enforcement. These latter elements are included as control variables in this econometric study.

⁴⁹ There are simply no methodological alternatives that would allow such quantitative study apart from econometric modeling.

⁵⁰ See DEADWEIGHT LOSS EXAMPLE, <http://goo.gl/qWClIQ> (last visited Sept. 12, 2016).

⁵¹ For the music market *see, e.g.*, Aguiar & Martens, *supra* note 38 at 16-17, Deadweight Loss Example, *supra* note 50, Leung, *supra* note 38 at 28.

B. Research Population and Sampling

The research population of this article is the World Intellectual Property Organization's member states—188 countries.⁵² This group was narrowed down based on available data regarding national digital piracy from BSAs 2014 Global Software Survey.⁵³ Thus, the convenience sample⁵⁴ used equaled 108 countries.⁵⁵ The sample countries were divided into the following categories:

- Central and Eastern Europe and Central and Western Asia (24): Albania, Armenia, Azerbaijan, Belarus, Bosnia, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan,

⁵² See World Intellectual Property Organization, *Member States*, <http://www.wipo.int/members/en> (last visited Sept. 12, 2016).

⁵³ BSA Global Software Survey, *supra* note 13.

⁵⁴ This study relies on a “convenience sample” because, within the research population, the selection of its units of analysis (108 countries) was based on a non-random criterion, i.e., availability of national digital piracy rates.

⁵⁵ The sample size is large enough to estimate the unknown parameters with precision. The sample does *not* include the most part of Africa, some Asian countries, the European microstates, the Caribbean, and the islands in the Indian Ocean and Oceania. Taiwan is not included either because the World Bank has no data available on the desired control variables. Hong Kong, although it is not a member of the WIPO, is part of the sample because there are reliable data for it. Specifically the eighty WIPO member states for which there are no data regarding digital piracy are:

- Africa (33): Angola, Benin, Burundi, Cape Verde, Central African Republic, Chad, Congo, Democratic Republic of the Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Lesotho, Liberia, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Sao Tome and Principe, Sierra Leone, Somalia, Sudan, Swaziland, Togo, Uganda, and Tanzania.

- Asia (15): Afghanistan, Bhutan, Burkina Faso, Cambodia, Iran, Kyrgyzstan, Lao, Mongolia, Myanmar, Nepal, North Korea, Syria, Tajikistan, Turkmenistan, and Uzbekistan.

- Caribbean (15): Antigua and Barbuda, Bahamas, Barbados, Belize, Cuba, Dominica, Grenada, Guyana, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, and Trinidad and Tobago.

- European microstates (5): Andorra, Holy See, Liechtenstein, Monaco, and San Marino.

- Indian Ocean islands (4): Comoros, Madagascar, Maldives, and Seychelles.

- Oceania islands (8): Fiji, Kiribati, Niue, Papua New Guinea, Samoa, Tonga, Tuvalu, and Vanuatu.

Latvia, Lithuania, Macedonia, Moldova, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, and Ukraine.

- Latin America (18): Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, and Venezuela.

- Middle East and Africa (27): Algeria, Bahrain, Botswana, Cameroon, Egypt, Iraq, Israel, Ivory Coast, Jordan, Kenya, Kuwait, Lebanon, Libya, Mauritius, Morocco, Nigeria, Oman, Qatar, Saudi Arabia, Senegal, South Africa, Tunisia, Turkey, United Arab Emirates, Yemen, Zambia, and Zimbabwe.

- North America and Western Europe (22): Austria, Belgium, Canada, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and United States.

- South and East Asia, and Pacific (17): Australia, Bangladesh, Brunei, China, Hong Kong, India, Indonesia, Japan, Malaysia, New Zealand, Pakistan, Philippines, Singapore, South Korea, Sri Lanka, Thailand, and Vietnam.

One important warning has to be made regarding the sample. Whereas the study's results will obviously be applicable to the selected countries (internal validity) because the project has been designed to minimize systematic error, it is difficult to say that the research will also have external validity because of the convenience sampling. However, this is not especially troubling because the excluded WIPO's member states are not of central interest in comparative legal studies regarding intellectual property. These states include most of Africa, some Asian countries, the European microstates, the Caribbean, and the islands in the Indian Ocean and Oceania.

C. Variables: Selection and Coding

1. Dependent Variable (Piracy Rates) and the BSA Global Software Survey: Relevance, Generalization, and Limitations

The dependent variable Y_i (computer software piracy rate of country i) is based on the 2014 BSA Global Software Survey.⁵⁶ At the time this article was written between 2014 and 2015, this was the most recent and thorough comparative study on digital piracy to date, and its outcomes continue to be applicable to 2016.⁵⁷ Although the survey focuses on computer software, this type of copyright infringement is a very good approximation of the overall level of piracy in the country. One can assume that software piracy rates can be suggestively extrapolated to general piracy figures because there is association between copyright infringements for all sorts of digital goods (software, films, music, literature, video games):

“[G]iven the relatively uniform global pricing for most media goods, a loose correlation is not surprising: the first determinant of access to media markets is income. Nor is the general assumption that countries ‘grow’ themselves out of high piracy levels as the number of high-income consumers increases (and, correspondingly, as formal markets crowd out informal ones).”⁵⁸

⁵⁶ BSA Global Software Survey, *supra* note 13.

⁵⁷ The 2014 BSA Global Software Survey was issued in June 2014 and was based on 2013 data regarding unlicensed software installation. On May 25, 2016, the Software Alliance released the 11th edition of its survey based on 2015 data: *BSA Global Software Survey 2016: Seizing Opportunity Through License Compliance*, BSA, THE SOFTWARE ALLIANCE, http://globalstudy.bsa.org/2016/downloads/studies/BSA_GSS_US.pdf. Between 2013 and 2015, there has been no change or a raw decrease of 1-2% in the software piracy rate for 91 of the 108 countries examined in this paper, with the exceptions of Bulgaria, Poland, South Korea, and Vietnam (-3%); China, Latvia, Moldova, and Sri Lanka (-4%); Estonia (-5%); Georgia (-6%); Bahrain, Dominican Republic, El Salvador, Greece, Honduras, and Libya (+1%); and Russia (+2%). These are all small and consistent differences across nations that maintain the validity of the article’s results.

⁵⁸ MEDIA PIRACY IN EMERGING ECONOMIES, 10 (Joe Karaganis ed. 2011), <http://piracy.americanassembly.org/wp-content/uploads/2011/06/MPEE-PDF-1.0.4.pdf>.

Namely, all forms of digital piracy are, to some extent, associated because they are inversely correlated to wider measures of socioeconomic development—the richer the country, the lower its piracy rate.⁵⁹ For this reason, the econometric model includes several economic control variables. Furthermore, it should be understood that there are no databases on piracy in other sorts of digital entertainment products that are truly comparable between states. However, because the BSA is an organization of pro-copyright companies,⁶⁰ it is likely to find overestimation in the BSA study's national digital piracy rates.⁶¹ Nevertheless, even if bias is revealed, it does not jeopardize the validity of the work because the absolute rate of digital piracy in one country is not relevant here. What is essential for this comparative study is that the BSA used the same methodology to calculate digital piracy

⁵⁹ See Acemoglu and Robinson; Diamond; and Thallam, *supra* note 34; see also Varian, *supra* note 30.

⁶⁰ The Software Alliance, *BSA Global & Global Policy Members*, <http://www.bsa.org/about-bsa/bsa-members> (last visited September 12, 2016). Members of the Software Alliance include: Adobe, Altium, ANSYS, Apple, Autodesk, Bentley Systems, CA Technologies, CNC Software – Mastercam, Dell, IBM, Intel, Intuit, Microsoft, Minitab, Oracle, PTC, Rockwell Automation, Rosetta Stone, Salesforce.com, Siemens, Symantec, Tekla, The MathWorks, and Trend Micro.

⁶¹ See Karaganis, *supra* note 58 at 11, “Our reservations about measurement extend to the BSA’s comparatively robust model of ‘rates’ of piracy, which underpins the organization’s very precise claims about changes in levels of piracy from one year to the next. The BSA studies rely on the relatively small and stable (and therefore predictable) number of packaged software applications installed on an average computer –what it calls ‘average software load’, or ASL. ASL allows the BSA to estimate the total installed software base in a country and to compare that number to legal sales. The difference between the two is attributed to piracy. The model has no counterpart in music or film, where the size of personal libraries is subject to huge and growing variation. While solid in principle, however, the model is still very dependent on complicated inputs that the BSA’s research vendor, the IDC [“International Data Corporation”], does not share. Conflicting estimates of the size of retail markets, for example, are relatively common outside the United States and Europe, as is difficulty in establishing how many computers are in use in different countries. In the case of Russia, for example, where the BSA prominently cites a 16% decrease in the piracy rate between 2005 and 2009 as evidence of effective enforcement strategies, we were unable to independently reproduce those inputs.”

rates for *all* the countries, granting that the relative relations between them remain constant.⁶²

*2. Independent Variables (Copyright Law Measures),
Replicability, and Aggregated Variable*

The independent variables X of this article's econometric model are copyright law measures that have been selected according to two criteria: (1) they have the closest relationship with immediate or proximate incentives toward digital piracy; and (2) they have substantial variance across countries. Consider that the relatively limited number of chosen independent variables allow (a) increased sample size, (b) increased number of degrees of freedom,⁶³ (c) gain variance,⁶⁴ and (d) limit/avoid multicollinearity.⁶⁵ Almost all copyright statutes share the same

⁶² The 2014 BSA study computes unlicensed software rates as the division between unlicensed software units and total software units installed. The total software units installed results from the multiplication of the number of PCs getting software by the software units per PC (licensed and unlicensed). The two sources of data that filled in the previous calculations were (1) a survey conducted by the International Data Corporation ("IDC")—a provider of market statistics headquartered in Massachusetts—in early 2014 and (2) quarterly research products called "PC Trackers" used by the IDC. The survey was conducted online or by phone and covered (a) 22,000 home and enterprise PC users in 34 markets and (b) 2,020 IT managers in 20 countries. IDC's PC Trackers reach 86 countries, and the rest of nations included in the Software Alliance report were assessed through custom assignments. The software examined in the BSA study comprises only PCs, including desktops, laptops, and netbooks, but *not* tablets, smartphones or software that runs on servers. It accounts for operating systems, systems software (e.g., databases and security packages), business applications, consumer applications (e.g., games, personal finance software, and cloud computing services), software-as-a-service (SaaS), platform-as-a-service ("PaaS"), and software sold as part of legalization programs (e.g., bulk sales for a government to distribute to schools), BSA Global Software Survey, *supra* note 13 at 11-12.

⁶³ In statistics, degrees of freedom are the number of independently variable factors affecting the estimate of a statistical parameter that are free to vary.

⁶⁴ In statistics, the variance (usually σ^2 or $\text{Var}(X)$) is the expectation of the squared standard deviation of a random variable from its mean. In other words, it measures how far a set of numbers is with respect to its mean.

⁶⁵ In statistics, multicollinearity happens when two or more independent variables in a multiple regression are highly correlated, meaning that it is increasingly difficult to compute the coefficient estimates of the regression or

legal patterns or institutions including, subject matter, authorship/ownership, terms of protection, economic and moral rights, limitations on exclusive rights, and enforcement.⁶⁶ Thus, the selection of independent variables was made after assessing all the common legal categories to, therefore, identify the variables that (i) act as incentives *now* toward digital piracy and (ii) provide variance. For instance, copyright terms or the possibility of termination of transfers and licenses granted by the author⁶⁷ take place thirty or more years in the future and, hence, do not have *immediate* or *proximate* effects on the decision of unlawfully downloading copyrighted content today. In contrast, the exclusive rights to reproduce copyrighted works, to prepare derivative works or to distribute copies are very similar across countries, such that they do not have enough variance to be included as independent variables.

All national copyright laws can be found in English on the WIPO Lex database.⁶⁸ This article deals only with statutes; exclusively in some common law countries,⁶⁹ court rulings were considered but only to validate the statutory analysis—hence, court opinions were not systematically coded. International treaties were not added,⁷⁰ although most of their content is already included in national legislations.⁷¹

how such individual predictors affect the outcome/dependent variable. For instance, with perfect multicollinearity, the ordinary least-squares estimator cannot be calculated.

⁶⁶ See PAUL GOLDSTEIN AND MARKET TRIMBLE, INTERNATIONAL INTELLECTUAL PROPERTY LAW: CASES AND MATERIALS (3d ed. 2012); Edwin Komen, Theodore Max, *USA Copyright 2016*, INTERNATIONAL COMPARATIVE LEGAL GUIDE TO COPYRIGHT (2d ed. 2016), <http://www.iclg.co.uk/practice-areas/copyright/copyright-2016/usa>.

⁶⁷ Time limit set for the allocation of the copyright, after which it will return to the artist. See 17 U.S.C. § 203(a)(3) (1976).

⁶⁸ World Intellectual Property Organization, *supra* note 12.

⁶⁹ This paper complements the content analysis for common law countries on national copyright acts with court rulings: Australia, Canada, India, Ireland, New Zealand, United Kingdom, and United States.

⁷⁰ The 1886 Berne Convention (Berne Convention for the Protection of Literary and Artistic Works), the 1961 Rome Convention (Rome Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations), the 1974 Brussels Convention (Brussels Convention Relating to

Therefore, seven binary and seven categorical variables were selected and distributed across the following six groups:

1. Subject matter of copyright.⁷²

1.a. Sweat of the brow doctrine⁷³ (Does an author gain copyright protection through simple diligence, effort, and expense during the creation of a work, such as a database, or a directory? In such case, it means that substantial creativity or “originality” is not required.) (*binary*).⁷⁴ [“sweatbrow”]⁷⁵

the Distribution of Programme-Carrying Signals Transmitted by Satellite), the 1996 WIPO Copyright Treaty, the 1996 WIPO Performances and Phonograms Treaty, other WIPO-administered treaties, the 1952 UNESCO Universal Copyright Convention, and the 1994 TRIPS Agreements, among others.

⁷¹ See, e.g., Berne Convention for the Protection of Literary and Artistic Works (1986), World Intellectual Property Organization (setting only minimum standards for the signatory parties).

⁷² Generally, the subject matter of copyright refers to the types of works that are protected by copyright laws, such as literary, musical, dramatic, choreographic, pictorial, graphic, sculptural, audiovisual, and architectural works. In the United States, it covers “original works of authorship fixed in any tangible medium of expression, now known or later developed, from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device.” Copyright Act of 1976, 17 U.S.C. § 102(a) (2012). Moreover, “[i]n no case does copyright protection for an original work of authorship extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work.” 17 U.S.C. § 102(b) (2012).

⁷³ In the United States, the sweat of the brow doctrine was once understood for the proposition “that an original arrangement of opinions is copyrightable whenever it is the product of *labor*, talent, or judgment.” *West Publishing Co. v. Mead Data Central, Inc.*, 799 F.2d 1219 (8th Cir. 1986), *cert. denied*, 479 U.S. 1070 (1987) (citing *Callaghan v. Myers*, 128 U.S. 617, 32 L.Ed. 547, 9 S.Ct. 177 (1888)). *Contra Feist Pub’l, Inc. v. Rural Tel. Serv. Co.*, 499 US 340 (1991) (establishing that information alone without a minimum of original creativity may not be protected by copyright, and thus rejecting the application of the sweat of the brow doctrine to U.S. copyright law).

⁷⁴ Binary variables are computed as 0 or 1. For more details, refer to coding outcomes provided in Appendix.

⁷⁵ The descriptors in brackets define the independent and control variables shown in the tables and figures below.

1.b. Is computer software considered a literary work? (*binary*).⁷⁶ [“softlitwork”]

2. Authorship and ownership:⁷⁷

2.a. Work-for-hire provisions (*binary*).⁷⁸ [“workforhire”]

2.b. Provision of solutions to copyright clarification problems in collective and orphan works (structural market failure),⁷⁹ such as one-stop shops and voluntary public registers (*binary*).⁸⁰ [“collorphanworks”]

⁷⁶ See generally WIPO Copyright Treaty, Art. 4, Dec. 20, 1996, S. Treaty Doc. No. 105-17. (“Computer programs are protected as literary works within the meaning of Article 2 of the Berne Convention.”). See also Andy Ramos, Laura López, Anxo Rodríguez, Tim Meng, & Stan Abrams, *The Legal Status of Video Games: Comparative Analysis in National Approaches*, WORLD INTELLECTUAL PROPERTY ORGANIZATION (2013), http://www.wipo.int/export/sites/www/copyright/en/activities/pdf/comparative_analysis_on_video_games.pdf, (comparing legal and copyright status of video games among countries).

⁷⁷ In the United States, ownership of copyright protected by the U.S. Copyright Act “vests initially in the author or authors of the work. The authors of a joint work are co-owners of copyright in the work.” 17 U.S.C. § 201(a) (2012).

⁷⁸ See generally CORY DOCTOROW, *INFORMATION DOESN’T WANT TO BE FREE: LAWS FOR THE INTERNET AGE*, (2014) (discussing the tensions between copyright laws in the digital age and small artists’ ability to earn money from their works).

⁷⁹ “An ‘orphan work’ [is] any original work of authorship for which a good faith prospective user cannot readily identify and/or locate the copyright owner(s) in a situation where permission from the copyright owner(s) is necessary as a matter of law.” U.S. COPYRIGHT OFFICE, *REPORT ON ORPHAN WORKS AND MASS DIGITIZATION* (2015) at 9, <http://www.copyright.gov/orphan/reports/orphan-works2015.pdf>.

⁸⁰ See generally Directive 2012/28/EU, of the European Parliament and the Council of 25 Oct. 12 on Certain Permitted Uses of Orphan Works, O. J. (L 299), <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012L0028&from=EN> (showing the European Union Directive’s approach allowed uses of orphaned works); *Final Guidelines on Copyright Clearance and IPR Management*, Art. 2.2, EUROPEAN FILM GATEWAY ECP-2007-DILI-517006 (2010), http://www.efgproject.eu/downloads/D_5_3_Final_Guidelines_Copyright_Clearance_online.pdf (defining and discussing proper use and attribution of orphan works); Directive of the European Parliament of 24 May 2011 on certain permitted uses of orphan works (COM [2011] 289 final),

3. Exclusive rights:⁸¹

3.a. Scope of performance and display rights (whether they encompass digital technology, which is very relevant in a world dominated by streaming and cloud services) (*discrete categorization 0-3*). [“performdisplay”]

3.b. Secondary liability for Internet Service Providers (ISPs) and safe harbors (*discrete categorization 0-3*).⁸² [“secliabilityisp”]

3.c. Scope of moral rights (*discrete categorization 0-3*). [“moralrights”]

4. Rights management:

4.a. Provisions on compulsory licenses (*binary*). [“compulsorylicenses”]

4.b. Regulation and powers of copyright collecting agencies (collective licensing) (*discrete categorization 0-3*).⁸³ [“collectingagencies”]

http://europa.eu/legislation_summaries/internal_market/businesses/intellectual_property/mi0084_en.htm (proposing new uses of orphaned works).

⁸¹ In the United States, and subject to certain limitations, the owner of copyright has the exclusive rights to do and to authorize the reproduction and distribution of the copyrighted work, the preparation of derivative works and, if applicable, the public performance and display of the copyrighted work. 17 U.S.C. § 106 (2) (2010).

⁸² In the United States, the 1998 Digital Millennium Copyright Act added § 512 to the 1976 Copyright Act to provide substantial immunity from copyright liability to ISPs if they are within one of these five safe harbors: (1) transitory digital network communications, (2) system caching, (3) information storage, (4) information location tools, and (5) service provision by nonprofit educational institutions. Online Copyright Infringement Liability Limitation Act, Pub. L. No. 105-304, 112 Stat. 2860, 2877-81 (1998) (codified at 17 U.S.C. § 512). Consider that this article uses the broad definition of Internet Service Provider or Internet intermediary, which includes the typical ISP companies (like AT&T), but also cable companies, Internet portals (eBay, Facebook), software and games providers, interactive forums, news aggregators, web search engines, and chats rooms. Of course, this accounts as well for (a) direct download websites (MEGA, RapidShare) and streaming websites (Dailymotion, Vimeo, YouTube), (b) peer-to-peer exchange programs (MGM Studios, Inc. v. Grokster, *Ltd.*, 545 U.S. 913 (2005), *μTorrent*, *eMule*), and (c) websites with magnet links (The Pirate Bay, (<https://thepiratebay.org/>) and embedded videos.

⁸³ See, e.g., INT’ CONFED OF AUTHORS & COMPOSERS (CISAC), <http://www.cisac.org/What-We-Do> (last visited Sept. 12, 2016).

5. Limitations on exclusive rights:⁸⁴

5.a. Possibility of private copying (and existence of private copying levy) (*discrete categorization 0-3*). [“private copying”]

5.b. Provisions on the fair use doctrine, the fair dealing doctrine, and similar concepts (*discrete categorization 0-3*).⁸⁵ [“fairuse”]

5.c. Provisions on the first sale doctrine or exhaustion of rights (*binary*).⁸⁶ [“firstsale”]

6. Remedies⁸⁷ and public domain⁸⁸:

⁸⁴ The U.S. Copyright Act provides a number of limitations on exclusive rights. *See, e.g.*, 17 U.S.C. § 107 (2010) (fair use); *id.* § 108 (reproductions by libraries and archives); *id.* § 109 (transfer by the owner of a particular copy); *id.* § 110 (some performances and display for education or religious purposes); *id.* § 111 (some cable broadcast transmissions); *id.* § 112 (ephemeral recordings made and retained by broadcasters); *id.* § 117 (additional copy or adaptation by the owner of a copy of a computer program as an essential step in its utilization, for archival purposes or for machine maintenance and repair); *id.* § 119 (some secondary transmissions of distant television programming by satellite); *id.* § 121 (reproduction and distribution of copies or phonorecords of previously published, nondramatic literary work for blind or other people with disabilities); *id.* § 122 (some secondary transmissions of local television programming by satellite).

⁸⁵ The fair use doctrine exempts from copyright infringement liability the reproduction or other usage of copyrighted material “for purposes such as criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research.” 17 U.S.C. § 107 (2010).

⁸⁶ “Notwithstanding the provisions of section 106 (3) [distribution right], the owner of a particular copy or phonorecord lawfully made under this title, or any person authorized by such owner, is entitled, without the authority of the copyright owner, to sell or otherwise dispose of the possession of that copy or phonorecord.” 17 U.S.C. § 109 (a) (2010). This limitation on the copyright holders’ exclusive right of distribution is known as the first sale doctrine—or exhaustion of rights principle in Europe—and it allows the owner of a physical copy of a work to legally resell it without obtaining permission of the copyright owner.

⁸⁷ *See generally* 17 U.S.C. §§ 501-513 (2010) (setting out scheme for copyright infringement remedies).

⁸⁸ In copyright, works in the public domain are those whose exclusive rights have expired, have been forfeited or are inapplicable. *See, e.g.*, JAMES BOYLE, *THE PUBLIC DOMAIN: ENCLOSING THE COMMONS OF THE MIND* (Yale University Press, New Haven) (2008), <http://thepublicdomain.org/thepublicdomain1.pdf>.

6.a. Remedies for copyright infringement, including civil, criminal, and administrative consequences (*discrete categorization 0-3*). [“remedies”]

6.b. Legal forecast of copyleft⁸⁹ schemes (the voluntary public domain is a possibility within the scope of Creative Commons and the GNU General Public License) (*binary*). [“copyleft”]

The previous legislative measures (qualitative in nature), which act as independent variables, were formalized—i.e., coded as quantitative data—to meet the requirements of any econometric model.⁹⁰ Bear in mind that the categorization of variables, as is unavoidable in economics and econometrics, is a simplification of the reality: the study loses qualitative detail to gain statistical evidence, which is a trade-off that must be accepted. Although binary variables are easy to code, independent variables based on the 0-3 discrete categorization are trickier. The rule of thumb behind it⁹¹ is that 0 indicates that there is no provision with respect to that copyright law measure, and 1, 2, and 3 mean that a country has such a provision with a small, medium or large scope, respectively. For instance, in the variable “remedies for copyright infringement” (6.a), 0 means no legal consequences for violating copyright, (1) lenient consequences, (2) neither lenient nor harsh consequences, and (3) harsh consequences.

The coding scheme developed for this paper achieved a high degree of replicability, which is essential to increase the reliability of its conclusions. It was shared with a Professor of Copyright Law at Universitat Pompeu Fabra, Barcelona, and with a J.D. student at Stanford Law School. They were asked to code both the U.S. and

⁸⁹ “Copyleft is a general method for making a [work] free, and requiring all modified and extended versions of the [work] to be free as well.” GNU Operating System, WHAT IS COPYLEFT?, <https://www.gnu.org/copyleft/> (last visited Sept. 12, 2016).

⁹⁰ Natural language cannot be indeed processed through econometric tools and, therefore, the selected national legislative measures were quantitatively coded.

⁹¹ For the categorization of all independent variables, objective standards used were taken from secondary authorities, see GOLDSTEIN ON COPYRIGHT, *supra* note 43 at 1:2-26, Sherrell, *supra* note 16, Ulmer and Schricker, *supra* note 16 at chapters 3 and 5.

the Spanish Copyright Act according to the protocol, with the following results:

TABLE 1. REPLICABILITY TEST RESULTS

	<i>U.S. Copyright Act</i>	<i>Spanish Copyright Act</i>
Professor of Copyright Law at Universitat Pompeu Fabra	100% in binary variables (7/7) 86% in categorical variables (6/7)	100% in binary variables (7/7) 100% in categorical variables (7/7)
J.D. student at Stanford Law School	100% in binary variables (7/7) 86% in categorical variables (6/7)	100% in binary variables (7/7) 86% in categorical variables (6/7)

Thus, although quite accurate, the coding scheme obviously still has room for improvement, especially regarding categorical variables. Thus, the coding outcomes are already publicly available (*see* Appendix) to refine them following a process of online crowdsourcing.

At the end of the coding process, an aggregated independent variable [“aggregated”] was also generated for each national copyright statute, which accounts for its global level of copyright optimism/pessimism⁹² or, in other words, whether that act is more pro-copyright holder or rather more pro-consumer/pro-free access. This provides the big picture of each copyright statute. The formula for computing such an aggregated figure consists in a weighted mean of all independent variables (subtracting half of their value to the categorical ones to equal them to the binary

⁹² *See generally* Paul Goldstein, COPYRIGHT’S HIGHWAY: FROM GUTENBERG TO THE CELESTIAL JUKEBOX 10–16 (2003) (describing the copyright debate between people who “view copyright’s cup of entitlement as always half full, only waiting to be filled still further [optimists]” and people who “see copyright’s cup as half empty: they accept that copyright owners should get some measure of control over copies as an incentive to produce creative works, but they would like copyright to extend only as far as is necessary to give this incentive, and treat anything more as an encroachment on the general freedom of everyone to write and say what they please [pessimists].”), *id.* at 11.

measures) and applying + or – to each variable depending, respectively, on whether it aims to increase authors’ protection or to give more freedom to consumers (*see* Appendix for more details). Finally, the results are converted to their absolute values and logarithmically normalized: a result closer to 1 means that, in general, the copyright statute is more pro-copyright holder, whereas numbers near 0 imply more pro-consumer regulations in that country.

3. Control Variables

Other important factors that may affect digital piracy were included as controls W in this econometric model to obtain a more exact relationship of legal measures on piracy rate in order to reduce any bias due to omitted variables. Control variables included:⁹³

1. Economics:
 - 1.a. GDP per capita (current US\$). [“gdpcapita”]
 - 1.b. Gini index.⁹⁴ [“gini”]
 - 1.c. Unemployment (% of total labor force) (modeled International Labor Organization estimate). [“unemployment”]
2. Technology:
 - 2.a. Internet users (per 100 people). [“internetusers”]
 - 2.b. Annual per capita spending on legitimate digital goods.*⁹⁵ [“spendinglegitdiggoods”]

⁹³ WORLD BANK OPEN DATA, <http://data.worldbank.org> (last visited Sept. 12, 2016). All data for this section are from the World Bank, except for those variables marked with “*”. Note that, although these variables are used as controls because of the nature of my research question, econometrics also allows the treatment of them as independent variables. This is especially important for controls such as the ones related to GDP, business models, sociocultural values, and judicial enforcement.

⁹⁴ The Gini index or coefficient represents the income distribution of a nation’s residents and is the most commonly used measure of inequality. “[A] Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality.” *GINI Index (World Bank Estimate)*, THE WORLD BANK, <http://data.worldbank.org/indicator/SI.POV.GINI?end=2013&start=2013&view=map&year=2013> (Click “Details” on interactive chart for definition) (last visited Sept. 12, 2016).

2.c. Presence of business models adapted to the “digital economy”⁹⁶ (Spotify Premium, Netflix, and iTunes).⁹⁷ [“businessmodels”]

2.d. Research and development expenditure (% of GDP). [“researchdevepxp”]

3. Others (geography, demographics, social attitudes, and legal system):

3.a. Region

3.b. Adult literacy rate (% of people aged 15 and above). [“adultliteracy”]

3.c. Population aged 65 and above (%).⁹⁸ [“oldpopulation”]

⁹⁵ This variable is generated from the national “Commercial Value of Properly Licensed Software 2011” of the BSA’s Global Software Piracy Study, published in BSA, THE SOFTWARE ALLIANCE (2013), *Competitive Advantage: The Economic Impact of Properly Licensed Software*, 10–14, http://portal.bsa.org/insead/assets/studies/2013softwarevaluestudy_en.pdf.

⁹⁶ See DON TAPSCOTT, *THE DIGITAL ECONOMY: PROMISE AND PERIL IN THE AGE OF NETWORKED INTELLIGENCE* (1997).

⁹⁷ See Sophie Curtis, *Spotify and Netflix Curb Music and Film Piracy*, TELEGRAPH (July 18, 2013, 9:57 AM), <http://www.telegraph.co.uk/technology/news/10187400/Spotify-and-Netflix-curb-music-and-film-piracy.html> (demonstrating that piracy rates decrease as good, legal sources for online content increase); Stuart Dredge, *Is Streaming Music Cannibalising Piracy? Spotify Dutch Study Says ‘Ja’*, MUSIC ALLY (July 17, 2013), <http://musically.com/2013/07/17/is-streaming-cannibalising-piracy-spotify-dutch-study-says-ja>; Will Page, *ADVENTURES IN THE NETHERLANDS: SPOTIFY, PIRACY AND THE NEW DUTCH EXPERIENCE 1* (2013), <https://spotify.box.com/shared/static/nbkltls3leeb0rcyh41sr.pdf>; Glyn Moody, *Yet More Evidence That Offering Good Legal Alternatives Reduces Music Piracy*, TECHDIRT.COM (Sept. 10, 2014, 12:25 PM), <https://www.techdirt.com/articles/20140910/09064428480/yes-more-evidence-that-offering-good-legal-alternatives-reduces-music-piracy.shtml>; Matt Schruers, *Variety Covers Internet Disintermediation; Producer Says ‘Get Off My Lawn’*, DISRUPTIVE COMPETITION PROJECT (Aug. 5, 2014), <http://www.project-disco.org/intellectual-property/080514-variety-covers-disintermediation-producer-says-get-off-my-lawn>. See also INTERNET POLICY TASK FORCE, U.S. DEP’T COMMERCE, *GREEN PAPER, COPYRIGHT POLICY, CREATIVITY, AND INNOVATION IN THE DIGITAL ECONOMY* 77-78 (July 2013), <https://www.uspto.gov/sites/default/files/news/publications/copyrightgreenpaper.pdf>.

3.d. Pro-copyright social norms.*⁹⁹ [“procopsocialnorms”]

3.e. Presence of the Pirate Party (*binary*).* [“pirateparty”]

3.f. Level of judicial enforcement for copyright infringement.*¹⁰⁰ [“enforcement”]

⁹⁸ This variable is included to account for the fact that an older population affects—by decreasing—the digital piracy rate. *See infra* note 107.

⁹⁹ The best available proxies to account for pro-copyright social norms are related to indices on ethics, corruption, and crime. Thus, this variable was created using the mean of the following concepts: (a) the six dimensions of national culture by GEERT HOFSTEDE, *CULTURE’S CONSEQUENCES: COMPARING VALUES, BEHAVIORS, INSTITUTIONS, AND ORGANIZATIONS ACROSS NATIONS* (2d. 2001); GEERT HOFSTEDE, GERT JAN HOFSTEDE & MICHAEL MINKOV, *CULTURES AND ORGANIZATIONS: SOFTWARE OF THE MIND* (3d. 2010); *see also* Bryan W. Husted, *The Impact of National Culture on Software Piracy*, 26 *J. OF BUS. ETHICS*, 197, 201 (2000) (explaining certain cultural values (“power distance,” “individualism versus collectivism,” masculinity versus femininity,” “uncertainty avoidance,” “pragmatic versus normative”—formerly known as “long-term orientation versus short-term normative orientation”—, and “indulgence versus restrain” may affect software piracy)); (b) “Ethics and corruption” *see* Klaus Schwab, *WORLD ECONOMIC FORUM Global Competitiveness Report 2014–2015*, <http://reports.weforum.org/global-competitiveness-report-2014-2015/>); (c) “Freedom from Corruption” *see* TERRY MILLER ET AL., *HERITAGE FOUNDATION 2014 INDEX OF ECONOMIC FREEDOM 4–9* (2014), http://www.heritage.org/index/pdf/2014/book/index_2014.pdf; and (d) “Absence of Corruption” and “Absence of Crime” *see* World Justice Project Rule of Law Index, 179, 182 (2014), http://worldjusticeproject.org/sites/default/files/files/wjp_rule_of_law_index_2014_report.pdf.

¹⁰⁰ This variable is included to capture the idea that “the same law” can be applied very differently depending on its enforcement. The degree to which a law is enforced directly affects the cost-benefit analysis for individuals: a low degree of enforcement decreased the probability of being punished, which means less cost for the individual and more unlawful conduct. The factor used here is a mean mix of four variables from three different international studies. *WORLD ECONOMIC FORUM, THE GLOBAL COMPETITIVENESS REPORT 2014–2015* 407 (Klaus Schwab ed., 2014), http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2014-15.pdf (“1.02 Intellectual property protection”); TERRY MILLER, ET AL., *THE HERITAGE FOUNDATION, 2014 INDEX OF ECONOMIC FREEDOM 471–72* (The Heritage Foundation ed., 2013), http://www.heritage.org/index/pdf/2014/book/index_2014.pdf (“Property Rights”); *THE WORLD JUSTICE PROJECT, RULE OF LAW INDEX 2014* 165–166 (The World Justice Project ed., 2014),

IV. ANALYSIS AND RESULTS

A. Descriptive Statistics

The descriptive statistics analysis is not a key component of this paper because it only provides a few broad brushstrokes of what this study actually covers. However, some results deserve attention (the full table is in the Appendix, with emphasis on the most relevant data points).

First, the average digital piracy rate worldwide is 58.36%, which is not nuanced enough, especially if we consider the likelihood of overestimation in the BSA's study. This concern will be overcome in the next section on multivariate analysis.

Of the sample countries, 76% consider software a literary work. This high figure is likely due to the Berne Convention, which was designed to better protect authors. 75% of the sampled countries apply the first sale doctrine, a pro-consumer measure, which allows second-hand markets for physical goods.

Moreover, the scope of the performance and display rights, the moral rights, and the copyright remedies are very high. All three are essential to provide more protection to copyright holders. It is thus a way to see how, in general, copyright statutes are highly influenced by lobbies from the entertainment industry.

Finally, some demographic data: 56% of the individuals in the sample countries have Internet access. Moreover each individual spends \$28.45/year on legal purchases of digital goods. We also observe neither high nor low values for business models, pro-copyright social norms, enforcement for IP infringement, and presence of the Pirate Party. The relevance of these variables will be better framed in the following pages.

B. Multivariate Analysis

As the research question shows, this study exclusively accounts for correlations between copyright law measures—as well as control variables—and digital piracy rates; it does not try to assess

http://worldjusticeproject.org/sites/default/files/files/wjp_rule_of_law_index_2014_report.pdf (“6.1. Effective regulatory enforcement” and “7.6 Effective civil justice enforcement”).

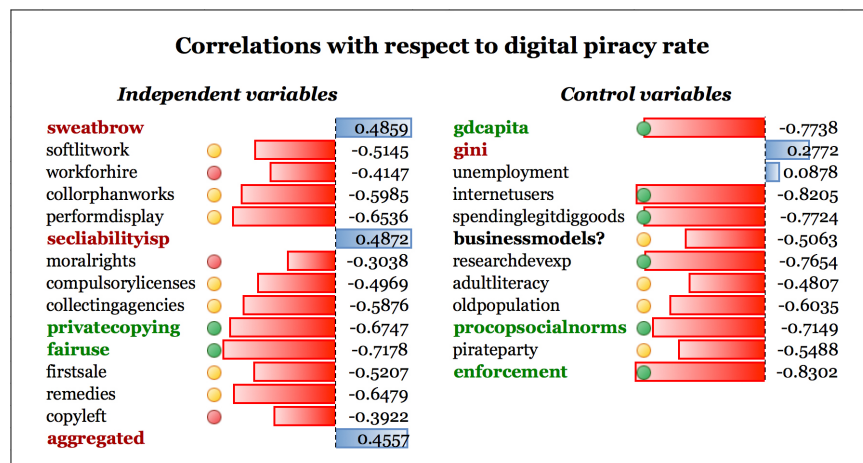
causal effects because, under its current approach, it would encounter the so-called identification problem.¹⁰¹

Before getting into the findings, it is important to understand that there are two competing models regarding piracy and copyright regulations. The first one supports an inverse relationship between them (i.e., more copyright protection, less piracy—or equally, less copyright protection, more piracy). The second one defends a direct relationship between those two variables (i.e., less copyright protection, less piracy—or equally, more copyright protection, more piracy). When referring to “intuitive” results below (that is, the expected behavior of the variables), it is under the assumption defended by the direct relationship model.

1. Correlation Analysis

To know what copyright law measures and/or control variables are more related to high/low digital piracy rates, correlation analyses were conducted:

¹⁰¹ The identification problem consists of not being able to say what reduced form coefficients of a model are compatible with each specific structural coefficients. For example, we cannot know whether a low/high digital piracy rate would be *caused* by a more/less expansive fair use doctrine, and/or more lenient/harsher provisions on remedies for copyright infringement, and/or the legal forecast of copyleft schemes. To solve the identification issue, the methodology used in this article would need to be changed and, for instance, adopt a quasi-experimental perspective. However, the global cross-national purpose of this study is not suitable for a quasi-experimental strategy, though future versions of this paper will likely incorporate this approach. Further developments of this study may also encompass panel data to assess causal relationships. Thus, the author may combine the cross-sectional data of this paper (current situation of 108 jurisdictions) with time series data, that is analyzing digital piracy rates, legislative changes, and control variables for the last X years in all the sample countries.

TABLE 2. CORRELATION ANALYSIS¹⁰²

Looking first at the correlations between the digital piracy rate and independent variables, at least three key results arise:

(1) As intuitively expected, the presence of the sweat of the brow doctrine and a larger scope of secondary liability rules for ISPs are related to high levels of piracy.

Regarding the sweat of the brow, when an author gains rights through simple diligence during the creation of a work (thus, substantial creativity or “originality” is not required), more (not very sensitive) material (databases, directories) becomes copyrighted and hence incentives to infringe increase. In this regard, remember Justice O’Connor’s excerpt from the *Feist* case quoted in the introduction. This fundamental opinion in the U.S. copyright history rejected the sweat of the brow doctrine, which

¹⁰² Table 2 shows the correlation between independent/control variables and digital piracy rates, considering all 108 jurisdictions in the sample. When the result is positive (dark blue bar), that variable and digital piracy react in the same way (e.g., more expansive rules on secondary liability for ISPs relates to higher piracy rates). In turn, when the result is negative (red bar), that variable and digital piracy are inversely associated (e.g., broader rules on fair use are correlated with lower piracy rates). For negative correlation results, Table 2 includes red, yellow, and green dots to ease visual perception of relatively low, medium, and high inverse associations. The colored variable names in bold reflect results further explained below.

had been upheld several times until then, thus making the U.S. Copyright Act more balanced between authors and consumers.

The rationale with respect to secondary liability for ISPs is that if copyright holders can request ISPs to take down content that presumably is infringing their copyright, then less material can be freely accessed by consumers on YouTube, Vimeo, Facebook, or Google. Thus, piracy tends to be higher because users get access to such content by illegal means (e.g., The Pirate Bay¹⁰³).

(2) Again, it is intuitive that copyright law measures such as private copying regulations and the fair use doctrine are correlated to low digital piracy rates. On the one hand, if consumers are allowed to make private copies of copyrighted works for their personal uses (and thus do not need to purchase another original copy), piracy should be reduced. On the other hand, if users have more exceptions and limitations to exclusive rights that copyright holders own (the fair use doctrine), there is more room for free access, and thus less piracy. Some common examples of fair use are commentary, search engines, criticism, parody, news reporting, research, teaching, library archiving, and scholarship.

(3) The last—and perhaps most crucial—result of this correlation analysis explains that a more pro-copyright holder statute is related to higher piracy rates and vice versa (statutes that are more pro-consumer are connected to a lower piracy rate in that country).

Other copyright laws also correlate to low digital piracy rates. Some of them (a) provision of solutions to copyright clarification problems in collective and orphan works; (b) provisions on compulsory licenses; (c) provisions on the first sale doctrine or exhaustion of rights; and (d) legal forecast of copyleft schemes) are tied to lower levels of piracy, as was intuitively foreseen because they are pro-consumer-oriented variables. However, the analysis also shows some counterintuitive results—in terms of the direct relationship model—because a group of copyright measures that give more protection to authors are, at the same time, correlated to

¹⁰³ THE PIRATE BAY, <https://thepiratebay.org> (last visited Sept. 12, 2016) (facilitating primary illegal downloads through peer-to-peer file sharing technology, specifically the BitTorrent protocol).

lower rates of digital piracy. They are (a) whether computer software is considered as a literary work, (b) work-for-hire provisions, (c) scope of performance and display rights, (d) scope of moral rights, (e) regulation and powers of copyright collecting agencies, and (f) remedies for copyright infringement, including civil, criminal, and administrative consequences. This issue requires further empirical research to better understand the interaction between those variables and digital piracy rates.

Second, correlations between digital piracy rates and the control variables were analyzed. Three fields are especially relevant in this sense:

(1) As predicted by the development economics theory, this study empirically shows that (a) the richer the country (in terms of GDP per capita), the lower its piracy rate; and (b) societies with more income inequality (higher values of the Gini index) experience higher levels of digital piracy.

(2) The existence of a legitimate market for intellectual property goods (“businessmodels”) is connected to less piracy, but not as much as expected.¹⁰⁴ This may be explained because the only input analyzed was comparable information for the national presence/availability of Spotify, Netflix, and iTunes, and not data showing their actual use in that country. Thus, although this research is in line with the extant literature focusing on specific jurisdictions that shows that the greater the use of such business models, the less the digital piracy, a stronger correlation could not be found due to such methodological limitation.

(3) As predicted, when a country has higher standards of pro-copyright social norms and better enforcement for IP infringement, piracy rates go down.

Third, in addition to the Gini index, the only control variable that relates to higher digital piracy is unemployment. This means that a society with more unemployed people is correlated with higher piracy rates. However, this association is very weak.¹⁰⁵ The rest of control variables are connected to low piracy rates. All the

¹⁰⁴ See Page, *supra* note 37.

¹⁰⁵ The correlation coefficient between unemployment and digital piracy rate is only 0.0878.

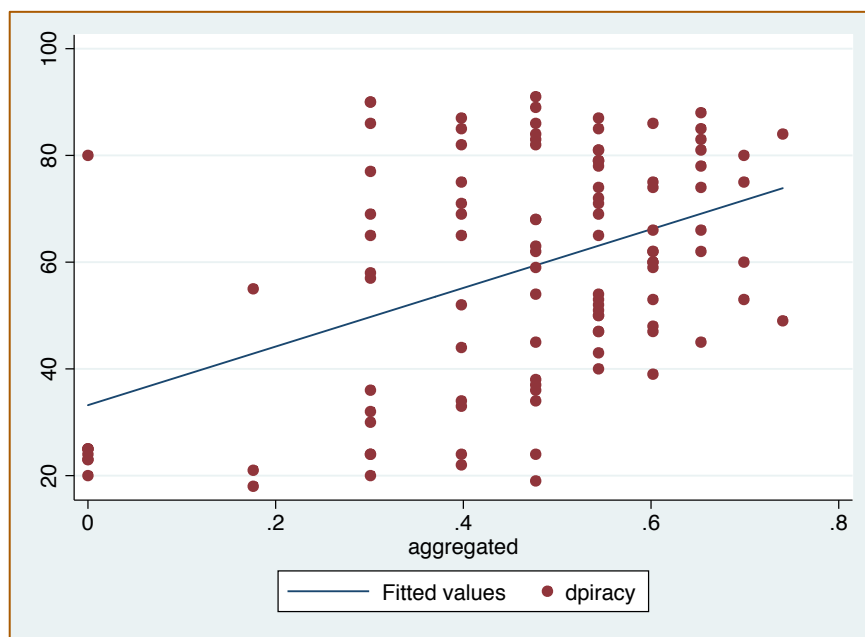
foreseeable results ((a) annual per capita spending on legitimate digital goods; (b) research and development expenditure; and (c) adult literacy rate) imply that better socioeconomic indicators mean less digital piracy, as mentioned before when assessing the development economics theory. Moreover, as it is intuitive as well, when the percentage of a country's population aged sixty-five and above is high, there is less digital piracy.¹⁰⁶ Results also show that both the percentage of Internet users in a given jurisdiction and the presence of the Pirate Party are related to lower levels of digital piracy. This suggests that societies with more Internet users and the Pirate Party as an option for the ballot box are more aware of copyright and thus engage less in piracy. Alternatively, this correlation may be explained by economics as these two variables are related to economic development, which is associated with lower rates of digital piracy.

¹⁰⁶ The fact that elderly people's Internet use is lower compared to that of younger segments of the population, and they also show inferior levels of digital literacy, may account for a lower digital piracy rate compared to nations with younger citizens. See Aaron Smith, *OLDER ADULTS AND TECHNOLOGY USE* (Pew Research Center 2014), <http://www.pewinternet.org/2014/04/03/older-adults-and-technology-use/>; see also Andrew Perrin & Maeve Duggan, *AMERICAN'S INTERNET ACCESS: 2000–2015 4* (Pew Research Center, 2015), http://www.pewinternet.org/files/2015/06/2015-06-26_internet-usage-across-demographics-discover_FINAL.pdf.

2. Regression Analysis¹⁰⁷

Using digital piracy rates as Y , the aggregated variable as X , and controlling for the W variables, regression analyses were employed to get a rough estimate of the effect of piracy on the aggregated independent variable. The scatterplot below is a simple regression (just the dependent and independent variables) but, nevertheless, supports the argument. It shows a relatively steep slope, which means that statutes that are more pro-copyright holder (and thus less pro-consumer or less pro-free access) are associated with higher digital piracy rates:

FIGURE 1. REGRESSION ANALYSIS (I)



However, as one can observe in the graph, the dispersion of the data points with respect to the regression line is notable. Adding control variables will improve these results as represented in the following regression table:

¹⁰⁷ For a discussion of control variables, *see supra* Section III.B.1.

TABLE 3. REGRESSION ANALYSIS (II)

dpiracy (Y)	(1) OLS	(2) GLM
aggregated (X)	11.67** (4.62)	Virtually same results but the coefficient of “aggregated” is here statistically significant at 99% confidence.
gdpcapita (W_1)	-0.0002* (0.0001)	
gini (W_2)	-0.025 (0.11)	
unemployment (W_3)	-0.13 (0.15)	
internetusers (W_4)	-0.29*** (0.06)	
spendinglegitdiggoods (W_5)	0.038 (0.04)	
businessmodels (W_6)	-1.66** (0.95)	
researchdevexp (W_7)	-3.66*** (1.19)	
adulteracy (W_8)	0.15** (0.089)	
oldpopulation (W_9)	0.045 (0.20)	
procopsocialnorms (W_{10})	6.5*** (1.66)	
pirateparty (W_{11})	-6.75*** (2.10)	
enforcement (W_{12})	-13.56*** (1.94)	

* significant at 90% confidence; ** significant at 95% confidence;
*** significant at 99% confidence | $N = 108$

Both econometric specifications (Ordinary Least Squares [“OLS”] and Generalized Linear Model [“GLM”]) provide almost

the same regression coefficients, showing that the results are robust. The interpretation of this multiple regression is clear: a positive and large coefficient ($\beta_1=+11.67$) that is statistically significant at 95% confidence (or p -value ≤ 0.05) under the OLS model. Thus, statutes that are more pro-copyright holder are associated with higher digital piracy rates whereas more pro-consumer regulations are connected to lower levels of piracy. This result is consistent with the negative or inverse correlation found earlier between piracy rates and the aggregated variable.¹⁰⁸

C. Main Contributions and Policy Recommendations

The main results of this multivariate assessment, for both the correlation and the regression analyses, can be easily summarized. This is the first comprehensive cross-national quantitative study on comparative copyright law that:

(1) Identifies the legal measures that are more correlated to *high* digital piracy rates: sweat of the brow and secondary liability for ISPs.

(2) Identifies the legal measures that are more correlated to *low* digital piracy rates: private copying and fair use.

(3) Proves with statistical significance that statutes that are more pro-copyright holder are associated with higher rates of digital piracy (and vice versa).

(4) Validates the development economics literature: the richer the country, the lower its piracy rate.

These outcomes have quite a straightforward implication for legislatures when designing copyright regulations, although it may upset some sectors of the entertainment industry. To fight digital piracy, aside from improving social attitudes, economic indicators, judicial enforcement, and legal markets for intellectual property products, the trend should be to avoid amendments that increase the protection toward copyright holders (e.g., secondary liability rules for ISPs). Rather, those legal reforms should follow a relatively pro-consumer or pro-free access nature, i.e., fostering provisions on private copying or fair use.

¹⁰⁸ See *supra* Table 2.

D. Application of the Proposed Policy Guidelines to the United States and Spain

The previous policy suggestions will be applied to the specific cases of the United States and Spain to test their reliability. These two countries were selected because they are both developed nations but show very different levels of digital piracy. Hence, provided that the U.S. and the Spanish piracy rates are, respectively, very low (18%) and very high (45%), this application is expected to find a fair degree of overlap between this article's proposal and the current legal and economic copyright situation in the United States, whereas much more divergences are likely to be present in the Spanish framework.

TABLE 4. COMPARISON OF THE PROPOSED POLICY GUIDELINES WITH THE CURRENT SITUATION OF THE UNITED STATES AND SPAIN

	<i>Relationship to Digital Piracy</i> ¹⁰⁹	<i>Ideal Trend/Scope to Reduce Piracy</i> ¹¹⁰	<i>United States (Current Situation</i> ¹¹¹)	<i>Spain (Current Situation</i> ¹¹¹)
digital piracy			18%	45%
sweatbrow	↑↑	↘↘	0 ✓	0 ✓
software	↓↓	↗	1 ✓	1 ✓
work-for-hire	↓	↗	1 ✓	0 ✗
collaborative works	↓↓	↗	1 ✓	0 ✗
performance display	↓↓	↗	2 ✓	3 ✓
securability	↑↑	↘↘	1 ✓	3 ✗
moral rights	↓	↗	1 ✗	3 ✓
compulsory licenses	↓↓	↗	1 ✓	1 ✓
collecting agencies	↓↓	↗	3 ✓	3 ✓
private copying	↓↓↓	↗↗	2 ✓	2 ✓
fair use	↓↓↓	↗↗	3 ✓	3 ✓
first sale	↓↓	↗	1 ✓	1 ✓
remedies	↓↓	↗	3 ✓	3 ✓
copy left	↓	↗	0 ✗	0 ✗
aggregated	↑↑	↘↘	0.18 ✓	0.65 ✗
gdp/capita	↓↓↓	↗↗	53,042 ✓	29,863.2 ✗
business models	↓↓	↗	3 ✓	2 ✓
pro-social norms	↓↓↓	↗↗	4.32 ✓	3.14 ✗
enforcement	↓↓↓	↗↗	5.41 ✓	3.58 ✗
RESULTS			15.5/19=82%	10/19=53%

¹⁰⁹ See *supra* Section III.B.1 (providing a description of this data, which come from the correlation analysis).

¹¹⁰ When the copyright law measure or control variable is correlated to higher digital piracy rates, the policy suggestion is to reduce its scope. In contrast, when copyright regulations or control variables are connected to lower digital piracy rates, then legislatures should tend to expand the extent or range of these copyright legal provisions.

¹¹¹ Data from coding outcomes spreadsheet (*see infra* Table 6).

With respect to the ideal panorama—according to the results of this article—aiming to combat piracy in the copyright field, the current situation in the United States achieves 82% overlap, whereas the one in Spain only reaches 53%. These outcomes support the practical reliability of these findings and policy recommendations because there is a clear connection between them and *actual* digital piracy rates, at least for the United States and Spain.

Thus, although the United States seems to have understood the equitable compromise between authors and consumers required to incentivize creativity, innovation, and originality, Spain does not and still has a serious problem with digital piracy. The country's rate of computer software copyright infringement is 45%, well above the European standard of 22-25%.¹¹² In music, movies, video games, and literature the piracy rate reaches an extremely high 84%.¹¹³ It gives the impression, then, that the current Spanish law—Royal Legislative Decree 1/1996 of April 12, which approves the Consolidated text of the Law on Intellectual Property (LPI)¹¹⁴—has been unable to successfully react to many of the

¹¹² See *BSA Global Software Survey*, *supra* note 13, BSA, THE SOFTWARE ALLIANCE, *Competitive Advantage: The Economic Impact of Properly Licensed Software* (2013),

http://portal.bsa.org/insead/assets/studies/2013softwarevaluestudy_en.pdf.

Rate of computer software piracy (45%) = market value of pirated content / value of the legal and illegal industry, i.e.: \$1,044M / \$2,320M. Comparative data: countries in Central and Northern Europe (Austria, Belgium, Denmark, Finland, Germany, Netherlands, Norway, Sweden, Switzerland, and United Kingdom) have software piracy rates between 22 and 25%. The situation is even better in the United States (18%) and Japan (19%). Within the Spanish geopolitical environment, the alarming piracy rate (45%) is only comparable to that in France (36%), Italy (47%), and Portugal (40%).

¹¹³ GfK, *Observatorio de Piratería y Hábitos de Consumo de Contenidos Digitales 2013 [Observatory of Piracy and Consumption Habits of Digital Content]* (2014), <http://www.cedro.org/docs/default-source/textos-de-inter%C3%A9s/observatorio-pirateria2013.pdf>. Digital piracy rate in music, movies, video games, and literature (84%) = market value of pirated content / value of the legal and illegal industry, i.e.: €16,136M / €19,210M.

¹¹⁴ The LPI experienced its two most significant amendments with Law 23/2006 of July 7 and Law 21/2014 of November 4. This latter reform—in force since January 1, 2015—introduces some important changes to the Spanish Copyright Act: (1) harsher fines for copyright infringement; (2) easier

issues raised in the copyright field. Moreover, the importance of having a better Copyright Act is not negligible at all: Spain would be able to capture some of the loss of profits generated by digital piracy, valued at over 1.3 billion Euros per year and 26,600 jobs. The translation of these figures into relative terms is overwhelming: the Spanish entertainment industry (music, movies, video games, and literature) could potentially increase its annual turnover by 43% and increase job creation in the sector by 42%.¹¹⁵

In a broader, comparative framework, it is also obvious that the proper treatment of copyright must become a legal policy priority issue, including taking an economic perspective. The “cultural and creative industries” (“CCI”) accounted for 2.6% of the European Union’s GDP in 2010, which was significantly higher than industries such as real estate, agribusiness, chemical, or information and communications technologies, and it provided employment to approximately five million people within the EU.¹¹⁶ In the United States, the CCIs, known as “core copyright

procedures for the government to shut down websites that engage in digital piracy; (3) implementation of the “Google tax” (economic compensation for news editors and publishers when news aggregators websites use their contents, which caused Google News closure in Spain last December); (4) economic compensation for private copying—whose scope has been reduced—now paid to copyright holders through the Spanish public treasury, instead of being directly charged to consumers when they buy some technological products; (5) attempt to increase the transparency and efficiency of the copyright collecting agencies; and (6) more protection to copyright owners (20 years of additional protection for artists, performers, and producers of phonograms, more coverage for orphan works, and stricter limits in the use of copyrighted works for educational and research purposes). Nonetheless, I will not code this last amendment in the Spanish Copyright Act since its effects on digital piracy are still unclear (recall that it entered into force on January 1, 2015).

¹¹⁵ See GfK, *supra* note 113. Loss of profits (€1,326M) = market value of pirated content multiplied by the average conversion rate of the pirated product to the legally acquired product, i.e.: €16,136M * 8.02%. In 2013 the turnover of the Spanish music, movie, video game, and literature industries totaled €3,096M and 63,578 direct jobs.

¹¹⁶ European Commission, *Green Paper: Unlocking the Potential of Cultural and Creative Industries 2–3* (April 27, 2010), <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52010DC0183&from=EN>.

industries,” represented 6.4% of its GDP in the same year and accounted for 3.9% of its employment.¹¹⁷

V. CONCLUSIONS

This article aims to identify which copyright law measures are more related to low/high digital piracy rates. The analysis relied primarily on data from WIPO Lex, the BSA, and the World Bank and provides a picture of how the copyright universe is *today*. The deployed empirical law and economics methodology consisted of a content analysis of significantly selected copyright law measures that have been more or less broadly implemented, or that have been dismissed, by 108 countries in their current national copyright statutes. The resultant coding scheme achieved a high degree of replicability, which is essential to increase the accuracy of its conclusions.

After processing the database with econometric tools, the findings suggest that (1) the legal measures that are more correlated to *high* digital piracy rates are the sweat of the brow doctrine and secondary liability rules for ISPs; (2) the ones more correlated to *low* piracy rates are private copying and fair use provisions; (3) statutes that favor copyright holders are associated with greater rates of digital piracy (and vice versa); and (4) richer countries show lower levels of copyright infringement, which validates the development economics theory. Because there is no existing literature in the field with the scope that this article offers, these results constitute the first step toward a comprehensive cross-national quantitative study on comparative copyright law and digital piracy, both in descriptive and explanatory terms.

These outcomes have a straightforward implication for policymakers when designing copyright regulations, although it may upset some sectors of the entertainment industry. To fight digital piracy, legislatures should avoid amendments that increase protections toward copyright holders (e.g., secondary liability rules for ISPs). Instead, these results show that the most effective legal

¹¹⁷ Stephen E. Siwek, *Copyright Industries in the U.S. Economy: The 2011 Report*, INTERNATIONAL INTELLECTUAL PROPERTY ALLIANCE (2011), <http://www.iipa.com/pdf/2011CopyrightIndustriesReport.PDF>.

reforms are pro-consumer, such as fostering private copying or fair use. Legislators should also continue seeking amendments that may improve social attitudes, economic indicators, judicial enforcement, and legal markets for intellectual property goods. With respect to that ideal panorama to combat piracy in the copyright field, the current situation in the United States achieves a high degree of overlap, whereas the one in Spain is much more limited. This supports the practical reliability of the results and the suggested policy guidelines laid out in this paper, as there is a clear connection between these findings and *actual* digital piracy rates, at least for the United States and Spain.

These recommendations, which especially target legislatures and governments, are in line with building a new—and economically viable—regulatory copyright model. Hopefully, it may help in reducing piracy rates, correcting the global tension between authors and consumers in the digital era, and thus leading society to greater heights of wellbeing.

VI. APPENDIX

TABLE 5. DESCRIPTIVE STATISTICS

<i>Variable</i>	<i>Observ.</i>	<i>Mean</i>	<i>Stand. Dev.</i>	<i>Min.</i>	<i>Max.</i>
dpiracy	108	58.36	21.76	18	91
sweatbrow	108	0.25	0.44	0	1
softlitwork	108	0.76	0.43	0	1
workforhire	108	0.12	0.33	0	1
collorphanworks	108	0.20	0.40	0	1
performdisplay	108	2.06	0.96	0	3
secliabilityisp	108	1.89	0.75	0	3
moralrights	108	2.19	0.90	0	3
compulsorylicenses	108	0.67	0.47	0	1
collectingagencies	108	1.82	1.14	0	3
privatecopying	108	1.79	1.05	0	3
fairuse	108	1.68	1.08	0	3
firstsale	108	0.75	0.44	0	1
remedies	108	2.14	0.91	0	3
copyleft	108	0.06	0.23	0	1
aggregated	108	0.46	0.18	0	0.74
gdpcapita	108	20,786.51	23,114.95	953.40	110,697
gini	108	37.46	8.66	24.80	65
unemployment	108	8.98	6.04	0.50	29
internetusers	108	55.62	24.87	2.60	96.50
spendinglegitdig.	108	28.45	45.75	0.02	254.66
businessmodels	108	1.55	1.11	0	3
researchdevepx	108	0.95	1.00	0.02	4.04
region	108	2.91	1.38	1	5
adultliteracy	108	91.77	12.64	41	100
oldpopulation	108	10.29	5.90	0.42	25.08
procopsocialnorms	108	3.72	1.19	1.69	6.32
pirateparty	108	0.51	0.50	0	1
enforcement	108	3.97	1.11	1.63	6.19

TABLE 6. CODING OUTCOMES

Visit <https://goo.gl/Khd6ST> to download the coding outcomes spreadsheet. To quickly identify the dichotomy, greener cells in the Excel file indicate more pro-consumer/pro-free access copyright regulations, whereas redder cells indicate more pro-copyright holder provisions.