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The User Rights Database: Measuring the Impact of Opening Copyright Exceptions

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THE USER RIGHTS DATABASE: MEASURING THE IMPACT OF OPENING COPYRIGHT EXCEPTIONS

*Sean Flynn and Michael Palmedo**

ABSTRACT

International and domestic copyright law reform around the world is increasingly focused on how copyright exceptions — a.k.a. “user rights” — should be expanded to promote maximum innovation, creativity, and access to knowledge in the digital age. These efforts are guided by a relatively rich theoretical literature. However, few empirical studies explore the social and economic impact of expanding user rights in the digital era. One reason for this gap has been the absence of a tool measuring the key independent variable – changes in copyright user rights over time and between countries. We are developing such a tool, which we call the “User Rights Database.” This paper describes the methodology used to create the Database and the results of initial empirical tests using it. We find that all of the countries in our study are trending toward more “open” copyright user rights over time – meaning that copyright exceptions have developed over time to cover more works, uses, users and purposes than before. However, we find a development gap in the data, with wealthy countries in our sample are about

* Invaluable research assistance was provided by Amber Barreda, Summer Benson, Brooke Friedman, and numerous other PIJP fellows. We owe an expression of extreme gratitude to the members of the Global Expert Network on Copyright User Rights who contributed substantial time and expertise to this project, including Beatriz Busaniche, Kimberlee Weatherall, Enyinna S. Nwauhe, Allan Rocha de Souza, J. Carlos Lara, Hong Xue, Marcela Palacio-Puerta, Taina Pihlajarinne, Anette Alén-Savikko, Shamnad Basheer, Pankhuri Agarwal, Tatsuhiro Ueno, Ayuko Hashimoto, Heesob Nam, Marco Caspers, Miguel Morachimo, Teresa Nobre, Daniel Seng, David Tan, Zuzana Adamová, Caroline Ncube, Simon Schlauri, Maksym Naumko, Andriy Bichuk, Rami Olwan, Peter Jaszi, Nhan T.T. Dinh, Ahmed Abdel Latif, Lila Bailey, Denis Barbosa, Lionel Bentley, Michael Birnhack, Carolyn Botero, Ellen Broad, Robert Burrell, Michael Carroll, Alberto Cerda, Ronan Deazley, Niva Elkin, Sean Flynn, Christophe Geiger, Michael Geist, Daniel Gervais, Rebecca Giblin, Lucie Guibault, Gwen Hinze, Bernt Hugenholtz, Meredith Jacob, Ariel Katz, Dick Kawooya, Howard Knopf, Kaya Koeklue, Oliver Metzger, Pedro Mizukami, Caroline Ncube, Sylvie Nerisson, Pedro Paranagua, Pranesh Prakash, Henning Ruse-Khan, Matt Sag, Pam Samuelson, Martin Senftleben, Jennifer Urban, Stef van Gompel, Fred Von Lohmann, and Peter Yu. Funding to support this research and the Global Expert Network on Copyright User Rights has been provided by the International Development Research Centre, Open Society Foundations, Ford Foundation, and through an unrestricted gift to the American University Washington College of Law Program on Information Justice and Intellectual Property from Google, Inc. All of the opinions and findings presented in this report are those of the Authors and were not directed or influenced by any of our funders.

thirty years ahead of developing countries. Our empirical tests find positive relationships between more open user rights and innovative activities in information and communication technology industries. We do not find evidence that opening user rights causes harm to revenue of copyright intensive industries such as publishing and entertainment.

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I. INTRODUCTION

Copyright law is the subject of increasingly contested debates around the world. Much of this reform is being driven by a perceived need to adapt outdated copyright laws to the digital age. Copyright owners often advocate that these reforms should center on expanding the length, scope, and enforceability of exclusive rights. However, there is a growing recognition that the digital environment warrants expansions in so-called user rights—rights to use copyrighted material without the permission of owners to facilitate a range of modern activities from social media to Internet search.¹

Few empirical studies analyze the impact of different ways to expand user rights for the digital environment. One reason for the lack of empirical research on the impact user rights has been the absence of a tool to measure changes in this variable of the law. To promote additional and enhanced research into the impact of user rights, we have created the User Rights Database. It is an open access repository of survey data that shows how and when copyright user rights have changed over time in a representative sample of different countries.

We have begun to use the User Rights database in empirical research projects. The first insight we draw is that there is a general trend toward making user rights applicable to a broader range of uses, users, purposes and works. We refer to this as a trend toward more “open” user rights. However, the growth is unequal. Developing countries in our sample are now at the level of openness that existed in the wealthy countries about thirty years ago.

Another insight from our data is that very few countries have the specific user rights most commonly mentioned as supporting creativity and innovation in the digital economy. Very few countries, for example, have specific exceptions permitting transformative and non-expressive uses, including for text- and data-mining.

We use the data in a series of econometric tests. Our results support the existing theoretical literature suggesting that more open user rights promote innovation, creativity, and are ultimately beneficial to firms in the information and communication technology (ICT) industries. Using a variety of sources for firm- and industry-level data, as well as data on scholarly research output, we find:

- More open user rights environments have been associated with

¹ See, e.g., WIPO Copyright Treaty pmbl., Dec. 20, 1996 (describing as a principle objective to promote “balance” between protections for copyright owners and user rights that serve “the larger public interest, particularly education, research and access to information”); Beijing Treaty on Audiovisual Performances pmbl., Jun. 24, 2012 (identifying a need to “maintain a balance between the rights of performers in their audiovisual performances and the larger public interest, particularly education, research and access to information”); U.S.-Korea Free Trade Agreement art.18.4 n.11, June 30, 2007 (“For greater certainty, each Party may adopt or maintain limitations or exceptions to the rights described in paragraph 1 for fair use, as long as any such limitation or exception is confined as stated in the previous sentence.”); S. Rep. No. 114-42, at 17 (2015) (instructing “that U.S. trade agreements should contain copyright provisions that...foster an appropriate balance in copyright systems, inter alia by means of limitations and exceptions”).

higher levels of research and development spending by firms in the information and communication technology (ICT) industries in a set of twelve countries. They may also be associated with higher levels of subsequent patenting by firms in the ICT industries.

- There is a positive relationship between sustained, increased openness in copyright user rights, and returns to firms. This relationship is evident when observing various firm- and industry-level indicators of firm performance.
- In the same set of countries, more open user rights environments have *not* been associated with harm to industries known to rely upon copyright protection, such as publishing and entertainment.
- Researchers in countries with more open user rights environments produce more scholarly output.

The rest of this paper describes our database and our initial tests in more detail. Section II surveys the existing theoretical literature that suggests that more open user rights promote innovation and creativity. Section III describes the methodologies we used to construct the User Rights Database. Section IV reports the methods and findings of our econometric analysis.

II. UNTESTED HYPOTHESES ON THE IMPACT OF USER RIGHTS

We do not know much about the impact of laws protecting copyright user rights.² The field's early work on the benefits of user rights to overcome

² Most of the economic literature on the impact of copyright focuses on other areas of copyright; such as the degree to which digital piracy may harm legitimate sales of works or the degree to which copyright strength incentivizes works. Compare Rahul Telang & Joel Waldfogel, *Piracy and New Product Creation: A Bollywood Story*, INFO. ECON. AND POL'Y, 1, 2–4 (2018) (finding that high levels of piracy depress the production of new Bollywood films), with Joel Waldfogel, *Bye, Bye Miss American Pie? The Supply of New Recorded Music Since Napster*, 1, 27–28 (Nat'l Bureau of Econ. Research, Working Paper No. 16882, 2011) (finding that increased file sharing through Napster led to no decrease in the creation of musical works), and Douglas Gomery, *Research Report: The Economics of Term Extension for Motion Pictures*, 1, 1–3 (1993) (finding that copyright term extensions for works for hire would harm users); see also Jeremy Reichman, *The Duration of Copyright and the Limits of Cultural Policy*, 14 CARDOZO ARTS & ENT. L.J. 625, 645–47 (1996) (finding that since there is rapid exploitation of cultural goods in the now digitized universe, the copyright term should arguably be shortened not extended); Raymond Shih Ray Ku et al., *Does Copyright Law Promote Creativity? An Empirical Analysis of Copyright's Bounty*, 62 VAND. L. REV. 1669, 1671, 1680 (2009) (finding that the depression in the number of new copyrighted works created after 1991, may have been due to disruptive technologies and piracy not changes in copyright law); Cecil C. Kuhne III, *The Steadily Shrinking Public Domain: Inefficiencies of Existing Copyright Law in the Modern Technology Age*, 50 LOY. L. REV. 549 (2009); I.P.L. Png & Qiu-hong Wang, *Copyright Law and the Supply of Creative Work: Evidence from the Movies 1-2* (Apr. 2009) (unpublished working paper) (on file with the Nat'l Univ. of Sing.) (finding that copyright term extension and the European Rental Directive had no discernable impact on movie production). There are a handful of studies on the impact of copyright "strength". See C. Ann Hollifield et al., *Copyright Consequences: Central European and U.S. Perspectives* 163–197 (Lee B. Becker & Tudor Vlad eds., 2003) (finding that stronger international copyright protection has been associated with the production of more print media). However, there is little literature studying the converse.

market failure takes no position on the particular shape of user rights that may better serve that limited purpose.³ The benefits of different formulations of user rights in copyright law may be diffuse, and therefore hard to measure.⁴ But we saw two of the most widely debated copyright hypotheses as testable. It is often claimed that adopting U.S.-style “fair use” rights may drive innovation and growth in the technology sector. It is also frequently claimed that user rights that are more open may create larger stockpiles of inputs for creators, leading to more local production of works of creativity. Before explaining our methodologies for testing these claims, we review some of the most useful literature we found on these topics.

A. Innovation and Growth in the Technology Sector

Those who rely on fair use often claim it is better for innovative businesses. Google, for example, has frequently and publicly explained that a core reason it grew its business in California instead of the UK is that fair use is more conducive to innovative enterprise than fair dealing. Why?

Fair use and fair dealing look a lot alike. They are both general exceptions in the sense that they apply to multiple different uses and purposes in a single user right. There is no real difference in the law between a fair “use” versus a “dealing.” Both broadly cover any potential use/dealing with a work that may be covered by a copyright protection (e.g. reproduction, display, communication, etc.). The main difference between them is that the UK right operates on a closed list of purposes. To be a fair dealing in the UK statute, one must be using the work *only* for the purposes of non-commercial research or study, criticism or review, or for the reporting of current events. The problem with this for innovators is that it does not include many modern purposes for which works are frequently—and fairly—used, such as indexing the Internet, reverse engineering software to create interoperable products, or mining content for meta-data to create translation and other tools.

³ See Wendy Gordon, *Fair Use as Market Failure: A Structural and Economic Analysis of the “Betamax” Case and Its Predecessors*, 82 COLUM. L. REV. 1600, 1605 (1982) (noting that market failure literature generally finds theoretical economic justifications for free use rights when (and perhaps only when) markets lack sufficient mechanisms for information sharing and transaction-free exchanges to enable licensing on a willing buyer—willing seller model. Permitting free uses in such a context produces net gains to social welfare—transactions occur for no loss to the copyright owner); see also Dan Burk & Julie Cohen, *Fair Use Infrastructure for Rights Management Systems*, 15 HARV. J.L. & TECH. 42, 42–83 (2001) (considering rights management statutory infrastructure as a means to enable public access to works secured by rights management systems and how to overcome statutory design challenges posed by fair use). A related stream of literature theorizes that even piracy can produce net social benefits where it does not displace actual sales. See Carlos A. Primo Braga & Carsten Fink, *Reforming Intellectual Property Rights Regimes: Challenges for Developing Countries*, 1 J. INT’L ECON. L. 537, 537–54 (1998). But the justifications for user rights are much broader than market failure, even if we focus on its economic aspects. See Mark A. Lemley, *Property, Intellectual Property, and Free Riding*, 83 TEX. L. REV. 1031, 1076 (2005) (describing the fallacy of overprotecting rights to eliminate all “free riding” and calling for a focus instead on the ultimate utilitarian justification of the minimum scope of exclusive rights consistent with giving due reward to creators to incentivize production and innovation).

⁴ Brett M. Frischmann & Mark A. Lemley, *Spillovers*, 100 COLUM. L. REV. 101, 101–43 (2006).

Fair use is preferred because its list of permitted purposes is open.

This theme—that the openness of fair use is helpful for innovation and modern technology industries—appears in the literature. The basic idea is that laws that permit a larger scope for new technologies to use works in new ways, without previous approval by the legislature, promote investments in technological innovation.⁵ For the most part, this literature is theoretical rather than empirical. However, there is a small body of policy change studies in single countries and over a comparatively short period of time.⁶

A related literature describes the massive investments in the US economy from the so-called “fair use industries.”⁷ These industry studies do not actually claim that changes in fair use will necessarily alter the fair use industries in any way. The implication is made but not tested. Most of this literature also supports, but does not actually test, that it is the openness of fair use that leads to the benefits they find.

B. Creativity and New Works

Another major argument in favor of fair use-like provisions is that they promote more and better works of creativity. It has been posited, for example, that scholars and firms engaged in research will produce more in countries

⁵ See Fred von Lohmann, *Fair Use as Innovation Policy*, 23 BERKELEY TECH. L.J. 1, 8 (2008) (describing “fair use” rights, by which he means generally any private copying rights, as providing a “reservoir of incentive” to the development of private copying technology industries from the VCR to the I-Pod); see also Michael Palmedo, *R&D Spending and Patenting in the Technology Hardware Sector in Nations With and Without Fair Use* (PIJIP Research Paper Series, Working Paper No. 02, 2017) (finding that technology hardware firms in countries with fair use spent more on research and development and received more patents); Joshua Lerner, *The Impact of Copyright Policy Changes on Venture Capital Investment in Cloud Computing Companies*, Computers and Communication Industry Association (2014), <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.732.839&rep=rep1&type=pdf> (last visited Sep. 12, 2018) (demonstrating how a court ruling clarifying copyright user rights increased venture capital funding to American cloud technology firms); Michael A. Carrier, *Copyright and Innovation: The Untold Story*, 891 WIS. L. REV. 893, 894–959 (2012) (focusing on the strength of copyright enforcement rather than exceptions, finding that aggressive online enforcement deterred venture capital funding for new technologies related to online music sharing).

⁶ See Roya Ghafele & Brooke Friedman, *A Counterfactual Impact Analysis of Fair Use Policy on Copyright Related Industries in Singapore*, 3 LAWS 327, 328–49 (2014) (finding that technology hardware firms in Singapore enjoyed faster growth after the nation’s introduction of fair use in 2006); see also Lerner, *supra* note 7 (finding that clarification of fair use of remote DVR providers led to an explosion of investment into what is now the cloud storage industry); Barbara Biasi & Petra Moser, *Effects of Copyright on Science: Evidence from the WWII Book Replication Program* (Sept. 14, 2017), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2542879 (using a natural experiment to test the relationship between unfettered access to science knowledge and research output; the U.S.’s suspension of copyright on German science publications during World War II drove subsequent innovations that can be found in patent citations to these German works).

⁷ Andrew Szamosszegi & Mary Ann McCleary, *Fair Use in the U.S. Economy*, Computers and Communication Industry Association (2017), <https://www.cciainet.org/wp-content/uploads/2017/06/Fair-Use-in-the-U.S.-Economy-2017.pdf> (employing WIPO’s methodology for the study of copyright industries to those that rely on copyright exceptions, in the U.S., finding that they employ 18 million workers and accounted for 16% of the U.S. economy).

that allow greater rights to access and use published works.⁸ Others explain how greater user rights may contribute to the quality or value of creative output.⁹ However, little of this literature zeros in on the particular attributes of user rights that may be better or worse at promoting the ends they identify.

There is a small-but-growing body of empirical work in this area. Studies have shown that more text and data mining research is published from countries that have adopted rights to use works for these purposes.¹⁰ Survey evidence has shown that knowledge of fair use rights among US filmmakers leads to higher production values of their films;¹¹ and correlatively that lack of knowledge of user rights in South Africa has depressed production

8 Andrew Gowers, *Gowers Review of Intellectual Property*, HM Treasury (2006), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/228849/0118404830.pdf (asserting that stronger research exceptions "create greater scope for research on protected material by universities and business and expand the stock of knowledge"); see also Joanna Adcock & Edward Fottrell, *The North-South Information Highway: Case Studies of Publication Access Among Health Researchers in Resource-Poor Countries*, Global Health Action, Coaction Publ'g (2008) (surveying health researchers from nine low income countries, finding that poor access to current literature in their fields lessened their published output); Ana Langer et al., *Why Is Research from Developing Countries Underrepresented in International Health Literature, and What Can Be Done About It?*, 82 BULL. WORLD HEALTH ORGAN. 797, 797–803 (2004) (highlighting limited access to published literature as a barrier to further research into diseases prevalent in poor countries); Biasi, *supra* note 9 (using a natural experiment to test the relationship between unfettered access to science knowledge and research output; the U.S.'s suspension of copyright on German science publications during World War II drove subsequent innovations that can be found in patent citations to these German works).

9 Christophe Geiger, *Promoting Creativity through Copyright Limitations: Reflections on the Concept of Exclusivity in Copyright Law*, 12 VAN. J. ENT. & TECH. L. 515, 515–16 (2010) (arguing that broader rights to use copyrighted materials may lead to higher production values in creative communities); see also Matthew J. Baker & Brendan M. Cunningham, *Court Decisions and Equity Markets: Estimating the Value of Copyright Protection*, 49 J.L. & ECON. 567, 567–596 (2006) (testing the effect of court cases on the value of copyright works); Yauhiro Arai & Shinya Kinukawa, *Copyright Infringement as User Innovation*, 38 J. CULT. ECON. 131, 131–144 (2014) (studying Japanese Dojinshi and finding value created by these derivative works. It is notable that in Arai and Kinukawa's model, producers of originals can maximize their welfare by ignoring Dojinshi even if transactions costs fall).

10 See Christian Handke et al., *Is Europe Falling Behind in Data Mining? Copyright's Impact on Data Mining in Academic Research*, (June 7, 2015), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2608513 (finding that data mining makes up a higher share of research output in countries with data mining user rights and vice versa for countries that require express consent of the rightsholder); see also Sergey Filippov, *Mapping Text and Data Mining in Academic and Research Communities in Europe*, The Lisbon Council (2014) (comparing the lack of text and data mining practices in Europe against countries like the United States and China who are leading the advancement of text and data mining publications); Ian Hargreaves et al., *Report from the Expert Group on Standardisation in the Area of Innovation and Technological Development, Notably in the Field of Text and Data Mining*, European Commission (2014) (finding that text and data mining tools are an important research technique that represents a significant economic opportunity for the European Union); see generally Jerome Reichman & Ruth Okediji, *When Copyright Law and Science Collide: Empowering Digitally Integrated Research Methods on a Global Scale*, 96 MINN. L. REV. 1363, 1365–66 (2012) (justifying the need for extraction and reuse of pertinent scientific data); Ian Hargreaves, *Digital Opportunity: A Review of Intellectual Property and Growth* (2011) (illustrating the importance of text and data mining exceptions specifically to medical professionals).

11 Patricia Aufderheide & Peter Jaszi, *Reclaiming Fair Use: How to Put Balance Back in Copyright*, University of Chicago Press (2018) (recounting examples where knowledge and use of fair use by filmmakers led to increased value productions).

Table 1: Summary of Previous Literature

Theme	Author	Hypothesis
Investment, innovation, and technology firm performance	Von Lohmann	Fair use leads to greater innovation – non-empirical
	Palmedo	Fair use leads to more R&D spending & patents in tech hardware
	Lerner	Clarification of user right led to more venture capital in cloud sector
	Carrier	Aggressive copyright enforcement depressed innovative investments
	Biasi and Moser	Access to more works led to more innovations drawing on them
	Ghafele and Gilbert	Fair use led to positive outcomes in Singapore
Creativity and new works	Aufderheide and Jaszi	Utilizing fair use raises film production values
	Geiger	More robust copyright exceptions lead to more creative works
	Aria Kinukawa	Greater openness in copyright leads to more creative works
	Handke, Guibault, Vallbé	Copyright limitations for text and data mining shape research output
	Filippov	Copyright limitations for text and data mining shape research output
	Hargreaves 2014	Copyright limitations for text and data mining shape research output
	Hargreaves 2011	Copyright limitations for text and data mining shape research output
	Reichman & Okediji	Researchers need better access to research and data
	Adcock and Fottrell	Lack of access to copyrighted journals hinders medical research
	Langer et al	Lack of access to copyrighted journals hinders medical research

values.¹²

Both fields of empirical studies of copyright user rights—the study of innovation and of output—are relatively small especially compared to research on piracy or copyright strength. And both could benefit from cross-country, multi-period studies on the impact of particular definitions of copyright user rights.¹³

III. DEVELOPING THE USER RIGHTS DATABASE

In 2013, American University convened a group of copyright economists

¹² Sean Flynn & Peter Jaszi, *Untold Stories in South Africa: Creative Consequences of the Rights Clearance Culture for Documentary Filmmakers* (PIJIP Research Paper No. 20, 2010) (illustrating the perceptions of South African filmmakers who believe that current copyright laws “discourage certain kinds of storytelling, and decreases production value because the “clearance culture” instills the concern that use of all copyrighted material needs to be cleared).

¹³ NATIONAL RESEARCH COUNCIL, *COPYRIGHT IN THE DIGITAL ERA: BUILDING EVIDENCE FOR POLICY* (Stephen A. Merrill et al. eds. 2013) (uncovering that empirical evidence on the effects of infringing copying and distribution to social welfare as varying across industries, countries, and times is lacking). For an example of the kind of work that is lacking in the area of user rights, see Walter G. Park, *The Copyright Dilemma: Copyright Systems, Innovation and Economic Development*, 64 J. INT’L AFF. 53, 64 (2010) (identifying that current research focuses on how patent protection and not copyright protection affects technological progress and economic development).

and policy researchers to discuss how to encourage more research on the impact of user rights.¹⁴ One problem stood out—there was no source describing changes in laws across countries and over time that one could use as an independent variable in empirical projects. The User Rights Database was created to fill that gap.

A. Mapping Openness, Flexibility & Generality

As described above, most of the literature on impact of user rights focuses on the impact of the U.S. fair use right.¹⁵ But only a handful of countries in the world have a U.S.-style fair use right.¹⁶ To create a larger study sample, we decided to try to map the degree to which countries have adopted copyright exceptions that are more or less like fair use in the most important respects.¹⁷

We identified three primary elements that are all contained in the U.S. fair use right but that are also present to greater or lesser degrees in every copyright exception around the world:

- *Openness*: the user right can be applied to any purpose, use (aka activity), work or user;
- *Flexibility*: the user right is applied through a flexible proportionality test that balances the interests of the rights holder with those of the user and general public;
- *Generality*: the exception applies a single test to a group of permitted activities.

Using these three concepts, one can distinguish between different operative elements of user rights. The U.S. fair use right in Section 107 is open (in each dimension), flexible, and general. The UK fair dealing clause is a flexible, general exception – but it is not open to any purpose. The South African quotation right is open to any purpose and is flexible, but is not open to any kind of use and is not general.

B. Over Time

We next sought to make our database collect information over time so

¹⁴ Information regarding the meeting on the Law and Economics of Copyright User Rights held on September 26, 2013 is available at <http://www.pijip.org/events/law-and-economics-of-copyright-users-rights/>.

¹⁵ See Palmedo, *supra* note 6 (looking at R&D spending and patenting activity by tech firms in fair use countries).

¹⁶ See Program on Information Justice and Intellectual Property, *Masterlist: Limitations and Exceptions Provisions in National Laws* (2017), <http://infojustice.org/wp-content/uploads/2017/07/Master-List-Version-06192017.pdf>. The project also reviewed past studies and convened legal and economic members of the Global Expert Network on Copyright User Rights in several workshops to discuss research methodologies.

¹⁷ As Band shows, one cannot tell a fair use right by its name alone. Some “fair dealing” rights, e.g. Singapore, have an open general exception that is more like the US fair use right than UK fair dealing. And some rights called “fair use” (e.g. in Bangladesh and Uganda) have rights labeled “fair use” that are only applicable to certain purposes. Jonathan Band & Johnathan Gerafi, *The Fair Use/Fair Dealing Handbook* (March 2015), <http://infojustice.org/wp-content/uploads/2015/03/fair-use-handbook-march-2015.pdf>.

that we could measure changes in the operative elements of user rights. There are a small number of useful resources that distinguish elements in the design of user rights,¹⁸ but none of them map changes in the elements they describe over time. To enable a range of empirical – especially econometric – methodologies, we want to know not only how policy contexts differ between countries now, but also how and when elements changed.

C. Through an Expert Survey

Finally, we sought a methodology that would allow us insight into the law as it is interpreted and implemented rather than only what is on the statute books. But researching the judicial and administrative law in a large group of countries was beyond our abilities. So we engaged experts with knowledge of both statutory and case law as our primary informants.

Since 2011, we have been coordinating the Global Expert Network on Copyright User Rights, a group of experts from around the world conducting research and providing technical assistance on user rights law and policy.¹⁹ Our research program at American University is also an affiliate of the Creative Commons Affiliate Network, which has had “legal leads” in scores of countries around the world. From these networks, we recruited experts to chart the history of openness, flexibility and generality of copyright user rights in their countries’ laws through a survey.²⁰

Our survey asks detailed questions about twenty categories of user rights common in many copyright systems, listed in Table 2. For each user right, it asks when a country’s law permitted various dimensions of openness (e.g. to works, purposes and users) and generality, as well as whether and when the exception was subject to a flexible balancing test. An example of one page of the survey is included as Figure 1.

Our survey collects over 120 inputs about the construction of user rights in each country between 1970 and 2016, providing a rich source for measuring change.²¹ The period 1970-2016 is intended to capture the modern period in copyright law reform, coinciding with the adaption of technologies like the photocopy machine and videocassette recorder through the present.

18 See, e.g., Max Planck Institut. for Innovation and Competition; World Intellectual Property Organization (WIPO), Standing Comm. on Copyright and Related Rights (SCCR), Study on Copyright Limitations and Exceptions for Libraries and Archives, SCCR/30/3 (June 10, 2015); see also WIPO, SCCR, *Draft Study on Copyright Limitations and Exceptions for Educational Activities*, SCCR/32/4 (May 9, 2016); WIPO, SCCR, *Updated Report on the Questionnaire on Limitations and Exceptions*, SCCR/21/7 (Oct. 2, 2010). Others have catalogued fine differences between the wording of laws within “fair use” and “fair dealing” countries – interestingly reporting the lack of difference between the two categories. See Band, *supra* note 17, at 55, 66 (reporting that the “fair use” general exception in Uganda is not open to application to a use for any purpose, but the “fair dealing” general exception in Singapore is).

19 See Global Expert Network Founding Members, <http://infojustice.org/flexible-use> (last visited Sep. 18, 2018) (listing the names of the founding members). Currently the network is much larger including over 80 individuals from over 50 countries.

20 User Rights Database, <http://infojustice.org/survey> (last visited Sep. 18, 2018) (listing names of the respondents and their completed surveys).

21 *Id.*

Table 2: Twenty Categories of Copyright User Rights

General Exception	Parody and/or Satire
Quotation	Incidental Inclusion
Education	Panorama Right
Research	Orphan Works
Personal or Private Uses	National Government Works
Use of Computer Programs	Exhaustion of Rights
Databases or Other Compilations of Non-Original Facts	Safeguards from Secondary/ISP Liability
Text and Data Mining	Temporary Copies for Technological Processes
Library Rights	Protection Against the Supremacy of Contracts
Disability Access	
Transformative Use	

The survey is designed to capture all relevant changes in the law, whether or not they were included in the statute itself.²² It is designed to identify user rights protected by a “limitation,” “exception,” definition of the scope of protection, or elsewhere. Respondents are instructed to define both “law” and “user rights” “broadly to document the full range of legal permission to use copyright material without authorization that exists in all facets of law.”²³

²² In many countries, judicial or administrative rulings may change the openness of user rights. Canada is a place where this has happened recently. *See* Michael Geist, *THE COPYRIGHT PENTALOGY: HOW THE SUPREME COURT OF CANADA SHOOK THE FOUNDATIONS OF CANADIAN COPYRIGHT LAW* (Michael Geist ed., 2013).

²³ We used the following definitions:

“Law” is meant to include all authoritative, published rules or interpretations. Such law may include statutory law, administrative regulations or directives, decisions by courts, enforcement agencies, or others.

“User rights” is defined as any functional permission to use copyright protected material without authorization of the right holder. User rights may exist in any part of the law, including in limitations or exceptions to protection, in definitions of the scope of protection or of copyrightable subject matter, in automatic remuneration schemes (a.k.a. liability rules or statutory licenses), and in protections from liability or enforcement. User rights may exist within copyright specific statutes or decisions, or by virtue of other areas of law, such as constitutional rights, competition, consumer protection, or other fields of law.

Fig. 1: Screen shot of Question 1, PIJIP’s Copyright User Rights Survey

1. General Exception

Instructions:

Column (1) Enter the ranges of years since 1970, if any, when the law included a general exception for the use of copyrighted works

Columns (2-6) Enter the ranges of years since 1970, if any, when the characteristics listed in the column headers applied to the general exception

Column (7) Provide citations to the law (including legislated law, regulations, and court cases) that support your answers

	(1) Exception recognized	(2) Open to any purpose	(3) Open to commercial uses	(4) Open to use of any type of work	(5) Open to any type of user	(6) Subject to a balancing test	(7) Citations
Clearly Included							
Mostly/ Probably Included Mostly not/ Probably Not Included Not Included							

(8) Comments:

The survey is designed to capture the fact that “changes in the law often occur through periods of re-interpretation in which there may be periods of ambiguity.”²⁴ This is particularly, but not only, the case in common law countries.²⁵ We therefore asked respondents for their “judgment on the degree of clarity in the law in regard to each user right” on a four-point spectrum between “not included” and “clearly included.”

We actively recruited inputs from a diverse set of countries from different regions, legal systems, and development levels. To date, we have received usable responses from an initial 21 countries. Roughly half of the countries in the data set are middle-income countries; the rest are high income countries.²⁶

²⁴ Program on Information Justice and Intellectual Property, Copyright User Rights Survey 1, 2 (2016), <http://infojustice.org/survey>.

²⁵ Although there may be formal distinctions in the treatment of judicial precedent between civil and common law countries, all of our civil law experts opined that judicial action can and does change the effective operation of the law in civil law countries. In Brazil, for example, a series of judicial decisions has had the effect of recognizing an open, flexible, and general exception even without statutory change or a formal system requiring the following of judicial precedent. Survey response of Allan Rocha de Souza from Brazil available at <http://infojustice.org/survey>.

²⁶ The experts who contributed to the study include: Beatriz Busaniche, Argentina; Kimberlee Weatherall, Australia; Enyinna S. Nwauhce, Botswana; Allan Rocha de Souza, Brazil; J. Carlos Lara, Chile; Hong Xue, China; Marcela Palacio-Puerta, Columbia; Taina Pihlajarinne & Anette Alén-Savikko, Finland; Shamnad Basheer & Pankhuri Agarwal, India; Tatsuhiro Ueno & Ayuko Hashimoto, Japan; Heesob Nam, Korea; Marco Caspers, Netherlands; Miguel Morachimo, Peru; Teresa Nobre, Portugal; Daniel Seng & David Tan, Singapore; Zuzana Adamová, Slovak Republic; Caroline Ncube, South Africa; Simon Schlauri, Switzerland; Maksym Naumko & Andriy Bichuk, Ukraine; Rami Olwan, United Arab Emirates; Peter Jaszi, United States; Nhan T.T. Dinh, Vietman. The study and responses are available at <http://infojustice.org/survey>.

Table 3: Completed Responses to Copyright User Rights Survey

11 High Income Countries	10 Middle Income Countries
Australia	Argentina
Chile	Botswana
Finland	Brazil
Japan	China
Netherlands	Colombia
Portugal	India
Singapore	Peru
Slovakia	South Africa
South Korea	Ukraine
Switzerland	Viet Nam
United States	

After receiving each completed survey, we corresponded with respondents as necessary to clarify answers. Law student researchers cite-checked each response. We then coded completed surveys, giving a score of 0 where a law did not have a particular element, up to a 3 if the law “clearly” had the element.²⁷ The final survey responses are posted online in both original and coded form.²⁸

The outcome is the User Rights Database. To our knowledge, it is the only compilation of information on change in the fine details of copyright user rights over time in a broad set of economies. We plan to expand the database with data on legal change in more countries over time – but our publishing this initial version fills a gap in available research tools for studying the impact of copyright policy.

The remainder of the paper will demonstrate some of the uses of the data.

IV. RESULTS AND ANALYSIS

Having constructed the database, we set out to examine changes in copyright user rights law, and to run initial tests of their potential impacts. We summarize our major findings below.

A. Trends in User Rights Reform

1. The Development Gap

In our sample, all of the countries have moved toward more open user rights over time, but we find what we call a “development gap” in the data.²⁹

²⁷ 1 and 2 indicate it is “probably not” or “probably or mostly” present.

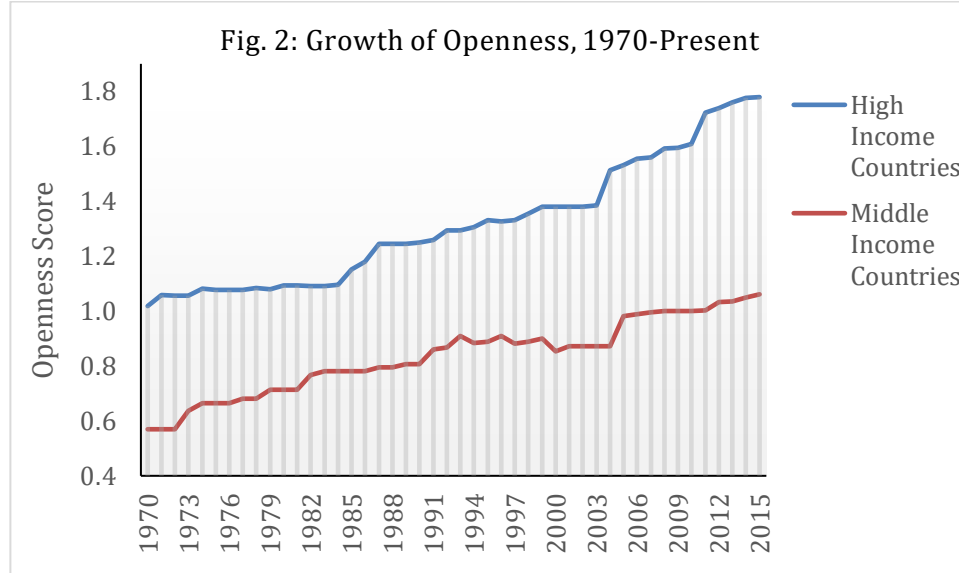
²⁸ See *supra* note 23.

²⁹ For a recent discussion of this trend, see Peter K. Yu, *Customizing Fair Use Transplants* (TEX. A&M UNIV. SCH. OF L., Legal Studies Research Paper No. 17–78, 2018).

There is a general trend toward more open exceptions everywhere. Even where countries focus on specific exceptions, such as those for education, there is a trend toward making such exceptions more open to different works, uses, and purposes. All countries' laws, in this sense, are becoming more open. But countries are not becoming more open at an equal pace.

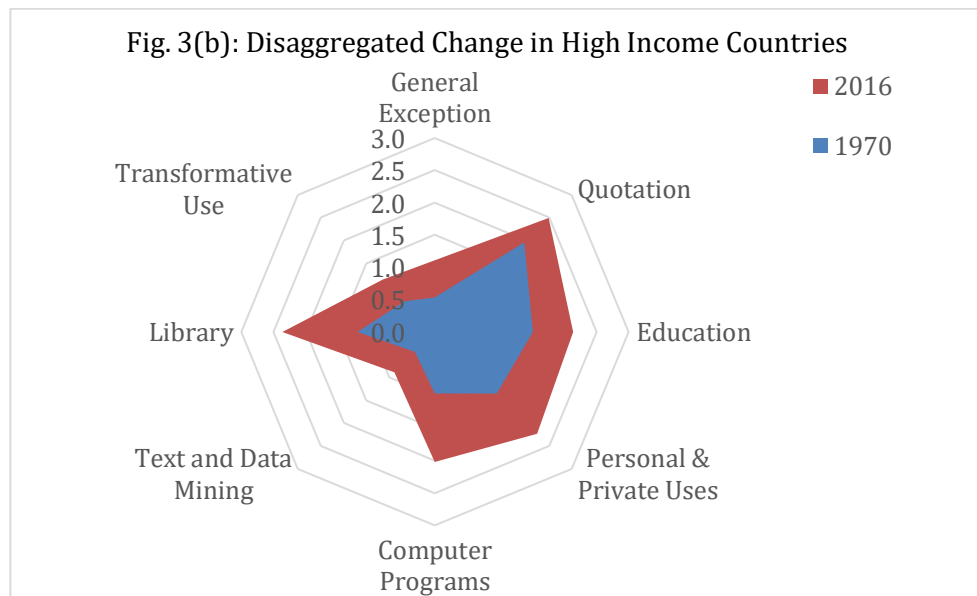
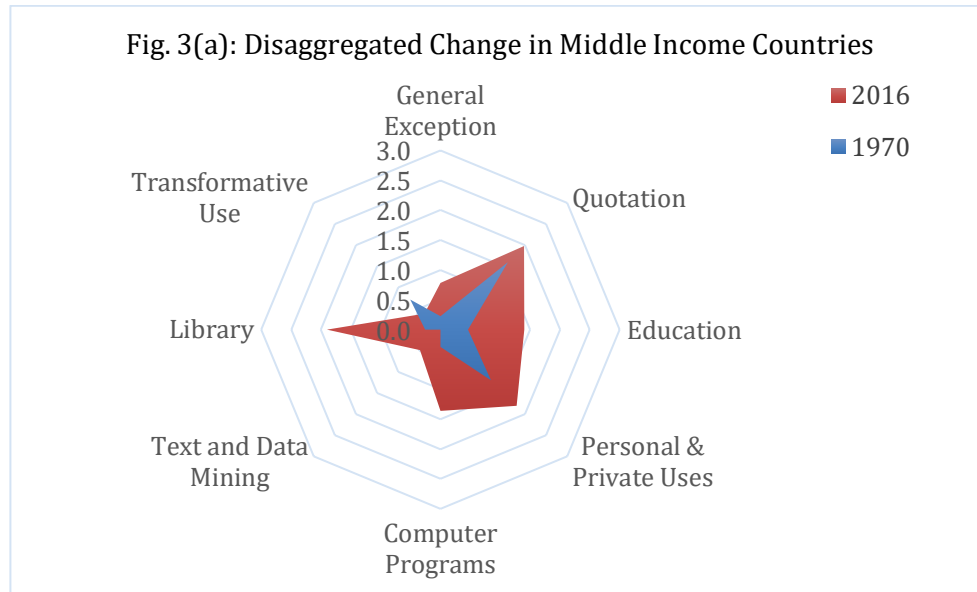
We combine the 76 questions in each survey pertaining to openness of various exceptions into an "Openness Score" -- the unweighted average of the coded answers on those questions for each year. Figure 2 reports the average scores of two subsets of respondent countries. A value of 3.0 would indicate that every user right in the country is fully open to all works, uses, and users.

On average, there is a clear upward (toward more open) trend for both the high- and middle-income subsets, indicating a greater opening of user rights provisions across the board. However, the high-income countries in our study have more open user rights in their laws. The gap between the wealthy and poorer countries on the score has been growing since the early 1990s. This finding is contrary to the frequent characterization of developing countries as pursuing rent-seeking through intellectual property exceptions. Wealthier countries are increasingly more likely to have copyright exceptions that are applicable to a broader range of uses of works than in developing countries



2. The Digital Gap

We also find what we call a "digital gap" in the data. It is commonly posited that it is the digital environment that is demanding change. One might therefore expect to see in the data a trend toward adoption of some of the categories of user rights most often associated with enabling digital



technology and Internet culture. We searched for trends toward adopting new digital rights, including rights to transformative uses and rights to use works for “non-expressive” purposes, such as for text and data mining.³⁰ But adoption of such rights is rare.

Figures 3(a) and 3(b) show the average openness in eight subsections of the overall openness score. The origin of each is zero. The center of the radar graph thus represents an openness score of zero for each area of user rights. The maximum value for each is three, which would indicate that a particular limitation is fully open to any user, any type of work, and for any purpose.

³⁰ See Matthew Jockers et al., *Digital Archives: Don't Let Copyright Block Data Mining*, 490 NATURE 29–30 (October 4, 2012); see also Matthew Sag, *Copyright and Copy-Reliant Technology*, 103 NW. UNIV. L. REV. 1607, 1607–82 (2009).

Figure 3(a) shows the average from the middle-income countries in our sample, and figure 3(b) shows the average for the high-income countries. In each, the blue area represents the scores from 1970 and the orange represents the scores from 2016. In both subsets of countries, there is more openness in quotation, education, personal use, and library exceptions. Few countries, and almost no developing countries, have user rights most associated with the digital economy, including for transformative use or text- and datamining, or a general exception that can adapt to new technologies.

B. The Impact of Opening User Rights

Having constructed the database and observing substantial differences between countries in their change in user rights over time, we set out to test whether adoption of more open user rights had impacts in the technology sector, in traditional copyright industries, and in publishing of scholarship.

1. Innovation and Technology Industry Growth

a. Openness and R&D Spending by Business Enterprises

To test the hypothesis that greater openness in copyright limitations is associated with more innovative activities, we first look at its relationship with R&D spending by ICT business enterprises using country-level data from the European Union's PREDICT dataset.³¹ Table 4 shows the industries included in the national ICT business enterprise R&D figures.³²

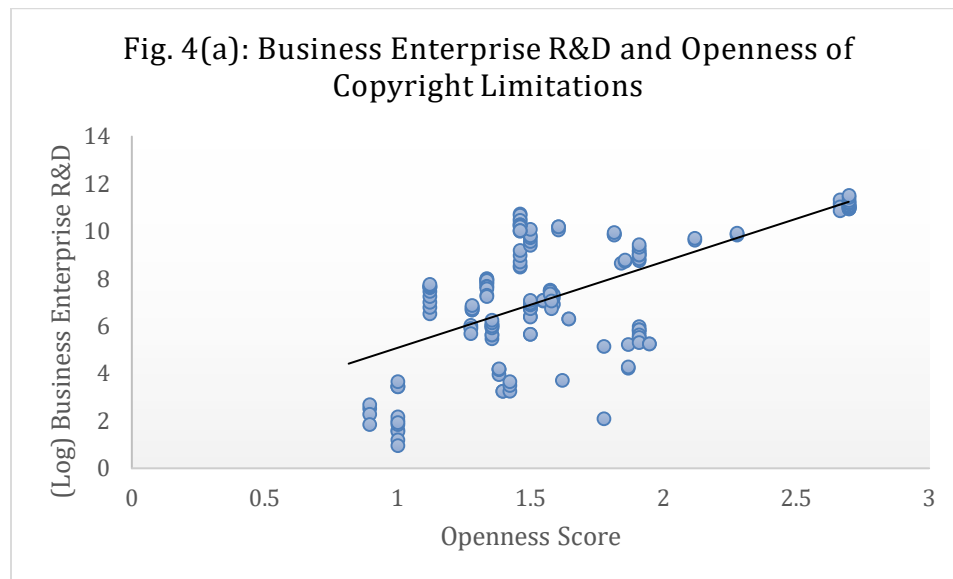
³¹ The data is available at <https://ec.europa.eu/jrc/en/predict/ict-sector-analysis-2018/data-metadata>. This source contains data from "official sources (such as National Accounts and R&D statistics from Eurostat and OECD)" for all EU countries, as well as 12 other comparator countries. This overlaps with 12 of the countries in PIJIP's Copyright User Rights Database: Australia, Brazil, China, Finland, India, Japan, Korea, the Netherlands, Portugal, Slovakia, Switzerland, and the United States. The countries from database which are not represented in this set of R&D data are the smaller non-European economies. Annual data is generally available from 2000 on, though data as far back as 1995 is available for some countries. Additionally, Brazil has data only for 2008 and 2011, and Switzerland has data only available for 2008 and 2012. Though PREDICT presents data in current Euro, all monetary data used in these regressions has been converted to constant Euro using the deflator from the St. Louis Fed.

³² The PREDICT Dataset includes data for the "comprehensive" ICT sector and the "operational" ICT sector. The comprehensive sector adheres to the OECD definition of the ICT industries, which includes ICT manufacturing industries, ICT trade industries and ICT services industries. The operational ICT sector is a subset of the comprehensive, which omits the manufacture of optical media and the ICT trade industries (such as wholesale and retail specializing in hardware). The operational dataset is less disaggregated, but it is available for more periods, especially for the non-EU countries. For this reason, the following analysis uses the operational definition of the ICT sector.

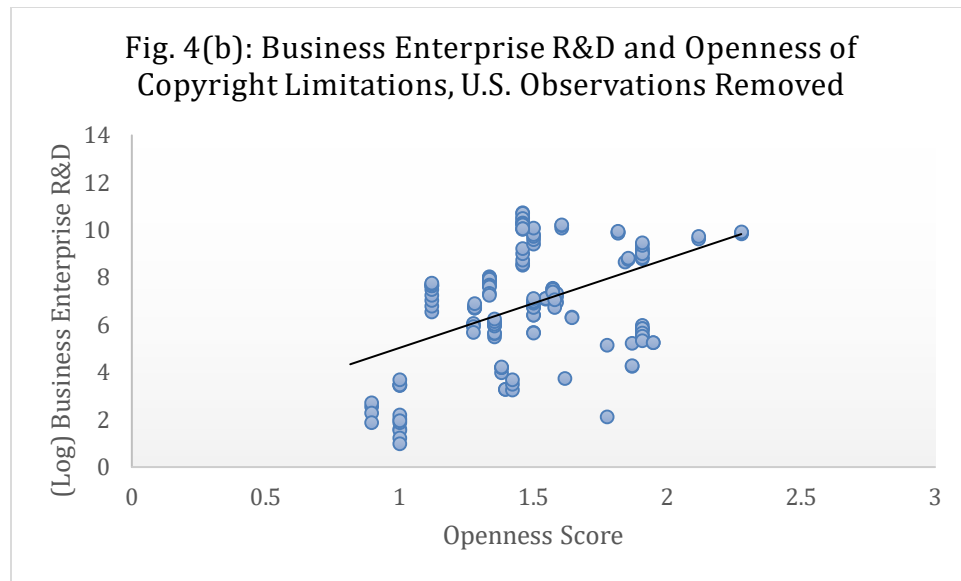
Table 4: Industries included in the PREDICT database's operational definition of the ICT sector

ICT Manufacturing industries
Manufacture of electronic components and boards
Manufacture of computers and peripheral equipment
Manufacture of communication equipment
Manufacture of consumer electronics
ICT Service industries
Telecommunications
Software publishing
Computer programming, consultancy and related activities
Data processing, hosting and related activities; web portals
Repair of computers and communication equipment

Figure 4(a) shows the correlation between the logged value of Business Enterprise Research and Development (BERD) spending and the Openness Score described in the previous section. The cluster of points in the upper right are from the U.S., which may be somewhat of an outlier. Therefore Figure 4(b) shows the correlation with U.S. observations removed. In both cases, there is a clear positive relationship between the variables.³³ The evidence thus supports arguments more open copyright user rights incentivizes more innovative activity by ICT firm.



³³ Note that a one-unit increase in our openness score is a very substantial increase in the actual openness of limitations in a country's copyright law, since our Openness Score runs from 0 to 3.



We next run panel regressions with country and year fixed effects to test the general correlation with controls for other major factors that could account the level of R&D spending by firms. The independent variable of interest, *Openness*, is our survey-based Openness Score. Employment controls for the size of the sector and previous-period gross output controls for the income of the ICT industries. We use EU data on GDP and World Bank data population to control for country wealth and size (the former is converted to GPD per capita).

We also want to control for the strength of copyright, because copyright limitations may be more important in countries with stronger copyright laws. To do this, we use a variable based on an index of copyright strength developed by AU economics professor Walter Park and Tad Reynolds.³⁴ The index is comprised of 21 factors related to duration, usage, and enforcement of copyright, and membership in various copyright treaties. It covers the strength of copyright in 118 countries (not including the United States) from 1989 through 2011. On average, the countries' index scores tend to rise over time, and the developed countries tend to have higher scores than the developing ones – qualities similar to our copyright index.

In order to avoid problems related to multicollinearity, we order the countries from lowest to highest in 1995 (the first year of data from the PREDICT dataset) and 2011 (the last year of data in the copyright index).

³⁴ See Walter Park and Tad Reynolds, Title (date published), link. Available online at http://fs2.american.edu/wgp/www/?_ga=2.33750561.1651042385.1528731157-1650226975.1521642567

Table 5: Ordered List of Country by Park-Reynolds Copyright Index

Country	Copyright Index, 1995	Country	Copyright Index, 2011
Slovakia	1.69	India	2.27
China	2.04	Slovakia	2.78
India	2.27	China	3.12
Portugal	2.37	Brazil	3.18
Brazil	2.71	Australia	3.44
Australia	2.80	Portugal	3.48
Netherlands	2.85	Netherlands	3.58
Finland	3.18	Switzerland	3.61
Japan	3.18	Japan	3.7
Korea	3.21	Finland	3.75
Switzerland	3.38	Korea	3.89

Table 5 shows the ordering. Though there is change in the placement from one country to the next, the countries with the five highest scores are the Netherlands, Switzerland, Japan, Finland and Korea in both time periods. We create a dummy variable *StrongCopyright* which is equal to one for these countries in each year from 1995 to 2015. In order to include the United States, we note that the U.S. Chamber of Commerce Global Intellectual Property Index³⁵ ranks the U.S. as having the strongest copyright protection out of the 50 countries it reviews, and we set *StrongCopyright* equal to 1 for the observations from the U.S.

Table 6 reports the regressions results. Columns (1) to (3) do not include the control for copyright strength, and columns (4) to (6) include it in the interaction variable *StrongCopyright*.

In each specification, the coefficient on *Openness* is positive and significant at the 90% level or better, despite the fact that the number of observations is low. The results suggest that a one-unit rise in the openness score is associated with large increases in R&D by businesses in the ICT sector, though it bears repeating that a one “unit” increase in the openness score is substantial given the scale of 0-3. The interaction term *Open*CopyrightStrength* is insignificant in the second three specifications. (Since we do not find copyright strength to be significant, we drop this control from subsequent tests of the relationships between openness and other firm-and-industry outcomes.) The coefficient on logged employment is positive and significant at the 95% level or better, as expected, but none of the other controls are significant.

³⁵ See U.S. CHAMBER OF COM., GLOBAL INTELLECTUAL PROPERTY INDEX (2018) <https://www.uschamber.com/report/us-chamber-international-ip-index>.

Table 6: Dependent Variable – Logged Business Expenditure on R&D in the ICT Sector

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Openness	1.309*** (0.533)	1.304** (0.529)	1.105* (0.580)	1.632*** (0.453)	1.685*** (0.463)	1.448** (0.650)
Openness*StrongCopyright				-0.757 (0.937)	-0.896 (0.999)	-0.686 (1.054)
(Log) Employment	1.664*** (0.361)	1.322*** (0.331)	1.348** (0.488)	1.549*** (0.318)	1.132** (0.382)	1.178** (0.508)
L. (Log) Gross Output		0.162 (0.216)	-0.108 (0.239)		0.186 (0.239)	-0.079 (0.251)
(Log) GDP per capita			0.322 (0.488)			0.329 (0.474)
(Log) Population			1.477 (1.444)			1.330 (1.450)
Constant	-4.982** (1.944)	-4.725* (2.352)	-26.16 (26.10)	-4.078* (2.002)	-3.586 (2.217)	-22.74 (25.99)
Observations	174	171	164	174	171	164
Within Entity R ²	0.432	0.402	0.400	0.440	0.412	0.405
Country & Time F.E.	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

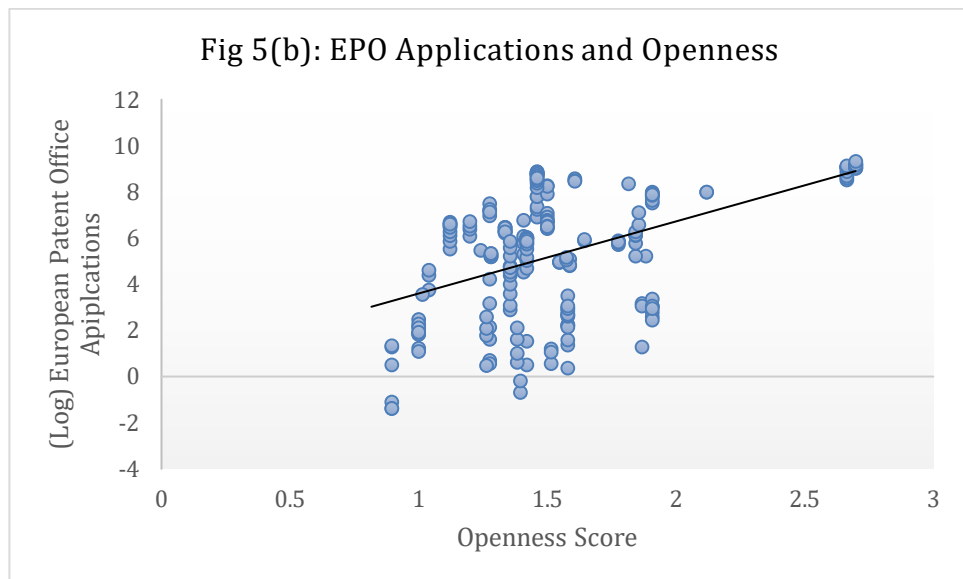
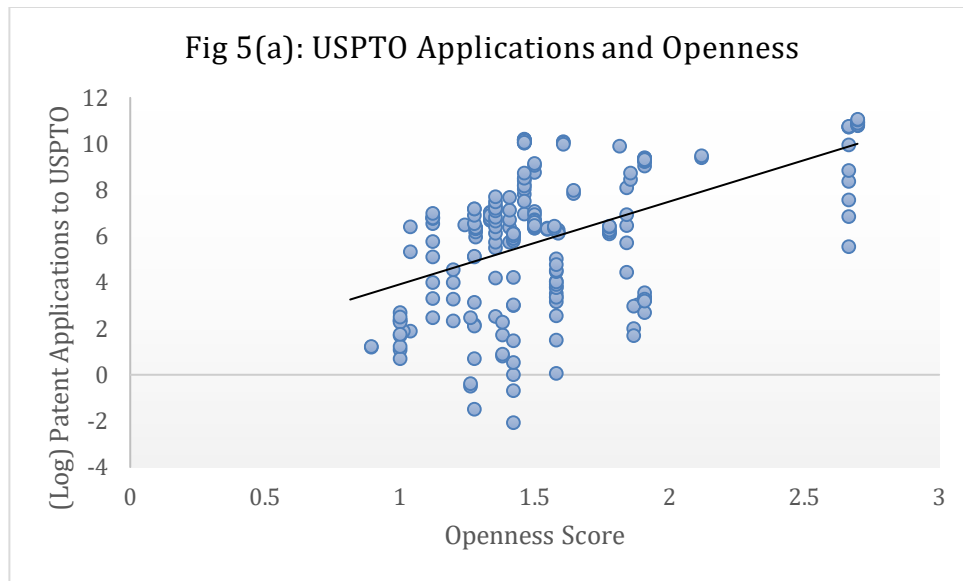
*** p<0.01, ** p<0.05, * p<0.1

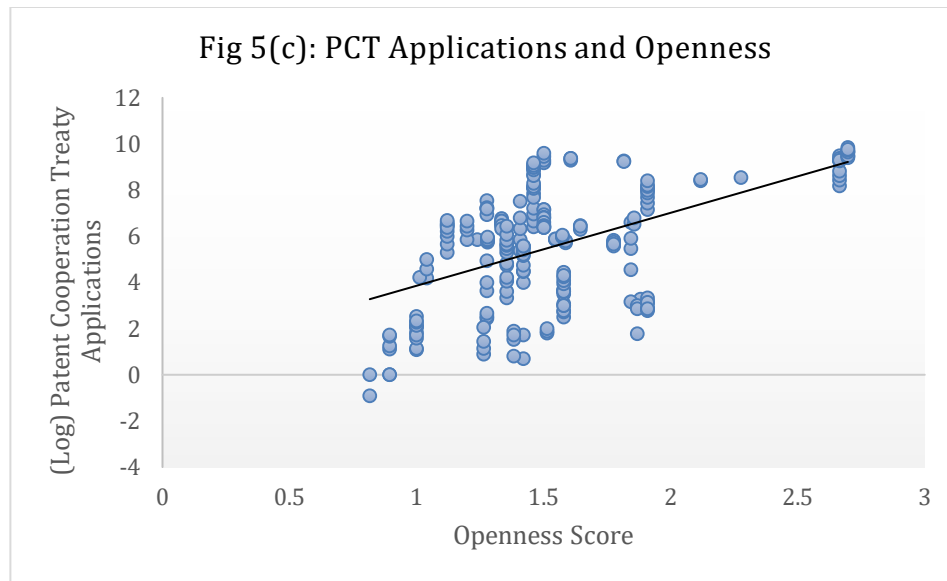
The within-entity R-squareds indicate that the model describes about 40% of the variation within the panels. However, most of the variation in the dataset is due more to unobserved differences between countries rather than changes in either copyright law or the controls. There is an interclass correlation of 96% or higher for each of the specifications.

Overall, the results suggests that, for the 12 countries for which we have data, the positive association between openness of copyright and business enterprise R&D in the ICT sector is significant and robust to the inclusion of controls.

b. Innovative Outputs: R&D Spending and Subsequent Patenting Activity by the ICT Industries

In order to gauge the relationship between openness and innovative outputs, we look at the relationship between openness and patenting activity





by ICT firms in the same set of countries. We use data from the OECD, which matches technology class codes to ICT industry codes and publishes the data online. The data is annual-by-country, and it is based on the patents' priority dates.

Figures 5(a-c) show positive correlations between our openness score and patent applications filed with (a) the US Patent and Trademark Office, (b) the European Patent Office, and (c) the Patent Cooperation Treaty.

We next use a two-stage fixed effect panel regression to gauge whether the innovative activity by firms (R&D spending) yields innovative outputs, proxied by the data on patent applications. However, we must acknowledge an apples-and-oranges problem. The OECD has matched technology classes to the industry codes for the *comprehensive* ICT sector, while our data on R&D spending, firm size, firm and firm sales comes from firms in the *operational* ICT sector. We still test the relationship between R&D spending and subsequent patent applications, but the results should be interpreted with care.

In the first stage of our tests on patents, we regress the previous-period Business Enterprise R&D (*BERD*) on previous period *Openness* and controls. In the second stage, we regress patent application counts on the predicted values of *BERD*.³⁶

Columns (1) and (2) report the results of the regression with data on applications to the USPTO. The observations from the United States have

³⁶ We tested the general model with various lags. Additional regressions (not shown) applying three year lags to the model produced similar results, though regressions applying two year lags to the model did not. We currently lack a theoretical reason to apply lags of a certain period over lags of another. One future area of inquiry is to identify the lags most likely to reflect the true time between research decisions and patent applications.

TABLE 7: Dependent Variables – Logged Business Enterprise R&D (First Stage), and Logged Patent Applications (Second Stage)

VARIABLES	(1) Stage 1	(2) Stage 2	(3) Stage 1	(4) Stage 2	(5) Stage 1	(6) Stage 2
	Dep Var: (Log) L.BERD	Dep Var: (Log) PTO Applications	Dep Var: (Log) L.BERD	Dep Var: (Log) EPO Applications	Dep Var: (Log) L.BERD	Dep Var: (Log) PCT Applications
L.Open	1.618*** (0.428)		1.571*** (0.423)		1.250** (0.513)	
L.(Log) BERD		1.046** (0.452)		0.880 (0.794)		0.946* (0.573)
L. (Log) Employment	1.745** (0.743)	2.235** (1.100)	1.967** (0.527)	-1.031 (2.459)	1.759** (0.651)	-0.063 (1.607)
L. (Log) Gross Output	-0.450 (0.496)	1.013* (0.528)	-0.571 (0.527)	1.189 (1.110)	-0.486 (0.525)	0.875 (0.864)
L. (Log) GDP per capita	0.231 (0.657)	-1.189** (0.520)	0.253 (0.686)	-0.422 (0.984)	0.364 (0.690)	-0.793 (1.194)
L. (Log) Population	1.260 (2.077)	-4.960* (2.842)	1.098 (1.539)	-1.272 (2.807)	1.384 (1.349)	-0.744 (2.746)
Constant	-21.74 (34.22)	55.91 (47.95)	-19.07 (26.29)	13.07 (43.45)	-22.85 (23.49)	-0.259 (44.51)
Observations	123	123	137	137	146	146
Within Entity R ²	0.441	0.559	0.433	0.022	0.398	.
Country & Time F.E.	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

been removed to eliminate home-country bias. However, the test based on applications to the EPO, reported in columns (3) and (4), do not eliminate European countries, because doing so would eliminate 5 of 12 countries from the dataset. Columns (5) and (6) report the results of tests based on PCT applications and the full set of 12 countries.

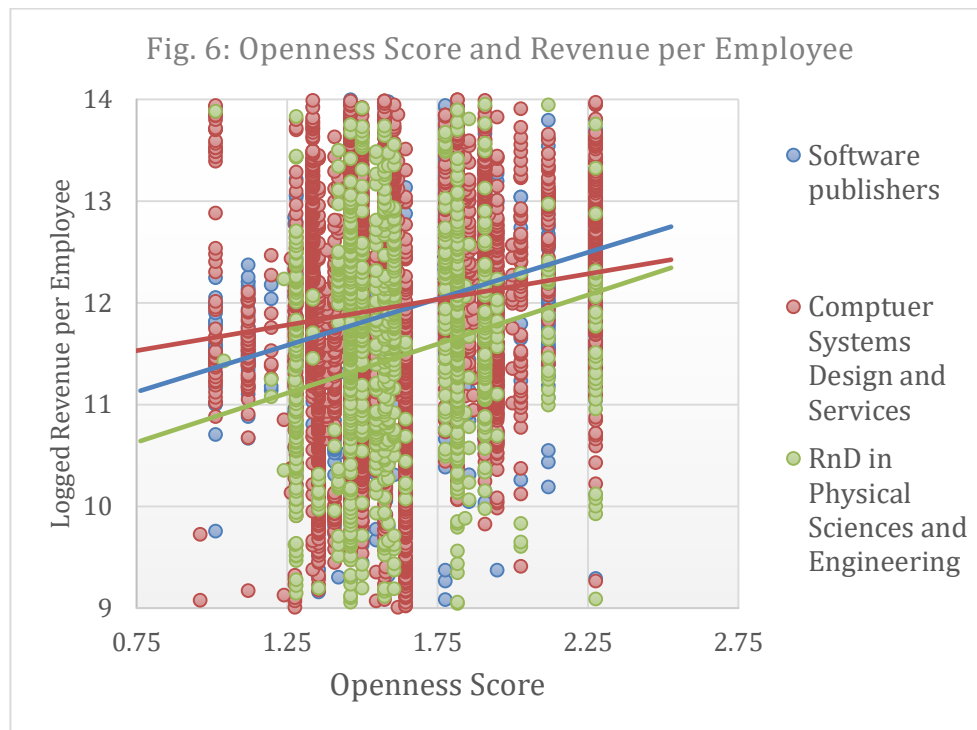
In the first stage of all three tests, the coefficients on *Openness* and logged employment are positive and significant, as expected based on the subsection above. In the second stage, the coefficient on lagged *BERD* is significant for USPTO and PCT applications, but not for applications to the EPO. None of the control variables in the second stage of the regressions are significant.

The results suggest that a fairly strong association between the openness of copyright user rights and private sector R&D spending is linked to subsequent patenting activity. However, the results describing the link between R&D and patenting may be suspect because they combine data from a samples of firms based on the comprehensive and operational definitions of the ICT sector.

c. *Openness and Returns to Firms in the Software, Computer Design, and Contract Research Industries*

Our research shows that domestic firms in industries reliant upon copyright user rights tend to have greater revenues when their laws include more open copyright user rights (and after controlling for other determinants).

We first test the relationship using firm-level data collected from Thomson Reuters for companies in select industries based in the countries represented in our Copyright User Rights Database, other than the United States (which is an upper-bound outlier). The industries selected were the software, computer systems design, and scientific R&D industries, identified by North American Industry Codes 5112, 5415, and 5417. The correlation between the openness score and logged³⁷ revenue per employee is visually represented (without controls) in Figure 6.³⁸



³⁷ Economists usually take the natural logarithm of skewed datasets to perform econometric analysis. Technically, a natural logarithm is the logarithm to base e ($\approx 2.718...$), meaning it is the value x to which the constant e must be raised in order to equal the original value of the observation. In practical terms, natural logarithms convert skewed datasets into datasets approximating a normal distribution, allowing for econometric analysis. They also change interpretation of the coefficients in regression analyses to indicate percent changes rather than unit changes of the original data.

³⁸ Note that a one-unit increase in our openness score is a very substantial increase in the actual openness of limitations in a country's copyright law, since our Openness Score runs from 0 to 3.

Table 8: Dependent Variable – Logged Firm Revenue
Panel Regression with fixed effects for year and country

VARIABLES	(1) Software Publishers	(2) Computer Systems Design and Related Services	(3) R&D in the Physical Engineering and Life Sciences
<i>Openness, Lagged 0,1,&2 Years</i>			
Joint Coefficient	0.353**	0.157**	-0.356***
Joint F-Test	4.60	5.45	29.64
Probability of > F	0.029	0.014	0.000
<i>Controls</i>			
(Log) Employees	0.763*** (0.0893)	0.802*** (0.0498)	0.823*** (0.0569)
(Log) GDP per capita	0.318*** (0.0776)	0.355*** (0.0639)	0.00689 (0.475)
(Log) Population	5.418*** (0.681)	2.493*** (0.691)	9.954*** (2.709)
Constant	-93.73*** (12.65)	-38.43** (12.89)	-175.0*** (47.03)
Observations	3815	6907	2455
Within-Entity R ²	0.462	0.535	0.287

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

We run a set of panel regressions to test the relationship between openness and firm performance with controls for firm size, home-market wealth and home-market size. As in the previous section, we include country and year fixed effects. We expect that the relationship between openness and firm performance is develop over time, because firms that invest in innovative activity in one period will reap the rewards in subsequent periods. Therefore, we include our openness score as an unlagged variable, and with lags of one and two years. Table 8 reports the results of the coefficients on the openness score jointly, and uses the F-statistic to show joint significance.

The regressions results are mostly positive. When the controls are added, openness over three years is positively associated with firm revenue in two of the three industries. A one unit increase in the openness score is associated with approximately 35% higher revenues for software firms, and 16% higher revenues for firms in the computer systems design industries. Note also that the control variables in the regressions are positive and significant as expected.

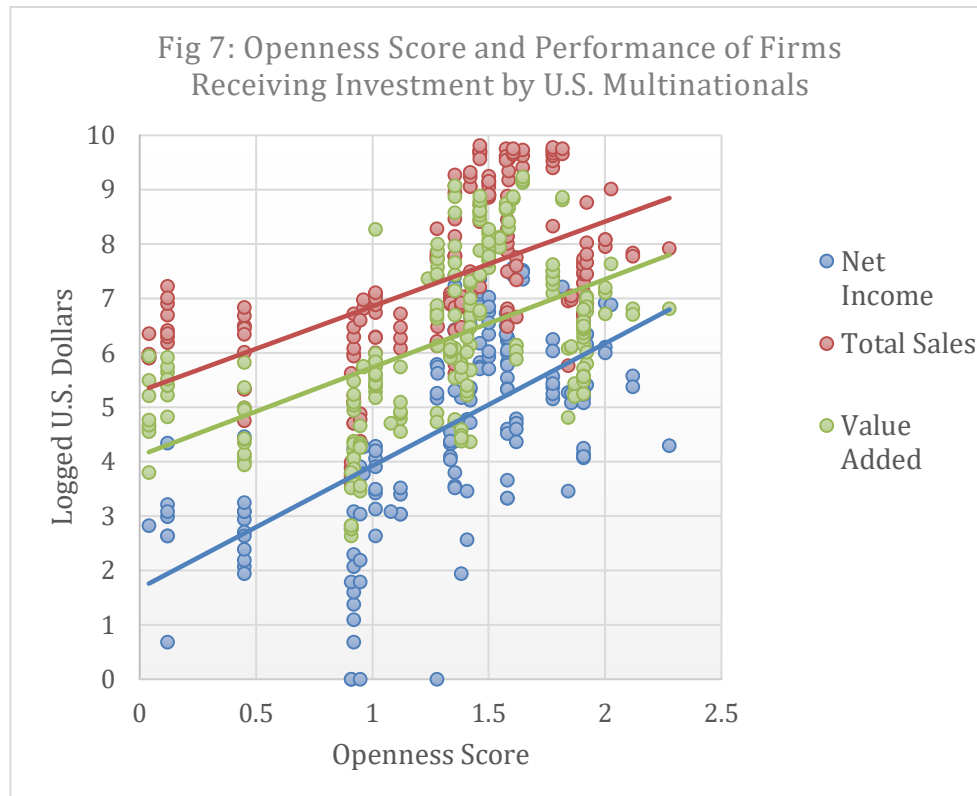
However, we find openness to be negatively associated with revenues for firms in the contract science R&D industry. This unexpected result may be due to the large coefficient on logged population. The countries in our sample with the largest population growth are middle income countries. As noted

above, the growth of openness in these countries has lagged growth in the wealthier ones.

d. Impact of Openness on Returns to Foreign Affiliate of U.S. Multinationals

Next, we test the effect of copyright openness on returns to firms receiving foreign direct investment from the United States, finding a positive relationship between openness in copyright user rights and returns to firms that partner with U.S.-based Multinationals.

This set of tests uses industry-level data on foreign affiliates of American Multinational Enterprises, taken from the Bureau of Economic Analysis.³⁹ We collected data on three variables of interest: net income, total sales, and value added for affiliates in the Scientific and Technical Services sector between 1999 and 2014. These are the industries under the two-digit NAICS code 54, which include research and development services and computer systems development, among others.⁴⁰



³⁹ The data is available at the two-digit North American Industry Classification System (NAICS) level of disaggregation. The BEA tables are available at <https://www.bea.gov/international/di1usdop.htm>.

⁴⁰ NAICS identifies industries at different levels of disaggregation, which are indicated by the number of digits. Two-digit classifications are very broad (i.e. - NAICS 54: "Professional, scientific, and technical services"), and more precise classifications are nested underneath and indicated by more digits (i.e. - NAICS 5415: "Computer systems design and related services"). For data on the activities of foreign subsidiaries of U.S. MNEs, the Bureau of Economic Analysis only provides data at the two-digit level of disaggregation.

As demonstrated by Figure 7, affiliates in this sector tend to have greater net income and total sales when they resided in countries with greater openness of copyright user rights. They also report higher value-added.

To control for other factors that ought to affect industry returns, we run a series of regressions testing the relationship of openness to each of the three dependent variables: net income, total sales, and value added. In these regressions, GDP per capita and population control for the wealth and size of the national markets in which the affiliates operate, and fixed effects control for country and time. The results, presented in Table 9, show that the positive relationship between openness and industry performance is significant and robust to the inclusion of controls. The coefficients suggest that a one-unit increase in the openness score is associated with a 37% increase in industry net income and 31% increases in both total sales and value added.⁴¹

**Table 9: NAIC 54 - Professional, Scientific, and Technical Services.
OLS Panel Regressions with country and time fixed effects**

VARIABLES	Dep. Var.: (Logged) Net Income	Dep. Var.: (Logged) Total Sales	Dep. Var.: (Logged) Value Added
<i>Openness, Lagged 0,1,&2 Years</i>			
Joint Coefficient	0.370**	0.306**	0.312**
Joint F-Test	3.62	4.51	3.80
Probability of > F	0.038	0.019	0.033
<i>Controls</i>			
(Log) GDP per capita	1.386*** (0.158)	1.489*** (0.151)	1.865*** (0.184)
(Log) Population	-1.039** (0.389)	-1.043** (0.433)	1.649 (0.981)
Constant	11.12 (6.981)	11.29 (7.674)	-42.32** (18.00)
Observations	240	233	219
Within-Entity R ²	0.802	0.799	0.565

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

⁴¹ The coefficient on our openness score is positive and statistically significant at the 99% level of confidence for each of the three tests. The coefficients on the control variables are also positive and significant, as expected, and R²s between 0.67 and 0.79 indicate a good overall fit. Taken together, the results indicate that openness is associated with greater returns to foreign affiliates of U.S. firms in these industries, even when controlling for other factors that also affect returns (wealth, market size, and time).

2. Traditional Copyright Industries

We next test whether the gains to technology firms come at a cost to traditional copyright intensive industries – such as book publishers, music publishers, and motion picture and video producers. We find no evidence of such a cost.

We again use total revenue as the dependent variable, the combined lagged-and-unlagged openness score as the independent variable of interest, and the same set of controls and fixed effects. As shown in Table 10, there is no significant association (either positive or negative) between the openness of copyright limitations and revenues among the firms in our sample.⁴²

TABLE 10: Firms that rely on copyright protection
Dependent Variable: Logged total revenue

VARIABLES	(1) Motion Picture & Video Production	(2) Print Publishers	(3) Sound Recordings
<i>Openness, Lagged 0,1,&2 Years</i>			
Joint Coefficient	0.192	-0.204	-0.422
Joint F-Test	1.25	2.00	2.86
Probability of > F	0.354	0.165	0.168
<i>Controls</i>			
(Log) Employees	0.723*** (0.084)	0.668*** (0.078)	0.679*** (0.048)
(Log) GDP per capita	0.273 (0.190)	0.908*** (0.066)	0.606 (0.443)
(Log) Population	7.938*** (2.154)	-0.957 (0.739)	2.314 (2.658)
Constant	-140.9*** (40.14)	23.40 (13.56)	-35.14 (47.90)
Observations	939	1305	312
Within-Entity R ²	0.476	0.490	0.342

Robust standard errors in parentheses

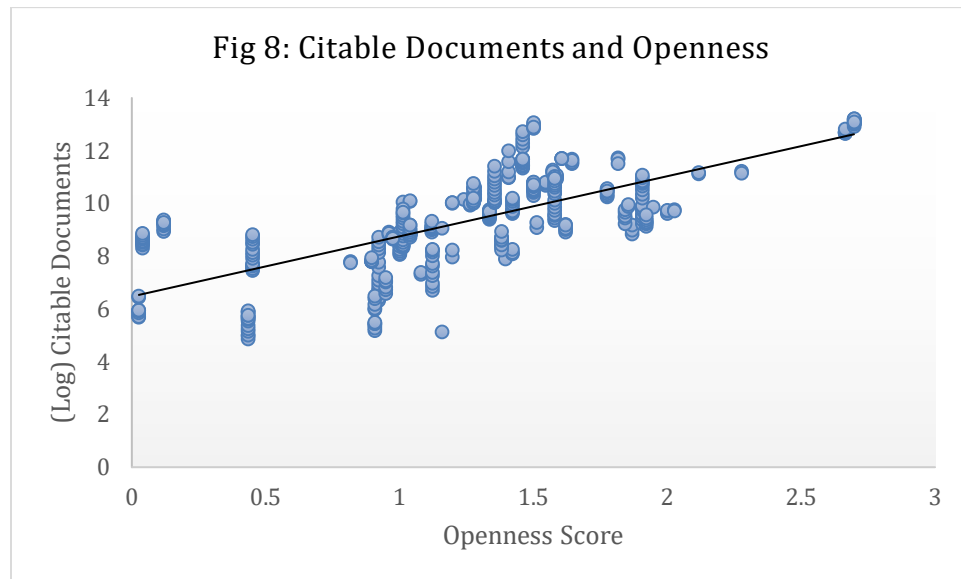
*** p<0.01, ** p<0.05, * p<0.1

⁴² In each regression, firm size and national wealth are positively associated with revenues, as expected. It is notable that our data source contains observations for fewer firms in this set of industries (especially music publishers), so our regressions involve smaller sample sizes. When we reran the tests on firms' net income instead of total revenue, we find a significant *positive* relationship between openness and revenues remained for the sound recordings industry, and no significant relationship for the other two.

3. Production of Scholarship

Our last tests of copyright openness address the hypothesis that more open copyright user rights are associated with the creation of more and better new works. We focus on scholarly writing because of the clear relationship of scholarship to access to previous works, and find that more open copyright user rights are positively associated with the quantity scholarly production in these fields in our set of countries. There are limitations to the data on quality, but the available evidence suggests a positive relationship between openness and quality of scholarship as measured by the citations-based H-index.

Data on the number of citable documents produced annually by researchers in each country is taken from the SCImago Journal & Country Rank website, which aggregates citations data from the Scopus database. The Scopus database draws citation data from over 21,500 titles from more than 5,000 international publishers.⁴³ The data gives us publication counts and citations data for all countries in our dataset except for Botswana from 1996 through 2015. (It has data from Botswana from 2000 through 2015.) Figure 8 shows the positive relationship between our openness score and the logged number of citable documents produced by scholars in each of the 21 countries in the User Rights Database.



We test the relationship with controls for GDP per capita and population, the interaction term capturing the openness score in countries with stronger copyrights, and GDP per capita and population data from the World Bank website. We add specifications with lags on both copyright variables in order to account for the time between the research and writing of a paper and its publication. As before, we include fixed effects for country and year. Table 11 reports the results. The first column reports results before lagged values

⁴³ The citable documents, data, and other citations data including the H index, is available for download from SCImago at <http://www.scimagojr.com>.

Table 11: Dependent Variable – (Log) Citable Documents

VARIABLES	(1)	(2)	(3)	(4)	(5)
Openness	0.218* (0.124)	0.148** (0.065)	0.158** (0.0613)	0.163** (0.061)	.0162** (0.064)
L.Openness		0.101 (0.130)	-0.010 (0.030)	-0.011 (0.030)	0.001 (0.021)
L2.Openness			0.136 (0.150)	-0.067 (0.056)	-0.062 (0.055)
L3.Openness				0.261** (0.100)	0.119*** (0.038)
L4.Openness					0.192** (0.080)
Openness*StrongCopyright	0.216 (0.428)	0.345* (0.166)	0.303** (0.123)	0.253** (0.103)	0.223*** (0.077)
L.Openness*StrongCopyright		-0.152 (0.355)	-0.007 (0.124)	-0.038 (0.086)	-0.075 (0.081)
L2.Openness*StrongCopyright			-0.100 (0.473)	0.141 (0.161)	0.079 (0.131)
L3.Openness*StrongCopyright				-0.146 (0.428)	-0.130 (0.164)
L4.Openness*StrongCopyright					0.130 (0.375)
(Log) GDP per capita	1.652*** (0.173)	1.657*** (0.178)	1.692*** (0.185)	1.753*** (0.195)	1.77*** (0.206)
(Log) Population	3.090*** (0.892)	3.069*** (0.961)	2.928*** (1.020)	2.588** (1.085)	2.325* (1.189)
Constant	-60.69*** (15.11)	-60.39*** (16.29)	-58.28*** (17.30)	-52.99*** (18.38)	-48.65** (20.09)
Observations	396	376	356	336	316
Within Entity R ²	0.846	0.842	0.838	0.833	0.824
Country & Time F.E.	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

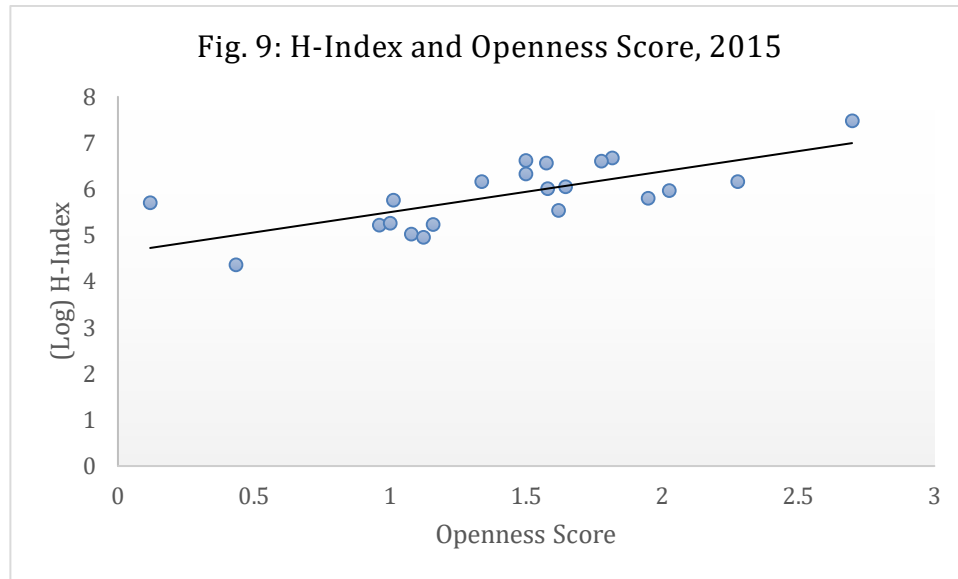
*** p<0.01, ** p<0.05, * p<0.1

of the openness score and the interaction terms are added. Columns (2) through (5) report the results of specifications with lags.

The coefficients on *Openness* are positive and significant in all specifications, and the coefficients on *Openness*StrongCopyright* are positive and significant in all but one. Lagged coefficients on *Openness* become significant when the lag is three or four periods, though not earlier, and further F tests (not shown) confirm they are jointly significant. None of the coefficients on the interaction term are significant. Control variables behave as expected. In all, the results suggest a positive association between openness and the quantity of scholarly works produced, which is more pronounced in countries with stronger copyright laws. There is some evidence to suggest a lag between the effect of openness (when writers would be doing early research) and subsequent publications, though the significant lags are long.

While the number of citable documents published by a country is an indicator of the quantity of scholarly output, it does not address the quality. To measure the relationship between openness and the quality of scholarly output, we turn to the “H-index,” a preferred quality metric which is also available from the SCImago website.

At the national level, the H index is defined as the highest number of papers “h” published by researchers in a given nation that have been cited at least h times. The metric was designed specifically to capture both the quantity and importance of a country’s scholarly output.



SCImago’s data on the H-index is cumulative for the 1996-2015 period, so annual observations are impossible. Nevertheless, we include the raw correlation as Figure 9. It shows a positive relationship between the H-index and the openness score using the 2015 value of all variables, providing some support for the hypothesis that scholars in countries with higher levels of openness publish higher quality scholarly works. Regressions on the sample of only 21 observations yield unsurprisingly insignificant results, and they are not shown in this paper.

V. CONCLUSION

This paper has presented a new open access resource for researchers seeking to test the impact of user rights on society – the User Rights Database. It is a tool for identifying and measuring change in nations’ laws protecting copyright user rights. Though the test described above focus on an Openness Score derived from the data, one can slice the information in Database in different ways to focus on different aspects of the law. For instance, one could examine survey data that is particularly relevant to educators or libraries. There are many ways to use the data to test the impact of legal changes on

people and firms.

Our tests using the Openness Score from the Database indicate that greater openness in copyright user rights has been associated with positive outcomes in our samples of countries. Firms in the ICT industries invested more in research and development when their home countries had more open copyright user rights. Greater R&D by businesses was followed by an increase in patent applications. Firms in these industries enjoyed higher returns following two years of greater openness. On average media and content industries in the same countries did not seem to suffer adverse consequences as the copyright laws became more open. We also find that scholars in countries with more open user rights environments publish more papers, though evidence does not suggest a positive relationship between openness and the quality of publications, as measured by citations.

The Copyright User Rights Database is still a work in progress. In the coming year we hope to expand it to include data from approximately 20 more countries. To further our analysis of copyright issues utilizing the Database, we will develop more complete models (including dynamic panel models) that capture other determinants of innovative activities and creative outputs, such as public sector research funding. Finally, we plan to use the data to identify shocks to copyright law that present opportunities for natural experiments. It is our hope that other researchers will make use of the Database as well.