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A Novel Dataset Measuring Change in Copyright Exceptions

Michael Palmedo

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Abstract

Copyrights grant creators long periods of market exclusivity during which they or their agents have the exclusive right to reproduce and distribute their works. However, copyright exceptions limit their scope and strength. The laws on both copyright protection and copyright exceptions vary substantially from one country to the next. This working paper introduces a novel, survey-based dataset that describes changes to 24 countries' laws on copyright exceptions over time. To explore the data, I construct two indices from subsets of the dataset; one that focus on exceptions related to ICT technologies and another that focuses on educational uses. The indices show that copyright exceptions have grown stronger since 1990, and that wealthier countries tend to have stronger exceptions than poorer ones. Initial empirical tests suggest that exceptions related to ICT technologies are stronger in countries with larger ICT sectors, and exceptions for educational uses are stronger in countries with higher educational attainments. Both types of exceptions are negatively associated with the share of GDP produced by the copyright-producing industries. Countries have stronger exceptions when they have entered into trade agreements with the U.S., though bilateral American pressure to strengthen copyright protection is associated with weaker exceptions related to ICT technologies.

[1] I wear two hats at American University. I am the Assistant Director for Interdisciplinary Research at the American University Washington College of Law Program on Information Justice and Intellectual Property; and I am an economics PhD Candidate at the College of Arts and Sciences. The dataset presented was developed as a research project at the law school, and it is part of my dissertation-in-progress. I wish to thank economics professors Walter Park, Robert Feinberg, and Kara Reynolds for their input in the presentation of the data; and law professors Sean Flynn, Peter Jaszi, and Michael Carroll for their help with construction of the survey upon which it is based. Furthermore, I would like to thank the participants at the 2018 meeting of the Society for the Economic Research of Copyright Issues for their feedback. Finally, I am deeply indebted to the attorney-respondents who completed the survey: Beatriz Busaniche, Kimberlee Weatherall, Enyinna S Nwauche, Allan Rocha de Souza, David Fewer and Lucie Guibault, J. Carlos Lara, Hong Xue, Marcela Palacio-Puerta, Taina Pihlajarinne and Anette Alén-Savikko, Jyh-An Lee, Shamnad Basheer, Pankhuri Agarwal, Tatsuhiro Ueno, Ayuko Hashimoto, Heesob Nam, Andrés Izquierdo, Marco Caspers, Miguel Morachimo, Teresa Nobre, Daniel Seng, David Tan, Zuzana Adamová, Caroline Ncube, Simon Schlauri, Jyh-An Lee, Maksym Naumko, Andriy Bichuk, Rami Olwan, Peter Jaszi and Nhan T.T. Dinh.

Introduction

Copyright and copyright exceptions

Intellectual property laws involve a tradeoff between the interests of creators and consumers of information goods. Copyrights grant the creators of new literary and artistic works long periods of market exclusivity during which they or their agents have the exclusive right to reproduce and distribute their works. This incentivizes the creation of new works (Landes & Posner, 1989), but it also can lead to high prices for consumers and follow-on creators. For instance, high prices have been shown to lead to piracy in online media markets (Karaganis, 2011), as well as lack of access to scholarly works (Albert, 2006; Adcock & Fottrell, 2008). Copyrights can also have unintended impacts on firms in the information & communications technology (ICT) sector, which complement information goods. For instance, if internet service providers are liable for infringements made by their customers, they face extra litigation risks which can impede investment and innovation in those industries (Lerner & Rafert, 2015).

To mitigate these types of consequences, copyright laws include exceptions to the exclusive rights conferred by copyrights. All countries that are Members of the WTO are required to have both copyright protection for creators and copyright exceptions for consumers, but the laws on both vary greatly from one country to the next.

Some exceptions are very narrow, allowing only very specific uses of copyrighted works. For example, the Ukrainian educational exception allows a teacher may reproduce a single copy of a work for use in the classroom, but she cannot distribute copies to students to take home, nor can she use copies for her own research purposes (Ukraine, 2017). Other exceptions are very broad. The Indian Copyright act's educational use exception permits "the reproduction of any

Table 1: Costs and Benefits of Copyright Exceptions

	Short Run	**Long Run**
Benefits	Greater access to books, articles, music, and other copyrighted works increases consumer welfare. Follow-on creators that build upon earlier works can obtain works at lower cost, reducing overall production costs. Firms that complement the copyright industries (i.e. – ISPs that allow people to share works online) able to develop new products and services, or improve existing ones.	More follow-on works available in the market. More variety and efficiency in the distribution of copyrighted works.
Costs	Lower sales of copyrighted works by copyright owners or their licensees. Producer welfare falls. Declines of sales by firms that distribute copyrighted works (i.e. – publishers, record companies). Lower returns to these complementary distributors.	Less compensation for authors, musicians, other creators. Fewer people relying on creative endeavors for their primary income. Contraction of distribution sector.

work – by a teacher or a pupil in the course of instruction" (India, 2012), and the courts have interpreted this to include copies of full textbooks distributed outside of the classroom.

Costs and benefits of strong copyright exceptions

There are various costs and benefits associated with broad, open copyright exceptions. These costs and benefits accrue to creators, distributors, and other industries that complement the creation of works. Table 1 summarizes the basic tradeoffs.

In the short run, more consumers will be able to access copyrighted works without authorization, and without payment, leading to an obvious increase in consumer welfare. Authors, researchers, and others who use existing works as inputs to the creation of new works

also gain, because they may be able to obtain those inputs without payment, lowering their overall costs. Finally, there are benefits that may accrue to complimentary industries providing consumers ways to access and share information goods. Often these are in the ICT industries – Blackboard, YouTube, and WeChat are examples. When customers are legally able to copy and share content, the law creates demand for new ways to do this, and firms will step in to meet this demand (Lohmann, 2008).

The long run benefits from stronger copyright exceptions flow from the short run benefits to creators and complementary firms. If creators who rely upon earlier works to create new ones are able to access those earlier works at a lower cost, it is reasonable to hypothesize that their output may increase. Similarly, as complementary industries emerge to help people reproduce and share content, the distribution market may become more efficient and/or have a larger variety of ways in which consumers can access works.

The costs of stronger copyright exceptions are largely borne by the producers and distributors of copyrighted works. They are rather straightforward. If the availability of free copies of articles, books, or other types of copyrighted works cuts into their sales, creators and distributors will experience a fall in income. In the long run, the number of people able to make a living in the creative industries will fall. The distribution industries will decline in terms of revenue and employment involved in the old ways of distributing works, though there is room for them to evolve into new types of intermediaries, as the record industry is currently doing (Siwek, 2018).

Previous Empirical Literature

A small body of empirical work has shown relationships between the structure of copyright exceptions and various outcomes.

One body of empirical work focuses on research exceptions for data mining. Some writers have addressed the link between copyright exceptions that explicitly permit data mining (defined as machine-assisted analysis of large datasets), and research that relies on it. The process of data mining necessitates *copying* large quantities of content from original sources and therefore requires authorization from rightholders in many jurisdictions. However, some countries have specific exceptions for data mining, or have broad exceptions that permit the process without authorization. Handke, Guibault and Vallbé (2015) find that in "countries in which data mining for academic research requires the express consent of rights holders, data mining makes up a significantly lower share of total research output." Similarly, Filippov (2014) finds that the structure of copyright law in EU countries has reduced the number of published papers that utilize data mining techniques. Hargreaves et al. (2014) use Filippov's data to find that researchers in the U.S. and Canada produce more articles based on datamining than those in European countries with more restrictive copyright limitations applicable to datamining. Though these studies are narrow in scope, they illustrate that the structure of copyright exceptions in countries' laws can have a measurable impact on the use of copyrighted works.

Legal academics have argued that copyright exceptions for researchers will drive the creation of more academic works by lower the cost of obtaining research materials (Geiger, 2009; Ginsburg, 2013). Palmedo (2019) tested this hypothesis, finding that robust exceptions have been positively associated with researcher output in a sample of 21 countries.

Other papers have explored potential relationships between copyright exceptions and Information and Communications Technologies (ICTs). Lerner and Rafert (2015) demonstrate that a court ruling clarifying copyright exceptions for cloud storage increased venture capital funding to American cloud technology firms. Ghafele and Friedman (2014) find that technology hardware firms in Singapore enjoyed faster growth after the nation's introduction of fair use[2] in 2006. Palmedo (2017) finds that technology hardware firms in countries with fair use spent more on research and development and subsequently received more patents than other countries. A white paper published by an ICT trade association list a number of activities carried out by ICT firms that would be illegal without robust copyright exceptions such as fair use. These uses include internet search, caching, and hosting (Szamosszegi & McCleary, 2017).

Though there is limited empirical work on copyright limitations, there is a broader empirical literature examining copyright's incentive for the creation of new works. Some researchers have studied the effects of copyright extension. Reichmann (1996), Kuhne (2004), Ku, Sun and Fan, (2009) and Png and Wang (2009) find no evidence to suggest that copyright term extension led to more production of new works, yet Rappaport (1998) estimates that an extended copyright term would lead to $330 million in royalties and states that the net proceeds from the fee would be devoted to promoting the creative arts. Others have studied the effects of piracy on the creation of new works. Telang and Waldfogel (2014) find that high levels of piracy depress the

[2] Fair Use is a copyright exception found in Section 107 of the U.S. Copyright Act. A handful of other countries have adopted it. Fair Use allows the unauthorized use of a copyrighted work as long the use is "fair", which is determined by consideration of four factors - "(1) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes; (2) the nature of the copyrighted work; (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and (4) the effect of the use upon the potential market for or value of the copyrighted work" (United States, 1976). It is not confined to certain types of uses, and is therefore considered by many legal academics to grant wider latitude for unauthorized uses than most other copyright exceptions. For more, see the U.S. Copyright Office's guide at https://www.copyright.gov/fair-use/more-info.html.

production of new Bollywood films. Hollifield, Vlad, and Becker (2003) find that stronger copyright protection has been associated with the production of more print media. On the other hand, Waldfogel (2011) finds that increased file sharing through Napster decreased the effectiveness of copyright for recorded music in the U.S. – yet it led to no decrease in the creation of musical works. For more comprehensive reviews of empirical copyright literature, see Handke (2011), and the Copyright Evidence Wiki (CREATe Centre, 2018).

Measuring Change in Copyright Exceptions

This working paper introduces a novel, survey-based dataset, which describes changes to countries' laws on copyright exceptions over time. The dataset is a tool for further econometric research, and it is available online in both coded and "human-readable" form.[3] It was created through a research project at American University College of Law.

The dataset differs from existing sources of information on the variation in copyright exceptions between one country and the next, including surveys by the World Intellectual Property Organization (Seng, 2017; Crews, 2015; WIPO Secretariat, 2010), and legal academics (Hilty & Nérisson, 2012). All of these previous studies are static. The dataset presented here is unique because it allows one to study changes in the laws over time and across countries.

The dataset covers 24 countries and 27 years.[4] Thirteen of the countries are currently classified as High Income by the World Bank, and the rest are classified as Middle Income. (Over the period studied, some countries advanced from Low- to Middle income and from Middle- to Upper income.) The distinction is relevant because legal academics have argued that

[3] http://infojustice.org/survey

[4] Some countries in the dataset have data going back to 1970. However, there is annual data for most countries in the dataset from 1990 to 2016.

Table 2. Countries in the Dataset

High Income Countries	Middle Income Countries
• Australia • Canada • Chile • Finland • Japan • Korea • Netherlands • Portugal • Singapore • Slovakia • Switzerland • Taiwan • United States	• Argentina • Botswana • Brazil • China • Colombia • India • Mexico • Peru • South Africa • Ukraine • Vietnam

copyright laws in less wealthy countries tend to have weaker exceptions than copyright laws in wealthy countries – despite the TRIPS Agreement's flexibilities allowing countries policy space to permit certain unauthorized uses (Okediji, 2019; Deere, 2008). Table 2 list the countries by income group.

To create the survey, American University Washington College of Law hosted a series of workshops with copyright attorneys. The completed survey was administered to law professors in their home countries. Respondents gave legal citations for all of their answers, and American University law students checked the citations to verify their accuracy.

The survey was comprised of 129 questions, grouped into 20 categories. Table 3 shows the categories and gives a very brief description of each.

Table 3: Categories of Survey Questions

Copyright Exception	Description
General Exception	Openly worded exception that allows a wide range of uses, on the condition that a "fairness" test would be passed. Includes the "fair use" provisions found in the laws of the U.S. and a handful of other countries, as well as the "fair dealing" provisions common in former British colonies.
Quotation	Allows the unauthorized reproduction and/or sharing of parts of a copyrighted work for the purpose of quotation.
Education	Allows unauthorized reproduction and/or sharing of copyrighted works (or parts thereof) for educational purposes.
Research	Allows unauthorized reproduction and/or sharing of copyrighted works (or parts thereof) for research purposes. This may or may not include commercial research.
Personal or Private Uses	Allows unauthorized reproduction and/or sharing of copyrighted works (or parts thereof) for personal use. This sometimes includes sharing in small groups such as families or peers.
Computer Programs	Allows reproduction and use of copies of computer programs without authorization. This exception may exist for a variety of purposes.
Databases or Other Compilations of Non-Original Facts	Allows unauthorized reproduction and/or sharing of databases or other compilations of facts for various purposes. This may take the form limits to the scope of copyright so that these collections are not eligible for protection in the first place.
Text- and Datamining	Allows unauthorized reproduction and use of works by machines in order to mine the works via text-or datamining processes.
Library Rights	Allows unauthorized reproduction and/or sharing of copyrighted works (or parts thereof) by libraries, for a variety of purposes.
Disability Access	Allows unauthorized reproduction and/or sharing of copyrighted works (or parts thereof) for the purpose of making works available to people with sight or hearing difficulties.
Transformative Use	Allows the unauthorized transformation of a protected work into a new work with a different purpose and intended audience.
Parody and/or Satire	Allows the unauthorized use of copyrighted work (or parts thereof) in the creation of new works of parody or satire.
Incidental Inclusion	Allows the unauthorized inclusion of a copyrighted work when it is incorporated into a new one. For example, a radio playing in the background when a scene is filmed.
Panorama Right	Allows the unauthorized reproduction of visual works stored in public spaces, such as architecture and public art.

Orphan Works	Allows the unauthorized reproduction and use of works (or parts thereof) for which the rightholder cannot be identified after a reasonable search ("orphan works").
National Government Works	Allows the unauthorized reproduction and use of works created by the national government. This exception may come in the form of limitations to the scope of copyright that prevent copyright protection of such works in the first place.
Exhaustion of Rights	States that once a rightholder has sold or licensed their work, their commercial rights are "exhausted" and cannot be used to prevent further unauthorized reproductions or uses. (Exhaustion can be national, regional or international. Regional or international exhaustion allows parallel imports.)
Safeguards from Secondary/Intermediary Liability	Protects internet service providers/ intermediaries from liability when their customers or users infringe copyrights (i.e. – when someone posts a copyrighted video on social media). Usually contingent upon good faith efforts by the intermediaries to remove infringing content upon request.
Temporary Copies for Technological Processes	Allows temporary copies to be made to allow for the functioning of technological processes (i.e. - caching content).
Protection Against Supremacy of Contracts	Does not allow voluntary contracts between copyright holders (or their agents) and their customers to override the copyright exceptions found in a country's law.

The survey asks if a country's law had an exception for each category in in 1970, and it asks respondents to give the year and a description of legal changes between 1970 and the present. It asks additional questions about the *qualities* of each exception if one existed, which describe how widely each can be used. Respondents were asked to include changes in both legislated and non-legislated law (examples of non-legislated law include court decisions and administrative rulings). The complete survey is attached as Appendix 1.

In order to gauge the level of uncertainty surrounding legal rights of users, respondents answered these questions on a four-point scale running from "Cleary Not Included" to "Clearly Included." Their answers were coded 0 to 3. Ambiguity could exist due to differing interpretations of legal texts, or due to judicial interpretations of laws that predate legislative change.

Table 4. Descriptive statistics by question category

Category	Mean	St. Dev.
General Exception	1.01	1.32
Quotation	2.09	1.18
Education	1.64	1.30
Research	1.53	1.33
Personal or Private Uses	1.80	1.27
Computer Programs	1.43	1.33
Databases or Other Compilations of Non-Original Facts	0.93	1.24
Text- and Datamining	0.46	0.92
Library Rights	1.81	1.33
Disability Access	1.28	1.33
Transformative Use	0.69	1.06
Parody and/or Satire	1.31	1.25
Incidental Inclusion	1.17	1.34
Panorama Right	1.77	1.33
Orphan Works	0.75	1.18
National Government Works	1.38	1.34
Exhaustion of Rights	1.32	1.31
Safeguards from Secondary/Intermediary Liability	0.62	1.14
Temporary Copies for Technological Processes	1.00	1.31
Protection Against Supremacy of Contracts	0.64	0.93

Survey Scores by Question Category

Table 4 shows the average score by category of question. For each category, the survey asks whether an exception is included in the country's law. It then asks a series of follow-on questions

relevant to that particular exception. These vary from one category to the next, but they generally include whether the exception can be applied to unauthorized uses for any type of work, any purpose, any type of user, and whether it can be used for commercial purposes. Some categories also include additional questions relevant only to the category at hand. For instance, the category "Computer Programs" includes a question asking whether the exception can be applied to unauthorized reproduction occurring during reverse engineering. The category for libraries includes the question of whether the exception allows unauthorized reproduction to provide copies for other libraries. Appendix 2 shows all of the survey questions that are included in the totals listed in Table 4.

Certain copyright exceptions are generally stronger than others in the countries' national laws. The mean score for exceptions protecting quotation, education uses, and personal or private uses is above 1.5. These types of exceptions are well-established in international copyright law. The Berne Convention of 1886 explicitly endorses copyright exceptions for quotation and education. Most countries have allowed come sort of personal use exception for a long time (Schwartz, 2014).

On the other hand, the copyright exceptions related to ICT technologies tend to be weaker. The surveyed countries are less likely to have protections for text- and data-mining, databases, transformative uses and safeguards for intermediary liability in their law. When national laws do include these types of laws, the exceptions tend to be more restricted in terms of the type of uses they permit. The average scores for each of these types of copyright exceptions are below 1.0.

Indices

The 20 categories can be used to divide the data into two overlapping thematic subgroups of copyright exceptions based on the type of user activity the exception protects. Below I describe two such subgroups: copyright exceptions for use by ICT firms' activities and those of their consumers, and use for educational purposes.

Table 5: Copyright Exceptions for Two Types of Uses

Exceptions related to Internet Communications Technologies	**Exceptions related to Education**
• General Exception • Quotation • Research • Personal Or Private Uses • Computer Programs • Databases Or Other Compilations Of Non-Original Facts • Text And Data-Mining • Transformative Use • Safeguards From Secondary Liability • Temporary Copies For Technological Processes • Supremacy Of Contracts	• General Exception • Education • Research • Personal or Private Uses • Library Rights • Exhaustion of Rights

Table 5 shows the categories of copyright exceptions relevant to each subgroup. The exceptions related to ICTs include those needed for technological processes, such as the making of temporary copies to perform internet search functions and protection from liability when customers post infringing content. This group also includes important exceptions for *users* of ICTs, such as the quotation right (for people who post clips of articles on social media) and the transformative use right (for people who make mashups online). The exceptions related to

education are those used by teachers and students in order to access and share materials for learning and research purposes. For the purpose of this paper, I drop observations before 1990.[5]

I create two indices using the mean scores by category. For each year,

- *tech* = mean of the category scores for the eleven categories related to Internet Communications Technologies (ICT) in Table 5
- *edu* = mean of the category scores for the six categories related to educational uses in Table 5

Table 6 gives descriptive statistics for each index, and Figure 1 shows the histograms. The data is not skewed, but it is not exactly normal either. The indexes are correlated, with a correlation coefficient of 0.794. The mean value of *Edu* is higher than the mean for *Tech*, indicating that copyright exceptions for education are more open than those meant to protect ICT firms.

Figure 2 graphs the mean index scores for each of the indexes by year, disaggregated by income group. One can see three things upon casual observation. First, the mean value of all three indexes has gradually increased over time, indicating that copyright exceptions have slowly grown stronger. This is true for high- and middle-income countries. Second, the high-income countries in the set have consistently had stronger copyright exceptions than the middle-income countries, supporting the assertions by Okediji (2019) and Deere (2009) that developing countries have not taken full advantage of TRIPS flexibilities for copyright. Third, the gap

[5] Some of the respondents' answers did not describe the state of the law in the earlier years they were asked. Most surveys have responses for all of the questions from approximately 1990 through 2016. In order to use a dataset with data on each index in each country for each year, I would need to drop all observations prior to 2000.

Table 6: Descriptive Statistics for Two Copyright Exceptions Indices

	Tech	***Edu***
Mean	1.13	1.52
St. Dev.	0.60	0.66
Skewness	0.33	-0.26
N	637	637

Figure 1: Histograms of Three Copyright Exception Indices

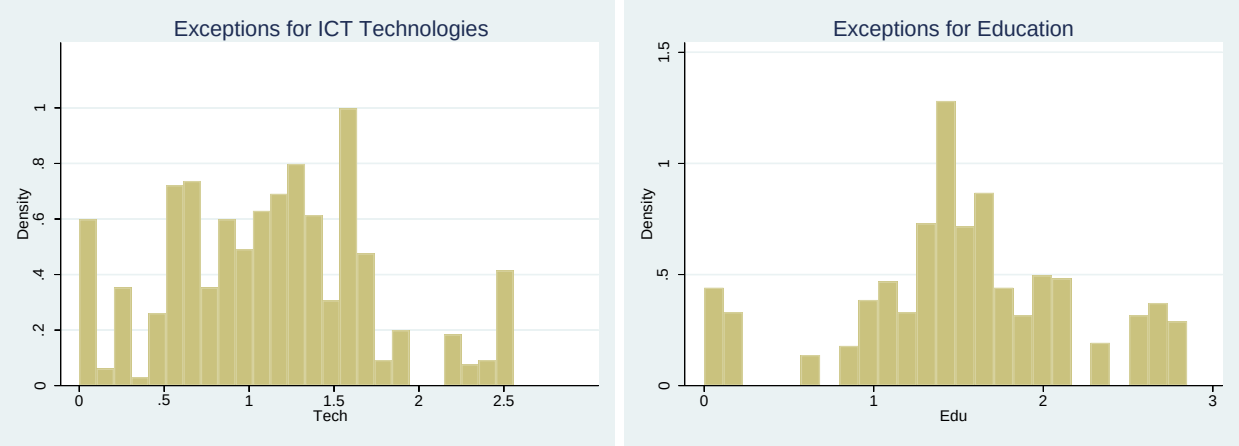
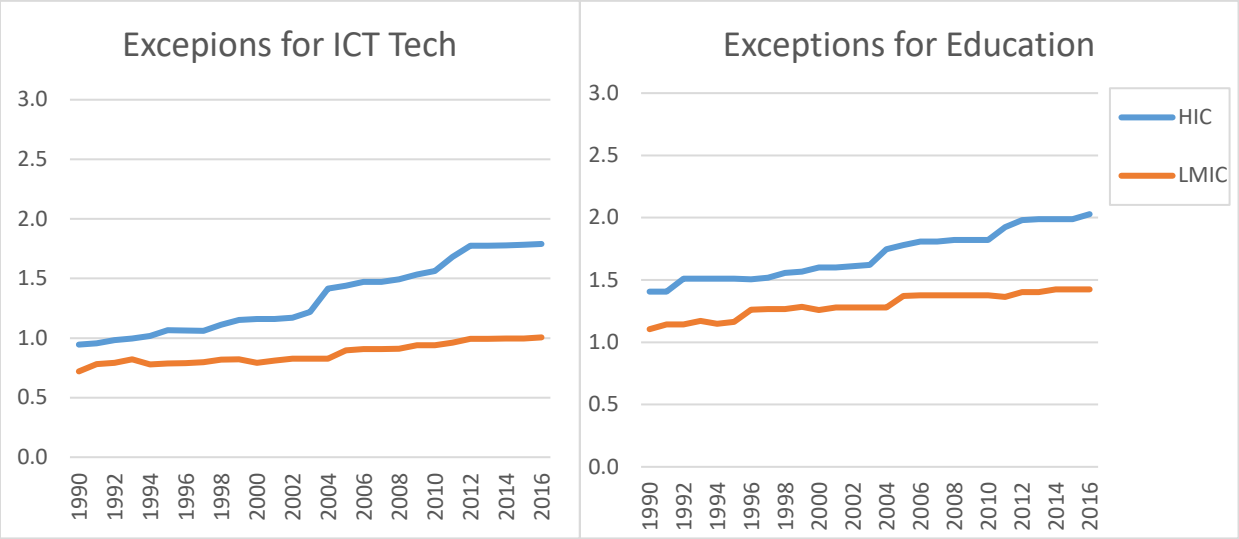


Figure 2: Average Index Scores for High- and Middle Income Countries, by Year



between copyright exceptions in more and less wealthy countries is growing. This is especially the case for exceptions that benefit technology firms.

Testing Covariates

This section reports the results of initial empirical tests on covariates. *Tech* and *Edu* are regressed against sector- and country-specific independent variables in a series of panel regressions with fixed effects each country and year, and with errors clustered by country. It does not seek to establish causality, but to show correlations between the indices, relevant sectors, and macroeconomic indicators.

Regressions on Tech

The regressions on *Tech* draw on the framework of potential costs and benefits presented in the first section. "Computer Services" firms that complement the copyright industries – such as ISPs as web hosts – theoretically benefit from stronger copyright exceptions, so one would expect a positive correlation with *Tech*. Conversely, the copyright industries themselves – print, sound and multimedia publishers that distribute copyrighted works – may face lower sales if more people can access works free, so one would expect a negative correlation with *Tech*.

The regressions test these assumption using data from the EU PREDICT dataset, the most comprehensive set of computer services and copyright industry data over time available.[6] This source contains data from "official sources (such as National Accounts … from Eurostat and OECD)" for all EU countries, as well as 12 other comparator countries. This overlaps with 14 of

[6] EU PREDICT data available at https://ec.europa.eu/jrc/en/predict/ict-sector-analysis-2018/data-metadata

the countries in PIJIP's Copyright User Rights Database: Australia, Brazil, Canada, China, Hong Kong, Finland, India, Japan, Korea, the Netherlands, Portugal, Slovakia, Switzerland, and the United States. The countries from database which are not represented in the PREDICT dataset are the smaller non-European economies (plus Mexico). Annual data is available from 1995 on.

The variables used to test the relationship – *Comp. Services Share* and *Copyright Sector Share* – are the ratio of each of these sectors' value added to that country's GDP in a given year. The values are small, with means of 1.5% and 0.8%, respectively.

Table 7 shows the results of the tests. Column (1) shows that *Comp. Services Share* is positive and Column (2) shows that *Copyright Sector Share* is negative, as expected. The results are significant at the 99% level of confidence. When the two are both included on the right hand side, the significance of Copyright Share drops to the 95% level of confidence.

Country level controls are added in Columns (4) and (5). Their addition causes the significance of *Comp. Services Share* and *Copyright Share* to fall to 95% and 90%, respectively.

Logged constant GDP per capita in U.S. dollars is taken from the World Bank and included as a regressor. The coefficient is positive and significant, confirming the positive relationship suggested by the difference in mean values of *Tech* for high- and middle-income countries shown in Figure 3.

Columns (4) and (5) also include *FTA*, a dummy variable equal to 1 for the years in which a country has a bilateral or regional free trade agreement with the U.S. in force. (Observations from the U.S. are dropped in the regressions reported in these two columns.) When a country enters into a trade agreement with the U.S., it must strengthen intellectual property protection in its law to meet FTA obligations. If the country is under pressure to implement its obligations in a

Table 7: Dependent Variable – *Tech*
Panel Regressions with F.E. for countries and years

	(1)	(2)	(3)	(4)	(5)
Comp. Services Share	0.346***		0.318***	0.212**	0.207**
	(8.518)		(0.075)	(0.086)	(0.078)
Copyright Share		-0.924***	-0.593**	-0.482*	-0.501*
		(0.277)	(0.228)	(0.232)	(0.234)
(Log) GDP per capita				0.304*	0.285*
				(0.163)	(0.143)
FTA				0.527***	0.453***
				(0.113)	(0.113)
Special 301					-0.112**
					(0.048)
Constant	0.918***	2.163***	1.417***	-1.698	-1.426
	((0.131)	(0.213)	(0.229)	(1.521)	(1.330)
N	308	208	308	286	286
Within Entity R^2	0.322	0.101	0.361	0.568	0.585

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

way that favors rightholders, it may be incentivized to weaken copyright exceptions (Deere, 2008). On the other hand, countries often amend their copyright laws in ways that both strengthen copyright protections and enhance exceptions at the same time, as lawmakers try to balance competing interests for the greater good (Guibault, Helberger, Hugenholtz, van Eechoud, & van Gompel, 2009). Therefore, implementation of a trade agreement may lead to stronger copyright exceptions by necessitating amendments to countries' laws. Australia provides an example – it strengthened its copyright exception allowing temporary copies for technological processes when it implemented the US-Australia Free Trade Agreement in 2004 (Burrell & Weatherall, 2008). The coefficient on *FTA* is positive and significant across all specifications in Table 4, supporting the notion that countries will tend to strengthen exceptions when they revisit their copyright laws to comply with trade agreements.

Special 301 measures negative trade pressures on a country, intended to force them to strengthen IPR protections. It is a dummy variable equal to 1 for country-year observations when a country was included in the U.S. Trade Representative's annual Special 301 Report, which lists countries alleged to provide inadequate protection of intellectual property.

Inclusion in the report indicates that a country is facing pressure from the U.S. government to strengthen IPR protections. If the report identifies a country as a "Priority Foreign Country", this designation triggers a Trade Act investigation that, in turn, can lead to sanctions (Congressional Research Service, 2020). A country may also be placed on watch lists, which indicates that the U.S. will further engage with it regarding its alleged intellectual property shortcomings. Countries on the PWL or WL are usually the subject of further diplomatic and trade pressures to change their domestic policies. *Special 301* is included in Column (6), and it is negative and significant, as expected. The U.S. Trade Representative has listed countries in the Report for having copyright exceptions it views as too permissive of unauthorized copying of works – a recent example is the 2020 Special 301 Report's criticism of South African copyright legislation (U.S. Trade Representative, 2020) – so inclusion in the report can be an incentive for a country to weaken copyright exceptions.

The most complete specification, shown in Column (6) shows a number of significant associations with covariates. The coefficients on *Comp. Services Share* and *Copyright Share* are significant and have the expected signs. A one-percentage point increase in the computer service industries' share of value added in a country's GDP is associated with a 0.20 increase in *Tech*. A one-percentage point increase in the copyright industries' share of GDP is associated with a 0.50 decrease in *Tech.* The controls for logged GDP per capita and the presence of an FTA are positively associated, and the placement of a country on the Special 301 list are negatively

associated, with *Tech.* The within-entity adjusted R^2 indicates that the overall model explains about 56% of *Tech*'s variation.

Regressions on Edu

I turn now to the tests of *Edu* and its covariates, reported in Table 8. Stronger copyright exceptions for educational uses benefit students (as well as teachers and educational establishments) by opening up the availability of articles and books for learning – so I expect that societies which place a higher emphasis on education to have stronger educational exceptions. I use data on the average years of schooling attained by individuals in a given year/country, taken from the Barro-Lee Educational Attainment dataset (Barro & Lee, 2013) as an indicator of social emphasis on education. This is included in the tests below as the variable *Ave. Years of Schooling.* Column (1) shows a significant positive coefficient on *Ave. Years of Schooling* when it is the sole right hand variable.

Copyright Share again measures the share of copyright industries' value added to a nation's GDP in a given year. As before, it is expected to be negative, as economies with larger copyright sectors may have weaker copyright exceptions. *Copyright Share* is positively correlated with *Ave. Years of Schooling* (correlation coefficient = 0.65) and its coefficient becomes insignificant in regressions with both variables included, so the test reported in Table 5 include these explanatory variables in separate regressions. Column (2) shows a negative coefficient on *Copyright Share* when it is the sole regressor.

Columns (3) through (6) show specifications with additional controls. The coefficients on *Ave. Years of Schooling* and *Copyright Share* remain significant at the 95% level of confidence throughout. Columns (3) and (4) add *(Log) GDP per capita*, which enters insignificantly when alongside *Ave. Years of Schooling*, and is significant at the 90% level alongside *Copyright Share*.

Table 8: Dependent Variable: *Edu*
Panel Regressions with F.E. for countries and years

	(1)	(2)	(3)	(4)	(5)	(6)
Ave. Years of Schooling	0.123***		0.109**		0.097**	
	(0.0329)		(0.0454)		(0.040)	
Copyright Share		-0.602***		-0.554**		-0.493**
		(0.198)		(0.190)		(0.199)
(Log) GDP per capita			0.0689	0.288*	-0.002	0.241
			(0.138)	(0.153)	(0.090)	(0.145)
FTA					0.252***	0.286***
					(0.058)	(0.058)
Constant	0.366	2.219***	-0.163	-0.684	0.499	-0.398
	(0.321)	(0.153)	(1.075)	(1.588)	(0.678)	(1.485)
N	377	308	377	308	356	286
Within Entity R^2	0.297	0.127	0.299	0.313	0.422	0.427

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Columns (5) and (6) add the dummy variable *FTA*, and drop observations from the U.S. The coefficients on *FTA* is significant at the 99% confidence level in both specifications. Columns (3-6) suggest that educational exceptions, which include legal provisions less commercial in nature, are unassociated or weakly associated with macroeconomic growth, but may be strengthened when copyright laws are revisited through FTA implementation processes.

I conclude this subsection with a closer look at the final specifications, those in Columns (5) and (6). The coefficient on *Ave. Years of Schooling* remains significant at the 95% level when the controls are added. The specification in Column (5) predicts that one additional year of schooling for the average citizen is associated with a 0.10 unit increase in *Edu.* The coefficient on Copyright Share remains significant at the 95% level with the inclusion of controls in Column (6). It predicts that a one-percentage point increase in the share of GDP produced by the

copyright industries is associated with a 0.49 unit decline in *Edu*. In columns (5) and (6), there is no significant relationship between *(Log) GDP per capita* and *Edu,* while *FTA* is positive at the 99% level. The overall fit for the regressions on *Edu* is not as strong as the fit for the regressions on *Tech*. The within-entity adjusted R^2 is below 0.42 in column (5) and 0.43 in column (6), suggesting the possibility of omitted variable bias.

Robustness Tests

Tech and *Edu* are the unweighted averages of the category means for the categories that build each index. In order to test the robustness of these metrics, I randomly adjust the weights of each category, yielding new variables with similar descriptive statistics to the originals. I then use the randomly weighted versions of *Tech* and *Edu* in the final specifications of the regressions on covariates reported above.

Four randomly weighted (*"RW"*) variables are created for both *Tech* and *Edu* using weights generated from values drawn from a uniform distribution within 0.01, 0.02, 0.3 and 0.4 standard deviations of each of the category scores' mean weight in the original variables. (The last weight for each is equal to 1 minus the sum of the other weights.) Table 9 shows the randomly weighted variables' descriptive statistics. All of the randomly weighted versions of both variables have a similar mean and standard deviation to the original version. None of the randomly weighted variables are significantly skewed.

Table 9: Descriptive Statistics for Randomly Weighted *Tech* and *Edu* Variables

Variable	Mean	Standard Deviation	Skewness
Tech	1.13	0.66	-0.26
Tech_RW1	1.11	0.60	0.36
Tech_RW2	1.09	0.61	0.43
Tech_RW3	1.05	060	0.38
Tech_RW4	1.04	0.61	0.36
Edu	1.52	0.65	-0.25
Edu_RW1	1.53	0.66	-0.28
Edu_RW2	1.54	0.66	-0.32
Edu_RW3	1.54	0.66	-032
Edu_RW4	1.64	0.66	-0.35

I test the randomly weighted versions of *Tech*, using the final specification from the previous section. Table 10 presents the results, with Column (1) showing regression results using the original, unweighted *Tech*, and columns (2) through (5) showing the randomly weighted versions. The coefficients on all variables keep the expected algebraic signs. The coefficients on *Computer Services Share* are significant at the 95% level in each of the tests, while the coefficients on *Copyright Share* remain significant at the 90% level or higher. All coefficients on the control variables remain significant as well. The adjusted R^2 falls slightly when the random weights are applied.

Next, I regress the randomly weighted versions of *Edu*, again using the final specification from the previous section. Tables 11.1 and 11.2 report the results, with the first column showing results from regressions on the unweighted *Edu* and columns (2) through (5) showing the randomly weighted variables. The coefficients on *Ave. Years of Schooling* remain positive and

Table 10: Dependent Variables – *Tech*, both Unweighted and Randomly Weighted Panel Regressions with F.E. for countries and years

	(1) *Tech*	(2) *Tech_RW1*	(3) *Tech_RW2*	(4) *Tech_RW3*	(5) *Tech_RW4*
Comp. Services Share	0.207**	0.221**	0.233**	0.249**	0.271**
	(0.078)	(0.082)	(0.084)	(0.093)	(0.100)
Copyright Share	-0.501*	-0.537**	-0.585**	-0.538*	-0.574*
	(0.234)	(0.241)	(0.253)	(0.259)	(0.276)
(Log) GDP per capita	0.285*	0.302*	0.332*	0.299*	0.306*
	(0.143)	(0.151)	(0.159)	(0.159)	(0.169)
FTA	0.453***	0.457***	0.465***	0.455***	0.467***
	(0.113)	(0.115)	(0.127)	(0.107)	(0.105)
Special 301	-0.112**	-0.117**	-0.126**	-0.126**	-0.129**
	(0.048)	(0.050)	(0.054)	(0.053)	(0.056)
Constant	-1.426	-1.599	-1.796	-1.636	-1.711
	(1.330)	(1.406)	(1.488)	(1.480)	(1.573)
N	286	286	286	286	286
Within Entity R^2	0.585	0.584	0.587	0.548	0.535

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11.1: Dependent Variables – *Edu*, both Unweighted and Randomly Weighted Panel Regressions with F.E. for countries and years

	(1) *Edu*	(2) *Edu_RW1*	(3) *Edu_RW2*	(4) *Edu_RW3*	(5) *Edu_RW4*
Ave. Years of Schooling	0.099**	0.091**	0.097**	0.092**	0.109**
	(0.040)	(0.037)	(0.039)	(0.037)	(0.044)
(Log) GDP per capita	-0.002	0.015	0.006	0.015	-0.009
	(0.090)	(0.089)	(0.091)	(0.090)	(0.100)
FTA	0.252***	0.229***	0.248***	0.232***	0.282***
	(0.058)	(0.055)	(0.058)	(0.056)	(0.0643)
Constant	0.499	0.459	0.491	0.463	0.524
	(0.678)	(0.692)	(0.691)	(0.698)	(0.691)
N	356	356	356	356	356
Within Entity R^2	0.422	0.403	0.419	0.407	0.438

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11.2: Dependent Variables – *Edu*, both Unweighted and Randomly Weighted Panel Regressions with F.E. for countries and years

	(1) *Edu*	(2) *Edu_RW1*	(3) *Edu_RW2*	(4) *Edu_RW3*	(5) *Edu_RW4*
Copyright Share	-0.493**	-0.508**	-0.530**	-0.534**	-0.553**
	(0.199)	(0.199)	(0.198)	(0.198)	(0.199)
(Log) GDP per capita	0.241	0.234	0.250	0.243	0.272
	(0.145)	(0.140)	(0.147)	(0.145)	(0.157)
FTA	0.286***	0.289***	0.274***	0.287***	0.263***
	(0.058)	(0.052)	(0.043)	(0.045)	(0.040)
Constant	-0.398	-0.309	-0.444	-0.372	-0.640
	(1.485)	(1.430)	(1.502)	(1.481)	(1.615)
N	286	286	286	286	286
Within Entity R^2	0.427	0.434	0.428	0.438	0.423

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

significant at the 95% level across specifications in Table 11.1 and the coefficients on *Copyright Share* are negative and significant at the 95% level across specifications in Table 11.2. The coefficient on *FTA* remains positive and significant, and the coefficient on *(Log) GDP per capita* is insignificant across the board. The adjusted R^2s for the tests of randomly weighted *Edu* variables are similar to the adjusted R^2s for the unweighted ones. Overall, the same relationships found in the regressions on the unweighted *Edu* variable tend to hold when its elements are randomly weighted.

Conclusion

This working paper has presented a novel dataset designed to measure changes in 24 nations' laws on copyright exceptions over time. The dataset is unique among sources of information on copyright exceptions because others are static. It is my hope that researchers can use the dataset to add to the relatively small body of empirical research in this area.

The data shows that the sample countries' copyright exceptions have grown stronger over time, that the high-income countries have consistently had stronger copyright exceptions on average than middle-income ones, and that the gap between the two subgroups has grown. Empirical test show that changes to copyright exceptions useful to ICT firms are stronger in countries with larger ICT sectors, and copyright exceptions useful for education are stronger in countries with higher educational attainments. Both types of exceptions are weaker in countries where the copyright industries contribute a higher share of GDP. Both tend to be stronger in countries that have signed free trade agreements with the U.S., and then had to amend their laws to comply with the treaty obligations. Copyright exceptions relevant to ICT firms also tend to be stronger in countries with higher GDP per capita, and tend to be lower in countries that have faced bilateral trade pressures from the U.S. through the Special 301 process.

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