Power and Innovative Capacity: Explaining Variation in Intellectual Property Rights Regulation across Trade Agreements

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Abstract

The extent to which intellectual property rights (IPRs) are regulated varies strongly across preferential trade agreements (PTAs). What explains this variation? We argue that deep IPRs are mainly found in PTAs characterized by large differences in power and innovative capacity across member states. Computational text analysis on the IPR sections included in 467 PTAs signed between 1994 and 2020 allows us to test our expectation. The results show that, indeed, power asymmetries combined with asymmetries in innovative capacity drive deep IPR provisions. Our account adjusts the conventional wisdom that sees the developed North forcing IPRs on the developing South in a subtle but important way. In fact, we find that the internationalization of IPR regulation is not just driven by countries that form part of the traditional Global North.

Keywords: intellectual property rights (IPRs); preferential trade agreements (PTAs); design of international institutions; trade negotiations; bargaining power

1 Introduction

Intellectual property rights (IPRs) are a controversial topic in trade negotiations. The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), which is part of the World Trade Organization (WTO), obliges most states across the globe to protect intellectual property. At the same time, many states include provisions regulating IPRs in their preferential trade agreements (PTAs). These provisions can require PTA member states to sign up to international conventions on IPRs, lengthen protection periods, impose protection for geographical indications, or ensure enforcement of IPRs. How PTAs address the protection of IPRs, however, varies dramatically. Some agreements do not even touch upon IPRs, or only include a brief general statement encouraging the protection of IPRs. Others, such as the Transpacific Partnership (TPP) or the Central America-South Korea free trade agreement include long and detailed chapters. These observations beg the following questions: what explains this variation in IPR coverage across trade agreements? Who are the actors that try to advance IPR regulation via PTAs, who are the opponents, and whose preferences prevail?

We argue that innovative economies press for the inclusion of comprehensive IPR regulation in PTAs, in order to secure economic rents for their innovative producers. We expect that this is particularly the case when the other country is less capable of producing intellectual property (IP) itself. In less innovative countries, on the contrary, IPR-favoring pressures are largely absent. In the absence of demand for deep IPRs, these less innovative countries will try to resist the inclusion of (far-reaching) provisions on IPRs in their trade agreements. Which preferences towards IPRs prevail, and ultimately find their way into the legal texts of trade agreements, therefore, is the result of trade negotiations where bargaining power is key. As a result, we should see the deepest IPR provisions in trade agreements bringing together major trading powers with high innovative capacity and smaller, less innovative countries. PTAs between economies of the same size or the same level of innovativeness, by contrast, should only feature shallow IPR provisions.

In presenting and empirically testing this argument, we make several contributions to the literature on the internationalization of IPR regulation. First, whereas the conventional wisdom sees Northern countries imposing strict IPR protection on Southern countries (Wade 2003, p. 624; Weintraub 2004, p. 91; Chen & Puttitanun 2005, p. 475; Shadlen 2005, p. 763; Drezner 2007, p. 33), we build our argument on the distinction between more and less innovative countries. This is a subtle but important difference, as in the twenty-first century, innovative countries may or may not form part of the traditional Global North. Illustratively, Iran now is a major producer of intellectual property, but would generally not be seen as a Northern country. In fact, in robustness checks we show that our argument has more explanatory power than the conventional North-South argument.

Second, whereas earlier research generally has relied on case studies, we test our expectation on a comprehensive dataset that covers all PTAs signed between 1994 and 2020. The dataset thus includes a broad sample of countries from all world regions and at very different stages of development. To single out influential factors for the inclusion of IPRs in a PTA on the one hand, and the depth of these provisions on the other, we rely on a Heckman sample selection model. The studies that come closest to our quantitative approach are the ones by Morin & Surbeck (2020) and Mödlhamer (2020). However, the former study presents a novel dataset and does not systematically test a specific argument, whereas the latter only concentrates on innovative capacity as an explanatory variable. Finally, we rely on unsupervised computational text analysis to capture the depth of IPR provisions in PTAs. Concretely, we conduct latent semantic analysis (LSA) on the IPR sections included in PTAs. Comparing our depth measures with those derived from manual coding exercises shows that LSA can provide a reliable and valid measure of IPR depth. This insight has the potential to facilitate future studies of regulation at the international level.

The results from our analysis confirm the expectation that the combination of power asymmetries and differences in innovative capacity explain variation in IPR depth in PTAs. PTAs involving powerful economies with high innovative capacity and weaker, less innovative economies indeed contain more comprehensive IPR provisions than other PTAs. This finding shows that domestic preferences towards IPRs can be explained by an economy's innovative capacity but also that power matters to push through these preferences in trade negotiations. We also find that especially large emerging countries (Brazil, Russia, India, and China) rather tend to abstain from addressing IPRs or prefer to advance shallow IPRs in their trade agreements. These countries both (still) lack an incentive to protect IPRs internationally and have the power to resist demands for the inclusion of IPRs in PTAs.

These findings speak to several broad debates with real-world relevance. Ever since the early 1990s when IPRs were internationalized, they have remained a highly contested issue in trade negotiations (Grossman & Lai 2004, p. 1635), as global trade in intellectual assets has steadily risen. This issue not only affects the length (Lechner & Wüthrich 2018, p. 875) and the success of trade negotiations (Serrano & Burri 2019, p. 289), but also support for PTAs themselves (Osgood & Feng 2018, p. 16; Spilker et al. 2018b, p. 512). IPRs also have the potential to become politicized among the broader public, as protests against the Anti-Counterfeiting Trade Agreement (ACTA) (Dür & Mateo 2014) and ongoing debates about the nexus between IPRs and prices and accessibility of medicines (Chorev & Shadlen 2015, p. 144) and agricultural products (Campi & Nuvolari 2021, p. 651f) have impressively shown. What is more, IPRs have broader real- world implications, as they can be detrimental for innovation (Crampes & Langinier 2009) and growth, especially for less developed countries (Helpman 1993). Understanding the lines of conflict that shape negotiations over IPRs, and the motivation of some countries to push for IPRs in trade agreements, therefore, is important for scholars, decision-makers, and the public alike.

2 Power, Innovative Capacity, and IPR Protection

In general, IPRs provide a legal framework that gives persons rights with respect to creations of their minds. This allows owners and producers of IP to generate revenue from their creations. Principal means to secure this are patents, trademarks, and copyrights (Rapp & Rozek 1990, p. 75). IPRs aim at protecting producers of IP by securing economic rents to recoup a priori sunk costs from innovative activities such as research and development (R&D), by excluding non-owners, and by barring free-riding in innovating (e.g. via piracy or counterfeiting). Simultaneously, IPRs aim at encouraging future innovations by creating material incentives and legal certainty (Shadlen et al. 2005, p. 49; Blank & Kappos 2012, p. 1).

Up until the end of the 1980s, IPR regulation was primarily considered a national domain. From then on, however, especially US-firms in the pharmaceutical, chemicals, computer, and entertainment industries began to lobby their government for increased IPR protection at the international level (Maskus 2002, p. 137; Chorev & Shadlen 2015, p. 144; Liu & La Croix 2015, p. 206). These efforts, with the United States as the driving force among other Western economies, culminated in the signature of TRIPS in 1994 following the WTO's Uruguay Round. TRIPS established a multilateral standard in international IP protection, which is binding for all WTO member states (Drahos 2001, p. 793; Maskus 2002, p. 137). For developing countries, TRIPS offers considerable flexibility by granting exemptions, as well as different implementation and transition periods (Shadlen 2008b, p. 56; Ridley 2018, p. 6).

However, few countries were satisfied with TRIPS and its implications. For some, TRIPS was too weak, granted too much leeway, and was too easily circumventable. These countries demanded stricter international IP protection in order to secure returns for their (innovative) firms, which overall was said to be beneficial to technological progress and economic development (Shadlen 2007, p. 172). For others, TRIPS mainly produced negative consequences such as increased prices in research-intensive goods, a greater concentration of wealth, curbs on technological progress, and overall lower economic development (McCalman 2001, p. 162; Glass & Wu 2007, p. 393). These countries complained that IPRs primarily strengthened the monopoly powers of multinational companies to the detriment of learning and technological spillovers.

With no new multilateral agreement possible after the end of the Uruguay Round, the struggle over the international protection of IPRs shifted towards PTAs (De Bièvre et al. 2014, p. 284). In fact, IPRs have been included in the majority of recent PTAs, with about 70 percent of PTAs signed after 2000 addressing this issue. Especially the United States often includes rigorous provisions on IPRs in their trade agreements that go beyond TRIPS. Other major economic players, among them the European Union, the EFTA countries, and Japan also tend to be comprehensive with IPRs in their PTAs (Fink 2011, p. 390; Morin 2009, p. 175; Ridley 2018, p. 6).

In the following, we put forward an explanation for variation in the strength of IPR protection in PTAs. This explanation draws on the distributional consequences of IPRs, namely the fact that IPRs create winners and losers. This leads to diverging preferences within and between economies regarding best-fitting IPRs (Osgood & Feng 2018, p. 27; Spilker et al. 2018a, p. 195). Bargaining power then explains which of these diverging preferences are reflected in PTAs.

2.1 Domestic Preferences towards the Internationalization of IPRs

IPRs in a PTA do not affect countries, industries, and firms equally. Thus, different preferences prevail within and between countries and industries. Firms that employ high-skilled personnel, spend considerable resources on R&D, and rely on the generation and exploitation of IP, prefer the strengthening of IPRs. These firms are mainly found in industries such as pharmaceuticals, chemicals, electronics, software, machinery, creative works and media; so-called knowledge-intensive or innovative industries (Ridley 2018, p. 2). Especially multinational corporations that engage and produce in multiple markets should be the largest beneficiaries of the international protection of IP. These firms may face losses by imitation through reverse-engineering, piracy, industrial espionage and theft, or by knowledge-spillovers due to workers' mobility in markets where they produce and sell their innovative goods, unless IP is sufficiently protected (Glass & Saggi 2002, p. 392; Rodrik 2018, p. 76). They thus favor comprehensive IPR provisions in a PTA that increase the costs of imitation, and hence lower risks of revenue losses for firms (Jain 1996, p. 11; Branstetter et al. 2011, p. 28). In fact, the initial push for IPRs in PTAs mainly came from IP-producing US-firms (Sell 2010, p. 450; Rodrik 2018, p. 84f).

At the same time, less innovative firms can be expected to oppose the (international) protection of IPRs. They benefit from the broad diffusion of IP as this allows them to imitate the inventions of more innovative firms. The more rigid IP protection is, the less they will be able to compete with more innovative companies. More innovative products will have more success on the market, increasing the profits of innovative companies, and thus allowing them to spend even more on R&D. With strict IPRs, therefore, the gap between more and less innovative companies tends to grow over time. Also, potentially innovative firms likely oppose IPRs until they can catch up, at which stage they can be expected to become supporters of intellectual property protection.

Both more and less innovative firms will lobby their governments to see their preferences reflected in the country's trade policies. They can offer financial, campaigning and electoral support to politicians in exchange for support for their positions. Moreover, they may use information and expertise to sway decision-makers. Which side wins should largely depend on the relative strength of the two sides: the more highly innovative firms and industries exist in a country, the more that country should favor the internationalization of IPRs. By contrast, the fewer innovative firms and industries exist in a country, the more that country should strive to avoid the internationalization of IPRs or at least should only want to make shallow commitments.

How strong demand for IPR provisions in PTAs is, however, should not so much depend on a country's absolute level of innovative capacity, but its innovativeness relative to the partner country (countries). Support for strong IPR provisions in PTAs should be highest in countries with a high capacity for innovation when they negotiate with one or several less innovative economies. It is in these cases that innovative firms are most in need of and can gain most from IPR protection. When an innovative economy negotiates with another innovative economy, demand for strong IPR provisions is likely to be lower (with the exception of geographical indications, which have proven to be contentious even in negotiations between countries with high innovative capacity). This is so because innovative countries anyhow have an incentive to protect IPRs above and beyond what would be included in a PTA or other international agreements. Moreover, innovative firms have less incentive to violate intellectual property rights, as they themselves can create intellectual property. In this constellation, therefore, on both sides there is a lower need and thus a lower demand for strong IPR provisions in PTAs. Finally, the governments of less innovative economies should oppose strict IPR provisions in PTAs independent of the country they negotiate with.

In focusing on the role of firms and industries in shaping countries' preferences with respect to the international regulation of IPRs, we have abstracted from the role of consumers and civil society groups. Consumers may benefit from weaker IPR protection via lower prices, but collective action problems largely impede their mobilization with respect to trade agreements. By contrast, civil society groups often actively oppose the internationalization of IPRs and their lobbying has been successful in some cases (Dür & Mateo 2014, p. 1211). Nevertheless, in line with the existing literature, we focus on the set of economic actors most directly affected by IPRs because they are likely to have the highest stakes in these negotiations and also tend to possess the resources necessary to influence policy outcomes. Focusing on the interests of firms thus allows us to capture the essence of the domestic battle over IPRs.

2.2 Power and IPR Regulation in PTAs

In PTA negotiations, governments try to design treaties that align with the preferences of important domestic constituencies with the aim of staying in power (Brown & Urpelainen 2015). If the negotiations encompass two or more countries with different preferences concerning IPR protection, which side manages to see its preferences reflected should depend on bargaining power (Drezner 2007). The key factor giving power to a country in trade negotiations is market size. This is because smaller countries can become asymmetrically dependent on access to the markets of larger countries (Hirschman 1945; Shadlen 2008a, p. 3f). According to Steinberg (2002, p. 347), "in trade negotiations, relative market size offers the best first approximation of bargaining power". Essentially, small economies face a choice between joining a PTA designed by larger economies and thus accepting its provisions, or not gaining access to that larger market beyond what is on offer to other countries, for example via the WTO's most-favored nation principle.

The incentive to join a PTA is particularly large because countries excluded from a PTA signed by competitors face trade diversion. For example, after Mexico signed a PTA with the United States (NAFTA), Chile also needed to sign an agreement with the United States or accept that its exports are no longer competitive in that market. The more countries sign agreements, the greater the pressure on the remaining countries becomes to sign their own agreements or to join existing agreements (Baldwin 1997; Dür 2010). These former non-PTA member countries then have to accept advanced IPRs in PTAs as a second order concession for securing institutionalized improved market access upon joining the agreement.

As a result, we expect major trading powers that favor deep IPRs following domestic pressures by IP-producers to successfully impose comprehensive IPRs on smaller, less innovative economies. The former not only have an interest in tighter IPR regulation, but also have the clout to impose such protection on their less powerful and less innovative trading partners. By contrast, PTAs bringing together countries at the same level of innovative capacity or countries with similar market size should feature only shallow IPR provisions. Clearly, in some cases, issue linkages or package deals may mean that a country can achieve more in one issue area of high interest than one would expect based on its bargaining power, making it more difficult to detect the role of power. We have no reason to believe, however, that issue linkages or package deals should systematically affect IPR provisions in a way to offset the effect of bargaining power on negotiation outcomes. In the form of a hypothesis, we thus expect:

H: *PTAs involving economies with higher differences in innovative capacity tend to contain more comprehensive IPRs, if the more innovative country also possesses more bargaining power.*

Consider the following illustrative cases of the TPP (2016) and its revised 2018 version, the Comprehensive and Progressive Agreement for Transpacific Partnership (CPTPP). In the course of the TPP negotiations, US-firms in patent-, trademark-, and copyright-intensive sectors, such as the pharmaceutical, chemicals, information technology, auto, and entertainment industries lobbied extensively for comprehensive IPRs (Rodrik 2018, p. 86). That this lobbying was not only heard, but found its way into the political decisions-making arena, is exemplified by the fact that business interest groups outnumbered government officials in TPP trade advisory committees (Neuwelt et al. 2016, p. 160; Rodrik 2018, p. 87). At the same time, civil interest groups were largely excluded from this process (Gleeson et al. 2018, p. 9). The United States, as the by far largest and most innovative economy among the prospective members, then pressed for the inclusion of deep IPRs. Due to its superior market size and the asymmetric dependence of other less powerful and less innovative negotiating parties on improved access to the United States' market, the United States was able to impose its preferred IPR policies on the other economies. TPP hence advanced TRIPS in several aspects such as secondary patents and patent linkages, extension of patent terms, and undisclosed test data exclusivity among others (Gleeson et al. 2018, p. 9). That the United States was successful in advancing its agenda is also highlighted by the fact that the contents of the TPP, among them also its IPR provisions, are to a large degree copy-pasted from previous United States PTAs (Allee & Lugg 2016, p. 6f).

With the United States dropping out of the TPP agreement, the remaining signatories quickly revised contentious provisions (Morin & Surbeck 2020, p. 114). In particular, certain IPR provisions that the United States had insisted on were toned down by the remaining signatories (Rodrik 2018, p. 86). According to our argument, this can be explained by decreased power asymmetries and differences in innovative capacities. After withdrawal of the United States, asymmetries in power and innovative capacities decreased, leading to a more levelled negotiation setting. However, as the agreement still includes powerful innovative economies such as Japan, which supported United States' proposals for IPRs (Gleeson et al. 2018, p. 9), we still see rather comprehensive IPRs compared to other PTAs that only involve less innovative countries or are characterized by less power asymmetry. In the following, we provide a systematic test of this relationship.

3 Research Design

In order to test our argument, we analyze 467 PTAs signed between 1994 and 2020 that are included in the Design of Trade Agreements (DESTA) project's database (Dür et al. 2014) and for which full-texts are publicly available. We start our analysis in 1994, the year when the WTO TRIPS agreement was signed, and thus IPRs found their way into trade agreements. The PTAs in our sample are distinguishable in twenty nine North-North (where the EU and OECD members count as Northern), 207 North-South, and 231 South-South agreements. The sample includes 304 bilateral, forty five plurilateral, 104 region with a third country, and fourteen region-to-region PTAs. Geographically, our sample is diverse, with 198 countries as signatories to 187 intercontinental, ninety nine European, ninety two American, seventy two Asian, sixteen African, and one Oceanian PTAs. Table A1 in the online appendix shows a list of the PTAs included in our analysis and whether a PTA contains an IPR section. Table A2 reports all PTA member states together with the number of their overall agreement memberships.

3.1 Measuring the Depth of IPR Commitments

We use computational text analysis to come up with a measure of the depth of IPR provisions in these PTAs. Doing so has the advantage that it provides us with values for a larger number of agreements than manually coded by DESTA or alternative projects. A computational approach is less costly than manual coding and can be easily scaled. Moreover, computational text analysis is highly reliable. Whereas manual coding of text leaves room for interpretation, which may lead to inter-coder discrepancies, treating text as data and employing computational approaches for feature extraction leads to consistent data that can be used in statistical analyses (Benoit 2020, p. 464). Finally, the computational approach has the potential to capture more fine-grained differences in the depth of IPR provisions across PTAs than a manual approach that necessarily focuses on the coding of a few major provisions.

For this approach, we first manually checked which agreements include IPR provisions. In our sample of agreements, we found 308 agreements that cover IPRs (sixty six percent). We translated texts available in a language other than English using Google Translate, a widely used and reliable method (Lucas et al. 2015; De Vries et al. 2018), and then extracted the sections specifically devoted to IPRs.[1] For these IPR text parts, we employed latent semantic analysis (LSA) to arrive at a measure of IPR depth.[2] LSA is an unsupervised algorithm to statistically assess the relationships among words and documents. LSA follows a "bag of words"-approach and operates along four steps: first, a document-feature matrix (DFM) is created with PTAs as rows and each individual word in columns; second, the DFM is transformed to account for the overall occurrences of a word; third, a dimension reduction on the DFM removes infrequent and highly common terms; and fourth, document-document, word-word, and word-document similarities are calculated. With these steps, LSA models the relationships between documents based on their constituent words, and the relationships among words based on their occurrences in documents (Deerwester et al.

1990; Dumais 2005).

For our LSA estimations, we relied on R's "quanteda" package (Benoit et al. 2018). In implementing LSA, we first transformed the IPR texts to lower-case, and then removed tab-stops, line-breaks, punctuations, symbols, numbers, and a few stop-words (such as "and" or "a"). On this basis, we created a DFM with 308 rows covering all PTAs that contain IPR sections, and 7,022 columns, i.e. the unique words that occur in PTAs' IPR sections. Words occurring in less than two PTAs, overall fewer than three times, and more than 1,000 times or in more than 250 agreements were excluded. Doing so prevents our results from being biased by infrequent terms, spelling mistakes, and other minor errors. Overall, however, these steps do not have a substantive impact on our findings. Finally, we implemented the LSA approach after weighting the word counts in the DFM using logcounts. The value that we use is the estimated location on the first dimension of the singular value decomposition. The assumption underlying this approach is that depth is the key aspect that distinguishes one text from another. For the following analysis, we rescaled our LSA values so that our response variable IPR depth ranges from zero, meaning very shallow IPR provisions, to one hundred, meaning very deep IPRs, which facilitates the interpretation of our results. According to this measure, the TPP from 2016 includes the deepest IPR provisions; and the Jordan-Singapore agreement from 2004 the shallowest.

As discussed before, IPRs encompass patents, trademarks, and copyrights. It is possible that the politics of IPRs differ across these three areas. For example, power asymmetry may be more relevant for patents than copyrights. To assess whether our argument applies to all three types of IPRs, we calculated separate measures of the strength of patent, trademark, and copyright measures contained in PTAs. We did so by extracting text segments related to these types of IPR. Concretely, we extracted the five words preceding and following (variations of) the term "patent" (and the same for "trademark" and "copyright") and then applied the LSA estimation as described above to these text segments. This results in measures of *IPR depth (Pat.)*, *IPR depth (Marks)*, and *IPR depth (Copy.)*. The three measures are highly correlated with each other (Pearson's r ranges between 0.86 and 0.94) and with *IPR depth* (r between 0.87 and 0.95).

We cross-checked the results from the LSA analysis using data from the DESTA project (Dür et al. 2014). Specifically, the DESTA project manually coded the presence or absence of thirteen provisions relevant for IPR protection in PTAs. To see whether the results from our text analysis make intuitive sense, we calculated a simple additive index of these DESTA provisions. We then checked the correlation between our LSA values and the manual coding index in DESTA for the agreements contained in both datasets. This correlation amounts to no less than 0.82 for the 261 agreements for which we have both measures, which means that the two variables capture the same underlying dimension. Furthermore, we also correlated our computational measure of IPR depth with the manually coded TRIPS-plus measure provided by Morin & Surbeck (2020). Again, the correlation is very high with r=0.93. Finally, we compared our measure with a semi-computational, dictionary-based IPR measure (Mödlhamer 2020). Once more, with r=0.90, this comparison shows a very high correlation. Overall, these three cross-checks indicate that our computational measure fares extremely well when compared to other approaches. Our results also make intuitive sense and mirror qualitative evidence reported in the existing literature (e.g. Sell & Prakash 2004). In robustness checks, we re-run our analysis with the DESTA (*DESTA IPR*) and Morin & Surbeck's (2020) IPR measures (*TRIPS+*).

3.2 Predictors and Control Variables

Our hypothesis refers to two explanatory variables: the innovative capacity of countries and power asymmetry. To operationalize a country's innovative capacity, we rely on per capita registered (with a national patent office or via the procedure foreseen in the Patent Cooperation Treaty) worldwide patents by residents from the World Bank's (2019) World Development Indicators. This operationalization makes sense for several reasons. For one, patenting is the most important form of IP protection (Park 2011, p. 277) that is also widely included in most recent PTAs (Seuba 2013, p. 248). Moreover, as firms are the ones that file and own most patents (Perelman 2003, p. 43; Ridley 2018, p. 13), it is a reasonable measure to assess the innovative capacity of firms in a country. Firms also own many trademarks and copyrights, so it is plausible that at least at the country-level, the number of patents, trademarks, and copyrights are correlated. By accounting for a country's population, registered patents by residents per capita thus should be a good proxy for a country's inventive performance.

We aggregate this data to the PTA level by taking the difference between the member state with the largest and the member state with the lowest number of registered patents per capita (*Patents, diff.*). In robustness checks, we also rely on the mean difference across member states instead of the maximum difference, which is relevant for plurilateral agreements. Here and below, when calculating our explanatory and control variables, member states of regional trading entities such as the EU, EFTA, MERCOSUR and CARICOM are summarized and treated as unitary actors. We also lag all economic and political variables by one year to account for timing effects. Also for this and all other variables, we fill missing values due to gaps in data coverage with values available for the nearest previous year. The highest disparity in registered patents per capita appears in the South Korea-Vietnam PTA signed in 2015, whereas the difference in innovative capacity is lowest for the Malawi-Mozambique PTA (2005).

In robustness checks, we use several alternative measures of innovative capacity. For one, we take account of the fact that patents are more common in some industries than in others. For this, we use data from the OECD (2021) on the number of patents per country and year across 34 industries (such as computer technology or optics). For each industry, we calculate a country's share of world patents and then sum across all industries to arrive at a value for the country (*Patents share (diff., log.)*). This weighs patents in industries with few patents (e.g. chemicals) more heavily than patents in industries with many patents (e.g. electronics). Second, we use data from Ginarte & Park (1997) and Park (2008) on the strength of patent protection in countries across the world (*IP protection (diff.)*). The rationale behind this measure is that more innovative countries should also have stronger domestic intellectual property protection. To avoid endogeneity (because PTAs can increase the strength of patent protection), we use data from 1990 (when available) or 1995 (in cases for which 1990 data are not available). Third, we rely on R&D spending as another widely used measure of a country's innovative capacity. Our variable *R&D spending (diff.)* measures the difference between the PTA members' highest and the lowest expenditures on R&D as a percentage of their GDP.[3] The highest differences in innovative capacity measured in R&D spending is found in the Central America-South Korea agreement (2018), whereas the lowest difference appears in the Ecuador-Paraguay bilateral (1994).

We operationalize power asymmetry relying on the difference in gross domestic product (GDP) between the largest and the smallest member country in a PTA (*GDP (diff., log.)*). This is in line with our argument that stresses relative market size as the key determinant of bargaining power. Data are from the World Bank's (2019) World Development Indicators.[4] In the models below, we take the natural log of this GDP difference variable, as it is characterized by a few outliers. The highest difference in economic size is found in the Economic Partnership Agreement (EPA) between Côte d'Ivoire and the European Union signed in 2009, whereas GDP difference is lowest for the PTA involving Kyrgyzstan and Moldova from 1995.

We include several control variables in our models.[5] For one, we use a dummy variable that is coded one if the agreement was signed by at least one of the so-called BRIC emerging economies, namely Brazil, Russia, India, and China *(BRIC countries)*. The reasoning behind doing so is that these are economically large countries with sizeable markets, but with still a limited interest in the international regulation of IPRs, or at least with a different conception of adequate IPRs (Bird 2006, p. 330f; Serrano Oswald & Burri 2020, p. 3). We also control for differences in the member countries' level of economic development. For this, we use the maximum difference across member states in GDP per capita *(GDPpc (diff., log.))*. Data again are obtained from the World Bank's (2019) World Development Indicators.[6] Because of outliers, we again use the natural log of this variable. Furthermore, we include a measure of democracy in our models. Concretely, we take the mean value of the PolityIV index across all member countries of a PTA in *Democracy (mean)*. The PolityIV project classifies countries on twenty one point scale, with minus ten indicating an autocratic political regime and ten a democratic political regime (Marshall et al. 2018). Controlling for democracy makes sense as democracies sign more PTAs, and cooperation, also on issues of IPRs, should be easier among democracies.

We also control for WTO membership (*WTO member*). This variable takes the value one if all parties to a PTA are also WTO members. Controlling for WTO membership is important because the TRIPS agreement imposes certain rules with respect to IPRs on all WTO members. Least developed countries, however, were given a waiver for their TRIPS obligations until 2021 and for medicines until 2033 (Serrano & Burri 2019, p. 278f). Moreover, we include a measure of a PTA's overall level of ambitiousness. To operationalize this variable capturing a PTA's depth, we rely on the logged number of words contained in a PTA (*Word count (PTA, log.)*). This builds on the assumption that longer PTAs are deeper as more detailed provisions increase an agreement's length. In fact, *Word count (PTA, log.)* is highly positively correlated with the measure of PTA depth available from the DESTA project (Dür et al. 2014). We do not use the DESTA measure here, because it is only available for a subset of our agreements. Finally, we include a time trend variable in the models below. This variable *(Year (count))* takes the value of one for 1994, two for 1995 and so on. Controlling for a time trend makes sense as IPRs increasingly found their way into PTAs after TRIPS went into effect (Chorev & Shadlen 2015, p. 144).

In robustness checks, we also control for the sum of the GDPs of an agreement's member states to account for the overall market size concerned (*GDP (sum, log.)*). In addition, we add a variable that distinguishes between bilateral, plurilateral, region-country, and region-region trade agreements. Moreover, we add a variable that controls for fifteen agreements that the United Kingdom recently signed with third countries (*Roll-over agreements*). These agreements were originally signed by the EU, and after Brexit the United Kingdom rolled them over. In one model,

Table 1: Descriptive statistics

	N	Mean	St. Dev.	Min	Median	Max
IPR included	467	0.66	0.47	0	1	1
IPR depth	308	22.91	24.32	0.00	10.30	100.00
IPR depth (Pat.)	308	16.16	18.98	−0.00	8.04	100.00
IPR depth (Marks)	308	18.99	24.83	−0.00	7.15	100.00
IPR depth (Copy.)	308	17.68	21.61	−0.00	9.53	100.00
DESTA IPR	425	3.22	1.79	0.00	3.00	6.00
TRIPS+	406	3.94	8.65	0.00	0.00	41.00
Patents (diff., log.)	442	4.00	2.03	−1.94	4.22	8.08
Patents share (diff., log.)	319	4.55	3.04	0.01	4.30	9.43
IP protection (diff.)	275	1.06	0.84	0.00	0.83	4.54
R&D spending (diff.)	443	0.96	0.89	0.0002	0.65	4.07
GDP (diff., log.)	467	5.59	2.53	−2.63	5.80	9.86
BRIC countries	467	0.12	0.33	0	0	1
GDPpc (diff., log.)	467	8.62	1.79	2.28	8.83	11.74
Democracy (mean)	443	5.34	4.25	−8.83	7.05	10.00
WTO member	467	0.69	0.46	0	1	1
Word count (PTA, log.)	467	9.91	1.75	5.72	9.81	13.86
GDP (sum, log.)	467	27.09	2.25	21.90	27.23	34.18
Roll-over agreements	467	0.03	0.18	0	0	1
Patents (mean, log.)	419	3.93	1.70	−1.76	4.21	7.55
Big3 economies	467	0.16	0.37	0	0	1
TBT provision	467	0.78	0.41	0	1	1

we also control for the mean level of innovative capacity across the member states of a PTA, to distinguish between agreements bringing together only highly innovative countries and agreements bringing together only little innovative countries *(Patents (mean, log.))*. Furthermore, we add a dummy that is coded one for all agreements signed either by the EU, Japan, or the United States *(Big3 economies)*. Doing so allows us to see whether the results are driven by agreements signed by these "usual suspects". Finally, we also run a test with a categorical variable that distinguishes between North-North, North-South, and South-South agreements, where Northern countries are OECD members and the EU (with memberships for both entities varying over time). Table 1 displays descriptive statistics of our continuous or dichotomous dependent variables, predictors, and control variables.

3.3 Model Specifications and Estimation

In the following models, we account for the fact that the depth of IPR provisions can only be measured for PTAs that include any IPR provisions in the first place. In fact, the sample of agreements that include IPR provisions may differ in *unmeasured* ways from the sample of agreements that do not include IPR provisions. For example, countries that expect to be highly innovative in the future may be more likely to sign PTAs with IPR provisions. To account for the resulting potential selection problem, we estimate a two stage Heckman selection model (Heckman 1979). In the first stage (the selection equation), we include all 467 PTAs signed since 1994 with a dummy capturing whether the agreement contains any mention of IPRs as our dependent variable (*IPR included*) in a probit model. For the Heckman selection model to provide credible estimates, the selection equation needs to include an instrumental variable. This variable should have a non-zero impact on selection into the sample, but no influence on the dependent variable in the outcome equation.

In our case, we rely on a variable that captures whether an agreement includes any provisions regarding technical barriers to trade (TBTs) as an instrument (*TBT provision*). Data for this variable come from the DESTA project (Dür et al. 2014). From extant work we know that agreements that address some trade-related issues such as TBTs also tend to address other trade-related issues such as IPRs (Baccini et al. 2015, p. 171f). Indeed, in Table 2 below we find that the inclusion of TBTs is an important predictor of the inclusion of IPRs in PTAs. We chose provisions on TBTs because in many agreements, they are very shallow. Their inclusion, hence, indicates that the PTA signatories wanted the agreement to cover more than just tariffs, but does not say anything about the depth of cooperation on other trade-related issues, in our case IPRs. Overall, the TBT variable promises to be a good instrument for our selection model.

The second stage of the model (the outcome equation) then employs our LSA-based measure of IPR depth as response variable and contains the same predictors and control variables as the first stage model, but with the inverse Mills ratio (*IMR*) calculated on the basis of the selection equation and without the instrument. This outcome equation is estimated using linear regression.[7]

4 Results

4.1 Baseline Results

We first present the results of the selection equation (see Model 1 in Table 2). The coefficient for *Patents (diff., log.)* is positive and weakly statistically significant, but neither the coefficients for *GDP (diff., log.)* nor the interaction between the two come close to statistical significance. Among the control variables, we find statistically significant coefficients for *BRIC countries* and *Word count (PTA, log.)*. As expected, agreements signed by the BRIC countries are less likely to regulate IPRs at all. Moreover, PTAs that overall are deep are also more likely to contain IPR provisions. That power and differences in innovative capacity only play a subordinate role in explaining the presence or absence of IPR provisions in PTAs is not particularly surprising. Mentioning a topic in an

Table 2: Main results

	Selection eq.	*Outcome eq. (Overall)*	*Outcome eq. (Pat.)*	*Outcome eq. (Marks)*	*Outcome eq. (Copy.)*
	(1)	(2)	(3)	(4)	(5)
GDP (diff., log.)	0.03	−1.50	−3.24***	−3.05**	−2.64**
	(0.09)	(1.27)	(1.06)	(1.42)	(1.25)
Patents (diff., log.)	0.21*	−3.97**	−4.18***	−2.65	−2.30
	(0.11)	(1.85)	(1.56)	(2.06)	(1.83)
Patents (diff., log.) x	−0.002	0.81***	1.02***	0.93***	0.79***
GDP (diff., log.)	(0.02)	(0.26)	(0.22)	(0.29)	(0.26)
BRIC countries	−1.16***	−17.24***	−8.81**	−17.54***	−15.30***
	(0.24)	(5.26)	(4.45)	(5.78)	(5.20)
GDPpc (diff., log.)	−0.07	−0.28	0.33	−0.84	−1.03
	(0.06)	(0.80)	(0.67)	(0.91)	(0.80)
Democracy (mean)	0.03	0.38	0.11	0.18	0.09
	(0.02)	(0.28)	(0.24)	(0.32)	(0.28)
WTO member	0.05	1.75	−0.09	3.19	2.50
	(0.18)	(2.36)	(1.97)	(2.68)	(2.34)
Word count (PTA, log.)	0.20***	7.37***	3.90***	8.22***	6.79***
	(0.06)	(1.07)	(0.89)	(1.20)	(1.06)
Year (count)	−0.02	0.48***	0.09	0.33*	0.20
	(0.01)	(0.16)	(0.14)	(0.19)	(0.16)
TBT provision	0.84***				
	(0.20)				
Constant	−2.26***	−58.05***	−20.97*	−66.69***	−46.95***
	(0.69)	(15.00)	(12.62)	(16.78)	(14.86)
Observations	424	424	424	424	424
R^2	0.57	0.57	0.45	0.51	0.46
Adjusted R^2	0.56	0.56	0.43	0.49	0.44
ρ	0.39	0.39	0.14	0.71	0.46
Inverse Mills Ratio	6.26 (6.30)	6.26 (6.30)	1.93 (5.34)	13.36* (6.86)	7.47 (6.21)

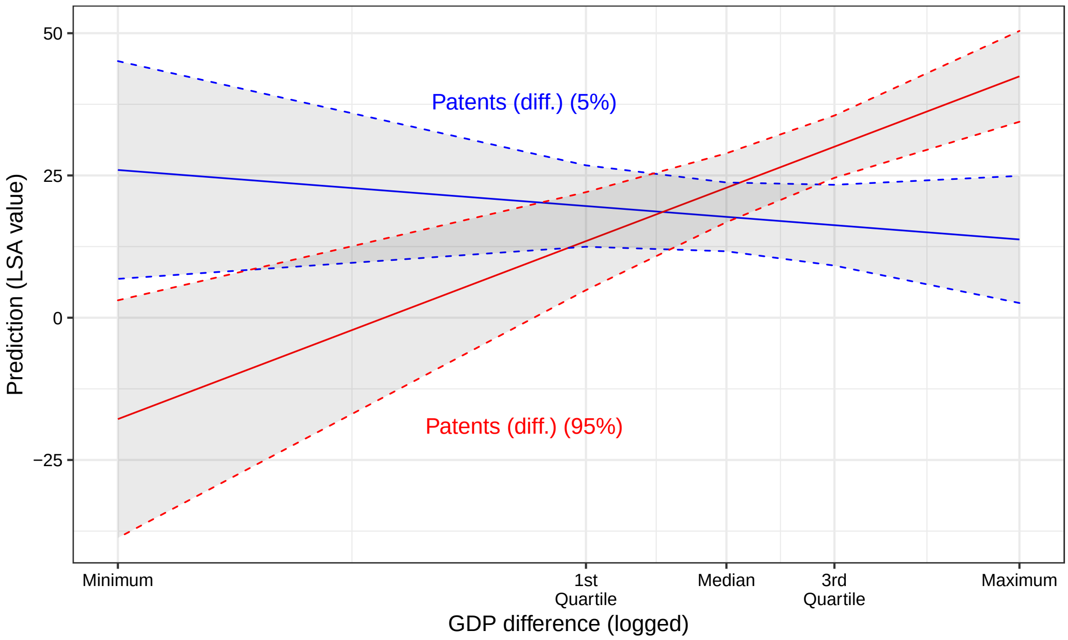
Note: Model 1 is a probit model, Models 2-5 are linear models. The selection model is the same for all four outcome models. Standard errors in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

agreement is cheap; politics comes in mostly at the moment when governments decide to include substantive provisions on a topic.

Importantly, the coefficient for *TBT provision* is positive and highly statistically significant. This is a key requirement when applying a Heckman selection model and hints at the aptness of our instrument. Substantively, this coefficient indicates that PTAs that address technical barriers to trade are also more likely to include provisions regulating IPRs. The second model in Table 2 reports the outcome equation for our baseline model. This model employs *IPR depth* as response variable and includes the variables as described above plus the inverse Mills ratio as calculated on the basis of the selection model.

For the assessment of our hypothesis, the coefficient for the interaction between *GDP (diff., log.)* and *Patents (diff., log.)* is key. In line with the hypothesis, this coefficient is positive and statistically significant. To facilitate interpretation, Figure 1 shows the interaction effect graphically. At very low levels of power asymmetry, a large difference in innovative capacity does not have a positive effect on the depth of IPR provisions included in a PTA. When the value of GDP *GDP (diff., log.)* exceeds its median, the effect of innovative capacity becomes positive. At the maximum level of GDP difference, the expected value on the dependent variable when the difference in innovative capacity is very low is around fifteen. For PTAs bringing together countries with high differences in innovative capacity, the expected value on the dependent variable is around forty.

Figure 1: The interaction effect



Note: The figure is based on the interaction term in Model 2. For *Patents (diff., log.)*, we take the values at the 5th and 95th percentile. The ribbons indicate the 95 percent confidence intervals.

While the positive effect of *Patents (diff., log.)* at high levels of GDP difference is very much in line with our expectations, the negative effect for countries of nearly equal size is surprising. A closer look at the data reveals that our dataset does not include any agreements between countries of highly similar economic size but starkly different innovative capacity. Moreover, Figure A1 in the online appendix shows that when using a categorical version of *GDP (diff., log.)*, the negative effect of innovative capacity at low levels of power asymmetry disappears, but the positive effect at high levels of asymmetry remains.

Several of the control variables are statistically significant. Among them, the coefficient for *BRIC countries* indicates that large emerging countries tend to sign PTAs that contain IPR provisions that are shallower than those of other countries. This finding not only supports our argument, but is also in line with existing research (e.g. Auriol et al. 2019; Serrano & Burri 2019). Deeper agreements and more recent PTAs contain deeper IPR provisions on average, as indicated by the positive and significant coefficients of *Word count (PTA, log.)* and *Year (count)*, respectively. That we do not find a statistically significant coefficient for *GDPpc (diff., log.)* may be partly explained by the fact that *GDPpc (diff., log.)* is positively correlated with both *Patents (diff., log.)* (richer countries tend to be more innovative) and *GDP (diff., log.)* (richer countries also have a larger GDP on average). Still, the lack of statistical significance for this term also indicates – as we argue throughout – that the story is not just about North-South differences.

In Models 3 to 5 in Table 2, we use the dependent variables that specifically capture the strength of provisions related to patents, trademarks, and copyrights. The selection equation for these models is the same as the one discussed before. For all three models, the results are similar to those we found for IPR provisions in general. Overall, therefore, we find strong evidence in support of our hypothesis. Accordingly, PTAs involving highly innovative trading powers include deep IPRs, whereas PTAs that are characterized by large power asymmetries but similar innovative capacities remain shallow in IPR protection.

4.2 Robustness Checks

We carried out several checks that modify the baseline model to assess how robust our results are. The detailed results of these tests are available in the online appendix. For one, we ran our model with two alternative dependent variables: the IPR depth variable (*DESTA IPR*) calculated using the data from Dür et al. (2014) and the TRIPS plus measure (*TRIPS+*) calculated by Morin & Surbeck (2020). In line with our previous findings, the coefficient for the interaction between *GDP (diff., log.)* and *Patents (diff., log.)* remains positive and (in one case weakly with p=0.056) statistically significant (see Models A13 and A14). Hence, the finding that power asymmetry in combination with asymmetry in innovative capacity drives deep IPR provisions is highly robust to different operationalizations of the dependent variable.

Second, in Models A15 to A17 we substituted *Patents (diff., log.)* with several other indicators of innovative capacity: a measure that accounts for the fact that in some industries, patents are more frequent than in other industries (*Patents weighted (diff.)*), a measure of existing IP protection in a country (*IP protection*), and expenditures on R&D (*R&D spending (diff.)*). The results are very similar to those presented in the baseline model.

Third, we analyzed whether the results are robust to using the mean rather than the maximum difference in terms of GDP and innovative capacity across member countries of an agreement. This is relevant for plurilateral agreements, where an outlier may lead to values for the maximum difference that are not representative for the member states as a whole. Doing so, however, does not change the substantive results (Model A18). Fourth, we deal with the issue that our interaction term also gives high values for PTAs in which country A has much power and country B has high innovative capacity. This is at odds with our argument that if a country with much power and high innovation capacity signs an agreement with a weaker and less innovative country, the former will impose deep IPR provisions on the latter. To ensure that these rather unusual but empirically observable cases do not affect our results, we drop cases where one country has larger size and the other has more patents. Doing so does not change the substantive result (Model A19).

Fifth, we add three more control variables to the model. For one, we control for agreement type, that is, whether a PTA is a bilateral, plurilateral, region to third country, or region-to-region agreement. The number of members may matter for the depth of cooperation, as more members increase the transaction costs of negotiations and enables coalition building as bargaining strategy. Moreover, we control for sixteen agreements recently signed by the United Kingdom after it left the EU. These agreements are particular as the United Kingdom simply "rolled over" these agreements it had originally signed as member of the EU, a much larger trading entity. Furthermore, we include the sum of the GDPs of the agreement's members in the model. This variable, which captures the combined market size, may control for whether it is even worthwhile for two countries to pay the costs of negotiating far-reaching IPR clauses. Adding these variables, however, again does not matter for the substantive findings (Model A20). Neither do the results change in a substantive manner if we control for the mean level of innovative capacity across members of an agreement (Model A21).

Finally, in two models we directly tackle the question to what extent our argument goes beyond the conventional wisdom of a North-South divide on IPRs. For one, we assess whether our results are largely or even solely driven by the "usual suspects", namely the United States, the European Union, and Japan as large Northern trading powers. We do so by adding *Big3 economies* to the model. However, doing so leaves our substantive results practically unaffected. In fact, the coefficient in Model A22 is nearly the same as in Model 2. Moreover, we add interactions between our measure of bargaining power and dummies capturing North-South and South-South agreements to our baseline model. In this model (Model A23), the coefficient for the interaction between *Patents (diff., log.)* and *GDP (diff., log.)* remains positive and statistically significant, whereas neither of the two coefficients for the North-South and South-South interactions is statistically significant. This evidence clearly shows that the subtle change to the conventional wisdom that we introduce in this paper can better explain the variation in the depth of IPR provisions across PTAs that we actually observe. In sum, our results prove to be highly robust to alternative model and variable specifications, and, overall, offer strong support for our hypothesis.

5 Conclusion

Why do some PTAs contain more comprehensive provisions regulating IP protection than others? We have argued that countries that host innovative industries and IP producers favor deep IPRs. Countries with few innovative industries, by contrast, oppose strong IPR regulation, as it increases costs for developing their own rather infant IP producing sectors. In trade negotiations between the two sides, bargaining power is key for preference attainment. This means that in trade negotiations, countries that are more innovative and also more powerful are able to impose comprehensive IPRs on less innovative and less powerful trading partners. In sum, we have expected to discover deep IPR provisions in PTAs that are signed by large, innovative trading powers on the one side and smaller, less innovative economies on the other.

By employing computational text analysis to measure the comprehensiveness of IPR provisions in 467 PTAs, we have been able to test this argument. In line with our expectation, we have found that PTAs that involve economies with higher differences in innovative capacity contain more comprehensive IPRs if there is also a power imbalance. In robustness checks, we show that these results are not only driven by the largest Northern trading powers, namely the United States, the EU, and Japan. Neither do our results disappear when controlling for agreements between the traditional Global North and the Global South. The largest emerging countries, however, rather sign PTAs that contain shallow IPR provisions as they still lack a motivation to agree to strong IPR protection, and have the power to avoid their addition to PTAs as a result of their own rather sizeable domestic markets.

Future research could go beyond what we have done here by taking IPR compliance into account, as there may be a difference between international commitments and domestic implementation. Within our argument, we would even expect this if we observe a shift in bargaining power. Future studies could get at this by incorporating IPR compliance reports and watch-lists, such as – even though debatable - the United States Trade Representative's Special 301 Report, which highlights countries with insufficient IPR protection. Such research would further contribute to our understanding of the relationship between domestic preferences, bargaining power, and PTAs.

Our findings have broader, real-world implications, as they show that popular concerns about the role of power in the internationalization of IPRs are well founded. Countries with lower innovative capacity try to avoid deep IPRs in PTAs; but they are only able to do so if they possess sufficient bargaining power. This means that the rules written down in many PTAs do not equally serve the current interests of all members. In less innovative economies, the strict IPR provisions included in some PTAs may make it harder for local firms and sectors to build capacities and finally become globally competitive innovators themselves. A better understanding of the driving forces behind the internationalization of IPRs, thus is not only of scholarly but also of broader public interest.

References

Allee, T. and Lugg, A. (2016). Who Wrote the Rules for the Trans-Pacific Partnership? *Research & Politics*, 3(3): 1–9.

Auriol, E., Biancini, S., and Paillacar, R. (2019). Universal Intellectual Property Rights: Too Much of a Good Thing? *International Journal of Industrial Organization*, 65(C): 51–81.

Baccini, L., Dür, A., and Haftel, Y. Z. (2015). Imitation and Innovation in International Governance: The Diffusion of Trade Agreement Design. In: Dür, A. and Elsig, M. (eds), *Trade Cooperation: The Purpose, Design and Effects of Preferential Trade Agreements.* Cambridge University Press, Cambridge. 167–194.

Baldwin, R. E. (1997). The Causes of Regionalism. *World Economy*, 20(7): 865–888.

Benoit, K. (2020). Text as Data: An Overview. In: Curini, L. and Franzese, R. (eds), *The SAGE Handbook of Research Methods in Political Science and International Relations.* SAGE Publications, London, UK. 461–497.

Benoit, K. and Laver, M. (2003). Estimating Irish Party Policy Positions Using Computer Wordscoring: The 2002 Election–A Research Note. *Irish Political Studies*, 18(1): 97–107.

Benoit, K., Watanabe, K., Wang, H., Nulty, P., Obeng, A., Müller, S., and Matsuo, A. (2018). quanteda: An R Package for the Quantitative Analysis of Textual Data. *Journal of Open Source Software*, 3(30): 774.

Bird, R. C. (2006). Defending Intellectual Property Rights in the BRIC Economies. *American Business Law Journal*, 43(2): 317–363.

Blank, R. M. and Kappos, D. J. (2012). Intellectual Property and the U.S. Economy: Industries in Focus. http://www.uspto.gov/sites/default/files/news/publications/IP_Report_March_2012.pdf. Accessed: December 18, 2020.

Branstetter, L., Fisman, R., Foley, F. C., and Saggi, K. (2011). Does Intellectual Property Rights Reform Spur Industrial Development? *Journal of International Economics*, 83(1): 27–36.

Brown, J. M. and Urpelainen, J. (2015). Picking Treaties, Picking Winners: International Treaty Negotiations and the Strategic Mobilization of Domestic Interests. *Journal of Conflict Resolution*, 59(6): 1043–1073.

Campi, M. and Nuvolari, A. (2021). Intellectual Property Rights and Agricultural Development: Evidence from a Worldwide Index of IPRs in Agriculture (1961-2018). *The Journal of Development Studies*, 57(4): 650–668.

Chen, Y. and Puttitanun, T. (2005). Intellectual Property Rights and Innovation in Developing Countries. *Journal of Development Economics*, 78(2): 474–493.

Chorev, N. and Shadlen, K. C. (2015). Intellectual Property, Access to Medicines, and Health: New Research Horizons. *Studies in Comparative International Development*, 50(2): 143–156.

Country Economy (2020). Taiwan GDP – Gross Domestic Product. https://countryeconomy.com/gdp/taiwan. Accessed: December 18, 2020.

Crampes, C. and Langinier, C. (2009). Are Intellectual Property Rights Detrimental to Innovation? *Journal of the Economics of Business*, 16(3): 249—268.

De Bièvre, D., Poletti, A., and Thomann, L. (2014). To Enforce or not to Enforce? Judicialization, Venue Shopping, and Global Regulatory Harmonization. *Regulation & Governance*, 8(3): 269–286.

De Vries, E., Schoonvelde, M., and Schumacher, G. (2018). No Longer Lost in Translation: Evidence that Google Translate Works for Comparative Bag-of-Words Text Applications. *Political Analysis*, 26(4): 417–430.

Deerwester, S., Harshman, R., Dumais, S. T., Furnas, G. W., and Landauer, T. K. (1990). Indexing by Latent Semantic Analysis. *Journal of the American Society for Information Science*, 41(6): 391–407.

Drahos, P. (2001). BITs and BIPs: Bilateralism in Intellectual Property. *The Journal of World Intellectual Property*, 4(6): 791–808.

Drezner, D. W. (2007). *All Politics is Global. Explaining International Regulatory Regimes.* Princeton University Press, Princeton, NJ.

Dumais, S. T. (2005). Latent Semantic Analysis. *Annual Review of Information Science and Technology*, 38(1): 188–230.

Dür, A. (2010). *Protection for Exporters: Power and Discrimination in Transatlantic Trade Relations, 1930-2010.* Cornell University Press, Ithaca.

Dür, A., Baccini, L., and Elsig, M. (2014). The Design of International Trade Agreements: Introducing a new Dataset. *Review of International Organizations*, 9(3): 353–375.

Dür, A. and Mateo, G. (2014). Public Opinion and Interest Group Influence: How Citizen Groups Derailed the Anti-Counterfeiting Trade Agreement. *Journal of European Public Policy*, 21(8): 1199–1217.

Fink, C. (2011). Intellectual Property Rights. In: Chaffour, J.-P. and Maur, J.-C. (eds), *Preferential Trade Agreement Policies for Development: A Handbook*. World Bank, Washington, DC. 387–405.

Ginarte, J. C. and Park, W. G. (1997). Determinants of Patent Rights: A Cross-National Study. *Research Policy*, 26(3): 283–301.

Glass, A. J. and Saggi, K. (2002). Intellectual Property Rights and Foreign Direct Investment. *Journal of International Economics*, 56(2): 387–410.

Glass, A. J. and Wu, X. (2007). Intellectual Property Rights and Quality Improvement. *Journal of Development Economics*, 82(2): 393–415.

Gleeson, D., Lexchin, J., Lopert, R., and Kilic, B. (2018). The Trans Pacific Partnership Agreement, Intellectual Property and Medicines: Differential Outcomes for Developed and Developing Countries. *Global Social Policy*, 18(1): 7–27.

Grossman, G. M. and Lai, E. L. (2004). International Protection of Intellectual Property. *The American Economic Review*, 94(5): 1635–1653.

Head, K., Mayer, T., and Ries, J. (2010). The Erosion of Colonial Trade Linkages after Independence. *Journal of International Economics*, 81(1): 1–14.

Heckman, J. J. (1979). Sample Selection Bias as a Specification Error. *Econometrica*, 47(1): 153–161.

Helpman, E. (1993). Innovation, Immitation, and Intellectual Property Rights. *Econometrica*, 61(6): 1247–1280.

Hirschman, A. O. (1945). *National Power and the Structure of Foreign Trade*. University of California Press, Berkeley.

Jain, S. C. (1996). Problems in International Protection of Intellectual Property Rights. *Journal of International Marketing*, 4(1): 9–32.

Lechner, L. and Wüthrich, S. (2018). Seal the Deal: Bargaining Positions, Institutional Design and the Duration of Preferential Trade Negotiations. *International Interactions*, 44(5): 833–861.

Liu, M. and La Croix, S. (2015). A Cross-Country Index of Intellectual Property Rights in Pharmaceutical Inventions. *Research Policy*, 44(1): 206–216.

Lucas, C., Nielsen, R. A., Roberts, M. E., Stewart, B. M., Storer, A., and Tingley, D. (2015). Computer-Assisted Text Analysis for Comparative Politics. *Political Analysis*, 23(2): 254–277.

Marshall, M. G., Gurr, T. R., and Jaggers, K. (2018). Polity IV Project Dataset. Political Regime Characteristics and Transitions, 1800-2017. Users' Manual. http://www.systemicpeace.org/inscr/p4manualv2017.pdf. Accessed: December 18, 2020.

Maskus, K. E. (2002). Regulatory Standards in the WTO: Comparing Intellectual Property Rights with Competition Policy, Environmental Protection, and Core Labor Standards. *World Trade Review*, 1(2): 135—152.

McCalman, P. (2001). Reaping what you sow: An Empirical Analysis of International Patent Harmonization. *Journal of International Economics*, 55(1): 161–186.

Mödlhamer, C. (2020). Innovativeness and the Design of Intellectual Property Rights in Preferential Trade Agreements: A Refinement of the North-South Explanation. *Journal of International Business Policy*, 3(4): 329–348.

Morin, J.-F. (2009). Multilateralizing TRIPs-Plus Agreements: Is the US Strategy a Failure? *Journal of World Intellectual Property*, 12(3): 175–197.

Morin, J.-F. and Surbeck, J. (2020). Mapping the New Frontier of International IP Law : Introducing a TRIPS-plus Dataset. *World Trade Review*, 19(1): 109–122.

Neuwelt, P. M., Gleeson, D., and Mannering, B. (2016). Patently Obvious: A Public Health Analysis of Pharmaceutical Industry Statements on the Trans-Pacific Partnership International Trade Agreement. *Critical Public Health*, 26(2): 159–172.

OECD (2020). Gross Domestic Spending on R&D. https://data.oecd.org/rd/gross-domestic-spending-on-r-d.htm. Accessed: December 18, 2020.

OECD (2021). Patents by Technology. https://stats.oecd.org/Index.aspx?DataSetCode=PATS_IPC#. Accessed: June 1, 2021.

Osgood, I. and Feng, Y. (2018). Intellectual Property Provisions and Support for US Trade Agreements. *Review of International Organizations*, 13(3): 421–455.

Park, W. G. (2008). International Patent Protection: 1960-2005. *Research Policy*, 37(4): 761–766.

Park, W. G. (2011). Intellectual Property Rights and Foreign Direct Investment: Lessons for Central America. In: Lopez, H. J. and Shankar, R. (eds), *Getting the most out of Free Trade Agreements in Central America*. World Bank, Washington, DC. 275–308.

Perelman, M. (2003). The Weakness in Strong Intellectual Property Rights. *Challenge*, 46(6): 32–61.

Rapp, R. T. and Rozek, R. P. (1990). Benefits and Costs of Intellectual Property Protection in Developing Countries. *Journal of World Trade*, 24(5): 75–102.

Ridley, W. (2018). Preferential Trade Agreements, Intellectual Property Rights, and Third-Country Trade: Assessing the Impacts of the New Multilateralism. http://www.colorado.edu/economics/sites/default/files/attached-files/18-03_-_ridley_-_revised_november.pdf. Accessed: December 18, 2020.

Rodrik, D. (2018). What Do Trade Agreements Really Do? *Journal of Economic Perspectives*, 32(2): 73–90.

Sell, S. K. (2010). TRIPS was never enough: Vertical Forum Shifting, FTAS, ACTA, and TPP. *Journal of Intellectual Property Law*, 18(2): 458.

Sell, S. K. and Prakash, A. (2004). Using Ideas Strategically: The Contest between Business and NGO Networks in Intellectual Property Rights. *International Studies Quarterly*, 48(1): 143–175.

Serrano, O. R. and Burri, M. (2019). TRIPS Implementation in Developing Countries. In: Elsig, M., Hahn, M., and Spilker, G. (eds), *The Shifting Landscape of Global Trade Governance*. Cambridge University Press, Cambridge, UK. 275–294.

Serrano Oswald, O. R. and Burri, M. (2020). India, Brazil, and Public Health: Rule-making through

South–south Diffusion in the Intellectual Property Rights Regime? *Regulation & Governance*, 14(5): 1–18.

Seuba, X. (2013). Intellectual Property in Preferential Trade Agreements: What Treaties, what Content? *Journal of World Intellectual Property*, 16(5-6): 240–261.

Shadlen, K. C. (2005). Exchanging Development for Market Access? Deep Integration and Industrial Policy under Multilateral and Regional-bilateral Trade Agreements. *Review of International Political Economy*, 12(5): 750–775.

Shadlen, K. C. (2007). Intellectual Property, Trade, and Development: Can Foes Be Friends? *Global Governance*, 13(2): 171–177.

Shadlen, K. C. (2008a). Globalisation, Power and Integration: The Political Economy of Regional and Bilateral Trade Agreements in the Americas. *The Journal of Development Studies*, 44(1): 1–20.

Shadlen, K. C. (2008b). Policy Space for Intellectual Property Management: Contrasting Multilateral and Regional-bilateral Arrangements. *Econômica*, 10(2): 55–81.

Shadlen, K. C., Schrank, A., and Kurtz, M. J. (2005). The Political Economy of Intellectual Property Protection: The Case of Software. *International Studies Quarterly*, 49(1): 45–71.

Slapin, J. B. and Proksch, S. O. (2008). A Scaling Model for Estimating Time-Series Party Positions from Texts. *American Journal of Political Science*, 52(3): 705–722.

Spilker, G., Bernauer, T., Kim, I., Milner, H., Osgood, I., and Tingley, D. (2018a). Trade at the Margin: Estimating the Economic Implications of Preferential Trade Agreements. *Review of International Organizations*, 13(2): 189–242.

Spilker, G., Bernauer, T., and Umaña, V. (2018b). What Kinds of Trade Liberalization Agreements Do People in Developing Countries Want? *International Interactions*, 44(3): 510–536.

Steinberg, R. H. (2002). In the Shadow of Law or Power? Consensus-Based Bargaining and Outcomes in the GATT/WTO. *International Organization*, 56(2): 339–74.

Wade, R. H. (2003). What Strategies Are Viable for Developing Countries Today? The World Trade Organization and the Shrinking of 'Development Space'. *Review of International Political Economy*, 10(4): 621–644.

Weintraub, S. (2004). Lessons from the Chile and Singapore Free Trade Agreements. In: Schott, J. J. (ed), *Free Trade Agreements: US Strategies and Priorities*. Institute for International Economics, Washington, DC. 79–92.

World Bank (2019). World Development Indicators. http://data.worldbank.org/indicator. Accessed: December 18, 2020.

Endnotes

[1] Other languages include Spanish (sixty six PTAs), French (five PTAs), and Arabic (three PTAs). As Table A6 in the online appendix shows, excluding non-English PTAs does not substantively change our findings.

[2] LSA has several advantages compared to alternative computational approaches. Wordscores requires reference texts for which the position on the dimension that should be estimated is known (Benoit & Laver 2003). By contrast, LSA is fully unsupervised and therefore more suitable in our case. Wordfish, which is still another alternative, requires assumptions that are unlikely to be given in our context (i.e. a Poisson distribution of words) (Slapin & Proksch 2008). By contrast, LSA requires few assumptions and, importantly, works well when one end of a dimension is characterized by the absence of specific terms (rather than the presence of specific terms that identify this end). This reflects PTA texts well as deep agreements contain lots of words (e.g. “effective”, “comply”, “commitments”, etc.), whereas shallow agreements simply omit these words. Finally, LSA performs particularly well with large amounts of text (Dumais 2005). This is of relevance here, as our text data of PTAs' IPR provisions contains over 690,000 words.

[3] Data are again from the World Bank's (2019) World Development Indicators with the exception of Taiwan, where data come from OECD (2020).

[4] GDP data for Taiwan come from Country Economy (2020).

[5] As adding control variables to a model may lead to post-treatment and confounding bias, we also ran a model without any control variables. The results are substantively the same as in the model with controls, with the coefficient of interest being of a very similar size as the one reported in Table 2. See Table A5 in the online appendix.

[6] GDP per capita data for Taiwan come from Country Economy (2020).

[7] In the online appendix (Table A4), we show the results of models in which we not only account for selection into intellectual property provisions but also for the selection into PTAs in the first place. Countries first decide whether they enter into a PTA with other countries; then whether they mention IPRs in the resulting PTA; and finally on the strength of the IPR provisions. The results are fully in line with those reported in the main part of the paper in Table 2.

A Appendix

A.1 Sample

Table A1: List of Preferential Trade Agreements

	PTA Name	Year	IPRs
1	Armenia Kyrgyzstan	1994	0
2	Armenia Ukraine	1994	0
3	Association of Caribbean States	1994	0
4	Bolivia Mexico	1994	1
5	Bolivia Paraguay	1994	1
6	Caribbean Community (CARICOM) Colombia	1994	0
7	Chile Ecuador	1994	0
8	Colombia Mexico Venezuela	1994	1
9	Commonwealth of Independent States (CIS)	1994	0
10	Czech Republic Romania	1994	1
11	EC Latvia	1994	0
12	EC Lithuania	1994	0
13	Economic and Monetary Community of Central Africa (CEMAC)	1994	0
14	Ecuador Paraguay	1994	0
15	Ecuador Uruguay	1994	0
16	Georgia Russia	1994	0
17	Group of Three	1994	0
18	Hungary Slovenia	1994	1
19	Israel PLO	1994	0
20	Jordan Morocco	1994	0
21	Kazakhstan Ukraine	1994	0
22	Moldova Romania	1994	1
23	Romania Slovakia	1994	1
24	Turkmenistan Ukraine	1994	0
25	Ukraine Uzbekistan	1994	0
26	West African Economic and Monetary Union	1994	0
27	Armenia Georgia	1995	0
28	Armenia Iran	1995	0
29	Armenia Turkmenistan	1995	0
30	Association of Southeast Asian Nations Services	1995	0
31	Azerbaijan Ukraine	1995	0
32	Bulgaria Czech Republic	1995	1
33	Bulgaria Slovakia	1995	1
34	Czech Republic Lithuania	1995	1
35	EC Estonia Europe Agreement	1995	1
36	EC Israel Euro-Med Association Agreement	1995	1
37	EC Latvia Europe Agreement	1995	1
38	EC Lithuania Europe Agreement	1995	1
39	EC Tunisia Euro-Med Association Agreement	1995	1
40	EC Turkey	1995	1
41	EFTA Estonia	1995	1
42	EFTA Latvia	1995	1
43	EFTA Lithuania	1995	1
44	EFTA Slovenia	1995	1
45	Estonia Ukraine	1995	1
46	Georgia Ukraine	1995	0
47	Israel Jordan	1995	1
48	Jordan PLO	1995	0
49	Kazakhstan Kyrgyzstan	1995	0
50	Kyrgyzstan Moldova	1995	0
51	Kyrgyzstan Ukraine	1995	0
52	Andean Community Trujillo Protocol	1996	0
53	Azerbaijan Georgia	1996	0
54	Baltic Free Trade Area (BAFTA) agriculture	1996	0
55	Bolivia MERCOSUR	1996	0
56	Bulgaria Slovenia	1996	1
57	Canada Chile	1996	0
58	Canada Israel	1996	1
59	Chile MERCOSUR	1996	1
60	Czech Republic Estonia	1996	1
61	Czech Republic Israel	1996	1
62	Czech Republic Latvia	1996	1
63	EC Faroe Islands	1996	0
64	EC Morocco Euro-Med Association Agreement	1996	1
65	EC Slovenia Europe Agreement	1996	1
66	Egypt Jordan	1996	1
67	Estonia Slovakia	1996	1
68	Estonia Slovenia	1996	1
69	Georgia Turkmenistan	1996	0
70	Israel Slovakia	1996	1

Continued on next page

Table A1: List of Preferential Trade Agreements

	PTA Name	Year	IPRs
71	Israel Turkey	1996	1
72	Kyrgyzstan Uzbekistan	1996	0
73	Latvia Slovakia	1996	1
74	Latvia Slovenia	1996	1
75	Lithuania Poland	1996	1
76	Lithuania Slovakia	1996	1
77	Lithuania Slovenia	1996	1
78	Macedonia Slovenia	1996	1
79	Southern African Development Community (SADC)	1996	1
80	Algeria Jordan	1997	0
81	Andean Community Sucre Protocol	1997	0
82	Baltic Free Trade Area (BAFTA) Non Tariff Barriers	1997	0
83	Caribbean Community (CARICOM) Protocol on Services	1997	0
84	Croatia Macedonia	1997	1
85	Croatia Slovenia	1997	1
86	Czech Republic Turkey	1997	1
87	EC Jordan Euro-Med Association Agreement	1997	1
88	EFTA Morocco	1997	1
89	Estonia Faroe Islands	1997	1
90	Estonia Turkey	1997	1
91	Georgia Kazakhstan	1997	0
92	Greater Arab Free Trade Agreement	1997	0
93	Guinea Morocco	1997	0
94	Hungary Israel	1997	1
95	Hungary Turkey	1997	1
96	Israel Poland	1997	1
97	Latvia Poland	1997	1
98	Lithuania Turkey	1997	1
99	MERCOSUR services	1997	0
100	Mexico Nicaragua	1997	1
101	Romania Turkey	1997	1
102	Slovakia Turkey	1997	1
103	Bulgaria Turkey	1998	1
104	Caribbean Community (CARICOM) Dominican Republic	1998	1
105	Central America Dominican Republic	1998	1
106	Chile Mexico	1998	1
107	Chile Peru	1998	0
108	Egypt Jordan	1998	1
109	Egypt PLO	1998	0
110	Estonia Hungary	1998	1
111	Faroe Islands Poland	1998	1
112	Hungary Lithuania	1998	1
113	India Sri Lanka	1998	0
114	Israel Slovenia	1998	1
115	Jordan Morocco	1998	1
116	Jordan Tunisia	1998	1
117	Latvia Turkey	1998	1
118	Latvia Ukraine Agriculture	1998	0
119	Slovenia Turkey	1998	1
120	Andean Community Auto Agreement	1999	0
121	Andean Countries Brazil	1999	0
122	Argentina Cuba	1999	0
123	Armenia Kazakhstan	1999	0
124	Belarus Russia (Union State)	1999	0
125	Brazil Cuba	1999	0
126	Bulgaria Macedonia	1999	1
127	Central America Chile	1999	1
128	Chile Cuba	1999	1
129	Cuba Guatemala	1999	0
130	Cuba Uruguay	1999	0
131	Cuba Venezuela	1999	1
132	East African Community (EAC)	1999	0
133	EC South Africa	1999	1
134	EC Switzerland Bilaterals I	1999	1
135	Eurasian Economic Community (EAEC)	1999	0
136	Hungary Latvia	1999	1
137	Macedonia Turkey	1999	1
138	Morocco Tunisia	1999	0
139	Poland Turkey	1999	1
140	Andean Countries Argentina	2000	0
141	Bolivia Cuba	2000	1
142	Bosnia and Herzegovina Croatia	2000	1
143	Caribbean Community (CARICOM) Cuba	2000	1
144	Colombia Cuba	2000	1
145	Cotonou Agreement	2000	1
146	Cuba Ecuador	2000	1

Continued on next page

Table A1: List of Preferential Trade Agreements

	PTA Name	Year	IPRs
147	Cuba Mexico	2000	0
148	Cuba Paraguay	2000	1
149	Cuba Peru	2000	1
150	EC Mexico	2000	1
151	EFTA Macedonia	2000	1
152	EFTA Mexico	2000	1
153	Guatemala Mexico	2000	0
154	Israel Mexico	2000	1
155	Jordan UAE	2000	1
156	Jordan US	2000	1
157	Mexico Northern Triangle	2000	1
158	New Zealand Singapore	2000	1
159	US Vietnam	2000	1
160	Bahrain Jordan	2001	0
161	Bosnia and Herzegovina Slovenia	2001	1
162	Brazil Guyana	2001	0
163	Bulgaria Estonia	2001	1
164	Bulgaria Israel	2001	1
165	Bulgaria Lithuania	2001	1
166	Canada Costa Rica	2001	0
167	Caribbean Community (CARICOM) revised	2001	1
168	Croatia EC	2001	1
169	Croatia EFTA	2001	1
170	EC Egypt Euro-Med Association Agreement	2001	0
171	EC Macedonia SAA	2001	1
172	EFTA Jordan	2001	1
173	EFTA services	2001	1
174	Gulf Cooperation Council (GCC)	2001	1
175	Israel Romania	2001	1
176	Jordan Kuwait	2001	0
177	Jordan Syria	2001	0
178	Macedonia Ukraine	2001	1
179	Pacific Island Countries Trade Agreement (PICTA)	2001	0
180	Tajikistan Ukraine	2001	0
181	Albania Croatia	2002	1
182	Albania Macedonia	2002	1
183	Algeria EC Euro-Med Association Agreement	2002	1
184	Armenia Estonia	2002	0
185	Bosnia and Herzegovina Macedonia	2002	1
186	Bosnia and Herzegovina Moldova	2002	1
187	Bosnia and Herzegovina Serbia Montenegro	2002	1
188	Bosnia and Herzegovina Turkey	2002	1
189	Brazil Mexico	2002	0
190	Bulgaria Latvia	2002	1
191	Central America Panama	2002	1
192	Chile EC	2002	1
193	Croatia Lithuania	2002	1
194	Croatia Macedonia (amended)	2002	1
195	Croatia Turkey	2002	1
196	EC Lebanon Euro-Med Association Agreement	2002	1
197	EFTA Singapore	2002	1
198	GUAM/GUUAM Organization for Democracy and Economic Development	2002	0
199	Japan Singapore	2002	1
200	Jordan Lebanon	2002	0
201	MERCOSUR Mexico Auto Agreement	2002	0
202	Pakistan Sri Lanka	2002	0
203	Southern Africa Customs Union (SACU)	2002	0
204	Afghanistan India	2003	0
205	Albania Bosnia and Herzegovina	2003	1
206	Albania Bulgaria	2003	1
207	Albania Kosovo	2003	1
208	Albania Moldova	2003	1
209	Albania Romania	2003	1
210	Albania Serbia	2003	1
211	Argentina Uruguay	2003	0
212	Australia Singapore	2003	1
213	Bosnia and Herzegovina Bulgaria	2003	1
214	Bosnia and Herzegovina Romania	2003	1
215	Bulgaria Serbia	2003	1
216	Chile EFTA	2003	1
217	Chile Korea	2003	1
218	Chile US	2003	1
219	China Hong Kong	2003	0
220	China Macao	2003	0
221	Common Economic Zone	2003	0
222	Economic Cooperation Organization Trade Agreement (ECOTA)	2003	1

Continued on next page

Table A1: List of Preferential Trade Agreements

	PTA Name	Year	IPRs
223	Jordan Sudan	2003	0
224	Laos US	2003	1
225	Macedonia Romania	2003	1
226	Moldova Serbia	2003	1
227	Moldova Ukraine	2003	1
228	Panama Taiwan	2003	1
229	Romania Serbia	2003	1
230	Singapore US	2003	1
231	Andean Countries MERCOSUR	2004	1
232	Association of Southeast Asian Nations China	2004	0
233	Australia Thailand	2004	1
234	Australia US	2004	1
235	Bahrain US	2004	1
236	Bulgaria Moldova	2004	1
237	Caribbean Community (CARICOM) Costa Rica	2004	0
238	Central American Free Trade Agreement (CAFTA) Dominican Republic	2004	1
239	Croatia Moldova	2004	1
240	Croatia Serbia Montenegro	2004	1
241	EFTA Lebanon	2004	1
242	EFTA Tunisia	2004	1
243	Group of Three Auto Agreement	2004	0
244	India MERCOSUR	2004	0
245	Iran Pakistan	2004	0
246	Japan Mexico	2004	1
247	Jordan Singapore	2004	1
248	Macedonia Moldova	2004	1
249	MERCOSUR Southern African Customs Union (SACU)	2004	0
250	Mexico Uruguay	2004	1
251	Morocco Turkey	2004	1
252	Morocco US	2004	1
253	South Asian Free Trade Area (SAFTA)	2004	0
254	Syria Turkey	2004	1
255	Tunisia Turkey	2004	1
256	Asia Pacific Trade Agreement (Bangkok Agreement amended)	2005	0
257	Brazil Suriname	2005	0
258	Chile China	2005	1
259	EFTA Korea	2005	1
260	Egypt Turkey	2005	1
261	Faroe Islands Iceland	2005	0
262	Guatemala Taiwan	2005	1
263	India Singapore	2005	1
264	Japan Malaysia	2005	1
265	Korea Singapore	2005	1
266	Malawi Mozambique	2005	0
267	MERCOSUR Peru	2005	1
268	New Zealand Thailand	2005	1
269	Peru Thailand	2005	0
270	Trans Pacific Strategic EPA	2005	1
271	Albania EC SAA	2006	1
272	Albania Turkey	2006	1
273	Association of Southeast Asian Nations Korea	2006	0
274	Belize Guatemala	2006	0
275	Bhutan India	2006	0
276	Central European Free Trade Agreement (CEFTA)	2006	0
277	Chile India	2006	0
278	Chile Panama	2006	1
279	Chile Peru	2006	1
280	China Pakistan	2006	0
281	Colombia US	2006	1
282	Cuba MERCOSUR	2006	0
283	D8 PTA	2006	0
284	EFTA Southern African Customs Union (SACU)	2006	1
285	Iran Syria	2006	0
286	Japan Philippines	2006	1
287	Malawi Zimbabwe	2006	0
288	Nicaragua Taiwan	2006	1
289	Oman US	2006	1
290	Panama Singapore	2006	0
291	Peru US	2006	1
292	Association of Southeast Asian Nations China Services	2007	0
293	Association of Southeast Asian Nations Korea services	2007	0
294	Brunei Japan	2007	1
295	Chile Japan	2007	1
296	Colombia Northern Triangle	2007	0
297	EC Montenegro SAA	2007	1
298	EFTA Egypt	2007	1

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Table A1: List of Preferential Trade Agreements

	PTA Name	Year	IPRs
299	El Salvador Honduras Taiwan	2007	0
300	Georgia Turkey	2007	1
301	Indonesia Japan	2007	1
302	Israel MERCOSUR	2007	0
303	Japan Thailand	2007	1
304	Korea US	2007	1
305	Malaysia Pakistan	2007	1
306	Mauritius Pakistan	2007	0
307	Panama US	2007	1
308	Algeria Tunisia	2008	1
309	Association of Southeast Asian Nations Japan	2008	1
310	Australia Chile	2008	1
311	Bosnia and Herzegovina EC SAA	2008	1
312	Canada Colombia	2008	0
313	Canada EFTA	2008	0
314	Canada Peru	2008	0
315	CARIFORUM EC EPA	2008	1
316	Chile Ecuador	2008	0
317	China New Zealand	2008	1
318	China Singapore	2008	0
319	Colombia EFTA	2008	1
320	Cote d'Ivoire EC EPA	2008	0
321	EC Serbia SAA	2008	1
322	Economic and Monetary Community of Central Africa (CEMAC) revised	2008	0
323	Gulf Cooperation Council (GCC) Singapore	2008	0
324	Japan Vietnam	2008	1
325	MERCOSUR Southern African Customs Union (SACU)	2008	0
326	Montenegro Turkey	2008	1
327	Paraguay Venezuela	2008	0
328	Peru Singapore	2008	1
329	Uruguay Venezuela	2008	0
330	Albania EFTA	2009	1
331	Association of Southeast Asian Nations Australia New Zealand FTA (AANZFTA)	2009	1
332	Association of Southeast Asian Nations Goods	2009	0
333	Association of Southeast Asian Nations India	2009	0
334	Belarus Serbia	2009	1
335	Canada Jordan	2009	0
336	Canada Panama	2009	0
337	Chile MERCOSUR Protocol on Services	2009	0
338	Chile Turkey	2009	1
339	China Pakistan Services	2009	0
340	China Peru	2009	1
341	East African Community Common Market	2009	1
342	EC Pacific States EPA Fiji Papua New Guinea	2009	0
343	EFTA GCC	2009	1
344	EFTA Serbia	2009	1
345	India Korea	2009	1
346	India Nepal	2009	0
347	Japan Switzerland	2009	1
348	Jordan Turkey	2009	1
349	Malaysia New Zealand	2009	1
350	Serbia Turkey	2009	1
351	Chile Malaysia	2010	0
352	China Costa Rica	2010	1
353	Costa Rica Singapore	2010	1
354	EC Korea	2010	1
355	EFTA Peru	2010	1
356	EFTA Ukraine	2010	1
357	Egypt MERCOSUR	2010	0
358	Hong Kong New Zealand	2010	1
359	Central America Mexico	2011	1
360	Chile Vietnam	2011	0
361	Commonwealth of Independent States (CIS)	2011	0
362	Costa Rica Peru	2011	1
363	Cuba El Salvador	2011	0
364	EFTA Hong Kong	2011	1
365	EFTA Montenegro	2011	1
366	Guatemala Peru	2011	1
367	India Japan	2011	1
368	India Malaysia	2011	0
369	Japan Peru	2011	1
370	Korea Peru	2011	1
371	Mauritius Turkey	2011	1
372	Mexico Peru	2011	1
373	Montenegro Ukraine	2011	0
374	Panama Peru	2011	1

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Table A1: List of Preferential Trade Agreements

	PTA Name	Year	IPRs
375	Australia Malaysia	2012	1
376	Central America EC	2012	1
377	Chile Hong Kong	2012	1
378	Colombia EC Peru	2012	1
379	Indonesia Pakistan	2012	0
380	Korea Turkey	2012	1
381	Pacific Alliance	2012	0
382	Peru Venezuela	2012	0
383	Bosnia and Herzegovina EFTA	2013	1
384	Canada Honduras	2013	0
385	Central America EFTA	2013	1
386	Chile Thailand	2013	0
387	China Iceland	2013	1
388	China Switzerland	2013	1
389	Colombia Costa Rica	2013	1
390	Colombia Israel	2013	0
391	Colombia Korea	2013	1
392	Colombia Panama	2013	1
393	New Zealand Taiwan	2013	1
394	Panama Trinidad and Tobago	2013	0
395	Singapore Taiwan	2013	1
396	Australia Japan	2014	1
397	Australia Korea	2014	1
398	Canada Korea	2014	1
399	EC Georgia	2014	1
400	EC Moldova	2014	1
401	EC Ukraine	2014	1
402	Eurasian Economic Union (EAEU)	2014	1
403	Malaysia Turkey	2014	1
404	Mexico Panama	2014	1
405	Moldova Turkey	2014	1
406	Australia China	2015	1
407	China Korea	2015	1
408	Common Market for Eastern and Southern Africa (COMESA) East African Community (EAC) Southern African Development Community (SADC)	2015	0
409	EC Kazakhstan	2015	1
410	EC Kosovo SAA	2015	1
411	Eurasian Economic Union (EAEU) Vietnam	2015	1
412	Honduras Peru	2015	1
413	Japan Mongolia	2015	1
414	Korea New Zealand	2015	1
415	Korea Vietnam	2015	1
416	Singapore Turkey	2015	1
417	Australia Singapore amended	2016	1
418	Canada EC (CETA)	2016	1
419	Chile Uruguay	2016	1
420	EC South African Development Community (SADC) EPA	2016	1
421	EFTA Georgia	2016	1
422	EFTA Philippines	2016	1
423	Transpacific Partnership (TPP)	2016	1
424	Argentina Chile	2017	0
425	Armenia EC	2017	1
426	Canada Ukraine	2017	1
427	Chile Indonesia	2017	1
428	China Georgia	2017	1
429	Colombia MERCOSUR	2017	1
430	Ecuador El Salvador	2017	0
431	Hong Kong Macao	2017	1
432	Pacific Agreement on Closer Economic Relations (PACER) Plus	2017	0
433	Australia Peru	2018	1
434	Central America Korea	2018	1
435	Comprehensive and Progressive Agreement for Transpacific Partnership (CPTPP)	2018	1
436	Continental Free Trade Agreement	2018	0
437	EC Japan	2018	1
438	EC Singapore	2018	1
439	Ecuador EFTA	2018	1
440	EFTA Indonesia	2018	1
441	Eurasian Economic Union (EAEU) Iran	2018	0
442	Georgia Hong Kong	2018	1
443	Singapore Sri Lanka	2018	1
444	US Mexico Canada Agreement (USMCA)	2018	1
445	Andean Countries UK	2019	1
446	Australia Hong Kong	2019	1
447	Australia Indonesia	2019	0
448	CARIFORUM UK	2019	1
449	Central America UK	2019	1

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Table A1: List of Preferential Trade Agreements

	PTA Name	Year	IPRs
450	Chile UK	2019	1
451	Eastern and Southern African States UK	2019	0
452	EC Vietnam	2019	1
453	Faroe Islands UK	2019	0
454	Georgia UK	2019	1
455	Iceland Norway UK	2019	0
456	Israel UK	2019	1
457	Jordan UK	2019	1
458	Korea UK	2019	1
459	Kosovo UK	2019	1
460	Lebanon UK	2019	0
461	Liechtenstein UK	2019	1
462	Morocco UK	2019	1
463	Pacific States UK	2019	0
464	Southern African Customs Union Mozambique (SACUM) UK	2019	1
465	Switzerland UK	2019	1
466	Tunisia UK	2019	1
467	Brazil Paraguay	2020	0

Table A2: List of Countries

	Country	Number of PTAs
1	Afghanistan	2
2	Albania	12
3	Algeria	4
4	Angola	3
5	Antigua & Barbuda	10
6	Argentina	18
7	Armenia	12
8	Australia	16
9	Austria	43
10	Azerbaijan	5
11	Bahamas	10
12	Bahrain	6
13	Bangladesh	3
14	Barbados	10
15	Belarus	9
16	Belgium	43
17	Belize	11
18	Benin	2
19	Bhutan	2
20	Bolivia	6
21	Bosnia & Herzegovina	12
22	Botswana	9
23	Brazil	20
24	Brunei	13
25	Bulgaria	34
26	Burkina Faso	3
27	Burundi	3
28	Cambodia	8
29	Cameroon	4
30	Canada	15
31	Cape Verde	2
32	Central African Republic	4
33	Chad	4
34	Chile	32
35	China	17
36	Colombia	24
37	Comoros	4
38	Congo - Brazzaville	4
39	Congo - Kinshasa	4
40	Cook Islands	3
41	Costa Rica	16
42	Cote d'Ivoire	4
43	Croatia	25
44	Cuba	16
45	Cyprus	21
46	Czechia	28
47	Denmark	43
48	Djibouti	3
49	Dominica	10
50	Dominican Republic	7
51	Ecuador	14
52	Egypt	11
53	El Salvador	14
54	Equatorial Guinea	4
55	Eritrea	2
56	Estonia	34
57	Eswatini	10
58	Ethiopia	3
59	Faroe Islands	5
60	Fiji	4
61	Finland	43
62	France	43
63	Gabon	4
64	Gambia	2
65	Georgia	14
66	Germany	43
67	Ghana	2
68	Greece	43
69	Grenada	10
70	Guatemala	15
71	Guinea	3
72	Guinea-Bissau	1
73	Guyana	11
74	Haiti	4
75	Honduras	14
76	Hong Kong SAR China	7

Continued on next page

Table A2: List of countries (cont.)

	Country	Number of PTAs
77	Hungary	27
78	Iceland	35
79	India	13
80	Indonesia	15
81	Iran	6
82	Iraq	1
83	Ireland	43
84	Israel	16
85	Italy	43
86	Jamaica	10
87	Japan	18
88	Jordan	22
89	Kazakhstan	13
90	Kenya	5
91	Kiribati	3
92	Kosovo	4
93	Kuwait	5
94	Kyrgyzstan	10
95	Laos	10
96	Latvia	34
97	Lebanon	5
98	Lesotho	9
99	Liberia	2
100	Libya	3
101	Liechtenstein	33
102	Lithuania	34
103	Luxembourg	43
104	Macao SAR China	2
105	Madagascar	4
106	Malawi	6
107	Malaysia	19
108	Maldives	1
109	Mali	3
110	Malta	21
111	Marshall Islands	2
112	Mauritania	2
113	Mauritius	7
114	Mexico	24
115	Micronesia (Federated States of)	2
116	Moldova	15
117	Mongolia	1
118	Montenegro	5
119	Montserrat	6
120	Morocco	11
121	Mozambique	7
122	Myanmar (Burma)	8
123	Namibia	9
124	Nauru	3
125	Nepal	2
126	Netherlands	43
127	New Zealand	12
128	Nicaragua	11
129	Niger	3
130	Nigeria	2
131	Niue	3
132	North Macedonia	13
133	Norway	33
134	Oman	5
135	Pakistan	10
136	Palau	2
137	Palestinian Territories	4
138	Panama	15
139	Papua New Guinea	4
140	Paraguay	19
141	Peru	28
142	Philippines	11
143	Poland	26
144	Portugal	43
145	Qatar	4
146	Romania	30
147	Russia	9
148	Rwanda	4
149	Samoa	3
150	Sao Tome & Principe	3
151	Saudi Arabia	4
152	Senegal	3

Continued on next page

Table A2: List of countries (cont.)

	Country	Number of PTAs
153	Serbia	11
154	Seychelles	4
155	Sierra Leone	1
156	Singapore	30
157	Slovakia	28
158	Slovenia	33
159	Solomon Islands	2
160	Somalia	2
161	South Africa	10
162	South Korea	19
163	South Sudan	1
164	Spain	43
165	Sri Lanka	5
166	St. Kitts & Nevis	10
167	St. Lucia	10
168	St. Vincent & Grenadines	10
169	Sudan	5
170	Suriname	10
171	Sweden	43
172	Switzerland	36
173	Syria	4
174	Taiwan	6
175	Tajikistan	5
176	Tanzania	6
177	Thailand	12
178	Togo	3
179	Tonga	3
180	Trinidad & Tobago	11
181	Tunisia	9
182	Turkey	32
183	Turkmenistan	5
184	Tuvalu	3
185	Uganda	5
186	Ukraine	20
187	United Arab Emirates	5
188	United Kingdom	62
189	United States	16
190	Uruguay	20
191	Uzbekistan	5
192	Vanuatu	3
193	Venezuela	14
194	Vietnam	16
195	Western Sahara	1
196	Yemen	1
197	Zambia	4
198	Zimbabwe	6

A.2 Double selection

In the main part of the paper, we correct for possible selection effects that occur because not all PTAs include provisions on IPRs. Here we extend this analysis to also control for selection into PTAs. In a first step, two or more governments need to decide whether they want to have a PTA. In a second step, they decide whether to include provisions on IPRs in that agreement. Finally, they decide on the strength of any IPR provisions.

We use two approaches to account for this double selection. For both, we rely on a undirected dyadic dataset that includes data for 196 countries. This dataset includes all dyads that can be formed by these 196 countries, independent of whether they signed a PTA. The dataset is a cross-section, that is, each dyad only appears once in the dataset. For dyads that signed more than one PTA, we only kept the one with the strongest IPR provisions.

Data on PTAs comes from the DESTA dataset (Dür et al. 2014). The data on IPR provisions, GDP, patents and so on are the same as discussed in the main part of the paper. In addition, we added a set of variables from CEPII that can explain the signing of PTAs: distance between the two countries, whether the two countries are neighbors, whether they share an official language, whether they were ever in a colonial relationship, and religious proximity (Head et al. 2010). For time variant variables, we use the year prior to PTA signature for dyads that sign a PTA. For dyads that did not sign a PTA, we use the mean over the course of the period we analyze. Table A3 provides descriptive statistics for all the variables in these models.

Table A3: Descriptive statistics (Double selection)

	N	Mean	St. Dev.	Min	Median	Max
PTA	19,110	0.32	0.47	0	0	1
IPR included	5,682	0.66	0.47	0	1	1
IPR depth	3,732	26.90	27.16	0	10.22	100
Patents (diff., log.)	19,110	5.02	3.08	0	5	14.04
GDP (diff., log.)	18,145	24.69	2.27	13.41	24.89	30.53
BRIC countries	19,110	0.06	0.24	0	0	1
GDPpc (diff., log.)	18,145	8.51	1.67	−1.59	8.68	11.64
Democracy (mean)	14,365	3.23	4.42	−10	3.46	10
WTO member	19,110	0.65	0.48	0	1	1
Word count (PTA, log.)	5,682	10.64	1.38	5.72	10	13.86
Contiguity	19,110	0.02	0.12	0	0	1
Distance (in km)	18,528	8,094.75	4,581.40	8.54	7,663.68	19,952.77
Common language	19,110	0.16	0.36	0	0	1
Colony	19,110	0.01	0.11	0	0	1
Common religion	18,145	0.17	0.25	0	0.05	1
TBT provision	5,682	0.92	0.27	0	1	1

To account for double selection, we pursue two approaches. For one, we model both selection processes. In a first model, we estimate a probit model with PTA yes/no as dependent variable, and *GDP (diff., log.)*, *Patents (diff., log.)*, their interaction, *BRIC countries*, *GDPpc (diff., log.)*, *Democracy (mean)*, *WTO member*, *Distance (in km)*, *Common language*, *Colony*, *Contiguity*, and *Common religion* as predictors. *Distance (in km)*, *Common language*, *Colony*, and *Common religion* are the instruments in this selection equation. Based on this model, we calculate the inverse Mills ratio (IMR), which we then include in the second selection equation, which is otherwise identical to Model 1 in the main part of the paper. Finally, the IMR from this equation enters the outcome equation, which is identical to Model 2. The second approach that we use to model the fact that countries also need to select into PTAs is to have a simple Heckman selection model, but with the choice to sign a PTA as the selection equation.

Table A4 shows the results. Substantively, despite the very different approaches, the results confirm those presented in the main part. In line with the hypothesis, the coefficient for the interaction between *GDP (diff., log.)* and *Patents (diff., log.)* is positive and statistically significant in the relevant equations (A3 and A5 in Table A4). Controlling for selection into PTAs thus does not change the key result: power differentials combined with differences in innovative capacity go hand-in-hand with strong IPR provisions.

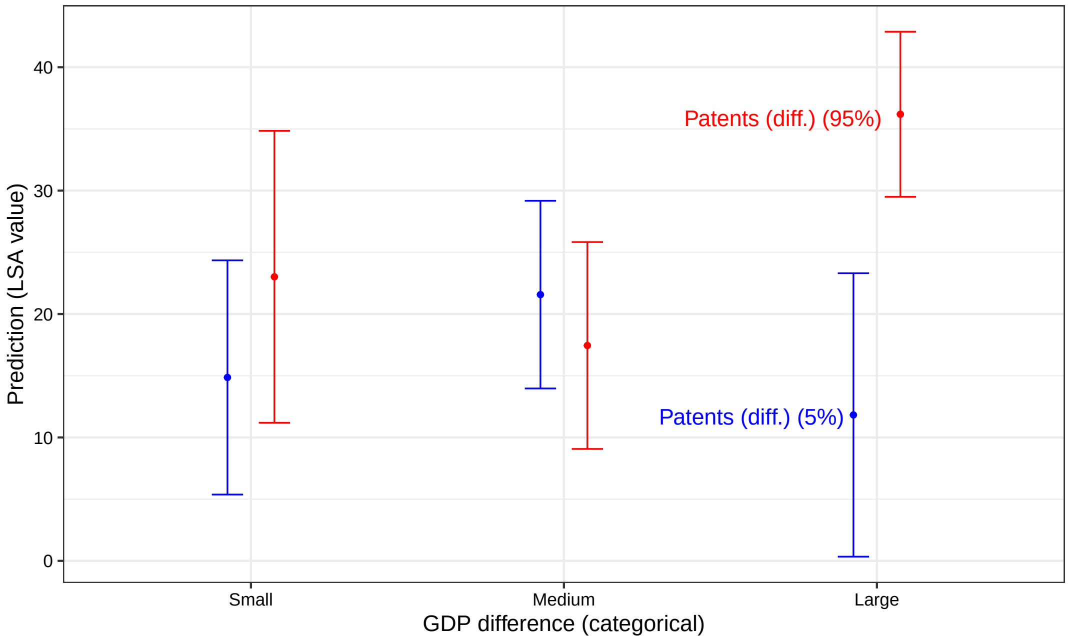
Table A4: Controlling for selection into PTAs

	Selection eq. 1	*Selection eq. 2*	*Outcome eq. (Overall)*	*Selection eq.*	*Outcome eq. (Overall)*
	(A1)	(A2)	(A3)	(A4)	(A5)
GDP (diff., log.)	-0.07^{***}	0.01	-1.29^{***}	-0.07^{***}	-1.78^{***}
	(0.01)	(0.03)	(0.38)	(0.01)	(0.24)
Patents (diff., log.)	-0.06	0.93^{***}	-4.90^{***}	-0.08	-2.17^{**}
	(0.05)	(0.11)	(1.41)	(0.05)	(0.84)
Patents (diff., log.) x	0.004^{**}	-0.03^{***}	0.23^{***}	0.005^{**}	0.17^{***}
GDP (diff., log.)	(0.002)	(0.004)	(0.05)	(0.002)	(0.03)
BRIC countries	-0.96^{***}	-1.28^{***}	-19.65^{***}	-1.03^{***}	-11.00^{***}
	(0.07)	(0.18)	(2.97)	(0.07)	(1.83)
GDPpc (diff., log.)	-0.01	0.41^{***}	0.53	-0.01	1.45^{***}
	(0.01)	(0.02)	(0.36)	(0.01)	(0.16)
Democracy (mean)	0.12^{***}	0.10^{***}	0.15	0.12^{***}	0.09
	(0.004)	(0.01)	(0.11)	(0.004)	(0.07)
WTO member	0.01	-0.15^{**}	-0.80	0.01	-0.73
	(0.03)	(0.06)	(0.77)	(0.03)	(0.57)
Contiguity	0.98^{***}			1.01^{***}	
	(0.12)			(0.12)	
Distance (in km)	-0.0002^{***}			-0.0002^{***}	
	(0.0000)			(0.0000)	
Common language	0.56^{***}			0.56^{***}	
	(0.04)			(0.04)	
Colony	0.22^{*}			0.25^{**}	
	(0.12)			(0.12)	
Common religion	0.59^{***}			0.59^{***}	
	(0.05)			(0.05)	
Word count (PTA, log.)		0.37^{***}	11.02^{***}		11.69^{***}
		(0.03)	(0.27)		(0.20)
Year (count)		-0.06^{***}	1.63^{***}		0.39^{***}
		(0.004)	(0.05)		(0.03)
TBT provision		0.43^{***}			
		(0.10)			
Constant	1.93^{***}	-8.44^{***}	-94.20^{***}	1.98^{***}	-89.67^{***}
	(0.30)	(0.72)	(10.32)	(0.30)	(5.76)
Observations	14,028	4,784	3,063	13,678	4,784
R^2			0.67		0.62
Adjusted R^2			0.67		0.62
Log Likelihood	$-6{,}537.24$				
ρ			0.41		-0.05
Inverse Mills Ratio		0.37^{***} (0.07)	6.57^{***} (1.49)		-0.82 (0.60)

Note: Models A1, A2 and A4 are probit models. Models A3 and A5 are linear models. Standard errors in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

A.3 Additional figure

Figure A1: Interaction with categorical version of *GDP (diff., log.)*



A.4 Regression tables

Table A5: Main results (no controls)

	Selection eq.	*Outcome eq.*
	(A6)	(A7)
GDP (diff., log.)	-0.07	-0.26
	(0.07)	(1.47)
Patents (diff., log.)	0.13	-7.19^{***}
	(0.10)	(2.06)
Patents (diff., log.) x	0.01	1.18^{***}
GDP (diff., log.)	(0.02)	(0.31)
TBT provision	1.13^{***}	
	(0.17)	
Constant	-0.84^{**}	27.41^{***}
	(0.39)	(9.55)
Observations	442	296
R^2		0.36
Adjusted R^2		0.35
ρ		-0.56
Inverse Mills Ratio		-11.87^{**} (5.92)

Note: Model A6 is a probit model. Model A7 is a linear model. Standard errors in parentheses. *p<0.1; **p<0.05; ***p<0.01

Table A6: Main results (English PTAs only)

	Selection eq.	*Outcome eq. (Overall)*	*Outcome eq. (Pat.)*	*Outcome eq. (Marks)*	*Outcome eq. (Copy.)*
	(A8)	(A9)	(A10)	(A11)	(A12)
GDP (diff., log.)	-0.06	-4.13^{***}	-5.55^{***}	-6.03^{***}	-5.20^{***}
	(0.10)	(1.47)	(1.24)	(1.67)	(1.49)
Patents (diff., log.)	0.13	-6.35^{***}	-7.05^{***}	-5.23^{**}	-5.10^{**}
	(0.13)	(2.16)	(1.83)	(2.43)	(2.20)
Patents (diff., log.) x	0.01	1.30^{***}	1.45^{***}	1.48^{***}	1.27^{***}
GDP (diff., log.)	(0.02)	(0.30)	(0.25)	(0.34)	(0.30)
BRIC countries	-1.16^{***}	-17.13^{***}	-9.49^{**}	-17.92^{***}	-15.65^{***}
	(0.28)	(5.61)	(4.76)	(6.28)	(5.72)
GDPpc (diff., log.)	0.01	0.08	0.73	-0.16	-0.66
	(0.07)	(0.82)	(0.69)	(0.96)	(0.84)
Democracy (mean)	0.02	0.46	0.18	0.29	0.07
	(0.02)	(0.32)	(0.27)	(0.36)	(0.32)
WTO member	0.03	1.17	0.19	2.55	2.88
	(0.20)	(2.45)	(2.06)	(2.85)	(2.50)
Word count (PTA, log.)	0.15^{*}	6.32^{***}	3.79^{***}	7.18^{***}	6.19^{***}
	(0.08)	(1.09)	(0.92)	(1.26)	(1.12)
Year (count)	-0.02	0.66^{***}	0.17	0.49^{**}	0.26
	(0.02)	(0.18)	(0.15)	(0.21)	(0.18)
TBT provision	0.83^{***}				
	(0.22)				
Constant	-1.90^{**}	-40.92^{**}	-10.36	-51.30^{***}	-30.75^{*}
	(0.80)	(16.20)	(13.67)	(18.50)	(16.51)
Observations	356	255	255	255	255
R^2		0.59	0.48	0.53	0.46
Adjusted R^2		0.57	0.46	0.51	0.44
ρ		0.40	0.09	0.76	0.39
Inverse Mills Ratio		6.34 (7.12)	1.15 (6.05)	14.42^{*} (7.94)	6.38 (7.25)

Note: Model A8 is a probit model. Models A9-A12 are linear models. The selection model is the same for all four outcome models. Standard errors in parentheses.
Significance codes: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

Table A7: Robustness checks (I)

	Outcome eq. (DESTA IPR)	*Outcome eq. (TRIPS+)*	*Outcome eq. (Patents weighted)*	*Outcome eq. (IP protection)*	*Outcome eq. (R&D spend.)*	*Outcome eq. (Mean diff.)*
	(A13)	(A14)	(A15)	(A16)	(A17)	(A18)
GDP (diff., log.)	-0.13	-0.45	0.76	2.18	0.54	
	(0.19)	(0.56)	(1.23)	(1.70)	(0.76)	
Patents (diff., log.)	-0.62^{**}	-2.42^{***}				
	(0.27)	(0.80)				
Patents share (diff., log.)			-5.23^{***}			
			(1.40)			
IP protection (diff.)				-28.82^{***}		
				(10.84)		
R&D spending (diff.)					-13.52^{***}	
					(4.34)	
Patents (diff., log.) x	0.08^{*}	0.40^{***}				
GDP (diff., log.)	(0.04)	(0.12)				
Patents share (diff., log.) x			0.65^{***}			
GDP (diff., log.)			(0.16)			
IP protection (diff.) x				3.64^{***}		
GDP (diff., log.)				(1.38)		
R&D spending (diff.) x					2.23^{***}	
GDP (diff., log.)					(0.61)	
Patents (diff. mean, log.) x						0.72^{***}
GDP (diff. mean, log.)						(0.26)
GDP (diff. mean, log.)						8.76^{***}
						(2.55)
Patents (diff. mean, log.)						-18.38^{**}
						(7.22)
BRIC countries	-1.38	-8.35^{***}	-18.34^{***}	-32.90^{**}	-17.01^{***}	-16.74^{***}
	(0.84)	(2.45)	(5.77)	(12.94)	(5.67)	(5.29)
GDPpc (diff., log.)	0.37^{***}	0.25	1.07	0.74	0.27	-0.20
	(0.13)	(0.38)	(0.91)	(1.67)	(0.82)	(0.81)
Democracy (mean)	0.06	0.11	0.80^{***}	0.87	0.33	0.36
	(0.05)	(0.13)	(0.30)	(0.56)	(0.28)	(0.28)
WTO member	-0.52	-0.05	1.57	-1.11	0.91	1.70
	(0.35)	(1.05)	(2.52)	(6.13)	(2.39)	(2.37)
Word count (PTA, log.)	0.99^{***}	2.09^{***}	4.62^{***}	11.14^{***}	7.08^{***}	7.45^{***}
	(0.17)	(0.51)	(1.11)	(3.01)	(1.12)	(1.05)
Year (count)	0.17^{***}	0.31^{***}	1.07^{***}	0.11	0.42^{**}	0.48^{***}
	(0.03)	(0.10)	(0.18)	(0.37)	(0.17)	(0.17)
Constant	-8.88^{***}	-19.42^{***}	-55.33^{***}	-130.51^{***}	-67.43^{***}	-290.88^{***}
	(2.23)	(6.70)	(13.49)	(44.93)	(14.08)	(68.77)
Observations	383	386	318	275	422	424
R^2	0.63	0.54	0.63	0.56	0.56	0.57
Adjusted R^2	0.61	0.52	0.61	0.54	0.54	0.55
ρ	-0.26	0.30	0.46	1.29	0.46	0.36
Inverse Mills Ratio	-0.61 (0.91)	2.06 (2.75)	6.76 (8.40)	40.19^{*} (22.17)	7.64 (7.07)	5.80 (6.29)

Note: Models A13-A18 are linear models. Significance codes: *p<0.1; **p<0.05; ***p<0.01

Table A8: Robustness checks (II)

	Outcome eq. (Small-) large)	*Outcome eq. (Add. controls)*	*Outcome eq. (Patents min.)*	*Outcome eq. (Top econ.)*	*Outcome eq. (North-South)*
	(A19)	(A20)	(A21)	(A22)	(A23)
GDP (diff., log.)	−1.70	−1.35	−1.60	−1.56	0.48
	(1.72)	(1.71)	(1.25)	(1.28)	(2.57)
Patents (diff., log.)	-4.39^{*}	-4.60^{**}	-3.62^{*}	-4.27^{**}	−3.18
	(2.35)	(1.79)	(1.97)	(2.04)	(2.01)
Patents (diff., log.) x GDP (diff., log.)	0.71^{**}	0.81^{***}	0.86^{***}	0.87^{***}	0.66^{**}
	(0.34)	(0.26)	(0.26)	(0.31)	(0.30)
BRIC countries	-12.55^{**}	-15.21^{***}	-17.21^{***}	-17.71^{***}	-16.14^{***}
	(6.30)	(4.76)	(4.93)	(5.43)	(5.51)
GDPpc (diff., log.)	1.77	0.23	−0.27	−0.31	−0.21
	(1.18)	(0.81)	(0.79)	(0.80)	(0.84)
Democracy (mean)	0.43	0.47^{*}	0.43	0.39	0.35
	(0.37)	(0.28)	(0.29)	(0.28)	(0.29)
WTO member	2.04	0.44	1.96	1.69	2.00
	(2.99)	(2.46)	(2.37)	(2.37)	(2.44)
Word count (PTA, log.)	7.98^{***}	6.65^{***}	7.33^{***}	7.39^{***}	7.28^{***}
	(1.34)	(1.03)	(0.98)	(1.07)	(1.07)
Year (count)	0.37^{*}	0.59^{***}	0.50^{***}	0.45^{**}	0.47^{***}
	(0.20)	(0.17)	(0.16)	(0.18)	(0.17)
GDP (sum, log.)		0.29			
		(1.91)			
Plurilateral		4.98			
		(7.50)			
Region-country		−4.18			
		(2.59)			
Region-region		−4.30			
		(5.79)			
Roll-over agreements		-9.85^{*}			
		(5.52)			
Patents (mean, log.)			−0.99		
			(1.66)		
Big3 economies				−1.53	
				(4.44)	
North-South					5.25
					(15.10)
South-South					10.26
					(15.32)
North-South x GDP (diff., log.)					−0.95
					(1.95)
North-South x GDP (diff., log.)					−1.92
					(2.21)
Constant	-77.22^{***}	−58.55	-56.07^{***}	-57.26^{***}	-68.87^{***}
	(21.00)	(40.71)	(14.03)	(15.15)	(21.57)
Observations	312	424	413	424	424
R^2	0.53	0.58	0.58	0.57	0.57
Adjusted R^2	0.51	0.56	0.57	0.55	0.55
ρ	0.37	0.05	0.38	0.38	0.41
Inverse Mills Ratio	6.38 (8.48)	0.85 (5.87)	6.08 (5.56)	6.14 (6.30)	6.65 (6.47)

Note: Models A19-A23 are linear models. Significance codes: *p<0.1; **p<0.05; ***p<0.01

A.5 Bibliography

Dür, A., Baccini, L., and Elsig, M. 2014. “The Design of International Trade Agreements: Introducing a new Dataset.” *Review of International Organizations* 9 (3): 353-375.

Head, K., Mayer, T., and Ries, J. 2010. “The Erosion of Colonial Trade Linkages after Independence.” *Journal of International Economics* 81 (1): 1–14.