

Leveraging for Better Investment Grounds:

IPR Protection through PTAs and FDI *

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Abstract

Preferential trade agreement (PTA) has long been understood as an effective institutional design to solve commitment problem for countries seeking economic expansion. This paper flips the literature by looking into how individual provision of PTA is formed and demonstrates that PTA is rather a tool to fulfill private interests, which can do more harm on some countries. I show that behind the incorporation of intellectual property rights (IPR) provisions in PTAs are the interests of multinational corporations (MNCs) and their home government leveraging its import market power against countries where MNCs establish direct investments. I test the theory with firm-level M&A data using the latest method of diff-in-diff which accounts for treatment heterogeneity due to dynamic treatment timing. The result confirms positive causality between IPR adoption in PTAs and foreign direct investment (FDI) of firms. Country-level analysis also supports the theory that developing countries eventually agree to include the provisions in the fear of losing their prominent market overseas. Case studies on Korea-US FTA and Trans-Pacific Partnership further buttress the findings.

Keywords: preferential trade agreement (PTA), foreign direct investment (FDI), intellectual property rights (IPR), staggered difference-in-differences

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1 Introduction

The implications of the current literature on PTAs highlight voluntary aspects of PTAs and how they eventually benefit the countries, often emerging economies, in need of food for growth. Buthe and Milner (2008) argue that countries sign PTAs in hopes of increased foreign direct investment (FDI) inflow because foreign investors perceive PTAs as signals of credible commitment to the security of their property rights. Pevehouse (2010) shows that burgeoning democracies can gain credibility from the international arena through joining international organizations (IOs) because IOs impose conditionality of reforms on the new members to maintain their membership, and political leaders are subject to significant reputation costs if they do not live up to the promise of reforms.

Nonetheless, if PTA really is an effective institutional design, why do some countries, developing countries in particular, end up signing PTAs with clauses that are utterly unfavorable and thus supposed to be far outside of their bargaining zone? One good example is Korea-US Free Trade Agreement (FTA) where South Korean government agreed to include highly restrictive intellectual property rights (IPR) regulations pertaining to pharmaceuticals industry. Korean national healthcare system relies heavily on generic drugs whereas introduction of pharmaceuticals patent protection pushed by US should entail delays in production of generic drugs and subsequent dramatic surge on drug prices. As a result, Korean government was bound to suffer from remarkable rise in reimbursement for medical bills due to inflated drug prices. The rationale behind the decision of Korean government to embrace such detrimental clause cannot be sufficiently explained by "tying hands" mechanism from the existing literature, since inclusion of such clause deviated far from the government's bargaining zone as explained thus far.

This paper solves the puzzle above by looking into what actually is the driving force behind inclusion of those individual articles and chapters in PTAs. The particular focus is on the adoption of substantive intellectual property rights (IPR) protection in PTAs and its effect on FDI, since IPR protection has become the utmost priority of elite firms engaging in direct investment overseas. Multinational corporations (MNCs) of developed countries seek for strong IPR protection in their FDI destination countries, in order to hedge themselves from the loss of confidential information and earn more profits in the local market. Home government to MNCs get

to take an action on behalf of MNCs as they have the most resources to lobby and consequently mobilize their home government. The government then pushes investment destination countries of MNCs to adopt highly restrictive IPR regulatory measures in PTAs, leveraging their market power against those countries which are often times developing nations. Even though emerging economies strongly oppose to these IPR provisions as their development is seriously tampered by limited access to new technologies, emerging economies have no other choice but to sign the PTAs with such IPR regulations because of the long history of their market dependence on developed countries.

The theory above boils down to two parts; 1) behind the adoption of IPR provisions are the interests of MNCs as investors in destination countries, 2) developed countries leverage their market power against emerging economies when negotiating PTAs, compelling them to adopt IPR clauses that are beneficial to the multinationals. I test the first part of the theory with firm-level FDI data employing the latest method in the diff-in-diff literature to account for treatment effect heterogeneity due to dynamic treatment timing. The second part of the theory is tested with Design of Trade Agreements (DESTA) dataset, using bivariate probit selection model. The results show strong support to both parts of the theory. Case studies on Korea-US FTA and Trans-Pacific Partnership agreement further endorse the findings.

2 Theory

2.1 Firms demanding IPR protection

The existing literature has a general consensus on ex post effects of PTAs on FDI inflows in positive direction. Medvedev (2012) and Berger et al. (2013) confirm that strong investment protection provisions and liberal admission rules of PTAs attract more FDI inflows. Dee and Gali (2005) show that non-tariff provisions of PTAs including but not limited to national treatment and IPR protection clauses increase bilateral FDI inflows at country level. Nonetheless, these studies are limited in the sense that they barely touched on the exact mechanism of how certain provisions stimulate investments or how such provisions got included ex ante. More importantly, they leave out the crucial decisionmaker in FDI process - firms, since all the analyses have been conducted at

state level.

Although firms are the actual main actors engaging in direct investments, little has been made of firm level perspectives on PTAs with regards to FDI decisions. Firms have heterogeneous preferences even within industries as they vary in sizes, productivity and level of product differentiation. Due to this heterogeneous nature of firms, only some portion of firms which are well above the threshold are capable of exporting or further establishing direct investment overseas. (Helpman et al., 2004; Helpman, 2006; Bernard et al., 2007; Bernard et al., 2009; Bernard et al., 2012) Although small in their numbers, these handful of multinational firms have a hold on most of the intellectual property rights, including patents, trademarks, copyrights and so forth. Bessen (2020) finds that investment in information technology is disproportionately beneficial to top firms of an industry since it increases productivity of top firms even further and subsequently leads to the larger market share.

Moreover, Autor et al. (2020) show that industries become more concentrated on superstar firms as globalization or technological gain drives up the sales of the most productive firms among an industry. In turn, industries with higher degree of concentration on superstar firms experience even faster growth of productivity than others. Linking Bessen (2020)'s finding to Autor et al. (2020)'s argument, elite firms which are already the most productive in their industry get to increase their productivity even further through acquiring intellectual property rights, which leads to larger market share. This feedback loop of technological gains capacitates elite firms to monopolize market and maximize their profits. It is a corollary for multinational firms to seek for IPR protection in their investment destinations as it is a channel to maximize their profits.

Not surprisingly, elite firms have the most resources to lobby their home government and have their demands heard. Matilde Bombardini and Francesco Trebbi (2012) find that in oligopolistic market where concentration on elite firms is high and products are differentiated, the elite firms are more likely to lobby individually to get product-specific protection which raises price of their own products rather than collectively lobby to get industry-wise protection. I bring their finding to the context of MNCs demanding for IPR protection. IPR intensive sectors including information technology industry, wholesale/retail trade, and so forth are heavily concentrated around a few elite firms. (Toole et al., 2022) These most profitable firms lobby government intensively to get product-specific production which is IPR protection in this context, because they want raise in

prices and profits of their own products.

Moreover, Huneus and I. S. Kim (2018) show that firm lobbying is essentially rare and if a firm ever gets to lobby then its lobbying expenditures strictly increases with its revenue. And these handful of firms that have entered into lobbying market persistently engage in lobbying. Similarly, Cowgill et al. (2021) find that market power begets political power. In other words, elite firms with the most resources get to have the most access to policymakers and gain disproportionate benefits. Bombardini and Trebbi (2020) also point out that firm lobbying is highly concentrated among the most productive firms of each industry. In sum, all the literature speaks to the mechanism of how MNCs buy off political influence to achieve their goal - having their home government to sign PTA including IPR provision with their investment target countries.

So far, I discussed why MNCs want IPR protection in their FDI destinations and how they get their goal achieved. MNCs want to maximize their profit through IPR protection and they successfully lobby their home government utilizing enormous amount of resources they possess. Henceforth, I deviate from the existing literature that all PTAs are beneficial to the countries that sign the agreements in the way that they work as credible commitment device and signatories enjoy the increase of FDI inflow. Instead, only the PTAs that satiate private interests of MNCs, which are PTAs with IPR provisions in the context of this paper, attract more FDI from MNCs. This naturally leads to the hypothesis below.

Hypothesis 1: Firms are more likely to increase FDI only after recipient countries sign PTAs with IPR provisions.

2.2 Leveraging import market power

Once the home government of the MNCs sits down at the negotiation table, now its utmost concern is whether the partner country will agree to include the IPR protection provisions in the PTA. Commitment to strong IPR regulation often times entails deep compromise of existing local laws and institutions. This is particularly the case for emerging economies. (Shadlen, 2005) It is a common practice for emerging countries to pursue development by starting from imitation and spillage of advanced technologies, so high barriers to be introduced by agreeing to IPR standards in the interest of developed countries surely do much harm than good for the sake of emerging states.

Moreover, high IPR standards often result in prolonged delays for developing countries to obtain crucial technologies directly related to promotion of public well-being, as paths for replicating these technologies at lower costs for mass production is banned by the IPR restrictions. (Markusen, 2001; Maurseth, 2018)

As discussed above, it is a challenging task for developed countries to negotiate the terms for IPR protection with developing countries, as the high IPR standards are often not in the best interest of developing countries. Thus, developed countries have to come up with a powerful device to "twist the arms" of developing countries not willing to adopt such regulatory measures. The weakness of emerging economies that developed countries can take advantage of lies in the major sources of revenues to fuel their economy - intensive reliance on exports to markets of developed countries and FDI from MNCs.

Not so coincidentally, many FDI hosts of MNCs often times make up a large share of major exporters in the global economy. To put it differently, it also means that these developing countries rely heavily on exports to generate revenues. This is of no surprise as emerging economies have a few key comparative advantages over developed countries, including but not limited to low production costs and currency undervaluation. These advantages are considered to be key determinants of FDI attractiveness to investors and whether home firms choose to engage in export business. From the perspective of foreign investors, low production costs lead to cutdown in operational costs. Currency undervaluation of investment destinations helps investors to sell their products produced in subsidiaries at cheaper price, granting their products price competitiveness. The very same logic applies to exporting firms of emerging economies as well. (Jensen et al., 2015; Yeaple, 2009) In addition, Head and Ries (2001) finds pattern of complementarity between FDI and exports for the countries that host FDI in vertical mode, which is attributed to the intrafirm trade to ship intermediates from subsidiaries to headquarters.

Developed countries are substantially large, prominent market to emerging economies which they can't let go of. It is fundamentally because consumers of developed countries are large in numbers and have high purchasing power coming from relative wealthiness. Beyond that is the established trade dependence of emerging economies on developed countries. Under GATT/WTO trade regime, developing nations have been able to gain preferential access to markets of advanced economies through Generalized System of Preferences (GSP). Given the unilateral tariff conces-

sions from developed nations, emerging economies were able to fuel their economic growth by intensively engaging in exports to those countries. (Bhattacharya, 1976; Brenton, 2003) Manger and Shadlen (2014) point out that the trade dependence of emerging economies on developed nations has substantially intensified because of GSPs, and emerging economies now have to switch from preferential access to reciprocal trade agreements which entail profound concessions from their end. Entrenched dependence on trade, which the authors define as "political trade dependence", urges emerging economies to enhance the stability of existing market access by making deep concessions such as economic or institutional reforms.

What the existing literature suggests so far is that trade dependence and market prominence of developed countries empower them with good leverage over emerging economies when negotiating PTAs. Developed countries are confident enough to offer a take-it-or-leave-it deal to emerging economies by declaring IPR provisions of their interests must be included or the negotiation should be over. Emerging economies are left with no choice but to sign PTAs with strong IPR regulations strictly compromising their development, in the fear of losing their important market. Then, the following hypothesis can be derived from what has been discussed so far.

Hypothesis 2: Countries with stronger market prominence are more likely to succeed in including substantive IPR protection in PTAs.

I define market prominence as centrality of a country within the global trade network which is weighted by the bilateral flows of import. Imports as weights should effectively capture how important a country is to another country as a market overseas. Method used to compute market prominence is elaborated in the following section.

3 Empirical analysis

3.1 MNCs' demand for IPR protection and investment decisions

3.1.1 Data

The first hypothesis serves the purpose of proving that the major drive for adopting IPR provisions in PTAs is MNCs' demand for IPR protection in investment destinations. If MNCs are actually behind the adoption of IPR provisions in PTAs, then their investment decisions should be contingent on whether countries they seek to invest in have signed PTA with their home country including such provisions.

In order to examine FDI decisions of firms with respect to IPR provisions, I use firm-level FDI data from Shim and Stone (2022). Observations of the data are annual mergers and acquisitions (M&A) amount in US dollars of individual firms which appear in Fortune 500 list. M&A is the common approach of firms to establish direct investment overseas, as acquisition of already-existing firms has a few key advantages over greenfield investment. It is less expensive, reduces acclimation time to new market, and can retain current customer base along with management team with local business know-how. (Harzing, 2002)

I aggregate M&A amount of each firm by year and home country of target firms and then take a log of base 10 to create the dependent variable. Only the firms of IPR intensive sectors are included in the analysis to reduce possible errors coming from non-IPR intensive firms. Identifying IPR intensiveness of industry sectors follows classification from Toole et al. (2022), the annual report published by US Patent and Trademark Office. The report defines the following industries to be IPR intensive: manufacturing, wholesale/retail trade, information, professional services, and finance.

IPR adoption status of PTAs is obtained from the Design of Trade Agreements (DESTA) data by Dür et al. (2014). Explanatory variable of interest is *IPR protection* which is a binary variable indicating whether a PTA signed by a dyadic pair of countries contains substantive IPR regulatory provisions.

Table 1: Descriptive statistics for firm-level M&A data

	N	Mean	SD	Min	Max
M&A amount $_{k,t}$	5,690	2.46	3.32	-4.61	12.4
M&A amount $_{k,t-1}$	4,732	2.42	3.33	-4.61	12.4
Ranking $_{k,t-1}$	3,194	333	136	1	500

3.1.2 Empirical strategy

Firm-level dependent variable together with dichotomous explanatory variable provides a good setting to look for causal effect between the variables using independent variable as treatment. Precisely, firm k of developed country i receives treatment if i signs PTA including IPR provisions with developing country j . One concern to this approach is that firms may be subject to treatment heterogeneity because of dynamic treatment timing. In other words, the effect of a PTA with IPR provision signed in year 2010 on firms may differ from the effect of another PTA signed in year 2020. This is because pre and post-treatment windows should differ and thus impact exposure to treatment depending on the timing of receiving treatment. (Baker et al., 2022)

The latest diff-in-diff method proposed by Sun and Abraham (2021) overcomes the problem above by constructing the new estimator robust to treatment heterogeneity. The core idea is to group observation units into cohorts depending on the treatment timing, and measure average treatment effect on the treated across all the cohorts. I follow their method to compute treatment effect of IPR provisions in PTAs on FDI decisions of firms, represented by the amount of M&A overseas.

In the first step, firms are grouped into cohorts depending on what year they received treatment. Cohort-specific average treatment effect on the treated (CATT) is computed for each cohort as below, using the conventional method in diff-in-diff literature which is two-way fixed effects regression including leads and lags of treatment.

$$Y_{k,t} = \alpha_k + \lambda_t + \sum_{e \notin C} \sum_{l \neq 1} \delta_{e,l} (\mathbf{1}\{E_k = e\} \cdot D_{k,t}^l) + \epsilon_{k,t} \quad (1)$$

$Y_{k,t}$ is the outcome variable which is equivalent to the M&A amount of firm k in year t . α_k and λ_t are firm fixed effect and year fixed effect, respectively. $\delta_{e,l}$ captures $CATT_{e,l}$. $\mathbf{1}\{E_k = e\}$ is the cohort indicator, and is interacted with the relative time indicator $D_{k,t}^l$. $l \in g$ is time period

relative to treatment timing. There are three relative time periods with respect to treatment timing - before signature of PTA, PTA signed but not enforced yet, and PTA in enforcement. I exclude all the units observed a year before treatment in order to eliminate correlation problem among relative time periods, as suggested in the literature. The rationale behind breaking down post-treatment windows into two groups, in between signature and enforcement, and the aftermath of enforcement, is to account for the fact that there normally exists some years of gap between signature and enforcement of PTAs. It is doubtful whether unenforced PTAs demonstrate full treatment effect on firms since the protection is not in place yet for the firms.

Next, weights of each cohort are estimated by sample shares of each cohort in relative time periods $l \in g$. The weights are computed as follows.

$$Pr\{E_k = e | E_k \in [-l, T - l]\} \tag{2}$$

Finally, the average treatment effect across all the cohorts is captured by the Interaction-Weighted (IW) estimator which is constructed from $CATT_{e,l}$ and weights of each cohort obtained from Equation (2). The term IW estimator follows the original naming by the authors. Below is the computation of IW estimator.

$$\hat{v}_g = \frac{1}{|g|} \sum_{l \in g} \sum_e \hat{\delta}_{e,l} \widehat{Pr}\{E_k = e | E_k \in [-l, T - l]\} \tag{3}$$

\hat{v}_g denotes the IW estimator. Note that $\hat{\delta}_{e,l}$ is the CATT estimate of $\delta_{e,l}$ from Equation (1). $\widehat{Pr}\{E_k = e | E_k \in [-l, T - l]\}$ is the estimate of cohort-specific weight $Pr\{E_k = e | E_k \in [-l, T - l]\}$ returned from Equation (2). $\frac{1}{|g|}$ normalizes the weights by the size of g .

3.1.3 Results

Table 2 presents IW estimates. All the coefficients can be understood as IW estimates for CATT across all the cohorts, with regards to each relative time period. The first column represents the main specification of interest, while the other two columns are variations. The first two columns use never treated units as the control cohort. The last column uses last treated units as the control

cohort, dropping all never treated units from the analysis. The purpose of using last treated units as the control cohort is to account for systemic difference that may exist among PTAs signed in different years, due to certain trends of PTA designs or some shocks in global economy. The second column adds to the first column $Ranking_{k,t}$ which is Fortune 500 ranking of firm k in year t and M&A amount of firm k a year before year t as covariates. This is to account for the possibility of parallel trend assumption being contingent on those two covariates. The rationale behind is that M&A amount of this year may be influenced by the amount of last year. Size of the firm represented by Fortune 500 ranking can also affect the M&A amount as larger firms are generally more productive and thus more likely to engage in intensive FDI. (Helpman et al., 2004)

Table 2: IW Estimates for CATT

	(1)	(2)	(3)
	M&A amount	M&A amount	M&A amount
Before signature	-0.451 (0.306)	-0.443 (0.485)	-0.054 (0.457)
Signed, not enforced	-0.644* (0.295)	-0.999* (0.437)	0.277 (0.910)
After enforcement	0.804*** (0.201)	1.088*** (0.266)	1.206* (0.546)
Year FE	✓	✓	✓
Firm FE	✓	✓	✓
Covariates		✓	
Control cohort	Never treated units	Never treated units	Last treated units
N	4,078	2,462	596

Standard errors clustered at firm level reported in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

All three columns of Table 2 confirm the prediction made in Hypothesis 1; fully enforced PTAs with IPR provisions have positive treatment effect on M&A amount of firms. Each coefficient is to be understood as an IW estimate for CATTs and thus can be translated into the average M&A amount of treated firms across all the cohorts. Insignificant coefficients associated with the pre-treatment period denoted as "Before signature" satisfy the assumption of no pretrend to validate the use of the estimator. Coefficients for one of the post-treatment periods, "Signed, not enforced" are negative for columns (1) and (2) but if summed up with those of "After enforcement", the overall treatment effect in the post-treatment periods remains positive.

To get a better sense on the substantive interpretation of each coefficient, I provide an event study plot as shown in Figure 1 using column (1) from Table 2. Each dot represents the IW

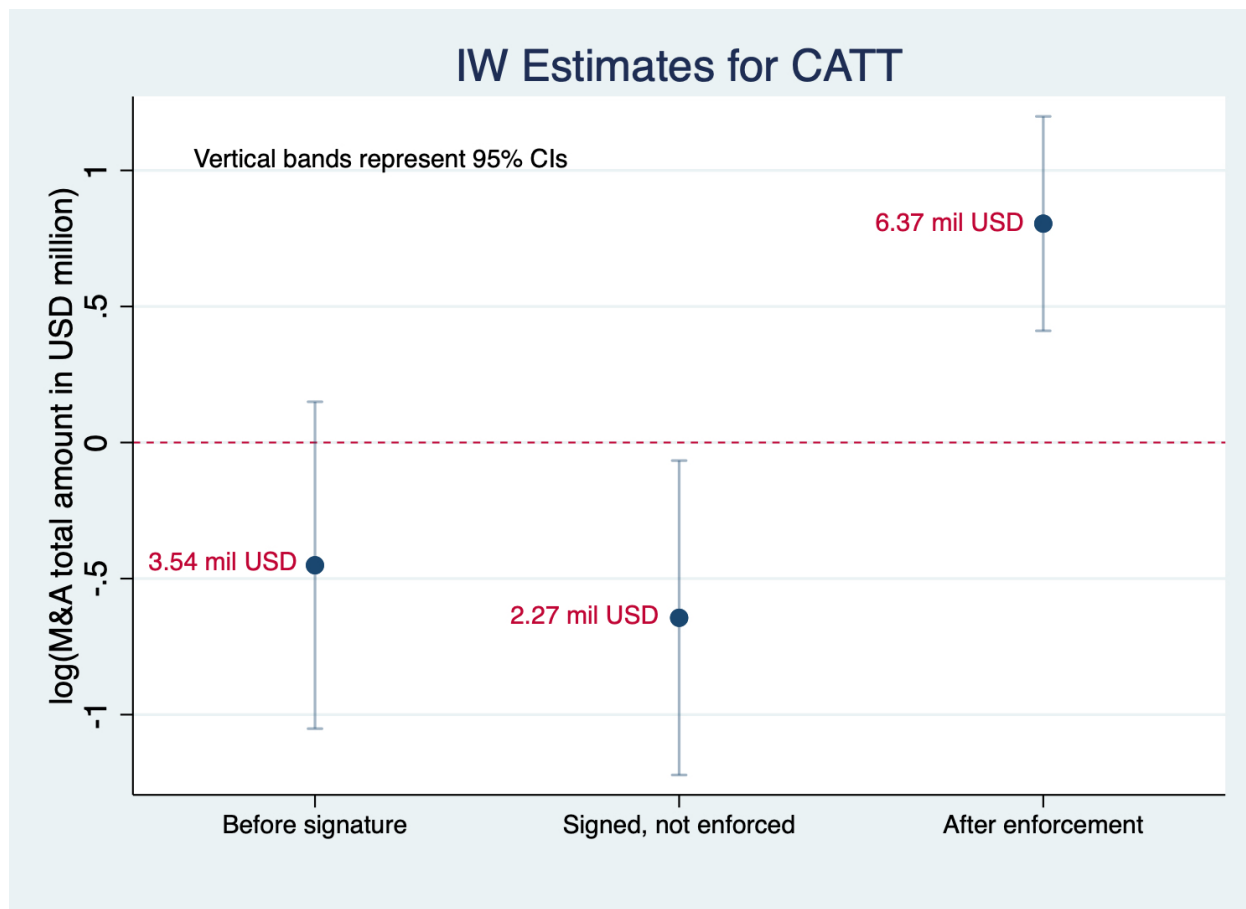


Figure 1: Event study plot of IW estimates, using column (1) of Table 2

estimate of each relative time period, and numbers next to the dots are the coefficients translated into the substantive M&A amount in US dollars. The plot illustrates that a firm invests 3.54 million USD in average before PTA with IPR provisions is signed, and after the firm receives the treatment and the PTA enters enforcement stage, the M&A amount is nearly doubled to 6.37 million USD.

3.2 Developed countries leveraging trade network centrality

3.2.1 Data

The second hypothesis speaks to the second part of the theory; developed countries which are home to MNCs utilize their import market power against emerging economies which are investment destinations to the MNCs in order to include IPR provisions in PTAs. Since the theory specifies the interaction between developed and developing countries, only the dyadic observations of developed-developing country pairs are used. I employ two most commonly used criteria to determine developed country status, Human Development Index (HDI) developed by the United Nations Development Programme and GDP per capita. It is generally conceived that threshold for developed country status is HDI greater than or equal to 0.8 and GDP per capita over \$25,000.

Using these criteria, I define one end of a dyad, country i as developed country which is home to multinational firm k appearing in Hypothesis 1. The other end is country j which is developing country and at the same time the investment destination of firm k .

The dependent variable is *IPR protection* which is used as the treatment for testing Hypothesis 1. To recall, it is a binary variable indicating whether a PTA contains any substantive IPR provision. The explanatory variable of interest is *Centrality _{i}* . It represents the eigenvector centrality of country i within the global trade network, ranging between 0 and 1. The closer the centrality is to 1, the more central and thus more powerful a country is in the trade network. The variable captures the idea of developed country market prominence to developing countries as described in the theory. The advantage of using eigenvector centrality over other centrality measures is that it accounts for both number of connections to other countries and how many powerful partners central to the network a country is connected to. The variable has been created using Direction of Trade Statistics(DOTS) dataset (Statistics Department, International Monetary Fund, 2021). DOTS lists annual export and import values in US dollars of all dyadic pairs of countries worldwide engaging in trade. Trade networks are built for each year t weighted by logged import values flowing in the direction from country i to j within each dyad. Then, eigenvector centrality of each country i in year t is calculated from the trade networks.

Veto players _{j} controls for the effect of the number of veto players in country j on ratifying a trade agreement in country j . Mansfield and Milner (2012) argues that as number of veto players in a country increases, regardless of the regime type, it is likely that diverging interests of stakeholders related to PTAs clash more often, obstructing ratification of PTAs. Building on to the idea, I posit that country i will have more difficult time getting PTAs with IPR provisions eventually signed or enforced in country j if veto players in country j increase in numbers and thus have more say in decisionmaking process. The variable originates from the Political Constraint Index (POLCON) dataset by Henisz (2002), following the methodology suggested in Mansfield and Milner (2012). The dataset offers two indices of measuring the intensity of political impact veto players have, *POLCON III* (Henisz, 2002) and *POLCON V* (Henisz, 2000). Both indices range from 0 to 1, being closer to 1 meaning larger political impact of veto players and thus policy change becomes more unlikely. The major difference between these measures is whether legal branch is counted as a significant veto player. I test for both of the indices, each denoted as *Veto players _{j}* (III) and *Veto players _{j}*

(V).

I also control for *Trade volume*, a logged sum of export and import in year t between countries i and j within a dyad. This speaks to the literature arguing that countries engaging in intensive trade with their trading partners are more likely to demand for stronger IPR protection to the partners. (Ethier and Markusen, 1996; Markusen, 2001; Helpman, 2006; Maurseth, 2018)

3.2.2 Empirical strategy

Due to the nature of the observations used in testing for Hypothesis 2, the issue of selection bias arises. IPR protective measures can only be adopted when countries do sign PTAs. Thus, observation of *IPR protection* is solely contingent upon PTA participation status. Note that *PTA* is the binary variable indicating whether a dyadic pair of countries have signed PTA. The data consists of three different types of observations - dyadic pairs of countries that have no PTAs signed at all between themselves ($PTA = 0$), dyads that signed PTAs without IPR clauses ($PTA = 1$ & *IPR protection* = 0), and dyads that have PTAs including IPR clauses ($PTA = 1$ & *IPR protection* = 1). There is more observability granted in this setting than the bivariate probit model with partial observability, but less than the full bivariate probit model. This is because dyads that have PTAs are distinguishable in terms of IPR clause adoption status, whereas dyads that do not have PTAs are indistinguishable in adoption of IPR clauses.

Berinsky (2004) proposes implementing the bivariate probit model with sample selection, also as known as the bivariate probit model with "partial" partial observability, to solve this specific type of selection bias issue. Following his approach, Hypothesis 2 is tested with the bivariate probit model with selection. The first stage selection equation is as below:

$$Pr(PTA = 1) = \Phi(Z\gamma), \quad (4)$$

where Z is the matrix of regressors that determine whether a PTA is signed between two countries in a dyadic pair. Regressors include the exclusion restrictions along with explanatory and control variables to be used in the second stage estimation. Exclusion restrictions used in the selection stage are *Contiguity* and *Distance* and *Veto players_j*. *Contiguity* and *Distance*, the geographic factors in determining PTA status, are obtained from GeoDist dataset provided by CEPII (Mayer

and Zignago, 2011). *Contiguity* is a binary indicator taking value of 1 when two countries are contiguous and 0 otherwise. *Distance* denotes distance between two countries in kilometers. It is believed that countries sharing borders or close to each other in terms of distance are highly likely to sign PTAs as a consequence of active trade. (Scott L Baier and Jeffrey H Bergstrand, 2002; Scott L. Baier and Jeffrey H. Bergstrand, 2009) These two variables however, do not have direct effect on adopting IPR provisions since inclusion of IPR clauses is mainly driven by demands of investing firms which has little to no relationship with geographical adjacency or distance between any two countries.

The outcome equation on *IPR protection* is specified as below:

$$Pr(IPR\ protection = 1, PTA > 0) = \Phi_{bn}(Z\gamma, X\beta, \rho), \quad (5)$$

where Φ_{bn} stands for the CDF of standardized bivariate normal distribution, X the matrix of the explanatory and the control variables which are *Centrality_i*, *Veto players_j* and *Trade volume* respectively. ρ is the correlation of the error terms from the two equations above.

Table 3: Descriptive statistics - HDI cutoff

	N	Mean	SD	Min	Max
Centrality _i	15,047	.769	.126	.491	1
Veto players _j (III)	11,639	.292	.196	0	.679
Veto players _j (V)	11,383	.38	.264	0	.854
Trade volume	15,047	17.1	3.36	6.44	27.2
Distance	15,047	8.76	.651	5.05	9.85

Table 4: Descriptive statistics - GDP per capita cutoff

	N	Mean	SD	Min	Max
Centrality _i	12,622	.795	.122	.544	1
Veto players _j (III)	9,459	.309	.195	0	.679
Veto players _j (V)	9,252	.41	.265	0	.854
Trade volume	12,622	17.7	3.37	6.44	27.2
Distance	12,622	8.72	.744	4.09	9.85

3.2.3 Results

Table 5 presents the results of bivariate probit models with sample selection. Columns (1) and (2) use HDI as criterion for developed country status while columns (3) and (4) use GDP per capita to determine the status. Fixed effects are not included here in order to avoid incidental parameters problem frequently arising in non-linear models when the number of observations for

each dyad is only handful (Lancaster, 2000; Wooldridge, 2002) - in this paper, there are over 5,000 dyads and each dyad only has 10 observations at most. Standard errors are clustered at dyadic level for all four models. Across all four models, as $Centrality_i$ increases, the probability of *IPR protection* also increases. The finding confirms Hypothesis 2; FDI sender countries (developed country i in a dyad) leverage their trade network centrality against FDI recipient countries (developing country j in a dyad) to satisfy the demands of investing firms for enhanced protection in their intellectual property rights.

Figures 2 and 3 elaborate on the effect size of $Centrality_i$ on predicted probabilities of the dependent variable *IPR protection*. Columns (1) and (3) in Table 5 are used to calculate the predicted probabilities. I let $Centrality_i$ to vary from 0.5 to 1 instead of starting from 0 since the minimum value of the variable is 0.491 when HDI is used as determinant of developed country status as can be seen in Table 3, and 0.544 when GDP per capita is used (refer to Table 4). Shaded areas of the graphs represent 95% confidence intervals of the predicted probabilities. Beneath the lines I juxtapose density plots.

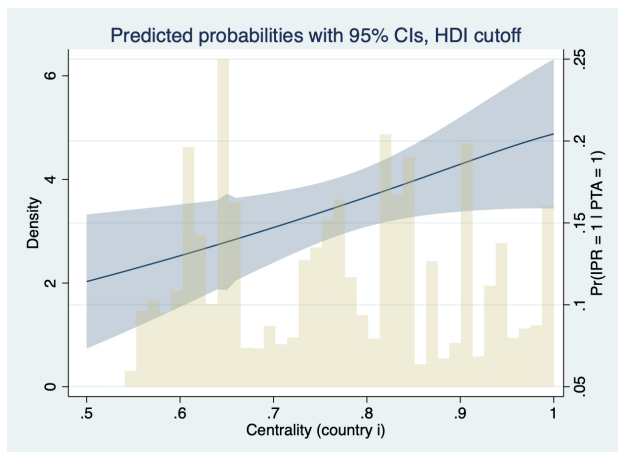


Figure 2: HDI as cutoff

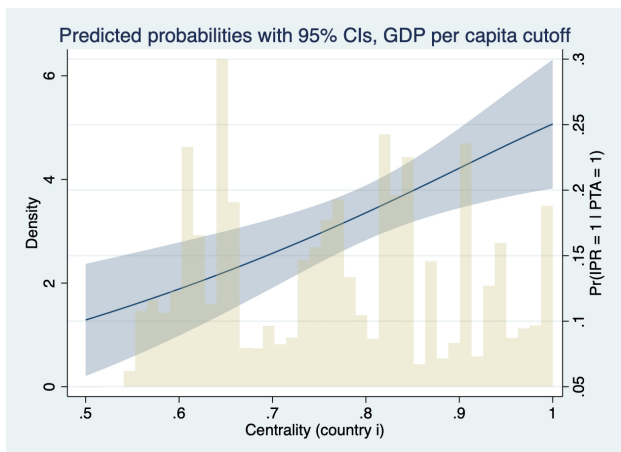


Figure 3: GDP per capita as cutoff

Figure 2 shows that when $Centrality_i$ doubles from 0.5 to 1, probability of having IPR provision in PTA which is $Pr(IPR = 1|PTA = 1)$ also nearly doubles from 0.11 to 0.2. In Figure 3, the effect is a little more magnified than in Figure 2. If $Centrality_i$ doubles from 0.5 to 1, $Pr(IPR = 1|PTA = 1)$ increases from 0.1 to 0.25 which is 2.5 times the initial probability.

Last but not least, I examine the validity of using the bivariate probit models with selection over basic probit models. In Table 5, all columns have statistically significant ρ^{-1} , which means that the outcome equation cannot be measured alone as the results will be biased. (Xiang, 2010).

Table 5: Bivariate probit model with selection

	(1) HDI	(2) HDI	(3) GDP per capita	(4) GDP per capita
<i>Outcome</i>				
Centrality _{<i>i</i>}	0.779* (0.358)	1.070** (0.356)	1.238** (0.381)	1.507*** (0.371)
Veto players _{<i>j</i>} (III)	1.214*** (0.153)		0.996*** (0.173)	
Trade volume	0.005 (0.014)	-0.013 (0.014)	-0.029 (0.015)	-0.043** (0.016)
Veto players _{<i>j</i>} (V)		1.030*** (0.121)		0.865*** (0.123)
Constant	-2.031*** (0.249)	-1.973*** (0.247)	-1.690*** (0.284)	-1.686*** (0.270)
<i>Selection (PTA)</i>				
Contiguity	0.351 (0.262)	0.272 (0.263)	-0.142 (0.239)	-0.177 (0.246)
Distance	-0.364*** (0.040)	-0.365*** (0.041)	-0.526*** (0.039)	-0.516*** (0.039)
Centrality _{<i>i</i>}	0.091 (0.318)	0.346 (0.320)	0.318 (0.326)	0.547 (0.329)
Veto players _{<i>j</i>} (III)	1.347*** (0.140)		1.247*** (0.150)	
Trade volume	0.045*** (0.013)	0.029* (0.013)	0.023 (0.014)	0.006 (0.014)
Veto players _{<i>j</i>} (V)		0.984*** (0.103)		0.956*** (0.110)
Constant	1.130** (0.380)	1.267** (0.391)	2.871*** (0.395)	2.912*** (0.398)
ρ^{-1}	3.757*** (0.373)	3.764*** (0.403)	3.116*** (0.252)	3.484*** (0.262)
<i>N</i>	10,893	10,639	8,867	8,660

Standard errors clustered at dyadic level in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

3.2.4 Robustness check

2SLS regression with the same setup of variables as the bivariate probit model is used to cross-examine if the results in Table 5 are robust to different specifications. Although the use of linear model with binary dependent variables is misspecification, there are clear advantages of using linear probability model - it does not suffer from convergence or numerical instability problem, and can effectively control for unobserved heterogeneity through including fixed effects. (Lewbel et al., 2012) The 2SLS models have the same set of exclusion restrictions used in the selection models, *Contiguity* and *Distance*. *PTA* is the variable to be instrumented in the first stage, just as the selection models in Table 5.

Table 6: 2SLS regression with fixed effects

	(1)	(2)	(3)	(4)
	HDI	HDI	GDP per capita	GDP per capita
Centrality _{<i>i</i>}	0.262*** (0.049)	0.267*** (0.050)	0.186** (0.061)	0.190** (0.063)
Veto players _{<i>j</i>} (III)	0.025* (0.012)		0.019 (0.015)	
Veto players _{<i>j</i>} (V)		0.023* (0.011)		0.023 (0.014)
Trade volume	-0.017*** (0.003)	-0.018*** (0.003)	-0.012*** (0.004)	-0.013*** (0.004)
PTA	0.431*** (0.068)	0.434*** (0.068)	0.263** (0.081)	0.263** (0.081)
Year FE	✓	✓	✓	✓
Country FE	✓	✓	✓	✓
Hansen J statistic	1.78	1.54	0.04	0.01
<i>N</i>	10,893	10,639	8,867	8,660

Standard errors clustered at dyadic level in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

All four columns include year and country fixed effects. Standard errors are clustered at dyadic level. Table 6 confirms that the substantive results still hold for the 2SLS specification as well. Across all four models, *Centrality_{*i*}* is statistically significant and has the same direction of effect on *IPR protection* just as the bivariate probit with selection models presented in Table 5.

4 Case study

In this section, I examine two real-world cases to buttress the findings of this paper. Both of the cases involve United States, as it is the leading pioneer of enforcing strict IPR regulations when signing PTAs. (Fink and Reichenmiller, 2005) Behind the action is US firms' increasing awareness of IPR infringements harming their business. In the National Trade Estimate (NTE) reports on foreign trade barriers published by Office of the United States Trade Representative (USTR) especially during the last decade, US exporters and multinationals have constantly complained IPR violations and thefts occurring in some major trading partners of US, including but not limited to China, Chile, Turkey, Japan and Vietnam. IPR section in the chapter covering Chile from 2016 NTE report reads,

"The 2015 Special 301 Report identified weaknesses in the adequacy and effectiveness of Chile's protection and enforcement of intellectual property. Specific obstacles include an ineffective Internet Service Provider liability regime, lack of protection against the unlawful circumvention of technological protection measures, ... The Report also urged Chile to address challenges in reviewing patent issues in connection with applications to market pharmaceutical products and to provide adequate protection against unfair commercial use of undisclosed test of other data generated to obtain marketing approvals for pharmaceutical products."

Two cases discussed in the following subsections demonstrate how US government resonated with the concerns of its MNCs as the excerpt above and leveraged its import market power against the partners to include IPR provisions in PTAs.

4.1 Korea-US FTA

Korea-US FTA was not an easy deal to strike for the US until it was eventually signed in 2007. Committee reports from the United States Industry Trade Advisory Committee for Chemicals, Pharmaceuticals, Health/Science Products and Services (ITAC 3) filed during the negotiation process of Korea-US FTA shows how challenging it was for US to apply IPR standards equivalent to relevant US laws. The report states that

"... this agreement blatantly excludes provisions to ensure affordable access to safe and

effective generic medicines. ... The implementation of laws, regulations and policies that are founded on unbalanced intellectual property principles will lead to the development of barriers to market access for U.S. generic manufacturers - barriers that do not exist in U.S law, and do not reflect the standard of protection found in U.S. law. ... Korea continues to move forward with imposition of an entirely new reimbursement system which does not adequately recognize and reward innovation or place a high priority on early patient access to cutting edge, life-saving medicines. It is critical that the U.S. government continue to address these issues as quickly as possible.”

While the generic report submitted by Advisory Committee for Trade Policy Negotiations (ACTPN) assesses IPR provisions in Korea-US FTA being at the highest level compared to other bilateral agreements signed before, US chemical/pharmaceuticals sector was not pleased enough with IPR protection provided to them as the standards were still not on the exact par with those of US. The full recognition of IPR rights on US patented medical devices deviates far from the negotiable zone from Korean government’s perspective due to the unique health care system in Korea. Drug prices in Korea are strictly regulated by National Health Insurance Service (NHIS) which is also responsible for the reimbursement of medical expenses. While it is a typical practice for countries with national health care system to fix prices for reimbursable medications, drug prices in Korea are particularly low, 44% less than average drug prices in OECD countries as of 2018. This is because NHIS in Korea references alternative drug prices when setting the prices of new drugs, rather than referencing average drug prices in foreign markets. There is no exact formula to calculate drug prices, and all drug prices should go through negotiation process to drive down the prices even further. (Jang et al., 2017) On the contrary, National Health Insurance (NHI) in Japan references the price of the original drug in pharmaceutical markets of US, Germany, France and UK, and applies fixed-rate formula to set the price of new drugs. (Yamate, 2017)

However, Korean government eventually agreed to include pharmaceutical-relevant IPR provisions in Korea-US FTA. One major concession from Korean government is patent linkage for pharmaceuticals. During the patent-protected period, no generic drugs can be filed for marketing approval. Moreover, all the original data used for the original drug to get marketing approval, e.g., lab experiments, clinical trial reports, are exclusively protected for 5 years. (Office of the United States Trade Representative, 2007a; Office of the United States Trade Representative, 2007b) In sum, these measures delay introduction of generic drugs and protects original drugs from rapid

decline in the prices. Consequently, government expenditure on medical expenses inevitably rise as drug prices are driven up. Setting aside concerns coming from the government side, Korean pharmaceutical industries also strongly opposed to adopting patent linkage, as their major source of profits was generic drugs sales. (Shin, 2007; Park, 2007; Ra, 2006)

Another major concession is establishment of an independent review body, named Medicines and Medical Devices Committee (MMDC), to determine pricing and reimbursement of pharmaceutical products and medical devices upon the request of relevant agents. MMDC consists of experts independent of government agencies regarding health care in both US and Korea. The introduction of the committee grants US pharmaceuticals more influence on determining prices of their own drugs in Korean market through filing complaints if prices asked for are not within their optimal range.

The main reason why Korean government had to make concessions in IPR regulations of pharmaceuticals field lies in the remarkable scale of US imports from Korean motor industries. According to annual statistical reports provided by Korean Statistical Information Service (KOSIS), US has been the predominant market for Korean automobiles with over a third of total production units imported. US was able to leverage the fact on the negotiation table and pressured Korean government that import barriers will be strengthened for automobiles if proposed pharmaceuticals-related IPR measures are not adopted. As the negotiation got stuck in stalemate due to conflicts of interests in pharmaceuticals, automobile, textile and agricultural industries, Korean government offered concession in pharmaceuticals-related IPR in return for long-desired repeal of import tariffs on vehicle components and cars fully assembled outside of US (Y.-Y. Kim, 2007).

4.2 Trans-Pacific Partnership

Trans-Pacific Partnership (TPP) was signed in 2016, between US and 11 other countries. The agreement is notorious for its highly restrictive legal standards in IPR protection. All of the participants are major trading partners of US, with most of their economies heavily relying on exports to US. These countries are also prominent hosts of FDI coming in from worldwide except for Japan where foreign investors find hard to penetrate, according to 2016 NTE report. For instance, Singapore, one of the TPP signatories, recorded FDI to GDP ratio of 24% in 2018, which places

the country at top 5 according to the World Bank statistics ¹. Vietnam recorded 6%, which places the country at top 28 in the same year.

The agreement pushed for highly restrictive IPR standards in pharmaceuticals including minimum of 8 years in data protection along with introduction of expedited marketing approval process for new drugs in order to prevent unreasonable curtailment of patent term (Office of the United States Trade Representative, 2016). Most of trade agreements US had before TPP include compensated patent term for unreasonable curtailment of the term attributed to marketing approval process, but expedited marketing approval process has never been introduced before. It is a powerful new protocol US came up with to protect original drugs more effectively from generic drugs entering the market. Some critiques argue that these strong IPR regulations deteriorate public health of developing countries where entire health care systems rely heavily on generic drugs (Gleeson et al., 2018).

Nevertheless, participants tailored their local IPR laws to fit into the requirements of TPP, in an effort to secure its status as one of the prominent trading partners with United States. For instance, Vietnam enabled foreign-invested pharmaceutical firms to directly sell their products to local distributors, build their own warehouses in Vietnamese territory and store their products there. The firms can also distribute their product information directly to local health care practitioners Hoang and Froman, 2016. Japan revised its national health system through introducing premium pricing policy for new pharmaceutical products. Drug pricing system for reimbursable products prior to TPP allowed stepwise decline of the original drug price until marketing approval of generic drugs, but with the introduction of the premium policy, price of the original drug remains the same until either marketing approval is granted for the first generic product or 15 years lapse from the NHI listing (Yamate, 2017).

5 Conclusion

PTA has long been understood as a means for countries to voluntarily tie their hands, in order to fend themselves from future commitment problems and signal their trading partners they are safe venues to host investment. This paper flips the script of the conventional approach which

¹TheGlobalEconomy.com provides the ranking based on the FDI statistics reported by World Bank.

assumes PTA as an effective institutional design to solve commitment problem and unveils another aspect of PTA which satiates private interests at the cost of some developing countries.

IPR intensive industries are heavily concentrated around a few MNCs. These elite firms use IPR as a means to fuel their productivity growth which feeds into price markups and subsequent increase of profits. It is thus crucial for them to secure IPR protection in their investment target countries if they are to achieve their ultimate goal of monopolizing the local market. With abundant resources, MNCs lobby heavily and persistently to home government demanding policymakers to go to the negotiation table with FDI recipients and get the deal they want. Then, home country to MNCs leverage their market prominence against investment target countries, knowing that emerging economies have to give in due to their long history of market dependence.

Firm-level analysis using firm-year M&A data confirms that only the PTAs that satisfy MNCs' demand for IPR protection attract more FDI in recipient countries. The novel method of staggered diff-in-diff is used to account for treatment heterogeneity problem due to dynamic treatment timing. PTAs with IPR provisions in enforcement have positive treatment effect on firm-level M&A amount in the developing country FDI destination. State-level analysis using trade network centrality as a proxy to market prominence of developed countries confirms that developed countries do leverage their market prominence against emerging economies to incorporate IPR provisions in PTAs which MNCs of developed countries have asked for. Case studies of Korea-US FTA and Trans-Pacific Partnership serve as good real-world examples to elaborate on the theory.

The importance of this paper lies on the alternative explanation it offers than the current literature on the rationale behind countries signing PTAs. The conventional wisdom has understood PTAs as a means for countries to voluntarily tie their hands, in order to fend themselves from future commitment problems and signal their trading partners they are safe venues to host investment. On the contrary, this paper shows that it is developed countries negotiating on behalf of MNCs that are coercing other countries to sign PTAs with strong IPR protection clauses included, and the increased FDI inflow in the countries that agreed to sign such PTAs is the subsequent outcome. What it implies is that these PTAs cater to the private interests of a few super firms seeking to enlarge their profits even further, rather than giving growth opportunities to the countries in need of more economic resources as often argued in the current literature.

References

- Autor, David et al. (2020). “The fall of the labor share and the rise of superstar firms”. In: *The Quarterly Journal of Economics* 135.2, pp. 645–709.
- Baier, Scott L and Jeffrey H Bergstrand (2002). *On the endogeneity of international trade flows and free trade agreements*. Tech. rep. mimeo New York.
- (2009). “Bonus vetus OLS: A simple method for approximating international trade-cost effects using the gravity equation”. In: *Journal of International Economics* 77.1, pp. 77–85.
- Baker, Andrew C, David F Larcker, and Charles CY Wang (2022). “How much should we trust staggered difference-in-differences estimates?” In: *Journal of Financial Economics* 144.2, pp. 370–395.
- Berger, Axel et al. (2013). “Do trade and investment agreements lead to more FDI? Accounting for key provisions inside the black box”. In: *International Economics and Economic Policy* 10.2, pp. 247–275.
- Berinsky, Adam (2004). *Silent Voices: Opinion Polls and Political Representation in America*. Princeton, NJ: Princeton University Press.
- Bernard, Andrew B, J. Bradford Jensen, and Peter K Schott (2009). “Importers, exporters and multinationals: a portrait of firms in the U.S. that trade goods”. In: *Producer Dynamics: New Evidence from Micro Data*. Ed. by Timothy Dunne, J. Bradford Jensen, and Mark J Roberts. Chicago: University of Chicago Press, pp. 513–552.
- Bernard, Andrew B et al. (2007). “Firms in International Trade”. In: *The Journal of Economic Perspectives* 21.3, pp. 105–130.
- (2012). “The Empirics of Firm Heterogeneity and International Trade”. In: *Annual Review of Economics* 4.1, pp. 283–313.
- Bessen, James (2020). “Industry concentration and information technology”. In: *The Journal of Law and Economics* 63.3, pp. 531–555.
- Bhattacharya, Anindya K. (1976). “The Influence of the International Secretariat: UNCTAD and Generalized Tariff Preferences”. In: *International Organization* 30.1, pp. 75–90.

- Bombardini, M and F Trebbi (2020). “Empirical Models of Lobbying”. In: ed. by P Aghion and H Rey. Vol. 12, pp. 391–413. ISBN: 1941-1383; 978-0-8243-4612-6.
- Bombardini, Matilde and Francesco Trebbi (2012). “Competition and political organization: Together or alone in lobbying for trade policy?” In: *Journal of International Economics* 87.1, pp. 18–26.
- Brenton, Paul (2003). “Integrating the least developed countries into the world trading system: the current impact of European Union preferences under “everything but arms”” In: *Journal of World Trade* 37.3.
- Buthe, Tim and Helen V. Milner (2008). “The Politics of Foreign Direct Investment into Developing Countries: Increasing FDI through International Trade Agreements?” In: *American Journal of Political Science* 52.4, pp. 741–762.
- Cowgill, Bo, Andrea Prat, and Tommaso Valletti (2021). *Political Power and Market Power*. Working paper.
- Dee, Philippa and Jyothi Gali (2005). “The trade and investment effects of preferential trading arrangements”. In: *International Trade in East Asia*. University of Chicago Press, pp. 133–176.
- DeLisi, V. M. Jim (2007). *The United States-Korea Trade Promotion Agreement: Report of the United States Industry Trade Advisory Committee for Chemicals, Pharmaceuticals, Health/Science Products and Services[ITAC-3]*. United States Industry Trade Advisory Committee for Chemicals, Pharmaceuticals, Health/Science Products and Services[ITAC-3].
- Dür, Andreas, Leonardo Baccini, and Manfred Elsig (2014). “The Design of International Trade Agreements: Introducing a New Database”. In: *The Review of International Organizations* 9.3, pp. 353–373.
- Ethier, Wilfred J. and James R. Markusen (1996). “Multinational firms, technology diffusion and trade”. In: *Journal of International Economics* 41.1-2, pp. 1–28.
- Fink, Carsten and Patrick Reichenmiller (2005). “Tightening TRIPS: the Intellectual Property Provisions of Recent US Free Trade Agreements”. In: *World Bank Trade Note No. 20*.

- “Foreign Direct Investment, Percent of GDP, 2018 - Country Rankings” (2018). In: *The-GlobalEconomy.com*. URL: https://www.theglobaleconomy.com/rankings/foreign_direct_investment/.
- Frenzel, Bill (2007). *The US-Korea Free Trade Agreement: The Report of the Advisory Committee for Trade Policy and Negotiations*. The Advisory Committee for Trade Policy and Negotiations.
- Froman, Michael B. G. (2016). *National Trade Estimate Report 2016*. Office of the United States Trade Representative.
- Gleeson, Deborah et al. (2018). “The Trans Pacific Partnership Agreement, intellectual property and medicines: Differential outcomes for developed and developing countries”. In: *Global Social Policy* 18.1, pp. 7–27.
- Harzing, Anne-Wil (2002). “Acquisitions versus greenfield investments: International strategy and management of entry modes”. In: *Strategic management journal* 23.3, pp. 211–227.
- Head, Keith and John Ries (2001). “Overseas Investment and Firm Exports”. In: *Review of International Economics* 9.1, pp. 108–122.
- Helpman, Elhanan (2006). “Trade, FDI, and the Organization of Firms”. In: *Journal of economic literature* 44.3, pp. 589–630.
- Helpman, Elhanan, Marc J Melitz, and Stephen R Yeaple (2004). “Export versus FDI with heterogeneous firms”. In: *American economic review* 94.1, pp. 300–316.
- Henisz, Witold J. (2000). “The Institutional Environment for Economic Growth”. In: *Economics and Politics* 12.1, pp. 1–31.
- (2002). “The Institutional Environment for Infrastructure Investment”. In: *Industrial and Corporate Change* 11.2, pp. 355–389.
- Hoang, Vu Huy and Michael B. G. Froman (2016). *US-Vietnam Letter Exchange on Pharmaceutical Distribution*. Office of the United States Trade Representative.
- Huneus, Federico and In Song Kim (2018). “The effects of firms’ lobbying on resource misallocation”. In:

- Jang, Sunmee et al. (2017). *PPRI Pharma Profile, South Korea 2018*. Pharmaceutical Pricing and Reimbursement Information.
- Jensen, J. Bradford, DP Quinn, and S Weymouth (2015). “The Influence of Firm Global Supply Chains and Foreign Currency Undervaluations on US Trade Disputes”. In: *International Organization* 69.4, pp. 913–947.
- Kim, Yoo-Young (2007). “[한미FTA 7차협상 마무리] 차 제외한 관세양허안 합의”. In: *Dong-A Daily*.
- Korean Statistical Information System (2020). *Export/Import of Automobiles Categorized by Partner Countries*. Korean Statistical Information System. URL: https://kosis.kr/statHtml/statHtml.do?orgId=101&tblId=DT_2KAA513.
- Lancaster, Tony (2000). “The incidental parameter problem since 1948”. In: *Journal of econometrics* 95.2, pp. 391–413.
- Lewbel, Arthur, Yingying Dong, and Thomas Tao Yang (2012). “Comparing features of convenient estimators for binary choice models with endogenous regressors”. In: *The Canadian Journal of Economics / Revue canadienne d’Economie* 45.3, pp. 809–829.
- Manger, Mark S and Kenneth C Shadlen (2014). “Political trade dependence and North–South trade agreements”. In: *International studies quarterly* 58.1, pp. 79–91.
- Mansfield, Edward D. and Helen V. Milner (2012). *Votes, vetoes, and the political economy of international trade agreements*. Princeton, NJ: Princeton University Press.
- Markusen, James R. (2001). “Contracts, Intellectual Property Rights, and Multinational Investment in Developing Countries”. In: *Journal of International Economics* 53.1, pp. 189–204.
- Maurseth, Per Botolf (2018). “Globalization of intellectual property rights”. In: *NUPI Working Paper*.
- Mayer, Thierry and Soledad Zignago (2011). *Notes on CEPII’s Distances Measures: The GeoDist Database*. Working Papers 2011-25. CEPII.
- Medvedev, Denis (2012). “Beyond trade: the impact of preferential trade agreements on FDI inflows”. In: *World development* 40.1, pp. 49–61.

- Office of the United States Trade Representative (2007a). “Intellectual Property”. In: *The US-Korea Free Trade Agreement*. Office of the United States Trade Representative. Chap. 18.
- (2007b). “Pharmaceuticals and Medical Devices”. In: *The US-Korea Free Trade Agreement*. Office of the United States Trade Representative. Chap. 5.
- (2016). “Intellectual Property”. In: *Trans-Pacific Partnership*. Office of the United States Trade Representative. Chap. 18.
- Park, Tae-Hae (2007). “국내 제약사 설 땅 좁아져 ”SOS””. In: *Segye Daily*.
- Pevehouse, Jon C. (2010). “Democratization, Credible Commitments, and Joining International Organizations”. In: *Locating the Proper Authorities*. University of Michigan Press, pp. 25–.
- Ra, Seong-Woong (2006). “한미 FTA 의료와 의약품 개방 - 대책과 전망”. In: *The Korean Journal of Medicine* 71.2, pp. 862–864.
- Shadlen, Kenneth C (2005). “Exchanging development for market access? Deep integration and industrial policy under multilateral and regional-bilateral trade agreements”. In: *Review of International Political Economy* 12.5, pp. 750–775.
- Shim, Gyu Sang and Randall W. Stone (July 2022). “Foreign Agents: MNCs and WTO Disputes”. In: *Political Economy of International Organizations*. Oxford, UK.
- Shin, Bum-Soo (2007). “한미 FTA 타결...제약계 타격 불가피”. In: *Doctor’s News*.
- Statistics Department, International Monetary Fund (2021). *Direction of Trade Statistics*. International Monetary Fund.
- Sun, Liyang and Sarah Abraham (2021). “Estimating dynamic treatment effects in event studies with heterogeneous treatment effects”. In: *Journal of Econometrics* 225.2, pp. 175–199.
- Toole, Andrew A., Richard D. Miller, and Nicholas Rada (2022). *Intellectual property and the U.S. economy: Third edition*. Tech. rep. Alexandria, VA: United States Patent and Trademark Office.
- Wooldridge, Jeffrey (2002). *Simple Solutions to the Initial Conditions Problem in Dynamic, Nonlinear Panel Data Models with Unobserved Heterogeneity*. Department of Economics, Michigan State University: Manuscript.

Xiang, Jun (2010). “Relevance as a Latent Variable in Dyadic Analysis of Conflict”. In: *The Journal of Politics* 72.2, pp. 484–498.

Yamate, Masanobu (2017). *Update of Drug Pricing System in Japan*. Ministry of Health, Labor and Welfare: Manuscript.

Yeaple, Stephen R (2009). “Firm heterogeneity and the structure of US multinational activity”. In: *Journal of International Economics* 78.2, pp. 206–215.