Journal of International Economics 138 (2022) 103630

Contents lists available at ScienceDirect

Journal of International Economics

journal homepage: www.elsevier.com/locate/jie

Full Length Articles

PTAs and the incidence of antidumping disputes☆

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ARTICLE INFO

Article history:
Received 27 May 2021
Received in revised form 10 May 2022
Accepted 11 May 2022
Available online 28 May 2022

Repository data link: https://data.mendeley.com/datasets/pcz6rd79f3/1

JEL classification:
F13
F14
F53

Keywords:
Antidumping
Preferential trade agreements

ABSTRACT

We analyze whether preferential trade agreements (PTAs) affect the incidence and pattern of antidumping (AD) filings. We find PTA membership results in a 29 percent (15 percent) decrease in the incidence of intra-PTA AD actions (measures). We then exploit variation in the content of PTAs and find the reduction is due to PTAs with explicit AD rules. We find that intra-PTA AD filings (measures) decrease by about 46 percent (34 percent) for PTAs with explicit AD rules. Our results are robust in controlling for other PTA-related phenomena, the emergence of China as the largest target of AD actions, and the role played by EU and US PTAs. Our findings highlight the effectiveness of PTA AD rules in curbing AD disputes among members.

1. Introduction

In recent decades, the stalling of the World Trade Organization (WTO) multilateral trade agenda has been accompanied by an unprecedented proliferation of preferential trade agreements (PTAs).[1] As of the end of 2021 there were over 350 PTAs in force, as compared to 20 PTAs in 1990 (WTO, 2022). The proliferation of PTAs has coincided with a substantial increase in trade disputes, primarily in the form of antidumping (AD) complaints. AD has long been the primary form of contingent protection (Prusa, 2001), but its dominance has only increased in recent decades. Since the WTO came into being in 1995 AD has accounted for an overwhelming 86 percent of contingent protection worldwide (WTO, 2021). Unlike the situation pre-1990 when only a handful of countries used AD, by the end of 2021 more than 110 countries had adopted AD statutes with 83 countries filing at least one complaint with a median number of filings per user of 32.[2]

☆ We would like to thank Jo-Ann Crawford, Alen Mulabdic, and Michele Ruta for their assistance creating our measures of the depth of PTA. Earlier drafts of this paper benefitted from the comments from two anonymous referees, Chad Bown, Hylke Vandenbussche, and Ruonan Xu. All remaining errors and omissions are the fault of the authors.

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[1] We use the term preferential trade agreement to refer to any trade agreement between two or more countries. In other words, the term PTAs in this paper captures Free Trade Agreements, Regional Trade Agreements, Economic Integration Agreements, Customs Unions, etc.

[2] The country totals adjust for the European Union (EU) and Gulf Cooperation Council (GCC) whose AD actions span multiple countries.

https://doi.org/10.1016/j.jinteco.2022.103630
0022-1996/

Both PTAs and AD are important policies in the current trade policy arena and have drawn substantial attention from both scholars and policymakers alike. Despite the empirical importance and widespread prevalence of these two trade policies, less attention has been devoted to exploring their relationship. This is a significant omission because it is well known that PTAs discriminate against members via decreasing tariffs, but it is not clear whether such discrimination is further accentuated or attenuated through the use of AD protection. On the one hand, AD is often driven by surges in imports and thus if PTAs lead to significant increases in trade flows, they might cause an increase in AD. On the other hand, PTAs, in particular the ones that contain specific AD provisions, generally discourage the use of AD on intra PTA trade. The impact of PTAs on bilateral AD disputes thus depends on which effect prevails.

In this paper, we seek to understand whether the composition of countries targeted by AD changes after the enactment of PTAs, and if so, whether the differences in AD rules across PTAs are responsible for these changes. A better understanding of the interdependence between PTAs and AD not only sheds new light on the effectiveness of preferential liberalization in freeing trade among members but also delivers significant implications for future bilateral or multilateral trade negotiations involving AD rules.

To answer these questions, we construct a dataset of worldwide AD filings (and measures) that incorporates information on PTAs in force during the 1980–2019 period. Our database has 8,243 AD disputes involving 51 users targeting 118 countries who are members of 129 active PTAs over the sample period. We apply the difference-in-differences framework to test whether PTA members experience fewer AD disputes than non-members. We find PTA membership results in a 29 percent decrease in the incidence of intra-PTA AD actions and a 15 percent decrease in intra-PTA AD measures in our benchmark specification. We then exploit differences in provisions across PTAs to examine whether the protection diminution is driven by the AD rules or it is simply due to PTA membership. Intra-PTA trade disputes might fall after the formation of PTAs because of "good will" or political closeness. We find no support for this conjecture. On the contrary, we find that PTAs with AD rules are characterized by protection attenuation, whereas PTAs without AD rules do not experience any change in intra-PTA AD activity. Specifically, intra-PTA AD actions (measures) fall by 46 percent (34 percent) for PTAs with explicit AD rules, while there is no change in AD usage for PTAs without AD rules. We note that our estimation approach does not identify whether the fall in intra-PTA AD disputes relative to inter-PTA AD disputes is due to PTA members being subject to fewer AD actions ("protection reduction"), and/or is caused by non-PTA members facing even greater AD scrutiny ("protection diversion"). It is likely that our estimates are capturing both the PTA deterring effect for members as well as the PTA dilating effect for non-members. However, we do not know the magnitude of each dimension.

A related concern involves the possibility that the change in the pattern of AD disputes is related to other PTA provisions but not AD rules. If, for example, PTAs with AD rules also tend to be deeper agreements then the interpretation of our results might change. For example, PTAs with an expansive scope and rules governing investment provisions, competition policy, etc., might result in increased bilateral imports but nevertheless have fewer intra-PTA AD petitions. It is possible that the observed reduction in intra-PTA AD activity might not cause by AD provisions but rather as a result of other PTA provisions. We investigate this possibility by controlling for the depth of PTAs. We continue to find that the presence of PTAs significantly reduces trade disputes among members and, in particular, it is the PTAs with AD rules that effectively rein in the use of such protection.

The validity of difference-in-differences method hinges on the parallel trend assumption. We check the plausibility of this assumption in several ways. First, we carry out an event study analysis by examining the year-wise change in the number of AD disputes on a set of dummies both before and after the establishment of PTAs. We find no decline in trade disputes before the years that country pairs entered PTAs, but strong evidence of decline after the PTA came into force. We also follow La Ferrara et al. (2012), Li et al. (2016), Cantoni et al. (2017), and Mattoo et al. (2017) and conduct a placebo test where we randomly assign PTA status to country pairs. There is no evidence of dispute-reducing effects when we use the placebo PTA variable. Third, we perform another placebo regression by relying on the data prior to the interventions of PTAs and find no difference in the number of AD disputes between PTA members and non-members during the pre period, demonstrating the change in the patterns of AD activity in the post-PTA does not reflect pre-existing trends.

A key challenge for our identification strategy is the possibility that the presence of PTAs among countries may be correlated with unobserved determinants of AD disputes. We follow the gravity analysis literature and employ a variety set of fixed effects (Head and Mayer, 2014; Larch et al., 2019) to alleviate this critical concern. To be precise, we first include pair and year fixed effects in the benchmark specifications and then augment the basic regressions by further adding both AD user-year and target-year fixed effects. The inclusion of three-way fixed effects drastically reduces any concerns related to omitted variables since they account for all time-invariant country-pair-specific heterogeneity and time-variant compounding factors such as demand and/or supply shocks that might impact trade disputes. We also address the concern of endogeneity due to simultaneity bias and measurement errors by running regressions controlling for anticipatory effects and errors in the effective date of the PTA. Thus, although the introduction of PTAs is not random across time and country, many differences across country pairs — other than the PTA enactment — are likely to be absorbed by our control variables, leaving us more confident that we are identifying the causal effect of PTAs on shaping AD activity.

Our work contributes to a growing literature that explores the interplay between AD protection and the implementation of preferential liberalization from the perspective of member countries. Bhagwati (1992, 1993) and Bhagwati and Panagariya (1996) were the pioneer theoretical papers to conjecture that contingent protection would amplify the discrimination created by PTA tariff preferences. Notable empirical exceptions from this line of research includes Blonigen (2005) who provides an early assessment of whether the use of dispute settlement panels in NAFTA reduce the US AD activity towards members, Ahn and Shin (2011) who study the effect of FTAs on AD filings for major AD users over the period of 1995–2009, and Silberberger

and Stender (2018) who explore the interplay of regional economic integration and the use of bilateral AD measures between 1991 and 2014, explicitly taking into account the role played by the level of intra-bloc tariff concessions. Li and Qiu (2021) also investigate the effect of preferential trade arrangements on intra-PTA trade disputes from 1995 to 2007. However, they engage in a very different research design by adopting a gravity style estimation approach and examine how PTAs affect a broad set of bilateral trade disputes (i.e., WTO disputes, regional disputes, contingent protection disputes, unilateral tariffs, etc.). Our work improves upon the statistical approach of these previous papers in a number of ways. Most notably, we implement a variety of techniques to demonstrate there are no pre-existing differences in trends of AD disputes across countries using our econometric formulation. In addition, we incorporate a broader range of fixed effects to control for endogeneity biases due to the non-random formation of PTAs. Consequently, the identification of the effects of PTAs on AD activity in this paper is not confounded by the endogeneity issues present in these earlier studies. Lastly, Prusa and Zhu (2021) explore how PTAs impact the duration of AD protection, a largely overlooked aspect on AD literature but is nonetheless essential.

This paper also relates to the literature on the ramifications of preferential liberalization on trade protection against PTA outsiders, focusing on non-tariff barriers to trade. Bown and Tovar (2016) examine whether MERCOSUR has a building block or stumbling block effect on multilateral trade liberalization for Argentina and Brazil, taking into account both tariff and temporary trade barriers as the measure for import protection. In many respects, Tabakis and Zanardi (2019) is the prior work most closely to ours. They explore the implication of PTAs for their members' extra-PTA AD measures and argue PTAs have a building block effect on multilateral liberalization. In contrast with their work, we examine the impact of PTAs on intra-PTA AD activity and also explore the importance of AD provisions in PTAs in shaping AD protection against members. Finally, our paper is loosely related to Tovar (2019) who tests the predictions from Bagwell and Staiger (1999) regarding the effect of PTAs on external import protection from a group of Latin America's countries and Tovar (2022) who explores the political-economy channel through which PTAs can affect global free trade.

The rest of the paper is organized as follows. Section2 discusses the empirical strategy, while Section3 describes the data and how we construct the sample. Section4 presents the results and examines the robustness of the findings. Section5 concludes.

2. Empirical methodology

To investigate whether the implementation of PTAs affect the application of AD activity, we utilize the variations across time and countries in the establishment of PTAs. Specifically, we rely on the difference-in-differences (DiD) method that compares the change in the number of AD disputes over time between country pairs with and without common PTA membership. For this purpose, we estimate the following reduced-form empirical model

$$\begin{aligned} Y_{ijt} &= \alpha + \beta PTA_{ijt} + \lambda_1 \ln RER_{ij(t-1)} + \lambda_2 \ln Import_{ij(t-1)} \\ &\quad + \lambda_3 GDP^{growth}_{i(t/t-3)} + \lambda_4 GDP^{growth}_{j(t/t-3)} + \pi_{ij} + \delta_t + \phi(PTA_{ij} \times t) + \varepsilon_{ijt}, \end{aligned} \tag{1}$$

where the subscripts *i, j* and *t* respectively denote AD-user, AD-target, and year. The dependent variable Y_{ijt} denotes the number of AD cases filed (measures imposed) by country *i* against a particular target country *j* for a given year *t*. Because the PTA effect could differ between filings and measures imposed we will consider specifications where we analyze each definition of Y_{ijt}. If PTAs affect the ability to obtain protection, industries will adjust their filing strategy and as a result could be that even weaker cases are initiated. If such an adjustment occurs, we expect PTAs will have a less pronounced effect on measures.

Given that our dependent variable is the count of disputes, which is a non-negative integer with many zeros, we assume that AD petitions across countries and time follow a Poisson distribution and employ a Poisson pseudo-maximum likelihood (PPML) estimator with multiple levels of fixed effects as the regression model. This estimator implicitly assumes that the variance of ε_{ijt} is proportional to the conditional mean of X_{ijt}. Silva and Tenreyro (2006, 2011) show that PPML generates robust results even when this assumption is not satisfied and/or the data features many zero trade values. As a result, PPML is preferred to other approaches to estimating count regressions with a large number of zero values, such as negative binomial regression.[3]

The key variable, PTA_{ijt}, is a dummy and takes the value of one if countries *i* and *j* belong to the same PTA in year *t* and zero otherwise. The enactment of PTAs could either increase or decrease the extent of intra-PTA AD activity. On the one hand, PTAs generally reduce trade barriers (like tariffs) among members, which significantly increase trade flows. However, tariff concessions are likely to spur more AD disputes since such contingent trade measures are mainly driven by surges in imports. In addition, most PTAs entail a multifaceted liberalization package containing a broad array of policies, many of which might adversely impact some import-sensitive sectors. Such negative effects often induce more lobbying activities by these industries which can result in greater AD protection. For these reasons PTAs might lead to more AD actions among members. On the other hand, the formation of PTAs generally produces closer and deeper economic and political ties between member countries, which might reduce AD protection targeting PTA members. This seems most likely for those PTAs with specific rules that impede the use of AD protection against PTA members. For example, PTAs can establish more restrictive rules for determining injury and calculating less-than-fair-value pricing. Both Blonigen (2005) and Bown (2005) emphasize the importance of PTA-specific dispute settlement procedures. Such procedures allow greater scrutiny on AD measures applied to PTA members which could restrain the intra-PTA AD

[3] We use the ppmlhdfe module by Correia (2020) to implement the multiway fixed effects in STATA.

activity. In order to identify the role played by the various AD rules in PTAs, we also estimate the model using two PTA control variables, $PTA_{ijt}^{AD\ Rules}$ and $PTA_{ijt}^{No\ AD\ Rules}$, rather than the single PTA dummy.

Following Knetter and Prusa (2003) we include the real GDP growth of an AD using (targeted) country's 3-year GDP growth prior to the AD initiation in year t and also a 1-year lag of the bilateral real exchange rate.[4] They argue that lower GDP growth for a user is likely to cause more AD filings, whereas poorer economic performance for a targeted country might induce firms to export more, perhaps at a dumped price. They also argue that an appreciation of AD users' currency is expected to result in greater filing activity. Prusa and Knetter argue the longer lag structure for GDP is related to the statutory requirements that the economic injury determination is calculated over a longer time horizon, typically three years; the the exchange rate affects the dumping margin calculation, which is normally calculated using a one-year window. We also include bilateral imports following Blonigen (2005) and Bown and Crowley (2013). These papers argue bilateral imports are the most direct measure of the competitive pressure caused by a trade partner and show that imports are positively correlated with the AD activity.

Finally we add several sets of fixed effects. First, dyad fixed effects (π_{ij}) are always included to eliminate all time-invariant country-pair-specific heterogeneity such as institutional differences across countries, differential treatment of certain exporters, i.e., China is more likely to be subject to AD disputes than other targets, and bilateral import-demand and export-supply elasticities. Second, year fixed effects (δ_t) are included to account for factors changing each year that are common to all trade relationships for a given year (e.g., business cycle effects, de-globalization trends, etc.). It also controls the possibility that AD protection has become overall more intensively applied. Depending on the specification, a treatment-specific linear time trend, $PTA_{ijt} \times t$, is also added to further control the differences between PTA members and non-members (Li et al., 2016). Standard errors are always clustered at the country-pair level to take into account the interdependence within clusters over time, although we discuss an alternative possibility in Section4.4.

Our identifying assumption is that, conditional on pair fixed effects, year fixed effects, treatment-specific linear trend, and other time-varying controls, the implementation of PTAs among countries is orthogonal to the error term. We test the plausibility of this assumption in several ways. We first conduct an event study by estimating the year-wise change in the number of bilateral AD disputes before and after the implementation of PTAs among countries. We then conduct two other exercises including a placebo test with randomly assigned PTA membership and another one by relying only on the data prior to the PTA intervention.

Another important potential issue to address is endogeneity because the presence (or absence) of a PTA between countries i and j is not an exogenous event. PTAs tend to form among country pairs with larger and more similar GDPs, geographically close, and larger the differences in their relative factor endowments (Baier and Bergstrand, 2007). Additionally, countries with good political relations may be more likely to create a PTA and at the same time are also less likely to have trade disputes.

We address this potential concern using a wide set of fixed effects. Specifically, the inclusion of country-pair fixed effects in the benchmark regressions largely reduces the endogeneity concerns due to the omitted variables bias. We further augment the basic specifications by additionally including the AD user/target-year fixed effects. The use of the three-way fixed effects accounts for time-varying unobservable multilateral resistances, the potential for any other observable and unobservable characteristics that vary over time for both sides, and time-invariant user-target pair heterogeneity, which can drastically reduce any endogeneity concern due to omitted variables bias (Yotov et al., 2016). Also, we include a specification where we control for the future status of a PTA so as to check for the concerns over reverse causality. That is, we examine whether an upcoming PTA plays any role in determining AD filings in current year. Finally, we explicitly examine the sensitivity of our estimates to measurement error bias. We do this by re-running our analysis with a series of alternative "effective" PTA inception dates. The results confirm the PTA effect is related to the true inception date.

3. Data description

3.1. Global antidumping database

Data on worldwide AD activity on cases filed and measures imposed for each user country i and target country j in each year t over the period of 1980–2019 come from the *Global Antidumping Database* (Signoret et al., 2020). We rely on this dataset to construct our dependent variables and to define the timing of disputes. Table A1 provides an overview of AD usage by each country in terms of both filings and measures and also includes information on the sample period for each AD user. Additionally, the "first" ("last") year columns denote the first (last) year in our sample period that each using country initiated AD activity. The table confirms previous findings in the literature in terms of countries who are the most intense users of AD.

3.2. PTA database

The World Bank's *Content of Deep Trade Agreements* database contains detailed information on a multitude of provisions in all economically large PTAs (Mattoo et al., 2020); all PTAs with the most active AD users are included in the database. In addition, the PTAs are geographically and economically diverse, covering almost every corner of the world: Europe, North America, the Caribbean, Latin America, Eastern Europe, Asia and the Pacific, Africa, and the Middle East. To the best of our knowledge, this is the

[4] The real exchange rate is expressed as the number of AD target currency per AD user's currency, with an upward movement of the exchange rate associated with an appreciation of the currency from the AD user.

most comprehensive database of PTA contingent protection rules. In particular, the database has detailed information on AD provisions in PTAs, which allows us to classify PTAs into three mutually exclusive categories (Prusa, 2020). The first category includes those PTAs that disallow AD actions among members. The second category includes PTAs that have no specific language or provisions on the use of AD. The third category includes PTAs that allow AD against PTA members but include specific provisions on how AD is to be implemented against PTA members.[5] Overall, we have 153 PTAs with no rules and 109 PTAs with AD rules; 21 PTAs prohibit the use of AD provisions.[6] We use this data source to create our key regressors related to the implementation of PTAs between country pairs *i* and *j*. The list of PTAs included in the analysis is given in Table A2.

3.3. Other data

The country-level datasets of bilateral trade flows are taken from CHELEM of CEPII (De Saint Vaulry, 2008). Other macro controls such as bilateral real exchange rate, real GDP growth rates of AD user and target countries are obtained from *World Development Indicators* (World Bank, 2021).[7]

After merging the databases, we obtain an unbalanced panel of 30,515 observations featuring 51 AD users, 118 target countries, and 129 PTAs over the period 1980–2019. Only country pairs that have at least one AD dispute at some point are included in our sample. Table A3 provides descriptive statistics for the explanatory and dependent variables used in the econometric analysis. We stress that our analysis is based on bilateral AD activity in each year and hence the mean filings (0.27) is deceptively small.

3.4. A first look at AD activity pre- and post-PTA

It is illustrative to take an initial look at the trends in intra-PTA AD usage. We calculate the annual number of AD cases initiated by each PTA member against its fellow PTA members. For the moment, we will ignore trends in AD use by PTA members against non-PTA members and AD usage by countries not in any PTAs. Given that PTAs are enacted in a variety of years, we abstract from calendar time and instead consider time relative to when the year of PTA enactment. For each PTA, year 0 is the year when the PTA was enacted, year −1 is one year before, year −2 is two years before the enactment, +1 is one year after the enactment, etc. This view of time allows us to conveniently aggregate across PTAs. We also control for the unbalanced nature of the data since for PTAs that emerge late in our sample we observe many years prior to enactment but only a few years in the post-enactment period by restricting this figure to those PTAs where we have at least ten years of data both before and after the enactment.

Fig. 1 provides a first look at how PTAs affect the pattern of intra-PTA filings for a balanced sample of AD activity. This simple chart provides evidence that PTAs reduce the occurrence of intra-PTA AD disputes. As seen, during the ten years prior to enactment an average of 83 intra-PTA filings per year occurred as compared to just 62 intra-PTA filings per year in the subsequent ten years.[8]

4. Results

4.1. Benchmark results

4.1.1. AD filings

We begin by presenting baseline estimates of the model. Table 1 shows the results from the estimation of Eq. (1) where the dependent variable is the number of AD filings in all specifications. The estimates are reported as “incidence rate ratios” (IRR) associated with the underlying parameter estimates. The null hypothesis is IRR = 1, which implies no relationship between the dependent variable and regressor.

Beginning with column (1) where we use a single dummy to capture the PTA impact together with the conventional macroeconomic determinants and country-pair and year fixed effects as controls, we see that the enactment of PTAs reduces the incidence of intra-PTA AD disputes by almost 27 percent and is statistically significant at the one percent level. The estimated impact is large and is consistent with the trends depicted in Fig. 1. To further facilitate the interpretation, we calculate the predicted counts of new AD filings for a country pair without a PTA versus a country pair with a PTA, with other variables being evaluated at their actual values. The results are presented in column (1) in Table A4. As seen, the estimates predict that country pairs without PTAs have 0.355 annual AD disputes, but the predicted count for those with PTA status drops to 0.261 – a change in filings consistent with the 27 percent reduction implied by the parameter estimate. Column (2) reports our benchmark results (corresponding to Eq. (1)) where we include a treatment-specific linear time trend. The results confirm that our key variable of interest, PTA_{ijt}, is highly significant. The estimated IRR is 0.715, indicating the presence of PTAs is associated with approximately a 29 percent reduction in intra-PTA disputes.

[5] As discussed in Prusa (2020) some PTAs either simply reference the WTO AD provisions or only state that AD is permissible but do not specify any *changes* to WTO AD rules for PTA members. He refers to these PTAs as having “weak” rules. We categorize PTAs with weak rules as not having rules.

[6] PTAs that prohibit AD include the European Union (and its various expansions), Australia–New Zealand, EU–EEA, and Canada–Chile (Prusa, 2020).

[7] For countries with missing exchange rates we complement with information from the Economic Research Service of the United State Department of Agriculture.

[8] A similar figure dropping all steel industry cases is presented in Fig. A1.

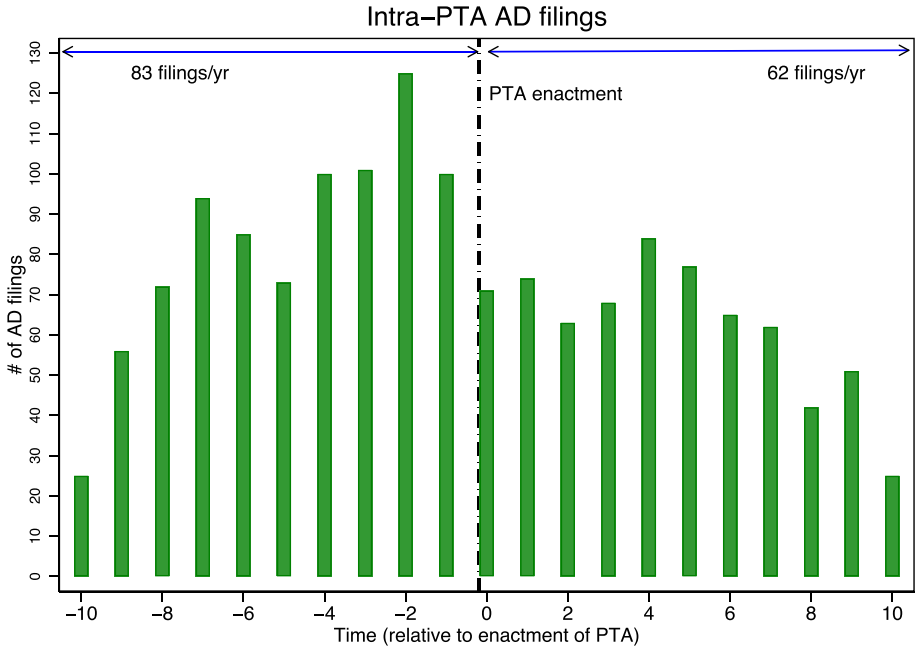

Fig. 1. Annual number of Intra-PTA AD filings (balanced sample, +/−10 years PTA enactment).

Table 1
The impact of PTAs on AD filings.

Dep. Var.	# of AD filings							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PTA_{ijt}	0.735***	0.715***			0.785**	0.765**		
	(0.078)	(0.078)			(0.092)	(0.093)		
$PTA_{ijt}^{AD\ Rules}$			0.559***	0.537***			0.484***	0.469***
			(0.095)	(0.085)			(0.108)	(0.103)
$PTA_{ijt}^{No\ AD\ Rules}$			0.990	0.952			0.903	0.875
			(0.106)	(0.121)			(0.150)	(0.159)
ln $RER_{ij(t-1)}$	1.198***	1.197***	1.191***	1.189***	1.200***	1.198***	1.189***	1.187***
	(0.041)	(0.041)	(0.039)	(0.039)	(0.041)	(0.041)	(0.039)	(0.039)
ln $Import_{ij(t-1)}$	1.747***	1.748***	1.711***	1.713***	1.740***	1.741***	1.720***	1.721***
	(0.076)	(0.076)	(0.079)	(0.080)	(0.077)	(0.077)	(0.079)	(0.080)
$GDP\ growth_{i(t/t-3)}$	1.009***	1.009***	1.008**	1.008**	1.009**	1.009**	1.009**	1.009**
	(0.003)	(0.003)	(0.004)	(0.004)	(0.003)	(0.003)	(0.004)	(0.004)
$GDP\ growth_{j(t/t-3)}$	0.998	0.998	0.997	0.997	0.998	0.998	0.997	0.997
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
PTA_{ijt}^{Depth}					0.769	0.740	1.574	1.539
					(0.310)	(0.297)	(0.999)	(0.973)
$PTA_{ijt}^{No\ AD\ Rules} = PTA_{ijt}^{AD\ Rules}$			0.005	0.005			0.002	0.002
Country-pair FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Treatment-specific Trend	No	Yes	No	Yes	No	Yes	No	Yes
Observations	22,670	22,670	21,661	21,661	22,670	22,670	21,661	21,661
Pseudo R^2	0.376	0.376	0.378	0.378	0.376	0.376	0.378	0.378

Note: The table reports the estimated incident rate ratio of Poisson regressions. Robust standard errors in parenthesis are clustered at country-pair level. Asterisks denote significance levels: *<0.10, ** < 0.05, *** < 0.01.

A single PTA dummy cannot distinguish among the different approaches toward AD across PTAs. Some PTAs prohibit the use of AD against PTA members; some raise the bar for using it, and others contain no AD rules. While we expect a different impact depending on PTA provisions, if bureaucratic discretion is as prevalent as the literature suggests, then it is possible the additional PTA AD rules might not matter. In other words, the decrease in intra-PTA activity may be more a result of broad PTA effects like political good will, better relations between countries, stronger political ties, and in some cases perhaps even outright

favoritism toward PTA members. If any of these factors are significant, then the change in intra-PTA AD activity could have nothing to do with the explicit AD provisions.

Columns (3) and (4) address these concerns by separately estimating the impact for the different types of PTAs. Specifically, in column (3), we find that the existence of AD rules leads to an approximately 44 percent reduction in the number of AD disputes while AD activity is unchanged for PTAs without explicit AD rules, (as compared to non-PTA members.)[9] Further, we find the estimated coefficients for PTAs with rules and without rules are statistically different from each other. Turning to the magnitudes of the effects, the quantification exercise (column (2) in Table A4) reveals that an implemented PTA with AD rules reduces the amount of AD cases by about 44 percent compared to a PTA without AD rules (i.e., the annual number of AD cases for country pairs with no AD rules is 0.346 versus 0.195 for country pairs with AD rules). These findings reject the conjecture that the PTA effect is due to "good will" rather than rules that affect filings. PTAs may also engender good will, but as seen from the PTAs without AD rules, good will alone does not result in significantly less intra-PTA AD activity. We continue to find a slightly stronger chilling effect once the treatment-specific linear time trend is included. As shown in in column (4), PTAs with AD rules leads to a 46 percent decline in AD activity among members.

PTAs are complex, multifaceted agreements. While tariff reductions might garner the headlines, PTAs are often wide-reaching accords. For some PTAs preferential tariffs might be among the least important aspects of the agreement. PTAs can involve dozens of other important policies. If one (or more) of these other provisions are correlated with AD rules then the decrease attributed to AD provisions may be in fact related to other provisions. For example, PTAs often have rules that facilitate foreign direct investment between PTA members. PTA investment rules might induce investment deepening (i.e., more multinational trade) which in turn might lead to a decrease in AD petitions. In this scenario, it is possible that PTAs reduce AD activity not because of the AD provisions but rather as a result of greater investment ties between PTA members that change the incentive to seek AD duties on PTA members. Our metric of PTA depth is based on the work of Hofmann et al. (2017) who gather information on 52 policy areas, some of which are legally enforceable provisions under the WTO and others which are outside the WTO mandate. This compilation captures not only investment and competition policy but also movement of capital and labor, public procurement, services, technical barriers to trade, rules-of-origin, state aid, etc.

We use their quantification to create an index of PTA depth, normalized to range from zero to one, with one indicating the maximum number of legally binding provisions (Table A3). The deepest agreement in our sample is the European Union with an index of 0.85, whereas the median depth is 0.43 (e.g., US–Republic of Korea Free Trade Agreement). Intuitively, the inclusion of this variable allows us to explore the variation in depth within country pairs to identify a possible confounding effect on AD disputes. For the reasons discussed above and also because many of the provisions are subject to dispute settlement mechanisms, we believe deeper agreements should be associated with fewer trade disputes between two countries.

The results are contained in columns (5)–(8) of Table 1. The point estimates and statistical significance of the key variables of interest are almost unchanged relative to those reported in columns (1)–(4). We continue to observe that the presence of a PTA significantly reduces trade disputes and, in particular, it is the PTAs with AD rules that effectively rein in the use of AD activity between PTA members. Moreover, the estimated IRR of the PTA depth variable is imprecisely estimated as it is not significant at standard confidence levels. We quantify the effect of PTA Depth by computing the predicted counts for AD filings for different levels of depth. We contrast cases of low depth (i.e., 25*th* percentile of the distribution) and high depth (i.e., 95*th* percentile of the distribution). As shown in column (3) of Table A4 (which is based on estimates in column (5) of Table 1), PTA membership reduces the intra-AD activities compared with the scenario with no PTA. But there is no statistically significant difference in "deep" versus "shallow" PTAs, as 0.278 filings/year (shallow PTA) is not statistically different from 0.255 filings/year (deep PTA). Said differently, the depth of a PTA by itself does not significantly impact AD activity.

Finally, we note that across specifications the estimated IRRs of macroeconomic determinants are in line with the literature. In particular, a higher import volume and a stronger currency of AD using country are associated with more AD activities, a result that accords with the findings of Knetter and Prusa (2003), Blonigen (2005), and Bown and Crowley (2013). While this result remains significant throughout different model specifications as well as with the inclusion of further controls, the estimated IRR on GDP growth is always indistinguishable from one.

4.1.2. AD measures imposed

The formation of PTAs might not only deter AD activity among members but also make members less likely to receive affirmative decisions. Table 2 examines this possibility. Broadly stated, the results for measures are qualitatively similar to those for AD initiations. The key difference is that the estimate of PTA_{ijt} loses statistical significance; however, when we distinguish the impact for PTAs with specific AD rules versus no AD rules, we continue to find rules have a large and statistically significant effect on chilling the activity of intra-PTA AD measure.[10] For instance, in both column (3) and (4) the estimated IRR of $PTA_{ijt}^{ADRules}$ is about 0.66, indicating PTAs with AD rules lead to a reduction of 34 percent AD activity among members.

Taking Tables 1 and 2 together, we find AD rules within PTAs not only have reduced the number of intra-PTA AD cases but also have decreased the number of intra-PTA AD measures. Thus our findings confirm the Bhagwati and Panagariya hypothesis that AD reinforces the discrimination already inherent in the PTAs. Put differently, the establishment of PTAs alters the pattern

[9] The handful of PTAs with AD prohibition are the omitted.

[10] The reduced sample size in Table 2 is caused by the inclusion of pair-wise fixed effects, which drops the country pairs with zero AD measures throughout the sample period. For instance, country pairs involving Latvia, Panama, Nicaragua, Honduras, Czech Republic, Guatemala, Jordan, Bulgaria, and Slovenia are all dropped from the estimation since these countries have not imposed any AD measures.

Table 2
The impact of PTAs on AD measures.

Dep. Var.	# of AD measures							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PTA_{ijt}	0.855	0.846			0.950	0.932		
	(0.099)	(0.108)			(0.136)	(0.139)		
$PTA_{ijt}^{AD\ Rules}$			0.664**	0.659**			0.574**	0.572**
			(0.129)	(0.129)			(0.152)	(0.155)
$PTA_{ijt}^{No\ AD\ Rules}$			1.098	1.090			1.008	1.005
			(0.125)	(0.140)			(0.178)	(0.191)
ln $RER_{ij(t-1)}$	1.171***	1.170***	1.162***	1.162***	1.173***	1.172***	1.161***	1.161***
	(0.045)	(0.045)	(0.043)	(0.043)	(0.045)	(0.045)	(0.043)	(0.043)
ln $Import_{ij(t-1)}$	1.710***	1.710***	1.676***	1.677***	1.699***	1.699***	1.685***	1.685***
	(0.082)	(0.082)	(0.084)	(0.085)	(0.083)	(0.084)	(0.085)	(0.086)
GDP $growth_{i(t/t-3)}$	0.999	0.999	0.998	0.998	0.998	0.998	0.998	0.998
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)
GDP $growth_{j(t/t-3)}$	1.002	1.002	1.001	1.001	1.002	1.002	1.001	1.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
PTA_{ijt}^{Depth}					0.648	0.630	1.564	1.560
					(0.304)	(0.299)	(1.185)	(1.178)
$PTA_{ijt}^{No\ AD\ Rules} = PTA_{ijt}^{AD\ Rules}$			0.025	0.024			0.011	0.011
Country-pair FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Treatment-specific Trend	No	Yes	No	Yes	No	Yes	No	Yes
Observations	17,811	17,811	17,009	17,009	17,811	17,811	17,009	17,009
Pseudo R^2	0.337	0.337	0.339	0.339	0.337	0.337	0.339	0.339

Note: The table reports the estimated incident rate ratio of Poisson regressions. Robust standard errors in parenthesis are clustered at country-pair level. Asterisks denote significance levels: *<0.10, ** < 0.05, *** < 0.01.

of protection through less frequent AD filings and measures against members relative to non-members. These results both enrich and broaden our understanding about the nature of the relationship between these two important trade policies.

4.2. Confirming parallel trends

The key identification assumption underlying our approach is that the formation of PTAs among countries, though not random, was uncorrelated with pre-existing differences in trade disputes across countries, after controlling for time-varying country-level controls, PTA-related characteristics, time-invariant country-pair heterogeneity, and a treatment-specific time trend. We assess the plausibility of this assumption in three ways.

First, we adopt the approach used by Autor (2003) and Li et al. (2016) and test whether the decline in AD disputes corresponds with the establishment of PTAs or if it precedes PTA formation. For this purpose, we estimate a specification that is analogous to column (2) of Table 1 but augmented with leads and lags. That is, we substitute the PTA dummy with a full set of dummies going from 20 years before to 20 years after the implementation of each PTA. In particular, we estimate

$$\begin{aligned} Y_{ijt} \;=\; & \alpha + \sum_{k=-20,\ k\neq -1}^{k=20} \beta_k D_{ij,t_0+k} + \lambda_1 \ln RER_{ij(t-1)} + \lambda_2 \ln Import_{ij(t-1)} \\ & + \lambda_3 GDP^{growth}_{i(t/t-3)} + \lambda_4 GDP^{growth}_{j(t/t-3)} + \pi_{ij} + \delta_t + \phi(PTA_{ij} \times t) + \varepsilon_{ijt}, \end{aligned} \tag{2}$$

where t_0 denotes the year a PTA was enacted. The dummy variables D_{ij,t_0+k} denote k years before/after a PTA is enacted between a country pair i and j (with $k = 0$ corresponding to the year that the PTA was enacted). Because PTAs are enacted at different times for different country-pairs, t_0 corresponds to 1991 for MERCOSUR members, 1994 for NAFTA members, etc. Importantly, of the 40 indicator variables, all of them are equal to one only in the relevant year, except the first and last which are are equal to one in every year $k \leq -20$ and $k \geq 20$ (similar to Autor, 2003; Li et al., 2016). The omitted time category is one year before entering a PTA, so that all estimated effects are relative to $t - 1$.

The estimated IRRs $\{\hat{\beta}_{-20}, \ldots, \hat{\beta}_{-2}, \hat{\beta}_0, \hat{\beta}_1, \ldots, \hat{\beta}_{+20}\}$ are displayed in Fig. 2 together with 95 percent confidence bands. As seen, the estimated IRRs for the years preceding the formation of PTAs are insignificantly different from one. By contrast, the effect of PTAs on AD disputes is statistically significant in nearly every year after a country-pair enters a PTA.

Secondly, we conduct a placebo test by randomly assigning PTA memberships to countries (see La Ferrara et al., 2012; Li et al., 2016; Cantoni et al., 2017; Mattoo et al., 2017, among others). To be precise, we generate a random PTA enactment year between 1981 and 2017 (the first and last year of PTA formation in our sample), which is different from the actual year that a PTA was formed, with randomly assigned PTA membership to countries. Via this procedure, we are able to construct a "false" or placebo

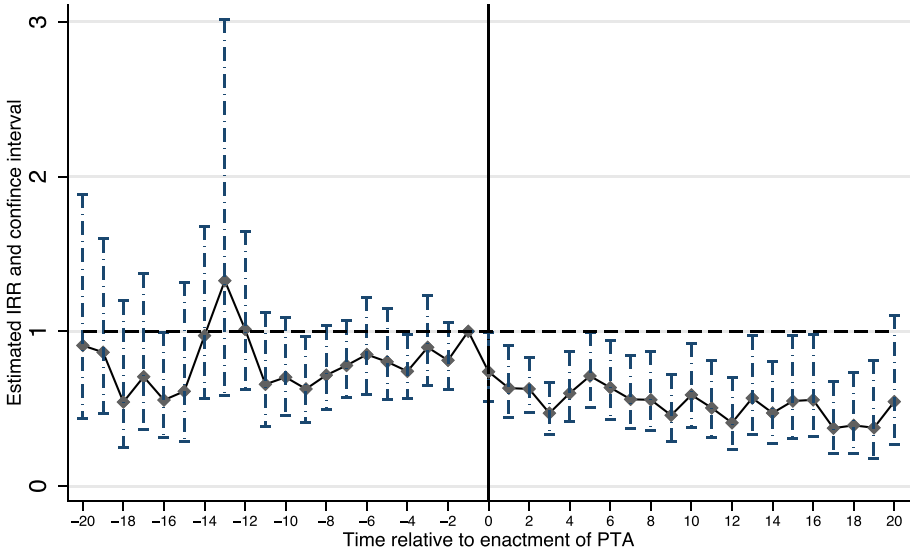

Fig. 2. Estimated impact of PTAs on AD disputes for years before and after enactment. *Notes:* Estimated IRRs (and their 95% confidence intervals) are reported. The dependent variable is the number of AD filings in a country−pair and year *t*. The controls include real exchange rate, import value, GDP growth rate, treatment −specific trend, country−pair, and year fixed effects.

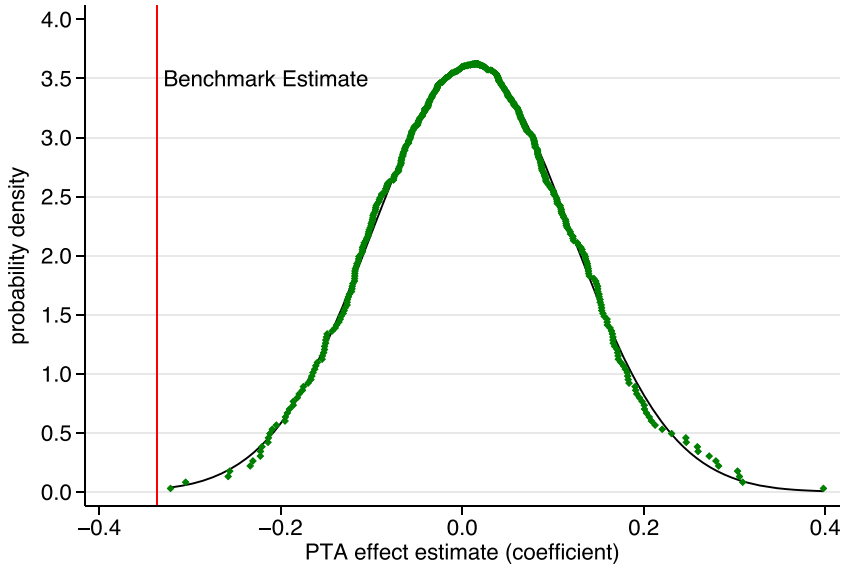

Fig. 3. Placebo PTA Enactment Date. Distribution of estimated coefficients. *Notes:* The figures shows the density of the estimated coefficients is from 500 simulations randomly assigning the PTA membership to countries. The vertical line presents the estimated coefficient in column (2) of Table 1.

PTA status variable. We then re-estimate our benchmark model (i.e., column (2) in Table 1), using this false PTA status variable and store the estimate. We repeat the exercise 500 times. Given the random data generation process, the false PTA variable should have produced no significant estimate and have a magnitude close to zero; otherwise, it would indicate misspecification of the model. Fig. 3 shows the distribution of the estimates from the 500 runs along with the benchmark estimate (indicated by a vertical line).[11] The distribution of estimates from random assignments is centered around zero and the benchmark estimate clearly lies outside the range of coefficients estimated in our simulation exercise, suggesting that there is no effect associated with the

[11] In this figure we report the estimated coefficient (−0.336), rather than the IRR (0.715).

randomly constructed PTA status. In other words, this placebo test indicates that the identified large PTA effect on intra-PTA AD disputes is not driven by unobservable factors.

A third way to investigate the nature of the possible selection in PTA formation is to run an alternative placebo test where we focus on dates prior to the PTA intervention, ignoring all data from the years where PTAs were actually came into effect (Schnabl, 2012). Specifically, we estimate a specification similar to column (2) in Table 1 but with a "fake" or "pretend" treatment date based on the pre-intervention data. In particular, we consider three scenarios; one where the PTAs were enacted one year, three years, or five years prior to the true enactment year. If the estimated PTA effect based on these "fake" dates yields a "PTA attenuation" effect, we might be concerned with a violation of parallel trends. As seen from Table A5, the IRR on PTA dummy (for each of the pretend PTA dates) is indistinguishable from one regardless of the date we pick, which supports the assumption of no pre-existing trends between PTA members and non-members and hence lends further credibility of our estimation strategy.

Taken together, the results summarized in Figs. 2 and 3, and Table A5 confirm the validity of the parallel trends assumption.

4.3. Robustness and sensitivity checks

In the following we present additional exercises aimed at testing the robustness and sensitivity of the results to various sets of fixed effects and to different sub-samples of years, countries, and industries.

4.3.1. AD filings

AD user-year fixed effects. We first replace the year fixed effect with AD user-year fixed effects but otherwise identical specification to column (2) of Table 1. This allows us to incorporate all time-varying factors from the users' perspective, such as demand shocks. As shown in column (1) of Table 3, the estimated IRR for PTA is 0.716, implying a 28 percent reduction in trade disputes for country pairs with PTA status.

As for other covariates they are all consistent with the ones in Table 1. In column (2) we distinguish between PTAs with and without AD rules. The regression results are comparable to column (7) of Table 1 while the statistical significance of the estimated impact is slightly reinforced. In particular, country pairs involving PTAs with AD rules are associated with approximately 37 percent fewer filings than country pairs involving PTAs with no AD rules.[12]

Anticipation effects. In column (3) we investigate whether there is "reverse causality", i.e., is the initiation of AD disputes in current year affected by a PTA enactment in next year? As discussed in Baier and Bergstrand (2007) and Wooldridge (2010), the uncorrelatedness of $PTA_{ij(t+1)}$ with concurrent trade disputes suffices the strict exogeneity of PTAs under the panel structure. The results in column (3) of Table 3 confirm this. The estimated IRR of $PTA_{ij(t+1)}$ is close to one and insignificant, indicating the anticipation effect of a pending agreement on the number of AD disputes is economically close to zero. Our estimate of the main PTA effect, on the contrary, continues to be unaffected by the inclusion of this additional variable and remains to have a deterrent effect on AD activities among members.

Three-way fixed effects. In column (4) we add AD target-year fixed effects into the regression to further control for time-varying confounding factors from the target country side (e.g., supply shocks), in addition to the AD user-year and country-pair fixed effects. The inclusion of the three-way fixed effects makes this the most restrictive specification. Said differently, three-way fixed effects not only absorb all time-invariant bilateral trade relationship characteristics but also control for any other country-year specific characteristics that may impact bilateral trade relationship on both the AD user and target side. Hence any significance of the coefficient of interest stems from variation within a country pair due to the different PTAs each pair is involved in overtime. While this indeed provides us with a clean method for identifying the parameter of interest, the multi-dimensional level of the fixed effects causes us to lose about one-quarter of the observations due to singletons. Nevertheless, our results remain robust to the inclusion of these more stringent fixed effects but with a slightly weak significance. Specifically, PTAs effectively reduce the intra-PTA AD filings by 24 percent.[13]

4.3.2. AD measures

In columns (5)–(8) we examine the effect of PTAs on the alternative definition of the dependent variable, AD measures. The results are similar to those reported in Table 2. Again, the results on PTA attenuation effect on intra-PTA AD measures are still qualitatively the same as the comparable specifications in Table 2. There is also no evidence of anticipatory effects (column (7)). Summarizing this table, the expanded fixed effects do not weaken our results.[14]

[12] This number is obtained through the quantification exercise provided in column (4) of Table A4.

[13] The estimated IRR of real exchange rate loses its significance due most to the fact that there is not much within variation.

[14] Following Baier and Bergstrand (2004), we also cluster the standard error at the AD using country level in consideration of the interdependence of various PTAs that users' involved (e.g., a PTA between the US and Mexico is not independent of such an agreement between the US and Canada). By doing so, we re-estimate specifications similar to columns (2) and (4) of Tables 1 and 2 which explicitly adjusts for such correlations. Our results indicate, despite the larger standard errors, that the statistical significance of the coefficients is largely unchanged, suggesting the interdependence of observations within cluster is not a major concern.

Table 3
Robustness checks.

Dep. Var.	# of AD filings				# of AD measures			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PTA_{ijt}	0.716***		0.714***	0.761**		0.811	0.835	0.818
	(0.073)		(0.077)	(0.099)		(0.117)	(0.124)	(0.130)
$PTA_{ij(t+1)}$			0.984				1.200	
			(0.118)				(0.215)	
$PTA_{ijt}^{AD\ Rules}$		0.492***				0.550*		
		(0.107)				(0.180)		
$PTA_{ijt}^{No\ AD\ Rules}$		0.776*				0.819		
		(0.116)				(0.174)		
ln $RER_{ij(t-1)}$	1.139***	1.134***	1.139***	1.010	1.110***	1.101***	1.108***	1.124
	(0.033)	(0.033)	(0.033)	(0.047)	(0.035)	(0.034)	(0.035)	(0.104)
ln $Import_{ij(t-1)}$	1.804***	1.803***	1.804***	1.322***	1.726***	1.736***	1.726***	1.316***
	(0.069)	(0.071)	(0.069)	(0.087)	(0.080)	(0.083)	(0.080)	(0.117)
$GDP\ growth_{j(t/t-3)}$	0.997	0.996			1.003	1.002		
	(0.003)	(0.003)			(0.003)	(0.003)		
PTA_{ijt}^{Depth}	1.924**	4.179**	1.928**	1.927*	1.379	2.839	1.356	1.546
	(0.632)	(2.566)	(0.635)	(0.735)	(0.597)	(2.404)	(0.580)	(0.692)
$PTA_{ijt}^{No\ AD\ Rules} = PTA_{ijt}^{AD\ Rules}$		0.003				0.068		
Country-pair FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AD user-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AD target-Year FE	No	No	No	Yes	No	No	No	Yes
Pseudo R^2	0.446	0.447	0.446	0.454	0.408	0.410	0.408	0.410
Observations	20,290	19,337	20,290	15,164	14,683	13,944	14,683	9,780

Note: The estimated coefficients are reported as the incident rate ratio of Poisson regressions. Robust standard errors in parenthesis are clustered at country-pair level. Asterisks denote significance levels: *<0.10, ** < 0.05, *** < 0.01.

4.3.3. Additional robustness tests

First, we restrict the sample of countries and PTAs included in the analysis. We start by dropping China, the world's leading target of AD actions (Prusa and Zhu, 2021). Given that China is only a member of a handful of PTAs, we are concerned the intra-PTA effect might reflect a changing pattern of protection targeting China. As seen from Table A6 our results mirror the ones in the benchmark regressions (columns (2) and (4) of Tables 1 and 2). That is, the reduction in intra-PTA AD activity is still present even when all cases against China are excluded.

Second, we examine whether the attenuation effect of PTAs on intra-PTA AD activity is driven by a few prominent PTAs. Our concern is that the US and EU have an outsized influence both in terms of AD activity and also PTA formation. The US and EU are among the most significant users of AD. Also, the US and EU are effectively the "hub" of many PTAs and their philosophies toward PTAs might be the cause of our findings. To rule out this possibility, we re-estimate specifications in Tables 1 and 2 but remove all country-pair observations where either the US or EU are PTA partners. As seen from Table A7, the estimated impact and the estimates remain at the same level of statistical significance in this restricted sample.

Third, we re-estimate our benchmark specifications by restricting the sample to years before the Global Recession (Table A8). This addresses the concern that the use of AD over the last decade is not just about an increased targeting of China but rather reflects a systematic change associated with the financial crisis and/or the growth of PTAs in the post-crisis period. As seen, our findings are robust to this restriction – AD rules matter for this restricted sample.

Finally, we drop all AD cases that involve the steel industry (i.e., HS chapters 72 and 73). Because steel is the most active AD user for many countries, there might be a concern that the estimated effects are inordinately influenced by steel products. This is not the case. As shown in Table A9 our results based on the restricted non-steel sample are roughly equal to those in the sample of all products, suggesting that the steel industry does not drive the results.

4.3.4. Sensitivity of inception date of the PTA

In the preceding analysis we mostly presume that the economically relevant date is the year when the PTA was enacted. However, it is likely that the effective date could be before or after the enactment year. Freund and McLaren (1999) argue that trade patterns change in advance of the official enactment date as firms anticipate the new trading environment. On the other hand, it is also likely that firms and bureaucratic agencies adjust to new rules with a lag. We investigate the sensitivity of our results to the timing and report the results in Fig. 4. In this graph we report the PTA parameter for the basic specification (column (2) of Table 1). We re-classified the effective date of each PTA from the year of enactment to +/− ten years. If, for example, a PTA came into force in 1994 and our benchmark regression would treat 1994 as the effective year ($t = 0$). In the robustness runs

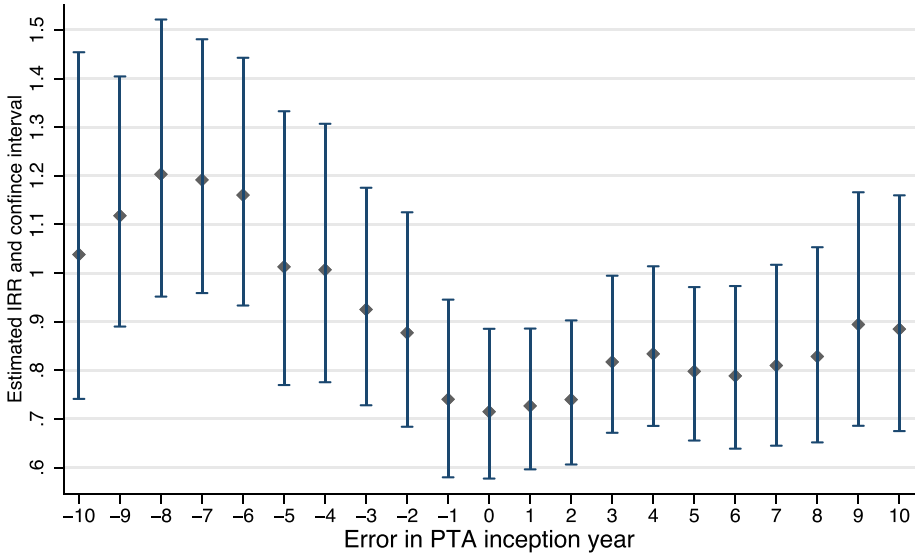

Fig. 4. Robustness to errors in effective date of PTA inception. *Notes:* IRR coefficient (and their 95% confidence intervals) are reported. The dependent variable is the number of AD filings in a country−pair and year *t*. The controls include real exchange rate, import value, GDP growth rate, treatment−specific trend, country −pair, and year fixed effects.

we perform 20 alternative regressions, one where we treat 1993 ($t = -1$) as the effective year, one where we treat 1992 ($t = -2$) as the effective year, one where we treat 1995 ($t = +1$) as the effective year, etc. The results for AD filings are depicted in the graph. The results indicate that as long as the effective date is within +/− one year of the actual year of enactment our results are essentially unaffected. This makes sense as AD investigations generally take 9–12 months to complete. This means a filing that is initiated shortly before the enactment date will ultimately be evaluated under the PTA rules. Moreover, the parameter estimates do not change very much (around the true enactment year) and the estimates are statistically significant. However, when we consider effective dates outside the window of +/− one year of the actual enactment date, the PTA effect loses most of its significance.

5. Conclusion

This paper presents new evidence that PTAs significantly alter the pattern of protection. Economists have long known that PTAs grant preferential tariffs to members; this paper provides evidence that the playing field is further tilted because of how PTA members use AD protection. Said differently, PTAs discriminate in both direct and indirect ways. Direct discrimination stems from preferential tariffs and indirect discrimination follows from the altered pattern of AD activity.

One key implication of this work is that in a world teeming with PTAs, there is a greater need for stronger multilateral disciplines on trade remedies. It appears that Bhagwati and Panagariya's fear of increased discrimination against non-members was well founded. To the extent that PTAs adopt special or additional rules on trade remedy actions against members' trade, they can effectively increase the level of discrimination against non-members. This increase in discrimination can occur when PTA members abolish trade remedy actions against the trade of PTA members but not against non-members' trade. It could also occur when PTA members adopt rules that strengthen disciplines on trade remedy actions against the trade of PTA members but not against the trade of non-members.

However, one important caveat of our research is that we do not know whether the identified relative fall in the intra-PTA AD filings with respect to inter-PTA AD filings is because PTA members are being spared from AD actions or is because non-members face greater AD scrutiny; and hence the results from this paper do not imply anything with respect to the aggregate number of AD filings. Our sense is the estimates are likely capturing both effects but we do not know the magnitude in each dimension. This is an important topic for future research.

At first blush, moves to strengthen disciplines on trade remedy actions against PTA partners or to abolish trade remedy actions against PTA partners appear good for trade. However, the welfare effects are ambiguous. Such rules may simply lead to intra-regional imports substituting for cheaper sources of imports from non-members, i.e., trade diversion. Since PTAs thrust us into the world of the second best, actions that look like they will lead to an increase in economic efficiency may achieve exactly the opposite effect.

Appendix A

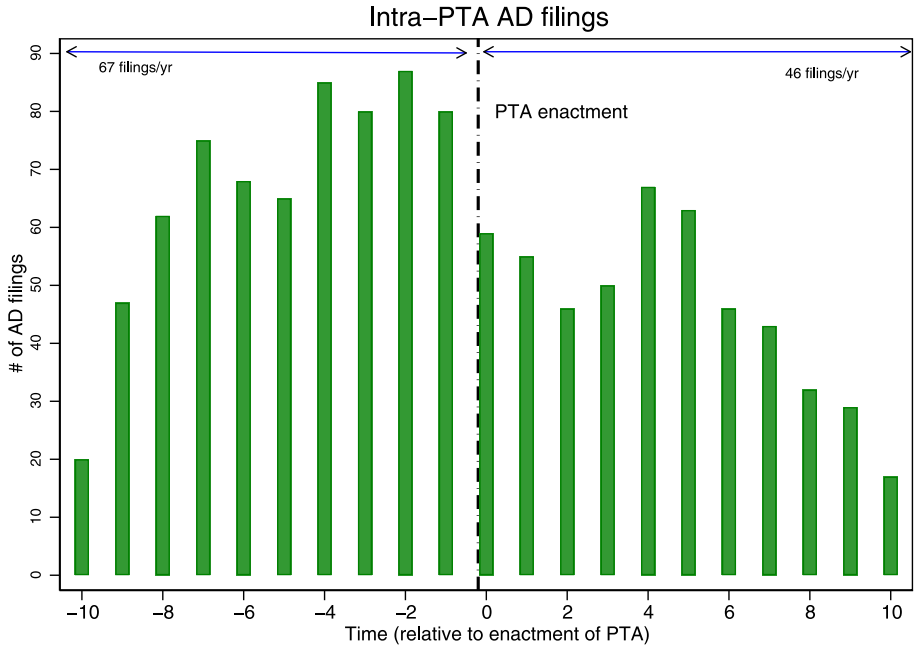

Fig. A1. Annual number of Intra-PTA AD filings (balanced sample, +/−10 years PTA enactment), excluding steel industry (i.e., HS Chapters 72 and 73).

Table A1
AD statistics, by user.

AD user	First year	Last year	Total filings	Total measures
United States	1980	2019	1,522	767
India	1992	2019	978	730
European Union	1980	2019	819	484
Australia	1989	2019	626	242
Brazil	1988	2019	477	291
Canada	1985	2019	460	298
Argentina	1989	2019	452	293
Turkey	1989	2019	318	243
South Africa	1992	2019	309	174
Mexico	1987	2019	308	195
China	1997	2019	291	233
South Korea	1986	2019	187	111
Chinese Taipei	1983	2019	151	53
Indonesia	1996	2019	141	73
Pakistan	2002	2019	135	91
Peru	1992	2019	119	66
Colombia	1991	2019	113	65
Egypt	1997	2019	104	56
Malaysia	1995	2019	97	58
Thailand	1996	2019	84	59
Israel	1991	2019	72	30
Russia	2001	2019	66	45
Ukraine	2002	2019	63	43
New Zealand	1995	2018	57	23
Kazakhstan	2006	2019	51	44
Chile	1995	2019	32	14
Venezuela	1992	2002	27	16
Philippines	1994	2017	24	15
Vietnam	2013	2019	18	10
Japan	1991	2019	18	14
Morocco	2011	2018	14	13
Poland	1997	2003	12	1
Trinidad and Tobago	1996	2016	12	9
Costa Rica	1996	2017	12	4
GCC	2015	2019	11	3
Uruguay	1997	2015	8	3
Latvia	2001	2002	7	0
Lithuania	1999	2001	7	1
Panama	1998	2009	6	0
Jamaica	2000	2010	6	5
Dominican Republic	2010	2019	5	4
Ecuador	1998	2010	5	2
Nicaragua	1997	1998	3	0
Paraguay	1999	2016	3	2
Honduras	2010	2010	3	0
Czech Republic	1998	1999	3	0
Singapore	1995	1995	2	2
Guatemala	1996	2014	2	0
Slovenia	1999	1999	1	0
Bulgaria	2002	2002	1	0
Jordan	2006	2006	1	0
Total			8,243	4,885

Notes: GCC stands for the six Middle Eastern countries of the Gulf Cooperation Council.

Table A2
PTAs included in the analysis.

ASEAN - Australia - New Zealand
ASEAN - China
ASEAN - India
ASEAN - Japan
ASEAN - Korea, Republic of
ASEAN Free Trade Area (AFTA)
Andean Community (CAN)
Aqadir Agreement
Asia Pacific Trade Agreement (APTA)
Asia Pacific Trade Agreement (APTA)
-Accession of China
Australia-Chile
Australia-China
Canada-Chile
Canada-Israel
Canada- Korea, Republic of
Caribbean Community and Common Market (CARICOM)
Central American Common Market (CACM)
Chile-China
Chile-Colombia
Chile-Costa Rica (Chile - Central America)
Chile-Mexico
China- Korea, Republic of
China-New Zealand
China-Singapore
Colombia-Mexico
Colombia- Northern Triangle
(El Salvador, Guatemala, Honduras)
Common Economic Zone (CEZ)
Dominican Republic - Central America
Dominican Republic - Central America
-US Free Trade Agreement (CAFTA-DR)
EC (15) Enlargement
EC (25) Enlargement
EC (27) Enlargement
EU (28) Enlargement
EFTA
EFTA - Canada
EFTA - Korea, Republic of
EFTA - SACU
EU - Albania
EU - Algeria
EU - Bosnia and Herzegovina
EU - CARIFORUM States EPA
EU - Central America
EU - Chile
EU - Colombia and Peru
EU - Egypt
EU - Faroe Islands
EU - Former Yugoslav Republic of Macedo
EU - Georgia
EU - Israel
EU - Korea, Republic of
EU - Mexico
EU - Morocco
EU - Norway
EU - Rep. of Moldova
EU - South Africa
EU - Tunisia
EU - Turkey
Economic Cooperation Organization (ECO)
Egypt-Turkey
Eurasian Economic Union (EAEU)
European Economic Area (EEA)
Gulf Cooperation Council (GCC)
Hong Kong, China - New Zealand
India-Japan
India-Malaysia
India-Nepal
India-Singapore
India-Sri Lanka
Israel-Mexico
Japan-Australia
Japan-Indonesia
Japan-Malaysia
Japan-Mexico
Japan-Philippines
Japan-Thailand
Korea, Republic of - Australia
Korea, Republic of - Chile
Korea, Republic of - Colombia
Korea, Republic of - India
Korea, Republic of - New Zealand
Korea, Republic of - Singapore
Korea, Republic of - Turkey
Korea, Republic of - US
Korea, Republic of - Viet Nam
Kyrgyz Republic - Ukraine
Latin American Integration Association
MERCOSUR - India
Malaysia-Australia
Mexico- Central America
Mexico-Uruguay
New Zealand- Chinese Taipei
New Zealand-Malaysia
North American Free Trade Agreement (NA
Pacific Alliance
Pakistan-China
Pakistan-Malaysia
Pakistan-Sri Lanka
Pan-ArabFTA (PAFTA)
Panama-El Salvador
(Panama- Central America)
Panama-Guatemala
(Panama- Central America)
Peru-Chile
Peru-China
Peru- Korea, Republic of
Peru-Mexico
Russian Federation -Azerbaijan
Russian Federation -Belarus-Kazakhstan
Singapore-Australia
South Asian FTA (SAFTA)
- Accession of Afghanistan
South Asian Free Trade Agreement (SAFTA)
Southern African Development Community
Southern African Development Community (SADC)
- Accession of Seychelles
Southern Common Market (MERCOSUR)
Thailand-Australia
Thailand-New Zealand
Trans-Pacific Partnership
Trans-Pacific Strategic Economic Partner
Turkey-Chile
Turkey-Georgia
Turkey-Israel
Turkey-Morocco
Turkey-Serbia
US - Australia
US - Chile
US - Colombia
US - Israel
US - Morocco
US - Oman
US - Peru
US - Singapore
Ukraine-Belarus
Ukraine-Kazakhstan
Ukraine-Moldova

Table A3
Summary statistics.

Variable	Obs.	Mean	St. Dev.	Min	Max
Dependent Variables					
Y_{ijt}(ADfilings)	30,515	0.270	0.897	0	29
Y_{ijt}(ADmeasures)	30,515	0.160	0.653	0	21
Explanatory Variables					
ln $RER_{ij(t-1)}$	25,877	0.260	3.556	−10.71	15.18
ln $Import_{ij(t-1)}$	25,850	6.520	2.515	−15.08	13.12
GDP $growth_{i(t/t-3)}$	30,470	11.22	8.103	−15.71	43.43
GDP $growth_{j(t/t-3)}$	28,317	10.95	11.17	−69.26	206.8
PTA_{ijt}^{Depth} (All country pairs)	30,515	0.052	0.138	0	0.846
PTA_{ijt}^{Depth} (PTA members only)	6,060	0.220	0.174	0	0.846

Table A4
Quantification exercise.

Dep. Var.	# of AD filings			
	(1)	(2)	(3)	(4)
(1) $C(PTA_{ijt} = 0)$	0.355***			
(2) $C(PTA_{ijt} = 1)$	0.261***			
Percentage change compared with $PTA_{ijt} = 0$	−26.53%***			
Test (1)=(2). *z*-statistic	3.18***			
(3) $C(PTA_{ijt}^{No\ AD\ Rules} = 1)$		0.346***		
(4) $C(PTA_{ijt}^{AD\ Rules} = 1)$		0.195***		
Percentage change compared with $PTA_{ijt}^{No\ AD\ Rules} = 1$		−43.52%***		
Test (3)=(4). *z*-statistic		3.00***		
(5) $C(PTA_{ijt} = 1, PTA_{ijt}^{Depth} = 25^{th}pct)$			0.278***	
Percentage change compared with $PTA_{ijt} = 0$			−20.38%***	
(6) $C(PTA_{ijt} = 1, PTA_{ijt}^{Depth} = 95^{th}pct)$			0.255***	
Percentage change compared with $PTA_{ijt} = 0$			−26.93%***	
Test (5)=(6). *z*-statistic			0.649	
(7) $C(PTA_{ijt}^{No\ AD\ Rules} = 1)$				0.317***
(8) $C(PTA_{ijt}^{AD\ Rules} = 1)$				0.201***
Percentage change compared with $PTA_{ijt}^{No\ AD\ Rules} = 1$				−36.56%***
Test (7)=(8). *z*-statistic				3.370
Country-pair FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	No
AD user-year FE	No	No	No	Yes
Observations	22,670	21,661	22,670	19,337

Note: The table reports average predicted counts, denoted by the $C(\cdot)$, for columns (1), (3), (5) of Table 1, and column (2) of Table 3 conditioning on the indicated variables evaluated at the specified values while all other variables are evaluated their actual values. Robust standard errors in parenthesis are clustered at country-pair level. Asterisks denote significance levels: *<0.10, ** < 0.05, *** < 0.01.

Table A5
Placebo test using false PTA inception year.

Dep. Var.	# of AD filings		
	Fake $PTA_{ij}^{Inception}$ at $t-1$	Fake $PTA_{ij}^{Inception}$ at $t-3$	Fake $PTA_{ij}^{Inception}$ at $t-5$
	(1)	(2)	(3)
Fake $PTA_{ij}^{Inception}$	0.935	0.992	0.919
	(0.133)	(0.120)	(0.114)
ln $RER_{ij(t-1)}$	1.240***	1.240***	1.240***
	(0.055)	(0.055)	(0.055)
ln $Import_{ij(t-1)}$	1.790***	1.789***	1.789***
	(0.088)	(0.088)	(0.088)
GDP $growth_{i(t/t-3)}$	1.009**	1.009**	1.009**
	(0.004)	(0.004)	(0.004)
GDP $growth_{j(t/t-3)}$	0.997	0.997	0.997
	(0.003)	(0.003)	(0.003)
Country-pair FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Treatment-specific Trend	Yes	Yes	Yes
Pseudo R^2	0.374	0.374	0.374
Observations	17,474	17,474	17,474

Note: The table reports the estimated incident rate ratio of Poisson regressions restricting the data to years prior to the PTA intervention. Robust standard errors in parenthesis are clustered at country-pair level. Asterisks denote significance levels: *<0.10, ** < 0.05, *** < 0.01.

Table A6
The Impact of PTAs & PTA AD rules on AD activity: drop China.

Dep. Var.	# of AD filings		# of AD measures	
	(1)	(2)	(3)	(4)
PTA_{ijt}	0.644***		0.771*	
	(0.070)		(0.109)	
$PTA_{ijt}^{AD\ Rules}$		0.540***		0.675**
		(0.080)		(0.125)
$PTA_{ijt}^{No\ AD\ Rules}$		0.792		0.928
		(0.114)		(0.149)
ln $RER_{ij(t-1)}$	1.166***	1.162***	1.136***	1.131***
	(0.037)	(0.036)	(0.039)	(0.038)
ln $Import_{ij(t-1)}$	1.731***	1.717***	1.707***	1.693***
	(0.090)	(0.090)	(0.107)	(0.109)
GDP $growth_{i(t/t-3)}$	1.010***	1.010***	1.001	1.000
	(0.003)	(0.004)	(0.004)	(0.004)
GDP $growth_{j(t/t-3)}$	0.993**	0.992***	0.997	0.996
	(0.003)	(0.003)	(0.003)	(0.003)
$PTA_{ijt}^{No\ AD\ Rules} = PTA_{ijt}^{AD\ Rules}$		0.043		0.151
Country-pair FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Treatment-specific Trend	Yes	Yes	Yes	Yes
Pseudo R^2	0.311	0.310	0.248	0.245
Observations	21,881	20,902	17,047	16,275

Note: The table reports the estimated incident rate ratio of Poisson regressions. Robust standard errors in parenthesis are clustered at country-pair level. Asterisks denote significance levels: *<0.10, ** < 0.05, *** < 0.01.

Table A7
The impact of PTAs & PTA AD rules on AD activity: drop EU and US PTAs.

Dep. Var.	# of AD filings		# of AD measures	
	(1)	(2)	(3)	(4)
PTA_{ijt}	0.733***		0.878	
	(0.084)		(0.105)	
$PTA_{ijt}^{AD\ Rules}$		0.470***		0.593***
		(0.071)		(0.092)
$PTA_{ijt}^{No\ AD\ Rules}$		1.008		1.105
		(0.139)		(0.153)
ln $RER_{ij(t-1)}$	1.196***	1.185***	1.172***	1.162***
	(0.041)	(0.039)	(0.045)	(0.038)
ln $Import_{ij(t-1)}$	1.778***	1.740***	1.713***	1.682***
	(0.078)	(0.080)	(0.086)	(0.067)
GDP $growth_{i(t/t-3)}$	1.007**	1.007**	0.997	0.996
	(0.003)	(0.004)	(0.003)	(0.004)
GDP $growth_{j(t/t-3)}$	0.998	0.997	1.002	1.001
	(0.003)	(0.003)	(0.003)	(0.003)
$PTA_{ijt}^{No\ AD\ Rules} = PTA_{ijt}^{AD\ Rules}$		0.000		0.000
Country-pair FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Treatment-specific Trend	Yes	Yes	Yes	Yes
Pseudo R^2	0.376	0.379	0.340	0.343
Observations	21,750	20,864	17,011	16,332

Note: The table reports the estimated incident rate ratio of Poisson regressions. Robust standard errors in parenthesis are clustered at country-pair level. Asterisks denote significance levels: *<0.10, ** < 0.05, *** < 0.01.

Table A8
The Impact of PTAs & PTA AD Rules on AD Activity: 1980–2007.

Dep. Var.	# of AD filings		# of AD measures	
	(1)	(2)	(3)	(4)
PTA_{ijt}	0.650***		0.763*	
	(0.097)		(0.124)	
$PTA_{ijt}^{AD\ Rules}$		0.507***		0.663**
		(0.073)		(0.113)
$PTA_{ijt}^{No\ AD\ Rules}$		0.864		0.887
		(0.163)		(0.179)
ln $RER_{ij(t-1)}$	1.242***	1.231***	1.232***	1.222***
	(0.061)	(0.059)	(0.066)	(0.064)
ln $Import_{ij(t-1)}$	2.029***	1.986***	1.953***	1.913***
	(0.130)	(0.125)	(0.154)	(0.153)
GDP $growth_{i(t/t-3)}$	1.006	1.006	0.996	0.997
	(0.004)	(0.004)	(0.005)	(0.005)
GDP $growth_{j(t/t-3)}$	0.998	0.998	1.000	1.000
	(0.003)	(0.003)	(0.004)	(0.004)
$PTA_{ijt}^{No\ AD\ Rules} = PTA_{ijt}^{AD\ Rules}$		0.016		0.241
Country-pair FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Treatment-specific Trend	Yes	Yes	Yes	Yes
Pseudo R^2	0.356	0.356	0.304	0.303
Observations	12,754	12,279	9,579	9,244

Note: The table reports the estimated incident rate ratio of Poisson regressions. Robust standard errors in parenthesis are clustered at country-pair level. Asterisks denote significance levels: *<0.10, ** < 0.05, *** < 0.01.

Table A9
The Impact of PTAs & PTA AD rules on AD activity: excluding steel industry.

Dep. Var.	# of AD filings		# of AD measures	
	(1)	(2)	(3)	(4)
PTA_{ijt}	0.701***		0.791*	
	(0.073)		(0.099)	
$PTA_{ijt}^{ADRules}$		0.516***		0.577***
		(0.075)		(0.099)
$PTA_{ijt}^{NoAD\ Rules}$		0.880		0.975
		(0.119)		(0.140)
ln $RER_{ij(t-1)}$	1.249***	1.240***	1.243***	1.232***
	(0.062)	(0.060)	(0.070)	(0.069)
ln $Import_{ij(t-1)}$	1.800***	1.757***	1.786***	1.740***
	(0.091)	(0.096)	(0.105)	(0.109)
$GDP\ growth_{i(t/t-3)}$	1.005	1.005	0.998	0.997
	(0.004)	(0.004)	(0.004)	(0.004)
$GDP\ growth_{j(t/t-3)}$	1.001	1.000	1.006	1.006
	(0.003)	(0.003)	(0.004)	(0.004)
$PTA_{ijt}^{NoAD\ Rules} = PTA_{ijt}^{ADRules}$		0.007		0.013
Country-pair FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Treatment-specific Trend	Yes	Yes	Yes	Yes
Pseudo R^2	0.359	0.360	0.330	0.330
Observations	20,569	19,585	15,770	15,017

Note: The table reports the estimated incident rate ratio of Poisson regressions. Robust standard errors in parenthesis are clustered at country-pair level. Asterisks denote significance levels: *<0.10, ** < 0.05, *** < 0.01.

References

Ahn, D., Shin, W., 2011. Analysis of anti-dumping use in free trade agreements. J. World Trade 45, 431–456.
Autor, D., 2003. Outsourcing at will: the contribution of unjust dismissal doctrine to the growth of employment outsourcing. J. Labor Econ. 123, 1–42.
Bagwell, K., Staiger, R.W., 1999. Regionalism and multilateral tariff co-operation. International Trade Policy and the Pacific Rim. Springer, pp. 157–190.
Baier, S.L., Bergstrand, J.H., 2004. Economic determinants of free trade agreements. J. Int. Econ. 64, 29–63.
Baier, S.L., Bergstrand, J.H., 2007. Do free trade agreements actually increase members' international trade? J. Int. Econ. 71, 72–95.
Bhagwati, J., 1992. Regionalism versus multilateralism. World Econ. 15, 535–556.
Bhagwati, J., 1993. Regionalism and multilateralism: an overview. In: de Melo, J. (Ed.), New Dimensions in Regional Integration. Cambridge University Press, Panagariya, Cambridge, pp. 22–51.
Bhagwati, J., Panagariya, A., 1996. The economics of preferential trade agreements. DC: AEI Press, Washington.
Blonigen, B.A., 2005. The effects of nafta on antidumping and countervailing duty activity. World Bank Econ. Rev. 19, 407–424.
Bown, C.P., 2005. Participation in wto dispute settlement: complainants, interested parties, and free riders. World Bank Econ. Rev. 19, 287–310.
Bown, C.P., Crowley, M.A., 2013. Import protection, business cycles, and exchange rates: evidence from the great recession. J. Int. Econ. 90, 50–64.
Bown, C.P., Tovar, P., 2016. Preferential liberalization, antidumping, and safeguards: stumbling block evidence from MERCOSUR. Econ. Pol. 28, 262–294.
Cantoni, D., Chen, Y., Yang, D.Y., Yuchtman, N., Zhang, Y.J., 2017. Curriculum and ideology. J. Pol. Econ. 125, 338–392.
Correia, S., Guimaraes, P., Zylkin, T., 2020. Fast poisson estimation with high-dimensional fixed effects. Stat. J. 20, 95–115.
De Saint Vaulry, A, 2008. Base de données CHELEM - Commerce international du CEPII. CEPII.
Freund, C.L., McLaren, J., 1999. On the Dynamics of Trade Diversion: Evidence from Four Trade Blocs. SSRN, 231779. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=231779.
Head, K., Mayer, T., 2014. Gravity equations: workhorse, toolkit, and cookbook. In: Gopinath, G., Helpman, E., Rogoff, K (Eds.), Handbook of International Economics vol. 4. Elsevier, pp. 131–195.
Hofmann, C., Osnago, A., Ruta, M., 2017. Horizontal depth: a new database on the content of preferential trade agreements. World Bank Pol. Res. Work. Paper.
Knetter, M.M., Prusa, T.J., 2003. Macroeconomic factors and antidumping filings: evidence from four countries. J. Int. Econ. 61, 1–17.
La Ferrara, E., Chong, A., Duryea, S., 2012. Soap operas and fertility: evidence from Brazil. Am. Econ. J. Appl. Econ. 4, 1–31.
Larch, M., Wanner, J., Yotov, Y.V., Zylkin, T., 2019. Currency unions and trade: a ppml re-assessment with high-dimensional fixed effects. Oxford Bullet. Econ. Stat. 81, 487–510.
Li, P., Lu, Y., Wang, J., 2016. Does flattening government improve economic performance?. evidence from China. J. Develop. Econ. 123, 18–37.
Li, T., Qiu, L.D., 2021. Beyond trade creation: preferential trade agreements and trade disputes. Pacific Econ. Rev. 26, 23–53.
Mattoo, A., Mulabdic, A., Ruta, M., 2017. Trade creation and trade diversion in deep agreements. World Bank Policy Research Working Paper, 8206. https://openknowledge.worldbank.org/handle/10986/28451.
Mattoo, A., Rocha, N., Ruta, M., 2020. Handbook of Deep Trade Agreements. The World Bank, Washington, DC. https://openknowledge.worldbank.org/handle/10986/34055.
Prusa, T.J., 2001. On the spread and impact of antidumping. Can. J. Econ. 34, 591–611.
Prusa, T.J., 2020. Antidumping and countervailing duties. In: Mattoo, A., Rocha, N., Ruta, M. (Eds.), Handbook of Deep Trade Agreements. The World Bank, pp. 319–342.
Prusa, T.J., Zhu, M., 2021. The Impact of PTAs on the Duration of Antidumping Protection. SSRN Available at SSRN 3901947 https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3901947.
Schnabl, P., 2012. The international transmission of bank liquidity shocks: evidence from an emerging market. J. Fin. 67, 897–932.
Signoret, J., Bown, C.P., Cieszkowsky, M., Erbahar, A., 2020. Temporary Trade Barriers Database including the Global Antidumping Database. https://www.worldbank.org/en/data/interactive/2021/03/02/temporary-trade-barriers-database.
Silberberger, M., Stender, F., 2018. False friends?. Empirical evidence on trade policy substitution in regional trade agreements. World Econ. 41, 2175–2199.
Silva, J.S., Tenreyro, S., 2006. The log of gravity. Rev. Econ. Stat. 88, 641–658.

Silva, J.S., Tenreyro, S., 2011. Further simulation evidence on the performance of the poisson pseudo-maximum likelihood estimator. Econ. Lett. 112, 220–222.
Tabakis, C., Zanardi, M., 2019. Preferential trade agreements and antidumping protection. Journal of International Economics 121, 103246.
Tovar, P., 2019. Preferential and multilateral liberalization: evidence from latin america's use of tariffs, antidumping and safeguards. J. Develop. Econ. 141, 1–19.
Tovar, P., 2022. Political-economic determinants of external import protection under a preferential trade agreement. World Trade Rev. 21 (2), 159–184.
Wooldridge, J.M., 2010. Econometric Analysis of Cross Section and Panel Data. MA: MIT Press, Cambridge.
World Bank, 2021. World Development Indicators. https://datatopics.worldbank.org/world-development-indicators.
WTO, 2021WTO Trade Topics. WTOhttps://www.wto.org/english/tratop_e/adp_e/adp_e.htm.
WTO, 2022Regional Trade Agreements Database. WTOhttp://rtais.wto.org/UI/charts.aspx.
Yotov, Y.V., Piermartini, R., Larch, M., 2016. An Advanced Guide to Trade Policy Analysis: The Structural Gravity Model. World Trade Organization, Geneva. https://www.wto.org/english/res_e/booksp_e/advancedwtounctad2016_e.pdf.