

# Do Trade Flows Respond to Nudges?

## Evidence from the WTO's Trade Policy Review Mechanism

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### Abstract

Relatively little is known about the economic effects of WTO members' communications outside of official negotiations and dispute proceedings. This paper considers whether interactions between members through the Trade Policy Review Mechanism, the WTO's prime transparency institution, lead to subsequent changes in bilateral trade flows. Trade policy concern submissions are more likely to lead to positive trade responses when (i) the receiving country is less concerned about terms-of-trade losses, (ii) the submitter is more willing to engage in WTO disputes with the reviewed member to challenge controversial trade policies, and (iii) the submitting country challenges trade policies in the non-chemical manufacturing sector. Nudges through the TPR process are not successful in raising agricultural trade.

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# 1 Introduction

There is a large literature on both the institutional underpinnings and the trade impact of the WTO. According to WTO theory ([Bagwell and Staiger 1999, 2002](#)), members liberalize trade on a reciprocal and MFN basis with the dispute settlement mechanism as underlying enforcement device in cases of non-compliance. However, there is little known about the economic effects of members' communications outside of official negotiations and dispute proceedings. In addition to being a negotiation forum and guardian of trading rules, one of the less publicized but crucial institutional tasks of the WTO is to ensure the transparency of its members' trade policies. For this purpose, the GATT provisionally established in 1989 the Trade Policy Review Mechanism (TPRM), which has conducted periodical reviews of members' trade policies ever since. Officially enshrined in the statutes of the WTO in 1995, the TPRM serves as a transparency-enhancing vehicle and informal communication forum as TPR materials are in general not intended to be used as evidence in any official WTO dispute proceedings.<sup>1</sup>

This paper investigates whether informal policy nudges through the TPRM, i.e. the non-binding transmissions of policy concerns, affect bilateral trading relationships. Using information from official GATT/WTO documents going back to 1989, I construct a bilateral dataset of submitted trade policy concerns during TPRM proceedings. Employing a gravity regression framework, I then examine to what extent the participation in these non-binding policy discussions translates to changes in bilateral trade flows. In particular, I consider whether the submission of a concern during a trade policy review subsequently raises a country's bilateral exports to the reviewed member. While the average communicated trade policy concern has no significant trade impact, the results exhibit a substantial degree of heterogeneity. Nudges through the TPRM are more likely to lead to positive trade responses when (i) the receiving country is less concerned about terms-of-trade losses, (ii) the submitting member has been an active pursuer of trade disputes against the importer in the past, and (iii) the submitting country challenges trade policies in the non-chemical manufacturing sector. Nudges through the TPR process are not successful in raising agricultural trade, which constitutes the most contentious area in trade negotiations for many countries.

By considering the trade effects of bilateral communications through the TPRM, this paper contributes in several ways to the WTO literature. First, it provides the first comprehensive

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<sup>1</sup> Annex 3 of the Marrakesh Agreement establishing the WTO explicitly states that the TPRM “is not, however, intended to serve as a basis for the enforcement of specific obligations under the Agreements or for dispute settlement procedures, or to impose new policy commitments on Members.” See [WTO \(2017a\)](#) for the text of Annex 3.

empirical analysis of the trade effects of the WTO's prime trade policy transparency mechanism. Examining the trade effects of the communications between members through the TPRM is a relevant exercise as it can provide valuable input for a cost-benefit analysis of the current apparatus. Trade policy reviews are both cost- and time-intensive, and the steadily increasing membership imposes a considerable burden on the WTO Secretariat. At the same time, the WTO Secretariat reports are frequently criticized for not commenting on members' compliance with WTO rules and for offering little concrete guidance on trade policy reforms (see, e.g., [Bown 2009](#)). The present paper can inform discussions on the effectiveness of the TPRM by shedding light on the question under which circumstances WTO members will experience positive trade effects from actively participating in the trade policy review process.

Second, and more broadly, this study provides evidence that specific WTO institutions can induce additional trade effects on a continuing basis. When assessing the effectiveness of the WTO, these estimates need to be added to any potential membership effects that have been identified in the previous literature and which usually rely on variations in trade flow patterns around GATT/WTO accessions. The latter line of research started out with the seminal paper by [Rose \(2004\)](#) who found no GATT/WTO membership effects on trade. Subsequent studies rejected or amended Rose's finding in several ways. [Tomz et al. \(2007\)](#) found positive GATT/WTO effects on trade when differentiating between de jure and de facto membership, while [Subramanian and Wei \(2007\)](#) suggest that the WTO promotes trade strongly for developed economies but not for developing countries. [Eicher and Henn \(2011\)](#) found that the latter result is not robust when accounting for heterogeneous PTA effects; they point instead to countries with greater incentives to bargain over tariff reductions as main beneficiaries of positive WTO effects. When accounting for both the intensive and extensive margins of trade, [Felbermayr and Kohler \(2006, 2010\)](#) and [Dutt et al. \(2013\)](#) also find evidence that the WTO enhances trade.<sup>2</sup> I control for WTO membership throughout in the regressions below and in line with the earlier research I find mixed effects depending on the exact empirical specification.

In addition to studies on accession effects, this paper relates to several other contributions in the literature that examine the economic implications of individual WTO agreements and institutional arrangements. While there has been no systematic empirical analysis of the TPRM, the trade effects of other WTO institutions such as the dispute settlement mechanism and the reporting

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<sup>2</sup> Additional papers that consider the trade effects of GATT/WTO membership include, among others, [Chang and Lee \(2011\)](#), [Dutt and Traca \(2010\)](#), [Gil-Pareja et al. \(2016\)](#), [Herz and Wagner \(2011\)](#), [Liu \(2009\)](#), [Rose \(2005\)](#), and [Roy \(2011\)](#).

mechanism for non-tariff barriers have previously been considered. [Bown \(2004\)](#) finds that trade volumes are greater after WTO disputes when complainants have substantial retaliation power. [Bown and Reynolds \(2017\)](#) further refine this result and provide evidence that import volume responses after trade disputes are in line with the terms-of-trade approach to WTO theory ([Bagwell and Staiger 1999, 2011](#)). In related research, [Bown and Reynolds \(2015\)](#) also show that complainants usually suffer a decrease in the bilateral exports of products that ultimately become subject to a dispute. [Disdier et al. \(2012\)](#), on the other hand, examine the impact of WTO-regulated Technical Barriers to Trade (TBT) and Sanitary and Phyto-Sanitary measures (SPS) on agricultural trade and find that developing country exports to OECD members are negatively affected by both kinds of regulations. [Fontagné et al. \(2015\)](#) provide further product-level evidence that SPS measures which were specifically raised as concerns at the responsible WTO committee have a negative impact on the extensive margin of trade.<sup>3</sup>

There is a growing literature which examines more broadly to what extent institutional design matters for the impact of trade agreements on trade flows. Focusing on preferential trade agreements negotiated by the US and the EU, [Horn et al. \(2010\)](#) divide agreement provisions into ‘WTO-plus’ and ‘WTO-extra’ rules, where the former encompasses components that fall under the current WTO mandate while the latter considers provisions which go beyond the multilateral trading rules agreed at the WTO. [Kohl et al. \(2016\)](#) extend the Horn et. al classification to 296 trade agreements and find that ‘WTO-plus’ regulations are trade promoting while ‘WTO-extra’ rules are in fact decreasing trade. [Dür et al. \(2014\)](#) compile instead a depth index for 587 preferential trade agreements, and confirm that deeper trade agreements lead to greater increases in trade flows. However, none of these papers considers the trade effects of trade policy transparency provisions and/or informal membership communications outside of official policy and access negotiations.

With regard to the trade effects of formal and informal information transmission, a number of papers also analyze the impact of governmental institutions abroad and the effects of interactions between country officials. [Rose \(2007\)](#) provides evidence that the presence of embassies and consulates promotes exports. [Nitsch \(2007\)](#) finds that state and official visits have a trade-enhancing effect as well, and [Lederman et al. \(2010\)](#) show that trade promotion agencies are successful in boosting exports, in particular for heterogeneous goods.<sup>4</sup> [Volpe Martincus et al. \(2010\)](#) argue that

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<sup>3</sup> Several recent papers also consider how countries’ usage of unfair trade rules (anti-dumping, safeguard and countervailing duties) are affected through trade policy reforms, WTO regulations and members’ MFN tariff structure. See, for instance, [Bown and Tovar \(2011\)](#), [Bown and Crowley \(2014\)](#) and [Kuenzel \(2017\)](#).

<sup>4</sup> In a meta-analysis of 32 empirical studies, [Moons and van Bergeijk \(2017\)](#) find a positive effect of economic

the latter result is driven by an expansion in the extensive margin while the presence of diplomatic missions mostly affects homogenous products. However, the effects of governmental trade promotion are not clear-cut. For instance, [Head and Ries \(2010\)](#) fail to identify a robust impact of trade missions led by Canadian government officials on imports and exports. In a similar vein, [Cassey \(2010\)](#) finds no evidence that the closure of California’s overseas offices in 2004 had a detrimental effect on exports. Below I examine to what extent nudges at the inter-governmental level through the WTO’s TPRM have an effect on bilateral trade patterns.

The remainder of the paper is organized as follows. Section 2 provides an overview of the Trade Policy Review Mechanism, and section 3 lays out the empirical approach. Section 4 discusses the TPRM and the gravity regression data. Section 5 presents the results at the bilateral import level, while section 6 considers sector-specific trade effects of TPR communications. Section 7 concludes.

## 2 The WTO’s Trade Policy Review Mechanism

### 2.1 General Structure

The surveillance of national trade policies is one of the core tasks of the WTO, and the Trade Policy Review Mechanism is the institutional center of this activity. The TPRM was provisionally established in April 1989 and became a permanent feature of the WTO after the successful completion of the Uruguay Round. Annex 3 of the Marrakesh Agreement establishing the WTO sets out the formal rules of the TPRM and affirms its commitment to achieve greater transparency and cooperation among WTO members:<sup>5</sup>

“The purpose of the Trade Policy Review Mechanism is to contribute to improved adherence by all Members to rules, disciplines and commitments made under the Multilateral Trade Agreements and, where applicable, the Plurilateral Trade Agreements, and hence to the smoother functioning of the multilateral trading system, by achieving greater transparency in, and understanding of, the trade policies and practices of Members.”

Importantly, however, the TPRM itself does not intend to evaluate WTO members’ compliance

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diplomacy on trade and investment flows. Their analysis also indicates, however, that the results are sensitive to model specification.

<sup>5</sup> See [Qureshi \(1995\)](#) and [Laird and Valdés \(2012\)](#) for a detailed account of the origin and a broader outline of the goals of the TPRM.

with specific rules, and therefore has a substantially different role from the Dispute Settlement Body. The process is intended to aid the understanding of a member's trade policies and to provide feedback to the reviewed country. Moreover, the reviews serve as a communication forum where countries can directly submit questions and concerns, and thus potentially nudge the reviewed member toward unilateral adjustments in its trade policies.

The frequency at which WTO members undergo trade policy reviews varies depending on a country's weight in world trade. The WTO currently conducts reviews on 2-, 4- or 6-year cycles (with flexibility of up to six months). [Table 1](#) distinguishes WTO members by their review frequency. Under the current TPRM rules, members of the Quad group —the United States, the European Union, Japan, Canada until 2006, and China from 2006 onwards— are reviewed every other year. The 16 countries with the highest trade volumes following the Quad, the group of Sixteen, are scheduled to be on a 4-year review cycle. However, currently the group features only 15 members. All other countries are subject to a review every six years, with a possibility of a longer interim period for the least-developed economies.<sup>6</sup> The WTO conducts between 14 to 20 trade policy reviews a year, which is a slight increase compared to the early stages of the TPRM during the GATT era ([VanGrasstek 2013](#)). As of the end of 2016, the TPRM had concluded more than 450 trade policy reviews.

A WTO trade policy review usually takes about nine months in total. Starting with the completion of a written questionnaire by the country under review, the process continues with an official WTO mission to the capital, and is followed by the circulation of written reports by both the WTO Secretariat and the reviewed member.<sup>7</sup> Every Secretariat report follows the same structure and includes a detailed overview of the member's trade policies and practices as well as a description of existing trade policy institutions and the current macroeconomic outlook. The report by the member usually takes the form of a policy statement in which the country outlines the objectives and direction of its trade policies ([Laird and Valdés 2012](#)). After receiving the report, the other members have four weeks to submit written questions or concerns to the country under review. The process finally culminates in a two-day meeting of the WTO's Trade Policy Review Body (TPRB) during which the member countries can make further statements and transmit additional concerns and/or questions to the reviewed member. After the meeting, usually within two to six weeks, the

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<sup>6</sup> Taking effect in 2019, the WTO membership recently agreed to raise the review frequencies to 3, 5 and 7 years to ease the pressures on the WTO administration from the rising number of member countries ([WTO 2016](#)).

<sup>7</sup> See [Table 2](#) in [Laird \(1999\)](#) for an exact timeline of the trade policy review process.

WTO Secretariat publishes the reports and the minutes of the meeting, which include the reviewed member’s written answers to all submitted questions and concerns. These meeting minutes form the basis for the database of bilateral trade policy concern submissions that I use in the analysis below. Section 4 provides a detailed discussion of this data.

The TPRM has received mixed reviews by the academic community and policy makers over the years. On the one hand, regular reviews of members’ trade policies by a neutral third party such as the WTO Secretariat are widely welcomed since they add to the transparency of the world trading system. In particular, the reviews provide useful information on countries’ protection patterns and openness across sectors (Bown 2009). In addition, TPRB meetings can serve as a valuable forum to discuss trade policy disagreements in a less confrontational manner than through the WTO’s dispute settlement mechanism. More generally, it has also been argued that the review process can strengthen a government’s domestic standing when pursuing desirable trade policy reforms.<sup>8</sup> That is, repeated scrutiny of one’s trade policies increases not only the incentive to implement better policies, but also offers governments a possible justification to pursue reforms in the first place.

On the other hand, the Secretariat reports are frequently criticized for failing to discuss members’ compliance with WTO rules. As Bown (2009, p. 219/220) points out: “[...] trade policy reviews are partially the result of a process that is influenced by political considerations, and thus they are written so as not to provoke disputes or to provide evidence useful in litigation.” As such, the member under review is not necessarily incentivized to be completely transparent with regard to its implemented trade policies. Hence, just going through the official motions of a trade policy review is unlikely to provoke any unilateral policy changes.

## 2.2 Bilateral TPR Communications

Despite the alleged hands-off approach by WTO officials, it is not uncommon that the Secretariat and in particular other member countries bring up controversial issues during the review process itself. Ghosh (2010), for instance, finds that in 53 percent of WTO disputes a preceding trade policy review highlighted or analyzed the eventually litigated policies, and in a quarter of disputes the complainant country itself had submitted a question related to the matter during a prior review. As fellow member countries can confront the country under review directly through written questions during the TPR process and at the TPRB meeting, these communications likely contain much more

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<sup>8</sup> See Maggi and Rodriguez-Clare (2007) for a formal discussion on how trade agreements can help governments to commit against domestic constituents.

substantial information on bilateral policy issues than the standardized Secretariat reports. In fact, this notion has been suggested by WTO members themselves. For instance, during the TPR of Bahrain in 2000 the representative of the European Union stated that “[...] the TPRM was one of the most important innovations of the Marrakesh Agreement. It was based on peer pressure to enable Members to think about their policies and to better integrate their economies into the global trading system (WTO 2000, p. 12).”

It is not known so far to what extent these bilateral nudges through the trade policy review process are actually effective. The analysis below will exactly address this question. In particular, does raising a concern during or ahead of TPRB meetings have an effect on countries’ subsequent bilateral trading relations? The effectiveness of this peer pressure to raise trade flows is likely to depend on a number of factors. The WTO literature suggests two particular channels which could be relevant in this context. First, WTO members’ actions are fundamentally driven by terms-of-trade considerations (Bagwell and Staiger 1999). Specifically, WTO members with greater market power should be less likely to implement unilateral policy changes in favor of exporters in response to comments in the TPR process as they would be more likely to suffer welfare losses due to deteriorating terms of trade. Second, the credibility of retaliation threats has been shown to be a successful determinant of whether WTO members live up to their commitments (Bown 2004). In the TPR context, bilateral requests that come from members that have engaged frequently in dispute litigation in the past should then be expected to be more effective. Below I consider not only the unconditional effects of bilateral TPR communications but also investigate these two channels.

The first part of the empirical analysis that follows will encompass a fairly broad definition of TPR concerns and their effects on aggregate trade flows as it is indeed not uncommon for bilateral TPR communications to be of a quite general nature. For instance, Hong Kong submitted the following concern during the TPR of New Zealand in 2009 (WTO 2009, p. 20): “[...] we note that although over 99% of the tariff lines are bound, there is an average gap of 9.1% between the applied and bound MFN rates. Such a gap, though small imparts a certain degree of unpredictability to the tariff regime. We look forward to seeing improvements in this area.” In other cases, however, the submitted questions by WTO members address a very specific issue in a particular industry. For example, the representative of New Zealand directed the following question concerning agricultural policies at the European Union during its TPR in 1997 (WTO 1997, p. 8): “While welcoming encouraging signs of liberalization in agriculture, he said that EU’s policies in this sector remained his country’s main area of concern. He underlined the EU’s high reliance on tariff protection (including



very high rates), export subsidies, reference price arrangements and domestic support policies, which maintained significant distortions for both the EU and trading partners. He expressed concerns about policies regarding the protection of food geographic indications and designations of origin. He called for the continuation of reforms in agriculture.” In order to obtain a complete picture of the effects of bilateral TPR communications, I consider in a second step how industry-specific protection concerns affect sectoral trade flows.

### 3 Empirical Setup

To investigate the impact of bilateral nudges through the TPRM on bilateral trade, I use a standard gravity regression framework.<sup>9</sup> To capture the effect of submitted trade policy review (TPR) concerns, I generate a binary variable,  $TPRconcern_{mxt}$ , which takes the value one if an exporter  $x$  submitted a concern or question prior or during a review of the importer  $m$  in year  $t$ , and zero otherwise. It is, of course, possible that the submission of a TPR concern is also partly driven by the extent of existing trade flows between a given country pair. To address these endogeneity concerns, I follow the suggestion of [Baier and Bergstrand \(2007\)](#) and include country-pair fixed effects throughout which has the additional advantage of further purging the estimates of any bias due to the omission of time-invariant country-pair-specific trade costs. Moreover, to account for multilateral resistance in gravity regressions (see [Anderson and van Wincoop 2003](#), and [Baldwin and Taglioni 2007](#)), all specifications include importer-year and exporter-year fixed effects.

To proxy for additional trade costs, the empirical model below also accounts for a number of common gravity controls that are not absorbed by the fixed effects. First and foremost, the regressions add a common WTO membership dummy,  $bothWTO$ , and a binary variable which captures whether the importer grants unilateral General System of Preferences benefits to the exporter,  $GSP$ . The former is crucial in order to not conflate potential TPR concern effects with more general WTO membership effects, while the latter variable helps to control for the possibility that countries enjoying GSP benefits might be less inclined to offer criticism of a member’s trade policies. The baseline specification also includes binary preferential trade agreement (PTA) controls which are differentiated by three degrees of integration: customs unions,  $CU$ , free trade agreements,  $FTA$ , and partial scope agreements,  $PS$ . To capture common membership in a currency union, the

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<sup>9</sup> See [Head and Mayer \(2014\)](#) for a review of the gravity equation’s theoretical underpinnings and different empirical approaches that have been applied in the literature.

binary variable *COMCUR* is added.

Summarizing the previous discussion, I estimate the following baseline gravity equation using a log-linear fixed effects approach:<sup>10</sup>

$$\begin{aligned} \log(\text{imports}_{mxt}) = & \beta_1 TPRconcern_{mxt} + \beta_2 \text{bothWTO}_{mxt} + \beta_3 GSP_{mxt} + \beta_4 CU_{mxt} \\ & + \beta_5 FTA_{mxt} + \beta_6 PS_{mxt} + \beta_7 COMCUR_{mxt} + \eta_{mx} + \nu_{mt} + \omega_{xt} + \epsilon_{mxt} \end{aligned} \quad (1)$$

where the dependent variable is the import volume (in logs) of country  $m$  from exporter  $x$  in year  $t$ .  $\eta_{mx}$ ,  $\nu_{mt}$  and  $\omega_{xt}$  are directional country-pair, importer-year and exporter-year fixed effects, respectively.

The literature has shown that controlling for the heterogeneous impact of trade agreements is potentially important when estimating trade effects in the WTO context (see, e.g., [Eicher and Henn 2011](#), and [Kohl 2014](#)). I therefore also examine the robustness of the results when the three aggregate trade agreement dummies (*CU*, *FTA*, *PS*) are replaced by individual trade agreement controls. The included set of individual trade agreements is guided by the recent literature ([Ghosh and Yamarik 2004](#), and [Eicher and Henn 2011](#)). In particular, I separately account for countries' memberships in *AFTA*, *CACM*, *CAN*, *CARICOM*, *EEA*, *EFTA*, *EU*, *MERCOSUR*, and *NAFTA*.<sup>11</sup> In addition, a number of agreements are added that have not been considered by the prior literature: *CAFTADR*, *COMESA*, *EAC*, *CEMAC*, *SADC*, and *WAEMU*.<sup>12</sup>

The recent gravity equation literature has pointed out that the log-linear specification in (1) prevents zero trade flow observations from being included in the estimation. Following [Silva and Tenreyro \(2006\)](#), I therefore also report results obtained with the Poisson pseudo-maximum likelihood (PPML) estimator in addition to the log-linear specifications. The PPML estimation replaces the log of bilateral imports in equation (1),  $\log(\text{imports}_{mxt})$ , with the actual level of imports,  $\text{imports}_{mxt}$ ,

<sup>10</sup> See [Correia \(2016\)](#) on the estimation of high-dimension linear fixed effects models.

<sup>11</sup> *AFTA*: ASEAN Free Trade Area, *CACM*: Central American Common Market, *CAN*: Andean Community, *CARICOM*: Caribbean Community, *EEA*: European Economic Area, *EFTA*: European Free Trade Association, *EU*: European Union, *MERCOSUR*: Southern Common Market, and *NAFTA*: North American Free Trade Agreement. Note that a number of PTAs which have been previously examined in the literature are not considered as they were signed prior to the start date of the sample in this paper. As such, these agreements are absorbed by the country pair dummies. These agreements include: *ANZCERTA*: Australia - New Zealand Closer Economic Relations Trade Agreement, *SPARTECA*: South Pacific Regional Trade and Economic Cooperation Agreement, and *LAI*: Latin American Integration Association

<sup>12</sup> *CAFTADR*: Dominican Republic - Central America - US Free Trade Agreement, *COMESA*: Common Market for Eastern and Southern Africa, *EAC*: East African Community, *CEMAC*: Economic and Monetary Community of Central Africa, *SADC*: Southern African Development Community, and *WAEMU*: West African Economic and Monetary Union.

which prevents zero trade flow observations from being dropped. In addition to handling zero trade flows, the PPML estimator is also considered to be more suitable to address the issues of heteroskedastic and non-normal residuals in gravity regressions.<sup>13</sup> The presence of a large number of three-way fixed effects puts substantial computational demands on the PPML framework. To circumvent these issues, I employ the iterative PPML estimator proposed by [Larch et al. \(2017\)](#). The next section provides a detailed overview of the panel used in the estimations as well as the data sources of all variables.

## 4 Data

To estimate the impact of submitted TPR concerns on bilateral trade, I use the International Monetary Fund’s Direction of Trade Statistics (DOTS). The panel of trade flows ranges from 1985 to 2015, with the length of the panel being guided by the fact that the first TPR was conducted under the GATT in 1989. I follow the steps outlined by [Head et al. \(2010\)](#) to compile the trade flow data from DOTS. In particular, when a bilateral trade flow is reported by both the importer and the exporter, I consider the larger value as the more reliable source of data. Since the exporter-reported data are in FOB terms while the importer-reported trade are on CIF basis, I adjust the latter using a 10% margin which is the mean difference for all observations in DOTS that are reported by both importers and exporters. The DOTS data is rounded in all cases to the nearest \$10,000 which corresponds to the standard of accuracy that the IMF follows when recording trade data.

One criticism when using consecutive years in a gravity framework is the potential inability of the data to capture the effects of trade policy and other changes as dependent and independent variables do not have sufficient time to fully adjust over short periods ([Cheng and Wall 2005](#)). [Olivero and Yotov \(2012\)](#), for instance, provide evidence that panel samples which pool data over consecutive years can produce non-reliable coefficient estimates. To minimize the risk of obtaining spurious coefficient estimates, I follow the advice of [Piermartini and Yotov \(2016\)](#) and consider 3-year intervals of the data starting in 1985.<sup>14</sup> The results presented below are similar when employing instead the random growth first-difference (RGFD) model suggested by [Baier et al. \(2014\)](#). Using

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<sup>13</sup> Nonetheless, the application of the PPML estimator can be problematic in certain circumstances as well. [Charbonneau \(2012\)](#) shows for the special case when  $N = T = 2$  that PPML with two-way fixed effects suffers from the incidental parameters problem. See [Head and Mayer \(2014\)](#) for a detailed discussion of the merits and drawbacks of different gravity estimation approaches.

<sup>14</sup> The results are similar when using 5-year intervals instead, which is line with the evidence provided by [Piermartini and Yotov \(2016\)](#).

the RGFDF approach, [Table A1](#) in the Appendix provides detailed estimates of the key specifications examined in section 5.

#### 4.1 Submitted TPR Concerns

Information on submitted concerns and questions by member countries prior or during meetings of the TPRB has been collected from the official GATT/WTO meeting minutes which can be accessed through a public WTO database ([WTO 2017b](#)). All TPRB meetings are structured in a similar fashion. First, the chairperson of the TPRB and a representative of the country under review give introductory statements which are then followed by remarks of one or two discussants drawn from the membership who comment in mostly general terms on the trade policy structure of the country under review. Thereafter, members can make statements directed at the country under review in which they raise specific concerns and questions. The member country then verbally replies to the raised concerns before the chairperson closes the TPRB meeting. In addition, the meeting minutes include written answers to questions that were submitted prior to the TPRB meeting.

TPRB meeting minutes can vary substantially in length depending on the complexity of a member's trade policies, its economic size, and the interest of other member countries. [Figure 1](#) shows the distribution of the number of members which submit concerns and/or questions during trade policy reviews. There is considerable variation in the number of countries that actively seek to engage a member during a review, with five being the smallest number of submissions (TPR of Uganda in 1995) and 56 being the largest number (TPR of the United States in 2014). The mean and median number of GATT/WTO members that submit concerns during a given TPR are 22 and 20, respectively. The data also reveal that the count of received TPR concerns varies substantially with the economic clout of the member under review. Using as proxy the Quad, Sixteen and Other WTO member definitions (see [Table 1](#)), the average number of received TPR concerns for these groups is 35, 26 and 18, respectively. In the empirical analysis below, I leverage this substantial variation in communications between members during TPRs to examine whether soft trade policy nudges have an effect on bilateral trade flows.

The number of countries that submit TPR concerns has increased over time from 13 in the average review in 1995 over 19 in 2005 to 30 in 2015. However, this development is in a way expected as the number of WTO members more than doubled from 76 in early 1995 to 162 at the end of 2015. [Table 2](#) shows the top 20 WTO member countries ranked by their share in total submitted TPR concerns. The United States, Canada, Japan, the EU and India are each responsible for more than

four percent of submitted TPR concerns. However, [Table 2](#) also illustrates that the TPR process is not dominated by a single country or even a group of WTO members as countries' individual shares are fairly low. In fact, by the end of the sample period (December 2015), only 14 out of 162 WTO member countries had never submitted a TPR concern.

As noted in section 2.2, submitted TPR concerns can address fairly general trade policy issues or involve a specific sectoral import barrier. The analysis in section 5 focuses on all TPR concerns, general and specific, to offer a comprehensive analysis of any potential trade effects arising from bilateral TPR communications. Thereafter, section 6 explores in more detail the trade effects of sector-specific TPR concerns to exploit the substantial variation across industries. For instance, 61 percent of all countries that submit a bilateral TPR concern specifically reference at least one import barrier in agriculture while only 20 percent mention issues for chemical products. The equivalent shares for raw materials and non-chemical manufactures stand at 23 and 33 percent, respectively.

## 4.2 Gravity Variables

The remaining variables for the empirical analysis have been collected from a variety of sources. Data on GATT/WTO membership status come from the WTO homepage, [www.wto.org](http://www.wto.org), while information on GSP benefits up until 2003 are from [Liu \(2009\)](#).<sup>15</sup> The information on bilateral GSP benefits after 2003 has been compiled from the GSP List of Beneficiaries documents provided by UNCTAD. Detailed information on *CU*, *FTA* and *PS* memberships (in binary format) has been obtained from the updated trade agreements database of [Egger and Larch \(2008\)](#).<sup>16</sup> Their database also provides in dummy variable format information on the individual trade agreements discussed in section 3. Data on currency union status (*COMCUR*) come from [de Sousa \(2012\)](#) whose updated dataset includes information up until 2015. [Table 3](#) provides detailed summary statistics for all variables included in the estimations below.

## 5 Results

To shed light on the trade effects following the submission of TPR concerns, this section considers the log-linear and PPML estimates of the fixed effects specification in equation (1). In addition

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<sup>15</sup> The results are nearly identical when incorporating the information on WTO nonmember participants in [Tomz et al. \(2007\)](#). Detailed results are available on request.

<sup>16</sup> Note that the *PS* variable was generated by grouping the information in the database on Partial Scope (PS) and Economic Integration (EIA) agreements.

to examining the average trade effects of TPR concerns for WTO members, I also consider two potential sources of heterogeneity for the effectiveness of communications through the TPRM: (i) countries' terms-of-trade concerns and (ii) the exporter's willingness to engage in WTO disputes as signal to enforce WTO commitments. Lastly, I examine whether there are time-dynamic effects of TPR concerns on trade.

## 5.1 Baseline Estimates of TPR Concern Effects

Table 4 provides the results from estimating the gravity equation in (1) to identify the average impact of submitting a TPR concern on bilateral trade flows. Specifications (1) to (3) report the log-linear fixed effects estimates, while columns (4) to (6) provide the corresponding results using the PPLM estimator, which has the advantage of including zero trade flow observations. In line with the discussion above, all specifications account for country-pair, importer-year and exporter-year fixed effects to control for endogeneity concerns as well as unobservable time-invariant bilateral trade costs and multilateral resistance effects. Standard errors are clustered throughout at the country-pair level. In addition to the *TPRconcern* dummy, all specifications feature the previously discussed set of control variables to account for other bilateral policy channels: WTO membership, GSP benefits, common currency status, and preferential trade agreements.

Column (1) starts out by capturing preferential trade agreement effects using separate binary variables for common membership in customs unions (*CU*), free trade agreements (*FTA*) and partial scope agreements (*PS*). Turning to the main variable of interest, the *TPRconcern* estimate is not significantly different from zero in the baseline specification in (1). Thus, on a first glimpse, nudges through the WTO's TPR mechanism seem to be, on average, an ineffective tool to address trade policy disagreements and raise bilateral trade flows. This result also persists when adding a separate dummy for EU members (instead of being treated as part of the customs union dummy) in specification (2). Controlling separately for EU membership is potentially important in the TPR context as EU members cannot file concerns against each other in this forum due to their representation as a uniform entity at the WTO. The absence of TPR interactions among EU members could then distort the estimates of the *TPRconcern* coefficient. All specifications going forward therefore include a separate EU control. To further eliminate potential estimation bias due to heterogeneous PTA effects, specification (3) includes individual binary controls for all 15 previously discussed agreements plus a separate dummy for all other trade deals (*BilPTA*).<sup>17</sup> While

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<sup>17</sup> The *BilPTA* variable takes the value one if a preferential trade agreement is in place between two countries which

the *TPRconcern* estimate turns more positive in columns (2) and (3), the effect remains statistically insignificant. Hence, on average, informal communications through the TPR process do not raise trade flows even when carefully accounting for the heterogeneous impacts of preferential trade agreements.

With regard to the additional control variables in specifications (1) to (3), the signs and magnitudes of the coefficient estimates are largely in line with expectations and previous results in the literature. WTO membership has throughout a significant positive effect on trade flows of a moderate magnitude, while granting GSP benefits to exporters is not found to increase trade. At the same time, both common membership in a customs union and in a free trade agreement significantly increase trade flows, while partial scope agreements (*PS*) do not exhibit a statistically significant effect. The magnitude of the trade effects is estimated to be greatest for CUs ahead of FTAs and WTO membership. Finally, a currency union (*COMCUR*) positively affects trade in columns (1) and (2). However, the effect subsides when separately accounting for EU membership in specification (2), and a common currency ceases to have a statistically significant trade impact once one controls for heterogeneous preferential agreement effects in column (3). Consistent with previous findings in the literature (see, e.g., [Eicher and Henn 2011](#), and [Kohl 2014](#)), there is substantial variation in the trade impacts of the individual agreements. On average, bilateral PTAs other than the separately listed ones (*BilPTA*) are estimated to significantly increase trade flows. But several of the individually included agreements in column (3) have substantially larger and statistically significant effects: *CAFTADR*, *CAN*, *COMESA*, *EAC*, *EEA*, *EU*, *MERCOSUR*, *SADC* and *WAEMU*. Nonetheless, a number of PTAs also show no statistically significant impact on trade: *AFTA*, *CACM*, *CARICOM*, *CEMAC*, *EFTA* and *NAFTA*. Note that while the detailed trade agreement estimates vary to some extent from earlier studies (e.g., [Ghosh and Yamarik 2004](#), [Eicher and Henn 2011](#), and [Kohl 2014](#)), these disparities are most likely due to the differences in the estimation approach and the considered sample period in the present paper.

The corresponding fixed effects PPML results in columns (4) to (6) show nearly identical estimates for the TPR concern term. Hence, the PPML models confirm the earlier findings from the log-linear specification. The submission of TPR concerns has, on average, no statistically significant effect on trade flows. Focusing on specification (6) which controls for heterogeneous effects of trade agreements, the coefficient estimates for *GSP* and *COMCUR* are again not significantly different from zero. However, some of the PPML estimates for the remaining control variables show

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is not one of the individually listed ones, and zero otherwise.

differences to the earlier log-linear specifications. With regard to the individual trade agreement dummies, several changes emerge. Five agreement measures who previously showed a positive and statistically significant effect cease to be effective drivers of trade flows in the PPML framework (*BilPTA*, *CAFTADR*, *EAC*, *EEA*, *MERCOSUR*). At the same time, two agreements now emerge to have a positive and statistically significant impact on trade (*CACM*, *NAFTA*). The remaining agreements show the same signs and similar statistical significance patterns as in the log-linear case, although the magnitude of the estimated economic effects varies to some extent. In line with expectations, none of the trade agreements is estimated to be trade inhibiting.

It should be emphasized at this point that the changes in the results between the log-linear and PPML specifications are not unexpected and line up with the findings of [Larch et al. \(2017\)](#) who note that the high-dimension fixed effects PPML estimator “can flip the conclusions of an otherwise rigorously-specified linear model.” Differences between the log-linear and PPML results can occur due to two reasons. First, in contrast to the log-linear model the PPML estimator includes zero trade flows, which raises the number of observations in the sample from 195,468 to 266,651. For instance, in the WTO context the PPML estimator now accounts for country pairs who neither traded before nor after joining the WTO, which could explain the statistically insignificant effect of WTO membership in all PPML specifications in [Table 4](#). Second, the presence of heteroscedastic error terms in the gravity equation can lead to inconsistent coefficient estimates in the log-linear specification ([Silva and Tenreyro 2006](#)). Going forward, it is therefore crucial to confirm the consistency of the results for the variable of interest, *TPRconcern*, across both the log-linear and PPML specifications.

## 5.2 Accounting for Heterogeneity in TPR Concern Outcomes

As previously emphasized, one complication in interpreting the above results is that the aggregate *TPRconcern* estimate only measures the average effect of TPR communications on trade flows. The baseline results in [Table 4](#) could therefore mask a substantial degree of heterogeneity in the impact of submitted trade policy concerns. To examine this possibility, this section considers two theory-based channels that could generate variations in trade outcomes after the submission of a TPR concern.



### 5.2.1 TPR Concerns and Terms of Trade

It is a well-established fact in the trade policy literature that terms-of-trade considerations are at the heart of GATT/WTO negotiations.<sup>18</sup> In line with the theory, importers should then be more reluctant to accommodate TPR concerns from exporters that account for a larger share in overall imports of the country under review as the importing country’s terms of trade would be at a greater risk to deteriorate in this case. Specifically, if an importer lifts a trade restriction that is particularly important to an exporter from which the former country sources a substantial share of its imports, the world market prices of its imported goods are more likely to rise as import demand is increasing. To test this prediction, I amend the empirical model in equation (1) by introducing an interaction of the TPR concern term with the share of imports that is accounted for by the exporter in a given year in the importing country,  $BilImportShare_{mxt}$ , as proxy for the terms-of-trade channel:

$$\begin{aligned} \log(imports_{mxt}) = & \beta_1 TPRconcern_{mxt} + \beta_2 TPRconcern_{mxt} \times BilImportShare_{mxt} \\ & + \beta_3 BilImportShare_{mxt} + \beta_4 bothWTO_{mxt} + \beta_5 GSP_{mxt} + \beta_6 CU_{mxt} \quad (2) \\ & + \beta_7 FTA_{mxt} + \beta_8 PS_{mxt} + \beta_9 COMCUR_{mxt} + \eta_{mx} + \nu_{mt} + \omega_{xt} + \epsilon_{mxt} \quad . \end{aligned}$$

If importers are less willing to implement trade policy changes in response to nudges through the TPR system from exporters that account for a larger share of their imports, then the coefficient of the interaction term should be negative:  $\beta_2 < 0$ . The relevant marginal trade effect of a TPR concern is now the following composite term:  $\beta_1 + \beta_2 \times BilImportShare_{mxt}$ .<sup>19</sup>

Table 5 reports the composite effect evaluated at the mean of the  $BilImportShare_{mxt}$  variable, 1 and .7 percent in the respective log-linear and PPML samples, and the individual coefficient estimates. Column (7) shows the results from the log-linear specification that includes the aggregate preferential trade agreement controls (CU, FTA, PS, EU) while specification (8) accounts again for individual PTA effects. Note that to conserve space Table 5 omits the coefficient estimates for the individual trade agreements as they are nearly identical to the prior results in Table 4. The complete results are available upon request. Three findings emerge. First, as expected, the coefficients of the interaction term are indeed negative in both specifications. Second, after controlling for

<sup>18</sup> Johnson (1953–1954) highlighted that in the absence of coordination large countries will choose higher tariff rates than optimal for the collective, and Bagwell and Staiger (2002) show how existing GATT/WTO principles can help solve this dilemma.

<sup>19</sup> One could also use the importer’s share in world imports in a given year as an alternative measure for terms-of-trade considerations. The conclusions are similar in this case. Detailed results are available on request.

the importer’s terms-of-trade concerns, the *TPRconcern* coefficient increases in magnitude and becomes statistically significant at the 10 percent level in specification (7) and at the 5 percent level in specification (8). Third, the average composite effect of submitting a TPR concern is also positive and statistically significant when accounting for heterogeneous PTA effects. That is, submitting a TPR concern significantly raises bilateral trade as long as the importer’s concerns about deteriorating terms of trade are not too great, which would lower the country’s incentive to unilaterally adjust its trade policies.

The corresponding PPML estimates in columns (10) and (11) in [Table 5](#) confirm these findings. In fact, after accounting for zero trade flows and heteroscedasticity with the PPML approach, the magnitude and statistical significance of both the *TPRconcern* variable and the composite term substantially increase. The composite *TPRconcern* effect in specification (11), which accounts for heterogeneous PTA effects and is statistically significant at the one percent level, implies that the submission of a TPR concern by an exporter with an average bilateral import share raises bilateral trade flows by about four percent ( $100 \times (e^{.0382} - 1) = 3.9\%$ ). Instead of only considering the mean effect, panel a) in [Figure 2](#) summarizes how the impact of TPR concerns on trade flows varies over a wide range of the exporting country’s import share based on the estimates in specification (11). The picture illustrates that submitting a TPR concern significantly raises bilateral trade flows as long as the bilateral import share is below 12 percent. Above this threshold, informal communications through the trade policy review mechanism have no significant positive effect on trade. Thus, TPR concerns can be a successful strategy for countries to stimulate exports as long as their share in the importing country’s market is not too large to discourage unilateral trade policy adjustments.

Finally, columns (9) and (12) in [Table 5](#) consider whether the success of TPR concerns also varies with the exporter’s terms-of-trade considerations. In particular, both specifications now replace the importer measure with the share of its own products that the exporter sends to the importing country, *BilExportShare<sub>mx</sub>*. On the one hand, a higher *BilExportShare<sub>mx</sub>* indicates that the exporter is more likely to affect markets in the importing country with its own policy decisions, which increases the pressure that the exporter can exert with a submitted TPR concern. However, the bilateral export share could also capture to what extent an exporter depends on the importer’s market, which could mitigate the effectiveness of a submitted TPR concern when the importer threatens retaliation. Thus, from a theoretical perspective, a higher bilateral export share could make TPR concern submissions more or less effective.

In specifications (9) and (12), only the individual *TPRconcern* coefficient in the linear regression

shows a significant effect (at the 10 percent level). The composite term evaluated at the mean of the *BilExportShare* variable shows no significant impact on trade flows in either case. Hence, both of the above outlined theoretical channels seem to offset each other. Panel b) in [Figure 2](#), which is based on the PPML estimates in column (12), further illustrates that bilateral export shares are not a significant driver for the trade success of TPR concerns. Thus, the results in this part reveal that terms-of-trade considerations by the importer are a key factor in explaining the trade impact of TPR communications, but the same channel is ineffective on the exporter side.<sup>20</sup>

## 5.2.2 TPR Concerns and WTO Enforcement

One key determinant for the success of the GATT/WTO agreements is the enforcement of members' trade policy commitments through the dispute settlement mechanism. While, as discussed earlier, trade policy reviews are in general not supposed to provoke dispute proceedings, there is some stylized evidence that controversial policies which eventually culminate in official disputes are frequently brought up in prior discussions during the TPR process ([Ghosh 2010](#)). From an enforcement perspective, exporters who are more willing to file trade disputes should also be more successful in inducing unilateral trade policy changes through the submission of TPR concerns as the WTO members under review face a greater threat of eventual retaliation if they lose a subsequent dispute.

In this part, I therefore consider the interaction of submitted trade policy concerns and prior dispute activity between the exporter and importer. In particular, I test the hypothesis whether exporters who have been active filers of GATT/WTO disputes against a given importer are more likely to succeed in raising bilateral trade flows via the submission of TPR concerns. To do so, I adapt the baseline specification in equation (1) by introducing a variable that captures how many disputes the exporter initiated against the importer in the previous three years,  $WTODisputes_{mxt}$ , and its interaction with the *TPRconcern* term:

$$\begin{aligned}
 \log(imports_{mxt}) = & \beta_1 TPRconcern_{mxt} + \beta_2 TPRconcern_{mxt} \times WTODisputes_{mxt} \\
 & + \beta_3 WTODisputes_{mxt} + \beta_4 WTOTotalDisputes_{mxt} + \beta_5 bothWTO_{mxt} \\
 & + \beta_6 GSP_{mxt} + \beta_7 CU_{mxt} + \beta_8 FTA_{mxt} + \beta_9 PS_{mxt} + \beta_{10} COMCUR_{mxt} \\
 & + \eta_{mx} + \nu_{mt} + \omega_{xt} + \epsilon_{mxt} \quad .
 \end{aligned} \tag{3}$$

<sup>20</sup> I also examined whether market power considerations as captured by countries' different TPR cycles (Quad versus Sixteen and other members) lead to heterogeneous trade effects. While the log-linear specification indicates that TPR concerns submitted by Quad and Sixteen members are more effective in raising trade, the PPML estimates do not confirm this pattern. These results are available upon request.

If importers are more receptive to TPR concerns from exporters that are more likely to enforce grievances via dispute proceedings, the coefficient of the interaction terms should be positive:  $\beta_2 > 0$ . Note that the specification above also includes as additional control variable the total number of bilateral WTO disputes over the previous three years,  $WTO_{TotalDisputes_{mxt}}$ , as a contentious relationship between the exporter and importer could depress trade flows.

Columns (13) and (14) in [Table 6](#) provide the log-linear estimates of equation (3), where the former specification includes the aggregate trade agreement dummies and the latter allows for heterogeneous PTA effects. The individual PTA estimates are again omitted in [Table 6](#) as they are similar to those in [Table 4](#); detailed results for these variables are available on request. The interaction coefficient,  $\beta_2$ , is indeed positive in both specifications. But neither the *TPRconcern* term nor its interaction with the dispute variable show a statistically significant effect on trade by themselves. The key effect to consider, however, is the composite of the *TPRconcern* and the interaction coefficients. The top row in [Table 6](#) reports this composite term when evaluated at the mean number of disputes that active users of the GATT/WTO systems have recently filed against importers. On average, these exporters have initiated two disputes against a given importer in the previous three years, implying that the mean composite effect is given by:  $\beta_1 + \beta_2 \times 2$ . The log-linear estimates of this term in columns (13) and (14) show that the average user of the dispute settlement system can expect an increase in bilateral trade by around three percent after submitting a TPR concern. This effect is statistically significant at either the five or 10 percent level. Thus, for exporters who have shown resolve in the recent past to enforce potential WTO agreement violations via the dispute settlement mechanism, TPR concerns are a successful tool to raise bilateral trade.

Columns (15) and (16) in [Table 6](#) report the corresponding PPML results. While the composite effect for the average user of the dispute settlement system is slightly smaller in magnitude, it is still significant at the 10 percent level when allowing for heterogeneous PTA effects. Using the PPML estimates in specification (16), [Figure 3](#) plots how the composite TPR concern effect on trade flows varies with the number of recently filed disputes by the exporter against the importer. The graph shows that exporters who recently initiated at least two trade disputes against the country under review can expect a statistically significant (up to seven disputes) or a borderline significant (eight to 10 disputes) increase in trade flows after submitting a TPR concern. The resulting trade effects vary between two and four percent for the considered range of two to 10 trade disputes. Hence, both the log-linear and PPML estimations show that nudging countries during trade policy reviews is more effective when the submitters of concerns are willing to use legal action to enforce their claims.

### 5.3 Dynamic Effects of TPR Concerns

The above analysis focused exclusively on the contemporaneous effects of TPR concerns on trade flows. TPR concerns could, however, also have dynamic effects on trade. To account for this possibility, panel A in [Table 7](#) adds 1-year lag and lead terms of the *TPRconcern* variable to several of the previous key specifications. The table focuses on the estimates of the dynamic TPR concern terms as the results for the remaining variables are nearly identical to the earlier discussion. The full results are available on request. Column (17) adds the 1-year lead and lag terms of the TPR concern variable to the baseline empirical model with heterogeneous PTA effects in specification (3) in [Table 4](#); the results are similar throughout when using aggregate PTA controls. The estimates show that the unconditional contemporaneous effect of TPR concerns on trade is now positive and significant (at the 10 percent level) after controlling for the potential dynamic impacts of TPR communications. While the statistically significant effect is limited to the linear fixed effects model, the magnitude of the contemporaneous estimate also increases in the corresponding PPML specification in column (20) relative to the baseline in column (6) of [Table 4](#). In both the linear and PPML specifications, the 1-year lead and lag terms show no significant impact on exports from the country submitting the TPR concern to the WTO member under review.

A similar pattern emerges in columns (18) and (21) when interacting all TPR concern terms with the bilateral import share measure from [Table 5](#) to control for terms-of-trade concerns of the importer. The unconditional estimates of the contemporaneous TPR concern terms increase in magnitude and statistical significance compared to columns (8) and (11) in [Table 5](#). The same holds when considering the contemporaneous composite effects, which are evaluated at the mean of the *BilImportShare* variable. That is, even after accounting for potential dynamic TPR effects, importers are less likely to implement unilateral trade policy changes that could increase imports when the exporter already accounts for a large share of bilateral imports. At the same time, specifications (18) and (21) show no significant trade effects of the 1-year lead and lag TPR concern terms, neither for the unconditional estimates nor for the composite terms. Finally, specifications (19) and (22) control for dynamic effects of TPR concerns when accounting for the enforcement channel as in [Table 6](#). Similar to the earlier results, the contemporaneous composite effect of TPR concerns (evaluated at the mean of two filed disputes) on trade is positive and significant when exporters have been more willing in the past to enforce WTO commitments through dispute filings. The 1-year lead and lag terms of TPR concerns show again no effect.

Panel A in [Table 7](#) indicates that any positive trade effects from submitted TPR concerns are relatively short-lived. However, as pointed out by [Cheng and Wall \(2005\)](#) and [Piermartini and Yotov \(2016\)](#), it becomes increasingly difficult in panel regressions with many fixed effects to identify effects over consecutive years as dependent and independent variables might not fully adjust in a single year’s time. To account for this possibility, columns (23) through (28) in panel B of [Table 7](#) present results from dynamic panel regressions when using instead 3-year lead and lag terms. Two results emerge. First, increasing the lead and lag frequency to three years consistently raises the magnitude and significance of both the contemporaneous and lagged TPR concern effects. Except for specifications (26) and (28), the submission of a TPR concern now has a significant positive effect on bilateral exports in the current year and three years later. Second, as found before, terms-of-trade considerations (as measured by the bilateral import share) moderate the effects of TPR concerns while dispute activity magnifies the trade response. Hence, the previously identified TPR effects are not only of a contemporaneous nature but also have a longer lasting impact. The latter point is important as the active participation in the TPR process can generate continuous trade increases beyond the one-time WTO membership effects that are emphasized in the literature.

## 6 Sector-specific Effects of TPR Concerns

The empirical analysis above focused on the effects of all submitted trade policy concerns, general and sector-specific, on aggregate bilateral imports between countries. When bilateral TPR communications cover fairly general trade policy issues, this approach ensures that the trade effects of TPR concerns are captured in the most comprehensive way. However, as pointed out in sections 2.2 and 4.1, it is not uncommon that countries reference in their bilateral TPR communications trade policy issues in specific sectors or products. This part examines the question how successful these more targeted nudges are in raising bilateral exports in the affected sectors.

For the product-specific analysis, I obtain bilateral import data from COMTRADE for four different product groups based on the SITC (rev. 2) nomenclature: (i) agricultural and food products (SITC 1-digit codes 0 and 1), (ii) raw materials, fuels and oils (SITC 1-digit codes 2, 3 and 4), (iii) chemicals (SITC 1-digit code 5), and (iv) non-chemical manufactured products (SITC 1-digit codes 6, 7 and 8). Based on the written TPR communications, I deconstruct, where applicable, the submitted trade policy concerns into four separate binary variables. For instance, if a country only submitted a question/concern regarding an agricultural product but not with regard to goods in

other categories, the sectoral TPR dummy for agriculture would take the value one and zero for all other categories. The empirical analysis focuses on relatively broad product categories for two main reasons. First, in most cases, countries describe the product of concern only verbally but do not report a detailed product code. Broad categories then help to minimize the risk of misclassifying TPR concerns in the wrong sector. Second, as the communications for even a single TPR often add up to dozens or hundreds of pages, a more detailed classification that would involve hand-matching the verbal descriptions of goods to specific product codes is not practically feasible.

The empirical specifications employed in this part closely follow the baseline model in equation (1) and Table 4. There are, however, two differences. First, the regressions are run separately for the four categories described above and in each case the aggregate bilateral import variable is replaced with the bilateral imports in the sector at hand. Second, in each regression, the *TPRconcern* variable is replaced by the respective *SectoralTPRconcern* dummy. For each of the four specifications, the lower panel in Table 3 reports summary statistics for both the sector-specific bilateral imports and TPR concerns. As discussed in section 4.2, we observe from the summary statistics that sectoral TPR concerns are most frequently encountered in the agricultural sample, followed by non-chemical manufactures, raw materials and chemicals.<sup>21</sup> Note that all specifications reported below include the same heterogeneous trade agreement controls as in columns (3) and (6) in Table 4. The results are virtually identical when using aggregate trade agreement controls. These results and all agreement-specific coefficient estimates are available on request.

Columns (29) to (32) in Table 8 present the results from the sectoral linear fixed effects regressions. Focusing on the *SectoralTPRconcern* variable, submitting a sector-specific concern about an import barrier has no statistically significant effect on sectoral trade flows in agriculture, raw materials and chemical products. However, there is a positive and statistically significant effect (at the 10 percent level) for non-chemical manufactures. Specifically, submitting a TPR concern about an existing import restriction in the manufacturing sector raises bilateral imports in that category by about four percent. This result is also confirmed when controlling for zero trade flow observations in the PPML model in column (36). The PPML estimates for the other product categories in columns (33) to (35) show a more mixed picture. While TPR concerns relating to raw materials have again no

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<sup>21</sup> Specifically, in the linear sample, the share of observations with a sector-specific TPR concern are: 1. agriculture: 3.6 percent, 2. non-chemical manufactures: 1.7 percent, 3. raw materials: 1.5 percent, and 4. chemicals: 1.4 percent. Note that around 31 percent of TPR concern submissions at the importer-exporter-year level do not include a reference to a specific sector. However, countries almost always augment their sector-specific submissions with more general policy comments.

significant impact on trade flows in that sector, TPR communications in the chemicals sector now feature a significant positive effect after including zero trade flows between countries. At the same time, the PPML estimates for agricultural products indicate a significant negative effect, which potentially illustrates the contentious nature of many agricultural policies in the WTO. As this result emerges only after accounting for zero trade flows, submitting a TPR concern in agriculture seems not a promising strategy to jump start a bilateral export relationship in that sector.

Most importantly, however, only the non-chemical manufacturing sector emerges as having a positive and statistically significant effect for the *SectoralTPRconcern* variable across both the linear and the PPML fixed effects specifications.<sup>22</sup> Hence, the results in [Table 8](#) indicate that TPR communications are a particularly effective means to raise exports for these products. As non-chemical manufactures often constitute the most traded product category between countries, this result is of particular relevance. In the sample, non-chemical manufactures account, on average, for 50 percent of trade across the four categories (when information for all four groups is available). Submitting product-specific instead of general criticisms of importers' trade policies during TPRs therefore proves to be an effective strategy to positively affect a large share of trade between WTO members.

## 7 Concluding Remarks

Most of the empirical WTO literature focuses on the implications of access negotiations and dispute proceedings while relatively little is known about the trade effects of members' communications outside of these channels. One of the less known but crucial institutional tasks of the WTO is to ensure and enhance the transparency of its members' trade policies via the Trade Policy Review Mechanism. This paper considers the question how policy nudges through the TPRM affect bilateral trading relationships between member countries. Specifically, I examine whether exporters' submissions of concerns during the review of an importer's trade policies lead to subsequent increases in bilateral trade flows.

Using data collected from official GATT/WTO documents going back to 1989, the empirical evidence suggests that soft policy nudges through the TPRM have, on average, no effect on bilateral

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<sup>22</sup> Similar to [Table 5](#) and [Table 6](#), I also examined the interactions between sectoral TPR concerns and terms-of-trade as well as trade dispute enforcement considerations. In line with the results in [Table 8](#), I only find significant composite trade effects of TPR concerns for the non-chemical manufacturing sector when controlling for either channel. Detailed results are available on request.



trade flows. The data also reveal, however, that the aggregate results mask a substantial degree of heterogeneity in the trade-creating effects of active participation in trade policy review proceedings. I find that the submission of trade policy concerns is more likely to have positive effects on bilateral trading relationships when (i) the country under review is less concerned about terms-of-trade losses, (ii) the submitting member has been an active pursuer of trade disputes against the importer in the past, and (iii) the submitting country challenges trade policies in the non-chemical manufacturing sector. However, nudges through the TPR process are not an effective means to raise trade flows in agriculture, the most contentious area in trade negotiations.

More broadly, the results in this paper suggest that the potential economic gains from the WTO can go beyond static one-time effects when countries join the organization. Active participation in WTO institutions such as the TPRM can generate additional continuous membership benefits under certain conditions. Further examining the institutional details of the WTO to sort out the composite welfare effects of the organization is therefore a promising avenue for future research.

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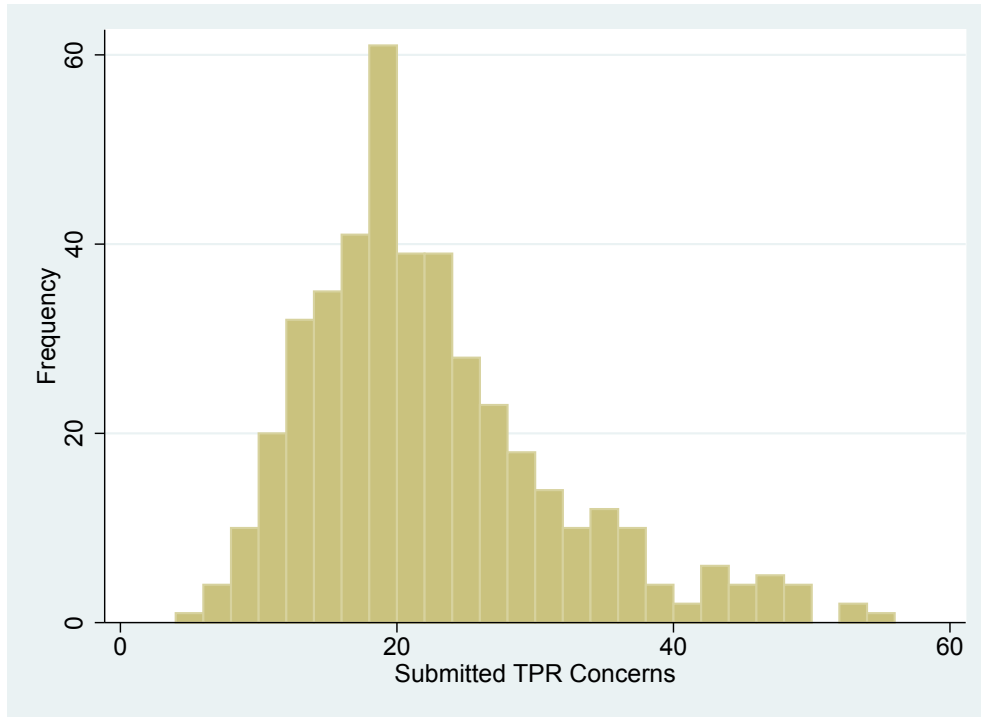
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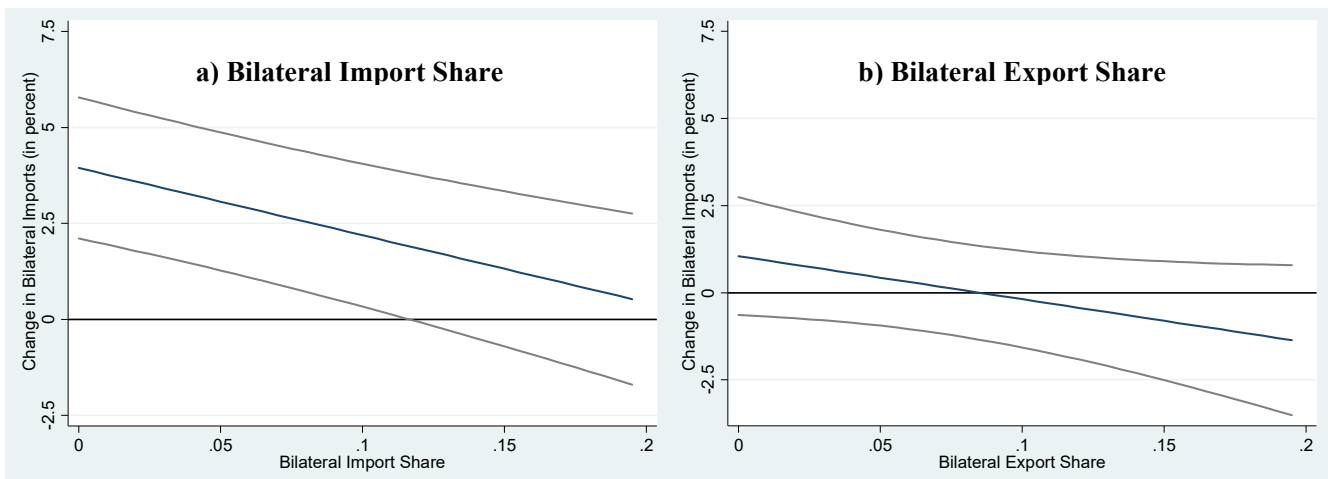
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**Figure 1: Submitted Concerns in Trade Policy Reviews, 1989–2015**



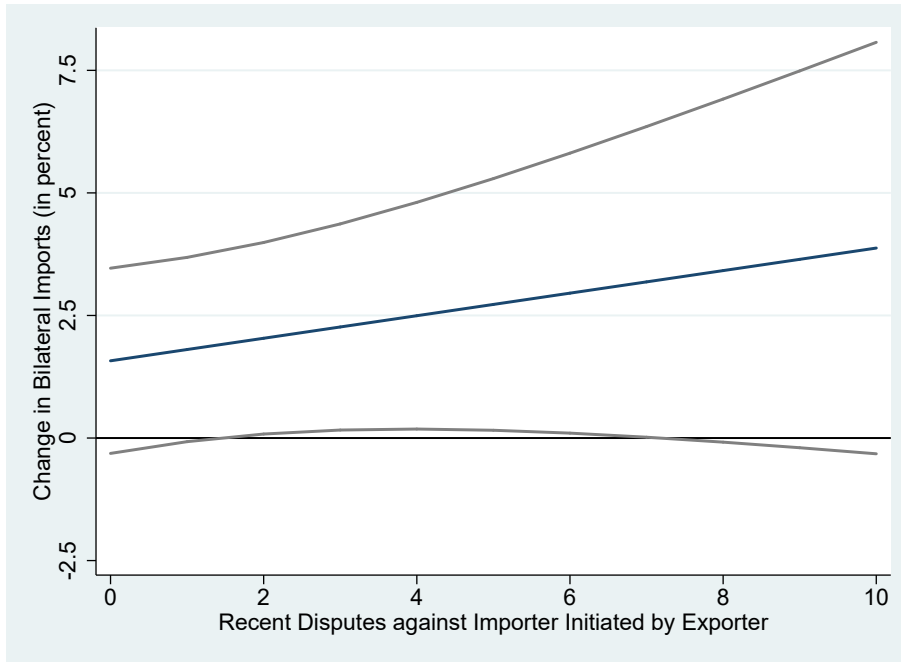
Notes: Figure 1 shows the distribution of the number countries that submit a concern during WTO trade policy reviews over the period 1989–2015.

**Figure 2: Trade, TPR Concerns and Terms of Trade**



Notes: Panel a) shows the composite effect of TPR concerns on trade as a function of the exporter’s share in the importer’s total imports based on the estimates in specification (11). Panel b) shows the composite effect of TPR concerns on trade as a function of the importer’s share in the total exports of the exporting country based on the estimates in specification (12). 90 percent confidence intervals are included for reference.

**Figure 3: Trade, TPR Concerns and WTO Disputes**



Notes: The figure shows the composite effect of TPR concerns on trade as a function of the number of WTO disputes initiated by the exporter against the importer in the previous three years based on the estimates in specification (16). 90 percent confidence intervals are included for reference.

**Table 1: WTO Member Countries by TPR Cycles**

<b>Group Name and TPR Frequency</b>		
<b>Quad</b> 2-year	<b>Sixteen</b> 4-year	<b>Others</b> 6-year
European Union Japan United States Canada (until 2006) China (after 2005)	Australia Brazil Canada (after 2006) Hong Kong India Indonesia Malaysia Mexico Norway Singapore South Korea Switzerland Taiwan Thailand Turkey	All other members

**Table 2: Top 20 WTO Members by Submitted TPR Concerns (as Share of Total)**

<b>Country</b>	<b>Share of TPR Concerns</b>	<b>Country</b>	<b>Share of TPR Concerns</b>
United States	0.044	Switzerland	0.023
Canada	0.044	Taiwan	0.023
Japan	0.043	Colombia	0.023
European Union	0.042	Norway	0.023
India	0.040	New Zealand	0.022
Brazil	0.033	Singapore	0.020
Australia	0.031	China	0.020
Hong Kong	0.030	Thailand	0.020
South Korea	0.028	Nigeria	0.020
Argentina	0.024	Chile	0.019



Table 3: Summary Statistics

Panel A: Aggregate Analysis - Tables 4-7								
Variable	Linear FE Sample (195,468 obs.)				PPML FE Sample (266,651 obs.)			
	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Min.	Max.
<i>AFTA<sub>mxt</sub></i>	0.00	0.06	0	1	0.00	0.05	0	1
<i>BilPTA<sub>mxt</sub></i>	0.16	0.36	0	1	0.13	0.34	0	1
<i>BilExportShare<sub>mxt</sub></i>	0.01	0.04	0	0.99	0.01	0.04	0	0.99
<i>BilImportShare<sub>mxt</sub></i>	0.01	0.04	0	1	0.01	0.03	0	1
<i>bothWTO<sub>mxt</sub></i>	0.66	0.47	0	1	0.61	0.49	0	1
<i>CACM<sub>mxt</sub></i>	0.00	0.03	0	1	0.00	0.02	0	1
<i>CAN<sub>mxt</sub></i>	0.00	0.03	0	1	0.00	0.03	0	1
<i>CAFTADR<sub>mxt</sub></i>	0.00	0.03	0	1	0.00	0.02	0	1
<i>CARICOM<sub>mxt</sub></i>	0.01	0.08	0	1	0.01	0.07	0	1
<i>CEFTA<sub>mxt</sub></i>	0.00	0.04	0	1	0.00	0.03	0	1
<i>CEMAC<sub>mxt</sub></i>	0.00	0.03	0	1	0.00	0.02	0	1
<i>COMCUR<sub>mxt</sub></i>	0.02	0.12	0	1	0.01	0.12	0	1
<i>COMESA<sub>mxt</sub></i>	0.01	0.09	0	1	0.01	0.09	0	1
<i>CU<sub>mxt</sub></i>	0.05	0.22	0	1	0.04	0.20	0	1
<i>CU_NoEU<sub>mxt</sub></i>	0.03	0.18	0	1	0.03	0.17	0	1
<i>EAC<sub>mxt</sub></i>	0.00	0.02	0	1	0.00	0.02	0	1
<i>ECOWAS<sub>mxt</sub></i>	0.01	0.09	0	1	0.01	0.09	0	1
<i>EEA<sub>mxt</sub></i>	0.02	0.14	0	1	0.01	0.12	0	1
<i>EFTA<sub>mxt</sub></i>	0.00	0.03	0	1	0.00	0.03	0	1
<i>EU<sub>mxt</sub></i>	0.02	0.13	0	1	0.01	0.11	0	1
<i>FTA<sub>mxt</sub></i>	0.09	0.29	0	1	0.07	0.26	0	1
<i>GSP<sub>mxt</sub></i>	0.17	0.38	0	1	0.15	0.36	0	1
<i>imports<sub>mxt</sub></i> (in \$ billions)	0.48	4.76	0	438.07	0.35	4.08	0	438.07
<i>logimports<sub>mxt</sub></i>	15.29	3.38	9.12	26.81	15.23	3.40	9.12	26.81
<i>MERCOSUR<sub>mxt</sub></i>	0.00	0.03	0	1	0.00	0.02	0	1
<i>NAFTA<sub>mxt</sub></i>	0.00	0.02	0	1	0.00	0.01	0	1
<i>PTA<sub>mxt</sub></i>	0.08	0.27	0	1	0.07	0.25	0	1
<i>SADC<sub>mxt</sub></i>	0.00	0.06	0	1	0.00	0.06	0	1
<i>TPRconcern<sub>mxt</sub></i>	0.05	0.22	0	1	0.04	0.19	0	1
<i>WTODisputes<sub>mxt</sub></i>	0.03	0.37	0	20	0.02	0.32	0	20
<i>WTOtotalDisputes<sub>mxt</sub></i>	0.06	0.69	0	39	0.04	0.59	0	39
<i>WAEMU<sub>mxt</sub></i>	0.00	0.04	0	1	0.00	0.04	0	1

Panel B: Sectoral Analysis - Table 8								
Sector: Agriculture	Linear FE Sample (149,426 obs.)				PPML FE Sample (222,616 obs.)			
	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Min.	Max.
<i>imports<sub>mxt</sub></i> (in \$ billions)	0.04	0.29	0	20.37	0.02	0.24	0	20.37
<i>logimports<sub>mxt</sub></i>	13.25	3.46	-0.13	23.74	13.18	3.49	-0.13	23.74
<i>SectoralTPRconcern<sub>mxt</sub></i>	0.04	0.19	0	1	0.03	0.16	0	1
Sector: Raw Materials	Linear FE Sample (135,907 obs.)				PPML FE Sample (212,809 obs.)			
	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Min.	Max.
<i>imports<sub>mxt</sub></i> (in \$ billions)	0.10	0.97	0	102.89	0.06	0.78	0	102.89
<i>logimports<sub>mxt</sub></i>	13.27	3.76	-0.13	25.36	13.18	3.80	-0.13	25.36
<i>SectoralTPRconcern<sub>mxt</sub></i>	0.02	0.12	0	1	0.01	0.10	0	1
Sector: Chemicals	Linear FE Sample (131,591 obs.)				PPML FE Sample (209,699 obs.)			
	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Min.	Max.
<i>imports<sub>mxt</sub></i> (in \$ billions)	0.06	0.53	0	25.33	0.04	0.42	0	25.33
<i>logimports<sub>mxt</sub></i>	12.96	3.74	-0.13	23.96	12.85	3.79	-0.13	23.96
<i>SectoralTPRconcern<sub>mxt</sub></i>	0.01	0.12	0	1	0.01	0.09	0	1
Sector: Non-chemical Manufactures	Linear FE Sample (187,628 obs.)				PPML FE Sample (243,231 obs.)			
	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Min.	Max.
<i>imports<sub>mxt</sub></i> (in \$ billions)	0.24	2.99	0	415.14	0.19	2.63	0	415.14
<i>logimports<sub>mxt</sub></i>	13.54	3.96	-0.13	26.75	13.51	3.97	-0.13	26.75
<i>SectoralTPRconcern<sub>mxt</sub></i>	0.02	0.13	0	1	0.01	0.11	0	1

Table 4: TPR Concerns and Trade – Baseline results

Variable	Linear Fixed Effects Model			PPML Fixed Effects Model		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>TPRconcern<sub>mx</sub>t</i>	-.0070 (.0150)	.0191 (.0149)	.0222 (.0149)	.0095 (.0116)	.0122 (.0114)	.0159 (.0114)
<i>bothWTO<sub>mx</sub>t</i>	.0746* (.0422)	.0826** (.0420)	.0827** (.0421)	-.0621 (.0606)	-.0641 (.0605)	-.0612 (.0601)
<i>CU<sub>mx</sub>t</i>	.5460*** (.0448)			.2225*** (.0479)		
<i>CU_NoEU<sub>mx</sub>t</i>		.2404*** (.0601)			.0624 (.0780)	
<i>EU<sub>mx</sub>t</i>		1.0064*** (.0473)	.4683*** (.0559)		.2646*** (.0537)	.2688*** (.0517)
<i>FTA<sub>mx</sub>t</i>	.1145*** (.0217)	.1771*** (.0226)		-.0533 (.0457)	-.0450 (.0475)	
<i>PTA<sub>mx</sub>t</i>	.0322 (.0422)	.0197 (.0421)		.0948*** (.0256)	.0932*** (.0260)	
<i>GSP<sub>mx</sub>t</i>	-.0308 (.0312)	.0069 (.0312)	.0122 (.0312)	.0099 (.0305)	.0123 (.0306)	.0216 (.0305)
<i>COMCUR<sub>mx</sub>t</i>	.3101*** (.0428)	.1267*** (.0430)	.0165 (.0417)	.0264 (.0348)	.0238 (.0348)	-.0028 (.0341)
<i>BilPTA<sub>mx</sub>t</i>			.1269*** (.0218)			-.0122 (.0434)
<i>AFTA<sub>mx</sub>t</i>			-.1573 (.1478)			-.1757 (.1458)
<i>CACM<sub>mx</sub>t</i>			.3601 (.2458)			.7260*** (.1640)
<i>CAFTADR<sub>mx</sub>t</i>			.4944*** (.1120)			.0555 (.0722)
<i>CAN<sub>mx</sub>t</i>			.4978* (.2879)			.7425*** (.2874)
<i>CARICOM<sub>mx</sub>t</i>			.3795 (.3072)			.0402 (.4448)
<i>CEMAC<sub>mx</sub>t</i>			-.1204 (.3377)			.2209 (.3319)
<i>COMESA<sub>mx</sub>t</i>			.4545*** (.1081)			.8422*** (.2103)
<i>EAC<sub>mx</sub>t</i>			1.1655*** (.2310)			.3521 (.2499)
<i>EEA<sub>mx</sub>t</i>			.5286*** (.0506)			.0373 (.0413)
<i>EFTA<sub>mx</sub>t</i>			.0583 (.1073)			-.1014 (.0733)
<i>MERCOSUR<sub>mx</sub>t</i>			.3342* (.1999)			.2235 (.1956)
<i>NAFTA<sub>mx</sub>t</i>			.1914 (.1267)			.2543*** (.0708)
<i>SADC<sub>mx</sub>t</i>			.7123*** (.1550)			.8030*** (.1524)
<i>WAEMU<sub>mx</sub>t</i>			.5135*** (.1726)			.4393** (.1711)
Obs.	195,468	195,468	195,468	266,651	266,651	266,651
$R^2$	.8954	.8955	.8956	.9927	.9927	.9926
Country-pair FE	Yes	Yes	Yes	Yes	Yes	Yes
Country-year FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Clustered standard errors at the country-pair level are in parentheses. \*\*\*, \*\* and \* indicate 1 percent, 5 percent and 10 percent significance levels, respectively.

Table 5: TPR Concerns and Trade – Terms of Trade

Variable	Linear Fixed Effects Model			PPML Fixed Effects Model		
	(7)	(8)	(9)	(10)	(11)	(12)
<b>Composite Effect:</b>	<b>.0224</b>	<b>.0254*</b>	<b>.0220</b>	<b>.0305***</b>	<b>.0382***</b>	<b>.0097</b>
<b>TPRconcern/ToT [= <math>\beta_1 + \beta_2 \times \bar{x}</math>]</b>	<b>(.0148)</b>	<b>(.0148)</b>	<b>(.0145)</b>	<b>(.0111)</b>	<b>(.0111)</b>	<b>(.0099)</b>
<i>TPRconcern<sub>mxt</sub> [= <math>\beta_1</math>]</i>	.0274*	.0306**	.0253*	.0311***	.0395***	.0105
	(.0155)	(.0155)	(.0152)	(.0112)	(.0112)	(.0103)
<i>BilImportShare<sub>mxt</sub> × TPRconcern<sub>mxt</sub> [= <math>\beta_2</math>]</i>	-.5002	-.5256*		-.0942*	-.1752***	
	(.3049)	(.3064)		(.0518)	(.0538)	
<i>BilImportShare<sub>mxt</sub></i>	15.8561***	15.8199***		6.6305***	6.7216***	
	(.6157)	(.6149)		(.3093)	(.2990)	
<i>BilExportShare<sub>mxt</sub> × TPRconcern<sub>mxt</sub> [= <math>\beta_2</math>]</i>			-.3348			-.1236
			(.3061)			(.0849)
<i>BilExportShare<sub>mxt</sub></i>			13.9652***			6.3155***
			(.4466)			(.2964)
<i>bothWTO<sub>mxt</sub></i>	.0841**	.0844**	.0685*	-.0226	-.0199	.0223
	(.0410)	(.0410)	(.0405)	(.0552)	(.0552)	(.0851)
<i>CU_NoEU<sub>mxt</sub></i>	.1920***			.0735		
	(.0566)			(.0605)		
<i>EU<sub>mxt</sub></i>	.9149***	.4234***	.4283***	.3071***	.2070***	.2078***
	(.0456)	(.0541)	(.0528)	(.0569)	(.0468)	(.0446)
<i>FTA<sub>mxt</sub></i>	.1536***			.0128		
	(.0222)			(.0538)		
<i>PTA<sub>mxt</sub></i>	-.0170			.0144		
	(.0417)			(.0313)		
<i>COMCUR<sub>mxt</sub></i>	.1028**	.0065	.0062	.1032***	.0626**	.0548**
	(.0402)	(.0397)	(.0389)	(.0295)	(.0283)	(.0260)
<i>GSP<sub>mxt</sub></i>	.0221	.0269	-.0012	.0357	.0469*	-.0617**
	(.0309)	(.0308)	(.0301)	(.0244)	(.0242)	(.0281)
<i>BilPTA<sub>mxt</sub></i>		.1054***	.1139***		.0071	.0064
		(.0214)	(.0209)		(.0454)	(.0405)
Obs.	195,468	195,468	195,468	266,651	266,651	266,651
<i>R</i> <sup>2</sup>	.8999	.9000	.9028	.9937	.9938	.9946
Country-pair FE	Yes	Yes	Yes	Yes	Yes	Yes
Country-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual PTAs	No	Yes	Yes	No	Yes	Yes

Notes: Clustered standard errors at the country-pair level are in parentheses. \*\*\*, \*\* and \* indicate 1 percent, 5 percent and 10 percent significance levels, respectively. Specifications (8), (9), (11) and (12) include individual trade agreement controls; see Table 4 for detailed list. The composite effect is evaluated at the respective mean of the *BilImportShare<sub>mxt</sub>* and *BilExportShare<sub>mxt</sub>* variables.

Table 6: TPR Concerns and Trade – GATT/WTO Enforcement

Variable	Linear Fixed Effects Model		PPML Fixed Effects Model	
	(13)	(14)	(15)	(16)
<b>Composite Effect:</b>				
<b>TPRconcern/Enforcement</b> [= $\beta_1 + \beta_2 \times \bar{x}$ ]	<b>.0308*</b> (.0166)	<b>.0332**</b> (.0166)	<b>.0173</b> (.0119)	<b>.0204*</b> (.0119)
<i>TPRconcern<sub>mxt</sub></i> [= $\beta_1$ ]	.0185 (.0152)	.0217 (.0152)	.0120 (.0115)	.0158 (.0115)
<i>TPRconcern<sub>mxt</sub> × WTODisputes<sub>mxt</sub></i> [= $\beta_2$ ]	.0062 (.0061)	.0058 (.0061)	.0027 (.0024)	.0023 (.0024)
<i>WTODisputes<sub>mxt</sub></i>	.0174 (.0127)	.0177 (.0126)	.0005 (.0072)	.0011 (.0072)
<i>WTOTotalDisputes<sub>mxt</sub></i>	-.0139** (.0062)	-.0145** (.0062)	-.0049 (.0038)	-.0046 (.0038)
<i>bothWTO<sub>mxt</sub></i>	.0827** (.0420)	.0828** (.0421)	-.0559 (.0605)	-.0520 (.0600)
<i>CU_NoEU<sub>mxt</sub></i>	.2404*** (.0601)		.0603 (.0781)	
<i>EU<sub>mxt</sub></i>	1.0051*** (.0474)	.4672*** (.0559)	.2577*** (.0537)	.2663*** (.0521)
<i>FTA<sub>mxt</sub></i>	.1769*** (.0226)		-.0473 (.0481)	
<i>PTA<sub>mxt</sub></i>	.0195 (.0421)		.0954*** (.0261)	
<i>COMCUR<sub>mxt</sub></i>	.1264*** (.0430)	.0162 (.0417)	.0241 (.0347)	-.0011 (.0340)
<i>GSP<sub>mxt</sub></i>	.0065 (.0313)	.0117 (.0312)	.0087 (.0306)	.0184 (.0305)
<i>BilPTA<sub>mxt</sub></i>		.1265*** (.0219)		-.0156 (.0435)
Obs.	195,468	195,468	266,651	266,651
$R^2$	.8955	.8956	.9927	.9926
Country-pair FE	Yes	Yes	Yes	Yes
Country-year FE	Yes	Yes	Yes	Yes
Individual PTAs	No	Yes	No	Yes

Notes: Clustered standard errors at the country-pair level are in parentheses. \*\*\*, \*\* and \* indicate 1 percent, 5 percent and 10 percent significance levels, respectively. Specifications (14) and (16) include individual trade agreement controls; see Table 4 for detailed list. The composite effect is evaluated at the mean of the *WTODisputes<sub>mxt</sub>* variable for active users of the GATT/WTO dispute settlement mechanism.

Table 7: TPR Concerns and Trade – Dynamic Effects

Panel A: 1-year leads and lags	Linear Fixed Effects Model			PPML Fixed Effects Model		
Variable	(17)	(18)	(19)	(20)	(21)	(22)
<i>f1.TPRconcern<sub>mxt</sub></i>	.0196 (.0171)	.0276 (.0176)	.0191 (.0173)	.0052 (.0191)	.0019 (.0161)	.0029 (.0200)
<i>TPRconcern<sub>mxt</sub></i>	.0319* (.0176)	.0410** (.0183)	.0302* (.0178)	.0263 (.0195)	.0590*** (.0172)	.0262 (.0197)
<i>l1.TPRconcern<sub>mxt</sub></i>	.0042 (.0178)	.0059 (.0183)	.0057 (.0182)	.0040 (.0146)	.0101 (.0131)	.0069 (.0154)
<b>Composite Effects: Terms of Trade</b>						
<i>f1.TPRconcern/ToT</i>		.0234 (.0169)			0.0009 (.0160)	
<i>TPRconcern/ToT</i>		.0321* (.0175)			.0561*** (.0171)	
<i>l1.TPRconcern/ToT</i>		.0040 (.0177)			.0096 (.0130)	
<b>Composite Effects: Enforcement</b>						
<i>f1.TPRconcern/Enforcement</i>			.0443 (.0280)			.0209 (.0217)
<i>TPRconcern/Enforcement</i>			.0639* (.0329)			.0497** (.0234)
<i>l1.TPRconcern/Enforcement</i>			.0004 (.0228)			.0089 (.0149)
Obs.	173,137	173,137	173,137	237,032	237,032	237,032
<i>R</i> <sup>2</sup>	.8969	.9015	.8969	.9925	.9931	.9924
Panel B: 3-year leads and lags	Linear Fixed Effects Model			PPML Fixed Effects Model		
Variable	(23)	(24)	(25)	(26)	(27)	(28)
<i>f3.TPRconcern<sub>mxt</sub></i>	.0037 (.0173)	.0108 (.0178)	.0040 (.0175)	-.0109 (.0172)	.0266* (.0156)	-.0161 (.0172)
<i>TPRconcern<sub>mxt</sub></i>	.0424** (.0200)	.0519** (.0206)	.0419** (.0203)	.0283 (.0193)	.0871*** (.0186)	.0281 (.0197)
<i>l3.TPRconcern<sub>mxt</sub></i>	.0739*** (.0189)	.0804*** (.0198)	.0740*** (.0193)	.0351** (.0149)	.0866*** (.0142)	.0338** (.0156)
<b>Composite Effects: Terms of Trade</b>						
<i>f3.TPRconcern/ToT</i>		.0084 (.0170)			.0258* (.0155)	
<i>TPRconcern/ToT</i>		.0430** (.0197)			.0841*** (.0184)	
<i>l3.TPRconcern/ToT</i>		.0758*** (.01888)			.0836*** (.0141)	
<b>Composite Effects: Enforcement</b>						
<i>f3.TPRconcern/Enforcement</i>			.0032 (.0192)			-.0051 (.0180)
<i>TPRconcern/Enforcement</i>			.0505** (.0214)			.0325* (.0197)
<i>l3.TPRconcern/Enforcement</i>			.0849*** (.0206)			.0437*** (.0149)
Obs.	173,137	173,137	173,137	237,032	237,032	237,032
<i>R</i> <sup>2</sup>	.8969	.9015	.8969	.9925	.9931	.9925

Notes: Clustered standard errors at the country-pair level are in parentheses. \*\*\*, \*\* and \* indicate 1 percent, 5 percent and 10 percent significance levels, respectively. All specifications account for the same control variables as specification (3) in Table 4, including country-pair, importer-year, exporter-year and individual PTA fixed effects. In addition, specifications (18), (21), (24) and (27) include the *BiImportShare<sub>mxt</sub>* variable from Table 5 and its respective interactions with the lead, contemporaneous and lagged *TPRconcern* terms. Specifications (19), (22), (25) and (28) add the same dispute controls as in Table 6 and the respective interactions of the *WTODisputes<sub>mxt</sub>* variable with the lead, contemporaneous and lagged *TPRconcern* terms.

Table 8: TPR Concerns and Trade – Sector-specific Results

Sector Variable	Linear Fixed Effects Model				PPML Fixed Effects Model			
	Agriculture (29)	Raw Materials (30)	Chemicals (31)	Non-chemical Manufactures (32)	Agriculture (33)	Raw Materials (34)	Chemicals (35)	Non-chemical Manufactures (36)
<i>SectoralTPRconcern<sub>mxt</sub></i>	-.0252 (.0245)	-.0214 (.0424)	-.0006 (.0386)	.0401* (.0218)	-.0258** (.0128)	-.0145 (.0384)	.0942*** (.0193)	.0255* (.0138)
<i>bothWTO<sub>mxt</sub></i>	.0071 (.0645)	-.0823 (.0806)	.0488 (.0667)	.1191** (.0533)	.1218 (.0951)	-.0203 (.1338)	.0084 (.1124)	-.0096 (.0827)
<i>COMCUR<sub>mxt</sub></i>	.0632 (.0617)	.1033 (.0772)	.1337** (.0636)	-.2163*** (.0476)	-.0220 (.0459)	.1422** (.0677)	-.1616*** (.0480)	-.1087*** (.0386)
<i>GSP<sub>mxt</sub></i>	.1628*** (.0410)	-.0465 (.0531)	-.0966* (.0500)	-.0705* (.0368)	.1188*** (.0341)	-.0201 (.0648)	.0337 (.0410)	.0636 (.0499)
<i>BilPTA<sub>mxt</sub></i>	.1676*** (.0291)	.1764*** (.0367)	.1012*** (.0309)	.1291*** (.0251)	.0018 (.0342)	-.0114 (.0559)	-.0122 (.0301)	-.0844 (.0706)
Obs.	149,426	135,907	131,591	187,628	222,616	212,809	209,699	243,231
$R^2$	.8277	.8000	.8529	.8775	.9873	.9751	.9844	.9918
Country-pair FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual PTAs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable in each column corresponds to the bilateral imports in the listed sector – in logs for columns (29)-(32) and in levels for columns (33)-(36). Clustered standard errors at the country-pair level are in parentheses. \*\*\*, \*\* and \* indicate 1 percent, 5 percent and 10 percent significance levels, respectively. All specifications include the same control variables as specification (3) in Table 4.

# Appendix: Additional Results

Table A1: TPR Concerns and Trade – RGFD Results

Variable	Random Growth First Difference Model					
	(A1)	(A2)	(A3)	(A4)	(A5)	(A6)
<b>Composite Effect:</b> TPRconcern/ToT [= $\beta_1 + \beta_2 \times \bar{x}$ ]			<b>.0296</b> (.0181)	<b>.0297</b> (.0182)		
<b>Composite Effect:</b> TPRconcern/Enforcement [= $\beta_1 + \beta_2 \times \bar{x}$ ]					<b>.0461**</b> (.0207)	<b>.0459**</b> (.0207)
$\Delta_5 TPRconcern_{mxt}$ [= $\beta_1$ ]	.0280 (.0183)	.0279 (.0183)	.0305 (.0188)	.0308 (.0188)	.0263 (.0185)	.0262 (.0185)
$\Delta_5 BilImportShare_{mxt} \times TPRconcern_{mxt}$ [= $\beta_2$ ]			-.0982 (.2202)	-.1089 (.2182)		
$\Delta_5 WTODisputes_{mxt}$					.0099 (.0068)	.0098 (.0068)
$\Delta_5 TPRconcern \times WTODisputes_{mxt}$ [= $\beta_2$ ]					-.0024 (.0163)	-.0023 (.0163)
$\Delta_5 WTOTotalDisputes_{mxt}$					-.0021 (.0078)	-.0020 (.0078)
$\Delta_5 bothWTO_{mxt}$	-.0189 (.0551)	-.0174 (.0551)	-.0155 (.0534)	-.0141 (.0534)	-.0189 (.0551)	-.0174 (.0551)
$\Delta_5 CU\_NoEU_{mxt}$	.0557 (.0712)		.0359 (.0682)		.0557 (.0712)	
$\Delta_5 EU_{mxt}$	.2990*** (.0569)	.2642*** (.0680)	.2669*** (.0553)	.2129*** (.0657)	.2978*** (.0570)	.2631*** (.0680)
$\Delta_5 FTA_{mxt}$	.0248 (.0288)		.0254 (.0281)		.0249 (.0288)	
$\Delta_5 PTA_{mxt}$	.0218 (.0432)		.0090 (.0421)		.0216 (.0432)	
$\Delta_5 GSP_{mxt}$	.0549 (.0396)	.0554 (.0396)	.0568 (.0391)	.0574 (.0391)	.0545 (.0396)	.0551 (.0397)
$\Delta_5 COMCUR_{mxt}$	.1566*** (.0515)	.1651*** (.0513)	.1613*** (.0498)	.1680*** (.0496)	.1566*** (.0515)	.1651*** (.0513)
$\Delta_5 BilPTA_{mxt}$		.0383 (.0277)		.0319 (.0271)		.0382 (.0277)
Obs.	91,705	91,705	91,705	91,705	91,705	91,705
$R^2$	.2396	.2398	.2758	.2759	.2396	.2398
Country-pair FE	Yes	Yes	Yes	Yes	Yes	Yes
Country-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual PTAs	No	Yes	No	Yes	No	Yes

Notes: Robust standard errors are in parentheses. \*\*\*, \*\* and \* indicate 1 percent, 5 percent and 10 percent significance levels, respectively. Specifications (A2), (A4) and (A6) include individual trade agreement controls; see Table 4 for a complete list. The composite effects in columns (A3) and (A4) are evaluated at the respective means of the  $BilImportShare_{mxt}$  variable while the composite effects in columns (A5) and (A6) are evaluated at the mean of the  $WTODisputes_{mxt}$  variable for active users of the GATT/WTO dispute settlement mechanism.