Interdependence that hurts: Sectoral trade as a driver of WTO litigation

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Abstract

When China introduced export duties and quotas on rare earths, the EU, Japan and the US initiated WTO trade disputes to remove these regulations. While the trade volume for these products were low, the complainant countries were highly dependent on sectoral trade with China for these goods. What role does interdependence play in WTO litigation? Contributing to the vast literature on political and economic determinants of WTO dispute settlement litigation, I argue that governments are more likely to initiate trade disputes in sectors that have large trade dependency. Building on previous findings that the WTO dispute settlement are used as enforcement tool to protect national industries against breaches of international trade agreements, I also claim that countries are more likely to initiate trade disputes in sectors with higher trade volume. Third, I expect the likelihood of WTO dispute onset to be higher when highly dependent sectors are also relevant for the domestic economy. I test these hypotheses using fixed effects logistic regressions on sectoral trade data and WTO dispute cases for 97 sectors, 25 years and 2862 country-dyads. My findings support the claim that WTO disputes are filed significantly more for sectors that are largely involved in trade. This effect is stronger when bilateral trade dependence increases. This study provides support for the idea that all countries protect national industries against unfair trade practices by filing WTO trade disputes in sectors that are largely involved in trade and highly dependant on foreign countries.

Keywords: Sectoral trade, trade disputes, WTO dispute settlement, bilateral trade dependency

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Introduction

What explains the selection of dispute cases by governments on a global level? Why do countries contest some breaches of international trade agreements while other are not subject of WTO litigation? Since its initiation in 1995, scholars have studied various factors that explain the onset and escalation of WTO disputes (e.g., Horn, Mavroidis, and Nordström, 1999; Davis and Shirato, 2007; Davis and Bermeo, 2009; De Bièvre et al., 2016; Bernauer et al., 2010; Sattler, Spilker, and Bernauer, 2014; Bechtel and Sattler, 2015; Yildirim et al., 2018; Lim and Lee, 2020; Davis, 2022). A large body of literature focused more specifically on the role of lobbying in WTO litigation, for instance related to the internationalization of production for anti-dumping cases or sector diversification (e.g., Kim and Spilker, 2019; Ommeren, Poletti, and De Bièvre, 2021). Yet, most of the studies that show how specific firms or sector influence WTO dispute settlement participation focus on the EU or US cases. Do these effect also hold on a cross-country level?

Many WTO dispute cases intuitively suggest that complainant countries are initiating trade disputes when important trade sectors are affected by harmful trade policy changes that allegedly violate international trade agreements as the following examples show. For example, Japan initiated a dispute against Ukraine contesting Ukraine's introduction of safeguard measures on certain passenger cars from Japan in 2013 (DS468). Japan's car exports to Ukraine only represented 0.45% of total car exports from Japan in 2012. So, why would Japan initiate a dispute for such a small fraction of exports affected by a foreign trade policy change? Besides country-level characteristics such as being a country highly involved in trade, having a strong economy and the legal capacities to participate in the DSB, clearly the reason behind this decision lies in the driving role of the sector's importance for the domestic economy (i.e. the trade volume). As passenger cars are by far the largest export sector in Japan and account for almost 13% of total exports (2012), the government had

a strong incentive to restore the market access following Ukraine's trade policy measure. Other examples are the dispute initiated by Russia against the EU (DS476) on the regulation of natural gas infrastructure within the EU. This sector accounts for almost 35% of total Russian trade and also features strong bilateral dependencies (2016). Similarly, Korea and China against the US (DS545 and DS562) on safeguards measures on certain crystalline silicon photovoltaic products (24%, 2018).

Yet, we observe large heterogeneity of trade volumes in WTO dispute cases (Bown and Reynolds, 2015). Why do countries initiate trade disputes when trade volumes are low? For example, the EU, the US and Japan initiated WTO trade disputes against China (DS431, DS432, DS433; later combined) following the imposition of export restrictions on various rare earths, tungsten and molybdenum, which only involved a low volume of imports. Why would these countries initiate a dispute then? It is reasonable to assume that the existence of a strong dependence from China explains the decision to file this WTO dispute. Large interdependence on trade with a foreign partner renders policy changes that negatively affected trade even more costly due to the difficulties to diversify trade in a short time period without causing disruptions. China is a global leader in the supply of these materials (for some complainant countries more than half of imports come from China) and the existence of a bilateral dependence increases government's willingness to restore fair trade conditions to protect national industries from market shortages.

Contributing to the literature on determinants of WTO dispute settlement participation, I focus on the role of sectoral trade in explaining why governments initiate trade dispute cases within the WTO. Following previous insights, I argue that governments worldwide are more likely to engage in WTO litigation when important domestic sectors (i.e. sectors that are largely involved in trade) are harmed by foreign breaches of international trade agreements. Secondly, I investigate the role of dependence from foreign partners in various sectors and claim that government's are more likely to start a dispute when a harmful foreign trade

policy change is perceived as a threat, i.e. when the interdependence from another country is high. Assuming that governments are more willing to bear the costs when the stake is high, I also control whether these effects become stronger when they are combined.

I employ data on WTO dispute cases and trade between 1995 and 2019 for 97 sectors and all countries involved in WTO litigation (2862 country-dyads). To test the effect of sector's interdependence and volume of trade flows on WTO litigation, I use fixed effects logistic regression. My results support the claim that higher percentage sectoral trade increases the likelihood of dispute onset: a complainant country is more likely to initiate a WTO dispute when the foreign trade policy negatively affects larger trade sectors. In addition, I also find support for the fact that higher larger sectors combined with higher bilateral sectoral trade dependency increases the likelihood of initiating a WTO dispute against that country. These findings are in line with previous observational evidence that WTO disputes concern "economically meaningful trade and market access interests" (Bown and Reynolds, 2015).

In the subsequent sections, I first briefly summarise the role of the WTO dispute settlement and previous literature to better understand the role of sectoral trade, in its domestic and international component, in WTO litigation. Then, I present the theoretical framework, the research design, including data sources and empirical investigation strategy, and present the results from the analysis. Finally, I conclude by discussing the limitations, implications and future avenues of this research field.

WTO litigation

WTO dispute settlement

The WTO and its dispute settlement body (DSB) are fundamental for a rules-based international trade system: 96% of global trade hinges on the rules decided at the WTO, which do

not only decrease tariff and non-tariff barriers but also provide firms the required stability to accurately plan and invest (Economist, 2019). The WTO dispute settlement system is indispensable for 'providing security and predictability to the multilateral trading system' because it allows to regulate and clarify existing trade regulations (see Article 3 DSU, 1994), enforce existing trade agreements (Sattler, Spilker, and Bernauer, 2014) and is actively used as a mean of de-politicized conflict resolution (Hoekman and Mavroidis, 2020). If a country perceives that another WTO member has (allegedly) violated an international trade agreements, for instance, through the increase of a tariff on a category of products, it can initiate a dispute through the DSB. Countries initiate WTO dispute cases to protect its interests in foreign markets and restore lost market access after a harmful trade policy change (Bown and Reynolds, 2015).

By January 2023 the DSB received 616 requests for consultations by more than 50 WTO member states. Almost half of the trade dispute cases have been settled through mutually agreed solutions, while the rest has required the ruling of a panel (first instance court) or the appellate body (AB) in case of appeal (second instance court). By December 2020 governments in 37 trade disputes requested an arbitration to determine the suspension of concessions or other obligations (last resort or retaliation), which allows the complainant country to implement countermeasures of an equal size against the country breaching international trade agreements. The AB stopped functioning in December 2019 after the US denied the appointments of new members protesting, among others, delays and judicial overreach, driving the rules-based, multilateral WTO and the DSB into a crisis (Hoekman and Mavroidis, 2019; Hoekman and Mavroidis, 2021). These motivates the period of investigation: I include all disputes initiated between 1995 and 2019 for a total of 593 WTO dispute cases at the country and 10892 at the sector level.

Previous literature on determinants of WTO litigation

Numerous scholars from political science, economics and law have been investigating different aspects of WTO dispute settlement cases (e.g., Sattler and Bernauer, 2011; Maggi and Staiger, 2013; Yildirim et al., 2018; Kim and Spilker, 2019; Lim and Lee, 2020). Starting with classical international political economy explanations, scholars showed that power measures - such as bigger economies, larger traders and higher retaliatory capacity - are significant predictors of WTO litigation on both the complainant and respondent side (e.g. Bown, 2004; Sattler and Bernauer, 2011). Larger market access and trade volume as well as a country's retaliatory and legal capacity matter for the initiation of WTO dispute cases (Bown, 2005; Bown and Reynolds, 2015). Also, WTO litigation is more likely between two countries of equal power (Allee and Huth, 2006).

Focusing on the participation of countries in WTO litigation many scholars were initially concerned of the lack of dispute cases by smaller/poorer countries due to a lack of legal capacity or economic power (e.g., Horn and Mavroidis, 2006, p. 16). Evidence shows that poorer countries participate less in WTO litigation because of the lack of (economic, personal and institutional) resources (Guzman and Simmons, 2005). Yet, the role of legal capacity of developing countries is found to be an initial constraint which gets overturned once a country gains experience either as complainant or respondent (Davis and Bermeo, 2009). Recently, the number of countries that are filing WTO disputes is increasing and diversifying, although not one dispute as been filed by African governments. Are traditional gravitation factors still significant predictors in the onset of WTO dispute cases?

Trade policy decisions and more specifically protectionism are often advanced by powerful lobbies more than voter-driven theories of accountability (Grossman and Helpman, 1994; Guisinger, 2009; Ommeren, Poletti, and De Bièvre, 2021). Previous studies show that trade policy is influenced by electoral goals of rent-seeking politicians which aim to maximise po-

litical support (e.g. Hillman and Ursprung, 1993; Hillman, 2009). Governments are found to file WTO complaints as "political cover" to reduce domestic political opposition (Allee and Huth, 2006). Focusing on the incentives of the respondent country, previous disputes with the same complainant and closeness to elections are found to be powerful predictors of litigation strategies to proceed with the DSB litigation as political cover for unpopular concessions (Lim and Lee, 2020). Leader change is also found to increase the likelihood of dispute onset, especially in autocracies (Rosendorff and Smith, 2018).

Studying the role of political determinants, several studies point out the driving role of domestic political interests of both complainants and respondent countries in WTO litigation. Governments assume a mediating role between numerous competing interests meanwhile trying to limit escalation in their gate-keeping role in selecting the litigation strategy of trade disputes (Davis, 2012). This interplay of international settings and domestic actors is also discussed in a study on the influence of international bargaining power of leaders and the signalling function of firms on government's decision to proceed with a WTO dispute case (e.g. Brutger, 2021). Numerous recent studies focus on the role of prominent industries in WTO litigation (e.g. Brutger, 2017; Yildirim et al., 2018; Ommeren, Poletti, and De Bièvre, 2021). In the case of trade disputes initiated by the EU, recent findings show that sectors which are dominated by few large firms are more successful in lobbying the European Commission to address the trade dispute at the WTO (Ommeren, Poletti, and De Bièvre, 2021). Moreover, the study finds evidence that the strategic choice of the EU whether to litigate trade issues within the WTO or through negotiation depends on the economic power of the respondent country: the EU initiates more WTO dispute cases when the respondent country is more powerful.

The international bargaining power of leaders and the signalling function of firms are found significant predictors of government's decision to proceed with a WTO dispute case (Brutger, 2021). Firms have a crucial role in WTO litigation as they can report alleged violations

of international trade agreements to the authorities. WTO disputes are mostly initiated in response to these reports by domestic firms on specific foreign trade measures that do not conform with current WTO regulations. Yet, in recent years, firms are increasingly reaching out to foreign governments to initiate a WTO dispute against its own country, signalling their interests in a resemblance with so-called "investment disputes" (Eckhardt and De Bièvre, 2015). The high rate of winning cases at the panel stage in WTO trade disputes (almost 90%) is explained by the success of governments in using clues from trade institutions to better rate the private information received by firms and make informed decisions about which foreign trade intervention to fight. The authors elaborate a formal model that "screens for losers" and brings forward the most likely winnable cases that are particularly hurtful to US firms and the economy and also have strong interest groups (Davis, 2022). Scholarly insights show that multinational corporations have a structural advantage in positively influencing their government (for instance which forum to choose) to improve their situation in contrast to small- and medium-sized firms. The type of firm and its involvement in GVC (domestic firms, autonomous exporters, exporters in GVCs and multinational firms) is found to found to be a relevant predictor of trade preferences - for instance on protection of foreign investments or the strength of dispute settlement systems - meanwhile diminishing the role of inter-industries differences (Kim et al., 2019). Yet, sectoral distinctions still remain an interesting avenue for research on the use of protectionist trade policy measures and the escalation of trade disputes. Finally, highly mobilized sectors and those of economic importance are most successful in receiving governmental protection (e.g., Bièvre et al., 2016; Francois, Horn, and Kaunitz, 2008). The analysis of four case studies suggests that the intensity of political mobilization of actors increases the likelihood of dispute escalation and a signal of politicians' commitment to the issue whereas the number of veto players in the domestic setting decreases the likelihood of EU compliance (Poletti and De Bièvre, 2014).

The role of sectoral trade in WTO disputes

The number of trade harming foreign policy changes by far exceeds the number of WTO disputes filed. This suggests that complainant and respondent country characteristics are not sufficient to explain WTO dispute initiation and escalation. Whereas some recent contribution focus on the role of lobbying in the EU and US based on different characteristics of industries - for instance, cooperation across border and the level of integration of firms (Yildirim et al., 2018; Kim and Spilker, 2019) - in explaining WTO dispute settlement litigation, I am interested in the role of sectoral trade for all countries participating. Following the idea that the WTO dispute settlement is used as enforcement device (Sattler, Spilker, and Bernauer, 2014), I posit that a country's likelihood of WTO onset is affected by the role of sectoral trade depending on its importance for the domestic economy and the interdependence from the partner country. Similar to protectionist policies that aim to protect the domestic sectors against external actors (Coughlin, Chrystal, and Wood, 1988), countries are thought to initiate WTO disputes to safeguard domestic interests, for instance to restore market access (Bown and Reynolds, 2015).

Sectoral trade: domestic volume

On the domestic side, the importance of sectoral trade is linked to the fact that larger sectors are often represented by a strong lobby that tries to influence political decision for the benefit of the firm(s), such as government's WTO dispute settlement onset - as shown, for instance, in the case of EU trade disputes in which mobilized and strong industries are successfully lobbying governments to file WTO disputes (Ommeren, Poletti, and De Bièvre, 2021). There are many underlying reasons that explain why governments are initiating more WTO disputes when large industries are involved, which can be for example donations or the loss of thousands of jobs if a harmful trade policy negatively affects trade or distorts market

competition. The statement by Delta Air Lines that 'the agreement "will help protect U.S. airlines, the millions of Americans they employ both directly and indirectly — and the U.S. traveling public"' (Amaro and Joseph, 2021) - after the announcement of settlement of the 17-year long reciprocal WTO dispute case between the US and EU on aircraft subsidies - clearly links these ideas. In this study, I do not aim to test this underlying causal mechanism, which has already been successfully achieved by previous case studies, but rather to study whether this effect is consistent across all countries participating in WTO litigation. For this, I focus on the country-level volume of trade by sector.

Considered that the onset of a trade dispute can be seen as an active governmental decision to support important national sectors, I expect that countries are more likely to file a WTO dispute case when sectors with a higher trade volume are harmed by breaches of WTO trade regulations.

> *H1:* Higher volumes of sectoral trade increase the likelihood of WTO dispute onset.

Sectoral trade: Bilateral dependence

Looking at the three dispute cases by the US, the EU and Japan against China in 2012 (China Rare Earths; DS431, DS432, DS433) that challenged export restrictions (duties, quotas and limitations of firms allowed to export the products) on various rare materials, two things stand out: first, these goods are crucial for the economy because they are needed for many electronic products, and second, they are largely produced in China. In 2012 the US, Japan and the UK imported significant percentages of rare earth, tungsten and molybdenum from China (respectively (%): US 11, 31, 48; Japan 4, 47, 31; UK 16, 26, 25; OEC, 2022). In 2014 the Appelate Body report confirmed that these trade policies were inconsistent with WTO trade agreements and did not fulfill the requirements for general exception on 'exhaustible

natural resources' that China claimed (Hoekman and Mavroidis, 2021). It is reasonable to assume that the complainant countries were threatened by the trade distorting effects of the new Chinese trade policies given the large dependence on China for these products.

I argue that larger bilateral sectoral trade is perceived as a systemic risk and therefore, higher interdependence increases the likelihood of initiating a WTO trade dispute when WTO trade regulations are violated. I also expect this effect to be stronger when the sector's trade volume is large, i.e. it is a relevant sector for the domestic economy.

> *H2:* Larger bilateral sectoral dependence from a partner country increases the likelihood of WTO dispute onset.

> *H3:* Bilateral sectoral dependence in large sectors increases the likelihood of WTO dispute onset.

Theoretical framework

Figure 1 is a graphical representation of the theoretical framework (following Hedström and Ylikoski, 2010). The graph shows the underlying micro-level phenomena that I assume following previous literature but do not empirically test (in grey). These are driven by the role that socio-economic factors play for consumers and firms in influencing government's trade policy decisions (e.g., the onset of a WTO dispute case) to maximize political support and success. The main interest of this analysis lies in the macro-level relationship between sectoral trade and WTO dispute cases by investigating the role of bilateral trade (to measure interdependence) and domestic trade volume (to measure relevance for the national economy).

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Figure (1)   Graphical representation of the mechanism: the role of sectoral trade in government's decision to participate in WTO dispute settlement.
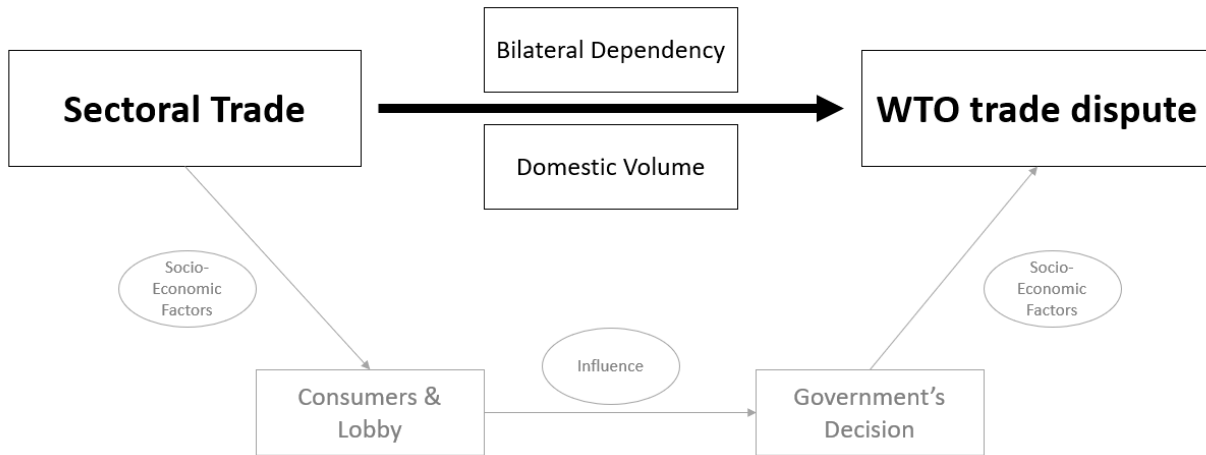
Note: distinctions between micro (1. situational mechanism; 2. action formation mechanism; 3. transformational mechanism), and macro-level phenomena (4. macro-level association).

Research Design

To study the role of sectoral trade and WTO litigation, I employ an improved version of the most recent database on WTO trade dispute cases (Hoekman, Mavroidis, and Saluste, 2020). It provides information on WTO dispute complainants, respondents, products, agreements, policy measures and policy sectors involved, the timing of the different stages. On the "issue of choosing the unit of account" as dispute cases are filed by different countries (and thus, formally appear as one case) or are resubmitted by more countries (for instance, the EC Bananas III dispute DS27, previously DS16) or include several claims addressing different measures, there is no optimal solution but only appropriate ones depending on the context of the study (Horn and Mavroidis, 2006, p. 14). I follow the original coding which accounts for "the multi-party nature of some disputes" (Hoekman, Mavroidis, and Saluste, 2020, p. 3). For the scope of this analysis, this solution appears to be fitting as it presents disputes for each country separately although it does not aggregate the disputes on the same topic

but references to them as different disputes (identified by the year the country started the dispute).

To estimate the role of sectoral trade, I create a variable that captures whether a sector was involved in a WTO dispute (by year, country complainant and respondent). I assign to each dispute the corresponding sector by aggregating the available information to a sectoral level (when the information was at the product level). In rare occasions there were multiple disputes by year, country pair and sectors. In those cases, when controlling for the number of sectors involved in a dispute case, I take the sum of all sectors; similarly for the stage reached in the DSB, I take the maximum stage. This solutions safeguards the dyadic structure of the dataset: 25 years, 2862 dyads (a combination of 71 complainant countries and 62 respondent countries minus the intra-EU cases) and 97 sectors.

The dependent variable is the onset of a trade dispute in a given sector, year and dyad. The main independent variables on sectoral trade are retrieved from the CEPII BACI dataset (Gaulier and Zignago, 2010), which contains dyadic information for over 200 countries from 1995 to 2020 at the product level. Again, I aggregate the trade from the product level to the 97 sectors of the harmonized system (2 digit level). I create four variables that measures the importance of sectoral trade (imports and exports) domestically - (a) percentage of sectoral trade over total trade - and bilaterally - (b) percentage of bilateral sectoral trade over sectoral trade. In addition, I estimate (c) the percentage of bilateral trade over total trade - as a measure of bilateral dependence in general - and (d) the percentage of bilateral sectoral trade over bilateral trade (see Figure 2). The large circles in the bottom part indicate that numerous WTO dispute cases are disputed over products that account for only small shares of trade (between 0% and 5%), nonetheless, a significant share of disputes involve sectors that account for large sectoral trade (depending on the variable). Given the skewed distribution of these variable, I employ a log transformation in the empirical analysis.

I select the control variables following previous literature and merge these from available

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Figure (2)   Percentage of sectoral trade for WTO trade dispute cases by country (1996-2019).
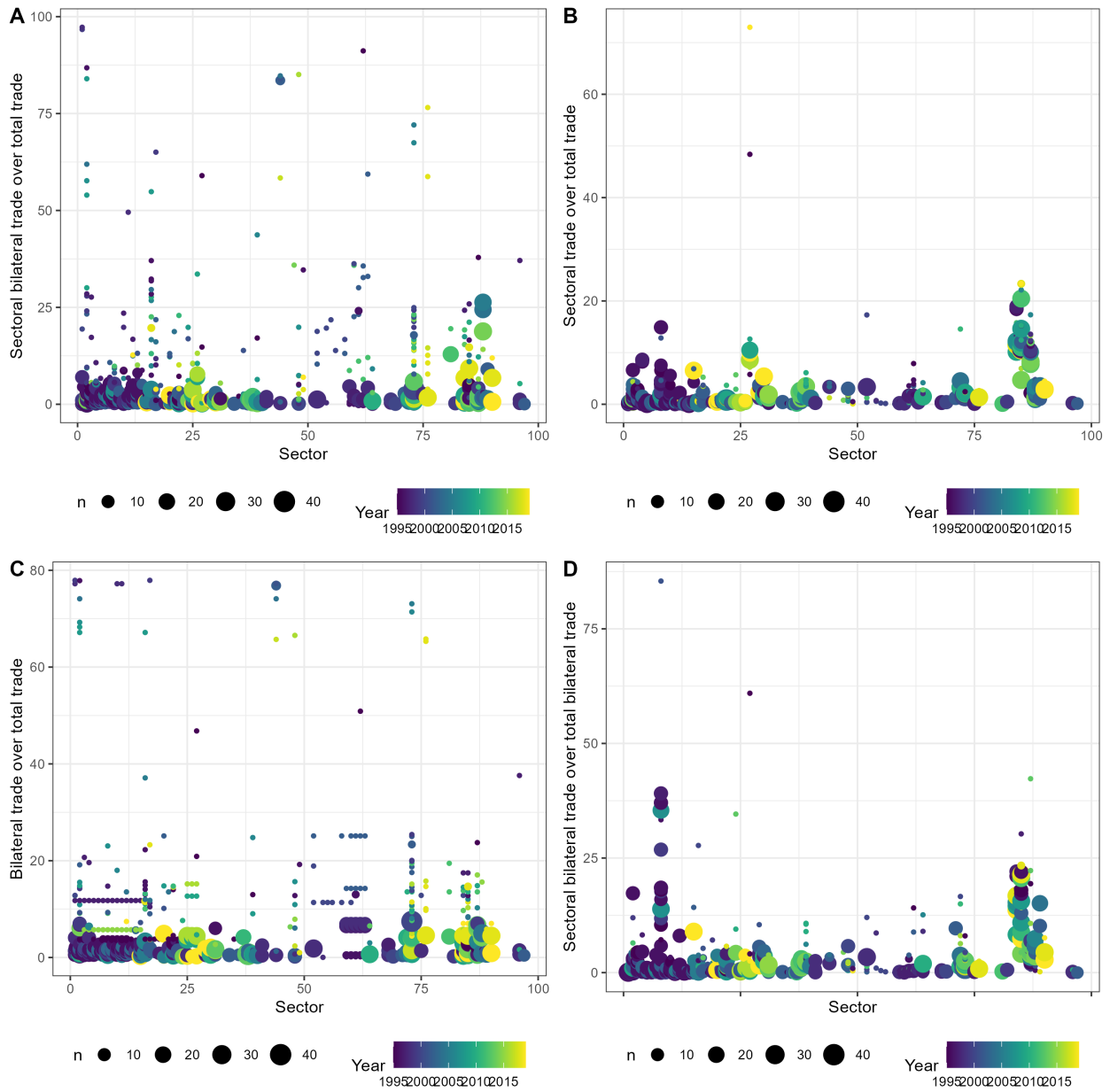
datasets. I control for gravitational factors - trade volume and economic capacity - using the (log of) trade (import plus export) as percentage of GDP and (log of) GDP per capita (constant 2000 US dollars). GDP is also a standard measure to test the economic power but often serves also as a proxies of the legal capacity. Following previous findings, I expect both factors to be positively related to the onset and escalation of WTO disputes. Next, I control for the economic power difference using the difference between GDPs per capita between the complainant and respondent country (WDI data). Some scholars use the difference in GDP to measure retaliatory power. In line with the literature, I expect that more litigation occurs between equally sized economies. I also use the United Nations (UN) general assembly votes and ideal points distance (Bailey, Strezhnev, and Voeten, 2017) as a dynamic measure of alliances and expect that more disputes occur between allied countries. I als control for the democracy score of complainant countries. Following best practices and assuming that it takes time to file a WTO dispute, I use the lead of the dependent variable. Finally, I include controls for previous disputes and the number of sectors involved in WTO litigation for dyad-year.

To analyze the effect of sectoral trade on WTO disputes I employ a logistic regression with dyadic and year fixed effects. Summary statistics and the correlation matrix are included in the appendix (see Table 1 and Figure 1). The unit of analysis is one observation per country-pair (excluding within EU country pairs) for each year and sector. The full model reads as follows:

$$Y_{irtn} = \beta_0 + \beta_1 SecTr_{itn} + \beta_2 BilSecTr_{irtn} + \beta_3 SecTr * BilSecTr + \beta_4 Z_{irtn} + \alpha_{ir} + \lambda_t + \epsilon_{irt}$$

$$(1)$$

where i is an indicator for the complainant country, r is an indicator for the respondent country, t the year and hs the sector; Y is the dependent variable - a dummy variable

for WTO dispute; $SecTr$ is the independent variable for sectoral trade and $BilSecTr$ for bilateral sectoral trade; Z is a vector of control variables ;β_0 is the intercept, β_1 and β_2 are the coefficients of the independent variables, β_3 is the coefficient of the interaction term; α are dyadic fixed effect, λ are year fixed effects, and ϵ the error term.

I use the following empirical identification of the concept of bilateral dependency and sectoral trade. These correspond to panel (a) and (b) in Figure 2. First, I use the share of bilateral trade over total trade by sector n and dyad-year (i, r, t) to identify the bilateral dependency.

$$BilSecTr = \frac{trade_{i,r,t,n}}{trade_{i,r,t}} \times 100 \qquad (2)$$

Then, I use the percentage share of sectoral trade (imports and exports) relative to total trade by the implementing country i in year t and sector n. This captures the volume of trade by sector, without distinguishing between bilateral trade with specific countries.

$$SecTr = \frac{trade_{i,t,n}}{trade_{i,t}} \times 100 \qquad (3)$$

Descriptive analysis

Before presenting the results from the empirical investigation, I provide descriptive data on the countries, sectors and trade of WTO dispute cases.

Figure 3 shows the WTO trade dispute cases by complaint and respondent country over time (1995-2020, for the complete list see the appendix). The G2 (US and EU) as well as the industrialized nations (OECD members, excluding US, EU, Colombia and Chile) have been by far the most active users. China has initiated trade dispute cases only against the EU and the US, suggesting that governments' claims may be more driven by political strategies or dependencies than pure economic reasons. On the other hand, only Bangladesh raised a trade dispute among the least developed states, while developing and BRIC (Brazil, Russia,

India, China) countries are increasingly taking part in the litigation process, diversifying the complainants' list.

Figure (3)   Countries involved in WTO litigation (1995-2020).
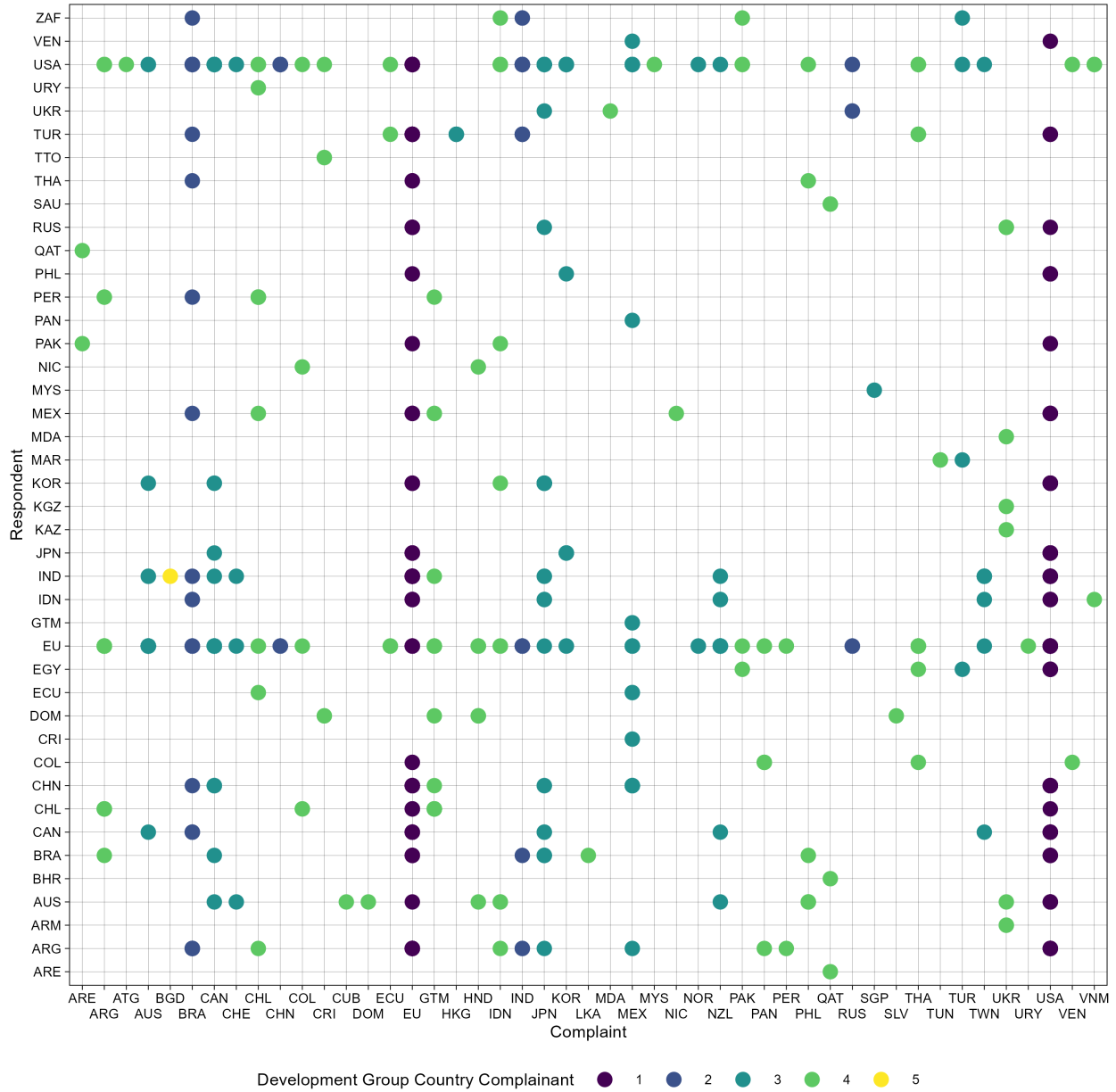
In 21 cases countries received the authorization to suspend obligation by the end of 2020. The DSB has authorized most frequently the last resort measure against the US. The EU

follows with 5 cases while Canada and Brazil have only had one (by Brazil and Canada on aircraft, respectively). Generally, there is less diversification than in the initial stages of trade disputes, suggesting that economic power may play a bigger role than in the previous stages. Moreover, the fact that small Central American countries did not make use of the retaliation measures allowed by the DSB (following the rulings for the EC-Bananas disputes against the EU) has raised a debate on the overall usefulness of the last resort measure.

Figure 4 provides the number of WTO disputes (count) initiated by sector between 1996 and 2019. The sectors that are particularly involved in disputes are various meat products (HS2 and HS15), beverages, spirits and vinegar (HS22), iron and steel and derivatives (HS72 and HS73), vehicles other than railway or tramway rolling-stock, and parts and accessories thereof (HS87) and aircraft, spacecraft, and parts thereof (HS88).

Figure (4)   Sectors involved in WTO disputes (1996-2019).
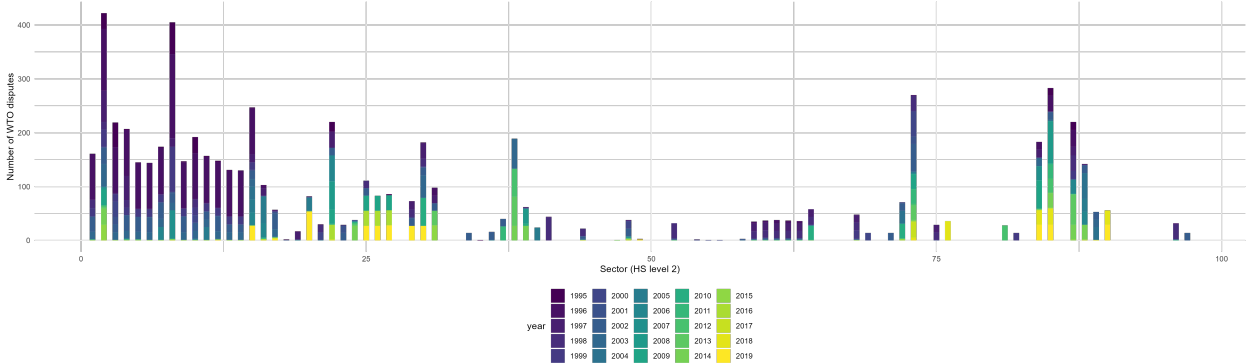
Results

In the following section, I present the empirical results on the effect of domestic trade volume by sector and bilateral dependence from a foreign country in WTO trade dispute onset. Overall, the results from Table 1 confirm *H1* and *H3*. When the size of sectoral trade increases governments are more likely to initiate a WTO trade dispute case and when the bilateral dependence for these sectors is larger the likelihood increases. I only find support

for *H2* in the models without fixed effect. In Table 1, the first column reports the estimates of the domestic component (sectoral trade), the second column includes the international component (bilateral sectoral trade). In the third column, I include both components (domestic relevance and bilateral dependence) and in the fourth I add the interaction effect. In the last two models, I first add year fixed effects and then dyadic fixed effects and in both I use robust standard errors.

Figure 5 visualizes the coefficient estimates. Given the difficulties of interpreting the effects of log transformed independent variables, I focus on the sign and statistical significance of the coefficients. First, the coefficient for the volume of sectoral trade is positive and significant throughout all models. This indicates that government's are more likely to file a WTO dispute when relevant domestic sectors are harmed by foreign policy breaches. Second, the coefficient for bilateral sectoral trade is positive and significant in the first models, but looses its statistical significance when year and dyad fixed effects are included. This suggests that while there seems to be a positive correlation for interdependent sectors, the results are not robust to time and country invariant factors. Third, as expected the interaction term is positive and statistically significant indicating that the likelihood to observe a WTO dispute in sectors that are of considerable size for the domestic economy increases when the bilateral dependence from the partner country is higher.

In line with the literature, I find that the coefficient for GDP per capita (log of) is positive and statistically significant, indicating that economic powerful countries are more likely to initiate a WTO dispute. Similar to previous studies, I also find that disputes are more likely to occur between allies as the negative (and statistically significant) coefficient of UN voting indicates. The full model (including fixed effects and robust standard errors) indicates that there does not seem to be a statistically significant effect of economic power difference, bilateral trade, trade openness of the complainant country, its democracy level or the occurrence of previous disputes between the two countries.

Table (1)   Sectoral trade and WTO dispute onset (1996-2019).

Dependent Variable:			WTO dispute			
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
Sectoral trade (log of)	0.294***		0.305***	0.214***	0.187	0.233*
	(0.020)		(0.020)	(0.029)	(0.122)	(0.135)
Economic power difference	0.000***	0.000***	0.000***	0.000***	0.000***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Bilateral trade	-0.001	-0.026***	-0.027***	-0.028***	-0.029	0.028
	(0.003)	(0.004)	(0.004)	(0.004)	(0.020)	(0.018)
UN voting distance	0.443***	0.448***	0.449***	0.449***	0.403***	-0.573***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.089)	(0.171)
Democracy score	0.476***	0.510***	0.474***	0.484***	-0.073	-0.301
	(0.109)	(0.109)	(0.109)	(0.109)	(0.679)	(0.719)
GDP per capita (log of)	0.768***	0.724***	0.743***	0.738***	0.922***	0.555**
	(0.027)	(0.027)	(0.027)	(0.027)	(0.204)	(0.229)
Trade (log of)	-0.901***	-0.903***	-0.915***	-0.912***	-0.658***	-0.355
	(0.027)	(0.027)	(0.027)	(0.027)	(0.208)	(0.226)
Previous disputes	0.171***	0.169***	0.169***	0.169***	0.204***	0.000
	(0.006)	(0.006)	(0.006)	(0.006)	(0.035)	(0.043)
Bilateral sectoral trade ((log of)		0.260***	0.277***	0.219***	0.137	0.171
		(0.022)	(0.023)	(0.026)	(0.107)	(0.169)
Bilateral sectoral trade × Sectoral trade				0.106***	0.114**	0.110**
				(0.022)	(0.044)	(0.051)
Fixed-effects						
Year					Yes	Yes
Dyad						Yes
Fit statistics						
Observations	5,481,375	5,481,375	5,481,375	5,481,375	5,481,375	1,831,931
Squared Correlation	0.001	0.001	0.001	0.001	0.005	0.017
Pseudo R^2	0.067	0.067	0.069	0.069	0.123	0.149
BIC	70,721.572	70,779.696	70,594.198	70,587.423	66,930.807	64,207.152

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1; Intercept values omitted*
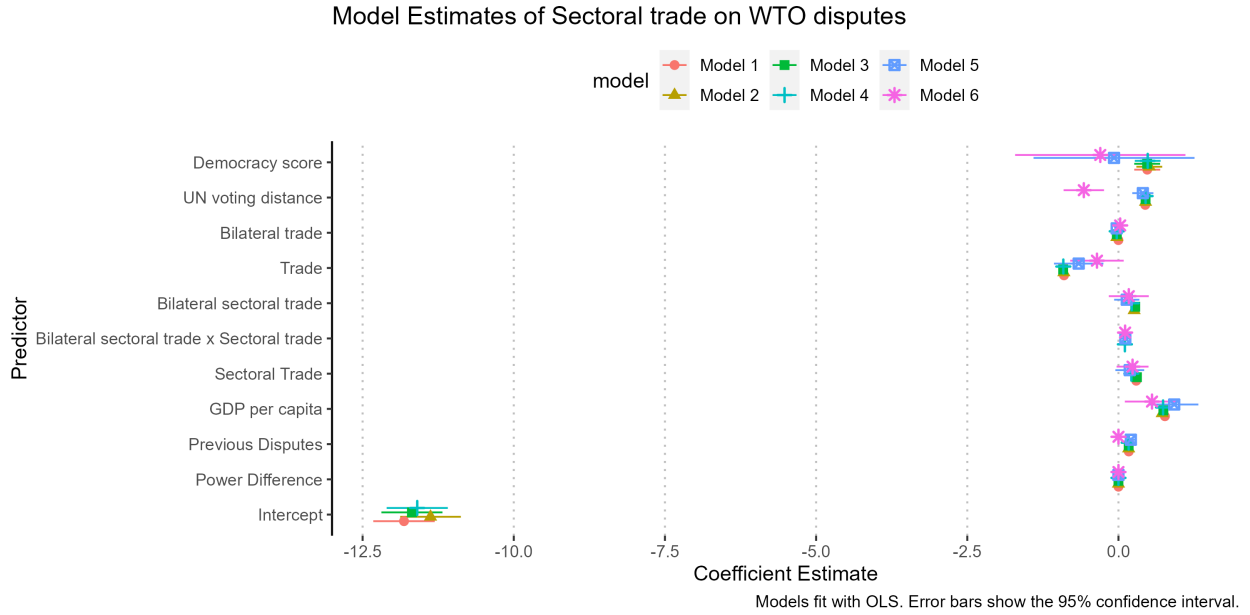
Figure (5)   Coefficient plot based on Table 1.

Table 4 and 5 in the appendix show that while the percentage bilateral sectoral imports, exports and trade are all positive and significant correlated with WTO dispute onset, WTO disputes are more likely to occur in sectors that have larger export shares.

Conclusion

In this study, I investigate 'which type of trade' is litigated in the WTO dispute settlement (Bown and Reynolds, 2015) with recent data on WTO disputes from 1995 to 2019. I focus on sectoral trade as well as bilateral dependence. I argue that governments are more likely to initiate a WTO dispute for sectors with larger trade volume and with larger trade dependence from the foreign partner. My findings confirm that there is a positive significant effect for WTO dispute onset for larger domestic sectors (in terms of trade) (*H1*). This effect increases when the interdependence from the foreign country is higher (*H3*). These results are robust to the inclusion of fixed effects and robust standard errors. On the contrary, the positive effect of bilateral sectoral trade on WTO disputes is not robust across all specifica-

tions (*H2* not supported).

Although the number of WTO dispute cases initiated per year is decreasing, the WTO DSB is still the preferred litigation system – compared, for instance, to those offered in regional trade agreements (Limenta, 2017). Nevertheless, future scholars should build a comprehensive dataset of dispute cases, including those from the regional trade agreements in order to control for forum shopping (Busch, 2007) and its determinants. Further insights are needed with regards to other dispute settlement systems to fully capture the role of sectoral trade. A final aspect that requires scholarly attention is the (self-)selection of harmful foreign trade policy changes into WTO disputes. This would allow to study more carefully the reasons behind government's decision to settle only some violations through the WTO system compared to diplomacy or other forums. Scholars have already advanced case studies but a more comprehensive data collection is needed to derive general patterns (on Japan and the US, see Davis and Shirato, 2007; Yildirim et al., 2018, and in a similar approach Ommeren, Poletti, and De Bièvre, 2021).

The results of this analysis suggest that countries file WTO dispute cases to contest (alleged) violations of international trade agreements significantly more when they affect sectors with larger domestic relevance and interdependence. Expanding the assumption that governments use the WTO DSB as enforcement tool more than as information device (Sattler, Spilker, and Bernauer, 2014), I find that governments are using the WTO dispute settlement to support larger sectors, especially when these have strong bilateral dependency in the hope to limit the harmful effects by eliminating the inconsistent trade policy. These results also suggest that previous findings on the role of lobbying as an important predictor for dispute settlement in the EU and the US (on which most studies focus) are valid for the rest of countries involved in WTO litigation.

In the last decade the usefulness of international organizations has been under attack and the international order has been witnessing a power-change. Although admitting that some

reforms are needed (Reuters, 2021), the US trade representative announced that the Biden administration is committed in supporting the WTO bringing a spiral of hope in the resolution of the long-lasting crisis of the DSB. While the interest in WTO dispute settlement research has witnessed a decrease lately, this study shows that there are still uncovered areas in WTO litigation.

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Appendix

Table (1)   Summary statistics

Statistic	N	Min	Max	Median	St. Dev.
Year	10541634	1995	2019	2007	7.211
Sector	10541634	1	97	49	28.000
Dyad ID	10541634	1	2862	1396	810.533
Number of Sectors in Dispute	10541634	0	66	0	0.692
Dispute	10541634	0	1	0	0.025
Stages	10541634	0	5	0	0.062
Percentage share of imports	5778169	0.000	100.000	57.430	22.697
Percentage share of exports	5778169	0.000	100.000	42.570	22.697
Percentage sectoral bilateral imports / bilateral imports	5778169	0.000	100.000	0.150	5.931
Percentage sectoral imports / imports	5778169	0.000	77.130	0.380	3.112
Percentage bilateral imports / imports	5778169	0.000	78.620	0.580	4.546
Percentage sectoral bilateral imports / sectoral imports	5778169	0.000	100.000	0.300	7.141
Percentage sectoral bilateral exports / bilateral exports	5778169	0.000	100.000	0.600	5.220
Percentage sectoral exports / exports	5778169	0.000	96.430	0.350	3.781
Percentage bilateral exports / exports	5778169	0.000	89.820	0.720	4.620
Percentage sectoral bilateral exports / sectoral exports	5778169	0.000	100.000	0.490	6.059
Percentage sectoral bilateral trade / bilateral trade	5778169	0.000	100.000	0.300	5.411
Percentage sectoral trade / trade	5778169	0.000	83.640	0.670	4.475
Percentage bilateral trade / trade	5778169	0.000	79.040	0.400	3.160
Percentage sectoral bilateral trade / sectoral trade	5778169	0.000	100.000	0.510	6.358
Dispute (year)	10541634	0	1	0	0.167
Years since past dispute	1777781	0	22	4	5.356
Number of Past Disputes	10541634	0	13	0	0.641
Left-Right Position	5924387	2.661	8.800	5.067	1.251
Country 1	10173228	2	920	325	263.729
Country 2	10173228	2	900	349	243.005
UN voting distance	10173228	0.00002	5.189	0.908	0.767
Democracy score	10391284	0.076	0.924	0.798	0.229
GDP C	10231511	559.690	87123.660	11466.140	18588.120
GDP R	10358304	587.305	75239.300	10476.350	15835.990
Trade C	10331629	15.636	442.620	72.983	64.530
Trade R	10335509	15.636	322.675	69.833	46.577
Power Difference	10051188	−73786.450	85896.840	483.478	24320.200
Trade Difference	10129384	−297.561	416.834	2.960	79.310

Figure (1)   Correlation matrix.

Figure (2) Countries involved in WTO litigation by year (1995-2020).

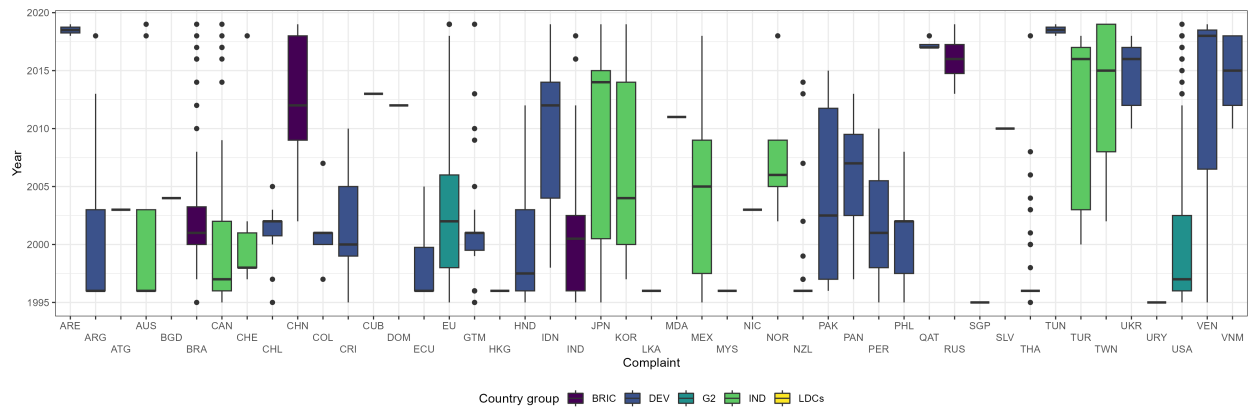Figure 3 illustrates the number of cases that reach different stages of the DSB, namely the request for consultation, the request for panel establishment, the establishment of a panel, the panel report, the notice of appeal, the AB report, the implementation of rulings and the mutually agreed solution (MAS).

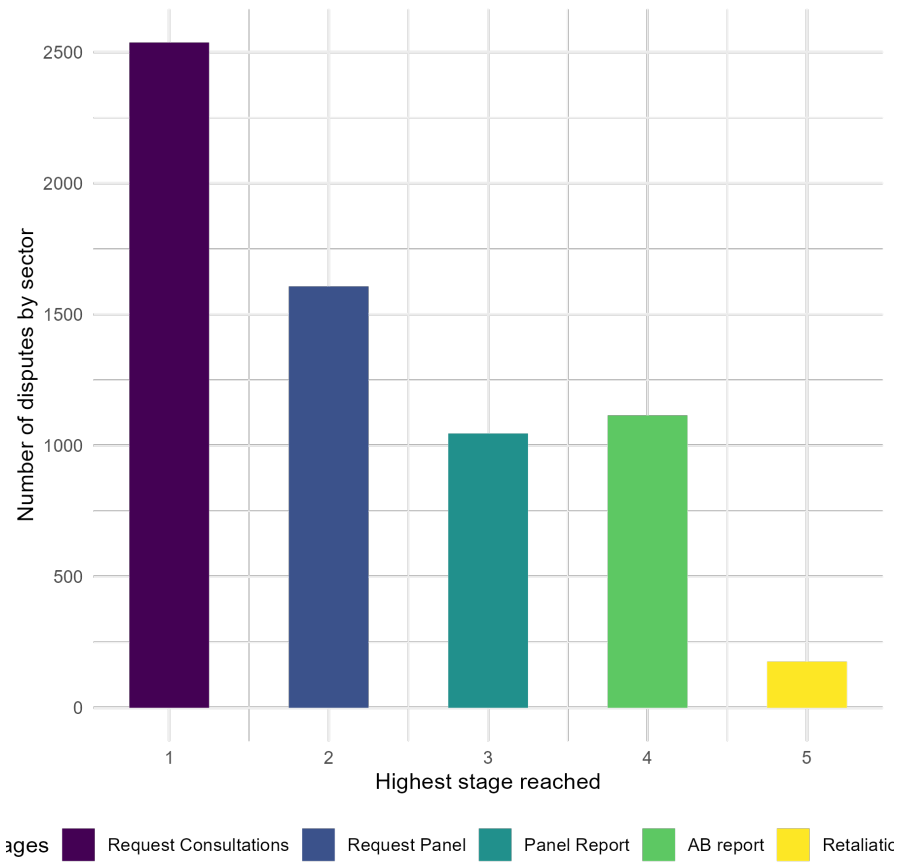Figure (3)   Number of cases by stages (1995-2020).

Figure (4)   Number of cases by stages and year (1995-2020).

Table (2)   Number of disputes by complainant country (1995-2020).

Country complainant	Number of disputes	Country complainant	Number of disputes
US	124	EU	114
Canada	40	Brazil	33
Japan	27	Mexico	25
India	24	Argentina	21
China	21	Korea	21
Thailand	14	Indonesia	12
Chile	10	Guatemala	10
Australia	9	New Zealand	9
Ukraine	9	Honduras	8
Russia	8	Chinese Taipei	7
Panama	7	Turkey	6
Colombia	5	Costa Rica	5
Norway	5	Pakistan	5
Philippines	5	Switzerland	5
Viet Nam	5	Qatar	4
Ecuador	3	Peru	3
Venezuela	3	Tunisia	2
United Arab Emirates	2	Antigua and Barbuda	1
Bangladesh	1	Cuba	1
Dominican Republic	1	El Salvador	1
Hong Kong	1	Malaysia	1
Moldova	1	Nicaragua	1
Singapore	1	Sri Lanka	1
Uruguay	1		

Table (3)   Number of disputes by respondent country (1995-2020).

Number of disputes	Country respondent	Number of disputes	Country respondent
167	US		
129	EU	44	China
32	India	23	Canada
22	Argentina	19	Korea
16	Australia	16	Japan
16	Mexico	15	Brazil
15	Indonesia	13	Chile
12	Turkey	9	Russia
7	Colombia	7	Dominican Republic
6	Peru	6	Philippines
5	South Africa	4	Egypt
4	Pakistan	4	Thailand
4	Ukraine	3	Ecuador
3	Morocco	2	Armenia
2	Guatemala	2	Nicaragua
2	Saudi Arabia	2	Trinidad and Tobago
2	Venezuela	1	Bahrain
1	Costa Rica	1	Kazakhstan
1	Kyrgyz Republic	1	Malaysia
1	Moldova	1	Panama
1	Qatar	1	United Arab Emirates
1	Uruguay		

Table (4)   Effect of bilateral sectoral imports, exports and trade on WTO disputes (1996-2019).

Dependent Variable:		WTO dispute	
Model:	(1)	(2)	(3)
Variables			
Bilateral sectoral import shares (log of)	0.200***		
	(0.015)		
Bilateral sectoral export shares (log of)		0.208***	
		(0.016)	
Bilateral sectoral trade shares (log of)			0.229***
			(0.016)
Fit statistics			
Observations	5,778,169	5,778,169	5,778,169
Squared Correlation	0.000	0.000	0.000
Pseudo R^2	0.002	0.002	0.002
BIC	79,650.211	79,670.197	79,621.798

IID standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table (5) Effect of bilateral sectoral imports and exports shares on WTO disputes (1996-2019).

| Dependent Variable: | WTO dispute | |
Model:	(1)	(2)
Variables		
Exports shares (of sectoral trade)	0.018***	
	(0.006)	
Economic power difference	0.000*	0.000*
	(0.000)	(0.000)
Bilateral trade	0.045**	0.045**
	(0.023)	(0.023)
UN voting distance	-0.581***	-0.581***
	(0.177)	(0.177)
Democracy score	0.217	0.217
	(0.709)	(0.709)
log(gdp_c+1)	0.650***	0.650***
	(0.225)	(0.225)
log(trade_c+1)	-0.268	-0.268
	(0.211)	(0.211)
Previous disputes	0.002	0.002
	(0.044)	(0.044)
Import shares (of sectoral trade)		-0.018***
		(0.006)
Fixed-effects		
Dyad	Yes	Yes
Year	Yes	Yes
Fit statistics		
Observations	1,831,931	1,831,931
Squared Correlation	0.025	0.025
Pseudo R^2	0.153	0.153
BIC	63,882.194	63,882.198

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