The Role of Languages in International Trade Disputes

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Abstract: *This paper examines the role of languages in international trade disputes using a comprehensive data set of 160 countries covering 565 WTO trade dispute cases from 1995 to 2018. In international trade disputes, languages play a notable positive role either as a language similarity or as a language barrier. The findings indicate that language-like trading countries tend to be more actively involved in trade disputes, such as similarity in spoken language between trading countries increase trade disputes likelihood by 0.34% and language similarity with both trade partners and WTO increase trade disputes probability by 0.79%, suggesting that more communication and negotiating capacity increase the probability of trade disputes. The findings further indicate that trade partners having language barriers are also involved in trade conflicts with an average probability of 0.19 %, which implies language barriers increase ineffective communication and misunderstandings. English and Spanish speaking countries participation in trade disputes are noteworthy. This paper contributes to the existing literature by illustrating the role of languages as language similarity and barriers with inherent communication, negotiation capacity, and incapacity channels in international trade disputes.*

Keywords**:** *Trade Disputes, Language similarity, Language Barriers, Common Spoken Language, WTO official languages.*

Introduction

This paper explores the role of languages in international trade disputes. Trading countries' ongoing participation in trade disputes with partners having language commonality as well language barriers raise the concern about the importance of languages—member countries participation in WTO trade disputes settlement affected by the ability of its people language skills (Wilkinson, 2009). Trading countries with similar languages get more opportunities to communicate and negotiate with other trade partnering countries without extra hassle and costs. Meanwhile, countries that have language similarities with WTO legal languages also get benefited.

The role of language in international trade is noteworthy, but how words play a significant

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role in trade disputes is still needs further study. Language's role in disputes whether trade or investment is gaining importance in many research studies (Darling John, 2011; Marsella, 2005; Taylor, 2014). Some studies indicate that language similarity can't reduce conflicts (Bove & Gokmen, 2017), and language similarity can increase negotiation and communication capacity among parties (Egger & Lassmann, 2012) that rises disputes likelihood also. On the other hand, a country having language barriers with trade partners face tariff equivalent trade costs regarding communication, information, face ambiguity, and uncertainty in both cases either initiate a complaint or settle the claim (Casella, 1998; Zhang et al., 2020) .

This paper contributes to the literature by providing empirical evidence of the role of languages on international trade disputes. In this paper, use a unique hand-collect dataset consisting of language data of 8,249 country pairs of 160 countries, and 565 disputes cases related to all products and services from 1995 to 2018. Consequently, use common spoken language (CSL) to capture language similarity aspects. Meanwhile, in all spoken, native, and official status, establish a variable language similarity (LS) to ensure proper language resemblance among trade partners and WTO. To capture the language barriers aspects, use the language barriers compiled from the World Atlas of Languages. Using panel probit regression, the empirical results showed that the probability of a trade dispute occurring is significantly positively related to language similarity and language barriers at the 1% significant level. Country pairs with language similarity such as CSL and LS increase trade dispute likelihood by 0.34% and 0.79%. The empirical results also indicate countries that have language barriers with their trade partners tend to involve in trade disputes by 0.19 %.

This paper further investigates the effect of WTO legal languages on trade disputes, which is another contribution. The empirical results also indicate English and Spanish are the most influential official languages of WTO than French which is a 1% significant level. Countries that have language commonality in English with their trade partners have a 0.61 % possibility to involve in trade disputes with those trade partners. On the other hand, in countries that have language similarity in Spanish, their likelihood of involvement in a trade dispute increase by 0.97 %. The intuition behind this English and Spanish spoken countries mostly involve in trade disputes than French-speaking countries.

The paper contributes to the literature by revealing channels through which languages play a role in trade disputes. Thus, propose a communication and negotiation capacity hypothesis to explain the possible positive correlation between language similarity and trade conflicts. Due to the similarity in languages, states have no extra hassles in terms of information

and communication, which facilities them to conduct dispute settlement and also reduces administrative and information costs. Language commonality enhances the capacity of trading countries through reducing communication and information costs and ensuring proper negotiation. In trade disputes, the capacity hypothesis indicates that countries with higher capacity in terms of administrative, financial, and economic have more possibilities to participate in trade disputes (Bown, 2002; Busch et al., 2009). Guzman and Simmons (2005) describe WTO members only undertake conflict when the potential benefits outweigh the foreseen costs. A capability that focuses on the available institutional, financial, and human resources to pursue a case. The capacity to communicate and negotiate increases the overall ability of countries to participate in trade disputes.

This paper also propose a hypothesis to explain the positive connection of language barriers with trade disputes due to ineffective communication and misunderstandings. Language barriers increase both communication barriers and information costs, and countries face difficulties in conducting dispute settlement as the need to hire third parties to facilitate trade negotiation. This hypothesis in trade disputes describes that ineffective communication is associated with communication costs (Konya, 2002). Language dissimilarities between countries act as a source of informational cost, communication cost, and a source of uncertainty promotes more trade disputes. As (Bown & McCulloch, 2010) describe identifying and processing all the relevant information is the main obstacle faced by countries in initiating disputes. They need to verify and demonstrate the damage suffered and establish the link between those damages and a specific infringement of WTO rules. These activities will be challenging for countries who have language barriers with trade partners and have distinct language from WTO legal languages. In sum, a nation with people who can easily interact with its trading partners will have a relative advantage in terms of cross-border activity. In the case of trade conflicts, either launch a complaint or resolve a dispute, in all instances language commonality plays an essential role by increasing communication and negotiating ability. On the other hand, a country having language barriers with trade partners face costs regarding communication and information, face ambiguity, and uncertainty in both cases either initiate a complaint or settle the claim.

The paper carried out a series of robustness tests, including Poisson model regressions, Mixed probit model regressions, Linear model regressions, Considering different language similarity data such as Common native language, Common Language Index and Language proximity. All the results are robust and reliable for models, samples, and variable measures. The robust test also supports core findings that language commonality and language barriers both have a

positive impact on international trade disputes. The rest of this paper has designed as follows. Section 2 describes related literature and introduces communication capacity, costs, and trade disputes hypothesis, the data is explained in Section 3 with methodology, empirical results, and interpretations with all robust checks present in Section 4, and finally, Section 5 gives concluding remarks.

Theoretical Background & Hypothesis

Theoretical Background

A wide variety of studies has been carried out to show the essential role of languages as language similarity and obstacles in trade, disputes, international arbitration, and negotiation. The work of Hutchinson (2005) showed that trading partners, speaking the same language, experience a significant decline in transaction costs in trade, can communicate and negotiate quickly with proper understanding. Fidrmuc and Fidrmuc (2016) highlight the importance of sharing a shared language for easier transactions, communication, and negotiation, with an impact comparable to sharing a common culture or a standard legal system. Rose (2008) finds that countries are sharing a common language trade 1.5 times more with each other. These findings can suggest that trade disputes may also increase as trade rises (Maggi & W.Staiger, 2018).

The growth of international business transactions means that parties negotiating such transactions in a language that may be or may not be their mother tongue. Many arguments in international commercial negotiation curtail poor language and are fed by misunderstandings about language (Ulmer, 2011). Those who have language similarity they can ensure proper understandings and communications. The study of Tung (2017) suggests that the variety in language and cultures of the parties involved can result in misunderstandings and miscommunications. When both parties have language similarity they can avoid discrepancies and extra costs but the use of different languages that is not native to both parties in every aspect of the negotiation process can result in discrepancies in the understandings of each party to such transactions (Brand, 2009). A simple way for parties to avoid unnecessary costs and misunderstandings is to agree on a language which is similar for both parties to be used in an arbitration during their negotiations on their business transactions (Kischel, 2009).

Countries who have language dissimilarity with trade partners and WTO official languages faces difficulties and hurdles to understand the rules and policies of WTO and trade partners (Bleyker, 2003; Cheng & Sin, 2008; Nida, 2001) . When countries used different languages

and translate WTO rules and negotiations errors occurred due to translation errors, words and expressions that can be expressed in different ways (Demirkol, 2016) , different provisions emanate from different sources, ambiguities may be intentional in order to accommodate political compromises (Hu & Cheng, 2016) . For a more detailed discussion of terminological problems and solutions that arise in the translation process (for example, terms that sound alike in two languages but have different meanings) (Rotman, 1995).

The study of Fink et al. (2005) and Gokan et al. (2019) describe communication and information costs incurred from language barriers negatively affect trade-related activities. But deal with an international partner without a common language implies hiring some sort of intermediary for communication, which consequently increases those costs. In light of falling tariffs and transport costs, the importance of language barriers to trade has captured much attention in recent research. The existence of a language barrier in commerce has been documented in numerous empirical studies such as Anderson and Wincoop (2004) estimate that the tax equivalent of the language barrier amounts to 7%. In conflict literature, common languages motivate conflicting parties to communicate and negotiate effectively and reach an acceptable solution (Taylor, 2014). On the other hand, common language does not reduce conflicts as parties understand each other intentions, which leads to more conflicts (Bove & Gokmen, 2017). With language barriers misunderstanding among parties increase and leads to unacceptable solutions (Darling John, 2011; Marsella, 2005).

Language may become an even more important variable shaping the dispute and its process when there are written legal codes and an official language of dispute (Janevski, 1998) . Knowledge of the law and dexterity in deploying its language become critical resources for defining and transmuting disputes (Drabarz et al., 2017). With the growing number of cross-border transactions whereby parties from different countries and cultures carry out the negotiations and performance of contracts, the issue of language has become an even more vital component in involving and resolving disputes in international arbitration. The progression of negotiations and performance of trade contracts are practically done in a variety of languages, which in itself can lead to conflicts due to miscommunications and ambiguity (Simões, 2017). Misunderstandings and miscommunications can arise from the diversity of the language and cultures of the parties concerned as trade conducted and discussing various details in a language that is not their mother tongue (Bhatia et al., 2007) .

In the WTO trade disputes settlement as well international arbitration, the issue of language is of utmost importance. The arbitral tribunal is also confronted by parties of varying nationalities. For such parties do not have the same mother tongue, it becomes a challenge

for successful communication. With respect to three distinct fields, language is relevant: the language of the conflict, the language of the hearing, and the language of the reward. In all three fields poor communication can create problems (Janevski, 1998; Karrer, 2004). The reckless or vague use of words, not the acts of the parties themselves, frequently results in conflicts. In the one hand, translation and interpretation influence the costs and the length of the proceedings and on the other hand, they cannot be very exact.

Furthermore, although existing language literature confirmed language has positive and significant impact on trade disputes, negotiation and disputes process, but few empirical studies conducted on languages direct effect on trade disputes because researchers excessively emphasized the macro-economic and political factors in these regards (Kuenzel, 2017; Maggi & W.Staiger, 2018; Paola Conconi, 2017). Therefore, based on the above discussions this paper propose hypotheses related with communication and negotiation channels of languages.

Language and Trade disputes Hypothesis

Trading countries and their language similarity and barriers with trade partners significantly influenced their trade disputes participation. As Language similarity provides communication and capacity on the other hand language barriers facilitate ineffective communication and misunderstandings. Communication capacity and incompetence both are a very significant factor that a country consider to involve in trade conflicts with trade partners. In this section, discuss these possible channels of language and propose the research hypothesis.

Communication and Negotiation Capacity and Trade Disputes Hypothesis

The essence of trade conflict participation and resolution is the ability to communicate and negotiate effectively. Communication and negotiation capabilities depend on the people of member countries who can easily understand each other languages and adequately convey the views, arguments with greater ease and success. In trade disputes, kinds of literature capacity hypothesis firmly indicate countries' trade disputes participation depends on its capacity related to financial, human, and administrative to handle all trade-related disputes activities (Bown, 2005). Standard languages are a significant factor that is closely associated with human resource capacity and organizational capacity. Countries having conventional spoken and common words can understand each other policies, rules and can deeply understand the mismatched newly imposed trade barriers inversely affect the trade flows and claim for the reduction of obstacles through complaining in WTO. Having language similarity increase countries' capacity through ensuring effective communication, a proper understanding

of foreign markets policies, and increase negotiation capacity. Language similarity also decreases administrative costs. In the WTO trade disputes settlement, it has noticed countries with language similarity complain and involve in trade disputes more frequently from the beginning of the presence of GATT*. Trade partner countries with language commonality have more chances to participate in trade disputes due to their communication and negotiation capacity than others.

The study of Oh et al. (2011) describes the demand for linguistic competencies also increase as product sophistication, differentiation, and ease of product substitution. The time and effort required to attain language competency are part of the transaction costs of languages in economic exchange. To engage in bilateral trade and investment, a country-pair composed of different languages requires a capacity to communicate in one, or both, potential partner languages, or in a third language which both countries' economic actors find acceptable. Languages require time to learn; the more difficulty encountered in learning the target language, the higher the transaction cost involved.

Common spoken language as a measure of communication capacity among people of the same country or different countries (Egger & Toubal, 2018). The findings of Melitz and Toubal (2014) show that communication skills tend to be relatively more important across a wide variety of countries. Melitz (2008) findings highlight the role of common spoken language as a way of promoting interaction through immediate communication (rather than a translation). Countries that have a common spoken language tend to involve more in trade and dispute activities. Having a common spoken language ensures proper understandings and reduce uncertainty (Egger & Toubal, 2016). So have language similarity in terms of speaking, native, and official ensure competencies. Therefore, we propose the hypothesis as follows,

Hypothesis 1a: Common spoken languages increase the probability of trade disputes between trading countries through rising communication and negotiation capacity.

The topic of language is of paramount importance in the resolution of WTO trade disputes. Parties of various nationalities are often confronted by the arbitral tribunal. Since these parties do not have the same mother tongue, successful communication becomes a problem (Drabarz et al., 2017). English, French, and Spanish are the official legal languages of the WTO. Language similarities with trading partners and trade regulatory bodies such as the WTO not only increase trade but also increase involvement in trade disputes. As language

* USA & Canada, EU & USA who have language similarity and their involvement in trade disputes is noteworthy (Reich, 2017).

commonality with trade partners enhances interaction and bargaining capability, capacity and strength are also strengthened by language similarities to WTO legal languages. Therefore, propose another hypothesis

Hypothesis 1b: Language similarities between trading countries and WTO raise the probability of trade disputes through increasing communication and negotiation capacity.

WTO legal Languages and Trade Disputes

The study of Condon (2010) describes WTO has three official legal languages, but English holds a unique position in dispute settlement than Spanish and French. In practice, English is the working language of the WTO. Simultaneously, formal trade negotiations and meetings of the WTO bodies are held in the three official languages, with simultaneous interpretation, other, more informal meetings held in English. Most panel and Appellate Body reports are written in English and then translated into French and Spanish. Likewise, the Uruguay Round Agreements were drafted in English and then translated into French and Spanish. English has a widely spoken language or lingua franca; in most cases, English is used as e medium of communication for those who have no language similarity (Ku & Zussman, 2010). Countries that have native languages like English, French, and Spanish pose some sort of power in trade negotiations (Wilkinson, 2009). In the WTO trade dispute settlement, trade partners who have language similarities in English and Spanish have significantly participated. The disputes settlement participation of Spanish speaking countries is noteworthy nowadays than before. Therefore, propose the hypothesis as follows,

Hypothesis 2: Language similarity in English and Spanish increases trade disputes likelihood than French.

Ineffective Communication, Misunderstanding, and Trade Disputes Hypothesis

Language barriers can impose high costs on bilateral trade between countries that do not share any sort of common language, either an official language or a widely spoken foreign language in terms of communication and information. The issue of language barriers is particularly critical during international trade conflicts as trade partners struggle to communicate what they want or even get necessary information regarding policies or regulations. Due to different languages, norms and perceptions create difficulties for trading countries to properly recognize the trade regulations and policies of each other (Korneliussen & Blasius, 2008). Misunderstanding (Gokan et al., 2019) and ambiguity of information (Konara, 2020) about

trade rules and regulations create uncertainty, which usually leads to trade disputes. Overall communication incapability arises when countries have language barriers. Countries with language barriers involved in trade disputes with ambiguity, lack of information, and less confident. Due to language barriers, countries need to hire people to conduct their trade dispute settlement process, which raises costs. Language barriers increase communication, and information costs overall increase administrative costs to attend the settlement of the dispute. Therefore, we propose the following hypothesis,

Hypothesis 3: Language barriers between trading countries also increase trade disputes likelihood due to ineffective communication and misunderstanding.

Figure 1 presents a model of the language variables associated with language similarity and barriers influencing trade disputes positively, including the possible channels hypothesized in this study.

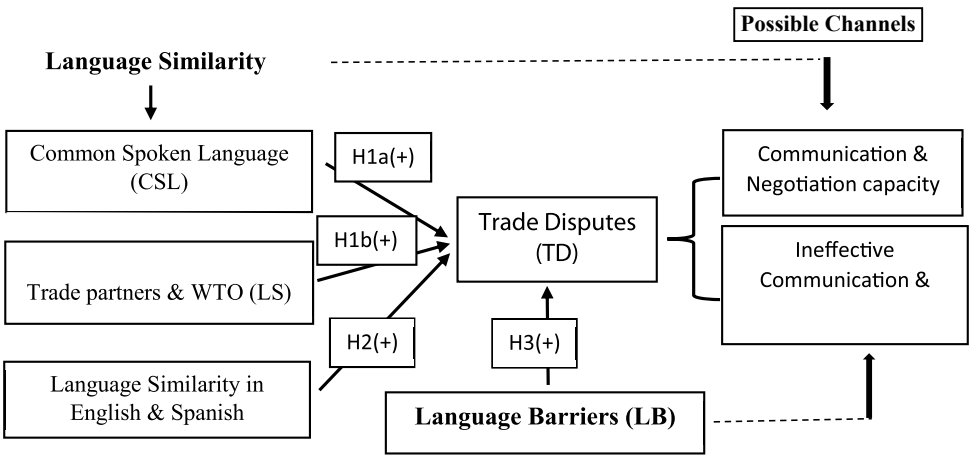

Figure 1: Hypothesized model of Languages as Similarity and Barriers influencing Trade Disputes with Possible Channels.

Data & Methodology

Data and Variables

In this section describe the data used and the panel probit model implemented. A detailed collection of data on language and trade conflicts between WTO members used for an extended period of 24 years with 8,249 country pairs of 160 WTO members. Besides, consider the European Union (EU) as a whole trade party. Data about each country-pair involvement in a trade dispute collected from the WTO trade disputes database. The multi-plaintiff cases parted into several bilateral cases with the same defendant country (WTO, 2019). Table 1 describes the countries directly involved in trade disputes with trade partners having common spoken language, language similarity with trade partners and WTO, and language barriers. The three main trading partners often embroiled in trade conflicts are the US & China 36 times, Canada & the United States 26 times, the European Union & the United States 55 times respectively as shown in the below Table.

Thus, around 60.35 % of trade disputes occurred between the trade partners having language similarity, and 40.17 % happened between trade partners having language barriers. These figures can purely evidence the imminent role of languages in international trade disputes. The English, French and Spanish languages are the official legal languages WTO members used to conduct the settlement of the dispute. In the following Table, English, and Spanish seem mostly used and common languages than French. We consider binary variable $TD_{i,j,t}$ equals one if country i take part in at least one trade dispute with country j in year t.

Table 1: Countries having Languages Similarity and Barriers with trade partners and involvement in Trade disputes

Country-Pairs	**No. of Trade Disputes Cases**	**Common Spoken Languages**	**Language Similarity among Trade partners & WTO**	**Language similarity with WTO Legal Languages**		
				English	**French**	**Spanish**
USA-China	36	0.0096	0*	0	0	0
Argentina-Brazil	3	0.0605	0	0	0	0
Argentina-Chile	7	0.9801	1	0	0	1
Argentina-USA	11	0.1594	0	0	0	0
Australia-Canada	2	0.8247	1	1	0	0
Australia-India	2	0.2231	0	1	0	0

Australia-Indonesia	2	0	0*	0	0	0
Australia-USA	6	0.9314	1	1	0	0
Brazil-Canada	5	0.0224	0	0	0	0
Canada-China	4	0.0085	0*	0	0	0
Canada-USA	26	0.8177	1	1	0	0
Chile-USA	3	0.1584	0	0	0	0
China-Japan	4	0.0012	0*	0	0	0
Colombia-Chile	2	0.9801	1	0	0	1
Colombia-Panama	3	0.9207	1	0	0	1
Colombia-Thailand	1	0	0*	0	0	0
Colombia-Nicaragua	1	0.9603	1	0	0	1
Colombia-USA	1	0.1584	0	0	0	1
Dominican Republic-Honduras	4	0.99	1	0	0	1
Ecuador-Mexico	2	0.9702	1	0	0	1
France-USA	4	0.3673	0	0	0	0
Germany-USA	4	0.5549	0	0	0	0
Greece-China	1	0.0048	0*	0	0	0
Greece-USA	4	0.4636	0	0	0	0
Guatemala-Mexico	5	0.8514	1	0	0	1
Guatemala-Peru	1	0.7482	1	0	0	1
India-USA	17	0.2208	1	1	0	0
Indonesia-Korea	4	0	0*	0	0	0
Japan-Canada	6	0.1020	0	0	0	0
Japan-Korea	7	0	0*	0	0	0
Mexico-China	5	0.0005	0	0	0	0
Mexico-USA	10	0.1988	0	0	0	0
New Zealand-Indonesia	4	0	0*	0	0	0
New Zealand-USA	4	0.9409	1	1	0	0
Norway-USA	4	0.8546	0	0	0	0
Pakistan-Indonesia	4	0	0*	0	0	0
Pakistan-USA	4	0.0960	0	0	0	0
Peru-Argentina	5	0.8613	1	1	0	0
Peru-Brazil	3	0.0522	0	0	0	0

Peru-Chile	4	0.8613	1	0	0	1
Philippines-Australia	4	0.5338	1	1	0	0
Philippines-USA	4	0.0960	1	1	0	0
Qatar-Saudi Arabia	4	0.7921	1	0	0	0
Qatar-UAE	4	0.6942	1	0	0	0
Russia-Ukraine	5	0.8300	1	0	0	0
Russia-USA	4	0.0483	0*	0	0	0
Spain-USA	4	0.3779	0	0	0	0
Switzerland-USA	3	0.5980	1	0	0	0
Thailand-Turkey	4	0.0170	0*	0	0	0
Tunisia-Morocco	4	0.7969	1	0	0	0
Ukraine-Armenia	4	0.0747	0	0	0	0
UK-USA	2	0.9513	1	1	0	0
USA-Brazil	15	0.0099	0*	0	0	0
USA-Japan	11	0.1152	0	0	0	0
Venezuela-USA	6	0.1584	1	1	0	0
USA-Korea	20	0	0*	1	0	0
Vietnam-USA	4	0.0001	0*	0	0	0
USA-Antigua & Barbuda	1	0.7680	1	1	0	0
EU-USA	55	0	1	1	0	0
EU-Canada	15	0	1	1	1	0
EU-Mexico	6	0	1	0	0	1
EU-Honduras	3	0	1	0	0	1
EU-Guatemala	3	0	1	0	0	1
EU-Panama	3	0	1	0	0	1
EU-Colombia	3	0	1	0	0	1
EU-Peru	1	0	1	0	0	1
EU-Brazil	12	0	1	0	0	1
EU-Argentina	14	0	1	0	0	1
EU-Chile	5	0	1	0	0	1
EU-Uruguay	1	0	1	0	0	1
EU-Russia	8	0	0*	0	0	0
EU-Turkey	2	0	1	1	0	0
EU-Norway	3	0	0*	0	0	0

EU-Pakistan	2	0	0*	0	0	0
EU-India	18	0	0*	0	0	0
EU-China	15	0	0*	0	0	0
EU-Thailand	5	0	0*	0	0	0
EU-Korea	7	0	0*	0	0	0
EU-Japan	7	0	0*	0	0	0
EU-Philippines	1	0	1	1	0	0
EU-Indonesia	6	0	0*	0	0	0
EU-Australia	3	0	1	1	0	0
EU-New Zealand	1	0	1	1	0	0
Bahrain-Qatar	1	0.7755	1	0	0	0
Bangladesh-India	1	0.0826	0	0	0	0
Belgium-USA	3	0.5792	0	0	0	0
Costa Rica-USA	1	0.1584	0	0	0	0
Costa Rica-Trinidad & Tobago	2	0	0*	0	0	0
Costa Rica- Mexico	1	0.9801	1	0	0	1
Costa Rica- Dominica Republic	2	0.9900	1	0	0	1
Croatia-Hungary	1	0.2112	0	0	0	0
Cuba-Australia	1	0.0198	0*	0	0	0
Czech Republic-Poland	1	0.2043	0	0	0	0
Denmark-USA	1	0.8302	1	1	0	0
Dominican Republic-Honduras	3	0.9900	1	0	0	1
Dominican Republic- El Salvador	1	1	1	0	0	1
Dominican Republic-Australia	1	0.0200	0*	0	0	0
Dominican Republic-Guatemala	1	0.8600	1	0	0	1
Ecuador-EU	1	0	1	0	0	1
Ecuador-Turkey	1	0	0*	0	0	0
Ecuador-USA	1	0.1568	0	0	0	0
Ecuador-Mexico	2	0.9702	1	0	0	1
Ecuador-Chile	1	0.9702	1	0	0	1

Egypt-Thailand	1	0	0	0	0	0
Egypt-USA	1	0	0	0	0	0
Egypt-Pakistan	1	0	0	0	0	0
Honduras-Nicaragua	1	0.9603	1	0	0	1
Honduras-Australia	1	0.0198	0*	0	0	0
Hong Kong-Turkey	1	0.0612	0	0	0	0
Hungary-Slovak Republic	1	0.3094	0	0	0	0
Hungary-Czech Republic	1	0.1457	0	0	0	0
Hungary-Romania	1	0.2043	0	0	0	0
Hungary-Turkey	1	0.0495	0*	0	0	0
Hungary-Argentina	1	0.0206	0*	0	0	0
Hungary-Australia	1	0.2236	0	0	0	0
Hungary-Canada	1	0.2001	0	0	0	0
Hungary-New Zealand	1	0.2255	0	0	0	0
Hungary-Thailand	1	0.023	0*	0	0	0
Hungary-USA	1	0.2279	0	0	0	0
Indonesia-Vietnam	1	0	0*	0	0	0
Indonesia-Brazil	1	0	0*	0	0	0
Indonesia-Chinese Tapei	1	0	0*	0	0	0
Indonesia-Japan	1	0	0*	0	0	0
Indonesia-South Africa	1	0	0*	0	0	0
Indonesia-Argentina	1	0	0*	0	0	0
Ireland-USA	3	0.9413	1	1	0	0
China-Italy	1	0.0029	0*	0	0	0
Uruguay-Chile	1	0.9801	1	0	0	1
Uruguay-EU	1	0	1	0	0	1
Ukraine-Australia	1	0	0*	0	0	0
Chinese Taipei-USA	1	0	0*	0	0	0
Chinese Taipei-India	1	0	0*	0	0	0
Chinese Taipei-EU	1	0	0*	0	0	0
Chinese Taipei-Canada	1	0	0*	0	0	0
Switzerland-India	1	0.1403	0	0	0	0

Switzerland-Australia	1	0.5924	1	0	0	0
Turkey-USA	3	0.1643	0	0	0	0
Sweden-USA	1	0.8573	1	0	0	0
Srilanka-Brazil	1	0	0*	0	0	0
Spain-Argentina	1	0.9801	1	0	0	1
Spain-USA	2	0.3779	0	0	0	0
Slovak Republic-Switzerland	1	0.3912	0	0	0	0
Russia-Japan	2	0.0060	0*	0	0	0
Romania-USA	1	0.2849	0	0	0	0
Portugal-USA	1	0.1120	0	0	0	0
Philippines-Brazil	1	0.0018	0*	0	0	0
Philippines-USA	5	0.5303	1	1	0	0
Philippines-Australia	1	0.5338	1	1	0	0
Philippines-Thailand	1	0.0550	0	0	0	0
Philippines-Korea	1	0	0*	0	0	0
Philippines-EU	1	0	1	1	0	0
Poland-Thailand	1	0.0290	0*	0	0	0
Poland-Slovak Republic	1	0.2574	0	0	0	0
Poland-India	1	0.0667	0	0	0	0
Moldova-Ukraine	1	0.2180	0	0	0	0
Morocco-Turkey	1	0.0257	0*	0	0	0
Netherlands-USA	1	0.8404	1	0	0	0
Netherlands-India	1	0.2001	0	0	0	0
Netherlands-Brazil	1	0.0102	0*	0	0	0
New Zealand-India	1	0.2254	0	1	0	0
New Zealand-Canada	1	0.8331	1	1	0	0
New Zealand-USA	1	0.9409	1	1	0	0
New Zealand-Australia	1	0.9506	1	1	0	0
New Zealand-EU	1	0	1	1	0	0
Norway-EU	2	0	1	0	0	0
Norway-USA	3	0.8546	1	0	0	0
Pakistan-South Africa	1	0.0290	0*	0	0	0
Pakistan-EU	2	0	0*	0	0	0

Panama-EU	3	0	1	0	0	1
Panama-Colombia	3	0.9207	1	0	0	1
Panama-Argentina	1	0.9207	1	0	0	1
Japan-Brazil	2	0	0*	0	0	0
South Korea-Canada	3	0	0*	0	0	0
Japan-Thailand	1	0.0120	0	0	0	0
Japan-China	2	0.0012	0*	0	0	0
Japan-Argentina	1	0	0*	0	0	0
Japan-India	1	0.0276	0*	0	0	0
Ukraine-Kazakhstan	1	0.7970	1	0	0	0
Malaysia-USA	1	0.2592	0	0	0	0
Malaysia-Singapore	1	0.4203	1	0	0	0
Mexico-Venezuela	1	0.9801	1	0	0	1
Mexico-China	4	0.0005	0*	0	0	0
Mexico-Nicaragua	1	0.9603	1	0	0	1
Mexico-Brazil	1	0.0594	0	0	0	0
Mexico-Chile	1	0.9801	1	0	0	1

Note: 0* indicates language barriers.

Source: Authors own accumulation from CIA factbook, CEPII & World ATLAS language data

Commonly spoken languages are undoubtedly a measure of language similarity between trading countries. Countries with similar spoken language tend to involve more in trade (Melitz & Toubal, 2014) ensure full of communication and information flows. We use Commonly spoken language (CSL) as a measure of language similarity using the CEPII Gravity Dataset. The variable $CSL_{i,j}$ $(i,j = 1,2,....160)$ takes highest value 1 if country j and country j have more similarity in their spoken language, otherwise 0.

In this paper, consider and construct one new language similarity variable, which consists of language similarity with trade partners and WTO. Then, the country pair is said to have language commonality if and only if two countries have similar native, spoken and official language and their languages are similar to WTO official languages. For this purpose use the CIA Factbook and CEPII Gravity dataset together. Dummy variable $LS_{i,j,WTO}$ $(i,j = 1,2,....160)$ takes one if country i and country j uses a language similar to their native, spoken, formal writing and WTO official language, other wise 0. LS takes one also specifies that the two countries have identical mother languages and no language differences.

To check the role of language similarity in terms of WTO official languages separately, we use English, Spanish, and French. Dummy variable $English_{i,j,WTO\ (i,j\ =1,2,....160)}$ takes one if country i and country j uses the English language as their native, spoken and official language which is also one of the official languages of WTO, otherwise 0. Similarly, the Dummy variable $Spanish_{i,j,WTO\ (i,j\ =1,2,....160)}$ as well as $French_{i,j,WTO\ (i,j\ =1,2,....160)}$ have constructed.

To capture the role of languages as a language barrier, use the *language barrier* index, language barriers are significantly negatively correlated with bilateral trade (Lohmann, 2011). The language barrier for a pair calculated using linguistic data provided by the World Atlas of Languages, which gives detailed information on 2650 languages. The variable $LB_{i,j(i,j\ =1,2,....160)}$ takes 1 if country i and country j have no common language features, otherwise 0. LB takes one indicates that the two countries have language differences. The two languages are identical, and one means two languages have no features in common (e.g., Brazil -Indonesia)

Besides, this paper control the country-level economic, geographic, and trade variables, GDP, Trade volume, Geographical Distance, and Trade freedom index. The GDP ratio $\frac{GDPi}{GDPj}$ is used to measure the relative market size and the Geographical Distance $GD_{i,j}$ is used to measure transport costs between trading countries also represents psychic distance. Trade Freedom ($TF_{i,}$) is the widely used proxy of the measure of the absence of tariff and non-tariff barriers that affect imports and exports of goods and services. This paper used $GDP_{i,}$ to measure the economic growth of a country and to check how a countries economic growth affects its participation in trade disputes. Trade ($Trade_{i,j}$) is the sum of export and import. The data for GDP collected from World Bank GDP data, the data of Import and Export gathered from the WITS database. Trade freedom index data compiled from "The Index of Economic Freedom by The Heritage Foundation and The Wall Street Journal," the data for geographical distance gathered from CEPII Gravity data.

Table 2: Summary of Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
$TD_{i,j,t}$	182,407	0.0044	0.0662	0	1
$LS_{i,j,WTO}$	181,135	0.0367	0.1877	0	1
$English_{i,j,WTO}$	182,407	0.0133	0.1147	0	1

$Spanish_{i,j,WTO}$	182,407	0.0205	0.1419	0	1
$French_{i,j,WTO}$	182,407	0.0085	0.0919	0	1
$CSL_{i,j}$	181,133	0.1058	0.2236	0	1
$LB_{i,j}$	181,135	0.4145	0.4950	0	1
$TF_{i,t}$	181,132	1.8772	0.1535	1.1206	4.1427
$Trade_{i,j,t}$	181,131	4.6440	1.6190	-0.4440	11.8478
$GDP_{i,t}$	181,132	4.0150	0.6090	0	4.9467
$\frac{GDP_{i,t}}{GDP_{j,t}}$	180,071	1.1440	0.2978	0	11.0900
$GD_{i,j}$	181,086	3.7831	0.3662	1.5218	4.8123

The descriptive statistics summarized in Table 2. As TD mean value 0.0044 means that an average 0.44 percent of WTO member countries were involved in at least a trade dispute from 1995 to 2018. Thus, LS 0.0367 indicates that an average of 3.67 % of WTO members has language similarity with their trading partners and WTO. The mean of Common Spoken language is 0.1058 with minimum value 0 and maximum 1. Language barriers mean 0.4145 suggests that 41.45 percent of WTO members have language barriers with their trade partners. In terms of language similarity, WTO legal languages mean value for English 0.0133, 0.0205 for Spanish and 0.0085 for French.

Panel Probit model

To empirically test the hypothesis of common spoken language, language similarity, and language barriers on trade disputes, adopt the panel probit regression model. More specifically we assume that the probability country i be involved in a trade dispute with the country j in a year t specified as follows,

$$Prob(TD_{\downarrow i,j,t}=1|CSL, LS, LB, controls=\phi(\beta_{\downarrow 0}+\beta_{\downarrow 1} C \quad SL_{\downarrow i,j}+\beta_{\downarrow 2} LS_{\downarrow i,j,WTO}+ \beta_{\downarrow 3} LB_{\downarrow i,j}+\gamma controls_{\downarrow i,j,t}+\varepsilon_{\downarrow i,j,t}) \qquad (1)$$

Where *Controles* is the vector of country-level control variables. $\varepsilon_{i,j,t}$ is an error term capturing unobserved actors, with $\varepsilon \square N(0,1)$. $\Phi(\cdot)$ is the CDF of the standard normal distribution.

For the sample, countries having language similarities as English, Spanish, and French and

initiate a trade dispute which is also WTO legal languages. Also assume that the probability that country i undertakes at least a trade dispute with their trade partner countries having these common languages as in year t is specified as follows,

$$\text{Prob}(TD_{\downarrow i,j,t}=1|\ CSL,English,LB,controls)=\Phi(\beta_{\downarrow 0}+\beta_{\downarrow}1\ CSL_{\downarrow}i,j+\beta_{\downarrow}2\ English_{\downarrow i,j,WTO}+\beta_{\downarrow}3\ LB_{\downarrow i,j}+\gamma controls_{\downarrow i,j,t}+\varepsilon_{\downarrow i,j,t}\ ) \quad (2)$$

$$\text{Prob}(TD_{\downarrow i,j,t}=1|CSL,Spanish,LB,controls)=\Phi(\beta_{\downarrow 0}+\beta_{\downarrow 1}\ CSL_{\downarrow i,j}+\beta_{\downarrow 2}\ Spanish_{\downarrow i,j,WTO}+\beta_{\downarrow}3\ LB_{\downarrow}i,j+\gamma controls_{\downarrow i,j,t}+\varepsilon_{\downarrow}i,j,t\ ) \quad (3)$$

$$\text{Prob}(TD_{\downarrow i,j,t}=1|CSL,French,LB,controls)=\Phi(\beta_{\downarrow 0}+\beta_{\downarrow 1}\ CSL_{\downarrow i,j}+\beta_{\downarrow 2}\ French_{\downarrow i,j,WTO}+\beta_{\downarrow 3}LB_{\downarrow}i,j+\gamma controls_{\downarrow i,j,t}+\varepsilon_{\downarrow i,j,t}) \quad (4)$$

βs and γ are the parameters to be estimated. This paper will examine the marginal effect of an individual variable to study the impact of CSL, LS & LB on trade disputes.

Empirical Results

Basic Regression Results :Language similarity, barriers, and Trade Disputes

In this section, discuss the empirical results. Table 3 shows the results of the panel probit model and confirms the hypotheses significantly. Empirical results of the model (1) of Table 3 show that the probability of trade dispute occurrence is significantly positively related to the common spoken language, language similarity, and language barriers at a significant level of 1%.

Table 3 column (2) and (3) shows that Language similarity in English and Spanish positively and significantly affect trade disputes at a 1% significant level. On the other hand, column (4) shows French also positively influences trade disputes but not substantial. English and Spanish play the most significant roles in trade disputes than French. English and Spanish speaking countries are more likely to be involved in trade disputes and these results confirm the hypothesis 2.

Table 3: Regression results of Panel Probit Model

Model	**(1)**	**(2)**	**(3)**	**(4)**
Dependent	**TD**	**TD**	**TD**	**TD**
$CSL_{i,j}$	0.4884*** (0.1807)	0.8417*** (0.1128)	0.5470*** (0.1419)	0.9273*** (0.1100)
$LS_{i,j,WTO}$	0.6709*** (0.1856)			
$LS\text{-}English_{i,j,WTO}$		0.5568*** (0.1632)		
$LS\text{-}Spanish_{i,j,WTO}$			0.7604*** (0.1451)	
$LS\text{-}French_{i,j,WTO}$				0.1635 (0.1484)
$LB_{i,j}$	0.2709*** (0.0705)	0.2152*** (0.0638)	0.2466*** (0.0653)	0.1934*** (0.0628)
$\log(TFI_{i,t})$	-0.7021*** (0.2039)	-0.6743*** (0.1858)	-0.7101*** (0.2071)	-0.6794*** (0.1913)
$\log(Trade_{i,j,t})$	0.3255*** (0.0210)	0.3240*** (0.0211)	0.3274*** (0.0209)	0.3266*** (0.0212)
$\log(GDP_{i,t})$	-0.5912*** (0.0879)	-0.6586*** (0.0919)	-0.5775*** (0.0868)	-0.6351*** (0.0888)
$GDP_{i,t}/GDP_{j,t}$	0.5717** (0.0851)	0.6339** (0.2497)	0.5479** (0.2252)	0.6116** (0.2386)
$GD_{i,j}$	0.3235*** (0.2314)	0.3004*** (0.0857)	0.3458*** (0.0861)	0.3359*** (0.0849)
Constant	-5.3636*** (0.5143)	-5.1052*** (0.5162)	-5.4685*** (0.5204)	-5.3426*** (0.5112)
Observations Country –Pairs	179,832 8,249	179,832 8,249	179,833 8,249	179,832 8,249
Prob > chi2	0.0000	0.0000	0.0000	0.0000

Notes: t Statistics in parentheses. ***/**/* indicate significance at the 1%, 5% and 10% levels, respectively

The results of the controls presented in Table 3 are mostly consistent with the existing literature. Trade freedom) is negatively associated with trade conflicts at a significant level of 1%. The results are consistent with economic intuition that the more free-trade policy and less trade protectionism (Kitson & Michie, 1995), lower the likelihood of trading partners to be involved in trade disputes (Oatley, 2017). The more bilateral trade, the higher the probability of trade disputes, aligned with many existing literatures (Horn et al., 1999; P.Bown, 2005). At a significance level of 1 percent, trade volume is positively correlated with trade disputes, suggesting that more substantial trade results in more trade conflicts.

$GDP_{i,t}$ measure the level of total output, which in turn reflects the size of a country's international market. The results of Table 3 show a negative relationship between and trade disputes. Trade has inevitably slowed down through trade conflicts or disputes and the economic growth of the country. As it dampens the country's commercial ties and trade flows, economic growth has been negatively associated with trade disputes (Fang et al., 2020; Matteis, 2004). This outcome supports Lee (2012) finding that the risk of trade disputes is negatively linked to the size of its trading partner market.

Table 3 also shows a statistically significant and positive correlation between GDP ratio and trade disputes at a level of 1%. The economic instinct of this result is defined in the theory of power where Guzman and Simmons (2005) and later, Bown and McCulloch (2009) explain that a country with a comparatively greater market size appears to have more market strength and to engage in trade disputes more easily.

Thus, $GD_{i,j}$ a measure of transport costs positively related to trade disputes at a 1% significant level, which simultaneously increases transportation and other trading costs, thereby leading to increased conflict and decreased cooperation working through diminished trade (Chang et al., 2004). The study of Polachek et al. (1999) describes an indirect effect of distance on conflict with the intuition that aloofness reduces trade due to increased transportation costs, with the reduction in business leading to an increase in friction.

The probability effects

This paper further calculate and report the average probability effects of CSL, LS, and LB in Table 4 to examine the economic significance of languages on trade disputes. Since LS is a dummy variable, report the average marginal effects derived from the panel probit model (1). The average probability of CSL on TD is 0.0034 and statistically significant at the 1% level. More importantly, the probability effects imply that one-unit further commonality in spoken

language between the two trading countries predicts the average occurrence probability of trade conflict rise by 0.34 %. The result confirms our communication and negotiation capacity hypothesis on trade disputes. The average marginal probability of LS on TD is 0.0079 and is also statistically significant at the 1% level. The probability effects imply that the likelihood of a country to participate in a trade conflict against its trading partner averagely increases by 0.79 % as they have language similarity between trade partners and WTO. The economic intuition behind these countries with language similarity with trade partners and WTO can communicate adequately, understand export-import markets, and have negotiation capacity that motivates them to involve in trade conflicts more frequently also confirm the hypothesis.

The results of column (1) of Table 4 indicate countries having language barriers their possibility to engage in trade conflicts increases by 0 .0019 at a 1% significant level. The probability effects imply that the probability of a state to participate in a trade conflict with its trading partner averagely increase by 0.19 % as they have language barriers. The theoretical intuition behind this is trade partners with language barriers are involved in trade conflicts due to improper communication, misunderstanding, and lack of information. The result confirms our hypothesis 3 as LB positive impact on trade disputes through ineffective communication and misunderstandings.

In Table 4 column (2) to (4), we calculate and report the average probability effects of English, Spanish, and French as language similarity. Column (2) indicates the average marginal probability of English on TD is 0.0058 and is statistically significant at the 1% level. More critical, the probability effects imply that two trading countries are having language similarity with each other and WTO as English predicts the average occurrence probability of trade conflict increase by 0.58 %. On the other hand, the average likelihood of Spanish on TD is 0.0097 depicted in column (3). It is statistically significant at the 1% level, implying that trading partners have language similarity with each other and WTO as Spanish, increases TD probability by 0.97 %. French is positive but insignificant effects on trade disputes shown in column (4).

Table 4: Average Marginal Probability Effects of CSL,LS and LB on TD

Model	**(1)**	**(2)**	**(3)**	**(4)**
Dependent	**TD**	**TD**	**TD**	**TD**
$CSL_{i,j}$	0.0034^{***}	0.0058^{***}	0.0039^{***}	0.0064^{***}
	(0.0013)	(0.0008)	(0.0010)	(0.0008)

$LS_{i,j,WTO}$	0.0079***			
	(0.0034)			
$LS\text{-}English_{i,j,WTO}$		0.0061***		
		(0.0026)		
$LS\text{-}Spanish_{i,j,WTO}$			0.0097***	
			(0.0031)	
$LS\text{-}French_{i,j,WTO}$				0.0013
				(0.0014)
$LB_{i,j}$	0.0019***	0.0015***	0.0017***	0.0016***
	(0.0005)	(0.0004)	(0.0005)	(0.0006)
$\log(TFI_{i,t})$	-0.0049***	-0.0047***	-0.0049***	-0.0047***
	(0.0014)	(0.0013)	(0.0015)	(0.0013)
$\log(Trade_{i,j,t})$	0.0023***	0.0022***	0.0023***	0.0023***
	(0.0002)	(0.0002)	(0.0002)	(0.0006)
$\log(GDP_{i,t})$	-0.0041***	-0.0046***	-0.0040***	-0.0044***
	(0.0006)	(0.0007)	(0.0007)	(0.0007)
$GDP_{i,t}/GDP_{j,t}$	0.0040***	0.0044***	0.0038***	0.0042***
	(0.0016)	(0.0018)	(0.0016)	(0.0017)
$GD_{i,j}$	0.0022***	0.0021***	0.0024***	0.0023***
	(0.0006)	(0.0006)	(0.0006)	(0.0006)
Observations	179,832	179,832	179,833	179,832
Country –Pairs	8,249	8,249	8,249	8,249
Prob > chi2	0.0000	0.0000	0.0000	0.0000

Notes: Robust t-statistics in parentheses. ***/**/* indicate significance at the 1%, 5% and 10% levels, respectively.

Robust tests

The key finding of the baseline study is that Common Spoken Language, Language Commonality, and Language barriers have a statistically and economically significant and positive impact on the occurrence of trade disputes. Further provide robustness tests using alternative language data, and different models.

Dependent Variable as Complainant and Respondent

Instead of Trade conflicts as a whole, use complainant and respondent separately as a

dependent variable to check whether languages play a similar role or play differently. CSL, LC, and LB affect trade partner participation in trade disputes as both complainant and respondent. The results are identical to the panel probit model (1) to (4) depicted in Table 4. In case of initiating a trade complaint and responding to trade conflicts, CSL, LC, and LB play positive and significant similar roles as mentioned above.

Table 5 column (1) indicates that trade partners having common spoken language and language similarity, their probability of initiating a trade complaint increase by 0.0019 and 0.0047 with a 1% significant level. Column (2) to (4) indicates English and Spanish as language similarities play a significant positive role like base results with 1% significant level than French, such as 0.0015 and 0.0038, respectively. These results also indicate when countries initiate a trade complain or their trade partners complaint against them, having language similarity increases their capacity to negotiate and communicate easily with them, understanding the conflict ground quickly. These results also support the capacity hypothesis. When trade partners having LB, their possibility to initiate a trade complains a chance to increase by 0.0012 with a significant level of 1%. These results also evidenced that countries with language barriers facing barriers due to their language restrictions, which influences their complaint initiation and to defend themselves. Without the proper knowledge, ambiguity, and lack of communication ability hinder a country's ability to participate in the settlement of the dispute. These results support our hypothesis capacity facilitates more frequent involvement in trade disputes.

Table 5: Average Marginal Probability Effects: Dependent Variable As Complainants

Model	**(1)**	**(2)**	**(3)**	**(4)**
Dependent	**CMPL**	**CMPL**	**CMPL**	**CMPL**
$CSL_{i,j}$	0.0019^{***} (0.0009)	0.0016^{***} (0.0009)	0.0017^{***} (0.0009)	0.0019^{***} (0.0006)
$LS_{i,j,WTO}$	0.0047^{**} (0.0025)			
$LS\text{-}English_{i,j,WTO}$		0.0015^{***} (0.0006)		
			0.0038^{***} (0.0015)	

$LS\text{-}Spanish_{i,j,WTO}$				0.0014 (0.0011)
$LS\text{-}French_{i,j,WTO}$	0.0012*** (0.0003)	0.0012*** (0.0004)	0.0011*** (0.0003)	0.0012*** (0.0003)
$LB_{i,j}$	-0.0039*** (0.0008)	-0.0037*** (0.0008)	-0.0040*** (0.0009)	-0.0038*** (0.0004)
$\log(TFI_{i,t})$	0.0014*** (0.0002)	0.0014*** (0.0002)	0.0014*** (0.0002)	0.0014*** (0.0002)
$\log(Trade_{i,j,t})$	-0.0021***	-0.0022***	-0.0020***	-0.0021***
$\log(GDP_{i,t})$	(0.0004)	(0.0004)	(0.0004)	(0.0004)
$GDPi,t/GDP_{j,t}$	0.0022*** (0.0009)	0.0022*** (0.0009)	0.0021*** (0.0009)	0.0022*** (0.0009)
$GD_{i,j}$	0.0013*** (0.0004)	0.0011*** (0.0004)	0.0014*** (0.0004)	0.0013*** (0.0004)
Observations Country –Pairs	179,832 8,095	179,832 8,095	179,833 8,095	179,832 8,095
Prob > chi2	0.0000	0.0000	0.0000	0.0000

Notes: Robust t-statistic in parentheses. ***/**/* reflect respectively 1%, 5% and 10% significance level.

The results of Table 6 in column (1) indicate countries participating in a trade dispute as a defendant with having CSL and LS with trade partners increase trade disputes likelihood. The probability effects imply that the probability of a country to participate in a trade conflict as a respondent rises by 0.19 % and 0.36 % with language similarity and commonly spoken languages at a significant level of 1%. If states have language barriers, their possibility to become a respondent in a trade dispute is 0.0008 at a significant level of 1%. These results also highlighted that countries having CSL, LS has more capacity to resolve trade disputes than those who have language barriers. English and Spanish also play a similar role as base results in the respondent segment. Language similarity in English and Spanish increase disputes participation as respondent 0.0023 and 0.0061.

Table 6: Average Marginal Probability Effects: Dependent Variable as Respondents

Model	**(1)**	**(2)**	**(3)**	**(4)**
Dependent	**RPDT**	**RPDT**	**RPDT**	**RPDT**
$CSL_{i,j}$	0.0019*** (0.0007)	0.0029*** (0.0005)	0.0014*** (0.0005)	0.0030*** (0.0005)
$LS_{i,j,WTO}$	0.0036*** (0.0020)			
$LS\text{-}English_{i,j,WTO}$		0.0023*** (0.0012)		
$LS\text{-}Spanish_{i,j,WTO}$			0.0061*** (0.0018)	
$LS\text{-}French_{i,j,WTO}$				0.0008 (0.0007)
$LB_{i,j}$	0.0008*** (0.0003)	0.0006*** (0.0003)	0.0007*** (0.0003)	0.0006*** (0.0003)
$\log(TFI_{i,t})$	-0.0017*** (0.0008)	-0.0016*** (0.0002)	-0.0017*** (0.0009)	-0.0015*** (0.0008)
$\log(Trade_{i,j,t})$	0.0025*** (0.0002)	0.0024*** (0.0002)	0.0025*** (0.0002)	0.0025*** (0.0002)
$\log(GDP_{i,t})$	-0.0020***	-0.0022***	-0.0018**	-0.0021***
$GDP_{i,t}/GDP_{j,t}$	(0.0003)	(0.0003)	(0.0009)	(0.0003)
$GD_{i,j}$	0.0020*** (0.0007)	0.0021*** (0.0007)	0.0017*** (0.0003)	0.0020*** (0.0007)
Observations	0.0014*** (0.0009)	0.0013*** (0.0004)	0.0016*** (0.0004)	0.0014*** (0.0003)
Country –Pairs	179,832 8,095	179,832 8,095	179,833 8,095	179,832 8,095
Prob > chi2	0.0000	0.0000	0.0000	0.0000

Notes: Robust t-statistic in parentheses. ***/**/* reflect respectively 1%, 5% and 10% significance level.

Alternative Models

In this section, discuss the use of alternative models for robust testing. In a year, WTO members several times involved in trade disputes with each other. The counting model is employed in which the dependent variable is a nonnegative integer, i.e., the count of the trade disputes brought at the WTO. To view that count aspect of trade disputes data, we use the Poisson model for the robustness test. The average likelihood outcome of CSL and LS, resulting in using the Poisson model, are reported in Table 7 column (1). The average probability effect of CSL on TD and LS on TD is 0.0032 and 0.0063, which are both statistically significant at the 1% level. The average probability effect of LB on TD is 0.0013, which statistically significant at a 1% level. Similarly, English and Spanish positively significantly affect trade disputes than French. The statistical significance and economic significance of these effects are consistent with the results of Table 4 using the panel probit model, indicating that the empirical results are robust to the model.

Table 7: Average Marginal Probability Effects: Panel Poisson Model

Model	**(1)**	**(2)**	**(3)**	**(4)**
Dependent	**TD**	**TD**	**TD**	**TD**
$CSL_{i,j}$	0.0045^{***} (0.0008)	0.0045^{***} (0.0008)	0.0036^{***} (0.0010)	0.0053^{***} (0.0007)
$LS_{i,j,WTO}$	0.0063^{***} (0.0021)			
$LS\text{-}English_{i,j,WTO}$		0.0029^{***} (0.0010)		
$LS\text{-}Spanish_{i,j,WTO}$			0.0032^{***} (0.0014)	
$LS\text{-}French_{i,j,WTO}$				-0.0007 (0.0011)
$LB_{i,j}$	0.0013^{***} (0.0003)	0.0014^{***} (0.0005)	0.0016^{***} (0.0005)	0.0011^{***} (0.0004)
$\log(TFI_{i,t})$	-0.0074^{***} (0.0010)	-0.0067^{***} (0.0011)	-0.0082^{***} (0.0017)	-0.0072^{***} (0.0011)

$\log(Trade_{i,j,t})$	0.0036*** (0.0002)	0.0069*** (0.0004)	0.0050*** (0.0003)	0.0070*** (0.0004)
$\log(GDP_{i,t})$	-0.0031***	-0.0032***	-0.0027***	-0.0031***
$GDP_{i,t}/GDP_{j,t}$	(0.0003)	(0.0002)	(0.0005)	(0.0003)
$GD_{i,j}$	0.0028*** (0.0004)	0.0025*** (0.0003)	0.0020*** (0.0004)	0.0025*** (0.0003)
Observations	0.0047*** (0.0005)	0.0041*** (0.0005)	0.0036*** (0.0007)	0.0045*** (0.0005)
Country –Pairs	179,841 8,249	179,832 8,095	179,994 8,104	179,832 8,095
Prob > chi2	0.0000	0.0000	0.0000	0.0000

Notes: Robust t-statistic in parentheses. ***/**/* reflect respectively 1%, 5% and 10% significance level.

Hence rerun mixed probit regression of TD and reported the results in Table 8. The results indicate that the average probability effects of CSL, LS, and LB on TD are 0.0039, 0.0062, and 0.0014 statistically 1% significant. These results are quite similar to our base results in Table 4. English and Spanish still play a significant positive role in trade disputes than French.

Table 8: Average Marginal Probability Effects: Mixed Probit Model

Model	**(1)**	**(2)**	**(3)**	**(4)**
Dependent	**TD**	**TD**	**TD**	**TD**
$CSL_{i,j}$	0.0039*** (0.0009)	0.0056*** (0.0006)	0.0043*** (0.0007)	0.0062*** (0.0005)
$LS_{i,j,WTO}$	0.0062*** (0.0020)			
$LS\text{-}English_{i,j,WTO}$		0.0051*** (0.0013)		
$LS\text{-}Spanish_{i,j,WTO}$			0.0070*** (0.0016)	

$LS\text{-}French_{i,j,WTO}$				0.0010 (0.0008)
$LB_{i,j}$	0.0014*** (0.0003)	0.0013*** (0.0003)	0.0013*** (0.0004)	0.0011*** (0.0003)
$\log(TFI_{i,t})$	-0.0054*** (0.0012)	-0.0046*** (0.0010)	-0.0049*** (0.0012)	-0.0050*** (0.0010)
$\log(Trade_{i,j,t})$	0.0033*** (0.0002)	0.0058*** (0.0002)	0.0058*** (0.0002)	0.0067*** (0.0003)
$\log(GDP_{i,t})$	-0.0043*** (0.0006)	-0.0043*** (0.0006)	-0.0035*** (0.0005)	-0.0044*** (0.0004)
$GDP_{i,t}/GDP_{j,t}$	0.0059*** (0.0017)	0.0054*** (0.0015)	0.0044*** (0.0013)	0.0059*** (0.0006)
$GD_{i,j}$	0.0038*** (0.0004)	0.0031*** (0.0004)	0.0033*** (0.0004)	0.0038*** (0.0004)
Observations Country –Pairs	179,841 8,104	179,841 8,104	180,003 8,249	179,841 8,104
Prob > chi2	0.0000	0.0000	0.0000	0.0000

Notes: Robust t-statistic in parentheses. ***/**/* reflect respectively 1%, 5% and 10% significance level.

Also run the linear regression model and results reported in Table 9. The average probability effect of CSL, LC, and LB on TD are relatively similar (0.0049, 0.0079, and 0.0012) statistical significance and economic significance are also consistent with Table 4. These results firmly ensure the robustness of the base empirical results.

Table 9: Average Marginal Probability Effects: Linear Regression Model

Model	**(1)**	**(2)**	**(3)**	**(4)**
Dependent	**TD**	**TD**	**TD**	**TD**
$CSL_{i,j}$	0.0049*** (0.0013)	0.0065*** (0.0012)	0.0049*** (0.0012)	0.0079*** (0.0007)
$LS_{i,j,WTO}$	0.0079*** (0.0024)			

$LS\text{-}English_{i,j,WTO}$		0.0056^{***} (0.0008)		
$LS\text{-}Spanish_{i,j,WTO}$			0.0078^{***} (0.0018)	
$LS\text{-}French_{i,j,WTO}$				0.0012 (0.0008)
$LB_{i,j}$	0.0012^{***} (0.0004)	0.0009^{***} (0.0003)	0.0011^{***} (0.0004)	0.0008^{***} (0.0003)
$\log(TFI_{i,t})$	-0.0040^{***} (0.0009)	-0.0038^{***} (0.0009)	-0.0040^{***} (0.0009)	-0.0041^{***} (0.0010)
$\log(Trade_{i,j,t})$	0.0041^{***} (0.0008)	0.0042^{***} (0.0002)	0.0042^{***} (0.0002)	0.0042^{***} (0.0001)
$\log(GDP_{i,t})$	-0.0030^{***} (0.0003)	-0.0031^{***} (0.0003)	-0.0024^{***} (0.0003)	-0.0029^{***} (0.0004)
$GDP_{i,t}/GDP_{j,t}$	0.0034^{***} (0.0005)	0.0031^{***} (0.0005)	0.0024^{***} (0.0003)	0.0033^{***} (0.0007)
$GD_{i,j}$	0.0042^{***} (0.0006)	0.0034^{***} (0.0005)	0.0041^{***} (0.0006)	0.0039^{***} (0.0004)
Observations Country –Pairs	179,841 8,249	179,841 8,249	179,841 8,249	179,841 8,249
Prob > chi2	0.0000	0.0000	0.0000	0.0000

Notes: Robust t-statistic in parentheses. ***/**/* reflect respectively 1%, 5% and 10% significance level.

Alternative Data for Language Similarity

This paper also used common native language, common language index, and Language Proximity to check the robustness of language similarity and its impact on Trade disputes. Rerun the panel Probit regression model (1) using a common native language (CNL) instead of CSL, common language index (CLI), and language proximity (LB) instead of LC and report the results in Table 10. The average probability indicates countries having a unit further higher value of common native language with their trade partners increase the possibility to involve in trade conflicts by 0.0058 with a 1% significant level. On the other hand, countries having high value in Common Language Index with their trade partner's chance to participate in trade conflicts raise by 0.0031. WTO members' average probability of involving in trade disputes with CNL and LP is 0.0045 and 0.0035, with a 1% significant level. The economic

intuition behind these results indicates all kinds of language similarities give countries more confidence and capacity to participate in trade disputes. The empirical results not only show the powerful influence of CNL, CLI, and LP on TD but also show that CSL and LS are relatively independent in proxying language similarity.

Table 10: Average Marginal Probability effects of CNL, CLI, and LP on TD

Model	**(1)**	**(1)**
Dependent	**TD**	**TD**
$CNL_{i,j}$	0.0058*** (0.0012)	0.0045*** (0.0015)
$LP_{i,j}$		0.0025*** (0.0005)
$CLI_{i,j}$	0.0031*** (0.0006)	
$LB_{i,j}$	0.0023*** (0.0005)	0.0022*** (0.0005)
$\log(TFI_{i,t})$	-0.0047*** (0.0015)	-0.0047*** (0.0014)
$\log(Trade_{i,j,t})$	0.0022*** (0.0002)	0.0023*** (0.0002)
$\log(GDP_{i,t})$	-0.0040*** (0.0006)	-0.0041*** (0.0006)
$GDP_{i,t}/GDP_{j,t}$	0.0036*** (0.0013)	0.0039*** (0.0015)
$GD_{i,j}$	0.0023*** (0.0006)	0.0024*** (0.0006)
Observations Country –Pairs	179,832 8,095	179,832 8,095
Prob > chi2	0.0000	0.0000

Notes: Robust t-statistic in parentheses. ***/**/* reflect respectively 1%, 5% and 10% significance level.

Conclusion

This paper explores the starring role of languages in international trade disputes and propose a communication capacity and ineffective communication hypothesis to explain the observed patterns of language similarity and language barriers. Since language is country-specific, we focus on trade disputes between two governments involving two goods or services, considering 160 WTO members with 565 trade dispute cases from 1995 to 2018.

The empirical results suggest that language similarity with trade partners and WTO official languages positively and significantly influenced trade disputes. Because of language similarities, countries do not have any additional challenges in terms of information and communication, which allows them to involve and resolve conflicts, as well reduce administrative and information costs. We find those trade partners having language similarities in English and Spanish are more inclined to participate in trade conflicts than French. Language similarity strengthens trading countries' ability by reducing the costs of contact, report, and ensuring proper negotiation. The findings indicate that having Language barriers to countries' involvement in trade conflicts increases costs. Language barriers raise both the cost of contact and information, and countries face difficulties resolving conflicts because they need to employ third parties to facilitate trade and negotiation.

Therefore, several countries have established their cultural and language institution in foreign countries, such as Chinese Confucius Institutes, Germany Goethe Institutes, to enhance the familiarity of their culture and language in other countries (Lien et al., 2012). Some countries used foreign languages as lingua franca to lower communication and information costs. Future research may analyze how these institutes and the lingua franca influence trade disputes and either increase capacity or expenses.

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