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THE IMPACT OF TRADE POLICY UNCERTAINTY ON THE INTENSIVE AND EXTENSIVE MARGIN OF TRADE: THE CASE UNDER WORLD TRADE ORGANISATION (WTO)

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Abstract

This paper studies the impact of trade policy uncertainty on the intensive and extensive margin of trade. Since most of the world trade occurs under the principles of World Trade organisation(WTO) trading system, this research aims to study the extent to which uncertainty prevails under World Trade Organisation(WTO) and how that affects firm entry and export decisions. Despite its apparent importance, this topic of research is largely unassessed and this paper employs novel methods gauge the impact. The primary dataset this paper employs is four-dimensional trade data from exporter dynamics database. In addition, to ensure the robustness to the sample selection, aggregation level and methodology this paper also uses disaggregated HS 6-digit product level data. Trade policy uncertainty is operationalised by binding overhang under the most favoured nation(MFN) tariffs. The analytical technique used is fixed effects and linear probability (regression) model. The results of binding overhang on the extensive margin are suggestive of a negative causal impact whereas, results of the intensive margin remain mixed and inconclusive.

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Introduction

Ever since the great recession of 2008 there has been a surge in academic research analysing the effects of economic policy uncertainty on agents' decision-making. The adverse effects of economic policy uncertainty on economic welfare—from investment to employment— is delineated in one of the recent seminal contributions by Baker et al.(2016)[1]. This means, uncertainty is important for rational decision-making.

Uncertainty is often important because it can dampen the subjective welfare compared to the outcome under certainty[2]. In economic transactions[3], under an investment of agents' constrained resource, the agents presume they would obtain the future payoff rightfully with credibility and commitment in the transaction. If, however, uncertainty for future payoffs prevails, their choice will deviate—different bundle that is inferior to his/her certain outcome. Hence, welfare loss is likely under uncertainty.

In recent times, an increasingly globalised world economy and fragmented production chain implies the transacting parties and source of uncertainty is no longer domestically confined. Consequently, international trade policies have an imperative role for the exporting decisions. In exporting, firms' decision to invest is often subject to trade policy uncertainty. Production-side decisions of an nation crucially trickle down in affecting employment, household consumption and the economy at large. On the whole therefore, any uncertainty from trade policies is socially relevant for several stakeholders. Moreover, the ongoing tense trade climates between dominant economies like China and US further spark interest towards understanding how trade uncertainty can be an impediment for trade and in diminishing welfare. This paper, therefore, aims to delve deeper into the central research question: **To what extent can trade policy uncertainty in the presence of World Trade Organisation (WTO) affect the intensive and extensive margin of trade?** To the extent that most trade occurs under World Trade Organization(WTO)[4], binding overhang represents trade policy uncertainty as it is the scope of increasing applied tariffs without active discouragement from the WTO, that is the need to make partner concessions.

[1] Baker et al.(2016) use newspaper coverage frequency to deduce about uncertainty from key phrases.
[2] Assuming that the agent is risk averse which aligns with empirical reality.
[3] In rational choice theory, most transactions of economic agents involve optimising the utility or payoffs subject to the agents' constraints, resulting in an optimal choice bundle.
[4] Notwithstanding, WTO aims at eliminating trade uncertainty and facilitating trade in a non-discriminatory way.

From an academic standpoint, the effect of trade policy uncertainty in terms binding overhang in the realms of WTO is scant and largely unassessed except, to the best of my knowledge, in the seminal work by Handley (2014). This study aims to fill the gap and takes an explorative stance by using different methods and dataset that have not been assessed for this definition of trade uncertainty before. This paper primarily uses a large four-dimensional panel dataset varying at four levels—importers, exporters, sectors and time, offering wider relevance and scope for internal and external validity. In addition, for robustness a disaggregated dataset for a single importer is also adopted. This paper applies to raw measures without scaling and parameterisation based on structural-based model like that of Handley's (2014) and assesses, the extensive margin alongside the intensive margin[5].

This paper is structured as follows, the first section presents the literature review and empirical background for the paper. The data section subsequently follows, which describes the sample selection criteria and descriptive statistics. After the data section, the econometric specification is explained in methodology. Then the results, robustness, discussion and conclusion with limitations and scope for further research complete the paper.

Literature review and empirical background

The impact of trade policy uncertainty on the trade margins can be best understood by drawing on the theoretical foundations on firm heterogeneity which provides the contextual background for the research and theoretical and empirical work on the extensive and intensive margin and trade policy uncertainty which concerns the outcome and variable of interest of this paper, respectively.

Empirical findings, point towards post-1950s trade being characterized by intra-industry trade and variety-seeking consumption – rather than inter-industry based on comparative advantage. In support of these findings, the origination of 'new trade theories' took place (Krugman, 1983).The seminal work by Krugman (1980) is the prominent beginning of 'new trade theories'. In Krugman's (1980) model, economies of scale and product heterogeneity are central features of the production side. Krugman (1980) defines the production side with equilibrium market conditions and assumptions under Chamberlain monopolistic competition—implying that new firm entry can drive monopoly power to zero. The

[5] This paper further contributes to the active discussion originated by Rose(2004), for the raison d'être of WTO in facilitating trade and especially, the presence uncertainty under WTO. This paper also connects with the large literature associated with why so few firms export.

Chamberlain approach also allows all differentiated product varieties to capture the demand in the similar way, eliminating any strategic dependencies between producers. As a result, Krugman's (1980) model implies that producers do not end up competing in same product varieties but instead differentiate their products[6]. Hence, Krugman's (1980) model not just introduces imperfect competition but provides a new foundation for trade in the trade literature — product diversity. Categorically, in Krugman's (1980) model the gains for trade emerge from consumption of diverse goods. Product diversity sustains after opening to trade because each product variety will be served by a specific firm in one country only. So, even in the absence of real wage increases, trade increases welfare due to product diversity[7].

Despite its eminence, Krugman's (1980) model has its limitations and problematic features.[8] Although, Krugman's (1980) model permits intra-industry trade it abstains from providing a foundation for inter-industry trade based on endowment-based or productivity-based. Furthermore, there is no clarity regarding the industrial structure in Krugman's (1980) model. In other words, a country can be an importer in the same industry as it is a net exporter it and the specialisation in product varieties is arbitrary. Incidentally, Krugman's (1980) model also does not result in differences in employment across industries. Differences in factor compensation (income distribution) likewise, do not result because his model assumes a single factor of production[9].

Auxiliary to these departures from empirical reality, the subsequent seminal contribution integrated the standard trade model and Krugman's (1980) model in Helpman and Krugman (1985). In particular, inter-industry trade (industrial structure) is determined by comparative advantage (endowment-based) and consumer demand for product varieties drives intra-industry trade. Moreover, the integrated model adheres to the four theorems of factor-price equalization, Rybczynskzi, Heckscher-Ohlin and Stolper-Samuelson. Taking all this into consideration, the new trade theories have aligned more to the empirical reality. Although,

[6]Furthermore, under the competitive conditions described, the effect on the price will be negligible when the produced varieties are large (Krugman, 1980).

[7] This is by treating the number of firms as given (Krugman, 1980).

[8] As far as problematic features are concerned, Krugman(1980) specifies gains from trade solely to emerge from diversity and not at all from economies of scale. Additionally, increased openness does not influence elasticity of demand and further production decisions in Krugman's(1980) model under open economy.

[9] Krugman (1980) does introduce wage inequality with iceberg transportation costs in the model. With transportation costs prices, firms and output will remain uninfluenced and wage inequality will occur because production will take place near the larger market in order to minimise transport costs and therefore, the local worker of the larger country will have higher wage compared to the workers from the smaller country.

they still hinge on one crucial, doubtful assumption—each firm, is assumed to be identical and a representative exporter. While in contrast, micro-datasets reveal that in any industry only a few firms export. In fact, exporters differ from non-exporters on dimensions such as productivity often referred to as 'exporter premia' (Bernard et al., 2007).

In this regards, Melitz (2003) extends the monopolistic competition model of Krugman (1980) but, without representative firms— introducing, firm heterogeneity. In Melitz's (2003) model, firms pay an irreversible fixed cost in entering an industry. Prior to entering, firms also have uncertainty over their own productivities. On entering, the firms obtain their productivities from a common distribution and the productivities remain fixed. After realising their productivity, a firm can only sustain if its productivity is higher than the zero-profit productivity cut-off threshold. If not, production would lead to losses and so the firms should exit the market immediately. Therefore, firm heterogeneity with respect to productivity partitions individual firms' existence in the market. Nevertheless, all existing firms do equally share the same exogenous probability of a bad shock that could cause them to exit[10].

Melitz (2003) also specifies the open economy case. Herein, firms face irreversible, fixed costs— in addition to variable costs of Krugman (1980)— for exporting. A firm that has a productivity level above the export productivity cut-off threshold engages in exporting. In an open economy therefore, two cut-offs relating to domestic- and exporting market entry are present. In relation to trade uncertainty, Melitz (2003) shows a reduction in trade costs lowers the exporter cut-off while simultaneously, increasing zero-profit cut-off. Overall, enhancing the existing exporters' profitability and making less productive firms worse off[11].

Melitz (2003) also describes that an open economy augments average industrial productivity through domestic factor reallocation. It means, a hike in factor prices due to high demand[12] leads to reallocation towards more productive firms who can 'afford' higher factor compensations and so — low productivity firms exit – dynamically leading average industry productivity to increase. In conclusion, Melitz's (2003) model permits both high-productivity leading to export via self-selection and exporting leading to high-productivity on an (average)

[10]Even though, the number of active firms remain constant in steady-state with entry and exit.
[11] For the least productive firms, this would mean exiting the market if their productivity is below the higher zero-profit productivity cut-off. Alternatively, for relatively less productive firms the consequence is loss of market shares and profits in domestic production.
[12] Domestic factor demands are driven by both production for domestic and foreign market.

industrial basis through factor reallocation. Growth in industrial productivity, appears a source of welfare gain supplementary to product diversity[13].

In trade literature, moving from standard model to the model with firm heterogeneity led to an important decomposition of trade. This decomposition is essential for gauging the impact on trade under firm heterogeneity, as it accounts for the exit and entry of firms namely, the extensive and intensive margin of trade. The intensive margin is regarded as the mean value of exports per exporter and the extensive margin as the number of exporters[14].

Chaney (2008) ascertains the importance of this, by showing that variable and fixed trade barriers can be decomposed into two margins that respond with opposing degrees under Melitz's (2003) model[15]. Under heterogenous firms, trade barriers in the form of variable and fixed costs affect the intensive and extensive margin of trade. Herein, the elasticity of substitution has no effect on the responsiveness of trade flows with respect to variable trade costs.

At the same time, the elasticity of substitution has a negative effect on the responsiveness of trade flows with respect to fixed trade costs. Higher elasticity of substitution magnifies the responsiveness of the intensive margin while dampening the responsiveness of the extensive margin to trade barriers. With substitutable goods, the demand for product varieties are sensitive to changes in trade costs. That is, the intensive margin responds more to reduced trade barriers. Conversely, the dampening response of extensive margin occurs since, when goods are substitutable the market share a firm can capture depends on productivity. Productivity differences feed in to firm size differences, increasingly making fixed costs less important for exporting as large firms can easily overcome it. Chaney (2008) concludes the dampened effect on extensive margin outweighs the magnified effect from the intensive margin when a decline in trade barriers occurs, under highly substitutable products[16]. This

[13] Even if there are high export costs, foreign firms may replace many domestic firms adversely affecting product diversity related welfare, the welfare gain from aggregate productivity gain will always dominate.
[14] The decomposition is realised from definition of mean value of export per exporter. The mean value per exporter in a country is total trade divided by number of exporters.
[15] For a given elasticity of substitution between the goods.
[16] The opposite holds true for low elasticity of substitution wherein monopolistic advantage stemming from differentiation outweighs productivity advantages. Here, the low product substitutability and high differentiation of goods implies that the inelastic demand faced by each firm is less reactive to trade costs and so is the intensive margin. Nevertheless, for the extensive margin, the new entrants face more possibilities to capture share at the extensive margin through product differentiation.

contrasts with Krugman (1980) where, the impact of trade barriers showing the effect of variable costs – is magnified by the elasticity of substitution—for the intensive margin.

On the empirical front, concerning work on the extensive and intensive margin, trade costs are proxied by distance are often the variable of interest[17]. However, some papers have also incorporated tariffs to study the extensive and intensive margins. French firm-level data used by Buono and Lalanne (2012) for instance, indicate hardly any extensive margin effects for the tariff changes induced by the Uruguay Round upon creation of the WTO.

As far as the theoretical and empirical contributions for trade policy uncertainty are concerned, they are relatively recent and few. This paper is inspired by the work of Handley (2014). Handley (2014) incorporates Australian disaggregated product import data to study the effect of trade uncertainty— measured by model-based parameterised binding gap— on firm entry. He extends on the prior work of Handley and Limão (2012).

In Handley's (2014) model[18], firms have to pay a fixed entry cost—which does not exist in the domestic market— to begin exporting. In addition, to export, the firm's unit cost should be below exporting cut-off threshold and the discounted value of entry should be positive. There are two possible tariff regimes: deterministic and stochastic, which the potential entrant could face. In a deterministic environment, there is no uncertainty on future tariffs so entry occurs if the net present discounted value of entry is positive and the firm fulfils the cut-off threshold. Under stochastic framework, future tariffs are uncertain and dependent on trade policy shocks. Firms, in this case, assign probabilities to future tariffs outcomes based on the arrival rate of a shock which they are aware of. Besides, all firms face an exogenous death shock like in Melitz (2003) that can lead to export market exit.

Under the stochastic regime, firms will only enter if the difference between the value of exporting and sunk cost exceeds or is equal to the option value of waiting[19]. Trigger tariff make firms indifferent between waiting or entering. If tariffs are expected to be below trigger tariffs a firm will enter into exporting. Due to uncertainty, the stochastic tariff regime has a

[17] Koenig (2005) for example, employs firm-level export data on French firms. The effect of distance on the intensive margin is larger for sectors with homogeneous goods and the effect of distance the extensive margin is less in sectors with homogenous goods.

[18]Underlying conditions entail that the utility function is a Cobb-Douglas function, where differentiated product varieties face transport costs and tariff and homogenous good are freely traded. Additionally, each firm has a distinct unit labour requirement in a monopolistically competitive industry.

[19] In accordance to Dixit (1989) an option value of waiting allows to seek more relevant information.

lower cut-off than the deterministic regime, implying that fewer firms can enter because they have to have a higher productivity to surpass the threshold. The bound tariff increases the cut-off to being compared to unbound because when a random tariff is drawn after the policy shock instead of maximum range of tariffs, only bound rate is observed. Thus, bad news relating to worse-case scenario only matters when entry considers irrecoverable sunk costs (Bernanke,1983).

Uncertainty always suspends entry compared to the deterministic model. There is therefore, a delay and cautionary effect of uncertainty. The former reduces cut-off threshold and increases sensitivity to arrival rate of a shock whereas the latter, reduces the sensitivity of entry margin(cut-off threshold) under uncertainty[20]. In this regards, lowering bindings could be as useful as lowering applied tariffs by acting as a insurance against tariff reversals. Finally, binding commitments and applied tariff changes together are more effective than unilateral applied tariff changes. Therefore in Handley's (2014) model trade policy uncertainty adversely impacts the extensive margin of trade[21].

From this section, based on the literature review and underlying framework the two main hypotheses that are to be tested:

Hypothesis 1: Trade policy uncertainty negatively impacts the extensive margin of trade.

Hypothesis 2: Trade policy uncertainty negatively impacts the intensive margin of trade.

Data

To examine the relationship between trade uncertainty and the intensive and extensive margin of trade, data is obtained from three secondary sources, namely exporter dynamics database (World Bank Group), market access indicators (WTO data portal) and gravity dataset (CEPII). Exporter dynamics database contains detailed records of the micro-characteristics of the exporting sectors including the dynamics, concentration and diversification of the sectors. The exporter-sectoral-destination-year country dataset used in this paper pertains to the

[20] This does not apply if tariffs are deterministic or when tariffs are at their maximum level in the distribution.

[21] Handley (2014) estimates the probability to import using linear probability model with fixed effects, with non-zero trade representing firm entry. Handley's (2014) empirical findings show there are more entrants who export in industries where binding overhang are low. Particularly, Handley (2014) specifies that, if Australia unilaterally reduced tariffs to free trade levels, the traded products would rise by 4 percent. Additionally, if Australia reduced both applied tariffs bindings to zero it would augment the number of traded products by 17 percent.

period 1997-2014[22]. The data originates from local customs data. Market access indicators is used to obtain the simple average[23] ad-valorem equivalent Most Favoured Nation(MFN) applied and bound tariffs at the chapter level. Applied tariffs[24] are obtained from the integrated database (IDB).Bound tariffs[25] are obtained from Consolidated Tariff Schedules (CTS) database. The gravity dataset is used to procure regional trade agreement dummy between importers and exporters[26]. The period covering the tariffs is also 1997-2014.

To use the dataset, the raw tariff indicators contains sectoral tariff rates for European Union combined and are analytically disassembled into the separate members. The same rates for each of the 28 members states is specified are after accounting for each member's date of accession to European union. This allows for the congruence with the exporter dynamics database on a country-basis and considers that the trading bloc has a common external tariff and free trade within. Additionally, the tariffs are aggregated on sectoral basis. To circumvent aggregation bias as Handley (2014) has described when moving from disaggregated to aggregate level maximum simple average ad-valorem MFN bound rates are used. This alleviates aggregation bias to some extent by considering the worse-case bounds and also avoids dropping many observation with negative overhang.

In this regards, this paper considers the trade uncertainty under the realms of credible commitment so the sample selection criterion restricts to those observations where binding overhang is positive. By the same notion, since the exporter dynamics database does include some countries which are not WTO members or have not attained the accession for the period concerned the other importers and exporters are excluded[27] or included from the period of their accession to WTO(before 2014)

Table A1(appendix) shows all the importing countries and their average MFN applied tariffs and binding overhang. As expected the binding overhang is larger for developing economies than developed economies, underlying the "more beneficial for less developed" trading

[22] For 62 exporters and 248 importers and all HS chapters.

[23] The average could be either simple or weighted by the country export/import share. Simple average is deemed appropriate to not include a further source of endogeneity(i.e. trade affecting tariffs), given that trade margins are the response variable.

[24] These are notified by each WTO member and non-WTO member negotiating accession.

[25] The changes in bound tariffs occurs during multilateral trade negotiations and are applicable after accession to the WTO

[26] This includes free trade agreements and custom unions and are reciprocal in nature. Original source is WTO.

[27] Since the definition MFN applied rates and MFN bound is applicable to WTO members only.

system principle (WTO,2019). There are "duty-free" economies of Singapore, Hong Kong (China) and Macao (China) and Switzerland that mostly abstain from imposition of tariff. From the sample, the highest binding overhang is for Myanmar. Likewise, the highest applied tariffs is for Egypt.

Table A2(appendix) shows all the exporting countries and their export sector characteristics. In the sample of countries, the highest number of exporters are present in Spain whereas the lowest number are in Kyrgyzstan. Similarly, the mean export value per exporter is highest in Botswana but lowest in Pakistan. In order to discern whether there are substantial differences in the average number of exporters for developed and developing countries[28].There are no statistically significant differences based on the two-sample t-test (p-value>0.10) with equal variances. Likewise, in assessing whether the mean value of exports per exporter dependent on development, there appears no statistical significant (p-value>0.10) differences. Notwithstanding, for all countries there is substantial difference between the mean and median exports per firm reflecting skewness in overall exporter size distributions wherein some major exporters are driving total exports. The most extreme cases of skewness is observed for the southern European countries Spain and Portugal where the mean export value is more than 9 times median export value per exporter. Subsequently, the share of top 5% exporters dominates the export shares most countries showing substantial deviation from a symmetric distribution and on average accounting for 30% of exporting share. The entry and exit rates are almost double of the survival rates[29] indicating that not many firms can strive the competitive export market aligning with most of findings pertaining to 'exporter premia'. At the same time, however, the entry rates are very close to exit rates.

The basic descriptive statistics with means can be found in table 4(appendix)

Methodology

For the dataset, a 5% significance level is used to evaluate statistical significance. The hypotheses will be tested by using fixed-effects. In order to test the two hypotheses the mathematical specification has to be described.

[28] The developed and developing countries are defined on the basis of 2014 WESP classification, from this definition 45 countries are developed and 47 are developing in this dataset (WESP, 2014)

[29] Entry rates are defined as the number of exporters present in year n but not in year n-1 over the total number of exporters in year n. Exit rates are number of exporters in year n-1 but not in year, n over the total number of exporters in year n-1. Lastly, survival rates are the number of exporters present year n and n+1 but not in year n-1, over the total number of exporters in year n.

$$Mean\ value\ of\ exporter\ by\ exporter\ = \frac{Total\ exports}{Number\ of\ Firms}$$

$$ln(total\ exports) = ln(mean\ value) + ln(number\ of\ firms)$$

$x_{ixhy} = n_{ixhy} + \bar{x}_{ixhy}$; *Where,* n_{ixhy}*= number of firms,* $\bar{x}_{ixhy}$*= mean value per exporter; i=importer, x=exporter, h=sector and y=year*

For the first hypothesis the most elaborate specification is as follows:

$ln(n)_{ixhy} = \beta_0 + \beta_1 ln(1 + water_{ixhy}) + \beta_2 ln(1 + MFN_{ixhy}) + RTA_{ix} + \delta_\partial + \delta_{\lambda\mu} + \varepsilon_{ixhy}$

$ln(1 + n)_{ixhy} = \beta_0 + \beta_1 ln(1 + water_{ixhy}) + \beta_2 ln(1 + MFN_{ixhy}) + RTA_{ix} + \delta_\partial + \delta\lambda\mu + \varepsilon_{ixhy}$

For the second hypothesis the most elaborate specification is as follows:

$ln(\bar{x})_{ixhy} = \beta_0 + \beta_1 ln(1 + water_{ixhy}) + \beta_2 ln(1 + MFN_{ixhy}) + RTA_{ix} + \delta_\partial + \delta_{\lambda\mu} + \varepsilon_{ixhy}$ *where,* n_{ixhy}*= number of firms,* $\bar{x}_{ixhy}$*= mean value per exporter,* $water_{ixhy}$*is binding overhang,* MFN_{ixhy}*is applied MFN tariff,* RTA_{ix} *is dummy for regional trade agreement,* δ_∂ *is an independent one-dimensional fixed effect and* $\delta_{\lambda\mu}$ *are joint-fixed effects.*

Results

Knowing the methodology, it is important to identify the source of variation in binding overhang that emerges in the dataset. Handley's (2014) work exploits temporal and cross-sectional bound rate (and applied tariff) variation between the Tokyo round's and Uruguay round's commitments and across HS 6-digit products. With regards to the scope of this paper though, Tokyo round bindings cannot be accessed[30].

As far as the definition of binding overhang[31] itself is concerned, variation can appear from two sources— applied and binding tariffs. For the exporter dynamics database[32], the bound rates are time-invariant for an importer-sector pair in the sample. Under this time-invariance the two sources of binding overhang variation would run counter lead to confounding when a single measure of 'binding overhang' is used. To put simply, a decrease in applied tariffs given bound rates, increases the binding overhang, but this increase can *positively* impact the trade margins— because the source is lower applied tariffs. On the contrary, higher binding tariffs can contribute to a higher binding overhang given applied tariffs and this increase in

[30] Specifically, as per Handley (2014) these bindings have to be specially requested from USITC which provide a CD-ROM. However, the CD-ROM also only runs on a 32-bit Windows XP(1995), and the software permits viewing of tariff lines on a one-by-one basis.

[31] Binding overhang in this paper = [Simple average advalorem maximum MFN bound rate(binding tariff) – Simple average advalorem equivalent MFN applied rate (applied tariff)]

[32] Only Uruguay round commitments are used.

overhang can *negatively* impact the trade margin— because the source is higher bindings. A higher water therefore can emerge from two possible sources that impact the trade margins in opposite directions[33].

Regressing the trade margins on binding overhang needs to identify the source, to avoid a biased coefficient. In this regards, the source of variation that best proxies trade policy uncertainty arises from bindings rates – not applied tariffs. This is since the study aims to finds how the scope of increasing applied tariffs to the level of *bindings* affects firm entry and mean value of exports— not, how levels of *applied* tariffs affect firm entry and mean value of exports.

In a conventional panel setting the effect of time-invariant variables cannot be gauged but because this research employs multiple dimensions, employing certain dimensions permits the control of fixed effects and simultaneously, leveraging the variation in the bindings for a given importer-sector pair – the time-invariant variable. For this reason, three points are fundamental in choosing the dimensions before the empirical method is carried out. Firstly, there should be sufficient variation in binding rates for the fixed effect model to exploit. Secondly, there should be less variation in applied tariffs as that is an undesired source. Lastly, control for applied tariffs should be made in any case, to isolate the 'binding rate effect' of trade policy uncertainty on the trade margins. Consequently, due to the time-invariance, the substantial variation across sectors and across importers in bound rates is exploited. This also means, this research minimises the usage of temporal variation which includes repeated observations on the importer-sector pair— as bindings are the same and the source of variation that emerges is undesired— applied tariffs.

In reaching the casual effect, endogeneity has to be circumvented and as a starting point, the inclusion of fixed effects to control for unobserved omitted variables is essential. The inclusion of fixed effects permits the control of variables that can potentially vary across the groups but do not change within the group. One-dimensional fixed effects relate to each of the four levels: exporters, importers, sectors and year.[34]

[33] Applied tariffs reduction can positively affect trade whereas, higher bindings can negatively. Notwithstanding, both do increase the binding overhang.

[34] Importer- and exporter-fixed effects capture time-invariant characteristics such as the country's average preferences, tastes, inclination towards trade(or anti-trade bias) and any other historical considerations

In the baseline regressions, table 4, column (1) (appendix) with year fixed effects the relationship between binding overhang and number of exporters shows a negative result such that if binding overhang increases by 10 percentage points(hereafter: p.p.) on average the number of exporters will decline by 2.34%[35] controlling for applied tariffs. If applied tariffs are not included, the effect would have been 3.69% indicative of a negative bias. The results are more statistically and economically significant if countries with zero exporters are excluded from the sample i.e. 2.94% table 4, column (2) (appendix). For the intensive margin, surprisingly, the results indicate that an increase in binding overhang by 10 p.p. on average would increase the mean value of exports by 3.56%.The results are in expected direction for the extensive margin but not the intensive margin. However, year fixed effects employ repeated importer-sector observations which do not make the result very interesting as binding variation could be further isolated by better and more controlling. The inclusion of all one-dimensional fixed effects and coefficient of binding uncertainty can be seen in table 5 (appendix) and are interpreted similar to above.

Notably, of the one-dimensional fixed effects, the importer-fixed effects are the least interesting because for a given importer there are several repeated importer-sector observations[36] and controlling for importers fails to employ the importer variation in overhang due to bindings sufficiently[37] and instead applied tariffs vary.

Next, employing more dimensions of the dataset joint-fixed effects are desirable since, one-dimensional fixed effects are a subset of joint-fixed effects. Exporter-importer fixed effects controls the unvarying bilateral trade determinants like distance, historic relationship of colonies, same nation, contiguity and common language. Sector-year fixed effects include controlling, for example, worldwide sectoral production growth due to better technologies or

affecting the trade with partners. Time-fixed effects, conversely, control for country-invariant characteristics, experienced by all the countries on average— for instance, global business cycle and consumer trends. For all countries alike, sector-fixed effects can control sector-specific characteristics that are time- and country-invariant— when exporting for example, this is connected to cost function and underlying production function like capital-intensive versus labour-intensive production and economies of scale in production. Also, when importing, average expenditure shares and import demand on a sectoral basis are controlled.

[35] [ln(1.1) – ln(1)] * (-0.246)

[36] With importer fixed effects, temporal variation in binding overhang would be the major source of variation which emanates from applied tariffs, alongside some sectoral variation. Importer variation is completely eliminated.

[37] These fixed-effects therefore cannot proxy trade policy uncertainty well, as seen in table 5, column (4) when controlling for importers alongside other fixed effects, the result of binding overhang on extensive and intensive margins becomes almost economically insignificant and statistically significant because the binding variation is not exploited.

inputs, or surge in import demand, or sectoral trade liberalisation at a certain period of time. Exporter-sector fixed effects encompass unobserved heterogeneity in productivities across sectors capturing comparative advantage. It can account also for different government's support directed to certain sectors and importer's average protectionist attitude towards an exporter's sector. Exporter- and importer-year effects encapsulate heterogeneity in aggregate productivity, wages, exchange rate, price index and local demand conditions.

Lastly, importer-sector fixed effects in addition to capturing the importer equivalent of exporter-sector fixed effects, would control import demand for specific importer-sector, it underlies the elasticity of demand affected by many factors—for instance, necessity, scarcity, frequency of consumption of the sectoral products for the importing nation. Noteworthy, however, controlling for importer-sector fixed effects would be perfectly collinear and thus, absorb any variation in bound rates which the research aims to employ as mentioned earlier; therefore, this fixed effect cannot be controlled. From the joint-effects, exporter-importer fixed effects are even more restrictive[38] than one-dimensional importer fixed effects and use several repeated importer-sector observations.

Controlling for joint-effects, the results of the responsiveness of extensive and intensive margin can be found in Table 6,7 and 8 (appendix).Consistency in the results for the extensive margin can be found wherein higher binding overhang is related to fewer number of exporters with both statistical and economic significance. More precisely, without quantification the results show the following inferences by exploiting the dimension and variation and controlling for applied tariffs is made (in column order). For a given exporter-importer pair, number of firms exporting decreases over time and across sectors as binding overhang increases.[39] The number of firms exporting decreases as binding overhang increases across importers for a given sector and year.[40] The number of firms exporting decreases across

[38] With exporter-importer fixed effects, temporal variation in binding overhang would be the major source of variation which emanates from applied tariffs, alongside some sectoral variation. Importer variation is completely eliminated. Herein, sectoral variation is even more muted because only a certain exporter's sectors are considered compared to importer fixed effects.

[39] Exporter-importer fixed effects. Even though the coefficients in are not statistically significant despite undesired temporal variation, the direction of the relationship between extensive margin and binding overhang still persists in the anticipated direction although less economically significant.

[40] Sector-year fixed effects.

sectors and importers for a given exporter and year.[41] The number of firms exporting decreases as binding overhang increases across importers for a given sector and exporter.[42] The number of firms exporting decreases across sectors as binding overhang increases for a given importer and year.[43]

As far as the intensive margin is concerned, the relationship between binding overhang and the intensive margin results is not so clear-cut to the fixed effects chosen. In fact on the one hand, the mean of value of exports decreases as binding overhang increases across importers for a given sector and year as well as for a given sector and exporter. On the other hand, the mean value of exports increases for a given exporter-importer pair over time and across sectors, across sectors for a given importer and year, and across sectors and importers for a given exporter and year in response to an increase in binding overhang.

On a closer inspection it seems, temporal and sectoral variation in binding overhang, increases mean value of exports whereas, importer variation decreases mean value of exporters in response to an increase in binding overhang. Most interestingly, controlling for sectoral variation has a crucial role. Even with one-dimensional fixed effects in table 4 (appendix), inclusion of sector-fixed effects averts the relationship between binding overhang and the intensive margin from positive in column (3) to negative in column (6). Not just that, in multilevel fixed effects inclusion of sectoral fixed effects shows the relationship between binding overhang and mean value of exports to change sign too from table 7, column(3) to table 10, column(6) for exporter-year clusters and table 8, column (3) to table 11, column (3) for importer-year clusters. What's more, inclusion of time-fixed effects does not change sign substantially but inclusion of sector-fixed effects substantially deflates the positive coefficient for exporter-importer clusters from table 9, column (3) to table 12, column(3). This strongly provides evidence in favour of a positive bias in the presence of sectoral variation in binding overhang this could be due to sector-characteristics that led to more trade and more uncertainty or alternatively, less trade and less uncertainty leading to a positive association.

[41] Exporter-year fixed effects.
[42] Exporter-sector fixed effects. In joint fixed effects, these results are strongest, after controlling for exporter-sector fixed effects the effect on the number of exporting firms decline by 3.34%, 3.74% respectively with and without zero exporters, corresponding to a 10 p.p. increase in binding overhang.
[43] Importer-year fixed effects.

Sectors like agriculture[44] could fall in former category while almost non-tradable goods[45] like gravel can fall in latter. A pooled result in the absence of fixed effects would therefore, mask such sectoral heterogeneity leading to a falsely-appearing positive relationship between binding overhang and intensive margin.

This results could be linked with the findings of Chaney (2008), the basic message of his model underlies that the impact of trade barriers depends on the elasticity of substitution and the concerned trade margin. Since the sectors have different elasticity of substitutions sector-fixed effects are important because the sensitivity of the sectors to trade barrier would vary and this heterogeneity needs to be controlled.[46]

The extensive margin reflects substantial consistency with different fixed effects, even at the multilevel effects, suggestive that an increased in binding overhang adversely affects the number of exporter in the importing nation. This aligns to the first component of delay effect in Handley (2014), that is higher binding overhang lower the cut-off entry by delaying the export market investment. In other words, with higher binding overhang there is more uncertainty over future expected tariffs. The option value of waiting becomes relatively more lucrative. According to the decision rule then, firms with sufficiently low unit labour requirement would choose enter the export markets over waiting overall, making the entry margin cut-off lower and leading to fewer firms who could overcome and export.

From this point onwards, it is much more interesting to see the relationship under the most restrictive fixed subject to employing the desired variation in bindings. This is exporter-sector-fixed effects shows the anticipated relationship for both the intensive and extensive margins table 13 (appendix), an increase in binding overhang decreases the trade margin, controlling for tariffs.

[44] Agriculture is often the most protected industry at the same time many country engage in its trade (WTO,2019).

[45] Transportation costs involved in such sectors almost leads to no trade and it does not seem rational that countries would engage in high negotiations of bindings for commodities for which naturally trade is low.

[46] On a purely conjectural basis, it could be seen controlling for sector-fixed effect, within sector variation in binding overhang is employed, within sector, across importers the elasticity of substitution is high as similar commodities are exported to different nations, for the same exporter the elasticity of substitution is even higher. In Chaney's (2008) model, high elasticity of substitution magnifies the response of the intensive margin, and possibly in this case the true effect emerges.

Cautionary effect under uncertainty in Handley (2014) states that the responsiveness of the entry margin to a tariff change under uncertainty is less elastic than certainty. By a similar notion, when binding overhang is non-zero the effect of applied tariffs should be less effective than when binding overhang is zero. The cautionary effect is shown in table 14 (appendix) and according to expectations, when there is uncertainty(non-zero overhang) applied tariffs are less effective in affecting trade margins than under certainty[47]. This can be seen by the drop in the magnitudes of the coefficient when uncertainty prevails.

Robustness

The previous findings point towards a negative relationship between trade uncertainty and the extensive margin; albeit, there is more to probe. Principally, it should be noted that in Handley's (2014) work aggregation bias affects the results when moving from a 8-digit to 4-digit product level. Thus far, this paper adopted trade and tariffs at sectoral aggregation. Consequently, changing the level of aggregation alongside an alternative methodology that minimises temporal variation would be interesting[48].

The robustness method is inspired by the empirical works of Debaere and Mostashari (2010) and Moncarz (2010). Herein, they assess the impact of tariffs on both the trade margins at a disaggregated 6-digit product level. Correspondingly, for the purpose of this paper import flows of Vietnam and binding overhang at 6-digit product level is computed. Repeated cross-sectional dataset[49] for the years 2012 and 2018 are used.[50]The reason for selecting Vietnam and the particular periods, that is, the sample selection criteria for robustness, alongside, the data sources can be found in the appendix(pg. 35).

The robustness is implemented by aggregating the tariff-line(8-digit) tariffs to 6-digit level for congruence with the import values and because working with a greater level of detail would lead to substantial loss in import data, by the way the intensive and extensive margin will be further defined (Moncarz,2010). The tariffs aggregation is conditional on the same measure code which is indicator of partner eligibility and the preferential rate (only, if applicable else, MFN rates). As mentioned earlier, the trade uncertainty emerging from binding overhang and

[47] Although, equating binding overhang to zero does not appropriately estimate the counterfactual of certainty, it does indicate that further tariff increments cannot take place and can be serve as a proxy.

[48] Above all, this serves in analysing the sensitivity of the results to not only the level of aggregation but to the methodology too.

[49] Due to repeated cross sectional data, temporal variation can be easily avoided.

[50] The binding commitments are effective after the WTO accession of Vietnam in 2007.

on a multilateral and credible basis in the realms of WTO is important ; hence, the tariffs and import flows sample constrains to those only partners who have MFN rates applicable— same measure code of MFN. Moreover, negative binding overhang observations are eliminated.

Further on, the approach closely follows Moncarz (2010) and Debaere and Mostashari (2010).Initially, a consistent trade (MFN only) sample of goods is formed for the two periods, these are basically subset of HS-6 product codes that are present in both versions of the respective periods' reported in HS-classifications import data. For the Vietnam dataset, the consistent trade sample consists of 2420 products, overall, contributing to 16,260 observations of exporter-product pairs in 2012 and 2018, respectively. Finally, since the imports of Vietnam have changed between 2012 and 2018, in order to specify the intensive and extensive margin of trade— the product categories are indexed into three groups: new, disappearing and continuously traded. The first two indexes can affect the extensive margin of trade whereas the latter determines the intensive margin of trade.

More specifically the indexes are defined with the respect to a threshold[51] in the following sense (Moncarz, 2010):

New: 6-digit product k, imported from country x to Vietnam, is considered new if imports in 2018 are greater than 1000 USD and imports were less than or equal to 1000 USD in 2012;

Disappearing: 6-digit product k, imported from country x to Vietnam, is considered disappearing if imports in 2018 were less than or equal to 1000 USD and imports were greater than 1000 USD in 2012

Continuous: 6-digit product k, imported from country x to Vietnam, is considered continuous if imports in both 2008 and 1996 are greater than 1000 USD.

These definition in absolute sense exclude those goods which were produced in 2012 but not produced in 2018[52]. Additionally, the products that were completely new in 2018 but not produced in 2012 are excluded. The exclusion of latter set underestimates[53] the extensive margin by excluding completely new goods. As mentioned previously, greater detail would have led to a loss of data, by losing more 'inconsistent' products therefore, 6-digit is adopted.

[51] The motivation behind the threshold is provided in the appendix(pg. 36).
[52]Alternatively, because they are regrouped to new 6-digit code.
[53] This further reinforces the choice of the threshold appendix(pg. 36).

The extensive margin of trade has the following specification[54]:

$$y_{xk} = \begin{Bmatrix} 1 & if y^*_{xk} > 1000, \\ 0 & otherwise \end{Bmatrix}$$

$\boldsymbol{y^*_{xk}}$ *is a latent variable which is equal to* 1 *if the imports of product* k *from country* x *to Vietnam in* 2018 *exceeds the threshold* $1000USD$.

$$y^*_{xk} = \beta_0 + \beta_1 \Delta ln(1 + water_k) + \beta_2 Status12_{xk} + \beta_3 \Delta ln(1 + MFN_k) + \delta_x + \varepsilon_{xk}$$

$\boldsymbol{\Delta ln(1 + water_k)}$ *and* $\boldsymbol{\Delta ln(1 + MFN_k)}$ *is the change in the natural log binding overhang and applied tariff imposed by Vietnam for product* k *imported from country* x *between* 2012 *and* 2018.[55]

$\boldsymbol{Status12_{xk}}$ *is a binary control which is equal to* 1 *if the imports of product* k *from country* x *to Vietnam in* 2012 *exceeds the threshold* $1000USD$.

$\boldsymbol{\delta_x}$ *represents exporter fixed effects and* $\boldsymbol{\varepsilon_{xk}}$ *is the error term.*

The intensive margin of trade has the following specification:

$$\Delta ln(y_{xk}) = \beta_0 + \beta_1 \Delta ln(1 + water_k) + \beta_2 \Delta ln(1 + MFN_k) + \delta_x + \varepsilon_{xk}$$

$\boldsymbol{\Delta ln(y_{xk})}$ *is the change in the logarithm of the value of imports of product* k *that Vietnam imports from country* x, *only for the continously traded group of goods*

The results of the robustness method can be found in appendix. As seen in table 15, column (1), without controlling for exporter fixed effects[56], a 10 p.p ceteris paribus increase in binding overhang over the time interval, decreases the probability of the partner to export the product variety to Vietnam by 1.7 p.p[57]. After controlling exporter fixed effects, the same change decreases the probability further, to 1.8 p.p. Controlling for change in applied tariffs strengthens the magnitude of the relation, but significance changes[58]. Column (4), considers the subsample for which there is no change in applied tariffs, here the effect is 1.7p.p.

[54] The choice of econometric method is linear probability model for extensive margin with fixed effects.
[55] The applied tariffs and bound rates only vary at the level of product because all exporters are MFN partners.
[56] Exporter fixed effects are jointly significant. F-statistic=22.9, p value<0.00
[57] (ln(1.1) – ln(1)) *(-0.168)
[58] Since water is computed from applied tariffs, the two are highly correlated. Multicollinearity becomes a bigger problem for a small sample, inflating the standard errors. Notwithstanding, the magnitude increases and given the sample size it is supportive of the negative relationship.

Conversely, surprisingly, for the intensive margin, if binding overhang grows by 10% over time it induces 6.8%[59] and 4.1% growth in the value of continuously traded imports– without controlling and with controlling for exporter fixed effects, respectively. Controlling for applied tariffs or using subsample changes the direction and magnitude substantially. However, these results are not statistically significant at even the 10% significance level. What's more, the 95% confidence interval of the coefficient broadly entails negative as well as positive range of coefficient values. To sum up, with the alternative method for robustness and aggregation level, the results for the extensive margin have proved to be consistent: a negative relationship between binding overhang and the extensive margin of trade. Nevertheless, the alternative robustness check failed to provide any conclusiveness for the intensive margin.

Discussion and Conclusion

This paper aims to answer the central research question 'To what extent can trade policy uncertainty in the presence of World Trade Organisation (WTO) affect the intensive and extensive margin of trade?'. From the results, there is insufficient evidence to plausibly reject the first hypothesis which relates to the extensive margin. In fact, controlling for several fixed effects and incorporating various dimensions all showed consistency in a negative response of the number of firms to an increase in binding overhang. Conversely, for hypothesis 2, there is not insufficient evidence to either reject or ascertain the hypothesis. Across importers for example, a negative relationship between binding overhang and the mean value of exports is realised, while the opposite holds true for across. In essence, it cannot be confirmed which effect is closer to the unbiased pure effect, however, a strong evidence for substantial impact of sectoral variation on mean value of exports can be made.

The research question demands causal inference, however, the variation in binding rates is not exogenously determined. Nevertheless, to the extent the binding rate variation for binding overhang is employed, reverse causality is unlikely because binding overhang's variation is pre-determined. Due to similar reasons, with substantial temporal gap between the negotiated bindings and trade margins, it is less likely for an omitted variable to be correlated with bindings and affect the trade margins, simultaneously. Most importantly, the major source of potential endogeneity – applied tariffs— are controlled for. In fact, given the levels of variation the data could employ, there is suggestive evidence for a causal impact.

[59] (ln(1.1) – ln(1)) *(0.715)

Notwithstanding, causality cannot be ascertained because the counterfactual to the treated outcome is not observed. Furthermore, although dimension-invariant characteristics can be controlled for and even time-fixed effects, dimension-varying characteristics that affect binding overhang and the trade margins are not controlled. Under the assumption that there are no correlated shocks only then can fixed effects provide an unbiased coefficient for causality.

As far as the limitations of the paper are concerned, perfect multicollinearity between bindings and importer-sector fixed effects prevented the control for importer time-invariant factors that could be associated with binding overhang and trade margins. Additionally, a potential source of concern for the inconclusiveness of the intensive margin[60] could be due to several missing observations, which is not the case for number of firms. Randomly missing observations is not problematic, but usually the reporting errors are inversely correlated to income per capita, as richer countries have better means and also large imports are unlikely to be unreported. In relation to this, the export data used is often criticised for being inferior to import values as the latter have close monitoring due to duties collection, and incorporating 'mirror data'[61] could be superior. Furthermore, due to the scope of the paper, the inability to use Tokyo round bindings is a further source of limitation, as then temporal variation could be exploited. In addition, effective bindings could be incorporated as for some countries the bindings are beyond prohibitive levels and binding overhang does not proxy uncertainty well. For further research, non-tariff barriers can be assessed as a source of uncertainty as possibly for the intensive margin too the effect is more noisy as it is more prone to non-tariff barriers. Moreover, effective bindings could be incorporated as for some countries the bindings are beyond prohibitive levels and do not proxy.

As bindings are a contentious issue for the ongoing, Doha round of negotiations, as a policy implication countries should realise that applied tariffs are an insufficient signal on the stance of trade. Negotiating lower bounds might serve better to liberalise trade on a multi-lateral basis. Moreover, there is less uncertainty in free-trade agreements or preferential agreement.

[60] The results of the intensive margin failed to reflect any consistency and support towards the anticipated hypothesis. This does though, align with econometric reasoning, most notably, the conditional-on-positives (intensive margin) effects are often contaminated by selection bias even in quasi-experimental settings (Angrist, 2001; Angrist and Pischke, 2009).

[61] Using import data from destination countries rather than export data from origin countries.

Appendix

Data

Table 1: Importers' average MFN applied tariffs and binding overhang

Importer	MFN applied tariff *ad valorem*(%)	Binding Overhang (maximum MFN bound tariff - MFN applied tariff) *ad valorem* (%)
Albania	6.95	6.68
Angola	9.17	50.87
Antigua and Barbuda	12.12	80.73
Argentina	13.43	20.45
Armenia	4.19	8.23
Australia	3.15	20.43
Austria	3.75	4.10
Bahrain	6.15	32.90
Bangladesh	16.47	104.36
Barbados	14.47	86.53
Belgium	4.23	4.69
Belize	12.25	58.55
Benin	12.58	40.76
Bolivia	10.84	29.16
Botswana	9.41	42.46
Brazil	13.84	22.43
Brunei Darussalam	2.22	26.95
Bulgaria	3.74	4.03
Burkina Faso	12.03	62.40
Burundi	16.10	61.08
Cabo Verde	13.40	18.93
Cambodia	13.20	17.57
Cameroon	19.93	60.57
Canada	3.94	10.08
Central African Republic	19.60	25.54
Chad	19.72	59.47
Chile	6.38	19.74
China	11.29	11.37
Colombia	12.73	46.46
Congo	21.05	7.68
Costa Rica	7.21	43.85
Croatia	3.72	4.87
Cuba	11.99	17.27
Cyprus	3.80	4.00

Czechia	3.84	4.18
Côte d'Ivoire	11.29	7.05
Denmark	4.28	4.74
Djibouti	23.82	36.15
Dominica	12.29	59.75
Dominican Republic	9.87	30.06
Ecuador	13.12	15.19
Egypt	32.15	90.28
El Salvador	8.36	40.66
Estonia	3.00	3.30
Eswatini	10.98	52.09
Fiji	11.14	32.74
Finland	3.44	3.82
France	4.26	4.70
Gabon	20.24	19.86
Gambia	17.12	79.76
Georgia	4.01	8.40
Germany	4.25	4.72
Ghana	14.37	64.19
Greece	4.09	4.35
Grenada	12.25	54.46
Guatemala	7.48	46.79
Guinea	11.75	22.39
Guinea-Bissau	13.47	34.41
Guyana	13.08	49.69
Haiti	6.56	18.98
Honduras	7.46	31.25
Hong Kong	0.00	0.00
Hungary	3.56	3.85
Iceland	4.22	43.01
India	18.25	60.78
Indonesia	7.82	39.14
Ireland	3.71	4.00
Israel	6.27	64.21
Italy	4.13	4.50
Jamaica	10.44	53.14
Japan	4.04	7.78
Jordan	14.96	16.97
Kenya	15.51	74.64
South Korea	14.28	80.63
Kuwait	5.08	94.92
Kyrgyzstan	4.94	5.38
Lao People's Democratic Republic	12.21	24.75
Latvia	3.30	3.52
Lesotho	8.64	70.38
Lithuania	3.40	3.80

Luxembourg	2.87	3.05
Macao	0.00	0.00
Malawi	15.25	72.05
Malaysia	7.10	23.86
Maldives	18.10	69.87
Mali	12.57	38.32
Malta	3.43	3.70
Mauritania	10.32	21.55
Mauritius	7.49	93.38
Mexico	13.84	29.26
Moldova	6.28	5.69
Mongolia	5.01	15.20
Morocco	21.00	35.17
Mozambique	12.50	80.90
Myanmar	6.23	111.40
Namibia	9.19	53.01
Nepal	13.85	24.20
Netherlands	4.27	4.75
New Zealand	2.98	23.52
Nicaragua	6.94	40.13
Niger	13.16	52.25
Nigeria	17.33	96.07
Norway	4.05	5.78
Oman	5.13	20.96
Pakistan	16.29	60.00
Panama	9.02	29.32
Papua New Guinea	5.99	46.22
Paraguay	12.51	22.45
Peru	8.36	23.20
Philippines	7.34	33.68
Poland	4.01	4.39
Portugal	4.26	4.51
Qatar	5.32	22.99
North Macedonia	8.61	9.88
Russia	8.30	4.79
Rwanda	17.38	79.10
Saint Kitts and Nevis	12.43	85.90
Saint Lucia	11.65	94.90
Saint Vincent and the Grenadines	10.81	97.09
Samoa	11.88	17.44
Saudi Arabia	5.81	11.01
Senegal	13.37	16.63
Sierra Leone	14.02	35.64
Singapore	0.00	9.02
Slovakia	3.24	3.43

Slovenia	3.33	3.64
Solomon Islands	11.01	73.33
South Africa	9.18	50.67
Spain	4.41	4.74
Sri Lanka	13.14	33.17
Suriname	11.08	11.91
Sweden	3.96	4.32
Switzerland	0.00	0.00
Taiwan	6.26	20.06
Tajikistan	8.28	5.44
Tanzania	15.12	104.73
Thailand	12.76	28.27
Togo	13.49	66.73
Tonga	12.43	6.18
Trinidad and Tobago	10.23	62.73
Tunisia	26.57	48.15
Turkey	10.89	41.42
Uganda	13.97	58.05
Ukraine	5.70	6.89
United Arab Emirates	5.60	18.19
United Kingdom	4.21	4.66
United States of America	5.91	14.63
Uruguay	12.73	21.99
Vanuatu	9.45	43.29
Venezuela	13.80	31.95
Viet Nam	11.83	16.83
Zambia	15.67	83.31
Zimbabwe	19.50	76.15
Total	8.48	25.11

Table 2: Exporter sector characteristics

Exporter	Number of Exporters	Mean Exports per Exporter	Median Exports per Exporter	Share of Top 5% Exporters	Entry Rate	Exit Rate	Entrant Survival Rate (1st year)
Albania	4.429843	192,286.30	90,449.18	22.79%	68.22%	65.24%	24.62%
Bangladesh	14.47318	210,881.40	91,982.49	17.99%	63.04%	60.30%	29.17%
Bolivia	2.952474	1,018,687.00	611,283.10	17.55%	52.60%	52.82%	31.90%
Botswana	7.169398	2,570,453.00	1,816,753.00	47.40%	77.91%	75.40%	17.12%
Bulgaria	10.99179	168,445.10	57,238.30	35.08%	63.98%	60.88%	28.84%
Burkina Faso	1.958271	637,439.60	373,700.50		77.13%	75.36%	17.55%
Cambodia	4.223552	201,505.30	99,880.54	13.94%	70.88%	67.86%	25.01%
Cameroon	3.678373	356,444.50	202,988.50	20.44%	67.29%	67.70%	18.94%
Chile	9.347202	1,934,750.00	990,282.30	23.23%	50.38%	49.79%	32.59%
Colombia	11.65726	369,189.90	122,521.40	29.52%	52.58%	51.72%	30.64%
Costa Rica	7.181177	367,492.10	96,559.42	35.87%	58.06%	54.96%	28.85%
Croatia	9.221936	288,106.50	114,726.40	41.56%	60.58%	56.18%	27.18%
Côte d'Ivoire	3.52263	699,075.40	346,823.50		59.77%	63.32%	22.66%
Denmark	24.62843	245,728.10		39.91%	46.81%	44.66%	49.83%
Dominican Republic	4.644691	361,998.90	185,248.00	36.38%	66.90%	63.25%	24.09%
Ecuador	6.341792	332,419.60	136,942.00	20.96%	61.40%	59.51%	28.02%
Egypt	6.465655	517,680.60	223,697.10	21.89%	60.09%	59.67%	28.62%
El Salvador	8.394526	179,594.40	58,584.62	28.59%	60.69%	60.71%	26.52%
Eswatini	9.265938	615,048.80	457,798.50	38.21%			
Gabon	5.284567	513,611.00	275,882.50	21.37%	58.13%	54.18%	31.45%
Georgia	2.663196	239,610.40	135,127.80	23.07%	76.69%	73.54%	19.46%
Guatemala	9.656154	254,787.90	126,885.80	33.24%	67.17%	66.10%	21.42%
Guinea	1.622651	1,084,156.00	211,966.70		78.76%	74.73%	16.16%
Jordan	3.335927	393,614.90	227,513.90	35.27%	62.08%	58.89%	28.80%
Kenya	5.929146	156,718.80	64,139.01	25.75%	70.79%	69.88%	18.58%
Kuwait	6.283572	192,030.00	74,875.40	37.58%	82.62%	82.30%	
Kyrgyzstan	1.426847	1,324,810.00	1,127,300.00		63.68%	63.89%	22.76%
Malawi	2.565372	430,656.50	299,912.20	27.60%	77.32%	79.18%	11.96%
Mali	1.67968	997,265.80	735,319.20		72.84%	71.67%	21.39%
Mauritius	2.843857	247,194.10	102,558.70	22.16%	60.95%	60.51%	23.75%
Mexico	27.50166	355,688.70	86,045.02	38.33%	56.25%	53.92%	30.56%
Morocco	6.839418	567,810.10	309,362.00	29.91%	64.55%	63.40%	23.72%
Myanmar	5.742246	441,456.70	171,040.80	12.01%	78.44%	70.26%	22.48%
Nepal	6.18028	110,033.70	49,492.66	14.08%	67.57%	68.05%	23.51%
Nicaragua	4.450949	406,056.60	244,938.80		63.67%	61.85%	26.39%
Niger	2.035019	2,215,382.00	2,200,382.00		73.23%	70.76%	18.12%
Norway	18.53192	536,912.10	181,904.90	37.74%	55.42%	54.81%	25.74%
Pakistan	15.28923	88,999.70	38,738.52	21.34%	71.84%	69.47%	22.62%
Paraguay	2.713231	1,361,222.00	812,856.90		43.66%	46.00%	36.46%
Peru	8.450307	559,138.20	210,084.90	29.80%	60.28%	58.10%	28.11%

Portugal	19.82088	237,332.70	24,997.60	28.14%	55.44%	52.11%	31.65%
North Macedonia	3.678849	234,912.80	119,293.20	38.38%	62.97%	58.37%	28.08%
Rwanda	1.965725	155,807.10	86,472.15		84.56%	82.62%	14.19%
Senegal	2.44706	169,249.00	97,983.51		67.99%	67.02%	20.69%
South Africa	20.33566	335,085.40	71,433.50	36.01%	63.27%	63.38%	23.99%
Spain	54.78689	255,809.00	26,266.84	32.07%	51.20%	48.02%	35.01%
Sri Lanka	7.494714	181,365.50	67,874.30	24.45%			
Tanzania	2.734991	345,611.40	170,073.60		74.79%	74.22%	17.29%
Thailand	29.44702	324,863.70	47,232.81	34.33%	48.88%	51.25%	29.12%
Uganda	2.796546	259,227.60	127,590.50		73.91%	69.77%	21.11%
Uruguay	3.278213	417,793.70	215,739.10	13.08%	53.75%	52.12%	32.10%
Zambia	2.648833	1,131,243.00	491,947.10	52.52%	73.33%	70.43%	18.37%
Average	15.87665	414,306.60	164,726.90	32.58%	59.94%	58.17%	27.79%

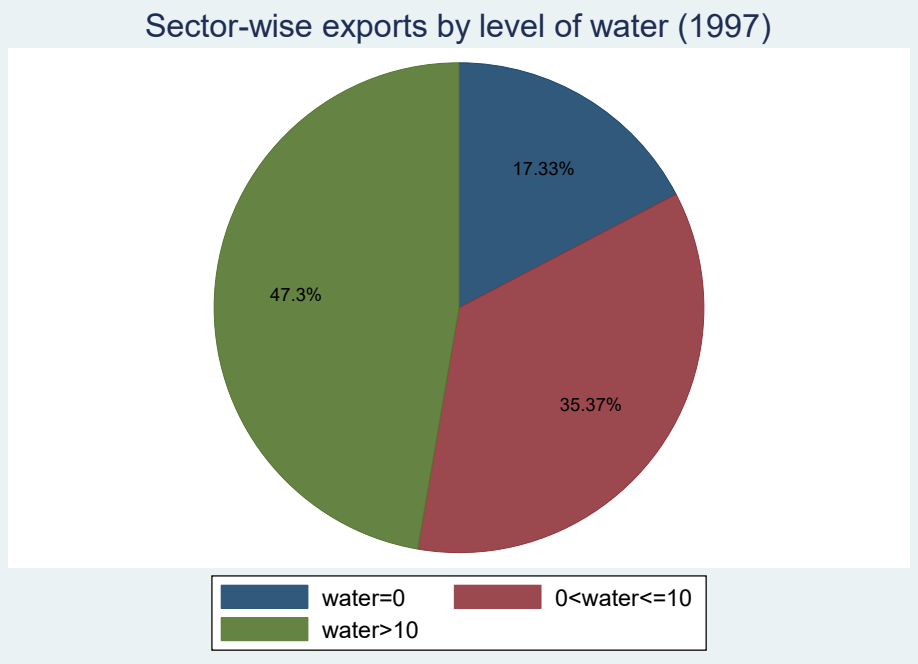

Figure 1: Sector-wise exports by level of water in 1997

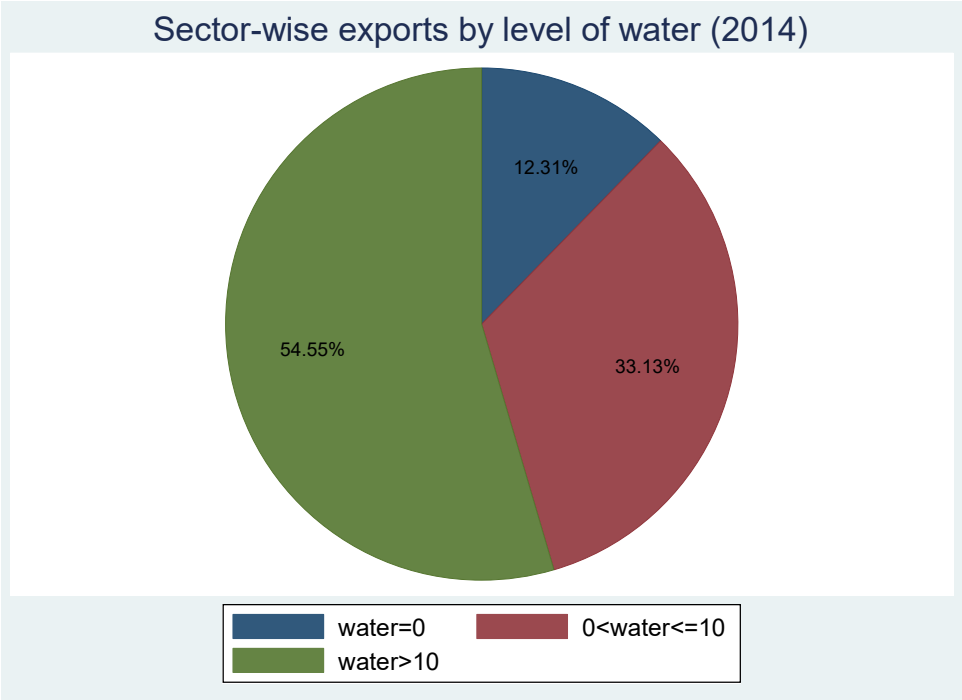

Figure 2: Sector-wise exports by level of water in 2014

Table 3: Descriptive statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Number of firms	1,287,735	15.79596	77.59976	0	7624
Mean value of exports	689,454	411488.3	5365069	$1.43*10^{-4}$	$1.72*10^{9}$
Binding Overhang	1,200,464	24.87021	54.08834	0	2964.043
Applied tariffs	1,280,671	8.447339	19.41416	0	1726
Maximum Bound rate	1,200,971	32.88234	63.54201	0	3000

Table 4: Effect of binding overhang on the intensive and extensive margin of trade with one-dimensional FE
(inclusive and exclusive of zero exporters for extensive margin)

Variables	(1) Extensive ln(1+Y)	(2) Extensive ln(Y)	(3) Intensive ln(Y)	(4) Extensive ln(1+Y)	(5) Extensive ln(Y)	(6) Intensive ln(Y)
lnwater	-0.246***	-0.308***	0.374***	-0.240***	-0.282***	-0.325***
	(0.005)	(0.006)	(0.014)	(0.005)	(0.006)	(0.014)
lnapplied	-1.038***	-1.239***	-0.627***	-1.329***	-1.576***	-0.392***
	(0.017)	(0.021)	(0.041)	(0.022)	(0.027)	(0.041)
Rta_wto	0.728***	0.799***	0.729***	0.790***	0.873***	0.710***
	(0.003)	(0.003)	(0.006)	(0.002)	(0.003)	(0.005)
Year fixed-effects	Yes	Yes	Yes	No	No	No
Sector fixed-effects	No	No	No	Yes	Yes	Yes
Observations	1,200,461	1,046,390	651,765	1,200,461	1,046,390	651,765
R-squared	0.092	0.092	0.029	0.158	0.165	0.191

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Effect of binding overhang on the intensive and extensive margin of trade with one-dimensional FE
(inclusive and exclusive of zero exporters for extensive margin)

Variables	(1) Extensive ln(1+Y)	(2) Extensive ln(Y)	(3) Intensive ln(Y)	(4) Extensive ln(1+Y)	(5) Extensive ln(Y)	(6) Intensive ln(Y)
lnwater	-0.309***	-0.351***	-0.272***	0.053***	0.060***	0.070***
	(0.005)	(0.006)	(0.014)	(0.006)	(0.007)	(0.018)
lnapplied	-1.153***	-1.317***	0.044	-0.841***	-0.955***	-0.779***
	(0.020)	(0.024)	(0.041)	(0.018)	(0.022)	(0.048)
Rta_wto	0.794***	0.890***	0.595***	0.894***	1.012***	0.739***
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Sector fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Exporter fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Importer fixed-effects	No	No	No	Yes	Yes	Yes
Observations	1,200,461	1,046,390	651,765	1,200,461	1,046,390	651,765
R-squared	0.301	0.307	0.248	0.404	0.413	0.288

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Effect of binding overhang on the intensive and extensive margin of trade with joint FE (inclusive and exclusive of zero exporters for extensive margin)

Variables	(1) Extensive ln(1+Y)	(2) Extensive ln(Y)	(3) Intensive ln(Y)	(4) Extensive ln(1+Y)	(5) Extensive ln(Y)	(6) Intensive ln(Y)
lnwater	-0.017	-0.036	1.151***	-0.240***	-0.286***	-0.352***
	(0.021)	(0.026)	(0.073)	(0.011)	(0.013)	(0.027)
lnapplied	-0.432***	-0.591***	-0.702***	-1.331***	-1.558***	-0.326***
	(0.044)	(0.054)	(0.153)	(0.082)	(0.096)	(0.081)
Rta_wto	0.097***	0.145***	0.197***	0.800***	0.884***	0.715***
	(0.014)	(0.015)	(0.030)	(0.011)	(0.011)	(0.013)
Exporter-importer fixed effects	Yes	Yes	Yes	No	No	No
Sector-year fixed effects	No	No	No	Yes	Yes	Yes
Observations	1,200,461	1,046,390	651,765	1,200,461	1,046,390	651,765
R-squared	0.001	0.002	0.006	0.111	0.112	0.030
Number of exporter-importer clusters	6,535	6,498	5,035			
Number of sector-year clusters				1,710	1,710	1,710

Cluster-robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7: Effect of binding overhang on the intensive and extensive margin of trade with joint FE (inclusive and exclusive of zero exporters for extensive margin)

Variables	(1) Extensive ln(1+Y)	(2) Extensive ln(Y)	(3) Intensive ln(Y)	(4) Extensive ln(1+Y)	(5) Extensive ln(Y)	(6) Intensive ln(Y)
lnwater	-0.289***	-0.342***	0.431***	-0.350***	-0.392***	-0.280***
	(0.034)	(0.037)	(0.053)	(0.024)	(0.027)	(0.042)
lnapplied	-0.865***	-1.010***	-0.338**	-1.236***	-1.419***	-0.038
	(0.067)	(0.077)	(0.132)	(0.086)	(0.100)	(0.118)
Rta_wto	0.717***	0.800***	0.582***	0.844***	0.955***	0.725***
	(0.018)	(0.020)	(0.034)	(0.012)	(0.013)	(0.021)
Exporter-year fixed effects	Yes	Yes	Yes	No	No	No
Exporter-sector fixed effects	No	No	No	Yes	Yes	Yes
Observations	1,200,461	1,046,390	651,765	1,200,461	1,046,390	651,765
R-squared	0.085	0.086	0.014	0.142	0.146	0.032
Number of exporter-year clusters	468	468	468			
Number of exporter-sector clusters				4,711	4,709	4,377

Cluster-robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8: Effect of binding overhang on the intensive and extensive margin of trade with joint FE (inclusive and exclusive of zero exporters for extensive margin)

Variables	(1) Extensive ln(1+Y)	(2) Extensive ln(Y)	(3) Intensive ln(Y)
lnwater	-0.092***	-0.141***	1.089***
	(0.013)	(0.016)	(0.051)
lnapplied	-0.870***	-1.056***	-1.420***
	(0.047)	(0.056)	(0.103)
Rta_wto	0.842***	0.928***	0.939***
	(0.013)	(0.015)	(0.024)
Importer-year fixed effects	Yes	Yes	Yes
Observations	1,200,461	1,046,390	651,765
R-squared	0.082	0.080	0.034
Number of importer-year clusters	2,199	2,197	2,191

Cluster-robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9: Effect of binding overhang on the intensive and extensive margin of trade with multi-level FE (inclusive and exclusive of zero exporters for extensive margin)

Variables	(1) Extensive ln(1+Y)	(2) Extensive ln(Y)	(3) Intensive ln(Y)	(4) Extensive ln(1+Y)	(5) Extensive ln(Y)	(6) Intensive ln(Y)
lnwater	-0.023	-0.046*	1.137***	-0.309***	-0.351***	-0.278***
	(0.021)	(0.026)	(0.073)	(0.013)	(0.014)	(0.027)
lnapplied	-0.396***	-0.534***	-0.627***	-1.161***	-1.325***	0.034
	(0.044)	(0.054)	(0.154)	(0.076)	(0.088)	(0.075)
Rta_wto	0.015	0.016	0.048	0.795***	0.892***	0.599***
	(0.013)	(0.014)	(0.030)	(0.009)	(0.009)	(0.012)
Exporter-importer fixed effects	Yes	Yes	Yes	No	No	No
Sector-year fixed effects	No	No	No	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	N/A	N/A	N/A
Exporter fixed effects	N/A	N/A	N/A	Yes	Yes	Yes
Observations	1,200,461	1,046,390	651,765	1,200,461	1,046,390	651,765
R-squared	0.003	0.006	0.009	0.257	0.258	0.092
Number of exporter-importer clusters	6,535	6,498	5,035			
Number of sector-year clusters				1,710	1,710	1,710

Cluster-robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10 : Effect of binding overhang on the intensive and extensive margin of trade with multi-level FE
(inclusive and exclusive of zero exporters for extensive margin)

Variables	(1) Extensive ln(1+Y)	(2) Extensive ln(Y)	(3) Intensive ln(Y)	(4) Extensive ln(1+Y)	(5) Extensive ln(Y)	(6) Intensive ln(Y)
lnwater	-0.346***	-0.390***	-0.292***	-0.306***	-0.348***	-0.279***
	(0.024)	(0.027)	(0.043)	(0.035)	(0.038)	(0.035)
lnapplied	-1.250***	-1.422***	0.007	-1.148***	-1.314***	0.048
	(0.086)	(0.101)	(0.119)	(0.077)	(0.087)	(0.113)
Rta_wto	0.848***	0.956***	0.718***	0.803***	0.901***	0.592***
	(0.012)	(0.013)	(0.021)	(0.021)	(0.023)	(0.032)
Exporter-sector fixed effects	Yes	Yes	Yes	No	No	No
Exporter-year fixed effects	No	No	No	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	N/A	N/A	N/A
Sector fixed effects	N/A	N/A	N/A	Yes	Yes	Yes
Observations	1,200,461	1,046,390	651,765	1,200,461	1,046,390	651,765
R-squared	0.142	0.146	0.035	0.195	0.204	0.192
Number of exporter-sector clusters	4,711	4,709	4,377			
Number of exporter-year clusters				468	468	468

Cluster-robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11 : Effect of binding overhang on the intensive and extensive margin of trade with multi-level FE
(inclusive and exclusive of zero exporters for extensive margin)

Variables	(1) Extensive ln(1+Y)	(2) Extensive ln(Y)	(3) Intensive ln(Y)	(4) Extensive ln(1+Y)	(5) Extensive ln(Y)	(6) Intensive ln(Y)
lnwater	-0.015	-0.025*	-0.005	-0.022*	-0.049***	1.147***
	(0.011)	(0.013)	(0.027)	(0.012)	(0.015)	(0.056)
lnapplied	-1.211***	-1.407***	-1.439***	-0.548***	-0.657***	-0.902***
	(0.082)	(0.094)	(0.106)	(0.029)	(0.033)	(0.106)
Rta_wto	0.935***	1.038***	0.914***	0.793***	0.893***	0.745***
	(0.015)	(0.017)	(0.022)	(0.013)	(0.014)	(0.019)
Importer-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Exporter fixed effects	No	No	No	Yes	Yes	Yes
Sector fixed effects	Yes	Yes	Yes	No	No	No
Observations	1,200,461	1,046,390	651,765	1,200,461	1,046,390	651,765
R-squared	0.176	0.183	0.204	0.235	0.233	0.088
Number of importer-year clusters	2,199	2,197	2,191	2,199	2,197	2,191

Cluster-robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 12 : Effect of binding overhang on the intensive and extensive margin of trade with multi-level FE
(inclusive and exclusive of zero exporters for extensive margin)

VARIABLES	(1) Extensive ln(1+Y)	(2) Extensive ln(Y)	(3) Intensive ln(Y)	(4) Extensive ln(1+Y)	(5) Extensive ln(Y)	(6) Intensive ln(Y)
lnwater	0.071***	0.086***	0.108**	-0.013	-0.021*	-0.015
	(0.020)	(0.024)	(0.051)	(0.009)	(0.011)	(0.025)
lnapplied	-0.675***	-0.813***	-0.651***	-1.215***	-1.421***	-1.419***
	(0.050)	(0.060)	(0.131)	(0.088)	(0.103)	(0.105)
fta_wto	0.110***	0.155***	0.232***	0.921***	1.022***	0.897***
	(0.015)	(0.016)	(0.030)	(0.013)	(0.013)	(0.017)
Exporter-importer fixed effects	Yes	Yes	Yes	No	No	No
Sector-year fixed effects	No	No	No	Yes	Yes	Yes
Sector fixed effects	Yes	Yes	Yes	N/A	N/A	N/A
Importer fixed effects	N/A	N/A	N/A	Yes	Yes	Yes
Observations	1,200,461	1,046,390	651,765	1,200,461	1,046,390	651,765
R-squared	0.293	0.315	0.196	0.181	0.184	0.081
Number of exporter-importer clusters	6,535	6,498	5,035			
Number of sector-year clusters				1,710	1,710	1,710

Cluster-robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 13: Effect of binding overhang on the intensive and extensive margin of trade with three-dimensional FE
(inclusive and exclusive of zero exporters for extensive margin)

Variables	(1) Extensive ln(1+Y)	(2) Extensive ln(Y)	(3) Intensive ln(Y)
lnwater	-0.344***	-0.388***	-0.312***
	(0.008)	(0.009)	(0.016)
lnapplied	-1.249***	-1.427***	-0.006
	(0.028)	(0.034)	(0.046)
Rta_wto	0.863***	0.976***	0.714***
	(0.004)	(0.005)	(0.008)
Constant	1.413***	1.258***	10.119***
	(0.003)	(0.003)	(0.005)
Exporter-sector-year fixed effects	Yes	Yes	Yes
Observations	1,200,461	1,046,390	651,765
R-squared	0.146	0.150	0.032
Number of exporter-sector-year clusters	41,303	40,475	36,183

Cluster-robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 14: Effect of binding overhang on the intensive and extensive margin of trade with three-dimensional FE
(inclusive and exclusive of zero exporters for extensive margin)

Variables	(1) Extensive ln(1+Y)	(2) Extensive ln(Y)	(3) Intensive ln(Y)	(4) Extensive ln(1+Y)	(5) Extensive ln(Y)	(6) Intensive ln(Y)
lnapplied	-2.831***	-3.236***	-1.922***	-1.205***	-1.401***	-0.313***
	(0.120)	(0.141)	(0.272)	(0.024)	(0.030)	(0.047)
fta_wto	0.810***	0.879***	0.810***	0.807***	0.925***	0.658***
	(0.013)	(0.014)	(0.027)	(0.004)	(0.005)	(0.008)
Constant	1.724***	1.608***	10.243***	1.311***	1.144***	10.035***
	(0.008)	(0.010)	(0.020)	(0.002)	(0.003)	(0.005)
Zero binding overhang	Yes	Yes	Yes	No	No	No
Exporter-sector-year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	138,152	127,262	85,724	1,142,516	985,366	599,545
R-squared	0.078	0.075	0.022	0.110	0.114	0.025
Number of exporter-sector-year clusters	23,900	21,729	16,075	41,480	40,687	36,125

Cluster-robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Robustness

Table 15: Effect of binding overhang on the extensive margin of trade

Variable	(1) y_{xk}	(2) y_{xk}	(3) y_{xk}	(4) y_{xk}
$\Delta\ln(1+\text{water}_k)$	-0.168***	-0.177***	-0.194	-0.181
	(0.063)	(0.064)	(0.202)	(0.308)
Status12_{xk}	0.123***	0.102***	0.102***	0.099***
	(0.011)	(0.011)	(0.011)	(0.011)
$\Delta\ln(1+\text{MFN}_k)$			-0.021	
			(0.231)	
Exporter fixed effects	No	Yes	Yes	Yes
Observations	16,259	16,259	16,259	14,099
R-squared	0.017	0.078	0.078	0.080

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 16: Effect of binding overhang on the intensive margin of trade

Variables	(1) $\Delta ln(y_{xk})$	(2) $\Delta ln(y_{xk})$	(3) $\Delta ln(y_{xk})$	(4) $\Delta ln(y_{xk})$
$\Delta \ln(1 + \text{water}_k)$	0.715	0.435	-1.862	-4.091
	(0.984)	(1.014)	(2.295)	(2.662)
$\Delta \ln(1 + \text{MFN}_k)$			-2.746	
			(2.498)	
Exporter fixed effects	No	Yes	Yes	Yes
Observations	14,136	14,136	14,136	12,205
R-squared	0.000	0.041	0.041	0.043

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Sample selection criteria

For the robustness check, the sample consists of Vietnam and the periods of 2012 and 2018, based on three criteria : firstly, on the country's development status; secondly, on the country's recency in accession to WTO; lastly, the recency of the time period. A developing country would permit non-zero binding overhang to be leveraged in the method[62]. Moreover, less developed countries upon accession witness some differential treatment and flexibility so they can adjust over time—meaning that the bindings are higher. Differential treatment towards less developed economies can even be witnessed in the precursor of WTO, in article XVIII of GATT. In addition, Vietnam has one of the relatively recent accessions to WTO; the bindings are well applicable and less likely to be redundant when compared to the accessions in 1995. Also, for the earlier subset, many countries are likely to have witnessed substantial changes in their economy; National income, consumer tastes etc. may change affecting the import demand and therefore, the old negotiated bound rates may hold less relevance concealing the 'effective' ceiling rates . Finally, the repeated cross-section pertains to 2012 and 2018, the recency of the periods likely warrants superior statistical collection of customs data and is relevant for the present period. Additionally, note that the trade value reporting

[62] I performed the same method first for US, it turned out however, that the bound rates and applied were the same, giving no scope to use binding overhang.

errors vary negatively with income per capita — for instance, the with the expansion of income per capita of Vietnam over time, better statistics and larger trade values mean that misreporting is unlikely. All in all, for the purpose of robustness check of the methodology as well as in deducing consistent results for the intensive and extensive margin of trade, Vietnam's repeated cross-sectional in 2012 and 2018 serve best.

Data sources

For the data, disaggregated import flows (6-digit) are extracted from the World Integrated Trade Solution (WITS) portal, from the UNCTAD TRAINS database. Applied tariff data is also at obtained from UNCTAD TRAINS via WITS at the 8-digit level. The TRAINS dataset also includes preferential rates and information on country eligibility. Lastly, the data on tariff bindings at the 8-digit level are obtained from WTO's consolidated tariff schedules(CTS) accessed through the Tariff On-line database.

Threshold level

A threshold level (1000 USD) restrictive definition is adopted for four reasons. Firstly, this method is most often used in the case of preferential trade agreements or multilateral negotiation rounds, given the scope of this research, it is applied to a period that did not witness a substantial change because of unavailability of bound rates prior to a exogenous change therefore, a threshold has to adopted because purely zero trade and positive for the consistently traded MFN sample is not observed. Secondly, a non-zero threshold avoids misclassifications and reporting errors by the administrative bodies, as unreported trade flows might be falsely considered as zero and therefore non-zero threshold facilitates in gauging aptly by pointing changes in the import values (Bachetta et al., 2008). Moreover, in forming consistent samples(same 6-digit codes), the extensive margin of trade would be substantially underestimated because completely new goods with a completely new 6-digit code are not part of the consistent sample and omitted (Moncarz,2010).Thus, the threshold level definition augments the new product subset. Lastly, nation level imports of less than 1000US for exporter-product pair could be considered close to negligible for Vietnam which on average imports more 200 billion US of commodities.

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