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The Impact of the EVFTA - Analysizing Trade Flows and Welfare Implications using Partial Equilibrium Modelling in GAMS programming language

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1 Introduction

Over the course of history, international trade has been an important element of national economic policy. Trade helps boost the economic growth by allowing citizens to access goods and services from around the globe, as well as allowing the export of one nation's specialities to different markets according Ricardo's idea. These mutual and interdependent relations have been an engine for prosperity and improvement of standard of living; for example, it has lifted more than one billion people out of the poverty line since 1990 (World Bank 2022). From 1820 onwards, economic and political liberalizations have resulted in a gradual decline in extreme poverty (Bourguignon and Morrisson 2002). To be more optimistic about the positive effect of international trade, this trend even accelerated. While taking over 160 years to halve the extreme poverty rate, the global poverty actually plummeted from 42 % in 1981 to 8.6 % in 2018, despite a strong population growth in the world (World Bank 2024a).

The last three decades have shown a noticeable increase in the ratification of trade agreements, manifesting through both goods and service agreements (figure 1). Hence, examining the costs and benefits inherent in trade agreements concerning both intra-and extra-agreement countries holds significant importance for policymakers and trade participants. This analysis aids in making informed decisions and devising effective business strategies. In this paper, we will have a look at the European Union - Vietnam Free Trade Agreement (EVFTA) that was entered into force in August 2020. The European Union functions as one single market, consists of 27 country members and has the total population of approximately 450 million inhabitants. Their economic output in 2022 is roughly 16.7 trillion dollars, putting them only behind China and the United States (World Bank 2024b). Furthermore, the EU27 represents approximately 14 % of global trade in goods, placing it ahead of the United States but trailing behind China in this regard (European Union 2024). Prominent trade partners of the EU are situated in regions like Southeast Asia. This collective group of countries, Association of South East Asian Nations (ASEAN), stands as the EU's third-largest trading partner, following

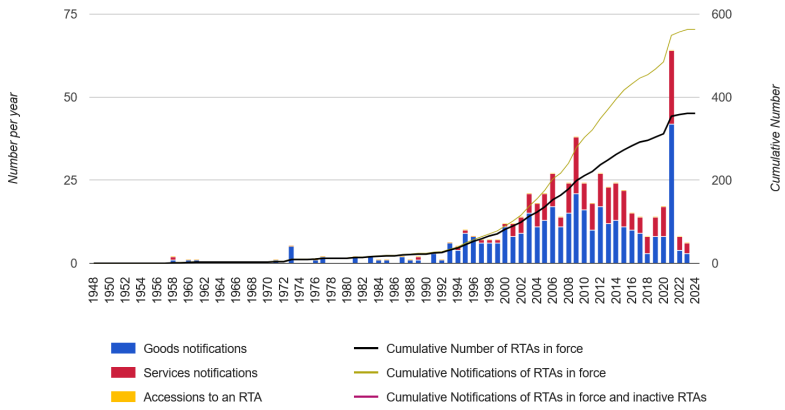

Figure 1: Evolution of Regional Trade Agreements from 1984 to 2024 (WTO 2024)

the US and China. The European Union exhibits substantial trade engagement, particularly with Singapore and Vietnam, as of 2022 (European Parliament 2023). Vietnam is an emerging economy like many ASEAN countries with the population of approximately 100 million inhabitants in an area comparable to Germany. The country has seen a big leap in economic growth since its integration into the international market after the economic reforms starting from 1986 (CIA 2024). Alongside its young population and growing middle class, the country is a significant actor in the region's economic landscape (McKinsey 2024). Notably, the export of EU goods to Vietnam has demonstrated consistent growth, reaching a cumulative value of 12.7 billion euros in goods export in 2022 from 4.9 billion euros in 2012. However, of significant importance is the EU's considerable import of goods from Vietnam, surpassing the EU's exports, with a valuation ranging from 15.8 billion in 2012 to 51.6 billion euros in 2022 (European Commission 2023). This trade dynamic underscores the significance and depth of the bilateral trade relationship between the European Union and Vietnam. The recently ratified trade agreement between the two entities potentially extends beyond economic advantages, catalyzing a notable social transformation in Vietnam. This is due to the enhancements in the FTA's labor clauses in Vietnam, a prerequisite imposed by the EU during the negotiation phase, as highlighted in Marslev and Staritz 2023. The envisioned success of this accord not only sets a precedent but also stands as a potential model for the ongoing FTA negotiations between the EU and other Southeast Asian nations. If proven successful, the EVFTA could become a cornerstone in further negotiations, with the potential to extend to an FTA including all ASEAN countries as well as the EU(European Union 2023).

Numerous academic papers have undertaken comprehensive assessments of Vietnam's trade policy impacts since the early 2000s, this time period aligns with the nation's integration into the global market. Important milestone of Vietnam's integration were studied and documented, including the grant of the Most Favored Nation status (MFN) by the US to Vietnam after a two-decade hiatus in bilateral trade relations (W. J. Martin and Fukase 1999), Vietnam's entrance into the ASEAN Free Trade Area (FTA) (Fukase and W. J. Martin 1999) and Vietnam becoming a member state of the World Trade Organization (WTO) in 2007 (Roland-Holst et al. 2002; Dimaranan, Duc, and W. Martin 2005; Vanzetti and Huong 2006; Valin and Boumellassa 2008; Doanh and Heo 2009). Prior literature concerning the European Union-Vietnam Free Trade Agreement (EVFTA) emphasizes the agreement's labor clause. The EU leveraged its negotiation power to press for improved labor and human rights conditions in Vietnam (Tran, Bair, and Werner 2017; Thu and Schweißhelm 2020; Sicurelli 2015; Marslev and Staritz 2023). However, little attention has been devoted to quantify the economic effects of this agreement, with only a handful of papers focusing on specific sectors. For instance, the study from Minh et al. 2021 has explored the impact on the meat market for both the EU and Vietnam. This analysis employed a partial equilibrium framework to assess global trade policy changes at the industry level. Additionally, studies like (Kikuchi, Yanagida, and Vo 2018) forecast structural change to Vietnam's economy at a bigger scale, involving multi-regional trade agreements like EVFTA, Trans-Pacific Partnership (TPP), CPTPP (TPP without the US), Regional Comprehensive Economic Partnership (RCEP), and the Free Trade Area of the Asia-Pacific (FTAAP). In essence, the findings from these studies showcased economic advantages for Vietnam, particularly evident in amplified exports within specific sectors like

rice, textiles, and apparel industries, coupled with enhanced productivity. However, certain sectors such as machinery, transportation equipment, and agriculture experienced contraction in this context.

Our paper aims to contribute to the literature of this agreement by assessing the effect of EVFTA. We employed the *Global Trade Analysis Project* (GTAP) database. The GTAP-database functions as a representation of the global economy, serving as a crucial input in contemporary applied equilibrium analyses concerning worldwide economic issues, widely utilized by numerous experts like Böhringer or Rutherford (GTAP 2015). The implementation of the trade model is based on the paper of T. F. Rutherford 2005 in the *General Algebraic Modeling Language* (GAMS) program. We used the GTAP 9 data with the benchmark year set to 2011, as the FTA negotiation between EU and Vietnam started on October 2010 (Russell 2018). There are 140 regions that are aggregated from 244 countries along with 57 commodities (Narayanan and McDougall 2015). In this paper, we first aggregate the GTAP database to only 3 regions - Vietnam, European Union and the Rest of The World (ROW). The aggregation is based on the International Standard Industrial Classification of All Economic Activities (ISIC) Rev 3.1 that was used in the GTAP 9 database. Factor of production is aggregated to 3 elements - labor, capital and resources including land. We take this aggregation as the default for our investigation. This minimalistic design allows us to have a basic understanding of the relationship between Vietnam and the EU before and after the introduction of an FTA, whereby tariffs on imports within the FTA are set to zero. Unaffected trade relations outside the FTA will remain at business as usual level (BAU). After subsequent aggregation of imports, exports, price of imports and exports, world market price for the corresponding regions, the social surpluses are calculated on the producers and consumers. As a result, Vietnam gains noticeable benefit thanks to the FTA, while the gain for the EU is ambiguous, our simulation shows a very small loss in economic welfare (0.076% decrease in welfare). However, this loss is not large enough to give any meaningful interpretation and is mostly driven by the lack of tariff income. Further sensitivity check were also conducted to verify the robustness of the results by adapting the export supply and import demand elasticities to a 50% lower and 50% higher level, which we will call scenario "l" and "h" respectively. Overall, the results with scenario "l" and "h" confirm the validity of the baseline result (subsection 3.2).

The partial equilibrium (PE) model involves equalizing supply and demand while treating numerous factors as exogenous. These exogenous factors include prices in different markets, agents' incomes, preferences, technology (Board 2009), as well as elasticities of import demand and export supply. This approach only describes a limited scope of the economy, therefore it is very suitable to examine the issue in isolation, such as the impact of the EVFTA on the EU and Vietnam. Furthermore, the PE model assumes the homogeneity of goods and does the analysis *ex ante*, thus provides a snapshot of what could potentially happen after the kick-in of the EVFTA. At the moment of the ratification of the FTA in 2020, Vietnam agreed to remove 65% of duties towards EU exports and will remove the rest of the duties gradually until 2030. Similarly, the European Union intends to gradually eliminate all tariffs on imports originating from Vietnam, currently 84 % of the tariffs are already removed. The tariff-removal process of the EU is expected to be concluded by 2027. The analysis of this paper will be done with the total implementation of the EVFTA in mind. It could serve as a blueprint for the policymakers and the economy of both sides to facilitate and plan their trade partnership. The paper will be divided in four sections, the first section 1 provides the context of the EVFTA as well as literature review and a short résumé of the paper. The second section 2 will detail the model description along with the baseline and policy scenarios of our analysis. The corresponding results will be discussed in the third part of the paper (section 3). And finally, the conclusion 4 will provide a quick overview of what has been achieved through this paper, the implication of the results and suggestion for further analysis.

2 Model description and scenarios

2.1 Model description

The PE model, on which our analysis is based on, was created by T. F. Rutherford 2005. We extend this fitting it to be able to use data from the GTAP-database (here Version 9 was used) that has been aggregated to three regions and 57 sectors and applying it to a real-world policy – the Free-Trade-

Agreement between the EU and Vietnam.

Its basis is a Global Multiregional Model of trade which fundamentally consists of a Vinerian Trade model with Armington representation of trade. Using the Armington representation goods stemming from different regions are imperfect substitutes so that import and export of a good can happen simultaneously in one region, which mirrors the real-world trading-patterns nicely. Also, these assumptions give rise to a dynamic where each countries' production and consumption affects the world price of a good(Lanz and T. F. Rutherford 2016, p. 5).

The conditions applied in the model show some distinct features. First, the problem is formulated as a mixed complementarity problem (MCP). This means that the model consists of inequalities which, by means of complementary slackness, are connected to variables. The MCP setup offers greater clarity for interpretation than for example a non-linear program would and models economic contexts well (Böhringer, T. Rutherford, and Wiegard 2003).

Secondly, the model conditions are displayed in calibrated share form which not only allows for better clarity and higher efficiency due to forgoing the inversion step that would be necessary in coefficient form, but also and most importantly makes the model's calibration easier. Using the calibrated share form requires data that displays a base (reference) period which matches our data at hand (Böhringer, T. Rutherford, and Wiegard 2003).

Lastly, using CES (constant elasticity of substitution) functions enables the use of a singular value for each elasticity whilst still yielding good flexibility (Lanz and T. F. Rutherford 2016). When thinking about the data requirements for such a model we have to think about all exogenous parts. In our case, these are (baseline) quantities, reference prices and tariff rates, which are all included in the aggregated GTAP-Dataset and values for own-price elasticities of import demand and export supply that are crucial in simulating the regional trade levels. These two elasticities are chosen based on the recommendation of (Hillberry and Hummels 2013). The import demand elasticity is set to -5, using the median value found from the estimation with multiple importers in the dataset, whether it is panel or cross-sectional data. This value is much higher than the one with other suggested method of time series, which is 1. The author argued that in the long time with the market shock - EVFTA in this case, the firms will make the necessary adjustment, and the change to the market structure will be permanent. As for the export supply elasticity, the author cited several studies dealing with this topic. We chose the value for export supply elasticity of 4 from the study of (Simonovska and Waugh 2011), because of their consideration of bilateral trade costs at a larger scale.

What differentiates Partial Equilibrium Models from their General Equilibrium Counterpart is their focus on specific markets and their equilibrium conditions leading to a narrow scope which allows for distinct analyses of policy-induced effects such as in our case the change in import and export markets of our three modelled regions (EU, Vietnam, ROW). Our focus here is on the substitutional effects caused by the ratification of the EVFTA and the shifting of trading partners, be it import or export. However, it is necessary to view this only in the scope of the model – meaning, income effects induced by an FTA cannot be considered. Such second-round effects will likely play an important role, especially for the Vietnamese economy but are not the subject of this model. An extension to a General Equilibrium Model is a feasible step to take, if welfare implications are of interest. We focus on the substitutional patterns and their relative implications for which a Partial Equilibrium Model is well-suited.

Our model consists of a few kinds of conditions following T. F. Rutherford 2005. Since we are using an MCP-formulation, they are a set of weak inequalities with complementary slackness. This leads to an implicit connection between condition and variable. Starting with import demand, which is connected to import prices. This is the model's main demand condition which states that the combination of Imports (of a certain good i in region r) from sources in- and outside the FTA-zone is equal to the baseline demand times a price change term raised to the power of the import demand elasticity (strictly speaking greater or equal to since we are using the MCP-formulation, but in the

case of excess imports the associated price variable would drop, potentially to zero):

$$M(i,r) + MF(i,r) = md0(i,r) \cdot \left(\frac{PM(i,r)}{E(r) \cdot pm0(i,r)} \right)^{id(i,r)} \tag{1}$$

Next, the export supply condition states that the baseline export supply times a price change term to the power of the export supply elasticity is equal to (or greater than, since MCP) the export supply to both the non-FTA and FTA market. The associated variable here is the export price.

$$xs0(i,r) \cdot \left(\frac{PX(i,r)}{E(r)} \right)^{es(i,r)} = X(i,r) + XF(i,r) \tag{2}$$

The Market-Clearance condition states that over all regions imports and exports of goods have to balance out – meaning what gets exported by one party has to be imported by another. The associated variable here is the world market price. If export supply would exceed import demand for a given good i, prices would drop to fix the equilibrium (with complementary slackness prices would need to be zero then).

$$\sum_{r} (X(i,r) - M(i,r)) = 0 \tag{3}$$

We also construct this condition for within the FTA-zone, such that this market also balances out, here the associated variable is the price of the commodity within the FTA.

$$\sum_{r} (XF(i,r) - MF(i,r)) = 0 \tag{4}$$

The Current Account Balance condition states, initial trade deficits b of each region have to be met again, and no new deficit should be built up (connected to the exchange rate variable):

$$\sum_{i} \left[P(i) \cdot (X(i,r) - M(i,r)) + (PF(i,r) \cdot XF(i,r) - PF(i,r) \cdot MF(i,r)) \right] = b(r) \tag{5}$$

The next condition (rr is the trading partner region) ensures that imports of good i into region r are matched by exports from regions rr (all within the FTA-zone) connected to the shadow-price variable λ:

$$\sum_{rr \neq r} XF(i,rr) = MF(i,r) \tag{6}$$

The condition that matches world market price to import price looks the following and is connected to the import quantity variable.

$$P(i) \cdot (1 + t(i,r)) = PM(i,r) \tag{7}$$

Additionally, this condition also has to hold for the FTA region, here the shadow price λ enters the condition (the connected variable is the import quantity from the FTA-zone)

$$PF(i) + \lambda(i,r) = PM(i,r) \tag{8}$$

Together with the previous two conditions the next two form the set of equation which prevents arbitrage opportunities. Here, the export price is equal to the world market price of good i. This leads to a situation where there is no surplus to be gained from exporting goods as compared to selling domestically (the connected variable is the export quantity).

$$PX(i,r) = P(i) \tag{9}$$

Similarly, for within the FTA-zone such a condition also exists with the addition of the shadow price λ.

$$PX(i,r) = PF(i) + \sum_{r \neq rr} \lambda(i,rr) \tag{10}$$

Table 1: Regional and Sectoral Aggregation

Regional Aggregation

Country/Region	**Corresponding Economies/Regions in GTAP 9**
Vietnam	Vietnam
European Union	27 countries of the European Union as of 2011
Rest of the World (ROW)	All other countries/regions

Sectoral Aggregation

Sector	**Corresponding Sectors in GTAP 9**
Agriculture	pdf, wht, gro, v_f, osd, c_b, pfb, ocr, ctl, oap, rmk, wol, frs, fsh
Manufacturing	cmt, omt, vol, mil, pcr, sgr, ofd, b_t, tex, wap, lea, lum, ppp, oil, crp, nmm, i_s, nfm, fmp, mvh, otn, eeq, ome, omf
Service	trd, otp, wtp, atp, cmn, ofi, isr, obs, ros, osg
Rest of the Industries	The remaining sectors outside of the 56 in the GTAP 9 database

The sector abbreviations are listed on page 10 of Chapter 2 of the GTAP 9 documentation (Narayanan and McDougall 2015).

2.2 Baseline scenario

The baseline scenario is presented to describe the situation of the world economy without the EVFTA. Like mentioned above, we start with the economies of three regions - Vietnam, EU and ROW in the baseline year set to 2011. Table 2 provides an overview for the two economies without the EVFTA using the GTAP 9 data. Before the EVFTA. The EU has more substantial tariffs on the agriculture and manufacturing products from Vietnam than vice versa, with 6.1% for Vietnamese agricultural and 6.05% for manufacturing products; while Vietnam puts almost zero tariff on agricultural products and 4.958% on manufacturing products from the EU. As a developed region, the EU's agriculture and service sectors are also much more capital intensive than the Vietnamese counterpart's. Meanwhile, the manufacturing sectors on both parties stay on the similar level. The three other indicators give us the first impression on the weight of each sectors' export and import to the economy of each region as a whole. Vietnam's manufacturing plays an important role compared to the two other sectors, with its export constitutes for 18.5% of Vietnam's output, 29.3% of Vietnam's demand is covered by import. Furthermore, the necessary intermediate goods being imported for its production accounts for more than one-quarter of the output. This reflects the importance of the manufacturing sector to Vietnamese economy as one of the main drivers. Regarding the manufacturing sector of the EU, they export approximately 10.5% of their output and import about 14.8% to meet their demand, which is less than the Vietnamese economy, but overall this sector is also a key element in the EU international trade. The EU's agriculture has a lower ratio of export and import to total output and total demand ratios respectively when comparing to Vietnam. Comparatively, the EU is less dependent on the imported intermediate inputs to meet their demand of production across both agriculture and manufacturing sectors. Finally, the EU is both a provider and recipient of a substantial volume of services.

Additional information about the most noticeable individual sectors from two regions were also presented in the table, which are the original sectors from the GTAP 9 data. On one hand, for Vietnam, textile, wearing apparels and leather-related products are export-oriented industries. All of those three sectors have quite substantial tariffs with regard to the EU counterparts. On the other hand, Vietnam imports a lot of machinery, equipment and other industrial products in general. Hence, their tariff practice for the EU products in these sectors are quite low. For the EU, both the export and import are very concentrated on manufacturing of transport vehicles, machinery, equipment and other industrial components. Out of the three sectors, the EU put an especially high tariff on Vietnam's vehicles. Minds that the Vietnamese vehicle industry is not particularly important in 2011. Nevertheless, a drastic tariff reduction thanks to the EVFTA could incentivize its production in the long run.

Sector	Import tariff rate between EU & Vietnam (%)	Capital Labor Ratio	Export to Total Output (before taxes) ratio	Import to Total Demand ratio	Imported Intermediate Inputs to Total Output ratio
Vietnam (4 aggregated sectors)					
Agriculture	0.082	0.354	0.014	0.016	0.014
Manufacturing	4.958	1.067	0.185	0.293	0.253
Service	NA	0.643	0.013	0.022	0.016
ROI	NA	12.497	0	0	0
Vietnam (some noticeable sectors from original GTAP 9 data)					
Textiles (tex)	7.571	0.887	0.014	0.030	0.028
Wearing Apparels (wap)	9.009	1.384	0.023	0.003	0.003
Leather-related (lea)	10.610	0.931	0.020	0.004	0.003
Machinery & equipment (ome)	0.055	0.730	0.017	0.052	0.043
Chemicals, plastic, rubber manufacturing (crp)	0.925	0.812	0.012	0.047	0.040
EU (4 aggregated sectors)					
Agriculture	6.10	0.628	0.003	0.005	0.004
Manufacturing	6.05	0.899	0.105	0.148	0.115
Service	NA	0.78	0.032	0.043	0.032
ROI	NA	94.345	0	0	0
EU (some noticeable sectors from original GTAP 9 data)					
Transport manufacturing (mvh)	21.159	0.592	0.014	0.014	0.011
Machinery & Equipment (ome)	2.486	0.581	0.021	0.023	0.017
Chemicals, plastic, rubber manufacturing (crp)	3.024	1.075	0.021	0.025	0.019

Table 2: Comparison of Economic Indicators between Vietnam and EU

2.3 Policy scenarios

The EVFTA was ratified with the aim of removing 99% of the tariffs between Vietnam and the EU. Therefore, with the policy shock of EVFTA in our model, the tariffs between the EU and Vietnam will be set to zero, while the tariffs of the EU and Vietnam to the ROW remain the same. In this case, there will two global markets, which trade goods and services in- and outside the EVFTA.

3 Results

3.1 Aggregate and sectoral results

Table 4 reports the results of our partial equilibrium simulation model split by sector and by region as relative change from the baseline scenario. The respective absolute changes can be seen in table 8 in the Appendix. In addition, table 3 displays the welfare implications of the price and quantity changes in each region. Most notably, Vietnam experiences a large increase in welfare after the implementation

Table 3: Changes in Major Economic Indicators

	Vietnam	EU	ROW
Economic welfare (in absolute change)			
Tariff	-2.484	-5.694	-0.041
Consumer	4.137	-0.417	-0.034
Producer	3.815	0.797	-0.025
Total	**5.468**	**-5.314**	**-0.1**
Economic welfare (social surplus as percentage of consumption)			
Tariff	-2.145	-0.081	-0.0003
Consumer	3.572	-0.006	-0.0002
Producer	3.294	0.011	-0.0001
Total	**4.721**	**-0.076**	**-0.0007**

of the EVFTA. Both consumer and producer surplus increase, whilst tariff income drops – the latter of which is to be expected of a free trade agreement. However, the gains in consumer and producer surplus more than compensate for the drop in tariff income, resulting in an overall welfare gain of 5.468 million units (here local currency with exchange rate 1.01).

As consumer surplus typically arises from imports in this kind of model, we first inspect changes in import quantities (and their respective changes). For Vietnam, imports increase for all sectors – this can be seen as trade creation, since by abolishing tariffs between the EU and Vietnam most imports are now cheaper than before, leading to heightened consumption possibilities of each affected good. It is not the case that all new imports are covered by trade with the EU: Especially in the service sector, the quantity of imports increases, even though after the implementation of the EVFTA all imports are covered by the ROW-region (e.g. insurances (GTAP notation: isr), other government services (osg) and rest of service (ros)).

For most agricultural and manufacturing sectors, we can see that trade gets diverted from the ROW-region to the EU – meaning, by removing tariffs, the EU becomes a more attractive trading partner through lower import prices, and imports which have in the past been covered by partners from ROW are now covered by EU export supply. The sectors with the highest absolute increase (measured in international) in import demand for Vietnam are oil (oil) at 3.26, textiles (tex) at 3.38 and chemical products (crp) at 2.16 (table 8).

Since Vietnam does not belong to an aggregate region we can deduct trade flows pre- and post-implementation of the EVFTA because there are only two partners for them to trade with, and they are distinguished by their respective markets (trade with the EU will appear as trade within the FTA-market, trade with ROW will not; for pre-implementation we can refer to initial GTAP data where trading partners are still fully included). For example, the Vietnamese demand for chemical products (crp) was initially met mostly by ROW supply and only a small fraction (8.8%) was made up by EU suppliers. After the ratification of the EVFTA our simulation shows a switch to 100% EU supply (similarly for oil and textiles). Not only did the EVFTA lead to an overall increase in import demand (trade creation), but it also diverted trade from the ROW to the EU. In total, the consumer surplus increase created by the EVFTA amounts to 3.57% of consumption. For producer surplus a similar picture can be painted; the overall producer surplus for Vietnam increases by 3.29% of consumption. Here, the most notable increases in export supply can be seen in the food products n.e.c. (ofd) sector with an increase of 2.51, the wearing apparel (wap) sector with an increase of 3.97 and the leather sector (lea) with an increase of 1.93 (overall, all clothing related sectors show a notable increase). There are also decreases in export supply, albeit they are all rather modest (crude oil (CRU) with a decrease of 0.22 being the largest decrease). Again, similar to the imports, we can observe the trade creation and diversion in detail for Vietnam. The wearing apparel (wap) sector being one of the most notable sectors in this simulation shows that whilst Vietnamese export pre-EVFTA has been roughly split 21% to 79% between EU and ROW markets, post-EVFTA the export supply is fully sent to the

Table 4: Effects on noticeable Sectoral Exports & Imports (percent deviation from the baseline in 2011)

Sector	Vietnam		EU		ROW	
	Export	Import	Export	Import	Export	Import
Agriculture	**34.885**	**15.819**	**-0.097**	**0.180**	**-0.122**	**0.131**
Rice (husked & non husked) (pdr)	25.078	85.502	0.316	-0.392	0.258	-0.322
Other crops						
Other agriculture						
Manufacturing	**16.851**	**18.780**	**0.055**	**-0.032**	**0.008**	**-0.011**
Textiles (tex)	17.624	31.970	0.297	-0.370	0.240	-0.299
Wearing apparel (wap)	37.398	45.090	-0.499	0.628	-0.555	0.699
Leather products (lea)	20.330	53.119	-0.274	0.343	-0.330	0.414
Chemicals, plastic, rubber (crp)	4.373	13.290	0.070	-0.087	0.014	-0.017
Crude oil (oil)	9.937	31.476	0.212	-0.264	0.155	-0.194
Dairy products (mil)	31.283	65.144	0.214	-0.267	0.157	-0.197
Rice (semi or wholly milled) (pcr)	9.621	83.180	2.873	77.295	2.815	-3.410
Meats (cmt)	62.184	172.057	1.142	-1.409	1.084	-1.339
Metals and products (nfm, fmp)	11.470	10.749	0.059	-0.076	0.008	-0.009
Machinery (ome)	3.860	8.333	0.058	-0.072	0.001	-0.001
Electronic equipment (ele)	-3.829	5.030	0.033	-0.041	-0.024	0.030
Transportation equipment (mvh)	41.278	11.855	0.036	-0.045	-0.020	0.025
Other manufactures (omf)	24.020	7.631	-0.022	0.028	-0.079	0.098
Services	**-2.461**	**5.001**	**0.038**	**-0.047**	**-0.018**	**0.022**
Construction and utilities (cns)	-3.819	4.988	0.048	-0.059	-0.009	0.011
Trade and transport (trd, otp, atp, wtp combined)	-3.827	4.999	0.038	-0.048	-0.0178	0.022
Financial services (ofi)	-3.830	5.003	0.037	-0.046	-0.020	0.025
Other private services (obs)	-3.832	5.006	0.035	-0.043	-0.022	0.028
Government services (osg)	-3.821	4.989	0.046	-0.058	-0.010	0.013

Source: Simulation results. The listed individual sectors are only the noticeable ones.

EU-market. The ratification of the FTA abolished the European import tariff of roughly 20% and thus allowed for the creation of new trade volume between the two trading parties and it also led to a complete diversion of Vietnamese export supply to its newly acquired FTA-partner (again, similar picture for the other notable sectors) (table 11).

Overall, both import and export markets see strong increases, which amount to a total increase of import volume of 17.73% and a total increase of export volume of 15.26%.

For the EU, the situation is different. Our simulation shows, they do not gain welfare by ratifying the EVFTA but instead have a small loss of 5.314 million € (0.07% of consumption). This loss is mostly due to lower tariff income (loss of 5.694 million €) which does not come as a surprise since the FTA removes tariffs. More strikingly, the EU consumer surplus change also displays a negative sign, but with -0.417 million € (-0.006% of consumption) the change is not large enough to see any meaningful change. The EU's producer surplus increases by 0.797 million $ (0.011% of consumption). Again, the result is very close to zero and does not, by itself, have the magnitude to capture much attention. Sectors of notice for EU imports are processed rice (pcr) which sees an increase in import volume of 1.44 million € which is a relative increase of around 77% as compared to the baseline scenario. In addition, the whole export supply of processed rice from Vietnam now is used to meet EU import demand. Another notable sector is the wearing apparel (wap) sector, which sees an increase in

EU import demand of 0.77 million € (0.628% relative increase shown in table 8). Regarding the EU exports, the largest increase in export supply can be seen in the chemical products (crp) sector. Here, the export volume supplied by EU producers increases by roughly 0.72 million € and as could be seen this increase likely goes to meet the increased import demand in the Vietnamese economy.

3.2 Robustness Check - Elasticity change

Since the results to a great extent hinge on the assumed price elasticities of both import demand and export supply, we cannot forgo adapting these to ensure the results are stable. For this, we create two additional scenarios aside the baseline scenario (base: import demand elasticity (id) of -5 and export supply elasticity (es) of 4). We create a scenario with higher elasticities (scenario "h": id = -7.5; es = 6) and lower elasticities (scenario "l": id = -2.5; es = 2), both showing a 50% change in magnitude (increase and decrease respectively).

The results of the simulation are presented in table 12 and table 13 in the Appendix. Starting with scenario "h" (higher magnitude of elasticities), we see an overall increase in surplus gained by the ratification for Vietnam, whilst simultaneously the deficit of the EU increases. Vietnam in this scenario gains 13.31% more as compared to the baseline scenario and the EU experiences losses 13.77% higher.

On the other hand, in scenario "l" (lower magnitude of elasticities) the surplus gained by Vietnam amounts to being 10.96% lower and the deficit of the EU to being 11.29% lower than in the baseline scenario.

Overall, the results seem robust to the changes in elasticities with effects only being amplified or dampened in magnitude.

4 Conclusion

At the time of this paper's writing, this study opens the first important door into investigating the effect of the EVFTA on all participating countries' sectors. For instance, by comparing the result from the study of Minh et al. 2021 about the meat sector to ours, we observe a similar pattern across both papers, in which the importing meat from EU to Vietnam is much cheaper to do than doing it from elsewhere. Hence, the trade diversion from ROW to EU for Vietnam's meat consumption happened. Despite this similarity, our paper only studies the EVFTA alone and concluded that Vietnam switches from importing meat from the EU and ROW in the ratio of 0.015 and 0.985 in pre- to 1 and 0 in post-EVFTA. Nonetheless, Minh et al. 2021 put the CPTPP into the context of their analysis and come to a slightly diverted conclusion about trade diversion. Overall, the unique *ex-ante* nature of the PE model being MCP-formulated plus our choice of regional aggregation with only three regions at play demonstrates a clear picture about the obvious benefit for Vietnam and the ambiguous benefit for the EU in terms of pure economic gain when ratifying this agreement (table 3). The calibration of import demand and export supply elasticities in our model solidified even more the result of our study (subsection 3.2).

The EVFTA in our model shows sizable economic opportunities for the Vietnamese economy and a rather ambiguous result for the EU, with the main driver behind this being lower tariff income. However, the EU entered the agreement with hopes of boosting investment and economic performance on one hand. On the other hand, the EU seeks to improve its political relationship with Vietnam (and other South-East Asian states in potential future FTAs) and work on improving Vietnamese workers' rights, which were a crucial part of the negotiation. Viewing the FTA solely as an economic endeavour is not sufficient to capture all the aspects the EU considered in the process of ratification. Also, one has to keep in mind the limitations of our model which in this case are that it does not capture well any long-term effects caused by the FTA. This could potentially be done using a General Equilibrium setup and deliver further insights into the developmental implication of such an agreement. By including long-term effects in our model, it seems likely that both parties involved would gain from the EVFTA - but this has to be analyzed using proper methods for long-term effects. What our model does show clearly is that the ratification of the EVFTA leads to significant diversions of trade. Whereas before

many goods were exported to and imported from ROW-partners, after the ratification the trade solely happens between the FTA-partners. Also, the trade-creating effect is significant, especially Vietnam benefits greatly from lower import prices due to the abolishment of tariffs from the EU. Considering our findings, it is unsurprising that over the last decades many FTA have been ratified - especially between developed and developing countries.

Subsequent research doorways following our paper could be done in several manners. At the moment, we are still in the midway between the agreement ratification year of 2020 and the final target year of complete tariff liberalization between the two partners of 2027. Therefore, additional investigation could be done on the consequence of current partial tariff removal, whereby Vietnam already abolished 65% of its tariffs, and the European counterpart has completed 84% of the goal. More recent GTAP data could also be used to calibrate the kick-in of the EVFTA more precisely, because Vietnam's economy has seen its rapid development since the start of the EVFTA negotiation in 2010 (hence the choice of using GTAP 9 with baseline data of 2011). Lastly, the EU in the analysis could be broken down into its individual members, so we could understand the individual economic gain and their motivations of supporting or opposing this agreement due to certain important sectors of each country.

References

Board, Simon (Nov. 28, 2009). "Partial Equilibrium: Positive Analysis". In: URL: http://www.econ.ucla.edu/sboard/teaching/econ11_09/econ11_09_lecture6.pdf.

Böhringer, Christoph, T. Rutherford, and W. Wiegard (2003). "Computable General Equilibrium Analysis: Opening a Black Box". In: URL: https://www.semanticscholar.org/paper/Computable-general-equilibrium-analysis%3A-Opening-a-B%C3%B6hringer-Rutherford/4af2982e35a7382f83c0927593c31((visited on 09/26/2024).

Bourguignon, François and Christian Morrisson (Sept. 2002). "Inequality Among World Citizens: 1820-1992". In: *American Economic Review* 92.4, pp. 727–744. ISSN: 0002-8282. DOI: 10.1257/00028280260344443. URL: https://www.aeaweb.org/articles?id=10.1257/00028280260344443 (visited on 01/02/2024).

CIA (2024). "World Fact Book". In: URL: https://www.cia.gov/the-world-factbook/.

Dimaranan, Betina, Le Thuc Duc, and Will Martin, eds. (2005). *Potential Economic Impacts of Merchandise Trade Liberalization under Viet Nam's Accession to the WTO*. 33 pp.

Doanh, Nguyen Khanh and Yoon Heo (2009). "Impacts of Trade Liberalisation Commitments on the Vietnamese Economy: A CGE Approach". In: *The World Economy* 32.4, pp. 606–628. ISSN: 1467-9701. DOI: 10.1111/j.1467-9701.2009.01166.x. URL: https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1467-9701.2009.01166.x (visited on 01/04/2024).

European Commission (Jan. 19, 2023). "European Union, Trade in Goods with Vietnam". In: URL: https://webgate.ec.europa.eu/isdb_results/factsheets/country/details_vietnam_en.pdf.

European Parliament (2023). "Trade Negotiations between the EU and ASEAN Member States". In: URL: https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/754629/EPRS_BRI(2023)754629_EN.pdf.

European Union (2023). *EU Trade Relations with Association of South East Asian Nations (ASEAN)*. URL: https://policy.trade.ec.europa.eu/eu-trade-relationships-country-and-region/countries-and-regions/association-south-east-asian-nations-asean_en (visited on 12/08/2023).

— (2024). *Facts and Figures, EU Economy — European Union*. URL: https://european-union.europa.eu/principles-countries-history/key-facts-and-figures/economy_en (visited on 01/03/2024).

Fukase, Emiko and Will J. Martin (1999). *A Quantitative Evaluation of Vietnam's Accession to the ASEAN Free Trade Area*. URL: https://papers.ssrn.com/abstract=216990 (visited on 01/04/2024). Pre-published.

GTAP (2015). *GTAP Data Bases: GTAP 9 Data Base*. URL: https://www.gtap.agecon.purdue.edu/databases/v9/default.asp (visited on 01/04/2024).

Hillberry, Russell and David Hummels (Jan. 1, 2013). "Chapter 18 - Trade Elasticity Parameters for a Computable General Equilibrium Model". In: *Handbook of Computable General Equilibrium Modeling*. Ed. by Peter B. Dixon and Dale W. Jorgenson. Vol. 1. Handbook of Computable General Equilibrium Modeling SET, Vols. 1A and 1B. Elsevier, pp. 1213–1269. DOI: 10.1016/B978-0-444-59568-3.00018-3. URL: https://www.sciencedirect.com/science/article/pii/B9780444595683000183 (visited on 11/16/2023).

Kikuchi, Tomoo, Kensuke Yanagida, and Huong Vo (Apr. 1, 2018). "The Effects of Mega-Regional Trade Agreements on Vietnam". In: *Journal of Asian Economics*. Trade, Industrialization, and Structural Reform in Southeast Asia 55, pp. 4–19. ISSN: 1049-0078. DOI: 10.1016/j.asieco.2017.12.005. URL: https://www.sciencedirect.com/science/article/pii/S1049007817301288 (visited on 01/04/2024).

Lanz, Bruno and Thomas F. Rutherford (Dec. 30, 2016). "GTAPinGAMS: Multiregional and Small Open Economy Models". In: *Journal of Global Economic Analysis* 1.2 (2), pp. 1–77. ISSN: 2377-2999. DOI: 10.21642/JGEA.010201AF. URL: https://jgea.org/ojs/index.php/jgea/article/view/38 (visited on 01/04/2024).

Marslev, Kristoffer and Cornelia Staritz (May 4, 2023). "Towards a Stronger EU Approach on the Trade-Labor Nexus? The EU-Vietnam Free Trade Agreement, Social Struggles and Labor Reforms in Vietnam". In: *REVIEW OF INTERNATIONAL POLITICAL ECONOMY* 30.3, pp. 1125–1150. ISSN: 0969-2290, 1466-4526. DOI: 10.1080/09692290.2022.2056903. URL: https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=DynamicDOIArticle&SrcApp=WOS&KeyAID=10.1080%2F09692290.2022.2056903&DestApp=DOI&SrcAppSID=EUW1ED0CFDINq7y42x1uzAc0zuuH0&SrcJTitle=REVIEW+OF+INTERNATIONAL+POLITICAL+ECONOMY&DestDOIRegistrantName=Informa+UK+%28Taylor+%26+Francis%29 (visited on 10/08/2023).

Martin, Will J. and Emiko Fukase (Nov. 1, 1999). *The Effect of the United States' Granting Most Favored Nation Status to Vietnam*. URL: https://papers.ssrn.com/abstract=623977 (visited on 01/04/2024). Pre-published.

McKinsey (2024). *Optimism for Vietnam's Economy Remains High in 2023*. Mckinsey. URL: https://www.mckinsey.com/featured-insights/asia-pacific/vietnamese-consumers-are-coming-of-age-in-2023-how-businesses-can-stay-ahead (visited on 01/03/2024).

Minh, Doan Nguyen et al. (Aug. 10, 2021). "Vietnam's Meat Import Market Under Impacts Of The European -Vietnam Free Trade Agreement And Quality Management Demand". In: *Management* 25.1, pp. 99–117. ISSN: 1429-9321 (1997-2019), 2299-193X. DOI: 10.2478/manment-2019-0061. URL: https://www.management-poland.com/Vietnam-s-Meat-Import-Market-Under-Impacts-Of-The-European-Vietnam-Free-Trade-Agreement,157625,0,2.html (visited on 01/04/2024).

Narayanan, Badri and Robert McDougall (2015). *Chapter 2: Guide to the GTAP Data Base*. Center for Global Trade Analysis. URL: http://www.gtap.agecon.purdue.edu/resources/res_display.asp?RecordID=4819.

Roland-Holst, David et al. (2002). *Vietnam's Accession to the World Trade Organization: Economic Projections to 2020*. URL: https://mpra.ub.uni.muenchen.de/29417/ (visited on 01/04/2024).

Russell, Martin (Oct. 2018). "Briefing: EU-Vietnam Free Trade Agreement. European Parliamentary Research Service." In: URL: https://www.europarl.europa.eu/RegData/etudes/BRIE/2018/628248/EPRS_BRI(2018)628248_EN.pdf.

Rutherford, Thomas F. (Oct. 17, 2005). "Modeling Free Trade Areas in a World Trade Simulation Model". In.

Sicurelli, Daniela (May 29, 2015). "The EU as a Promoter of Human Rights in Bilateral Trade Agreements: The Case of the Negotiations with Vietnam". In: *Journal of Contemporary European Research* 11.2. ISSN: 1815-347X. DOI: 10.30950/jcer.v11i2.655. URL: https://jcer.net/index.php/jcer/article/view/655 (visited on 01/04/2024).

Simonovska, Ina and Michael E. Waugh (Feb. 2011). *The Elasticity of Trade: Estimates and Evidence*. DOI: 10.3386/w16796. National Bureau of Economic Research: 16796. URL: https://www.nber.org/papers/w16796 (visited on 04/26/2024). Pre-published.

Thu, Mai Ha and Erwin Schweißhelm (2020). *Labour Rights and Civil Society Empowerment in the EU-Vietnam Free Trade Agreement*. IPE Working Paper 135/2020. Berlin School of Economics and Law, Institute for International Political Economy (IPE). URL: https://econpapers.repec.org/paper/zbwipewps/1352020.htm (visited on 01/04/2024).

Tran, Angie N, Jennifer Bair, and Marion Werner (Oct. 1, 2017). "Forcing Change from the Outside? The Role of Trade-Labour Linkages in Transforming Vietnam's Labour Regime". In: *Competition & Change* 21.5, pp. 397–416. ISSN: 1024-5294. DOI: 10.1177/1024529417729326. URL: https://doi.org/10.1177/1024529417729326 (visited on 01/04/2024).

Valin, Hugo and Houssein Boumellassa (2008). "Vietnam's Accession to the WTO: Ex-post Evaluation in a Dynamic Perspective". In: *Conference papers* 331717. URL: https://ideas.repec.org//p/ags/pugtwp/331717.html (visited on 01/04/2024).

Vanzetti, David and Pham Lan Huong, eds. (2006). *Vietnam's Trade Policy Dilemmas*. 19 pp.

World Bank (2022). *Trade*. World Bank. URL: https://www.worldbank.org/en/topic/trade/overview (visited on 04/22/2024).

— (2024a). *Poverty and Shared Prosperity 2018*. World Bank. URL: https://www.worldbank.org/en/publication/poverty-and-shared-prosperity-2018 (visited on 01/02/2024).

— (2024b). *World Bank Open Data*. World Bank Open Data. URL: https://data.worldbank.org (visited on 01/03/2024).

WTO (2024). *WTO — Regional Trade Agreements Database*. URL: https://rtais.wto.org/UI/PublicMaintainRTAHome.aspx (visited on 01/03/2024).

A Appendix

Table 5: Glossary of Abbreviations

Abbreviation	**Description**
ASEAN	Association of South East Asian Nation
CPTPP	Comprehensive and Progressive Agreement for Trans-Pacific Partnership
EU	European Union
EVFTA	European Union - Vietnam Free Trade Agreement
FTA	Free Trade Agreement
FTAAP	Free Trade Area of the Asia-Pacific
GDP	Gross Domestic Product
GE	General Equilibrium
MCP	Mixed Complementarity Problem
PE	Partial Equilibrium
RCEP	Regional Comprehensive Economic Partnership
ROI	Rest of Industries
ROW	Rest of the World
TPP	Trans-Pacific Partnership
WTO	World Trade Organization

Table 6: Values for world market price (P) and price within FTA regions (PF) - Part 1

Sector	P	PF	Sector	P	PF
isr	1.000114	0.970852	c_b	1.000052	1.000052
omn	1.000118	0.588618	pfb	1.000355	0.999351
obs	1.000086	0.929879	ocr	0.998573	0.699328
ros	1.000096	0.969208	ctl	1.000083	0.926594
osg	1.000116	0.963565	oap	1.000095	0.825211
pdr	1.000787	0.999914	rmk	1.000107	1.000107
wht	1.000322	0.879273	wol	1.000118	0.994091
gro	1.000325	0.878137	frs	1.000269	0.950473
v_f	0.999581	0.560947	fsh	1.000099	0.899877
osd	1.000321	0.922011	oil	1.000529	0.041689

Table 7: Values for world market price (P) and price within FTA regions (PF) - Part 2

Sector	P	PF	Sector	P	PF
gas	1.000107	0.803690	fmp	1.000118	0.077138
cmt	1.002842	0.841301	mvh	1.000091	0.233232
omt	1.000054	0.510984	otn	1.000154	0.082643
vol	1.000477	0.846483	ele	1.000081	0.986814
mil	1.000535	0.561216	ome	1.000144	0.158420
pcr	1.007106	0.977306	omf	0.999945	0.086790
sgr	1.000323	0.936026	wtr	1.000093	0.992565
ofd	0.999664	0.075204	cns	1.000119	0.969455
b_t	1.000360	0.287753	trd	1.000098	0.955618
tex	1.000742	0.228494	otp	1.000095	0.960274
wap	0.998749	0.204714	wtp	1.000094	0.978224
lea	0.999315	0.497596	atp	1.000098	0.961223
lum	0.999886	0.125110	cmn	1.000099	0.970755
ppp	1.000104	0.082503	ofi	1.000091	0.953852
crp	1.000175	0.158286	col	1.000089	0.983512
nmm	0.999969	0.346965	CRU	1.000138	0.706113
i_s	1.000235	0.057494	EEQ	1.000163	0.092056
nfm	1.000179	0.068608	ROI	1.000101	1.000101

Table 11: Ratio of trade Diversion for Vietnam between EU and ROW (baseline elasticity)
Timeline: 0 (before EVFTA), 1 (after EVFTA)

Export	**Timeline**	**EU**	**ROW**	**Import**	**Timeline**	**EU**	**ROW**
isr	0	0.255	0.745	isr	0	0.498	0.502
	1	0.917	0.083		1	0.000	1.000
omn	0	0.027	0.973	omn	0	0.120	0.880
	1	1.000	0.000		1	1.000	0.000
obs	0	0.044	0.956	obs	0	0.521	0.479
	1	0.976	0.024		1	0.000	1.000
ros	0	0.534	0.466	ros	0	0.517	0.483
	1	1.000	0.000		1	0.000	1.000
osg	0	0.269	0.731	osg	0	0.317	0.683
	1	0.931	0.069		1	0.000	1.000
pdr	0	0.052	0.948	pdr	0	0.000	1.000
	1	1.000	0.000		1	1.000	0.000
wht	0	0.000	1.000	wht	0	0.000	1.000
	1	1.000	0.000		1	1.000	0.000
gro	0	0.031	0.969	gro	0	0.033	0.967
	1	1.000	0.000		1	1.000	0.000
v_f	0	0.097	0.903	v_f	0	0.003	0.997
	1	1.000	0.000		1	1.000	0.000
osd	0	0.127	0.873	osd	0	0.000	1.000
	1	1.000	0.000		1	1.000	0.000
c_b	0	NA	NA	c_b	0	0.000	1.000
	1	NA	NA		1	1.000	0.000
pfb	0	0.000	1.000	pfb	0	0.005	0.995
	1	1.000	0.000		1	0.574	0.426
ocr	0	0.433	0.567	ocr	0	0.043	0.957
	1	1.000	0.000		1	1.000	0.000
ctl	0	0.441	0.559	ctl	0	0.001	0.999

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Export	Timeline	EU	ROW	Import	Timeline	EU	ROW
	1	1.000	0.000		1	0.000	1.000
oap	0	0.123	0.877	oap	0	0.066	0.934
	1	1.000	0.000		1	1.000	0.000
rmk	0	NA	NA	rmk	0	0.062	0.938
	1	NA	NA		1	1.000	0.000
wol	0	0.455	0.545	wol	0	0.036	0.964
	1	1.000	0.000		1	1.000	0.000
frs	0	0.012	0.988	frs	0	0.042	0.958
	1	1.000	0.000		1	1.000	0.000
fsh	0	0.104	0.896	fsh	0	0.004	0.996
	1	1.000	0.000		1	1.000	0.000
oil	0	0.005	0.995	oil	0	0.002	0.998
	1	1.000	0.000		1	1.000	0.000
gas	0	0.000	1.000	gas	0	0.000	1.000
	1	1.000	0.000		1	0.000	1.000
cmt	0	0.047	0.953	cmt	0	0.015	0.985
	1	1.000	0.000		1	1.000	0.000
omt	0	0.057	0.943	omt	0	0.254	0.746
	1	1.000	0.000		1	1.000	0.000
vol	0	0.020	0.980	vol	0	0.003	0.997
	1	1.000	0.000		1	1.000	0.000
mil	0	0.036	0.964	mil	0	0.179	0.821
	1	1.000	0.000		1	1.000	0.000
pcr	0	0.012	0.988	pcr	0	0.013	0.987
	1	1.000	0.000		1	1.000	0.000
sgr	0	0.359	0.641	sgr	0	0.001	0.999
	1	1.000	0.000		1	1.000	0.000
ofd	0	0.211	0.789	ofd	0	0.111	0.889
	1	1.000	0.000		1	1.000	0.000
b_t	0	0.066	0.934	b_t	0	0.144	0.856
	1	1.000	0.000		1	1.000	0.000
tex	0	0.102	0.898	tex	0	0.020	0.980
	1	1.000	0.000		1	1.000	0.000
wap	0	**0.206**	**0.794**	wap	0	0.028	0.972
	1	1.000	0.000		1	1.000	0.000
lea	0	0.409	0.591	lea	0	0.106	0.894
	1	1.000	0.000		1	1.000	0.000
lum	0	0.195	0.805	lum	0	0.038	0.962
	1	1.000	0.000		1	1.000	0.000
ppp	0	0.069	0.931	ppp	0	0.071	0.929
	1	1.000	0.000		1	1.000	0.000
crp	0	0.150	0.850	crp	0	0.088	0.912
	1	1.000	0.000		1	1.000	0.000
nmm	0	0.169	0.831	nmm	0	0.053	0.947
	1	1.000	0.000		1	1.000	0.000
i_s	0	0.051	0.949	i_s	0	0.050	0.950
	1	1.000	0.000		1	1.000	0.000
nfm	0	0.081	0.919	nfm	0	0.024	0.976
	1	1.000	0.000		1	1.000	0.000
fmp	0	0.266	0.734	fmp	0	0.050	0.950
	1	1.000	0.000		1	1.000	0.000
mvh	0	0.079	0.921	mvh	0	0.089	0.911
	1	1.000	0.000		1	1.000	0.000
otn	0	0.492	0.508	otn	0	0.522	0.478

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Export	Timeline	EU	ROW	Import	Timeline	EU	ROW
	1	1.000	0.000		1	1.000	0.000
ele	0	0.399	0.601	ele	0	0.050	0.950
	1	1.000	0.000		1	1.000	0.000
ome	0	0.088	0.912	ome	0	0.123	0.877
	1	1.000	0.000		1	1.000	0.000
omf	0	0.167	0.833	omf	0	0.056	0.944
	1	1.000	0.000		1	1.000	0.000
wtr	0	0.502	0.498	wtr	0	0.362	0.638
	1	1.000	0.000		1	0.000	1.000
cns	0	0.401	0.599	cns	0	0.479	0.521
	1	0.932	0.068		1	0.070	0.930
trd	0	0.474	0.526	trd	0	0.436	0.564
	1	0.966	0.034		1	0.000	1.000
otp	0	0.427	0.573	otp	0	0.383	0.617
	1	1.000	0.000		1	0.000	1.000
wtp	0	0.459	0.541	wtp	0	0.542	0.458
	1	1.000	0.000		1	0.000	1.000
atp	0	0.431	0.569	atp	0	0.481	0.519
	1	0.953	0.047		1	0.000	1.000
cmn	0	0.587	0.413	cmn	0	0.526	0.474
	1	0.943	0.057		1	0.070	0.930
ofi	0	0.560	0.440	ofi	0	0.540	0.460
	1	0.972	0.028		1	0.000	1.000
col	0	0.003	0.997	col	0	0.000	1.000
	1	1.000	0.000		1	1.000	0.000
CRU	0	0.001	0.999	CRU	0	0.000	1.000
	1	1.000	0.000		1	1.000	0.000
EEQ	0	0.345	0.655	EEQ	0	0.001	0.999
	1	1.000	0.000		1	1.000	0.000
ROI	0	0.473	0.527	ROI	0	0.211	0.789
	1	1.000	0.000		1	0.000	1.000

Table 8: Changes in Import and Export Volumes after FTA in absolute value - baseline elasticity scenario

Sector	Export Volume			Import Volume		
	Vietnam	EU	ROW	Vietnam	EU	ROW
isr	-0.0148	0.03346	-0.0076	0.02031	-0.0233	0.01406
omn	0.0258	0.01828	-0.0294	0.02343	-0.0419	0.03311
obs	-0.0513	0.17017	-0.1061	0.0949	-0.2139	0.1317
ros	-0.0115	0.03308	-0.0185	0.02175	-0.0415	0.02294
osg	-0.0246	0.0439	-0.0177	0.02986	-0.0511	0.02292
pdr	0.01535	0.00092	0.00655	0.03262	-0.0035	-0.0063
wht	0.00009	0.01891	0.02831	0.10211	-0.0158	-0.0390
gro	0.00091	0.01268	0.0266	0.08912	-0.0163	-0.0326
v_f	0.87398	-0.0633	-0.2022	0.28336	0.10884	0.21634
osd	0.00225	0.0091	0.04467	0.12813	-0.0243	-0.0479
c_b	0	0.00002	0	0.000002	0	0.000026
pfb	-0.0001	0.00271	0.01935	0.04633	-0.0016	-0.0228
ocr	1.24677	-0.1196	-0.3809	0.10357	0.27148	0.37121
ctl	0.00127	0.0019	-0.0016	0.00096	-0.0017	0.00239
oap	0.0195	0.00527	-0.0029	0.02421	-0.0062	0.00383
rmk	0	0.00001	0	0.00002	0	0.00003
wol	0.00022	0.00016	-0.0004	0.00023	-0.0006	0.00040
frs	-0.0005	0.00651	0.00811	0.03299	-0.0096	-0.0093
fsh	0.01846	0.00313	-0.0025	0.02236	-0.0056	0.00236
oil	0.06582	0.38823	1.01848	3.26315	-0.6877	-1.1029
gas	0	0.00515	-0.0271	0.000003	-0.0439	0.02194
cmt	0.00287	0.21357	0.36392	1.28394	-0.2744	-0.4292
omt	0.06142	0.00958	-0.0127	0.05118	-0.0107	0.01783
vol	0.02293	0.03852	0.13146	0.40723	-0.0681	-0.1463
mil	0.02047	0.11187	0.0437	0.36109	-0.1092	-0.0759
pcr	0.29025	0.03516	0.46982	0.00358	1.44173	-0.6501
sgr	0.00437	0.00903	0.02287	0.07636	-0.0124	-0.0277
ofd	2.50531	-0.2150	-0.4219	1.06371	0.27242	0.53231
b_t	0.22646	0.12149	0.04163	0.57314	-0.1016	-0.0820
tex	1.17200	0.27883	0.69911	3.38055	-0.4706	-0.7600
wap	3.97492	-0.3469	-1.1533	0.56053	0.77327	1.1409
lea	1.93278	-0.1442	-0.3628	0.76972	0.24521	0.41085
lum	0.4945	-0.0444	-0.1364	0.08159	0.05476	0.17738
ppp	0.06181	0.06082	-0.0212	0.13402	-0.0635	0.03086
crp	0.25369	0.72147	0.16828	2.15627	-0.7813	-0.2315
nmm	0.3124	-0.0091	-0.0687	0.13017	0.00996	0.09441
i_s	0.0089	0.17491	0.10827	0.63100	-0.1981	-0.1408
nfm	-0.0039	0.12224	0.07535	0.46346	-0.1827	-0.0871
fmp	0.23143	0.0774	-0.0184	0.35702	-0.0907	0.02404
mvh	0.24356	0.24024	-0.1234	0.40002	-0.2315	0.19191
otn	0.07968	0.11186	0.01446	0.35309	-0.1282	-0.0190
ele	-0.0042	0.01128	-0.0050	0.00688	-0.0124	0.00756
ome	0.30703	0.58779	0.01687	1.51364	-0.5780	-0.0239
omf	0.51200	-0.0197	-0.1831	0.06285	0.02798	0.21836
wtr	0	0.00053	-0.0005	0.00032	-0.0008	0.00054
cns	-0.0135	0.02523	-0.0055	0.02506	-0.0266	0.00779
trd	-0.02546	0.06345	-0.03705	0.03826	-0.0823	0.04498
otp	-0.01299	0.05299	-0.04075	0.03125	-0.0774	0.04544
wtp	-0.0089	0.02467	-0.0116	0.01273	-0.0257	0.01711
atp	-0.0221	0.0552	-0.0278	0.02964	-0.06200	0.037770
cmn	-0.0151	0.02467	-0.0106	0.02209	-0.0347	0.0116
ofi	-0.0181	0.05248	-0.0278	0.04291	-0.069	0.03272
col	0.0447	0.00066	-0.0261	0.00326	-0.011	0.02707
CRU	-0.2215	0.009456	-0.019	0.00029	-0.2494	0.0181
EEQ	0.09163	0.15658	0.10117	0.74973	-0.286	-0.1143
ROI	-0.0006	0.0013	-0.0039	0.000035	-0.0062	0.00302

Table 9: Changes in Import and Export Volumes after FTA in absolute value - High elasticity scenario

Sector	Export Volume			Import Volume		
	Vietnam	EU	ROW	Vietnam	EU	ROW
isr	-0.0105	0.0252	-0.0064	0.0142	-0.0176	0.0117
omn	0.0055	0.0147	-0.0179	0.0159	-0.0336	0.0201
obs	-0.0365	0.1289	-0.0838	0.0666	-0.1620	0.1040
ros	-0.0081	0.0250	-0.0147	0.0153	-0.0314	0.0183
osg	-0.0174	0.0332	-0.0146	0.0209	-0.0387	0.0190
pdr	0.0067	0.0005	0.0028	0.0143	-0.0017	-0.0027
wht	0.0000	0.0121	0.0151	0.0582	-0.0101	-0.0209
gro	0.0004	0.0076	0.0126	0.0459	-0.0098	-0.0154
v_f	0.3797	-0.0197	-0.0865	0.1471	0.0339	0.0924
osd	0.0010	0.0058	0.0235	0.0707	-0.0154	-0.0252
c_b		0.0000	-0.0000	0.0000	-0.0000	0.0000
pfb	-0.0001	0.0015	0.0137	0.0325	-0.0012	-0.0162
ocr	0.5455	-0.0489	-0.1682	0.0547	0.1105	0.1632
ctl	0.0006	0.0015	-0.0011	0.0007	-0.0014	0.0017
oap	0.0079	0.0047	-0.0016	0.0145	-0.0055	0.0020
rmk		0.0000	-0.0000	0.0000	-0.0001	0.0000
wol	0.0001	0.0001	-0.0003	0.0002	-0.0005	0.0003
frs	-0.0007	0.0043	0.0045	0.0197	-0.0064	-0.0051
fsh	0.0078	0.0027	-0.0013	0.0128	-0.0049	0.0013
oil	0.0266	0.2159	0.4870	1.6402	-0.3828	-0.5279
gas	0.0000	0.0040	-0.0209	0.0000	-0.0338	0.0169
cmt	0.0012	0.0852	0.1381	0.4990	-0.1103	-0.1642
omt	0.0262	0.0097	-0.0079	0.0277	-0.0108	0.0111
vol	0.0100	0.0231	0.0693	0.2204	-0.0408	-0.0772
mil	0.0089	0.0552	0.0172	0.1653	-0.0540	-0.0300
pcr	-0.0253	0.0241	0.3206	0.0015	0.7659	-0.4480
sgr	0.0019	0.0054	0.0107	0.0385	-0.0074	-0.0130
ofd	1.0935	-0.0628	-0.1830	0.5377	0.0795	0.2305
b_t	0.0955	0.0630	0.0148	0.2553	-0.0527	-0.0292
tex	0.5051	0.1587	0.3651	1.6946	-0.2683	-0.3974
wap	1.7346	-0.1405	-0.5102	0.2687	0.3123	0.5029
lea	0.8408	-0.0529	-0.1580	0.3616	0.0897	0.1786
lum	0.1983	-0.0021	-0.0611	0.0532	0.0026	0.0794
ppp	0.0260	0.0470	-0.0161	0.0824	-0.0491	0.0235
crp	0.0781	0.4897	0.0503	1.2188	-0.5313	-0.0694
nmm	0.1364	0.0077	-0.0331	0.0740	-0.0084	0.0454
i_s	-0.0061	0.1183	0.0579	0.3794	-0.1340	-0.0754
nfm	-0.0065	0.0854	0.0323	0.2763	-0.1277	-0.0374
fmp	0.0991	0.0613	-0.0121	0.2043	-0.0718	0.0158
mvh	0.1057	0.1860	-0.0940	0.2305	-0.1793	0.1463
otn	0.0314	0.0774	-0.0024	0.1919	-0.0887	0.0032
ele	-0.0030	0.0085	-0.0040	0.0048	-0.0093	0.0060
ome	0.0873	0.4373	-0.0095	0.9321	-0.4305	0.0135
omf	0.2233	0.0048	-0.0892	0.0394	-0.0069	0.1064
wtr	-0.0000	0.0004	-0.0004	0.0002	-0.0006	0.0004
cns	-0.0096	0.0189	-0.0048	0.0176	-0.0199	0.0068
trd	-0.0181	0.0481	-0.0296	0.0268	-0.0623	0.0359
otp	-0.0092	0.0403	-0.0322	0.0219	-0.0589	0.0359
wtp	-0.0063	0.0187	-0.0093	0.0089	-0.0195	0.0136
atp	-0.0157	0.0418	-0.0222	0.0208	-0.0470	0.0302
cmn	-0.0107	0.0185	-0.0087	0.0155	-0.0260	0.0095
ofi	-0.0128	0.0395	-0.0223	0.0301	-0.0519	0.0262
col	0.0113	0.0007	-0.0102	0.0023	-0.0110	0.0105
CRU	-0.1616	0.0072	-0.0185	0.0002	-0.1908	0.0177
EEQ	-0.0315	0.1193	0.0722	0.4597	-0.2181	-0.0816
ROI	-0.0004	0.0010	-0.0030	0.0000	-0.0048	0.0023

Table 10: Changes in Import and Export Volumes after FTA in absolute value - Low elasticity scenario

Sector	Export Volume			Import Volume		
	Vietnam	EU	ROW	Vietnam	EU	ROW
isr	-0.01050	0.02524	-0.00637	0.01424	-0.01759	0.01172
omn	0.00555	0.01466	-0.01787	0.01585	-0.03361	0.02009
obs	-0.03648	0.12886	-0.08377	0.06657	-0.16196	0.10400
ros	-0.00815	0.02502	-0.01472	0.01525	-0.03141	0.01831
osg	-0.01744	0.03324	-0.01462	0.02094	-0.03871	0.01895
pdr	0.00669	0.00045	0.00280	0.01435	-0.00170	-0.00271
wht	0.00004	0.01207	0.01515	0.05822	-0.01009	-0.02088
gro	0.00040	0.00763	0.01257	0.04586	-0.00983	-0.01543
v_f	0.37967	-0.01975	-0.08647	0.14713	0.03392	0.09240
osd	0.00097	0.00576	0.02348	0.07075	-0.01537	-0.02516
c_b		0.00002	-0.00002	0.00000	-0.00002	0.00002
pfb	-0.00011	0.00154	0.01371	0.03248	-0.00118	-0.01616
ocr	0.54553	-0.04887	-0.16815	0.05474	0.11054	0.16322
ctl	0.00055	0.00153	-0.00112	0.00067	-0.00141	0.00171
oap	0.00793	0.00466	-0.00155	0.01450	-0.00549	0.00203
rmk		0.00001	-0.00003	0.00002	-0.00006	0.00002
wol	0.00010	0.00013	-0.00028	0.00015	-0.00050	0.00029
frs	-0.00068	0.00434	0.00449	0.01967	-0.00638	-0.00513
fsh	0.00777	0.00272	-0.00133	0.01279	-0.00490	0.00126
oil	0.02657	0.21587	0.48704	1.64020	-0.38281	-0.52790
gas	-0.00000	0.00396	-0.02086	0.00000	-0.03379	0.01689
cmt	0.00121	0.08519	0.13815	0.49899	-0.11028	-0.16417
omt	0.02616	0.00968	-0.00787	0.02774	-0.01082	0.01106
vol	0.01002	0.02307	0.06930	0.22036	-0.04081	-0.07716
mil	0.00893	0.05523	0.01724	0.16533	-0.05397	-0.02997
pcr	-0.02525	0.02405	0.32064	0.00154	0.76594	-0.44804
sgr	0.00191	0.00543	0.01074	0.03854	-0.00743	-0.01304
ofd	1.09347	-0.06280	-0.18296	0.53766	0.07950	0.23054
b_t	0.09554	0.06301	0.01484	0.25535	-0.05273	-0.02923
tex	0.50510	0.15874	0.36507	1.69460	-0.26832	-0.39737
wap	1.73459	-0.14055	-0.51017	0.26871	0.31227	0.50290
lea	0.84076	-0.05286	-0.15803	0.36157	0.08969	0.17860
lum	0.19834	-0.00210	-0.06107	0.05322	0.00259	0.07936
ppp	0.02599	0.04702	-0.01614	0.08245	-0.04906	0.02348
crp	0.07806	0.48974	0.05030	1.21883	-0.53134	-0.06938
nmm	0.13635	0.00772	-0.03306	0.07402	-0.00840	0.04539
i_s	-0.00614	0.11829	0.05793	0.37944	-0.13401	-0.07536
nfm	-0.00647	0.08540	0.03231	0.27625	-0.12765	-0.03737
fmp	0.09913	0.06128	-0.01211	0.20431	-0.07180	0.01579
mvh	0.10565	0.18596	-0.09404	0.23054	-0.17926	0.14629
otn	0.03142	0.07743	-0.00244	0.19193	-0.08872	0.00320
ele	-0.00297	0.00848	-0.00400	0.00482	-0.00931	0.00599
ome	0.08732	0.43728	-0.00955	0.93213	-0.43054	0.01347
omf	0.22333	0.00484	-0.08923	0.03943	-0.00687	0.10637
wtr	-0.00001	0.00041	-0.00039	0.00022	-0.00063	0.00042
cns	-0.00958	0.01890	-0.00483	0.01758	-0.01994	0.00685
trd	-0.01809	0.04806	-0.02957	0.02684	-0.06234	0.03590
otp	-0.00923	0.04029	-0.03216	0.02192	-0.05888	0.03586
wtp	-0.00634	0.01867	-0.00926	0.00893	-0.01948	0.01361
atp	-0.01568	0.04180	-0.02215	0.02079	-0.04697	0.03015
cmn	-0.01072	0.01846	-0.00869	0.01549	-0.02596	0.00952
ofi	-0.01285	0.03948	-0.02225	0.03010	-0.05193	0.02622
col	0.01132	0.00066	-0.01016	0.00225	-0.01095	0.01052
CRU	-0.16159	0.00723	-0.01854	0.00020	-0.19076	0.01767
EEQ	-0.03145	0.11934	0.07220	0.45974	-0.21807	-0.08157
ROI	-0.00042	0.00099	-0.00300	0.00002	-0.00479	0.00234

Table 12: Changes in Major Economic Indicators - High elasticity scenario

	Vietnam	EU	ROW
Economic welfare (absolute change)			
Tariff	-2.484	-6.433	-0.069
Consumer	4.352	-0.269	-0.034
Producer	4.348	0.656	-0.026
Total	**6.216**	**-6.046**	**-0.129**
Economic welfare (social surplus as percentage of consumption)			
Tariff	-2.144	-0.092	-0.0005
Consumer	3.757	-0.004	-0.0003
Producer	3.754	0.009	-0.0002
Total	**5.367**	**-0.086**	**-0.001**

Table 13: Changes in Major Economic Indicators - Low elasticity scenario

	Vietnam	EU	ROW
Economic welfare (absolute change)			
Tariff	-2.484	-5.049	-0.020
Consumer	4.311	-0.897	-0.028
Producer	3.058	1.232	-0.024
Total	**4.885**	**-4.714**	**-0.072**
Economic welfare (social surplus as percentage of consumption)			
Tariff	-2.145	-0.0719	-0.0001
Consumer	3.722	-0.012	-0.000
Producer	2.640	0.017	-0.0002
Total	**4.218**	**-0.067**	**-0.0006**