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Master Thesis International Economics

Impact of Free Trade Agreements on Employment in the European Union: An Analysis of Industry-Specific Tariff Reductions from 2002-2019

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Abstract

This study examines the impact of Free Trade Agreements (FTAs) on employment across various industries in the European Union and its member countries from 2002 to 2019. It does this by creating import and export weights for each industry and country combined and interact this with a dummy variable indicating if an FTA is active or not. Furthermore, by collecting data on tariffs for each industry, the effect of an FTA and the level of tariffs is shown. A fixed effects regression model, with industry and year fixed effects, is used to estimate the effects of FTAs and corresponding tariff changes on employment. Findings indicate that the relationship between FTAs and employment is minimal, even when interacted with the level of import- and export tariffs there are no significant results. When estimated only for FTAs with more developed countries Canada, Japan and South Korea, positive effects were found from the import perspective on employment,. Additional results show that there are heterogeneous effects of FTAs and tariff levels on employment across EU member countries and industries.

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1. Introduction

The European Union (EU) is currently negotiating several Free Trade Agreements (FTAs) with countries all over the world. These agreements have as goal to facilitate trade and remove possible trade barriers. It is widely acknowledged among scholars that the removal of these trade barriers leads to an increase in trade volumes (Romalis, 2007). However, what remains ambiguous, is the relationship between FTAs and employment. In this paper, I will research how FTAs and its corresponding tariff reductions influence employment in the European Union (EU) and across the EU member countries. When the EU enters into an FTA with another country, a lot of tariffs for products are reduced, or completely removed. For each industry or for each product the level of tariff cuts is negotiated and decided in the FTA. The level of tariff cuts could influence the changes in employment in each industry, as certain industries could become more or less competitive. To research this, I would look at the effects within each country's industry and how employment is affected by the FTA. So the research question is the following:

What is the impact of FTAs on employment in the European Union (EU), and how does this impact vary depending on the level of tariff cuts per industry mandated by the FTA?

The gains from FTAs on trade have been studied widely before (Francois et al., 2005; Baier & Bergstrand, 2007). There have also been studies on the influence of trade agreements on the domestic labor market outcomes in Canada and the US (Trefler, 2004; Revenga, 1992), but this will be the first study that examines the effects of the FTAs and its tariff cuts on employment for the EU. Previous studies did not study the effects of FTAs for the EU on employment, but primarily looked at the effects for individual countries, mostly outside Europe. This is a gap in the literature that is hard to quantify, but this study will attempt to estimate the effects of FTAs and import and export tariff cuts on employment.

This question is socially relevant as many trade agreements are still negotiated, and it is important for countries to know more about the influence of FTAs and how they can influence domestic employment. If FTAs and tariffs do influence domestic employment, it is also an important subject for voters as they could influence a country's policy towards entering into trade agreements and lowering tariffs.

For my research I looked at the period 2002-2019 and studied how the tariff cuts in a specific industry affect employment in that industry. To address this research question I used a comprehensive dataset that includes information on employment levels in the EU and 26 EU

member countries across 33 industries, tariff levels for each of these industries in each year, and information on the free trade agreements the EU has. I also constructed import and export ratio's with each country for each industry that functioned as weights. A fixed effects model is used to estimate the effects of changes in tariffs and FTAs on employment. I find no significant results of FTAs and tariffs on employment when estimated for the whole sample. However, when only the FTA partner countries are included that did not receive preferential tariffs pre-FTA, there are significant positive effects on employment on the import side. From the export perspective, no significant effects are found.

In this paper I briefly discuss the background information of FTAs and other preferential trade agreements. Then I look at the previous literature on the topic of FTAs and tariffs, and how they could affect employment. After, the data used and its sources will be clarified. Then the fixed effects model and its variables will be explained in the methodology section. Then the results for the EU, EU member countries and industries will be presented. Lastly, the limitations will be discussed and the paper will be concluded.

1.1 Background information

Globalization in the past decades has led to an increased demand for deeper economic integration. Many countries in Europa, and later the EU, have formed economic partnerships, aiming to reduce barriers to trade and enhancing economic growth. An FTA is an example of these economic partnerships. By agreeing to an FTA, many tariff duties for products are bilaterally reduced and this facilitates the growth of imports and exports for both countries. Another example of such an economic partnership is the World Trade Organization (WTO), which replaced the General Agreement on Tariffs and Trade (GATT) in 1995. The WTO aims to promote open and fair trade. One of the principals of the WTO is the Most Favored Nation (MFN) concept, which entails that countries do not discriminate in tariffs and apply the MFN tariffs to all members of the WTO, unless a more beneficial agreement is in place. This essentially means that the EU could apply three types of tariffs.

(i) Preferential tariffs, these tariffs are applied when the EU has a preferential trade agreement with its trade partner.
(ii) Most Favored Nation tariffs, these tariffs are applicable to WTO member countries that do not have a preferential trade agreement with the EU.
(iii) Tariffs applied to non-WTO members, there is no restriction on the tariff level applicable for products.

Since 2003 till 2019 the EU has entered into a Free Trade Agreement with 26 countries. This collaboration between the EU and these countries, in some cases saw an already improved trade relationship before the FTA was officially signed by all countries involved and the European Commission. We see in some cases that the FTA was provisionally applied several years before the official signing of the FTA. This means that the corresponding reduction of trade barriers, tariffs and quotas are applied in the year the FTA is applied, and not necessarily when it is signed.

The EU also has specific programs targeting less developed countries through the Generalised Scheme of Preferences (GSP). This is a unilateral arrangement between the EU and other countries. This scheme provides beneficial arrangements for tariffs and duties for countries that fall under this scheme. This GSP exists of three sub-schemes. Firstly, there is the regular GSP. Countries that are classified by the World bank as lower or lower-middle income countries can benefit from duty suspensions or duty reductions for two-third of all EU tariff lines. Secondly, there is the GSP +. The EU cuts import duties to zero for two-third of tariff lines for developing countries in exchange for their pursue for sustainable development and good governance. Lastly, there is the Everything But Arms (EBA) scheme. This is for the least developed countries and reduces all import tariffs to zero except for ammunition and arms from those countries (European Commission, 2023). In a paper by Rose (2004) he estimates the effect of GSP and the WTO on international trade. His findings show that GSP have a much larger positive impact on trade then the GATT/WTO system.

For countries that entered into an FTA with the EU, but previously fell under the GSP, the decline in import tariffs will be smaller and so the effect on employment will also be smaller. Later in this research, a regression is performed, where only non-GSP countries are included as countries that signed a FTA, to see if the effect on employment is more pronounced for those countries.

2. Literature review

Numerous studies have investigated the effects of FTAs on multiple economic performance indicators, as trade flows, economic growth and welfare. Empirical studies generally support the view that FTAs can increase trade volumes between countries and boost economic growth. Baier and Bergstrand (2007) showed that FTAs had a significant positive effect on bilateral trade flows. They found that countries with FTAs experienced a 100% increase in trade in a

decade, and the mechanisms behind this increase were reduced tariffs and the removal of non-tariff barriers.

Furthermore, the impacts of FTAs goes beyond solely increased trade. A study by Frankel and Romer (1999) used an instrumental variable technique to show that higher levels of international trade led to a growth in income. Sohn and Lee (2010) show with the use of "trade structure" variables that FTAs strongly enhance growth in GDP. The paper by Anderson and van Wincoop (2004) shows that trade costs are high, not only because of border related trade costs, but also because of lack of trade facilitation. FTAs can remove many border related trade costs and often encompass the trade facilitation and this can induce higher economic growth. Long-term effects of trade liberalization, including FTAs, show increased productivity and economic growth (Wacziarg & Welch, 2008).

Since FTAs go hand in hand with tariff reductions, it is important to also know the economic effects of tariff reductions. The theoretical knowledge suggests that lowering import tariffs increases domestic competition. With lower import tariffs, the imported goods will be cheaper and more accessible, leading to an increase in imports and thus competition. The famous paper by Melitz (2003) uses a model to show that trade liberalization forces less productive firms to exit the market, and so increasing the threshold productivity to produce. The exit of less productive firms could lead to a short term decrease in overall employment. The infant industry theory entails that emerging domestic industries might need protection from foreign competition to grow and develop, until they become competitive. Higher tariffs for imported goods in these industries can help these infant industries to grow. However, when an FTA is in place, and a lower level of tariffs is mandated, this exposes industries to increased international competition, which in turn can lead to less productive firms shutting down. The net effect on employment thus depends on the initial productivity and level of competitiveness of the industry. A recent study by Rodriguez-Lopez and Yu (2024) examines the firm level effects of reductions of tariffs. The results provide evidence that in China the reductions in import- and export final-goods tariffs are associated with job destruction for low-productivity firms and lead to job creation for high-productivity firms.

Revenga (1992) researches the influence of increased import competition in the United States, following a more open economy, on employment in manufacturing industries. She finds that industries facing a higher level of import competition showed a decline in employment levels. Furthermore, Trefler (2004) studies the effect of tariff cuts in the Canada-U.S. Free Trade Agreement (CUSTA) on employment and finds that industries experiencing the deepest tariff

cuts, see the largest employment losses. This effect is explained by the contraction of low productivity plants, which in turn leads to the industry also gaining in productivity. Beaulieu (2000) finds that before CUSTA, less-skilled industries were more protected than skilled industries and that is why less-skilled workers are predominantly affected by the reduction of tariffs.

Revenga (1997) studies the trade liberalization between 1985-1987 in Mexico and finds that wages decline as a consequence of the tariff cuts, which might offset the reduction in employment. Contrary to the previous discussed literature, Currie and Harrison (1997) do not find any significant effects of tariff reductions on firm-level employment in Morocco. They explain this by arguing that it is possible that Moroccan firms lower their profit margin or increase their productivity to be able to keep the same level of employment.

In the case of FTAs, the tariff reductions are applied bilateral. The reduction of export tariffs reduces barriers for domestic firms to export goods to foreign markets. The lower costs of exporting leads to more firms entering the export market and lowering the threshold export productivity (Chaney, 2008). Bernard, Jensen and Schott (2006) study the effects of falling trade costs in the U.S. and see that low productivity firms exit the market and higher productivity non-exporting firms start exporting and already exporting firms increase their exports. This in turn can lead to employment growth in these exporting industries. In the paper by Trefler (2004), he shows that in export oriented industries the employment increases for firms that export. However, the net effect of lower exporting tariffs is still negative as non-exporting firms experience a steep decline in employment.

Empirical evidence thus suggests heterogenous effects for import and export tariff reductions on employment. The net effect of bilateral reductions of tariffs remains unclear, although in most studies a negative overall on employment is observed. While import competing industries may experience job losses due to increased competition, export oriented industries could see a rise in employment due to higher foreign demand for their goods. The overall impact depends on the strengths of both forces.

2.1 Hypotheses

Building on the literature by Melitz (2003) that trade liberalization leads to increased competition and work by other authors that shows empirical evidence for a negative effect of increased import competition on employment, the following first hypothesis is formed:

1. *Lower import tariffs in the EU, as a consequence of FTAs, have a negative influence on employment on corresponding industries in the EU.*

This would mean that the employment levels of industries facing higher reductions in import tariffs will be more negatively affected. As a result of increased competition employment in these industries will fall, and for industries where higher import tariffs remain, will relatively increase.

For the second hypothesis I focus on the export tariffs and their influence on employment. Based on the knowledge that there are increased export opportunities when export tariffs are lowered, the second hypothesis is the following:

2. *Higher export tariffs in the EU, as a consequence of FTAs, have a negative influence on employment on corresponding industries in the EU.*

So this hypothesis predicts that industries for which the export tariffs are higher, will see less employment gains than industries that face lower exporting tariffs. This hypothesis depends on the strength of the exporting firms in the export oriented industries. The effect might be negative if non-exporters dominate the effect by reducing their employment.

3. Data

Free Trade Agreements

For my research I need data on when a trade agreement was applied between country j and the EU. The DESTA database (Dür et al., 2014) has information on over 600 Regional Trade Agreements (RTAs), and also to which depth this agreement is. Here I collect all the agreements with the EU from 2003 till 2019 which they classify as an FTA. This means that the Economic Partnership Agreements the EU has with several African and Pacific countries are not counted as an FTA. For some countries the FTAs were provisionally applied before the agreement was officially installed. I collect information on when each agreement was applied from the WTO Regional Trade Agreement Database (WTO, n.d.). There have been 26 FTAs applied in the period 2003-2019. Montenegro, Serbia and Kosovo are removed from my sample as for these countries it was not possible to create import and export ratio's, as these countries did not independently exist as of 2001. For Singapore the FTA was ratified at the end of 2019 and the reduced tariffs were not yet applied as of 2019, so this FTA falls outside of my research period. A list of the remaining 22 FTAs and when they were applied is shown

in the Appendix A. I also collect information on countries that entered into an FTA that previously fell under one of the GSP, and therefore received lower import tariffs from the EU.

Employment

Eurostat has data on employment for a range of industries. Only the industries that trade products will be used in this research, as not all industries engage in international trade. The 33 industries that will be used are listed in the Appendix C. The data is reported yearly and the unit of measure is thousand persons. The employment data is available from a Labour Force Survey (LFS) that is conducted for the years 1992-2008 and from 2008 onwards. This data is available for the EU from the year 2002. The first LFS uses NACE rev. 1.1 and the second LFS uses NACE rev. 2 to indicate the industries. This data is merged by using a correspondence table available from the European Commission, which connects the NACE rev. 1.1 codes and the NACE rev. 2 codes.

Imports and exports

I use data on imports and exports for each industry and trade partner to construct a weight for the trade partners and industry combined. So countries the EU has a higher volume of imports/exports with get attributed a higher weight. This weight is constructed one year before the timeframe my research entails, so for the year 2001. This is important since the imports and exports are then exogenous and are not influenced by changes in tariffs and FTAs. The data for imports and exports for the EU are available from the World Integrated Trade Solution (WITS). In the methodology section is shown how these weights are constructed.

Tariffs

The WITS has data from TRAINS on tariffs applied for each product at the HS6 digit level. For my research I need data on tariffs applied by the EU for other countries and tariffs applied by other countries for the EU. They are referred to as import- and export tariffs respectively. The WITS data shows the effectively applied tariff. This shows the Ad Valorem Equivalent in the case that non-Ad valorem tariffs are applied to products. The value of the effectively applied tariff depends on whether a country has any preferential trade agreement with the EU or if the country is part of the WTO, as the Most Favoured Nation tariff will then be applicable. The tariff data is a simple average for all products falling under the HS6 product code. The employment data is in NACE code, so for all the HS6 product codes I need to find the correspondence code for NACE. Since I was unable to find a direct transformation for all HS6 codes to NACE codes, the HS6 codes are first transformed to ISIC 4 codes and then to

NACE codes. The Jordan Industrial Observatory has the correspondence table for HS codes to ISIC 4, and the European Commission has the correspondence table for ISIC 4 and NACE codes (Jordan Industrial Observatory, 2022) (European Commission, n.d.). For all HS6 codes that fall under a specific NACE code a simple average will be calculated, to find the average tariff for each NACE code.

EU member countries

Data on which countries are member countries of the EU and when they entered is available via the European Union (European Commission, n.d.) I include 26 member countries in my analysis, all but Croatia are included. Croatia is not taken into account as they were not part of the EU for a large part of my sample when many FTAs were ratified.

3.1 Summary statistics

Table 1 shows the summary statistics for my dataset for the EU. The dataset has 100,926 observations. This consists of tariff data for each industry, for the years 2002-2019 for all countries the EU traded with, in 2001. The average employment level is 1.9 million and this deviates substantially across industries. For import tariffs and export tariffs there are missing values. These missing values occur when a country fails to report the applied tariff (Teti, 2023), or if there are no imported/exported products for that industry. In some cases the missing values are only for a single industry, while in other cases the data is not reported for a certain year at all.

Table 1. Summary statistics for the EU

Variable	Obs	Mean	Std. dev.	Min	Max
Year	100,926	2010.5	5.188	2002	2019
Employment	100,926	1943.181	2435.525	38	14762
Import weight	100,926	0.006	0.034	0	0.842
Export weight	100,926	0.006	0.031	0	0.839
Import tariffs	85,703	1.411	4.286	0	99.82
Export tariffs	56,535	9.769	30.287	0	3000
FTA	100,926	0.135	0.342	0	1

Note: The time period for my research is 2002-2019. Employment data is in thousands of persons, the import and export ratio are the ratio of imports or exports for a certain industry by a country to the EU's total imports or exports for that industry. Import and export tariffs are constructed by calculating the simple average for all tariffs falling under a certain NACE code. FTA is a dummy variable equalling 1 if a country has an FTA with the EU in a certain year, and 0 otherwise.

I perform a balance check to test if the missing values are missing at random, or if the missingness is related to values of other variables. The balance test in Table 6 in Appendix D, shows that the missing values are predominantly for countries with lower import and export ratio's with the EU and for industries with lower levels of employment. This could be a problem if the missing values are more common for higher or lower applied tariffs, as this would mean that values affecting employment a specific side would be missing. However, Table 7 in Appendix D shows that there is no clear correlation between import and export ratio's and the level of applied tariffs. This indicates that the missing values are not more common for countries with higher or lower tariffs, so this is not likely to bias the results. Table 7 also shows that the average employment level for missing export tariffs is lower than for non-missing values. This means that industries with higher levels of employment have more missing export tariffs. This does not necessarily leads to bias for the results as industry fixed effects are used, which leads to with-in industry comparisons. So, employment level in an industry is not affected by a value missing.

The mean of FTA indicates for how many observations an FTA is active. This is the case for 13.5% of the total observations. FTAs before 2003 are also considered here. The reason that this percentage is higher than the percentage of countries the EU has an FTA with, is because the scope of traded industries is larger for countries the EU has an FTA with, and this explains the relative high percentage.

Appendix D, Table 8, shows the average tariffs pre- and post FTA for the countries that changed FTA status in the years 2003-2019. The initial import tariffs were significantly lower than initial export tariffs. This can mainly explained by the pre-existing GSP schemes, which caused import tariffs to already be lower. In both import and export tariffs there is a clear reduction post FTA. The average export tariffs after an FTA are still relatively high as developing countries get a certain amount of transition years in which they can adjust their tariffs.

4. Methodology

For my research I want to capture the effects of FTAs and the corresponding tariff changes on employment. I employ a fixed effects regression model to analyze this relationship. The use of industry and year fixed effects allows to control for unobserved differences across industries and years. I will compare employment levels across industries before and after the

implementation of FTA, to see how the improved trade relationships affected employment. First this will be done for the EU and then for every country of the EU individually. Additionally, I will study the role of tariff changes resulting from FTAs in driving employment outcomes within each industry. This comparative analysis will enable us to differentiate the effects of tariff changes and FTAs on employment.

To perform this analysis it is important to create weights for all trading partners with the EU and its member countries. This is because countries who have a higher trade volume with the EU have a greater influence on changes in trade when tariffs are lowered. By assigning weights the observations of countries with more imports and or exports for a specific industry with the EU get more importance. This can lead to more reliable and robust estimates. To construct the weights for the imports and exports for each country the following specifications are used:

$$\frac{Imports_{cij}{}^{2001}}{Totalimports_{ci}{}^{2001}} = Importweight_{cij}$$

$$\frac{Exports_{cij}{}^{2001}}{Totalexports_{ci}{}^{2001}} = Exportweight_{cij}$$

The value of imports for industry i from the country j to country c divided by total value of imports for industry i by country c is the weight that is attributed to the imports from country j for industry i. The export weight for industry i for country j is the value of exports from country c to country j for industry i divided by the total value of exports for industry i by country c. In these specifications c can also be the EU as a whole.

The first regression that will be performed is the following:

$$(1) \quad Ln(Employment_{it}) = \beta 0 + \beta 1 \sum_{it}(Importweight_{ij} \times FTA_{jt}) + \beta 2 \sum_{it}(Exportweight_{cij} \times FTA_{jt}) + \delta i + \delta t + \varepsilon_{ijt}$$

Here $Ln(Employment_{it})$ is the natural logarithm of employment in country c in industry i in year t. Country c is in this case an individual country or the EU as a whole. $\beta 0$ is a constant. $\sum_{it} Importweight_{ij} \times FTA_{jt}$ is the sum of industry i in year t for the import weight of industry i for country c to country j interacted with a dummy-variable indicating if country j has an FTA with the EU at year t. This variable measures the influence of the FTA with country j on employment depending on the amount imported from country j for industry i. $\sum_{it}(Exportweight_{ij} \times FTA_{jt})$ is the same interaction variable, but then with the export weight

for industry i with country j. δi and δt are industry and year fixed effects for each EU member country or the EU respectively. ε_{ijt} is the error term.

In the second regression the tariffs applied by the EU and tariffs applied to EU exports are added to the model. The import and export tariffs are the same for all countries part of the EU.

This gives the following regression:

$$(2) \quad Ln(\mathrm{E}mployment_{it}) = \beta 0 + \beta 1 \sum_{it}(Importweight_{ij} \times FTA_{jt}) + \beta 2 \sum_{it}(Exportweight_{ij} \times FTA_{jt}) + \beta 3 \sum_{it}(Importweight_{ij} \times Tariffs_{ijt}) + \beta 4 \sum_{it}(Exportweight_{ij} \times Tariffs_{ijEUt}) + \beta 5 \sum_{it}(Importweight_{ij} \times FTA_{jt} \times Tariffs_{ijt}) + \beta 6 \sum_{it}(Exportweight_{ij} \times FTA_{jt} \times Tariffs_{ijEUt}) + \delta i + \delta t + \varepsilon_{ijt}$$

In this regression the interaction term for import weight and import tariffs for country j for industry i in year t is added as well as the interaction term between export weight and export tariffs. These variables measure the effects of tariff changes for each industry on employment in the corresponding industry. This way the possible heterogenous effects of import tariff changes and export tariff changes on employment can be studied. The interaction term $\sum_{it}(Importweight_{ij} \times FTA_{jt} \times Tariffs_{ijt})$ looks at the effects of import tariff levels in industry i in year t resulting from the FTA, on employment in country c in industry i in year t. $\sum_{it}(Exportweight_{ij} \times FTA_{jt} \times Tariffs_{ijEUt})$ does the same for export weights and export tariffs. The total effect on the import side of an FTA and a one percentage point lower tariff is $((\beta 1 * 1) + (\beta 3 * -1) + (\beta 5 * 1 * -1))$, while the total effect on the export side is $((\beta 2 * 1) + (\beta 4 * -1) + (\beta 6 * 1 * -1))$. δc and δt again represent industry and year fixed effects respectively for each country or the EU. This regression is performed separately for each EU member country, and the EU as a whole.

The use of industry fixed effects helps to account for unobserved heterogeneity across industries that could influence employment outcomes. Furthermore, it helps capture industry specific trends and shocks over time. The use of year fixed effects helps to control for any economic or policy changes that could affect employment levels across all industries. The inclusion of both fixed effects reduce the problems with omitted variable bias. In my analysis I use clustered standard errors at the industry level, as this will give more reliable standard error estimates. First, clustering by industry helps account for possible within-industry correlation in the error terms that might exist due to unobserved industry specific factors. While industry fixed effects account for part of the within-cluster correlation of the error, they

do not completely control for this. Second, it can also handle heteroskedasticity, which helps giving reliable estimates even when variance of error term is not constant across observations (Cameron & Miller, 2015).

One important concern in researching the impact of FTAs and their corresponding tariff reductions on employment in the EU is the potential endogeneity of FTAs. Specifically, tariff reductions might be strategically chosen for industries with pre-existing trends in employment levels. This would lead to endogeneity. To address this concern, I argue that FTAs and its tariff reductions are exogenous to industry-specific employment trends. First, FTAs are negotiated with a long-term vision based on political and economic factors. The EU has many different countries with different industries, which might all have different employment trends. It is therefore unlikely that a single industry in the EU could influence the specific tariff reductions mandated by the FTA. Second, the EU uses FTAs to achieve long-term economic goals such as market liberalization and investment promotion (European Commission, n.d.). The goal of the EU is also to increase consumer welfare by eliminating tariffs, which leads to lower prices for consumers. In many FTAs tariffs for all products are also eliminated, which shows that any possible employment trends do not influence the tariff reductions.

To examine possible heterogeneity across industries, all EU member countries are pooled together so that there are more observations for each industry. This gives the following regression:

$$(2) \quad Ln(\mathrm{E}mployment_{cit}) = \beta 0 + \beta 1 \sum_{cit}(Importweight_{cij} \times FTA_{jt}) + \beta 2 \sum_{cit}(Exportweight_{cij} \times FTA_{jt}) + \beta 3 \sum_{cit}(Importweight_{cij} \times Tariffs_{ijt}) + \beta 4 \sum_{cit}(Exportweight_{cij} \times Tariffs_{ijEUt}) + \beta 5 \sum_{cit}(Importweight_{cij} \times FTA_{jt} \times Tariffs_{ijt}) + \beta 6 \sum_{cit}(Exportweight_{cij} \times FTA_{jt} \times Tariffs_{ijEUt}) + \delta t + \varepsilon_{cijt}$$

The c dimension is now added to the model, and entails every EU member country. For this regression robust standard errors are used. This regression is performed for each industry separately. The results for the industries will be discussed later in the results section.

5. Results

First, the results of FTAs and tariffs on employment in the EU will be discussed. Table 2 shows the results for the EU of FTAs on employment. Column 1 is the first regression with only import- and export weight interacted with if an FTA is applied or not, for all observations. The results show there is no significant effect of import weight and having an FTA on employment. This indicates that when the EU imports more from a specific industry from a country with who they are in an FTA with this has no significant effect on employment. A negative coefficient for this estimate might be expected, as industries with higher import volumes from the countries entering into an FTA with the EU, may experience increased import competition due to the removal of trade barriers like tariffs. One of the reasons for the lack of any effect might be because the EU, before the FTA was applied, already had a large amount of tariffs equal to 0 for certain countries that were part of any of the GSP programs. By entering into an FTA less import barriers are removed with those GSP countries and there is less of an increase in import competition. Later, a regression will be performed to see the results only for the countries that did not benefit from any GSP program before the FTA was ratified, to see how employment is affected then.

The estimate for Exportweight_FTA in Table 2 in column 1 is significantly negative at the 5 percent level. This can be interpreted as that industries with higher exports to countries with an FTA, leads to lower employment levels in the corresponding industry. More specifically, because it is the natural logarithm of employment it can be interpreted as the percentage change in employment if the sum of $Exportweight_{EUij} \times FTA_{jt}$ increases by one unit. As a one-unit change in export weight is theoretically impossible, the mean export ratio for my sample is used, shown in Table 1. This leads to the following interpretation of $\beta 2 \sum_{cit}(Exportweight_{cij} \times FTA_{jt})$: -1.286 * 0.006 * 1 = -0.0077. For a specific industry, if 0.006 of its total exports is with country j, a change in FTA status leads to a 0.77% decrease in employment. This effect can be larger or smaller, depending on the size of the export weight. This result is not in line with previous literature that highlights the increased possibilities for exporting, due to trade liberalization.

Table 2. Results for EU employment

VARIABLES	(1) LnEmployment	(2) LnEmployment	(3) LnEmployment
Importweight_FTA	0.308	0.513	0.481
	(0.331)	(0.308)	(0.322)
Exportweight_FTA	-1.286**	-0.324	-0.359
	(0.593)	(0.352)	(0.417)
Importweight_Tariffs			-0.006
			(0.005)
Exportweight_Tariffs			-0.001
			(0.001)
Importweight_FTA_Tariffs			0.012
			(0.008)
Exportweight_FTA_Tariffs			0.001
			(0.002)
Constant	9.214***	9.176***	9.211***
	(0.221)	0.111	(0.126)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	594	593	593
R-squared	0.992	0.992	0.992

Note: This table shows the effects of the independent variables on the natural logarithmic of employment. Industry and Year fixed effects are used and standard errors are clustered at the industry level. Column 1 reports the estimates for the total dataset for the weighted import and export FTA. Column 2 reports the same estimates for all observations for which there is no missing tariff data. Column 3 includes all interaction variables and observations with missing tariff data are excluded. For one industry in one year all tariff data is missing. Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

In column 2 the same regression is performed as in column 1, only now all observations for which any import tariff or export tariff is missing are excluded from the analysis. This is so the result of the second regression in column 3, in which these observations are naturally excluded from the analysis, can be compared to the result of the first regression. The estimate in column 2 for $\sum_{it}(Exportweight_{cij} \times FTA_{jt})$ shows no significant effect on employment.

The third column of Table 2 shows the estimates for the second regression. For import weight interacted with FTA, again no significant result is found, as well as for import weight interacted with the level of tariffs. The estimate for $\sum_{cit}(Importweight_{cij} \times FTA_{jt} \times Tariffs_{ijt})$ is positive. However, the term is not statistically significant. The combined effect on the import side of FTAs and tariffs is 0.487 but this term is not significant with a p value of 0.137.

For Exportweight_FTA_Tariffs, the estimate is 0 and insignificant, so there is no effect for changes in export tariffs, when an FTA is active. The second hypothesis predicts that there will be a positive effect of lower tariffs, when interacted with an FTA. There is no evidence

that this hypothesis is true. Other studies that examined the impacts of export tariff changes also found none, or moderate effects on employment, so this result is not too surprising. The combined effect on the export side is -0.359, but insignificant.

These results suggests that there is no clear evidence that the FTA interacted with level of tariffs significantly affects employment in the EU. The absence of any significant results could be caused by multiple factors. Since this analysis looks at employment in all of the EU, it might be that employment in individual countries react differently to FTAs with partner countries and the level of tariffs. With these possible counteracting effects on employment, it might result in non-significant coefficients. To study if there are effects on employment for individual countries, the regressions are also performed for each EU member country. Furthermore, it could be that the inclusion of countries that previously fell under any GSP program, conceals the possible effects of the import side of FTAs and tariffs on employment.

5.1 Non-GSP countries

I perform a regression in Table 3 for only the countries that were not part of any GSP program before the FTA was ratified. From the 22 countries that entered into an FTA with the EU during 2003-2019, only 3 of those did not benefit from lower tariffs due to GSP. These countries are Canada, Japan and South Korea. This is interesting to study, because for those countries the FTA had a bigger effect on the removal of trade barriers, so it is more likely any effect is observed. Furthermore, as is shown in Appendix A and Appendix B, Canada, Japan and South Korea have the highest import- and export weights and are thus most likely to have any impact on employment levels for EU members.

A significant positive coefficient is found for the estimate of Importweight_FTA, in column 1 and column 2, indicating that a higher import weight combined with an FTA has a positive effect on employment. So this implies that employment benefits from the FTA. To interpret the results, the coefficient for each estimate is multiplied by the mean import ratio, which is 0.009. For $\beta 1$ this suggests that an increase in the sum of Importweight_FTA by 0.009, because an additional FTA is active, leads to an increase in employment of 0.481 * 0.009 * 1 * 100 = 0.43%.

Table 3. Results for EU employment excluding GSP countries

VARIABLES	(1) LnEmployment	(2) LnEmployment	(3) LnEmployment
Importweight_FTA	0.677***	0.517***	0.481**
	(0.187)	(0.167)	(0.182)
Exportweight_FTA	-1.180*	-0.269*	-0.250
	(0.593)	(0.146)	(0.153)
Importweight_Tariffs			-0.020*
			(0.011)
Exportweight_Tariffs			-0.000
			(0.000)
Importweight_FTA_Tariffs			0.020*
			(0.010)
Exportweight_FTA_Tariffs			0.001
			(0.001)
Constant	9.461***	9.172***	9.260***
	(0.206)	(0.054)	(0.075)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	594	575	575
R-squared	0.992	0.992	0.992

Note: Analysis were only Canada, Japan and South Korea are included as countries that signed an FTA. Other countries that signed an FTA and previously fell under one of the GSP programs are excluded from the sample. Import and export weights are adjusted accordingly. Column 1 shows the estimates for the sample with missing tariff data. Column 2 excludes all observations with missing tariff data and in column 3 all observations with missing tariff data are also excluded. Industry and Year fixed effects are used, and standard errors are clustered at the industry level in parentheses. *** p<0.01, ** p<0.05, *p<0.1

For Importweight_Tariffs a marginally significant negative effect is found. For $\beta 3$, the interpretation is for one percentage point decrease in tariffs, as this is more often the case with FTAs. This indicates that a decrease of one percentage point in tariffs leads to an increase in employment of -0.020 * 0.009 * -1 *100 = 0.018%. Conversely, for Importweight_FTA_Tariffs the coefficient is significantly positive at the 10 percent level. This indicates that when an FTA is applied, the industries where tariffs remain higher, have higher employment levels, compared to industries where tariffs are lower. The combined effect of an FTA and a reduction of tariffs of one percentage point on employment is $100 * ((\beta 1 * 1 * 0.009) + (\beta 3 * -1 * 0.009) + (\beta 5 * 1 * -1 * 0.009)) = 0.43\%$ and is significant at the 5 percent level. These results are not in line with the model from Melitz (2003) and the first hypothesis that predicts that the trade liberalization could lead to increased import competition and employment losses. However, this positive effect on employment could be the result of firms benefiting from lower prices for their inputs that FTAs facilitate. The lower production costs can lead to industries expanding production and increase employment. This mechanism could explain why the results show a positive relationship, in contrast to previous

literature which mainly highlights the negative impacts of import tariff cuts on employment. The study from Amiti and Konings (2007) found evidence in Indonesia that firms experienced productivity gains, because of lower tariffs for imported inputs. These effects could lead to higher profit margins and more workers being hired by firms.

For the other countries that entered into an FTA during 2003-2019, the GSP program meant they already benefited from lower tariffs, so the results in Table 2 for Importweight_FTA might be underestimated. In the analysis in Table 3 the effects of FTAs and tariffs, especially from the import perspective, are more notable and significant, than the results in Table 2. For the remainder of this research, only Canada, Japan and South Korea will be used in the sample as countries that signed FTAs, as this will be the baseline measure.

5.2 Heterogeneity across countries

For each EU member a coefficient plot is created for $\beta 1 \sum_{it}(Importweight_{ij} \times FTA_{jt})$, $\beta 3 \sum_{it}(Importweight_{ij} \times Tariffs_{ijt})$ and $\beta 5 \sum_{cit}(Importweight_{cij} \times FTA_{jt} \times Tariffs_{ijt})$ to compare the heterogeneous effects of import weight, FTAs and import tariffs on employment across EU member countries. Then the coefficient plots for $\beta 2 \sum_{it}(Exportweight_{ij} \times FTA_{jt})$, $\beta 4 \sum_{it}(Exportweight_{ij} \times Tariffs_{ijEUt})$and $\beta 6 \sum_{it}(Exportweight_{ij} \times FTA_{jt} \times \text{Tariffs}_{ijEUt})$ will also be studied to see the effects of export weight, FTAs and export tariffs on employment. In each of these coefficient plots industry and year fixed effects are used and standard errors are clustered at industry level. The coefficient plots only include Canada, Japan and South Korea as countries who entered into an FTA during 2003-2019. The other countries that entered into an FTA with the EU are excluded from the sample. EU members that entered later than 2002 in the European Union, are included from the year they were part of the EU.

Figure 1 shows the effect of having an FTA interacted with the import weight on employment. For most countries, there is no significant positive or negative effect. For Austria, Italy, Luxembourg, Netherlands and Spain there is a positive effect on employment, just as was estimated in Table 3 for the EU. It could be that firms in these countries benefit from the lower prices for imported inputs, and this could increase the levels of employment.

The coefficient plot in Figure 2 shows the results for import weight interacted with the level of import tariffs on employment. Industries that have higher import tariffs for trade partners all across the world do not seem to have higher employment levels than industries who face

lower tariffs. Only for Netherlands and Romania a significant negative is found, indicating that import tariffs have a negative effect on employment, and thus that industries with lower tariffs could grow their employment levels.

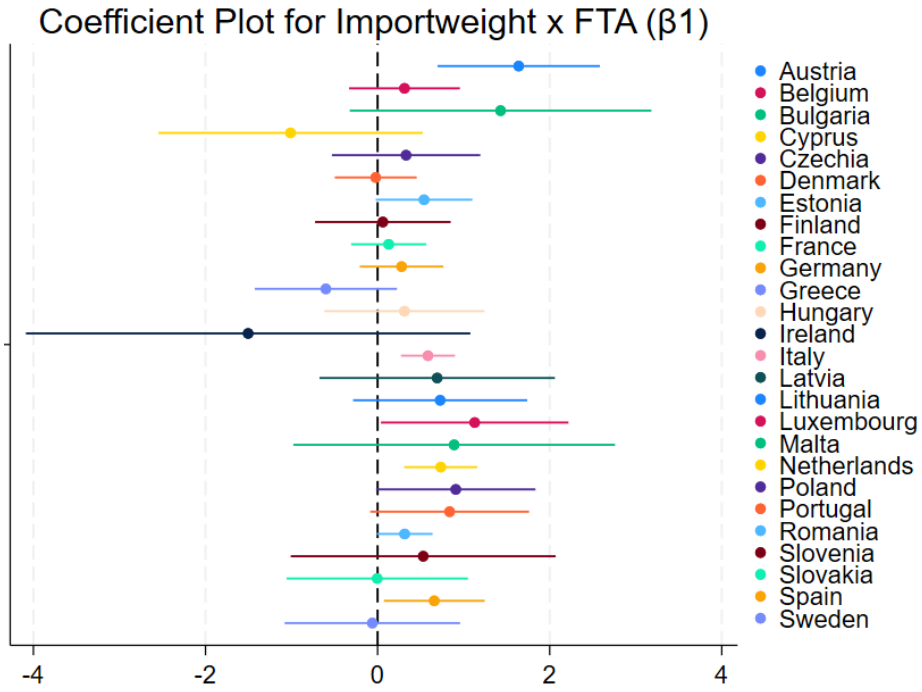

Figure 1. Coefficient plot for EU members for Importweight_FTA for the second regression. The regression is performed for each country individually and the estimate for β1 is shown in this figure. In the sample, Canada, Japan and South Korea are included as the countries that signed an FTA, during 2003-2019. The dot indicates the coefficient and the horizontal line for each country is the confidence interval. Industry and year fixed effects are used and standard errors are clustered at industry level.

In Figure 3, the import weight is interacted with the level of import tariffs and with the FTA dummy. A positive coefficient in this case suggests that when an FTA is applied, a higher level of import tariffs has a positive effect on employment, and conversely, lower tariffs a negative effect on employment. The level of import tariffs the EU has for countries after it entered into an FTA is predominantly 0. Nevertheless, in industries where tariffs remain relatively high, the tariffs could still have the protective effect and lead to a higher level of employment in those industries.

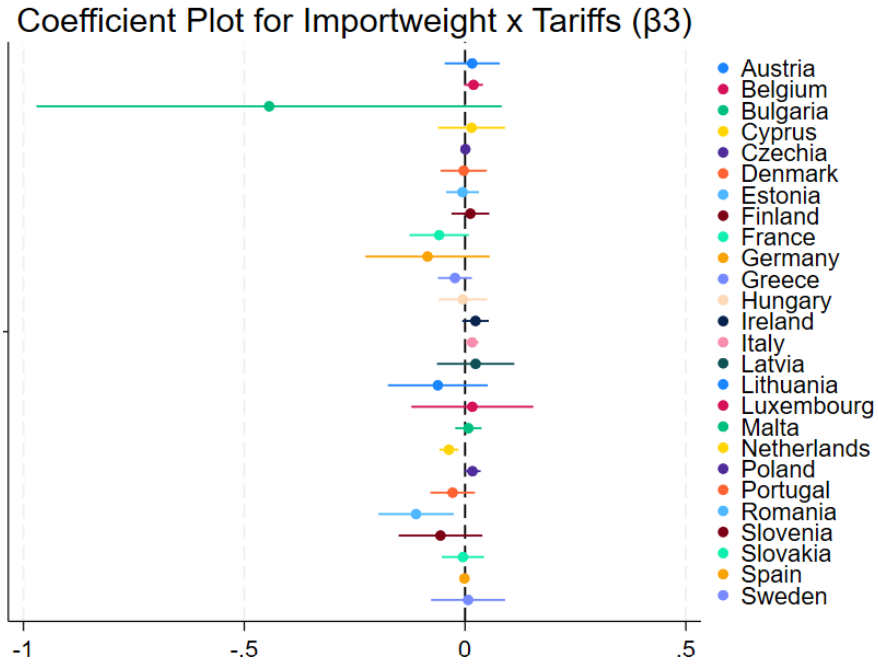

Figure 2. Coefficient plot for EU members for Importweight_Tariffs for the second regression. The regression is performed for each country individually and the estimate for β3 is shown in this figure. In the sample, Canada, Japan and South Korea are included as the countries that signed an FTA, during 2003-2019. The dot indicates the coefficient and the horizontal line for each country is the confidence interval. Industry and year fixed effects are used and standard errors are clustered at industry level.

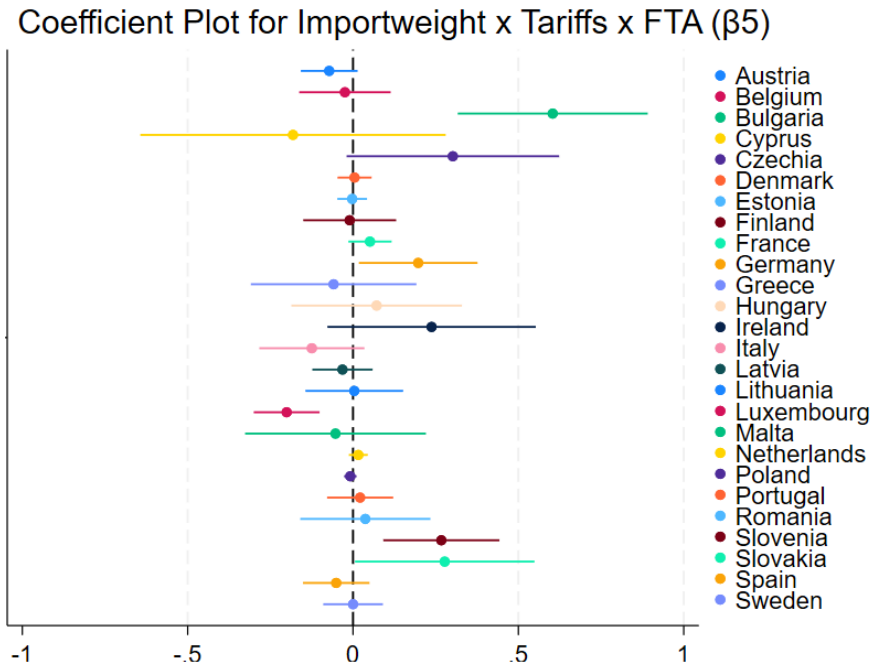

Figure 3. Coefficient plot for EU members for Importweight_Tariffs_FTA for the second regression. The regression is performed for each country individually and the estimate for β5 is shown in this figure. In the sample, Canada, Japan and South Korea are included as the countries that signed an FTA, during 2003-2019. The dot indicates the coefficient and the horizontal line for each country is the confidence interval. Industry and year fixed effects are used and standard errors are clustered at industry level.

Figure 3 shows that for most countries there is no clear effect between change in FTA status interacted with the level of import tariffs and import weight on employment. For Bulgaria, Germany and Slovenia there is a significant positive relationship. This thus suggests that for those countries, when an FTA is applied, the industries where tariffs remain higher, have higher employment levels, compared to industries where tariffs are lower.

Table 4 shows the combined effects on the import and export side of FTAs and tariffs across the EU member countries. More precisely, this shows the effect when an FTA is applied and tariffs decrease by one percentage point. As discussed earlier, this combined effect on the import side is $((\beta 1 * 1) + (\beta 3 * -1) + (\beta 5 * 1 * -1))$. For Austria, Italy and the Netherlands there is a highly significant positive effect on employment for an FTA and lower tariffs. This again supports the study by Amiti and Konings (2007). For Czech Republic, Estonia, Luxembourg, Portugal, Romania and Spain there are less significant positive effects. For all other countries no significant effect is found. These results are not consistent with the first hypothesis, that predicts that lower tariffs combined with an FTA, have a negative effect on employment.

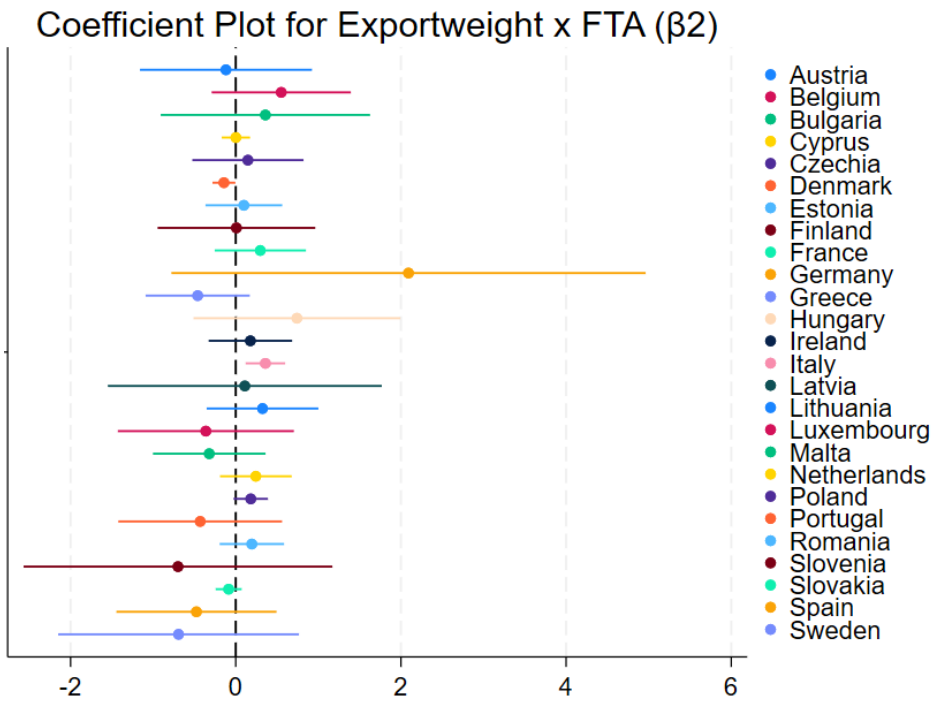

Figure 4. Coefficient plot for EU members for Exportweight_FTA for the second regression. The regression is performed for each country individually and the estimate for β2 is shown in this figure. In the sample, Canada, Japan and South Korea are included as the countries that signed an FTA, during 2003-2019. The dot indicates the coefficient and the horizontal line for each country is the confidence interval. Industry and year fixed effects are used and standard errors are clustered at industry level.

The coefficient plot in Figure 4, shows the relationship between having an FTA interacted with export weight and employment. For almost all countries there is no significant relationship. For Italy there is a significant positive effect. This suggests that for Italy the lower export tariffs have led to domestic firms increasing their employment due to the lowering of the export barriers. For all other countries no significant effect is found. Firm-level data could further demonstrate if there are effects for other countries at firm level. For example, it might be that highly productive firms increase their exports and employment, but that less productive firms have employment losses (Trefler, 2004). For Exportweight_Tariffs in Figure 5, no significant results are observed. The only outlier is Bulgaria which surprisingly shows a positive coefficient.

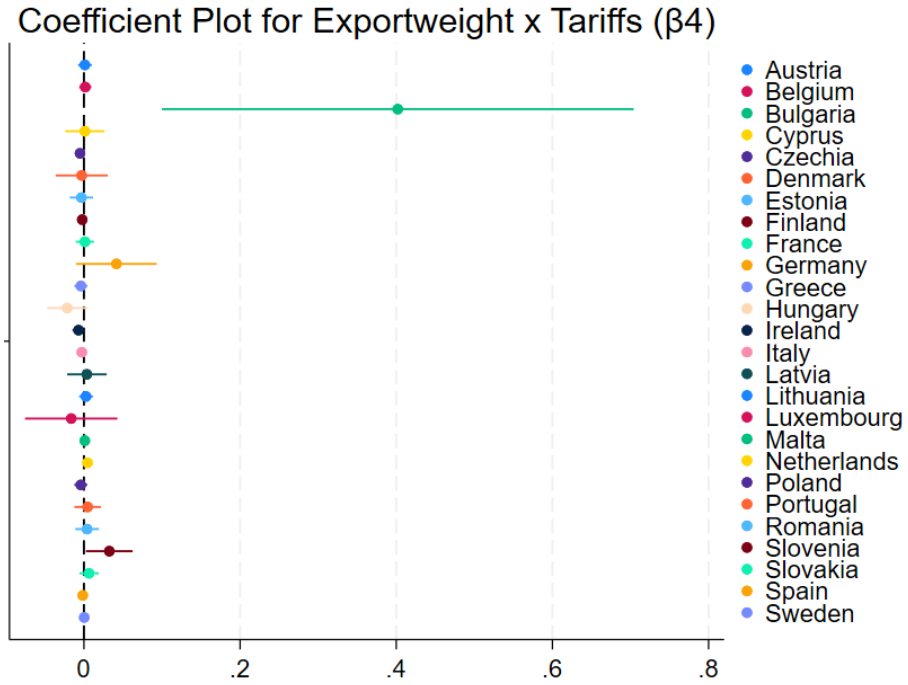

Figure 5. Coefficient plot for EU members for Exportweight_Tariffs for the second regression. The regression is performed for each country individually and the estimate for β4 is shown in this figure. In the sample, Canada, Japan and South Korea are included as the countries that signed an FTA, during 2003-2019. The dot indicates the coefficient and the horizontal line for each country is the confidence interval. Industry and year fixed effects are used and standard errors are clustered at industry level.

Figure 6 shows $\beta 6 \sum_{it}(Exportweight_{cij} \times FTA_{jt} \times \text{Tariffs}_{ijEUt})$ for each EU member country. A positive $\beta 6$ indicates that when an FTA is applied, a higher level of export tariffs, leads to higher levels of employment in the corresponding industries. Table 4 shows the combined effects on the export side of FTAs and tariffs across the EU member countries. More precisely, this shows the effect when an FTA is applied and tariffs decrease by one percentage point. The combined effect on the export side is $((\beta 2 * 1) + (\beta 4 * -1) +$

($\beta 6 * 1 * -1$)). The second hypothesis predicted that industries with lower export tariffs could increase their employment levels, because of lower exporting costs. This phenomenon is only observed for Italy, that has a significant positive coefficient for the effect of an FTA and lower tariffs on employment. For Denmark there is a significant negative relationship, which is surprising, as the lower export tariffs do not harm domestic firms in any way. It could be that many non-exporting firms have to exit the market and the exporting firms increase their trade volume, as Trefler (2004) finds in his paper. As firm level data is not available, this mechanism cannot be examined. For all other countries no significant effect is found.

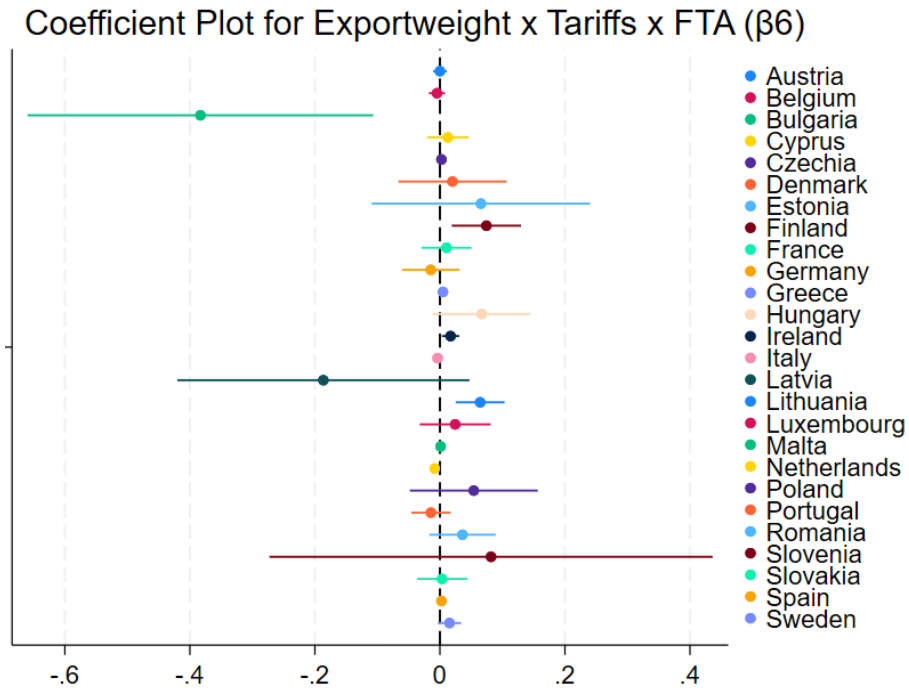

Figure 6. Coefficient plot for EU members for Exportweight_FTA_Tariffs for the second regression. The regression is performed for each country individually and the estimate for β6 is shown in this figure. In the sample, Canada, Japan and South Korea are included as the countries that signed an FTA during 2003-2019. The dot indicates the coefficient and the horizontal line for each country is the confidence interval. Industry and year fixed effects are used and standard errors are clustered at industry level.

Table 4: Combined import- and export effects on employment for EU member countries

Country	LnEmployment (Import)	LnEmployment (Export)
Austria	1.696***	-0.120
	(0.476)	(0.509)
Belgium	0.318	0.554
	(0.350)	(0.411)
Bulgaria	1.269	0.340
	(0.966)	(0.660)
Cyprus	-0.845	-0.012
	(0.804)	(0.080)
Czech Republic	0.028*	0.150
	(0.553)	(0.333)
Denmark	-0.023	-0.160**
	(0.232)	(0.074)
Estonia	0.548*	0.036
	(0.290)	(0.203)
Finland	0.059	-0.064
	(0.424)	(0.473)
France	0.136	0.286
	(0.213)	(0.285)
Germany	0.167	2.065
	(0.249)	(1.398)
Greece	-0.519	-0.462
	(0.449)	(0.311)
Hungary	0.245	0.695
	(0.544)	(0.614)
Ireland	-1.766	0.167
	(1.409)	(0.250)
Italy	0.694***	0.365***
	(0.206)	(0.118)
Latvia	0.700	0.292
	(0.664)	(0.805)
Lithuania	0.785	0.257
	(0.536)	(0.333)
Luxembourg	1.313**	-0.370
	(0.507)	(0.512)
Malta	0.935	-0.323
	(0.999)	(0.328)
Netherlands	0.755***	0.247
	(0.210)	(0.212)
Poland	0.900*	0.132
	(0.454)	(0.136)
Portugal	0.844*	-0.421
	(0.488)	(0.494)
Romania	0.388*	0.155
	(0.197)	(0.189)
Slovak Republic	0.276	-0.096
	(0.561)	(0.077)
Slovenia	0.319	-0.814
	(0.771)	(0.907)
Spain	0.711**	-0.477
	(0.318)	(0.478)
Sweden	-0.0567	-0.708
	(0.501)	(0.722)

Note: This table shows the results for the combined effects of FTAs and lower tariffs on employment. In column 1 the effects on the import side are estimated for each country. This effect is estimated using $(\beta 1 * 1) + (\beta 3 * -1) + (\beta 5 * 1 * -1)$. In column 2 the effects on the export side are estimated for each country using $(\beta 2 * 1) + (\beta 4 * -1) + (\beta 6 * 1 * -1)$. Industry and Year fixed effects are used, and standard errors are clustered at industry level.

5.3 Heterogeneity across industries

I examine how the effect on employment differs across industries. Again, a coefficient plot is created for each term to analyze the effects of FTAs and tariff levels on employment levels across industries in the EU. For each industry, the regression specified in the methodology section is performed. In this analysis, only Canada, Japan and South Korea are included from the countries that signed an FTA during 2003-2019. In this regression, all EU countries are pooled together to create sufficient observations for each industry, otherwise there would only be 18 observations for each industry. This approach will give insights for which industries the level of tariffs could be important as a protectionist measure for employment, or can provide cheaper inputs to cut production costs. The description of the industry is simplified into a short term that catches the main genre of that industry. The industry 'Other service activities' is excluded, as no coefficient could be calculated, possibly due to lack of datapoints. For the clarity and readability of the coefficient plots, outlier industries are excluded. The presence of these outliers made it difficult to observe the effects for the remaining industries. The combined effect from the import and export perspective are presented in Table 5.

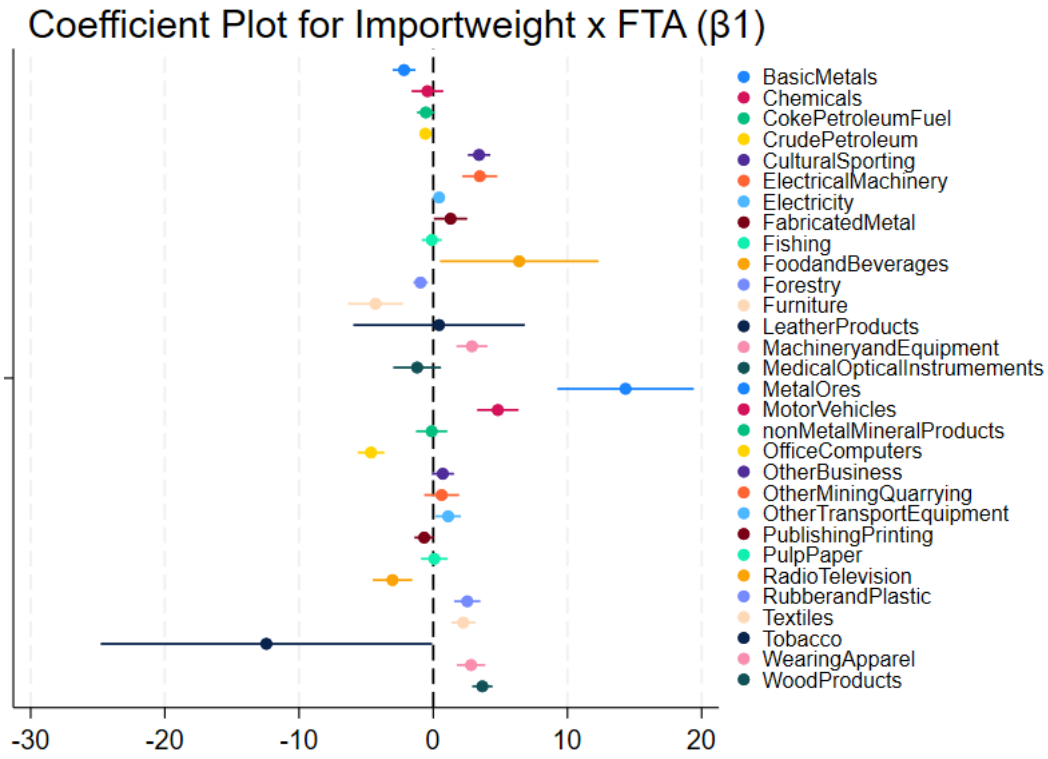

Figure 7. Coefficient plot for industries for Importweight_FTA for the second regression. The regression is performed for each industry individually and the estimate for β1 is shown in this figure. The dot indicates the coefficient for each industry and the line is the confidence interval. Year fixed effects are used and robust standard errors are used.

Figure 7 shows for each industry the effects FTAs interacted with import weight have for each industry. There seems to be clear heterogeneity across industries, as there are industries where employment benefits from the FTA, and industries for which employment decreases. To interpret the results in this figure, it is important to consider the import weights, as when an FTA is signed, the sum of $(Importweight_{cij} \times FTA_{jt})$ increases by the value of the import weight. This means that if the EU enters into a FTA with a country with an import weight of 0.009 for a certain industry, this leads to an effect of $\beta 1 * 0.009$ *100% on employment. There seem to be less significant effects in Figure 8, which shows the import weight interacted with the level of import tariffs. The coefficient plots for the interaction term with FTAs, tariffs and the created weights are shown in Appendix E.

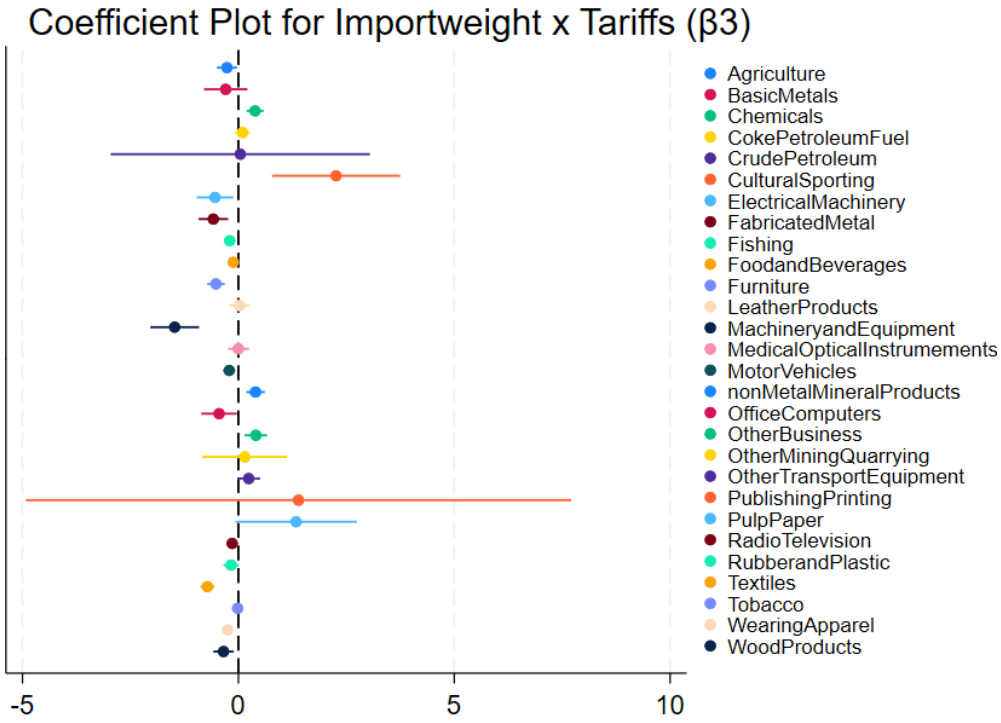

Figure 8. Coefficient plot for industries for Importweight_Tariffs for the second regression. The regression is performed for each industry individually and the estimate for β3 is shown in this figure. The dot indicates the coefficient for each industry and the line is the confidence interval. Year fixed effects are used and robust standard errors are used.

Table 5 shows the combined import effect for each industry. For imports, the combined import effect is again calculated as the effect of FTAs and lower tariffs on employment, which can be written as $(\beta 1 * 1) + (\beta 3 * -1) + (\beta 5 * 1 * -1)$. For the industries with significant positive coefficients, the lower tariffs and the FTA seem to provide benefits, as those industries increase their employment following an FTA and lower tariffs. The industries with a significant negative coefficient, experience employment losses because of the FTA and lower

tariffs. This is the case for 'Forestry' and manufacturing industries as 'Furniture', 'RadioTelevision' and 'CokePetroleumFuel'. The coefficient suggests that for these industries, the increased import competition because of the FTA and lower tariffs, leads to employment losses. This finding is in line with the model by Melitz (2003) that predicts that increased import competition can lead to less productive domestic firms shutting down. Unfortunately, in my research firm-level data is not available, so the mechanisms behind the effects on employment cannot be examined. Future research could study the inputs for each industry and how the tariffs for these inputs affect employment in those industries, as this would further show the impact of import tariffs on employment and how this is related to prices for imported inputs. The heterogeneity across industries is expected, as industries are different in how many imported inputs are used.

Table 5: Combined import- and export effects on employment across industries

Industry	LnEmployment (Import)	LnEmployment (Export)
Agriculture	25,586***	3,631***
	(3,326)	(1,337)
BasicMetals	-2,200	-1,086
	(0,971)	(0,688)
Chemicals	-0,589	1,928**
	(1,680)	(0,973)
CoalandLignite	33,612***	3,270***
	(8,541)	(0,651)
CokePetroleumFuel	-11,80***	0,669**
	(3,269)	(0,296)
CrudePetroleum	-0,629	0,107
	(1,447)	(0,144)
CulturalSporting	12,473***	0,448
	(4,759)	(0,428)
ElectricalMachinery	3,102*	1,974**
	(1,621)	(0,804)
Electricity	0,441***	1,286***
	(0,140)	(0,173)
FabricatedMetal	1,844	0,160
	(1,981)	(0,672)
Fishing	-0,092	0,293
	(0,404)	(0,339)
FoodandBeverages	6,999**	7,289***
	(3,169)	(1,722)
Forestry	-0,944***	0,653
	(0,269)	(0,989)
Furniture	-5,830***	1,796***
	(1,503)	(0,619)
LeatherProducts	-38,204	-0,796
	(26,416)	(0,654)
MachineryandEquipment	5,482***	9,319***
	(1,936)	(0,958)
MedicalOpticalInstrumements	-1,450	5,241***
	(2,288)	(1,137)
MetalOres	14,330***	-0,253

	(2,552)	(0,950)
MotorVehicles	6,426***	-0,315
	(0,905)	(0,547)
nonMetalMineralProducts	-2,967**	0,314
	(1,283)	(0,575)
OfficeComputers	-12,22***	2,746***
	(2,569)	(0,455)
OtherBusiness	-0,697***	-5,650***
	(0,880)	(1,619)
OtherMiningQuarrying	-23,69***	-1,338***
	(8,173)	(0,593)
OtherTransportEquipment	2,675*	-0,565
	(1,385)	(0,521)
PublishingPrinting	-2,064	0,579***
	(3,167)	(0,425)
PulpPaper	-6,431*	1,383*
	(3,386)	(0,821)
RadioTelevision	-5,661***	1,146*
	(1,434)	(0,678)
RubberandPlastic	2,067**	-2,224***
	(0,851)	(0,467)
Textiles	1,230**	-0,079
	(1,719)	(0,428)
Tobacco	-12,24*	-0,709*
	(6,369)	(0,397)
WearingApparel	3,250***	-2,351***
	(0,640)	(0,481)
WoodProducts	8,546***	-1,474***
	(1,559)	(0,434)

Note: This table shows the results for the combined effects of FTAs and lower tariffs on employment. In column 1 the effects on the import side are estimated for each industry. This effect is estimated using $(\beta 1 * 1) + (\beta 3 * -1) + (\beta 5 * 1 * -1)$. In column 2 the effects on the export side are estimated for each industry using $(\beta 2 * 1) + (\beta 4 * -1) + (\beta 6 * 1 * -1)$. Year fixed effects are used, and standard errors are robust.

Figure 9 illustrates the effects of an FTA interacted with the export weight for each industry. For most industries there seems to be a positive effect of the FTA on employment. These industries seem to increase their employment because of increased export possibilities. The coefficient plot in Figure 10, that displays the effects of export tariffs, demonstrates more variation across industries for the effects on employment. Table 5 shows the combined effects on the export side of FTAs and tariffs across industries. More precisely, this shows the effect when an FTA is applied and tariffs decrease by one percentage point. The combined effect on the export side is $((\beta 2 * 1) + (\beta 4 * -1) + (\beta 6 * 1 * -1))$. For industries with a positive coefficient, the FTA and the reduction of tariffs, lead to an increase in employment levels. The second hypothesis predicted this effect on employment. Although this effect was not seen in the entire EU when performed for all industries in Table 1 and 2, when looking at industries individually with all countries pooled together these effects become visible for some industries. The industries with a negative coefficient experience employment losses. It could be that many non-exporting firms have to exit the market and the exporting firms increase their trade volume (Trefler, 2004).

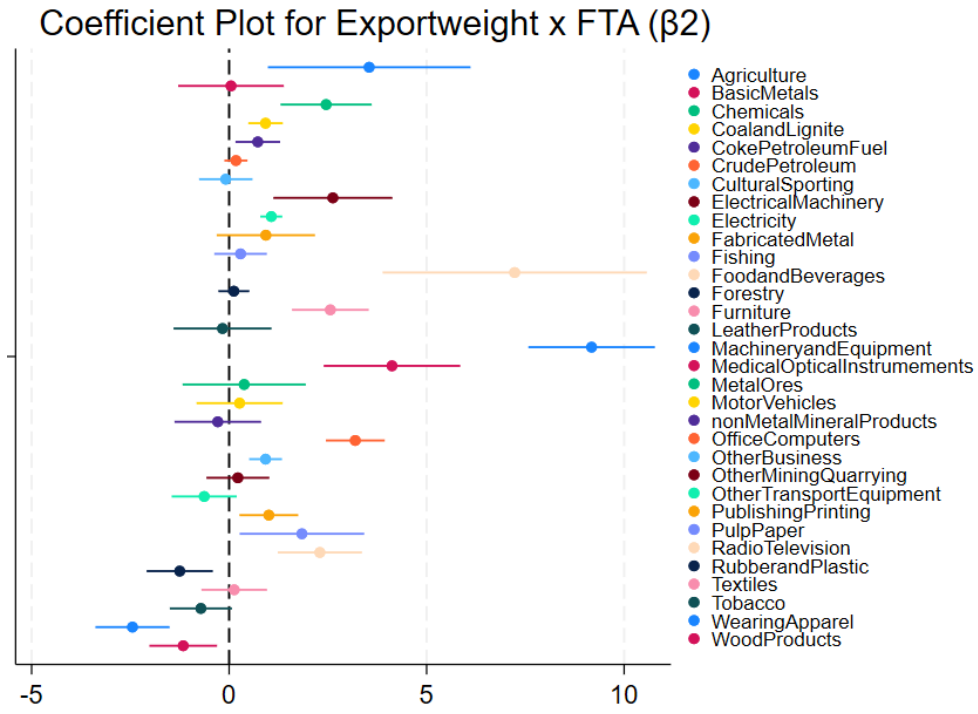

Figure 9. Coefficient plot for industries for Exportweight_FTA for the second regression. The regression is performed for each industry individually and the estimate for β2 is shown in this figure. The dot indicates the coefficient for each industry and the line is the confidence interval. Year fixed effects are used and robust standard errors are used.

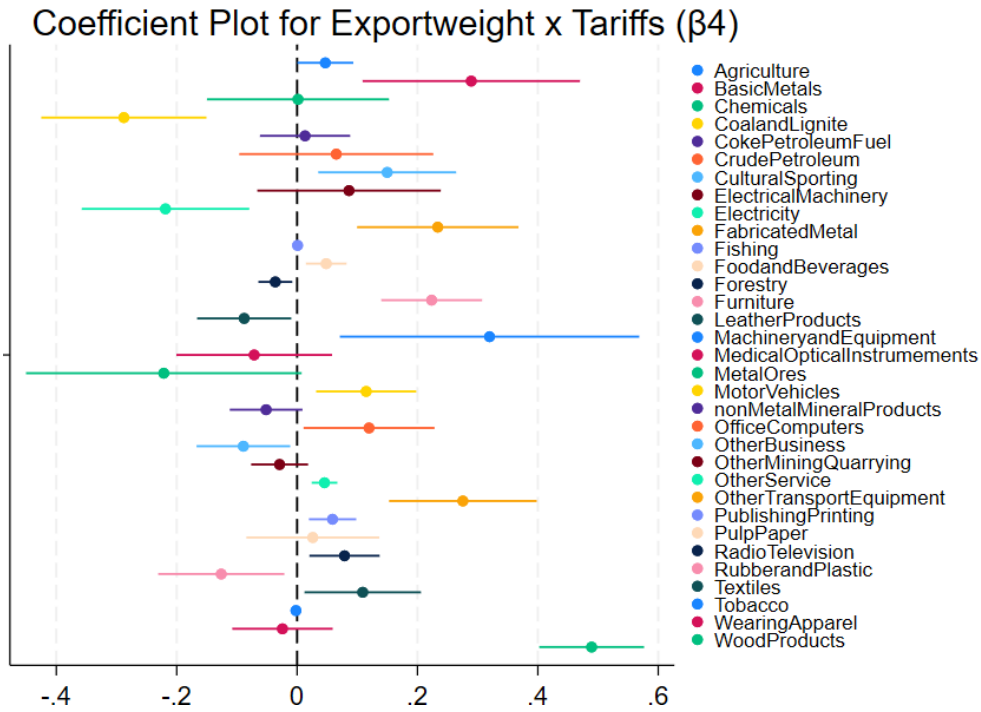

Figure 10. Coefficient plot for industries for Exportweight_Tariffs for the second regression. The regression is performed for each industry individually and the estimate for β4 is shown in this figure. The dot indicates the coefficient for each industry and the line is the confidence interval. Year fixed effects are used and robust standard errors are used.

6. Conclusion

This paper has studied the impact of Free Trade Agreements (FTAs) and their associated tariff levels on employment across 33 industries for the European Union and its member countries. With the created import- and export weights and the use of industry and year fixed effects the impact of FTAs on employment is estimated. The effects of FTAs on employment are multifaceted and reveal differentiated effects across member countries and for the impact on the import and export side. Specifically, the interaction between import weights and FTAs did not show a significant effect on employment, suggesting that entering into an FTA with a country with a higher import share for a certain industry, did not affect employment in that industry. However, when only looking at countries that did not benefit from lower tariffs pre-FTA, there seems to be a positive effect on employment for the FTA interacted with import weight. This could be the effect of firms benefiting from lower prices for imported inputs. Conversely, the interaction between export weights and FTA, showed a marginally significant negative effect on employment. However, no significant effect was observed when this variable was interacted with the level of export tariffs, implying that changes in export tariffs under FTAs do not significantly affect employment levels. This finding is comparable with previous literature which shows the effects of export tariffs are moderate or only observable at the firm-level.

When the effects are estimated across different EU member countries, the results show that the effects of FTAs and tariffs on employment across EU member countries are heterogeneous. For most countries, no clear positive or negative impact of FTAs and tariffs was observed. However, countries such as Austria, Italy and the Netherlands experienced significant positive effects on employment when an FTA was applied and there were lower tariffs, supporting the idea that reduced import costs can increase employment. In my research there is no evidence that FTAs and tariff cuts led to employment losses, contrary to evidence provided in previous research. For policymakers it is important to consider the differentiated effects for countries and industries.

This study contributes to the existing literature by providing a framework that displays the effects of FTAs and tariff reductions on employment within the EU. Previous studies did not study the effects of FTAs for the EU on employment, but primarily looked at the effects for individual countries, mostly outside Europe. This study highlighted the important finding that

lower importing tariffs are not always harmful for domestic firms, but can even be advantageous, as was found earlier by (Amiti & Konings, 2007).

6.1 Limitations

This study has several limitations and these will be further explained. Firstly, the lack of disaggregated employment data makes it harder to precisely estimate the effects of tariff changes on employment. Tariff data is available at a very disaggregated level, but this is aggregated at the level for which employment data is available. This aggregation discards some potentially import variation in tariffs within industry groups and can lead to less accurate estimates, as tariffs for many products are grouped together (Goldberg & Pavcnik, 2007). Related to this is the conversion of HS6 tariffs data to Nace 1.1 employment data. The use of correspondence tables, to first convert the HS6 tariffs to ISIC 4 and then from ISIC 4 to Nace 1.1, can be noisy and lead to measurement errors.

Secondly, this study uses aggregated employment data for EU member countries and the EU, and lacks firm level data. This limits the ability to examine possible mechanisms that explain the effects on employment. Furthermore, if firm level data was available the heterogeneous effects for low-productivity and high-productivity firms could be studied, as previous studies found differentiated effects for low- and high-productivity firms (Trefler, 2004) (Bernard, Jensen & Schott, 2006) (Rodriguez-Lopez & Yu, 2024). These counteracting effects thus make it harder to observe any effect on employment, when it is aggregated for the country.

Thirdly, the missing data on import tariffs and export tariffs led to different outcomes on employment when included and excluded. If the missing observations are related to outcomes in employment, this could possibly lead to biased estimates. For example, if a country does not report the level of tariffs to the WTO, when the economy is doing worse, this could lead to them importing less goods from EU countries which could harm employment. This would lead to the missing observations not being independent of the outcome variable, and the effects on employment would be overestimated.

6.2 Future research

Further studies can explore the mechanisms behind the observed effects on employment, as these remain unclear in this study. This could be done by examining the possible heterogeneity across different firm productivity levels. Furthermore, it could be interesting to examine the effects of FTAs on wages and sales, as these are outcome variables that could be influenced by the level of protection and trade agreements as well.

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8. Appendix

Appendix A: Countries the EU has an FTA with in the period 2003-2019 and summary statistics on import weights.

#	Country	FTA implemented	Observations	Mean	Std. dev	Min	Max
1	*Chile*	*2003*	*540*	*0.0080*	*0.0155*	*2.75e-08*	*0.0591*
2	*Egypt*	*2004*	*576*	*0.0035*	*0.0051*	*0*	*0.2322*
3	*North Macedonia*	*2005*	*558*	*0.0005*	*0.0006*	*0*	*0.0020*
4	*Algeria*	*2005*	*558*	*0.0078*	*0.0399*	*0*	*0.2262*
5	*Albania*	*2007*	*540*	*0.0003*	*0.0004*	*3.66e-07*	*0.0133*
6	*Lebanon*	*2008*	*540*	*0.0004*	*0.0007*	*0*	*0.0033*
7	*Bosnia*	*2009*	*576*	*0.0014*	*0.0024*	*0*	*0.0099*
8	*South Korea*	*2011*	*576*	*0.0178*	*0.0262*	*0*	*0.1094*
9	*Georgia*	*2014*	*540*	*0.0001*	*0.0002*	*0*	*0.0009*
10	*Moldova*	*2014*	*558*	*0.0021*	*0.0004*	*0*	*0.0017*
11	*Costa Rica*	*2014*	*540*	*0.0013*	*0.0050*	*0*	*0.0279*
12	*El Salvador*	*2014*	*486*	*0.0002*	*0.0007*	*0*	*0.0034*
13	*Guatemala*	*2014*	*540*	*0.0002*	*0.0004*	*0*	*0.0019*
14	*Honduras*	*2014*	*522*	*0.0010*	*0.0029*	*0*	*0.0132*
15	*Nicaragua*	*2014*	*504*	*0.0005*	*0.0015*	*0*	*0.0073*
16	*Panama*	*2014*	*540*	*0.0005*	*0.0018*	*0*	*0.0096*
17	*Colombia*	*2014*	*558*	*0.0059*	*0.0227*	*5.85e-06*	*0.1253*
18	*Peru*	*2015*	*540*	*0.0027*	*0.0065*	*0*	*0.0274*
19	*Ukraine*	*2017*	*594*	*0.0080*	*0.0098*	*2.15e-05*	*0.0357*
20	*Ecuador*	*2017*	*558*	*0.0012*	*0.0046*	*0*	*0.0246*
21	*Canada*	*2017*	*576*	*0.0295*	*0.0375*	*0*	*0.1885*
22	*Japan*	*2019*	*576*	*0.0764*	*0.1073*	*4.17e-07*	*0.4620*

Appendix B: Countries the EU has an FTA with in the period 2003-2019 and summary statistics on export weights.

#	Country	FTA implemented	Observations	Mean	Std. dev	Min	Max
1	*Chile*	*2003*	*540*	*0.0033*	*0.0025*	*8.61e-05*	*0.0101*
2	*Egypt*	*2004*	*576*	*0.0108*	*0.0108*	*4.32e-06*	*0.0474*
3	*North Macedonia*	*2005*	*558*	*0.0031*	*0.0036*	*0.0002*	*0.0184*
4	*Algeria*	*2005*	*558*	*0.0090*	*0.0109*	*1.34e-07*	*0.0604*
5	*Albania*	*2007*	*540*	*0.0024*	*0.0036*	*3.70e-05*	*0.0191*
6	*Lebanon*	*2008*	*540*	*0.0048*	*0.0039*	*5.12e-05*	*0.0164*
7	*Bosnia*	*2009*	*576*	*0.0030*	*0.0034*	*1.44e-07*	*0.0158*
8	*South Korea*	*2011*	*576*	*0.0143*	*0.0117*	*0*	*0.0596*
9	*Georgia*	*2014*	*540*	*0.0003*	*0.0003*	*0*	*0.0019*
10	*Moldova*	*2014*	*558*	*0.0011*	*0.0020*	*1.27e-05*	*0.0108*
11	*Costa Rica*	*2014*	*540*	*0.0007*	*0.0006*	*8.53e-06*	*0.0021*
12	*El Salvador*	*2014*	*486*	*0.0006*	*0.0010*	*8.02e-06*	*0.0053*
13	*Guatemala*	*2014*	*540*	*0.0005*	*0.0004*	*7.32e-06*	*0.0017*
14	*Honduras*	*2014*	*522*	*0.0002*	*0.0001*	*0*	*0.0008*
15	*Nicaragua*	*2014*	*504*	*0.0001*	*0.0002*	*5.47e-08*	*0.0008*
16	*Panama*	*2014*	*540*	*0.0011*	*0.0013*	*1.86e-06*	*0.0072*
17	*Colombia*	*2014*	*558*	*0.0017*	*0.0016*	*0*	*0.0067*
18	*Peru*	*2015*	*540*	*0.0016*	*0.0037*	*8.42e-07*	*0.0211*
19	*Ukraine*	*2017*	*594*	*0.0062*	*0.0056*	*0*	*0.0225*
20	*Ecuador*	*2017*	*558*	*0.0008*	*0.0007*	*0*	*0.0027*
21	*Canada*	*2017*	*576*	*0.0283*	*0.0285*	*0.0044*	*0.1301*
22	*Japan*	*2019*	*576*	*0.0620*	*0.0579*	*0*	*0.3277*

Appendix C: List of industries used.

Agriculture, hunting and related service activities

Forestry, logging and related service activities

Fishing, fish farming and related service activities

Mining of coal and lignite; extraction of peat

Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction, excluding surveying

Mining of metal ores

Other mining and quarrying

Manufacture of food products and beverages

Manufacture of tobacco products

Manufacture of textiles

Manufacture of wearing apparel; dressing; dyeing of fur

Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear

Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials

Manufacture of pulp, paper and paper products

Publishing, printing and reproduction of recorded media

Manufacture of coke, refined petroleum products and nuclear fuel

Manufacture of chemicals and chemical products

Manufacture of rubber and plastic products

Manufacture of other non-metallic mineral products

Manufacture of basic metals

Manufacture of fabricated metal products, except machinery and equipment

Manufacture of machinery and equipment n.e.c.

Manufacture of office machinery and computers

Manufacture of electrical machinery and apparatus n.e.c.

Manufacture of radio, television and communication equipment and apparatus

Manufacture of medical, precision and optical instruments, watches and clocks

Manufacture of motor vehicles, trailers and semi-trailers

Manufacture of other transport equipment

Manufacture of furniture; manufacturing n.e.c.

Electricity, gas, steam and hot water supply

Other business activities

Recreational, cultural and sporting activities

Other service activities

Note: List of industries for which goods are traded. Industries are in Nace 1.1

Appendix D: Further summary statistics for the dataset.

Table 6. Balance tests for trade ratio's and employment for missing and non-missing export tariffs

	Non-missing		Missing	
	Obs	Mean	Obs	Mean
Employment	56,535	1924.024	44,391	1879.251
		(10.169)		(11.614)
Import ratio	56,535	0.009	44,391	0.002
		(0.000)		(0.000)
Export ratio	56,535	0.009	44,391	0.001
		(0.000)		(0.000)

Note: Balance test for import and export ratio's and employment to see differences in variables for missing and non-missing values. Standard errors are reported in parentheses.

Table 7. Correlation table for import- and export weights to applied import- and export tariffs

	Import ratio	Export ratio	Import tariffs	Export tariffs
Import ratio	1.000			
Export ratio	0.605	1.000		
Import tariffs	0.088	0.077	1.000	
Export tariffs	-0.019	-0.027	0.157	1.000

Note: Correlation table that shows the correlation for import- export ratio's and import- export tariffs.

Table 8. Import and export tariffs pre and post FTA for countries that signed an FTA during the sample

Tariff type	PRE FTA	POST FTA
Import tariffs	1.580	0.449
Export tariffs	7.244	4.713

Note: This table reports the average applied import and export tariffs before and after they entered into an FTA with the EU for countries that signed an FTA during 2003-2019 .

Appendix E: Coefficient plots for β5 and β6 for each industry.

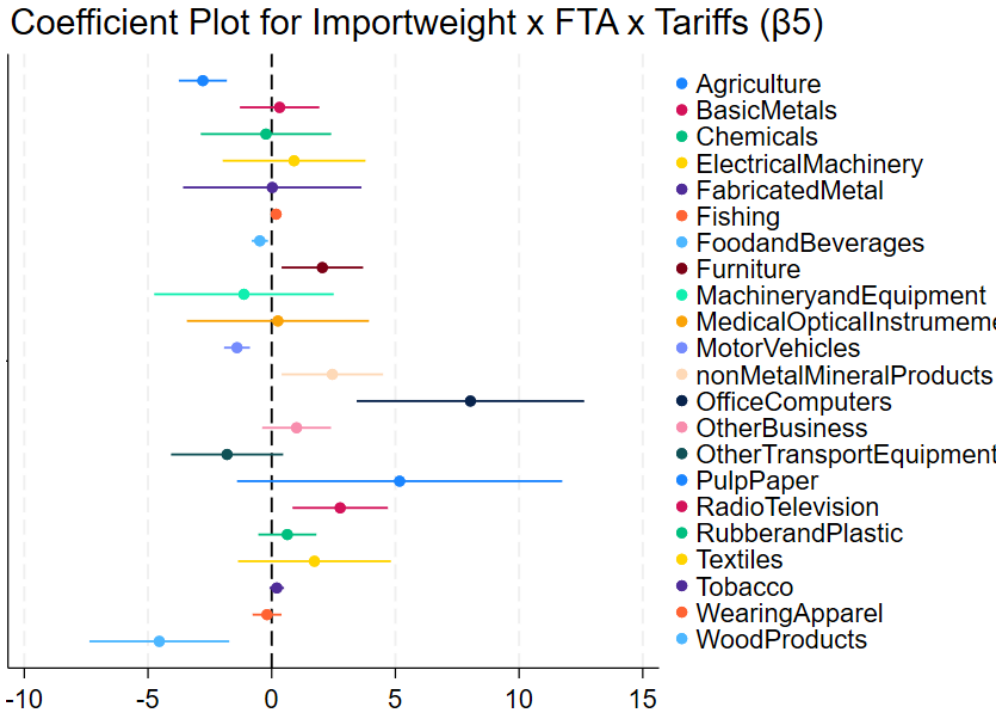

Figure 9. Coefficient plot for industries for Importweight_FTA_Tariffs for the second regression. The regression is performed for each industry individually and the estimate for β5 is shown in this figure. The dot indicates the coefficient for each industry and the line is the confidence interval. Year fixed effects are used and robust standard errors are used.

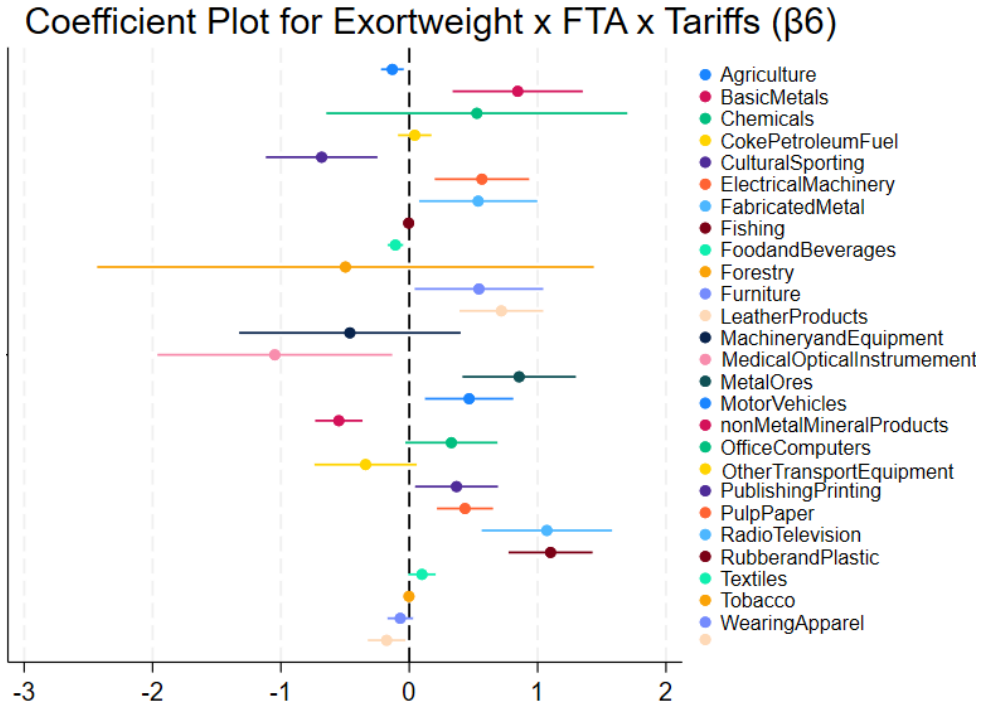

Figure 9. Coefficient plot for industries for Exportweight_FTA_Tariffs for the second regression. The regression is performed for each industry individually and the estimate for β6 is shown in this figure. The dot indicates the coefficient for each industry and the line is the confidence interval. Year fixed effects are used and robust standard errors are used.