Trade diversion of the 2014 EU tariff increase for China and India: A case study of the textile and clothing industry

Master Thesis Policy Economics

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Abstract

This paper analyzes the effect of the EU tariff increase for China and India for textile products in 2014 on trade from competitors of China and India to EU members and non-EU OECD countries. Assuming that this would hurt China's and India's trade to the EU, it is hypothesized that the trade volumes to EU members of the competitors increase. Second, this paper argues that these effects depend non-monotonically (inversed u-shaped) on the products' market share of China and India. The hypotheses are tested using annual data from UNcomtrade between 2007 and 2016 for 20 competitors, 40 importers (27 EU members, 13 non-EU members) and 976 product categories. The data is analyzed using a triple difference approach with multiple high order fixed effects included. The hypothesized positive effect is not supported by the data, neither when the effect is hold constant for competitors nor when considered competitor-specific. In fact, for many competitors, trade to the EU decreased after 2014 rather than increased. We do find a u-shaped relationship between market share and the change in competitors' exports. Finally, possible explanations for these unexpected results are provided.

1. Introduction

Developing countries face substantial constraints when it comes to participating in the global economy. Import tariffs of the European Union are one of these constraints. The European Union implemented various instruments to lower trade barriers, like the 'Generalized Scheme of Preferences' (GSP) and the 'Everything but Arms' (EBA) tariff reductions for developing countries (European Commission, 2019).

Moreover, developing countries experience strong trade competition when they enter the global economy. Opponents of globalization worry that developing countries engage in a "race to the bottom". Herein, multinationals set up their production in countries with the lowest production costs due to low wages and possibly few labor and environmental regulations. This could create a race for governments of developing countries to lower their regulations, in order to undercut the regulations, and hence the production cost, of their competitors (Rudra, 2008). These activities could create a situation where human rights are violated and severe damage is caused to the environment (Mosley and Uno, 2007). As production cost increase, multinationals are feared to leave the country, causing unemployment and lower economic growth.

This research investigates the extent to which trade diversion effects occur when production cost increase in a country, by looking at the change in export volumes of countries competing for the same products. I analyze EU's GSP graduation for the textile and clothing industry for China and India in 2014 as at that moment China and India no longer met the conditions for a tariff reduction. This increase in European import tariffs for textile and clothing products from China and India resulted in increased relative prices for China's and India's products and decreased relative prices for the products of their competitors, ceteris paribus.

The research question therefore states: *Which countries benefit from India's and China's GSP graduation by the EU in 2014 in the textiles and clothing industry, and does this vary by product?*

Under GSP, vulnerable developing countries are offered lower import tariffs when exporting their products to the EU. By lowering trade barriers, developing countries can enter the global market, which should help them reduce poverty and create jobs that meet core human rights. GSP can be terminated if, for example, beneficiaries fail to meet core human rights or become too competitive for specific product categories and thus no longer need these advantages to enter the global market

(European Commission, 2019). The latter was the case for China and India in the textiles and clothing industry. China's and India's share of the total imports to the EU exceeded the predetermined threshold of 14.5%.[1] EU's import tariffs for China and India increased by approximately 3 percentage points on January 01, 2014. Based on the mechanism of the race to the bottom, it is expected that multinationals move their production from India and China to lower cost countries, such as Bangladesh, Vietnam, and Myanmar.

A similar intervention is analyzed by Cheong et al. (2017). They studied the effectiveness of EU's trade concessions[2] for 75 important textile export products after a natural disaster struck Pakistan. In addition, they researched whether this intervention had a negative impact on exports of competing countries for products facing lower import tariffs to the EU from Pakistan. They used a triple-difference approach with fixed effects and a synthetic control analysis. They found trade diversion effects for countries competing with Pakistan for the same products, however, these changes were insignificant. In terms of trade volumes, Pakistan was (and is) an average textile exporter to the EU. The trade diversion effects on competing countries were, therefore, possibly not big enough to find significant trade diversion effects.

The intervention analyzed in this paper, however, is likely to have a substantial effect on competing countries. As China and India are two of the biggest textile exporters to the EU, increasing their relative prices are likely to induce many firms to seek alternative options, ceteris paribus. Another difference is the timeframe of both interventions. Pakistan's tariff reductions were temporary while the GSP graduation is permanent.[3] This makes it more likely to observe trade diversion effects when analyzing the GSP graduation.

In addition, the GSP graduation for China and India applies for almost a thousand product categories compared to the 75 waived products for Pakistan. This has the advantage that there are more product categories included in my analysis, increasing the statistical power of my analysis. On the downside, the GSP graduation is a 'coarse intervention' covering all textile and clothing products. Thus, due to the nature of the intervention, there are no textile and clothing products

[1] GSP was removed for textile products from India, whereas China's GSP was removed for the entire clothing and textiles industry.
[2] Import tariffs decreased by approximately 12% for most products covered by the intervention.
[3] Unless EU's imports from China and India fall below the predetermined threshold again, which is unlikely (European Commission, 2014).

without treatment, i.e., there is no control group. In order to find a causal effect of China's and India's GSP graduation on the exports of competing countries to the EU, a control group is required. Fortunately, there are product categories within the textile and clothing industry, which are not exported to the EU by China or India. These products are used as a control group in this paper. China's and India's share of total exports to the EU across the products is very variable (from 0 to 100%) and rather evenly distributed. It is therefore a suitable measure of the size of the treatment, and can be used to identify trade diversion effects on competing countries.

This paper hypothesizes a non-monotonic relationship between the market share of China and India and the change in export values of competing export countries. On the one hand, trade diversion effects are expected to increase in China's and India's market share as this increases opportunities of competing countries. On the other hand, if China and India become too competitive, which is likely to be indicated by a market share approaching 1, trade diversion becomes more unlikely. For intermediate values, the change in exports of competing countries is expected to be positive.

In order to account for possible endogeneity issues, a triple-difference approach was used. I compared the difference between competing countries' exports for products exported by China and/or India with products which are barely exported by China and/or India, prior and post the intervention, both to EU-members and non-EU OECD countries. Following Cheong et al. (2017) and Frazer and van Biesebroeck (2010), importer-product, importer-time, and product-time fixed effects were included. Different model specifications were considered to analyze the possibly non-monotonic relationship between China's and India's market share and the change in export values of competing countries. Treatment effects were estimated both under the assumption of a homogenous treatment effects (i.e., equal across competitors) and assuming heterogeneity in the treatment effects.

I found no support for the hypothesized non-monotonic relationship. The change in exports of competing countries to the EU varied substantially in size, sign, and significance level between competing countries. Robust to all significant model specifications, the export volumes of competing countries to the EU first decreased as China's and India's market share increased, and subsequently increased again. This is opposite to our hypothesis. Possible explanations for this unexpected relationship will be discussed.

The remainder of this paper is organized as follows. Section 2 considers the mechanisms involved in trade diversion effects as well as a literature review. Section 3 describes the data used in this research. Section 4 presents the empirical strategy used to identify trade diversion effects. The results are presented in Section 5. A discussion on the findings and limitations are provided in Section 6. This paper concludes with concluding remarks and suggestions for further research. An appendix provides details for some additional analyses.

2.1 Theoretical framework

In classical trade theory, international trade between countries is analysed. This is for example the case in the Ricardian model and the Heckscher-Ohlin model. However, as taken into account by Krugman (1980), international trade takes place at the firm level instead of at the country level. Meltitz (2003) extended this theory even further by allowing firms to be heterogeneous with respect to their productivity. According to this model, the most productive firms are active on the export market.

There are many factors that determine the cost of production for a firm, such as labour and capital costs. If companies want to be active internationally, there are additional trade costs to take into account, e.g., tariffs. Thus, a firm's choice to produce and export a certain product to a certain country is dependent on the import tariffs of the importing country, among other factors.

The GSP graduation by the European Union increased China's and India's import tariffs to the EU. As tariffs are variable costs, increasing import tariffs increased the relative price of China's and India's products. As a consequence, countries competing with China and India for the same products market share experienced a decrease in the relative price of their products, ceteris paribus. Thus, China's and India's competitors experienced a competitive advantage due to the intervention. This is expected to result in an increase in export values of competing countries to the EU for product categories already traded by competing countries, which is referred to as the *intensive margin* (Krugman, 1980).

Firms from competing countries could also have started to trade new product categories with the EU, due to the decreased relative trade costs, which is referred to as trade creation effects at the *extensive margin* (Helpman, Melitz, & Rubinstein, 2008). If the fixed costs of producing new products was low enough, even a small decrease in the relative price of competing countries' exports would be enough to induce (existing) firms to produce and/or export these new products.

However, if the fixed cost of producing new product categories was high, the relative price of competing countries must have decreased substantially to induce producers to export new product categories (Cheong, Kwak, & Yuan, 2017).

Cheong et al. (2017) argued that it is most likely that competing countries started trading new product categories relatively similar to product categories which were already being traded. This can be explained by the fact that the required resources were already available within the industry of a competing country.

The extent to which competing countries' exports to the EU were affected by China's and India's GSP graduation depends on multiple factors. First, for products which were hypothetically subjected to higher import tariffs but were not exported by either China or India face, relative prices were not affected. Hence, there is no expected effect for the products exported by competing countries if China and India were not trading these product categories with the EU.

Second, if all exports of a certain product category to the EU were exported by China and/or India, this might indicate that the Chinese and Indian firms were very competitive when it came to producing these products. China and India could therefore exhibit cost leadership for these product categories. Many factors determine the cost-leadership within a specific product category. One of these factors is increasing returns to scale. If the production of certain product categories require significant investments (fixed costs), the average cost will decrease as production increases. Since the incumbents have a lower average cost, they can outcompete potential entrants to the market. In addition to scale effects, there could exist learning effects. These learning effects decrease the unit cost over time and can create long-lasting cost advantages (Amit, 1986). Due to the strong entry barriers, caused by the high fixed costs and learning effects, it will require a substantial decrease in relative variable costs before companies from other countries enter the market. A small increase in the import tariffs faced by China and India might, therefore, not be enough to incentivize companies in competing countries to enter the market.

There are two opposing mechanisms through which the market share of China and India is expected to affect the exports of competing countries to the EU[4]. The first mechanism involved

[4] Note that India was granted GSP graduation for fewer product categories than China. Within India, this could lead to substitution from product categories that faced higher import tariffs to the EU, to product categories that did not.

opportunities of these competitors. The larger the market share of China and India, the more European firms were confronted with higher relative prices from their current suppliers in China and India. These firms are expected to have searched for better alternatives in other countries. This reasoning suggest that the competitors' export value to the EU increased with the market share of China and India for these products.

The second mechanism concerned cost leadership in products which we assume to be those of which China and India had a large market share. Cost leadership may have resulted from economies of scale or learning effects. For those product categories of which China and India dominated the market to the EU, a substantial difference is expected in production costs for China and India on the one hand, and the competitors on the other hand. GSP graduation would have decreased this differences, but plausibly this would not have resulted in competitive prices of competitors. To sum up, this second mechanism suggest that for higher market shares for China and India, the change in export values of competing countries may actually have decreased.

In addition to the second mechanism concerning cost leadership, a number of Dutch professionals mostly working as CEO, import manager, or CSR manager in textiles companies and other experts in the textiles and garment industry[5] repeatedly argued that for many specific products, China and India were realistically the only possible exporters. Thus, for these products, it is expected that the market share of China and India equalled 1. Consequently, for these product categories, no trade diversion effects are expected to have occurred.

Combining the two mechanisms, the relationship is unlikely to be monotonic. While non-monotonic relations can take many forms, this paper hypothesizes the simplest non-monotonic relationship, namely an inversed U-shaped function, formalized as a quadratic one.

Therefore, it is expected that India exported more of the products of which only China faced higher European import tariffs. This effect can partially absorb the trade diversion effects of the intervention on the other countries.

[5] Due to context and confidentiality of these conversations, it is not possible to identify these people. Moreover, whether or not it is true that China and India were the only possible exporters, the perception alone would be sufficient to prevent trade diversion effects to have occurred. This perception seemed commonly shared among experts in the field.

2.2 Related literature

The effects of trade liberalization on trade flows have been analysed by many researchers. However, the unique combination of protectionist policies and their effect on competing exports has not been researched yet as far as I am aware.

Cheong et al. (2017) studied the effectiveness of tariff waivers for flood-hit Pakistan granted by the EU in 2013 as a policy instrument for disaster relief. They estimated the effect of tariff waivers for textile products on Pakistan's exports and the exports of competing countries by using both a triple-difference approach and a synthetic control analysis. The triple difference approach compared the export value of waived goods with non-waived goods before and after the effectiveness of the waivers, both to the EU and non-EU members. Their results indicated that countries competing with Pakistan over the same product categories faced the largest trade diversion effects, but the results were statistically insignificant.

Russ and Swenson (2019) analysed whether the Korea-US Free Trade Agreement (2012) diverted U.S. imports away from other U.S. trading partners. They used a fixed effects model with Canada's and Australia's imports, both from Korea and other trading partners, as a control group. They found a significant increase in U.S.'s imports from Korea and strong diversion effects away from U.S.'s third-country trading partners. The imports were mainly diverted away from other Asian countries. The product categories which were diverted away from other trading partners were mostly clothing and textile, footwear and leather products.

In addition, Frazer and van Biesebroeck (2010) researched the effect of the African Growth and Opportunity Act which lowered tariffs for African countries to export to the US for a broad range of products. Using a triple difference approach, they found that apparel products exported to the U.S. increased most. On average, apparel exports to the U.S. increased by 53%. Apparel product categories which were not traded prior to the Act, increased by 23%. Thus, both at the intensive and extensive margin the researchers found strong evidence for trade creation effects due to the decreased relative price of African producers compared to other trading partners.

These studies all considered how trade flows changed due to a decrease import tariffs. This gave the exporting countries for which the interventions were applicable a competitive advantage due to the decrease in relative prices of their products. The intervention analysed here concerned an increase of import tariffs for China and India, which resulted in a decrease in relative prices of products exported by competing countries. Thus, based on the previous literature in combination with international trade theory, I expected to find an increase in exports for countries competing with China and India over the same products as these competing countries gained a competitive advantage due to the intervention.

3. Data

This research used annual HS-6 digit product-level export data of the major textile and clothing exporting countries in Asia and Europe to 27-EU members and 13 non-EU OECD countries between 2007 and 2016 from the UNcomtrade database. The data consisted of export values in US dollar from country *j* to country *i* in year *t* for all products *k* in the textiles and clothing industry.[6] Only positive trade values were used in the analysis to estimate trade diversion effects from China's and India's GSP graduation to competing countries.

For a number of exporter-year combinations positive trade flows were not reported in the UNcomtrade database.[7] This was the case for Bangladesh in 2014 and 2016, for Indonesia and Myanmar between 2007 and 2009, for Macedonia in 2008, and for Ukraine in 2007. In order to estimate trends over time in this data section, the missing data were imputed by interpolation using proportional scaling over all importers and products. Country-specific annual export growth rates for the textiles and clothing industry retrieved from the WTO.[8,9] Thus, over all importer and product combinations, the same annual export growth rate was used to estimate the missing values. Beware that if the actual growth rates of exports to non-EU members and EU members differed for the countries of which trade data was not reported, the descriptive statistics below would be biased (either positively or negatively).

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[6] Importers (N=40), competitors (N=20), product categories (commodities N=976, grouped into N=194 families, grouped into N=21 chapters).

[7] However, some importer-year combinations did not exist in the data. Also, there were some importer-exporter-year combinations with zero trade reported, which we assumed to mean that these countries did not trade with each other in a certain year. Thus, this would not imply that the data for these specific importer-exporter-year combinations were missing.

[8] Annual growth rates used to impute the missing trade data: 1% (2013-2014) and 7.8% (2015-2016) for Bangladesh, 2.7% (2007-2008), -8.4% (2008-2009) and 20,2% (2009-1010) for Indonesia, -10.0% (2007-2008), 36.1% (2008-2009) and -32.3% (2009-1010) for Myanmar, -29.0% (2008-2009) for Macedonia and 0.00% (2007-2008) for Ukraine.

[9] Comparing the data from the WTO and UNcomtrade databases, substantial differences in reported export volumes were observed. For example, based on the data retrieved from the WTO, Bangladesh's exports had a growth rate of 29% between 2012 and 2013, while the UNcomtrade database reported a growth rate of 0.5% between these years. As far as I could tell, this did not result from differences in definitions between these widely used databases. We concluded that the reliability of the data used in this paper was at least questionable.

In the following sections, I refer to competing exporting countries that were not subjected to changes in EU's import tariffs by the GSP graduation as the *Competitors*. Also, the textile, garment, and leather industry is referred to as the *textile industry* for conciseness unless explicitly mentioned otherwise. In this analysis, I define the *World* as all countries in the sample of my database. Data at the HS 6-digit product-level are referred to as *commodities*, at the 4-digit level they are called *families* and at the 2-digit level as *chapters.*[10]

Table 1. Total export values (in billions US$) for China and India, the Competitors (N=20) and the World (China, India and Competitors), three years prior and post GSP graduation to the EU and non-EU.

	China + India			Competitors			World		
	non-EU	EU	Total	non-EU	EU	Total	non-EU	EU	Total
Pre	410.44	240.56	651.00	215.33	321.32	536.65	625.77	561.88	1187.65
Post	433.10	253.14	686.23	254.90	345.21	600.12	688.00	598.35	1286.35
Total	843.54	493.69	1337.23	470.23	666.53	1136.76	1313.77	1160.22	2473.99

Table 1 presents total export values both to EU-members and non EU-members, three years prior and three years post the intervention[11], separately for China and India, the Competitors, and the World. These descriptive statistics show that the total of exports of the Competitors and China and India are higher in the three years post than prior to the intervention. It is also worth mentioning that the growth rate between the exports prior and post the intervention of Competitors to non-EU members is higher than the growth rate to EU-members.

[10] An example: the 2 digit-product codes 52 refers to the chapter *cotton;* one of the 4 digit-product codes belonging to chapter 52 is 5204 which refers to the family "*cotton sewing thread, whether or not put up for retail sale";* one of the 6 digit-product codes belonging to family 5204 is 520420 which are the commodities *"cotton; sewing thread, put up for retail sale".*

[11] For comparison purposes the same time span in used to calculate the average export values prior and post the intervention. In addition, this solves the problem of missing data for Myanmar (2007/2009), Indonesia (2007/2009), Macedonia (2008), and Ukraine (2007).

Figure 1. Total exports of all exporting countries over time (in billions US$)
to EU members, non-EU members, and the World

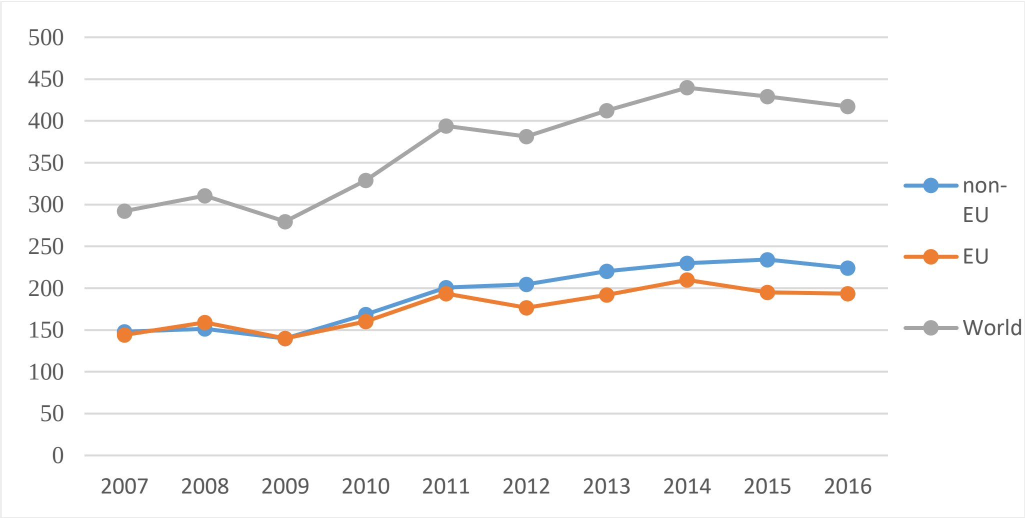


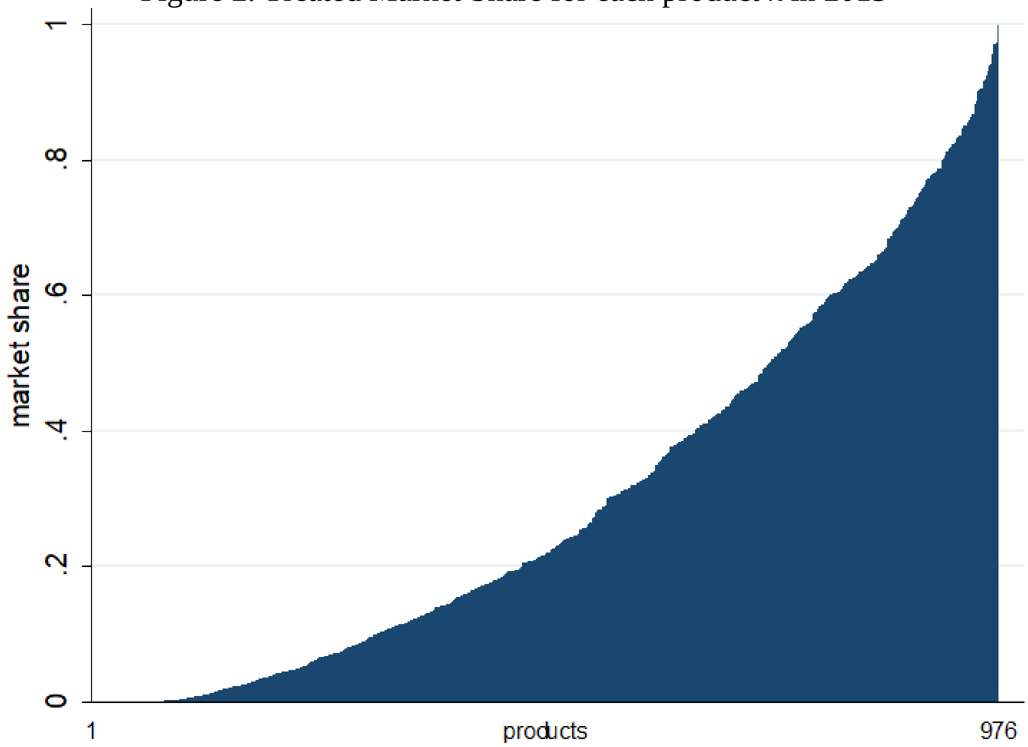
Figure 1 shows the trend in the export values tot EU-members and non-EU members in billion US$ of all exporting countries in the sample. Until 2011, the trend in exports to the EU and non-EU was more or less the same. After 2011, exports to non-EU members grew faster than those to the EU. Based on Table 1 and Figure 1, at first sight, the data did not support the hypothesis that after the intervention Competitors' exports grew faster to EU-members than to non-EU members.

As it is likely that the effect of the intervention varied with the market share of China and India within a specific product market, it is important to include their market share at the product level into the analysis. The importance of the GSP graduation is dependent on the ratio of the volume of products that receive treatment compared to the total volume of products that are exported to the EU in that product category. To quantify this ratio, a measure of the relative importance of China and India per product category had to be constructed: the '*treated market share'*, where the total market share is the sum of all exports to the EU at the product level for all exporting countries in the data. This was calculated (per product) by the sum of the export values of the products exported to the EU in India and China which received treatment, divided by the total market share of the exports to the EU. See formula (1) below:

$$Treated\ Market\ Share_{k,t-1} = \frac{\sum_i Export\ value_{i,China,k,t-1} + \sum_i Export\ value_{i,India,k,t-1}}{\sum_{ij} Export\ value_{ijk,t-1}} \qquad (1)$$

where export values of India were skipped for ungraduated products k. The summations over i were restricted to EU members only. As the entire clothing and textiles industry in China faced higher import tariffs to Europe, within the data there were no product categories that did not receive treatment. For India, only product categories in the textiles industry received treatment. However, some products in the product groups that faced higher tariffs were rarely or not exported by either China or India. These products were used as a control group. Figure 1 shows the variation in treated market shares in 2013 over all 976 products (commodities). The treated market share varied between 0 and 1. From the competitors' perspective, this means that there was continuous variation in the extent to which the market shares of exported products have been effected by the intervention. This measure was included in the analysis to estimate the effect of the intervention on competitors' exports, which is explained in more detail in Section 4.

Figure 2. Treated Market Share for each product *k* in 2013



* The sum of China's and India's exports to the EU,
as a share of the World's total exports to the EU.

Table 2 gives an overview of the frequency of positive trade flows prior and post the intervention for all combinations of product, exporter and, importer. For example, for 526,332 product-exporter-importer combinations no export was reported in one of the three years prior and post the intervention.

Table 2. Descriptive evidence: trade creation effects at the *extensive margin*

		Post		
		No trade	Trade	Total
Pre	No trade	526,332	33,946	560,278
	Trade	77,686	220,916	298,602
	Total	604,018	254,862	858,880

* Total: commodities*exporters*importers.
* Pre (2011-2013) and Post (2014-2016) intervention.
* Frequency of positive trade values if in one of the three years prior/post the intervention trade has been reported for product *k*, between exporter *j* and importer *i*.

If the intervention led to trade creation effects at the extensive margin, this would show up in these descriptive statistics. A higher ratio of positive trade values over the total set of product-exporter-importer combinations after the intervention compared to this ratio prior to the intervention would indicate that the intervention induced trade creation effects at the extensive margin, as a higher number of products was exported by competitors after the intervention than before. It seems that the intervention did not induce new firms to enter the market as, as 298,602/858,880 > 254,862/858,880. This is in the opposite direction of what is expected if the intervention led to trade creation effects at the extensive margin. Thus, the descriptive evidence suggest that increasing China's and India's import tariffs to the EU did not lead new product categories entering the market in competing countries. Therefore, this is not further researched in this paper.

4. Empirical strategy

In order to identify the causal effect of China's and India's GSP graduation in the textiles industry on the export volumes of the competitors, the export volumes of competitors to the EU after the intervention has to be compared with the counterfactual. In this study, the counterfactual is what would have happened to the size of competitors' exports to the EU, if graduation would not have been applied to China and India. As the counterfactual was not observed, this research analyzed the difference in competitors' exports prior and post the intervention to importers where the different import tariffs applied and to importers for which this was not the case. See Ritzel et al. (2017, section 4.1) for a more in depth discussion on the concept of causal inference.

4.1 Treatment effect assumed equal across competitors

The difference in difference model to analyze the change in competitors' exports was specified as follows[12]:

$$\log\left(Export_{ijkt}\right) = \alpha_0 + \alpha_1 EU_i + \alpha_2 Post_t + \beta_1 (EU_i * Post_t) + u_{ijkt} \quad (2)$$

with $\log\left(Export_{ijkt}\right)$ the log value of exports to country *i* from competitor *j* of product *k* in year *t*, EU_i equal to 1 if country *i* is an EU-member and to 0 otherwise, and $Post_t$ equal to 1 after 2014 and to 0 otherwise. The coefficient β_1 indicates the change in competitors' exports to the EU after the intervention, which is expected to have a positive sign. Throughout the entire analysis, the sample is restricted to positive export volumes.

Next, the treated market share at the HS 6-digit product level was added to the model. The treated market share varied between 0 and 1. There were products, which were not exported to the EU by either China or India and thus were effectively not subjected to higher import tariffs. Similarly, there were products where the entire exported volume to the EU faced higher import tariffs. As described in the data section and shown in Figure 2, the extent to which products received treatment varied rather continuously between 0 and 1. The variation in treated market shares was used to identify the extent to which products, exported by competitors to the EU, were exposed to treatment. This is presented in the triple difference specification below:

$$\begin{aligned} \log\left(Export_{ijkt}\right) = {} & \alpha_0 + \alpha_1 EU_i + \alpha_2 Post_t + \alpha_3 TreatedMS_{k,t-1} \\ & + \beta_3\left(EU_i * TreatedMS_{k,t-1}\right) + \beta_1 (EU_i * Post_t) \\ & + \beta_2\left(Post_t * TreatedMS_{k,t-1}\right) + \gamma_{ikt}\left(EU_i * Post_t * TreatedMS_{k,t-1}\right) \\ & + u_{ijkt} \end{aligned} \quad (3)$$

with $\log\left(Export_{ijkt}\right)$ the log value of exports to country *i* by competitor *j* for product *k* in year *t*. The continuous variable $TreatedMS_{k,t-1}$ indicated the treated market share at *t-1* for product *k*. The coefficient γ_{ikt} gives the treatment effect on the treated, assumed constant across competitors *j*, and captures the trade diversion effects of the GSP graduation. Throughout the remainder of this

[12] No fixed effects were included in Model (2), as this would subsume the coefficient of interest (β_1). The coefficient β_1 can be interpreted as a (partial) correlation between competitors' exports to the EU after the intervention, as this model does not include confounders.

paper, it will be assumed that γ_{ikt} is constant over all importers i. The treatment effect is expected to be positive, $\gamma_{ikt} > 0$.

The error term in Model (3) is given by:

$$u_{ijkt} = \mu_{it} + \sigma_{ik} + \tau_{kt} + \epsilon_{ijkt}$$

which consists of importer-time (μ_{it}), importer-product (σ_{ik}), and product-time (τ_{kt}) fixed effects and a random error term (ϵ_{ijkt}). By including these fixed effects, confounding factors are absorbed, such as importers' GDP growth, importing countries preferences at the product level, or aggregated import growth at the product level. It is essential that the random error term (ϵ_{ijkt}) is uncorrelated with the treatment indicator in order to obtain an unbiased estimate of $\gamma_{ikt.}$[13] See Fraser and van Biesebroeck (2010) for further discussion on fixed effects in a gravity framework. Following Cheong et al. (2017), the standard errors in the entire analysis were adjusted for two-way clustering by importer and product.

In Model (3), the effect of the treated market share on competitors' exports to the EU were modeled as a linear function. However, as argued in section 2, the effect of treated market share on the exports of competitors to the EU was likely not constant, presumably even non-monotonic. A mathematically convenient specification for such a non-monotonic relationship is a quadratic function. Thus, a term, quadratic in treated market share, was added to (3). In addition, all lower than third order interactions were excluded from the model, as these effects would be subsumed by including the importer-time (μ_{it}), importer-product (σ_{ik}), and product-time (τ_{kt}) fixed effects. Model (4) is given by:

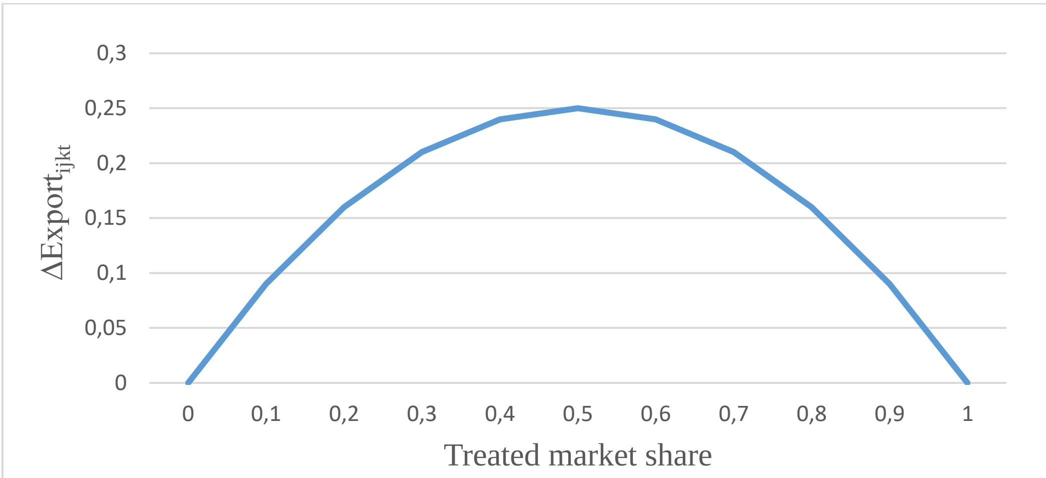
$$\log\left(Export_{ijkt}\right) = \gamma_{ikt}\left(EU_i * Post_t * TreatedMS_{k,t-1}\right) + \varphi_{ikt}\left(EU_i * Post_t * \left(TreatedMS_{k,t-1}\right)^2\right) + u_{ijkt} \quad (4)$$

The coefficients γ_{ikt} and φ_{ikt} represent the treatment effect of interest. Depending on the sign of γ_{ikt} and φ_{ikt}, the treatment effect is positive/negative and has a concave/convex form. As the GSP graduation for China and India was assumed to give competitors a comparative advantage, it was

[13] This assumption is also known as "Zero Conditional Mean." It is, however, not very likely that this assumption holds strictly true, even with multiple fixed effects included in the model. For instance, fixed effects cannot control for counter policies of Chinese and Indian governments in an attempt to offset the intended goal of the intervention. See the Discussion for a more elaborate debate on the validity of the Zero Conditional Mean assumption.

expected that competitors' exports to the EU increased after the intervention, ceteris paribus. I expected that $\gamma_{ikt} > 0$ and $\varphi_{ikt} < 0$, corresponding with a positive treatment effect and a concave form, as shown in Figure 3.

Figure 3. Hypothesized treatment effect: relationship between treated market share and ΔExport$_{ijkt}$



Whether the optimum of the parabola lies in the domain [0,1] depends on $x_{top} = \frac{-\varphi_{ikt}}{2\gamma_{ikt}}$. If $0 < x_{top} < 1$ the treatment effect first increases (decreases) in the treated market share, and subsequently decreases (increases) again. More in detail, the treatment effect is given by taking the first order derivative of Model (4) with respect to $TreatedMS_{k,t-1}$:

$$\frac{d\log(Export_{ijkt})}{dTreatedMS_{k,t-1}} = \gamma_{ikt} + 2\varphi_{ikt} * TreatedMS_{k,t-1},\ where\ 0 \leq TreatedMS_{k,t-1} \leq 1 \qquad (5)$$

4.2 Treatment effect separately for each competitor

As this research also looked into differences between competitors, the model was extended by interactions with competitor, represented by an additional subscript j for the treatment effect coefficient γ:

$$\log(Export_{ijkt}) = \gamma_{jkt}(EU_i * Post_t * TreatedMS_{k,t-1}) + u_{ijkt} \qquad (6)$$

where γ_{jkt} gives the treatment effect on the treated, separately for all competitors. It captures the trade diversion effects of the GSP graduation.[14] Note that it is still assumed that the treatment effect γ_{jkt} is constant over all importers $\underline{i}$. The error term in Model (6) is given by:

$$u_{ijkt} = \mu_{ijt} + \sigma_{ijk} + \tau_{jkt} + \epsilon_{ijkt}$$

which consists of importer-exporter-time (μ_{ijt}), importer-exporter-product (σ_{ijk}), and exporter-product-time (τ_{jkt}) fixed effects and a random error term (ϵ_{ijkt}). In addition to the fixed effects of Model (3), the fixed effects of Model (6) also controls for historical ties between importing and exporting countries, cultural ties, etc. Compared to the fixed effects of Model (3) and Model (4), these fixed effects now also control for the exporter specific trends.

The quadratic Model (4) was likewise extended with an interaction with Competitor:

$$\log(Export_{ijkt}) = \gamma_{jkt}\left(EU_i * Post_t * TreatedMS_{k,t-1}\right) + \varphi_{jkt}\left(EU_i * Post_t * \left(TreatedMS_{k,t-1}\right)^2\right) + u_{ijkt} \tag{7}$$

with interpretation analogous to as Model (4). Note that the treatment effect differs between competitors.

5 Results

The estimates for competitors' exports to the EU after China's and India's GSP graduation, assumed invariant across competitors, are reported in Table 3. Based on the difference in difference specification M2, the average exports of competitors over all product categories after the intervention were 7.6 percentage points lower than the exports to non-EU members. However, this coefficient was statistically insignificant. These results are unsurprising, as Figure 1 already indicated that competitors' exports to non-EU members grew faster than to EU members.

[14] If the Zero Conditional Mean assumption holds.

Table 3. Competitors' exports to the EU after China's and India's GSP graduation

Model	M2	M3.1	M3.2	M3.3	M4
Dependent variable	Log(Export)	Log(Export)	Log(Export)	Log(Export)	Log(Export)
EU	0.042 (0.2737)	-	-	-	-
Post	-0.168*** (0.0501)	-	-	-	-
Treated MS		-	-0.162** (0.066)	-	-
EU*Post	-0.076 (0.054)	-	-	-	-
EU*Treated MS[1]		-0.062 (0.169)	-0.115 (0.069)	-0.087 (0.087)	-
Treated MS*Post		-	0.131** (0.051)	-	-
EU*Post* Treated MS		0.048 (0.063)	0.038 (0.050)	0.040 (0.057)	-0.335** (0.130)
EU*Post* Treated MS^2					0.448*** (0.153)
Fixed effects:					
Importer*Year	No	Yes	Yes	Yes	Yes
Importer*Product	No	No	Yes	Yes	Yes
Product*Year	No	Yes	No	Yes	Yes
$\mathbf{R^2}$	0.0011	0.1780	0.2509	0.2560	0.2560
Observations	1,480,257	1,343,387	1,342,432	1,342,380	1,342,380

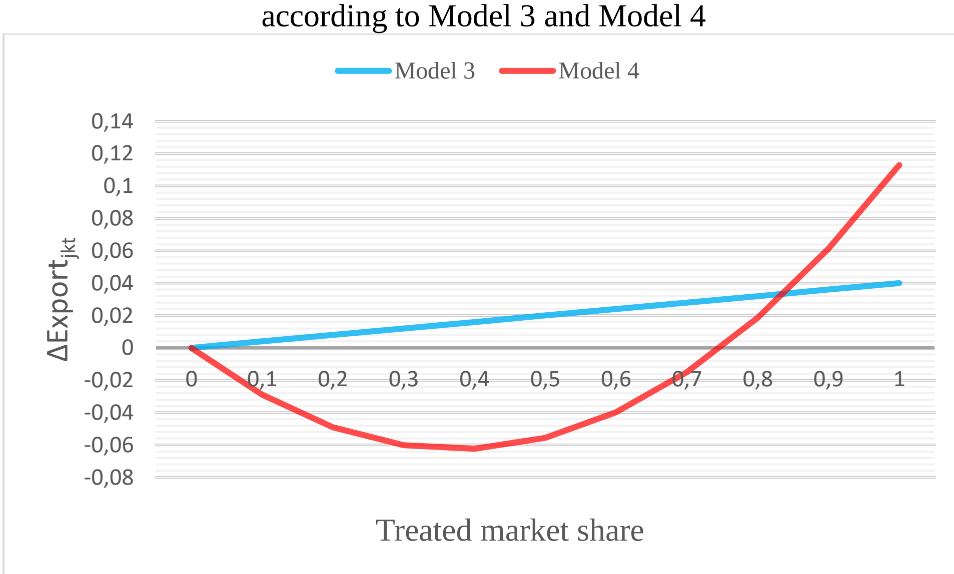
**Note.* Standard errors in parentheses; two sided p-values: *** p<0.01, ** p<0.05, * p<0.1
*Observations: Importer*Exporter*Product*Year
*[1]Beware, the variable treated market share depends on *k* and *t*, thus the interaction with EU is not subsumed by including the Importer*Product fixed effect.
* Coefficients which were not identified, as they are being subsumed by the fixed effects, are indicated by a dash ("-"), coefficients excluded from the model are indicated by a blank.

The difference in difference specification, M2, was extended with an interaction with treated market share to analyze if and how competitors exports to the EU varied in China's and India's market share of exports to the EU. Models M3.1, M3.2, and M3.3 represent variants of Model 3 with different sets of fixed effects included. The coefficients of Model 3 with the full set of fixed effects included are reported as M3.3, however, they were not statistically significant at the 10% level.

Note that the treated market share is coded such that China and India have the entire market for product *k* if the treated market share equals 1. The percentage of change in exports of competitors increased with 4 percentage points if the treated market share equals 1. Thus, a 1 percentage point increase of the market share increased the treatment effect by 0.04 percentage points. As the coefficient was insignificant, this means that there was no significant linear relationship between the treated market share and the exports of competitors' to the EU, assuming that these relationships are the same for all competitors. This was in line with the hypothesis, as a non-linear relationship between the treated market share and competitors' exports to the EU was expected.

In order to identify whether there existed a non-linear relationship between competitors' exports to the EU and the treated market share, a quadratic term was added to the model. The coefficients in M4 were significant at the 1% level, and showed a negative relationship between the treated market share and competitors exports for treated market share below 0.75. For a treated market share between 0.75 and 1, there existed a positive and convex treatment effect. Thus, the results from M4 indicated a non-linear relationship between competitors' exports to the EU and the treated market share, which became positive for the treated marker share above 0.75. Models M3 and M4 are graphically illustrated in Figure 4. The results from the quadratic model rejected the hypothesis that competitors' exports to the EU increased in the treated market share until a certain point and then decreased again as the treated market share approached one.

Figure 4. Relationship between treated market share and $\Delta Export_{ijkt}$ according to Model 3 and Model 4



The change in competitors' exports to the EU was not allowed to vary between competitors in M3 and M4. In order to research if the relationship between the treated market share and the competitors' exports to the EU differed between competitors, M6 and M7 were estimated (see Table A2).

The linear model is interpreted first. It is important to mention that both the size and sign of the treatment effect varied substantially between the competitors. The competitors for which significant results were found at the 5% and 1% level are European. Exports of Hungary, Poland, Romania, and Turkey to the EU increased more after the intervention than their exports to non-EU members. For example, for a treated market share of 1, Romania's exports to the EU increased by 61.58 percentage points. Thus, an increase of 1 percentage point in the treated market share increased Romania's exports by 0.62 percentage points. No significant results were found for Asian competitors. This means that there was no linear relationship between Asian competitors' exports to the EU and the treated market share for positive trade values. The other coefficients of M6 have to be interpreted in a similar way. The hypothesis that competitors benefit from the intervention held true for Hungary, Poland, Romania, and Turkey as the coefficients of the treatment effect were positive and significant.

As a non-linear relationship was expected, the results for the linear and quadratic models were compared. A linear relationship between the treated market share and the exports of competitors can be rejected if the quadratic term in M6 is significant, i.e., the relationship is than non-linear. A non-linear relationship was found for Italy, Thailand, and the Philippines. The hypothesis that the treatment effect was positive and increased (decreased) in the treated market share below (above) some threshold was rejected for all competitors.

Summarizing, there seemed to be a relationship between the treated market share and competitors' exports to EU-members. Especially competitors in the EU managed to increase exports to other EU-members after the intervention according to the linear model specification. The next section will test the robustness of this tendency with respect to different model specifications.

This research hypothesized a positive non-monotonic relationship. In order to accept the hypothesis, the quadratic model assuming homogeneous treatment effects among competitors' should fit the data. In addition, to support the hypothesized mechanism a positive non-monotonic treatment effects should be found for most or all competitors, and no effect for the remaining competitors, However, there was no evidence that this type of relationship existed, as the hypothesis was neither supported for the quadratic model assuming homogenous treatment effects for the competitors, nor for the model with heterogeneous treatment effects. Therefore, if the entire sample was considered in the analysis, the hypothesis had to be rejected.

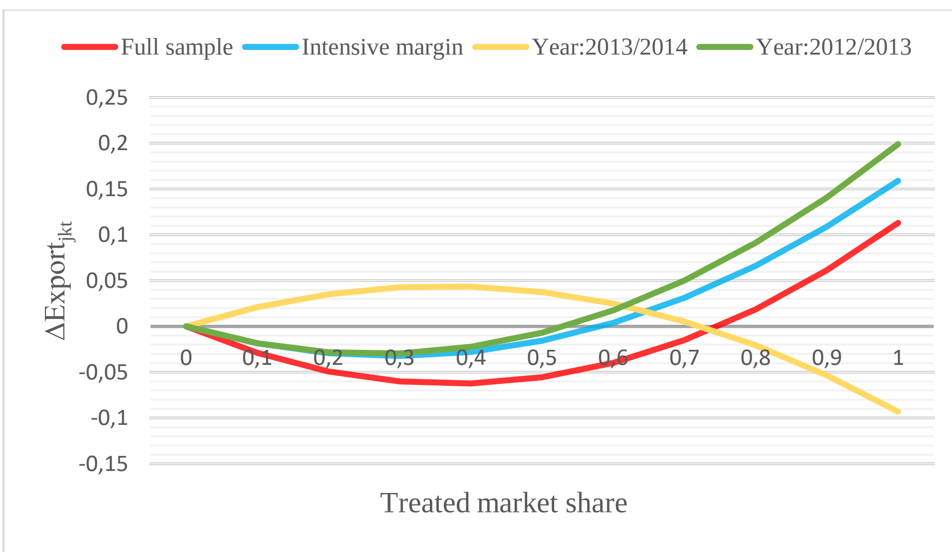
6. Sensitivity analysis

The positive non-monotonic relationship hypothesized in this research was rejected based on the main analysis. Before elaborating on possible explanations for the rejection of the hypothesis, this section presents some additional analysis to test if the main results were robust with respect to model specification.

6.1 Sample restrictions

The first additional analysis considered models M3, M4, M6, and M7 with different sample restrictions. As the main analysis was performed over the entire sample, the average exports of competitors to the EU prior to the intervention were compared with its average exports after the intervention. The results for M4 with different sample restrictions are shown in graphical form Figure 6. The results for the entire sample is included for comparison purposes.

Figure 6. Relationship between treated market share and $\Delta Export_{ijk}$ – Model 4 with different sample restrictions



6.1.1 Intensive margin

Following Cheong et al. (2017), the second sample restriction considered importer-exporter-product combinations with positive trade values in 2007, thus $Export_{ijk,2007} > 0$. Trade diversion effects at the intensive margin can be analyzed with this sample restriction.[15] The intensive margin was defined in Section 2. The estimates of the coefficients of the estimates when the sample is restricted to $Export_{ijk,2007} > 0$ are presented in Table A1 (M3a and M4a) and A2 (M6a and M7a). For the European competitors', the results of the main analysis seemed robust with respect to. to this sample restriction as no negative treatment effects are found. As shown in Figure 5, the results of the main analysis when assuming homogenous treatment effects were also robust with respect to this sample selection. Therefore, the hypothesis is again rejected when analyzing trade diversion effects at the intensive margin.

6.1.2 Shorter time frame

If the treatment effect occurred relatively shortly after the intervention, averages over multiple years might underestimate the treatment effect. The sample was restricted to 2013 (pre) and 2014 (post) to assess whether the treatment effect would be clearer with a shorter time frame. The results are presented in Table A1 (M3b and M4b) and A2 (M6b and M7b). As can be seen in Figure 6, considering only 2013 and 2014 changed the relationship from a convex function to a concave function, which is consistent with the hypothesized relationship. However, the results for M4b were insignificant, and therefore the length of time did not influence the results of the main analysis.

For a number of competitors, the treatment effect increased in absolute terms and became significant at the 5% and 10% level. The pattern that some European competitors experienced a positive treatment effect while Asian competitors experienced a negative treatment effect is also observed with this sample selection. The extent to which competitors experienced positive or negative treatment effects still varied substantially between different competitors. We conclude that the hypothesis was also rejected with the sample restriction to 2013 and 2014.

6.1.3 Anticipation effect

The European Commission announced the GSP graduation on the 17th of December 2012. Thus, economic agents could have anticipated on the increased cost of sourcing from the textile industry in China and India by moving their production elsewhere. If this anticipation was the case, the effect of the GSP graduation on the exports of competitors would have appeared (partially) in

[15] Cheong et al. (2017) did not elaborate on the considerations for restricting the sample to $Export_{ijk,2002}>0$ (their panel data consisted of data between 2002-2014, whereas the data in this study sample was from 2007-2016). If the aim of this sample restriction was to isolate the trade diversion effects at the intensive margin, restricting the sample to positive trade values one year prior the intervention would have sufficed.

2013. In order to account for the possible anticipation effects, we analyzed the subsample of 2012 and 2013. If the exports of competitors to the EU increased significantly after the announcement of GSP graduation, this would indicate that the treatment effect of the intervention took place prior to the actual intervention. The results are presented in Table A1 (M3c and M4c) and A2 (M6c and M7c). As can be seen in Figure 5, the results for M4c were similar to the results in the main analysis. Even though the relationship was similar and the coefficients of M3c were still insignificant, it seemed that the treatment effect became positive for small treated market shares compared to the entire sample, the years 2013/2014, or $Export_{ijk,2007}>0$. Thus, there seemed to be some evidence for anticipation effects of the intervention. However, we still did not find support for the non-monotonic relationship hypothesized in this paper.

Even though insignificant, estimating heterogeneous treatment effects changed the sign of the treatment effect for competitors substantially, including those of the European competitors. Hence, the pattern that European competitors seemed to benefit from the intervention was not robust to the model re-specification that addressed the anticipation effect of the intervention.

In sum, the results from the main analysis were robust with respect to different sample restrictions when homogeneous treatment effects were assumed. As the different relationship with the time frame 2013/2014 was insignificant, and all other sample restriction gave significant coefficients, this did not affect the robustness of the main analysis. Thus, fitting M3 for different samples changed coefficients to a certain extent, but no substantial differences in the relationship between the treatment effect and the treated market share were significant. The hypothesis was thus rejected for all model sample restrictions. The trend that European competitors tended to benefit from the intervention was not robust to model specification. As most of the coefficients for different competitors' treatment effect were insignificant and varied between sample restrictions, there was no plausible stable pattern among treatment effects at the competitor level.

6.2 Control group: no treated market share

We also compared the export values for products exported by China and/or India with products which were minimally exported by China and/or India, prior and post the intervention, both to EU-members and non-EU OECD countries. A dummy indicator, equal to 0 for treated market share < 0.05 and to 1 otherwise, replaced the continuous variable $TreatedMS_{k,t-1}$, in M2 and M5. This additional analysis considered a binary variation in treatment; products were either treated or not.

This had the advantage that it was straightforward to interpret the fitted model, and was analogous to Cheong et al (2017). However, it was little informative to identity the actual relationship between the treated market share and the change in competitors exports.

The results are presented in appendix Table A3. Assuming homogenous treatment effects, the exports of competitors for treated and untreated product were similar. Allowing the treatment effect to vary between competitors showed similar treatment effects as in the main analysis. There was still no clear pattern among treatment effects at the competitor level.

6.3 Categorical variable for treated market share

This paper researched whether relationship between competitors' exports to the EU and the treated market share was positive and non-monotonic. In the main analysis, a quadratic function is used to analyze this. We also checked an alternative specification, considering a categorical indicator for treated market share (ms), categorized as low ($ms<1/3$), middle ($1/3\leq ms\leq 2/3$), and high ($ms>2/3$). Thus, this analysis avoided a detailed assumption on the functional form. Evidence for this non-monotonic relationship would show up as a larger treatment effect for the 'middle' category than for the 'low' and 'high' category of treated market shares.

The results are presented in Appendix Table A3 (M3e and M6e). Comparable to the quadratic specification, similar relationship were found for a categorical indicator for treated market share and for the quadratic specification. Assuming homogenous treatment effects, the treatment effect is lowest for the 'middle' category and highest for the 'high' category. In a variant of the model with a heterogeneous treatment effect, the results were similarly consistent with the quadratic specification. Hence, we found no indication that functional form mattered a lot. The hypothesis was again rejected.

6.4 Treatment effect by homogenous products

A final robustness analysis considered treatment effect across a number of product groups. The previous models allowed the treatment effect to only vary in treated market share. This implicitly assumed that treatment effects did not differ across product categories besides the variation in treated market share. This last sensitivity analysis researched if the treatment effect varied between six relatively homogenous product categories.[16] These homogenous product groups represent industries which we assumed were likely to face different substitution possibilities. For example, the production of articles of apparel and clothing accessories likely required nothing but sewing machines, which was available in every competing country. On the other hand, large spinning mills, used in the production process of certain types of textiles, were concentrated in specific regions of a few countries. M3 and M4 were therefore estimated for homogenous product categories, denoted by $\tilde{k}$. This means that $\gamma_{i\tilde{k}t}$ is estimated for the six products groups separately. The results are presented in table A4 (M3f and M4f). Assuming treatment effects homogenous for all competitors, the hypothesized relationship had to be rejected for the six product groups.[17]

Concluding, the hypothesis was rejected with respect to all model specifications. Possible explanations are discussed in the next section.

7. Discussion

Robust results regarding the relationship between the treated market share and competitors' exports to the EU were found if the treatment effect was assumed constant across competitors. However, this relationship was different from the hypothesized relationship. Therefore, the hypothesis was rejected for all sample restrictions. This asks for an elaborate discussion on the hypothesized relationship and of the employed empirical strategy.

The first important point that needs to be addressed is the endogeneity of the treated market share. In general, endogeneity arises from omitted variable bias, measurement errors, and/or simultaneity.[18]

If the residual error term is correlated with the treated market share, the results suffer from endogeneity issues. This would be the case, for example, if China and/or India implemented policies to support their textiles industry as a reaction to the increase of the import tariffs to the

[16] The product categories considered are: Raw hides and skins and leather; Articles of leather and Fur skins; Textiles; Articles of Apparel and clothing accessories; Footwear; Headgear, umbrellas, sun umbrellas, sticks, whips and prepared feathers and down.

[17] M6 and M7 are also fitted for product categories with treatment effect heterogeneous across competitors. The hypothesis still had to be rejected in these variations. As this robustness check involved 20*6 treatment effects, the detailed results are not further discussed or presented in detail.

[18] The treated market share is lagged which is usually an effective method to tackle simultaneity issues. In addition, GSP graduation is granted when a predetermined threshold is exceeded. The treatment indicator is thus unlikely to suffer from simultaneity biases.

EU. It is therefore possible that China and/or India were effective in offsetting the increased relative prices of their products by supporting their industry.

On the 24th of April 2012, the Chinese government announced policies to support their textiles industry. These policies include financial support, policies to strengthening technical innovation and increasing efficiency. This plan also included explicitly the goals to stabilize China's global market share by expanding export diversity (China Business Insight, 2012). If these policies were effective and China's export diversity expanded, this could explain the relationship found in this paper between the treated market share and change in competitors' exports to the EU. The negative treatment effect for the product categories with a low treated market share could be actually caused by China's policies to gather a larger market share for these product categories.[19] This is, of course, very speculative and cannot be interpreted as a causal finding of this paper.

In addition to omitted variables, measurement errors in treated market share biases parameter estimates. The credibility of the data is questionable, as mentioned in the data section (footnote 4). Random measurement error likely bias towards zero the parameter estimates presented in this paper, but are unlikely to yield estimates of incorrect sign for non-zero parameters. Thus, random measurement errors are unlikely to explain the unexpected findings in this paper.

With systematic measurement errors, such claims cannot be made. In order to test the hypothesized mechanism in this paper, proper data and estimation methods are essential. The treated market share variable is constructed such that China's and India's exports to the EU are summed over importers and competitors for the products covered by the GSP graduation. The mechanism concerning cost leadership applies to industries within a country. Summing exports over two countries is therefore problematic, as a treated market share of (close to) 1 does not necessarily imply that China and/or India exhibit cost leadership. There are few product categories for which China or India has a very large market share (ms>0.9). Therefore, this element cannot be addressed empirically with the data used here.

Another point of discussion concerns the level of detail in the products contained in the data. It is possible that there are products which can only be produced in China and/or India (due to cost

[19] The Chinese policies implemented relatively close to the implementation date of the GSP graduation are not controlled for by including importer-exporter-time (μ_{ijt}), importer-exporter-product (σ_{ijk}), or exporter-product-time (τ_{jkt}) fixed effects.

leadership or availability of necessary resources). If these products require more detailed specifications than the HS-6 digit level offers, the data is not sufficient to take this type of arguments into account. Both limitations can partially explain why the hypothesized theory is rejected in this paper.

This paper mainly followed the methodology of Cheong et al. (2017). Are their results comparable to the results found in this paper. The nature of the interventions differs, which complicates the extent to which the results can be compared one on one. The intervention analyzed in Cheong et al. (2017) is a *temporary decrease* in import tariffs of ±*12*% for a *medium* textile exporter *after a natural disaster*. This paper analyzes a *permanent increase* in import tariffs of ±*3*% for *two major* textile exporters as their share of imports to the EU exceeds a predetermined threshold, i.e. they became too competitive. Our results from the model linear-in-market-share considering the intensive margin only are comparable to the finding by Cheong et al. (2017).[20] First of all, the results of both papers are insignificant considering this model specification. Second, overall I find larger coefficients than the coefficients found by Cheong et al. (2017), indicating that the GSP graduation had more effect on competitors than the tariff waivers for flood hit Pakistan. To conclude, both papers find positive and negative treatment effects for competitors, with no clear pattern among the competitors explaining this difference.

Until recently, statistical models with large data sets and multiple high dimensional fixed effects were deemed computationally unfeasible (Head and Mayer, 2015, pp 151-152). This paper uses recently developed and publically available statistical estimation methods that overcome this problem (Correia, 2018) (Guimarães & Portugal, 2010). These developments may help trade economist to overcome the computational difficulties in their search for theory-consistent estimations.

8. Conclusion

This paper researched whether and how EU's GSP graduation for China and India affected the export values of competing countries. In order to do so, the relationship between the treated market share and the change in competitors' exports was analyzed using a triple difference approach with importer-time, importer-product, and product-time fixed effects. I was therefore able to control for

[20] This model is most similar to the model used by Cheong et al.(2017).

product-time trends, differences in importer-product preferences, and time-varying demand at the importer level.

A non-monotonic relationship between the market share of China and India and the change in export values of competing export countries was hypothesized. This hypothesis was rejected for all model specifications. The change in exports of competing countries to the EU varies substantially in size, sign, and significance level. The actual relationship is negative and convex, which is robust to all significant model specifications. Thus, the export volumes of competing countries to the EU first decreases as China's and India's market share increases, and subsequently increases again. As discussed, the analysis is likely to suffer from endogeneity issues plausibly explaining the unexpected relationship.

In order to improve the empirical evidence regarding the mechanism of the race to the bottom, more research on interventions causing relative price changes is required, including countries facing different prices, but also countries that might benefit/loose from these relative price changes. Preferably, exogenous interventions should be analyzed, without effective counter policies aimed to offset the effect caused by an intervention. Hopefully the increasing available of data, also for the least developed countries, in combination with new statistical models to analyze large data sets with multiple high dimensional fixed effects, enables economist and other scientist to find unbiased effects of these type of interventions.

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10. Appendix

Table A1. Competitors' exports to the EU after China's and India's GSP graduation with sample restrictions (see row "Sample" below)

Model	M3a	M4a	M3b	M4b	M3c	M4c
Dependent	Log(Export)	Log(Export)	Log(Export)	Log(Export)	Log(Export)	Log(Export)
EU*Post* Treated MS	0.084 (0.063)	-0.222 (0.176)	-0.028 (0.054)	0.243 (0.210)	0.120** (0.052)	-0.226 (0.164)
EU*Post* Treated MS^2	-	0.381* (0.213)	-	-0.336 (0.267)	-	0.425** (0.201)
Fixed effects:						
Importer*Year	Yes	Yes	Yes	Yes	Yes	Yes
Importer* Product	Yes	Yes	Yes	Yes	Yes	Yes
Product* Year	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.3089	0.3089	0.2833	0.2833	0.2878	0.2878
Observations	906,050	906,050	306,825	306,825	304,834	304,834
Sample	$Export_{ik,2007} > 0$	$Export_{ik,2007} > 0$	Year: 2013/2014	Year: 2013/2014	Year: 2012/2013	Year: 2012/2013

* *Note.* Standard errors in parentheses; two-sided p-values: *** p<0.01, ** p<0.05, * p<0.1
* Observations: Importer*Exporter*Product*Year
* Variables not included in the model indicated by "-".
* Trade values for Indonesia, Myanmar, and Macedonia were missing in 2007, thus these countries were not included in the analysis with the sample restriction $Export_{ik,2007} > 0$.

Table A2. Competitors' exports to the EU after China's and India's GSP graduation with sample restrictions, separately for each competitor.

Model	M6	M7	M6a	M7a
Dependent variable	Log(Export)	Log(Export)	Log(Export)	Log(Export)
EU*Post*Competitor *Treated MS				
BGD	-0.172	-0.092	-0.047	0.306
	(0.182)	(0.848)	(0.238)	(0.952)
BGR	0.226	0.512	0.212	1.161
	(0.230)	(0.725)	(0.382)	(0.936)
HUN	0.527**	-0.353	0.286	-0.094
	(0.229)	(0.699)	(0.268)	(1.097)
IDN	-0.136	-0.637	.	.
	(0.132)	(0.612)		
ITA	0.123	-0.518**	0.084	-0.514**
	(0.077)	(0.193)	(0.084)	(0.205)
KHM	-0.114	1.198	-0.034	3.507***
	(0.337)	(1.070)	(0.493)	(1.285)
KOR	-0.282	-0.014	-0.251	0.165
	(0.187)	(0.434)	(0.254)	(0.641)
LKA	0.451	-0.593	0.194	-0.521
	(0.311)	(0.861)	(0.278)	(0.902)
MKD	0.445	0.590	0.209	-5.632
	(0.556)	(2.254)	(0.954)	(4.979)
MMR	0.419	1.296	.	.
	(0.752)	(2.405)		
MYS	0.144	-0.512	-0.301	-1.855
	(0.393)	(1.294)	(0.413)	(1.317)
PAK	0.093	-0.255	0.008	0.135
	(0.147)	(0.380)	(0.158)	(0.444)
PHL	-0.147	-1.411**	-0.234	-1.878
	(0.317)	(0.686)	(0.464)	(1.148)
POL	0.504**	0.010	0.466	0.115
	(0.218)	(0.682)	(0.290)	(0.965)
PRT	0.128	-0.498	0.212	-0.539
	(0.172)	(0.646)	(0.168)	(0.609)
ROU	0.616**	0.483	0.665**	0.245
	(0.255)	(1.000)	(0.270)	(1.373)
THA	-0.248	-1.617***	-0.122	-1.501***
	(0.151)	(0.485)	(0.156)	(0.526)
TUR	0.282*	0.381	0.206	0.494
	(0.153)	(0.339)	(0.214)	(0.345)
UKR	0.812	-0.069	.	.
	(0.538)	(2.098)		
VNM	0.267	0.084	0.382*	0.072
	(0.172)	(0.572)	(0.216)	(0.779)
EU*Post*Competitor* Treated MS^2				
BGD		-0.098		-0.433
		(1.009)		(1.144)
BGR		-0.370		-1.250

	(1)	(2)	(3)	(4)
		(0.798)		(0.977)
HUN		1.070		0.459
		(0.792)		(1.407)
IDN		0.606		.
		(0.707)		
ITA		0.810***		0.761***
		(0.246)		(0.257)
KHM		-1.814		-5.495***
		(1.433)		(1.848)
KOR		-0.328		-0.504
		(0.539)		(0.701)
LKA		1.283		0.884
		(1.179)		(1.227)
MKD		-0.186		7.139
		(2.637)		(5.579)
MMR		-1.168		.
		(2.993)		
MYS		0.775		1.816
		(1.386)		(1.397)
PAK		0.467		-0.174
		(0.527)		(0.616)
PHL		1.556*		1.961
		(0.845)		(1.291)
POL		0.589		0.424
		(0.679)		(0.931)
PRT		0.779		0.937
		(0.794)		(0.787)
ROU		0.170		0.547
		(1.337)		(1.781)
THA		1.653***		1.656***
		(0.591)		(0.612)
TUR		-0.123		-0.354
		(0.395)		(0.458)
UKR		1.067		.
		(2.385)		
VNM		0.222		0.376
		(0.692)		(0.920)
Fixed effects:				
Importer*Exporter*Year	Yes	Yes	Yes	Yes
Importer*Exporter* Product	Yes	Yes	Yes	Yes
Product*Exporter*Year	Yes	Yes	Yes	Yes
R^2	0.8436	0.8336	0.8478	0.8478
Observations	1,268,652	1,268,652	886,292	886,292
Sample	Full Sample	Full Sample	$Export_{ik,2007} > 0$	$Export_{ik,2007} > 0$

* *Note. S*tandard errors in parentheses; two-sided p-values: *** p<0.01, ** p<0.05, * p<0.1

* Observations: Importer*Exporter*Product*Year

* Coefficients for IDN, MMR and UKR could not be estimated due to missing data, indicated with a ".".

Table A2 (continued)
Competitors' exports to the EU after China's and India's GSP graduation with sample restrictions, separately for each competitor.

Model	M6b	M7b	M6c	M7c
Dependent variable	Log(Export)	Log(Export)	Log(Export)	Log(Export)
EU*Post*Competitor* Treated MS				
BGD	.	.	0.078	-0.055
			(0.162)	(0.527)
BGR	0.354	-0.273	-0.167	-2.019**
	(0.276)	(0.917)	(0.345)	(0.961)
HUN	0.406	2.190*	0.079	-1.021
	(0.263)	(1.240)	(0.284)	(1.044)
IDN	0.071	-1.012*	0.171	0.309
	(0.185)	(0.519)	(0.182)	(0.802)
ITA	0.139**	0.035	0.108	-0.131
	(0.063)	(0.254)	(0.083)	(0.275)
KHM	0.191	2.769**	-0.620**	-2.666**
	(0.363)	(1.067)	(0.273)	(1.032)
KOR	-0.245	-0.152	-0.240	0.486
	(0.186)	(0.562)	(0.213)	(0.593)
LKA	0.300	-0.290	-0.040	-0.625
	(0.334)	(1.085)	(0.345)	(1.157)
MKD	-0.006	-1.130	0.988	0.553
	(0.703)	(2.487)	(0.735)	(1.895)
MMR	-0.275	3.001	-0.854	1.670
	(0.975)	(4.183)	(1.156)	(6.016)
MYS	0.261	2.319**	-0.209	-1.634
	(0.277)	(0.982)	(0.348)	(1.310)
PAK	-0.130	-0.581	0.142	-0.028
	(0.217)	(0.738)	(0.163)	(0.756)
PHL	0.362	-0.785	-0.129	-2.595
	(0.403)	(1.018)	(0.370)	(1.821)
POL	0.285	1.196*	0.166	0.206
	(0.197)	(0.660)	(0.248)	(0.552)
PRT	0.057	-0.147	-0.121	0.699
	(0.181)	(0.742)	(0.203)	(0.707)
ROU	0.262	-0.464	0.474	0.847
	(0.330)	(0.990)	(0.346)	(0.982)
THA	-0.398**	-1.109	-0.134	-2.266***
	(0.167)	(0.737)	(0.188)	(0.711)
TUR	-0.033	-0.186	0.340*	0.014
	(0.140)	(0.404)	(0.172)	(0.573)
UKR	1.142*	3.976	0.247	1.315
	(0.574)	(3.591)	(0.619)	(3.236)
VNM	0.053	0.778	0.457***	0.284
	(0.165)	(0.717)	(0.156)	(0.538)
EU*Post*Competitor* Treated MS^2				
BGD		.		0.168
				(0.659)

BGR		0.820		2.456*
		(1.301)		(1.289)
HUN		-2.205		1.330
		(1.406)		(1.188)
IDN		1.308**		-0.166
		(0.526)		(1.004)
ITA		0.131		0.298
		(0.317)		(0.356)
KHM		-3.551**		2.718**
		(1.465)		(1.302)
KOR		-0.115		-0.890
		(0.688)		(0.664)
LKA		0.728		0.717
		(1.266)		(1.400)
MKD		1.462		0.579
		(3.219)		(2.457)
MMR		-4.060		-3.330
		(5.159)		(7.658)
MYS		-2.454**		1.687
		(1.065)		(1.385)
PAK		0.614		0.228
		(1.024)		(0.974)
PHL		1.460		3.018
		(1.241)		(2.052)
POL		-1.090		-0.047
		(0.717)		(0.623)
PRT		0.255		-1.013
		(0.862)		(0.775)
ROU		0.944		-0.480
		(1.343)		(1.113)
THA		0.861		2.548***
		(0.842)		(0.785)
TUR		0.190		0.402
		(0.507)		(0.630)
UKR		-3.560		-1.265
		(4.287)		(3.941)
VNM		-0.879		0.206
		(0.816)		(0.597)
Fixed effects:				
Importer*Exporter*Year	Yes	Yes	Yes	Yes
Importer*Exporter* Product	Yes	Yes	Yes	Yes
Product*Exporter*Year	Yes	Yes	Yes	Yes
R^2	0.9370	0.9370	0.9343	0.9343
Observations	245,284	245,284	246,428	246,428
Sample	Year: 2013, 2014	Year: 2013, 2014	Year: 2012, 2013	Year: 2012, 2013

* *Note. S*tandard errors in parentheses; two-sided p-values: *** p<0.01, ** p<0.05, * p<0.1
* Observations: Importer*Exporter*Product*Year
* Coefficients for BGD could not be estimated due to missing data, this is indicated with a ".".

Table A3. Competitors' exports to the EU after the intervention.

M3e: Homogenous competitors, categorical indicator for market share
M63: Heterogeneous competitors, categorical indicator for treated market share
M3d: Homogenous competitors, binary indicator for treated market share
M6d: Heterogeneous competitors, binary indicator for treated market share

Model	M3e	M6e	Model	M3d	M6d
Dependent variable	Log(Export)	Log(Export)	Dependent variable	Log(Export)	Log(Export)
EU*Post* Competitor* 1/3≤TreatedMS≥2/3	-0.023 (0.027)		EU*Post* Competitor* TreatedMS≥0.05	0.000 (0.031)	
BGD		-0.007 (0.102)	BGD		-0.177 (0.174)
BGR		0.237* (0.131)	BGR		0.005 (0.113)
HUN		0.107 (0.132)	HUN		-0.070 (0.127)
IDN		-0.035 (0.079)	IDN		-0.074 (0.112)
ITA		0.001 (0.034)	ITA		-0.050 (0.047)
KHM		-0.125 (0.207)	KHM		0.145 (0.142)
KOR		-0.084 (0.072)	KOR		0.003 (0.116)
LKA		0.192 (0.139)	LKA		-0.239 (0.148)
MKD		0.142 (0.336)	MKD		-0.092 (0.217)
MMR		0.079 (0.350)	MMR		0.059 (0.490)
MYS		0.024 (0.150)	MYS		-0.267 (0.408)
PAK		-0.019 (0.071)	PAK		-0.078 (0.073)
PHL		-0.286* (0.160)	PHL		-0.205 (0.234)
POL		0.147 (0.115)	POL		0.156 (0.167)
PRT		0.010 (0.081)	PRT		-0.011 (0.120)
ROU		0.211** (0.100)	ROU		0.297* (0.169)
THA		-0.240*** (0.067)	THA		-0.241* (0.120)
TUR		0.132** (0.062)	TUR		0.110 (0.092)
UKR		0.057 (0.267)	UKR		0.772* (0.432)

VNM		-0.045 (0.077)	VNM		0.225* (0.117)
EU*Post* Competitor* 2/3<TreatedMS≥1	0.048 (0.037)				
BGD		-0.126 (0.129)			
BGR		0.012 (0.165)			
HUN		0.401** (0.159)			
IDN		0.003 (0.105)			
ITA		0.124* (0.059)			
KHM		-0.140 (0.242)			
KOR		-0.214 (0.149)			
LKA		0.344 (0.259)			
MKD		0.041 (0.331)			
MMR		0.478 (0.475)			
MYS		0.174 (0.243)			
PAK		0.174 (0.131)			
PHL		0.016 (0.184)			
POL		0.328** (0.122)			
PRT		0.042 (0.124)			
ROU		0.503** (0.209)			
THA		-0.024 (0.107)			
TUR		0.121 (0.113)			
UKR		0.283 (0.295)			
VNM		0.228* (0.134)			
Fixed effects:					
Importer*Exporter* Year	Yes	Yes		Yes	Yes

Importer*Exporter*Product	Yes	Yes		Yes	Yes
Product*Exporter*Year	Yes	Yes		Yes	Yes
R^2	0.2545	0.8356		0.2545	0.8356
Observations	1,478,946	1,402,295		1,478,946	1,402,295
Sample	Full Sample	Full Sample		Full Sample	Full Sample

* *Note. S*tandard errors in parentheses; two-sided p-values: *** p<0.01, ** p<0.05, * p<0.1
* Observations: Importer*Exporter*Product*Year

Table A4. Competitors' exports to the EU after China's and India's GSP graduation by industry

Model	M3f	M4f
Dependent variable	Log(Export)	Log(Export)
EU*Post*Industry* Treated MS		
1	0.998**	0.751
	(0.469)	(0.958)
2	0.102	-0.650
	(0.145)	(0.414)
3	0.160*	-0.026
	(0.084)	(0.255)
4	-0.012	-0.619**
	(0.086)	(0.237)
5	0.077	-1.170**
	(0.165)	(0.547)
6	-0.133*	-0.285
	(0.069)	(0.394)
EU*Post*Industry* Treated MS^2		
1		0.164
		(1.166)
2		0.987**
		(0.402)
3		0.118
		(0.348)
4		0.819***
		(0.283)
5		1.704***
		(0.612)
6		0.096
		(0.447)
Fixed effects:		
Importer*Year	Yes	Yes
Importer*Product	Yes	Yes
Product*Year	Yes	Yes
$\mathbf{R^2}$	0.2560	0.2560
Observations	1,342,380	1,342,380

* *Note. S*tandard errors in parentheses; two-sided p-values: *** p<0.01, ** p<0.05, * p<0.1
* Observations: Importer*Exporter*Product*Year.