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The Role of Specific Trade Concerns Raised on TBTs in the Import of Products to the EU, USA and China

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Abstract

The Specific Trade Concerns (STC) data on Technical Barriers to Trade (TBT) notifications of WTO members report 317 TBT notifications between 1995 and 2011. This contribution provides evidence concerning the impact of TBT STCs on the imports of products at 4-digit level of the Harmonised System to three major economies – the EU, the United States and China – over the period 1995-2011 using an augmented gravity model controlling for the endogenous characteristics of TBTs and tariffs. Robustness checks are provided using Fixed Effect (FE) Estimation, and Poisson FE. Further, since TBTs are generally imposed on non-food products, food and non-food products are analysed in separate specifications. Bootstrapped robust results suggest that these policy measures have negatively influenced trade flows to the EU and China, while they have enhanced the imports of products to the United States. The quality impact of these measures is assessed using unit values of imports. The results suggest that US notifications improve the quality and values of imports, while in the case of the EU notifications this effect is observed only for the high-income trade partners. Lower imports to China due to quality improvement of products, on the other hand, may refer to low preference of Chinese consumers for higher quality.

CONTENTS

TABLES AND FIGURES

1. Introduction

Since the start of the General Agreement on Tariffs and Trade (GATT) in 1948, tariffs between the member states of the World Trade Organisation (WTO) have fallen dramatically. However, a considerable number of non-tariff measures (NTMs) have been implemented drawing global attention. Technical Barriers to Trade (TBTs) are one of the most important subcategories of these NTMs that have been frequently used by governments. The nature of these instruments is very complex and opaque and the true motivation of governments for implementing them is by no means evident.

The introduction of legitimate regulations and standards within TBTs are expected to improve market efficiencies. For instance, with mandatory labelling of products, transparency can increase the information provided to the consumers and producers in the market, which will improve the welfare of consumers, producers, and the entire society. Moreover, these measures can be levied for the protection of human health, environmental quality, national security, etc. These aims behind TBTs have been usually referred to as faithful approach to the introduction of TBTs. Member states can provide evidence for their claims to the WTO secretariat in order to make their policy instruments acceptable to other members. By contrast, some TBTs might be in pursuit of restrictive protectionism of domestic producers, which might raise concerns of other WTO members.[1]

While countries are obliged to notify their NTMs directly to the WTO secretariat, another system is also structured by the WTO regulations. Other countries can also discuss the issues related to other members' policies and notify them to the meetings of TBT committees, WTO minutes recording sessions. Whether or not a country is reluctant to notify its own policies directly to the secretariat, other countries can raise their own Specific Trade Concerns (STCs). These reverse notifications are documented and data on TBT STCs have been provided by the WTO secretariat. These data cover 317 reverse notification items on TBTs for all member states during 1995-2011. Each item (measure) may cover various products and various concerned countries.

TBT STCs are specific cases of NTMs and the STC data represent a subset of all TBTs notified to the WTO secretariat. In other words, the actual number of TBTs imposed by the WTO members is much larger than the number of STCs on TBT. In the context of STCs, countries are becoming increasingly concerned because of the significant impact of TBT on their trade. The important issue for STCs is that these notifications have been more in the focus of countries facing TBTs than any other general TBTs have. Therefore, the impact of TBT STCs on product imports can show the significant role of these notifications in international trade.

The European Union is the largest WTO member, maintaining 64 STCs. China – having acceded to the WTO at the end of 2001 – is the second largest member, maintaining 39 TBT STCs. The United State of America is the third largest WTO member, maintaining 35 items during 1995-2011.

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[1]   Ghodsi (2015) provides empirical evidence for protectionist motives of TBT STCs.

When a WTO member believes that another member is violating one of the WTO agreements, it can make a request for consultation within the Dispute Settlement Mechanism (DSM). During 1995-2012, there were 45 DS cases citing the TBT agreement. In the case of the European Union, requests for consultation for violating the TBT agreement (20 DS cases) were more frequent than for any other member. However, only one of those EU cases (DS 231 complained by Peru and some other third parties) was proved by the Dispute Settlement Body (DSB) to be a violation of the TBT agreement. Concerning the United States there were 11 requests for consultation for violation of the TBT agreement; the DSB finally concluded that the US had in fact violated the TBT agreement four times (DS cases 381, 384, 386 and 406). Interestingly, in the case of China there have been no requests for consultation concerning the violation of the TBT agreement until 2014.

Ghodsi and Michalek (2014) have shown a strong positive relationship between TBT STC notifications and requests for consultations citing the TBT agreement within the DS mechanism. Thus, TBT STCs might follow some protectionist motivations causing trade conflicts. Hence, the aim of this paper is to determine the impact of these measures on trade flows, in order to discover their protectionist motivations.

The main goal of this contribution is to investigate the impact of TBT STCs maintained by the EU, the United States and China on their imports of products at 4-digit level of the Harmonised System classification during 1995-2011. The structure of the rest of the paper is as follows: In the next section, a brief literature review is provided. The third section then focuses on the methodology of the analysis, data description and estimation specifications. In the fourth section, the estimation results are presented and discussed. The final section provides a summary of the main findings and concluding remarks.

2. Literature review

The empirical analysis of bilateral trade was first introduced by Jan Tinbergen in 1962. Since he was both a physicist and an economist, he formulated a gravity framework for international bilateral trade based on Newton's law of gravity. The main issue of this framework is that bilateral trade between two countries is positively affected by their economic attractors, similar to the mass of two objects forcing gravity on each other. For the economic potential of partners, Gross Domestic Product (GDP) is usually used. Moreover, the geographical distance between the two is decreasing their trade flows.

After Tinbergen (1962), this strand of literature has been largely extended. Anderson (1979) introduced a theoretical framework for the gravity model using constant elasticity of substitution as proposed by Armington (1969). A monopolistic competition framework using Armington-type consumer preferences was implemented in the gravity model several times (Krugman, 1980; Helpman and Krugman, 1985; Bergstrand, 1985, 1989). Deardorff (1998) also analysed the Heckscher-Ohlin model within the gravity framework, while Eaton and Kortum (2002) implemented the gravity framework for the Ricardian theory. Melitz (2003) and Bernard et al. (2007) introduced firm heterogeneity and intra-industry trade. Anderson and van Wincoop (2004) modified the gravity equation considering not only trade obstacles existing at the bilateral level, but also relative size adjusted obstacles with respect to other countries.

TBTs are mostly technical regulations aiming at higher standards of the imported products. Higher standards within these regulations usually increase the quality of production processes and products (Wilson and Otsuki, 2004; Trienekens and Zuurbier, 2008). A recent field of international trade literature focuses on the quality of traded products. Various scholars discussed the importance of product quality for specialisation, direction of trade flows, and growth of countries (Schott, 2004; Hummels and Klenow, 2005; Hallak, 2006). However, it is not easy to measure and analyse the quality of products. Traded unit values are claimed to be suitable proxies for the quality of products. However, using raw unit values, it is not very accurate to distinguish between the costs associated with comparative disadvantage and product qualities. Hallak and Schott (2008), Khandelwal (2010) and Feenstra and Romalis (2014) established theoretical frameworks to measure quality and derive quality-adjusted prices from available trade information on unit value and quantity. Applying a new modified gravity model, Feenstra and Romalis (2014) calculated quality and quality-adjusted prices considering both supply and demand size. In their framework, trade-specific costs and costs related to exports are increasing the quality of exports. However, the authors did not consider NTMs in their analysis, while TBTs can be some specific trade costs enhancing the quality.

According to the underlying theoretical frameworks of the gravity models, costs of transportation and information are the main factors explaining the negative effect of distance on bilateral trade. The usage of only geographical distance between the two partners seems not to be appropriate in such investigations. Studies have included some other variables in the analysis that are crucial for decreasing the bilateral trade costs, such as having a common language, common historical heritage, common religion or ethnicity. Since the geographical distance between the two partners is usually calculated between the capitals or large cities of the two countries, having a common border variable can serve as

a better proxy for contiguity of the two countries enhancing trade (Frankel and Wei, 1993; Frankel and Rose, 1998; Anderson and van Wincoop, 2001, 2004; de Groot et al., 2004; de Benedictis and Taglioni, 2011).

In the early strand of the literature, cross-sectional data were used in the empirical analysis of the gravity equation. Later on, Ghosh (1976) and Mátyás (1997) pointed out the existence of exporter, importer, and time effects in the estimation of the gravity model using panel databases. The application of panel data techniques controlling for country-pair fixed effects was first introduced by Hummels and Levinsohn (1995); other scholars tried to follow that approach. However, using fixed effect techniques will drop the time-invariant variables such as bilateral distance, common language and common borders.

The volume of bilateral trade is furthermore highly affected by similarities between the two partner countries. Not only similarities in ethnicities, language and historical heritage matter, but also similarities in economic factors. Similarity of factor endowments between the two partners had been ignored within classical international trade theory but not in Ricardian models. That is why the New Trade Theory is characterised by economies of scale, product differentiation, and transportation costs in the models of Krugman (1980) or Helpman and Krugman (1985), which have been implemented in gravity models by many other scholars.

Helpman (1987) empirically found that the similarity of income between 14 industrial partner countries increases the volume of trade. Hummels and Levinsohn (1995) tried to reconsider this evidence by the inclusion of both developed and less developed countries. Their results suggested that when product differentiation provides a good fit of the model, dissimilarities between partners could not fit well. However, their sample of homogenous countries showed similar results to Helpman (1987). Bergstrand (1990), on the other hand, found that differences in factor endowments negatively affect the bilateral trade.

Baltagi, Egger and Pfaffermayr (2003) included the similarity index of the two partner countries' GDP measuring the relative country size, and the absolute difference in relative factor endowments in a modified gravity model. Their empirical analysis was focused on bilateral trade between the triad (EU 15, USA and Japan) and their 57 trading partners in an unbalanced panel database for the period 1986-1997. They found a positive relationship between relative country size and bilateral trade flows, while such a positive relationship between relative factor endowment similarities and trade would depend on the model specification and inclusion of various fixed effects.

Wang et al. (2010) also included similarities in the regression of the gravity equation. They also added similarities of foreign direct investment between the two trade partners. As suggested by other scholars such as Egger (2000), they included country fixed effects in the estimation of their model. They used the generalised method of moments (GMM) to control for the possible endogeneity of some explanatory variables with trade flows in the existence of possible heteroscedasticity.

While similarity indices of the two trade partners were used in Egger (2002), the application of a new estimation technique was first introduced. It was suggested that the AR(1) model in the framework of Hausman and Taylor (1981) would eliminate the systematic difference between observed and in-sample predicted trade values, which provides consistent and also efficient estimators. Egger (2002) stated that the Fixed Effect Estimator (FEE) is consistent rather than the Random Effect Estimator (REE) only in the

absence of endogeneity. Later on, a Hausman Taylor (HT) estimation was used by other researchers studying the gravity model (Baltag, Bresson and Pirotte, 2003; Egger and Pfaffermayr, 2004; Serlenga and Shin, 2004; Carrere, 2006; Stack and Pentecost, 2011).

Many authors have analysed the impact of NTMs and specifically TBTs on international trade. Essaji (2008) analysed the impeding effect of technical regulations imposed by the US government on the imports of 6-digit HS products. He found that these regulations imply a huge burden on poor countries with weak capacities, keeping them away from the industries characterised by the prohibitive instruments.

Disdier et al. (2010) studied the impact of TBTs and Sanitary and Phytosanitary (SPS) measures on imports of tropical products. In a gravity estimation controlling for fixed effects in 2004, their results showed a significant negative influence of these measures on imports. Li and Beghin (2012) also found a negative effect of TBTs on trade controlling for enodogeneity and time fixed effect in gravity estimations.

In a recent study, Yousefi and Liu (2013) investigated the role of TBTs on trade between China, Japan, Korea and the United States for manufacturing industries. In a gravity framework, they found a negative impact of TBTs on trade in the long run. Bao and Chen (2013) also tested the influence of TBTs on trade components. Their empirical analysis, covering 103 countries over the period 1995-2008, suggested that TBTs decrease the probability of trade while they increase the number of products traded (extensive margin). However, it was found that TBTs have no statistically significant impact on the trade value of each product (intensive margin). Many scholars investigated the role of NTMs on trade for specific sectors. For instance, Wilson et al. (2003), Wilson and Otsuki (2004), Chen et al. (2008) and Disdier and Fontagné (2010) focused on trade in agricultural products; Blind (2001), Blind and Jungmittag (2005) and Fontagné et al. (2005) studied manufacturing sectors.

This contribution extends the literature by putting a special focus on TBT STCs. In an earlier study, Ghodsi (2015) analysed the determinants of these TBT STCs. Protectionism, economic factors, technological improvement, and institutional and environmental issues were found to be important determining factors behind these trade policy measures. Since the European Union, China and the United States have maintained these notifications to a larger extent than any other WTO member, this contribution is concentrated on the imports of products to these countries over the period 1995-2011. An augmented gravity model is implemented using econometric techniques to control for the problems concerning endogeneity, country fixed effects, time effects and heteroscedasticity as reviewed above, which will be controlled for by using a HT estimation as elaborated next.

3. Methodology and data description

In this paper the impact of TBT STCs on the trade flows of products at the 4-digit level of the Harmonised System revision 2 (HS2) to the EU, the United States and China for the period 1995-2011 is analysed using a gravity framework. Since China joined the WTO only at the end of 2001, its TBT STCs have been notified after that period. Thus, the benchmark analysis for China is over the period 2002-2011[2]. Since policy measures may affect both prices and the amount of products imported, import values, quantities and unit values are considered in the study. However, in the benchmark analysis, the effect of TBT STCs on the value of imports is presented whereas the analysis concerning quantities and unit values of imports are presented as robustness checks in the appendix. In the analysis a gravity model is used similar to that applied by Nunn (2007) and Essaji (2008):

$$Im_{ijht} = \alpha + \beta_0 TBT_{iht} + \beta_1 T_{ijht} + \beta_2 Y_{ijt} + \beta_3 D_{ij} + \beta_4 S_{ijt} + \gamma_i + \delta_j + \theta_h + \vartheta_t + \varepsilon_{ijht} \qquad (1)$$

where Im_{ijht} is the import (value, quantity or price) of product h to the reporter country i from partner country j at time t. TBT_{iht} is a dummy variable with a value of 1 at time t indicating that there is a TBT STC imposed by country i on product h. TBT STC hits are included in such a variable for two reasons: Firstly, some TBT STCs are not permanently maintained during a long period. However, there is not enough information regarding the withdrawal of these measures in the data. Secondly, some TBT STCs are modified or amended over years. Again, it is not known whether these amendments are major or minor modifications on previous measures. Therefore, to separate all of these TBT STCs during different periods of time, only TBT STCs at the time of imposition (or raising concerns) are considered as hits in the analysis.

Since some TBTs are maintained permanently and their impact might remain, one lag of this variable is also included in the regressions. Y_{ijt} refers to the summation of total real GDP of both partners, which can be considered as market potentials based on the traditional gravity framework. T_{ijht} is the import weighted average effective applied tariff rate on all subcategories of product h imposed by the reporter country against the partner. D_{ij} captures the effects of the average distance between the two trade partners' main cities. $\gamma_i, \delta_j, \theta_h$ and ϑ_t are respectively reporter country, partner country, product, and time fixed effects; ε_{ijht} is the error term. In order to control better for product level characteristics, the number of varieties of products at 8-digit level within each product group j is included in the equation as well. S denotes a vector of variables capturing similarities between the two partners which will be discussed in more detail in the following.

As discussed earlier, similarities between countries can be an important factor for increasing the volume of trade lowering the transaction costs. Similarity in development (SimY) and factor endowments (SimF) between the two partners are one of the main variables discussed in the literature, which are calculated as follows:

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[2]   The analysis for China over the period 1995-2011 and for the EU and US over the period 2002-2011 is presented in the appendix.

$$SimY_{ijt} = 1 - \frac{Yp_{it}^2}{(Yp_{it}+Yp_{jt})^2} - \frac{Yp_{jt}^2}{(Yp_{it}+Yp_{jt})^2} \tag{2}$$

$$SimF_{ijt} = \left| ln\left(\frac{K_{jt}}{L_{jt}}\right) - ln\left(\frac{K_{it}}{L_{it}}\right) \right| \tag{3}$$

Here Yp refers to the GDP per capita, and K and L are respectively capital stock and labour force. Index SimY used by Baltagi, Egger and Pfaffermayr (2003) ranges between zero when the two countries are very far from each other and one half ($SimY_{ijt} \in (0, 1/2]$) when the two partners are the same in terms of GDP per capita. Index SimF equals zero if the two countries have the same proportion of factor endowments; otherwise, it will receive a higher value.

In matrix S of the gravity equation, having a colonial history (Colony), common official language (Language) of the two partners, and a dummy for being WTO members are included.[3] Besides, to control for similarities in terms of trade, having a free trade agreement (FTA) between the two trade partners is also considered as a dummy variable. This variable gets a value of 1 if there is a bilateral FTA in force between the two countries and zero otherwise. Moreover, since a large share of partner countries are EU Member States sharing similar regulations and trade policies, a dummy variable for EU member receiving the value 1 of the partner country is part of the EU at time *t* is included in the estimation.

Ghodsi (2015) showed that import values are an important determinant of TBT STC notifications. According to those estimation results, import values increase the probability of a new TBT STC. However, controlling for the endogeneity problem in the GMM regressions, the regressions suggested that lower bilateral import flows are statistically significantly related to more TBT STC notifications. Therefore, there is a strong dual causality in the regressions on equation (1). The same issue can be argued for tariffs. Due to possible endogeneity of variables with the dependent variable (specifically policy instruments), and the possibility of including time-invariant variables in the panel, the estimation technique proposed by Hausman and Taylor (HT) in 1981 will be used for the benchmark analysis. Heterogeneity across countries and products may lead to a different structure of variances within each individual group in the panel regressions. Thus, there may be possible heteroscedasticity in the structure of error terms. Therefore, the variance-covariance (VCE) matrix is modified using bootstrap technique to achieve robust estimators, as robust VCE is not an option with HT. Moreover, as a robustness check specification, a Fixed Effect (FE) estimator will be applied separately (presented in the appendix).

TBT STC data are provided by the WTO secretariat[4]. The data on trade flows are gathered from three different sources. Values and quantities of imports to the EU are gathered from the COMEXT database provided by Eurostat[5] as this database is richer than other available databases. Value of imports and tariffs are collected from the Trade Analysis and Information System (TRAINS) provided by World Integrated Trade Solution (WITS)[6]. The quantity of imports is compiled from the UN COMTRADE

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[3]   Contiguity (sharing the same border) is another gravity variable frequently used in the literature. However, this variable causes bias in the estimations over distance, especially for the US sample. Since Canada and Mexico are the only two countries sharing a border with the US, and since imports to the US are more from distant countries such as the EU or China than from Latin American countries nearby, the coefficient of distance becomes upward-biased if contiguity is also included. In other words, including a contiguity variable in the regressions makes the distance coefficient positive. Estimation results including both contiguity and distance are available on request.

[4]   Can be found at: http://www.wto.org/english/res_e/publications_e/wtr12_dataset_e.htm

[5]   Can be found at: http://epp.eurostat.ec.europa.eu/portal/page/portal/international_trade/introduction

[6]   Can be found at: http://wits.worldbank.org/wits/

database provided by WITS. Import prices are the simple unit values calculated by dividing import values by quantities. Data on GDP, GDP per capita, capital formation, and labour force are gathered from the World Development Indicators (WDI) provided by the World Bank[7]. Data on distances, colony, and common language are downloaded from the CEPII database[8].

In this analysis, the European Union is considered as a single economy with the number of countries expanding over time. Thus, the data are constructed for all of the members as aggregates or averages wherever applicable according to their time of accession to the EU. For instance, distance is considered as the average distance of members from the trading partners, while the GDP of the EU is the summation of all members' GDP at the time.

All variables except dummies and tariffs are in logarithmic form. Since the logarithm of the trade flow is considered in the regression, zero values become missing values in the estimation. In the literature, various different ways to handle this problem have been proposed. One way of controlling such a problem is an estimation using Poisson regression. Because of using panel data, fixed-effect Poisson estimation drops out some observations due to zero outcomes or single observation in groups. On the other hand, using normal Poisson regression with the inclusion of country, product and time dummies controlling for fixed effects, convergence in the maximisation process cannot be achieved. Even after 6500 iterations, Poisson regression cannot produce maximum-likelihood estimation results with fixed effect dummies using various techniques. Nonetheless, there is no zero observation in the imports value data of China and the US, while there are some zeros for the sample of the EU. Therefore, for regressions over China and the US, a normal panel FE estimator is applied, while for the EU Poisson FE is applied for robustness checks.

In the TBT STC database, some information is provided regarding the issues raised for a specific TBT. Discrimination and unnecessary barriers to trade (UBT) are two important issues stated by the concerned countries for some of the TBT STCs which might be the most important issues behind raising a concern over a regulation. Thus, in a separate estimation specification, instead of the TBT STC variable, three other variables will be included: Discriminatory, UBT, and the rest of TBT STCs are the three separate explanatory variables replacing TBT STCs in the new specification[9].

TBTs are mainly imposed for technical issues that might be more related to manufacturing non-food products. On the other hand, regulations on food products will be mostly imposed within a SPS measure. Therefore, samples of food and non-food products will be analysed in two separate estimation specifications[10].

Finally, the impact of the trade policy of the three advanced economies under study might differently affect the trade patterns of the respective country depending on its development. Specifically with technical regulations, advanced countries seem to be more flexible towards a trade instrument. In other words, an advanced country is enjoying high standard production procedures and can thus easily comply with effective technical barriers. Therefore, four different categories of countries will be analysed within four estimations. Low-, lower-middle-, upper-middle- and high-income countries are categorised separately using the evolutionary classifications of the World Bank, based on income per capita.

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[7]   Can be found at: http://data.worldbank.org/data-catalog/world-development-indicators

[8]   Can be found at: http://www.cepii.fr/anglaisgraph/bdd/distances.htm

[9]   These three variables are dummies similar to TBT STC variables, whose first lags are also included in the estimation.

[10]   Products with HS 2-digit codes 1 to 24 are considered as food products and the rest as non-food.

4. Estimation results

4.1. THE EUROPEAN UNION

Table 1presents the regression results of imports to the EU during 1995-2011. From the first column to the left (M1) it can be observed that TBT STCs have no statistically significant impact on import values of products imported to the EU. However, Table 6 (in the appendix) shows that these regulations are hampering traded quantities at the 5% level of significance. This result suggests that TBT STCs maintained by the EU hamper trade by increasing the price of imported products, which can be also observed in Table 7 for the estimation results on import prices. This usually happens when new regulations and technical standards need to be met in order for products to be imported to the EU. Firstly, due to TBT regulations, the quality of products might increase leading to higher prices. Feenstra and Romalis (2014) showed that some specific trade costs increase the quality and consequently prices of product exports. TBTs can also be considered as part of these specific trade costs. However, this cannot fully take place within a short period. In other words, to comply with TBT regulations enhancing products quality, production procedure modifications are usually time consuming. This process may take place partially within one year. Secondly, the increase in prices and import values may be due to a specific set of products with higher prices and not all subcategories of products. In fact, those products might be substitutes for cheaper products within that specific category.

The second column (M2) shows the coefficients of TBT STCs based on the three concerned issues in the notifications. Discriminatory STCs have a significantly negative influence on import values and quantities of products imported to the EU. However, these TBT STCs do not influence the current import prices statistically significantly, while they increase the imported unit values in the next year. Seemingly, discriminatory STCs affect the trade flows instantly and, after complying with them for a longer time, due to higher induced costs the unit values of imports increase, which causes lower trade even in the next year. In fact, these specific regulations hamper trade by about 5.7 percentages. The coefficient of TBT STCs that are deemed to be unnecessary barriers to trade excluding discriminatory ones (UBT) is statistically significantly not different from zero. However, they strongly increase the import prices to the EU in the current and next year. Since they do not affect the current import quantity and values but increase the import quantity and values in the next year, it seems quite reasonable that they are considered as unnecessary barriers to trade. UBT STCs somehow act as specific trade costs affecting the import unit values, leaving the trade flows unaffected, but due to higher quality in the next period, the demand for the products complying with the regulations increases in the next period. The rest of the TBT STCs maintained by the EU strongly increase the current import values of products imported to the EU. As shown in Table 6 and Table 7, the rest of TBT STCs do not have any statistically significant impact on imported quantities and prices. These kinds of TBTs seem to be those policy instruments facilitating imports of products which mainly affect the import values in the current period and decrease the import prices in the next period.

Table 1 / HT regression of import values to the EU (1995-2011)

Import Value	M1	M2	Food	Non-Food	Low	Low-mid	Upp-mid	High
TBT STC	-0.0037		0.013	-0.016***	0.059**	0.028*	-0.028**	-0.0028
	(0.0042)		(0.013)	(0.0047)	(0.021)	(0.012)	(0.010)	(0.0048)
TBT STC (t-1)	0.0015		-0.018	0.00073	0.025	-0.0039	-0.024*	0.011*
	(0.0041)		(0.013)	(0.0046)	(0.020)	(0.011)	(0.0097)	(0.0047)
T	-0.0068***	-0.0069***	-0.020***	0.0094***	-0.0083	-0.0069**	-0.018***	0.0070***
	(0.0010)	(0.0010)	(0.0015)	(0.0014)	(0.0062)	(0.0023)	(0.0023)	(0.0018)
No. CN8	0.031***	0.031***	0.020***	0.034***	0.021***	0.028***	0.045***	0.036***
	(0.00063)	(0.00063)	(0.0013)	(0.00072)	(0.0020)	(0.0013)	(0.0014)	(0.00081)
GDP	12.6***	12.2***	8.35***	12.8***	71.0***	14.2***	23.6***	12.5***
	(0.18)	(0.17)	(0.48)	(0.19)	(2.08)	(0.48)	(1.18)	(0.21)
SimY	4.91***	4.96***	3.28***	5.26***	18.1***	7.79***	5.08***	9.07***
	(0.10)	(0.10)	(0.27)	(0.11)	(1.39)	(0.31)	(0.34)	(0.24)
SimF	0.18***	0.18***	0.18***	0.18***	-0.14***	0.030	0.66***	0.13***
	(0.0089)	(0.0089)	(0.023)	(0.0097)	(0.035)	(0.022)	(0.026)	(0.016)
WTO	0.30***	0.30***	0.18***	0.33***	0.41***	0.34***	0.82***	2.48***
	(0.013)	(0.013)	(0.036)	(0.014)	(0.034)	(0.021)	(0.046)	(0.23)
FTA	-0.093***	-0.095***	-0.043	-0.089***		0.058**	0.13***	-0.32***
	(0.012)	(0.012)	(0.032)	(0.013)		(0.020)	(0.027)	(0.023)
EU Partner	0.60***	0.59***	1.03***	0.56***			0.78***	0.082***
	(0.0097)	(0.0097)	(0.029)	(0.010)			(0.018)	(0.019)
Language	0.16***	0.17***	0.64***	0.086*	-0.75***	-0.64***	-0.91***	0.72***
	(0.033)	(0.033)	(0.089)	(0.035)	(0.091)	(0.055)	(0.072)	(0.042)
Colony	-0.55***	-0.56***	-0.64***	-0.54***	0.90***	-0.18**	0.89***	-1.23***
	(0.036)	(0.036)	(0.098)	(0.038)	(0.11)	(0.058)	(0.067)	(0.045)
D	-0.93***	-0.93***	-0.62***	-0.98***	-0.18	-0.063	-0.61***	-1.70***
	(0.017)	(0.017)	(0.048)	(0.019)	(0.12)	(0.034)	(0.040)	(0.025)
Disc. STC (t-1)		-0.057***						
		(0.0065)						
Disc. STC		-0.057***						
		(0.0061)						
UBT. STC (t-1)		0.012						
		(0.0066)						
UBT. STC		0.062***						
		(0.0067)						
Rest. STC (t-1)		0.030***						
		(0.0074)						
Rest. STC		-0.0090						
		(0.0069)						
Constant	-369.2***	-357.8***	-243.3***	-374.7***	-2148.8***	-426.3***	-702.4***	-363.2***
	(5.23)	(5.18)	(14.4)	(5.54)	(62.6)	(14.4)	(35.3)	(6.26)
N	843472	843472	120020	723452	55394	155179	165048	467851
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TBT regulations are mostly imposed for technical issues on manufacturing products, and SPS measures are usually imposed on food products. It is observed that TBT STCs imposed on food products by the EU have no statistically significant trade effects while results on both import values and quantities show that these measures strongly decrease the import of non-food products. This suggests that TBT STCs are hampering trade of non-food products as the regulations related to them are mostly technical issues. However, observing the statistically significant positive effect of TBT STCs on import prices of non-food products, it can be argued that these technical regulations rather increase the quality and unit values of non-food products.

The estimations distinguishing four income classifications of trade partners show interesting results. In fact, countries are affected differently by the EU regulations. TBT STCs are increasing the import values of products from low- and lower-middle-income countries, which is statistically significant during the whole period of analysis. However, these regulations have no statistically significant impact on the quantities of imports to the EU from these groups of countries. This is due to the fact that technical regulations maintained by the EU increase the value and prices of products in less advanced countries. In order to be able to export the same amount of quantities to the EU, these countries need to make some adjustments affecting their costs of production and final prices. This happens especially in lower-middle-income countries where the regressions on import prices are also affected positively by TBT STCs according to Table 7. This might as well reflect higher qualities of products in these countries.

The regressions suggest that imports from high-income countries are not affected by TBT STCs, which means that advanced countries can adjust to regulations imposed by the EU very easily. In other words, high-income countries are following similar technological production procedures as EU members are. Besides, current TBT STCs increase the prices and total value of product imports in the next year. While the import quantities in the next year are statistically significantly unaffected, this result shows that the TBT STCs imposed by the EU have a positive dynamic impact on the quality of products from advanced economies. The quality of the imported products from high-income economies increases in the next year. Consequently, the preferences of EU consumers for higher quality enhance the trade flows into the EU.

TBT STCs increase the import prices and decrease the import quantities from upper-middle-income countries in the current period. Besides, the aggregate effect on the total import values is negative. As Feenstra and Romalis (2014) discussed, advanced economies such as EU members have high preferences for high qualities. Therefore, in such situations, the lower demand for higher unit values of products refers to higher costs of imports rather than higher qualities of them. Hence, it could be argued that the technical regulations imposed by the EU act as restrictive barriers to trade flows from upper-middle-income countries. These EU regulations hamper the imports from these countries even in the next period, while the next year prices remain unaffected.

Tariffs are known to be among the traditional protectionist measures impeding trade, which is observable in most of the estimation results. However, it is observed that tariffs on non-food products (i.e. covering the majority of the sample) enhance the value and quantities of imports to the EU. Still, these results do not seem to be consistent because FE regression controlling for specific product-country-pair effects is not showing any impact of tariff changes on the importation of non-food products into the EU. Moreover, import values from high-income countries are decreasing with tariffs, while quantities of imports are increasing. This surprisingly suggests that traditional protectionist measures are

working in the opposite direction for very advanced countries. It can be argued that in order to increase the market share in a highly taxed market, advanced economies would rather decrease their prices (relatively even more than tariffs) to become competitive with the domestic producers within that market.

Having a free trade agreement (FTA) on goods with a partner country has a negative effect on imports of all products and non-food products to the EU. This effect is not statistically different from zero for food imports. However, the interesting issue is that FTAs are increasing the imports from middle- and upper-middle-income countries, while they are hampering trade from high-income countries. This result might have some policy implications for the current rounds of the Transatlantic Trade and Investment Partnership (TTIP) negotiations. Based on the regression results of the EU and the United States (being represented next), the US as an advanced economy might have lower trade with the EU after signing an FTA. Controlling for policy measures such as tariffs and TBT STCs, signing an FTA between these two high-income economies might affect their bilateral trade negatively.

The estimated coefficients of other variables such as the number of varieties of products, GDP, economic development similarities, factor endowment dissimilarities, WTO and EU membership of the partner, and gravity variables such as common language, common colonial heritage and distance are straightforward and similar to other gravity estimations in the literature.

4.2. THE UNITED STATES

Table 2 provides the estimation results of import values to the United States during 1995-2011. An overview of the coefficients of TBT STCs and the different issues of these in all regressions (also robustness checks) shows a trade creation effect of the measures imposed by the US. Generally, legitimate TBTs are imposed to provide higher standards and qualities of products. The positive influence of these measures on import prices is shown in Table 11; hence, the US regulations are enhancing the quality of imported products. Consequently, higher quality induces consumers to demand more. However, US regulations do not affect the prices of food imports. In fact, these TBT STCs do not affect the quality of food imports. Assuming that the regulations maintained by the United States are transparent and publicly available, the safety and security concerns of the imported products are improved by the TBT STCs on the food products. In other words, even without any change in the quality and prices of the imported food products, these regulations help consumers feeling safer and consequently lead to an increase in their demand. Because the import quantities and values of food products are increased by the notifications, it can be argued that the aim of these measures on food is to provide safety and security for the consumers.

As shown in Ghodsi (2015), there are various reasons behind the imposition of TBT STCs, among which are environmental and health issues. However, STCs are raised if there is a concern on the TBT measure. The results suggest that this specific subcategory of TBTs is not having negative effects on the trade flows of products to the United States. In other words, TBT STCs maintained by the US are enhancing imports, which may be due to the legitimate issues of these regulations. In spite of raised concerns for these measures, these are not actually impeding trade flows but improving them. It can be concluded from various estimations that TBT STCs maintained by the United States are based on faithful motivations. These results are in line with the findings of Bao and Chen (2013) discussed in the literature review.

Table 2 / HT regression of import values to the USA (1995-2011)

Import Value	M1	M2	Food	Non-Food	Low	Low-mid	Upp-mid	High
TBT STC	0.10***		0.12***	0.079***	0.0045	0.094***	0.11***	0.093***
	(0.0061)		(0.018)	(0.0074)	(0.025)	(0.013)	(0.014)	(0.0080)
TBT STC (t-1)	0.078***		0.090***	0.079***	0.035	0.067***	0.077***	0.070***
	(0.0063)		(0.018)	(0.0074)	(0.027)	(0.014)	(0.014)	(0.0081)
T	-0.015***	-0.015***	-0.0028***	-0.024***	-0.044***	0.0075***	0.023***	0.0033***
	(0.00061)	(0.00061)	(0.00083)	(0.00080)	(0.0010)	(0.0016)	(0.0020)	(0.00099)
No. CN8	0.020***	0.020***	0.0066***	0.023***	0.022***	0.020***	0.024***	0.027***
	(0.00066)	(0.00066)	(0.0014)	(0.00074)	(0.0023)	(0.0013)	(0.0014)	(0.00091)
GDP	11.3***	11.3***	6.18***	12.1***	36.2***	13.5***	32.6***	7.94***
	(0.17)	(0.17)	(0.43)	(0.18)	(1.46)	(0.33)	(0.80)	(0.34)
SimY	0.29*	0.30*	-0.41	0.57***	50.3***	2.53***	5.04***	2.10***
	(0.12)	(0.12)	(0.32)	(0.13)	(2.80)	(0.50)	(0.39)	(0.37)
SimF	-0.095***	-0.094***	-0.15***	-0.063***	-0.022	0.095***	0.40***	0.12***
	(0.0097)	(0.0097)	(0.023)	(0.011)	(0.043)	(0.022)	(0.030)	(0.020)
WTO	0.41***	0.41***	0.31***	0.41***	0.35***	0.17***	0.43***	4.52***
	(0.015)	(0.015)	(0.034)	(0.016)	(0.038)	(0.023)	(0.056)	(0.28)
FTA	0.051***	0.048***	0.15***	-0.011		0.11***	0.21***	-0.054***
	(0.011)	(0.011)	(0.022)	(0.012)		(0.021)	(0.025)	(0.016)
EU Partner	0.30***	0.30***	-0.054	0.35***			0.24***	-0.0040
	(0.013)	(0.013)	(0.038)	(0.013)			(0.020)	(0.029)
Language	0.30***	0.30***	0.47***	0.28***	-0.36***	-0.064	-0.053	0.40***
	(0.042)	(0.042)	(0.11)	(0.045)	(0.10)	(0.080)	(0.10)	(0.057)
Colony	0.28***	0.28***	0.012	0.30***		0.40*		0.38***
	(0.069)	(0.069)	(0.19)	(0.073)		(0.16)		(0.079)
D	-0.41***	-0.41***	-0.84***	-0.33***	1.00***	0.75***	-0.40***	-1.41***
	(0.038)	(0.038)	(0.094)	(0.041)	(0.14)	(0.061)	(0.058)	(0.063)
Disc. STC (t-1)		0.18***						
		(0.014)						
Disc. STC		0.14***						
		(0.014)						
UBT. STC (t-1)		0.13***						
		(0.0100)						
UBT. STC		0.043***						
		(0.011)						
Rest. STC (t-1)		0.060***						
		(0.0082)						
Rest. STC		0.086***						
		(0.0083)						
Constant	-330.4***	-330.4***	-173.9***	-354.4***	-1099.8***	-409.4***	-975.0***	-226.4***
	(5.04)	(5.05)	(13.1)	(5.44)	(43.9)	(9.92)	(24.1)	(10.1)
N	586544	586544	71018	515526	40492	118717	124344	302991
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Tariffs levied by the US government are hindering import values of products in most of the estimations. However, values of imports from middle-, upper-middle- and high-income economies are increasing with tariffs. This issue is clear for upper-middle-income countries from which import quantities to the US are also increased by tariffs. In contrast, tariffs have no statistically significant impact on quantities imported from lower-middle- and high-income countries, which relates to the increase in prices due to higher tariffs (Table 11).

Similarities in economic development (SimY) with trade partners increase the import values, but decrease the quantities imported to the US. In other words, the United States imports larger quantities of products from countries that are less developed (considering the US as a highly developed economy), but the values of imports from those countries are smaller. This suggests that countries distant from the US in terms of economic development have higher prices than others. However, considering the regression for low-income countries, those that are closer to the United States in terms of GDP per capita in that category export larger quantities of products to the US.

While FTAs increase the trade flows of products to the US, having an FTA with high-income economies has a statistically significantly negative impact on trade. This result was also found for the EU, and similar policy implication for the TTIP talks may apply here as well. However, being an EU partner increases the trade flows to the US statistically significantly in almost all regressions. This might on the other hand suggest a good trade relationship between the US and EU Member States, which might not necessarily need an FTA.

While the EU is importing more from countries with dissimilarities in the factor endowment ratio, the United States is importing more from those countries that have more similarities in these terms. However, classifying trade partners according to development groups suggests similar results as for the EU. Estimated coefficients of varieties of products, GDP, WTO membership, colonial similarities of the partner and distance have a similar impact and can be similarly interpretations as in the case of the EU.

4.3. CHINA

Table 3 presents the estimation results on import values of products imported to China over the period 2002-2011, i.e. starting from China's accession to the WTO. That is the main reason why the benchmark estimation covers this period. The benchmark estimation (M1) shows that the impact of TBT STCs on import values of all products is not statistically different from zero. However, it is observed that these measures hamper imports of food products and imports of all products from the high-income economies. More precisely, the imposition of a TBT STC by China decreases the value of food imports by about 18% and the quantity of food imports by about 20%. To explain this large impact of the measures observe that technical issues of food products related to human health should be mostly implemented within SPS measures rather than TBTs. Thus, TBTs aiming at food products might relate to the technical issues common for all categories of products (e.g. mandatory labelling).

After decomposing Chinese TBT STCs, a strong hampering effect of discriminatory and UBT notifications is observed. The estimation results of the issues related to TBT STCs represented in M2 are showing that there are certain impeding effects behind some of these measures. This confirms the concerns of other countries raising STCs on these specific TBTs.

While import values are not affected by Chinese TBT STCs in most regressions, quantities imported to China are statistically significantly decreased by these policy measures. This again suggests that prices of imported products have increased because of technical issues related to the regulations. The results of the regressions on import prices during 2002-2011 in Table 15 also acknowledge this issue. Higher prices of imports and lower quantities due to new TBT STCs reflect the impeding effects of these measures that might be resulting from the behaviour of consumers. The prices of products imported from low- and lower-middle-income countries are not affected by the Chinese TBT STCs, which might suggest the incapability of these countries in improving the quality of products. The prices of imports from less advanced economies remain unaffected and the Chinese consumers increase their demand in the next year. In fact, TBT STCs increase the next-year imports from less developed countries, because the prices of imports from upper-middle- and high-income economies have increased. The quality of imported products – especially from upper-middle- and high-income economies – rises because of technical regulations and prices of imports from these countries increase consequently. Overall, lower demand for foreign products with higher qualities as reflected in the unit values might indicate lower preferences of Chinese consumers for higher quality.

During the period 1995-2011 the EU and the United States were more often than any other country requested to participate in WTO consultations regarding the TBT agreement. By contrast, there has been no case against China – the second largest WTO country maintaining TBT STCs – violating the TBT agreement. In spite of finding trade hampering effects of some particular TBT STCs on trade values to China, the results remain slightly inconclusive with respect to the above-mentioned issues. In general, the estimation outcomes suggest a price-disturbing stimulus of these regulations. In fact, China does not significantly hinder imports by using these policy instruments. As these measures are mostly increasing the prices (quality) rather than hindering total import values, it would be difficult to address them as obstacles to trade. Moreover, the positive impact of previous TBT STCs on current import values might imply adjusted quality (or any other technical issue) of the imported products after a short time. This will lead to an increase in the trade values as prices are increased but quantities are decreased. In other words, after one year, fewer products with higher quality corresponding to a much higher price will enter the Chinese market. This issue seems very realistic and natural in terms of standards and regulations and does not indicate protectionism.

Statistically significant coefficients of similarity in economic development show that China imports products mostly from countries with larger dissimilarities. Especially for the group of high-income economies this relationship is stronger. Conversely, for other groups of countries, China imports more from countries with more similarities in terms of GDP per capita. During 2002-2011, imports of products to China are larger from countries with a similar share of factor endowments, which is similar to the pattern observed in the United States.

The estimation results suggest that WTO members have statistically higher exports to China. However, a negative relationship is observed for food imports and all imports from high-income countries. In other words, being a WTO member facilitates trade of non-food products to China. Moreover, having an FTA with China reduces the exports of products to China. However, for low-income countries having an FTA with China the coefficients are statistically significantly positive.

Table 3 / HT regression of import values to China (2002-2011)

Import Value	M1	M2	Food	Non-Food	Low	Low-mid	Upp-mid	High
TBT STC	-0.015		-0.18***	0.015	0.020	0.054	-0.018	-0.039***
	(0.0100)		(0.044)	(0.011)	(0.055)	(0.028)	(0.027)	(0.012)
TBT STC $_{(t-1)}$	0.032**		-0.12**	0.062***	0.21***	0.11***	0.048	-0.017
	(0.0100)		(0.042)	(0.011)	(0.057)	(0.027)	(0.027)	(0.012)
T	-0.014***	-0.015***	-0.018***	-0.011***	-0.028***	-0.0100**	-0.023***	-0.011***
	(0.0014)	(0.0014)	(0.0030)	(0.0015)	(0.0053)	(0.0033)	(0.0037)	(0.0018)
No. CN8	0.038***	0.039***	0.017***	0.048***	0.022***	0.029***	0.036***	0.045***
	(0.0013)	(0.0013)	(0.0024)	(0.0016)	(0.0051)	(0.0030)	(0.0028)	(0.0017)
GDP	1.81***	1.79***	1.11***	1.92***	2.33**	6.71***	2.64***	1.27***
	(0.058)	(0.058)	(0.17)	(0.061)	(0.90)	(0.40)	(0.32)	(0.057)
SimY	-3.85***	-3.90***	0.038	-4.33***	13.9***	1.25	2.49**	-7.48***
	(0.19)	(0.19)	(0.60)	(0.20)	(1.73)	(0.78)	(0.97)	(0.46)
SimF	-0.29***	-0.29***	-0.035	-0.32***	0.18	0.19*	-0.28**	-0.99***
	(0.022)	(0.022)	(0.068)	(0.023)	(0.17)	(0.074)	(0.099)	(0.044)
WTO	0.39***	0.38***	-0.33**	0.47***	0.025	-0.080	0.28*	-9.61***
	(0.042)	(0.042)	(0.12)	(0.045)	(0.079)	(0.089)	(0.14)	(1.40)
FTA	-0.19***	-0.19***	-0.040	-0.22***	0.27***	0.0014	-0.15**	-0.39***
	(0.021)	(0.021)	(0.062)	(0.023)	(0.079)	(0.051)	(0.054)	(0.034)
EU Partner	0.36***	0.36***	-0.62***	0.43***			0.33***	0.041
	(0.040)	(0.040)	(0.14)	(0.041)			(0.077)	(0.062)
Language	0.27**	0.26**	-0.082	0.29**			1.22***	-0.75***
	(0.091)	(0.091)	(0.26)	(0.096)			(0.17)	(0.12)
Colony	-1.36***	-1.37***	0.23	-1.51***	0.63	0.97*		
	(0.40)	(0.40)	(0.96)	(0.44)	(0.54)	(0.47)		
D	-1.29***	-1.30***	0.18	-1.47***	0.56**	-0.15	-0.88***	-1.57***
	(0.036)	(0.036)	(0.097)	(0.038)	(0.18)	(0.093)	(0.080)	(0.056)
Disc. STC $_{(t-1)}$		-0.16***						
		(0.037)						
Disc. STC		-0.063**						
		(0.021)						
UBT. STC $_{(t-1)}$		-0.044**						
		(0.014)						
UBT. STC		0.043*						
		(0.017)						
Rest. STC $_{(t-1)}$		0.0090						
		(0.012)						
Rest. STC		0.047***						
		(0.012)						
Constant	-36.1***	-35.5***	-29.1***	-38.0***	-73.1**	-190.9***	-65.3***	-6.00*
	(1.78)	(1.78)	(5.28)	(1.88)	(25.9)	(12.5)	(9.80)	(2.56)
N	241670	241670	21418	220252	9959	36103	40434	155174
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

According to the regression outcomes, being an EU Member State would increase the value of exports to China, except for food products, for which a reverse relationship is observed. However, this issue is due to the higher prices of imports from EU members considering the estimation results on the quantity of imports. In fact, higher prices of imports from the EU might be attributed to the higher qualities of products. Lower imported quantities from the EU Member States can indicate lower preferences of Chinese consumers for higher quality (unit-value prices).

The impact of traditional gravity variables, distance and languages on the imports to China are consistent with the results found elsewhere in the literature. In addition, tariffs, the number of variety of products, and GDP of both trade partners have the expected signs. Nevertheless, sharing a similar colonial history with China decreases the trade flows of products to this country.

5. Summary and concluding remarks

This paper investigates the impact of Specific Trade Concerns (STCs) raised on Technical Barriers to Trade maintained by the EU, the United States and China on their product imports. While the imposition of TBTs is allowed in the framework of WTO regulations for justifiable reasons, some of them have resulted in STCs being raised. During 1995-2011, the above-mentioned countries have used TBT STCs more than any other WTO member states. The EU and the United States have been requested for consultation within the dispute settlement mechanism (DSM) of the WTO citing the TBT agreement more than any other countries, while there has been no case against China.

Imports of products at 4-digit level of the Harmonised Systems during 1995-2011 were considered in the analysis. Import values, quantities and prices have been separately analysed using the gravity model framework. A modified gravity equation, based on the ones used by others in the literature, was estimated using Hausman-Taylor (HT) estimation controlling for endogeneity. Fixed Effect (FE) estimations were also applied as a robustness check. Including gravity variables in the model augmented with product level and policy instruments variables, the results shed light on the nature of TBT STCs maintained by the EU, the United States and China.

There is some evidence pointing towards hampering effects of TBT STCs maintained by the EU. This relationship is stronger for those measures that are claimed to be discriminatory. Thus, these policy instruments can evidently reduce the value of non-food imports to the EU. On the other side of the Atlantic, TBT STCs maintained by the US government seem to follow good faith as it was consistently showed that – also subject to various robustness checks – these measures are enhancing export of products to the United States.

The analysis showed that FTAs with low-medium- and upper-medium-income countries would increase exports to the EU and the United States. However, controlling for EU partners (the majority of high-income countries in the sample), FTAs with high-income countries have a negative influence on exports to the US and the EU. Without an FTA between the two nations, the results showed a good strong trade relationship between them, given the positive impact of EU membership on exports to the US. Considering the current negotiations on a Transatlantic Trade and Investment Partnership (TTIP), signing an FTA between the two nations might be beneficial, improving the current trade relations. Specifically, since TBT STCs maintained by the US have a positive influence on bilateral trade flows of products, a harmonised system of regulations might enhance the trade relationships between the two economies.

Results also confirmed the impeding effect of Chinese TBT STCs on imported quantities to China. Moreover, discriminatory and unnecessary barriers to trade – the main important issues regarding Chinese measures – impede imports of products to China significantly. However, TBT STCs in general do not cause any statistically significant impact on import values of products imported to this country, but they increase the price of imports. Therefore, it can be argued that such measures rather increase the quality and price of the imported products especially from upper-middle- and high-income economies.

Since the prices of imports from less advanced economies are not affected by the Chinese TBT STCs, imports from these countries in the year following the imposition of the regulation are increasing. The results suggest that Chinese consumers prefer cheaper products (with lower quality). In fact, the preference of consumers for low quality and low prices in China corresponds to the low quality of production and exports in China. Chinese consumers do not seem to afford higher prices for higher quality. Given these preferences of consumers, TBT STCs imposed by China have trade diversion effects rather than a general impeding behaviour. This might bring insights on the reasons why there has been no DS case within the WTO against China citing TBT agreement during the period studied. China's role in international trade has dramatically expanded during the past two decades, so there might be political reasons for countries to request cases against it. It seems that either the TBT measures imposed by China are not causing sufficient distortions to request a case in the WTO, or there is some specific political intuition behind.

Overall, this study showed that TBT STCs have heterogeneous effects across the EU, the United States and China. There is such diversity in the implications of these policy instruments because they are originally motivated by various factors as discussed in Ghodsi (2015). In addition to economic, political, health and safety issues affecting these trade policy measures, preferences of consumers of the countries were found to be other issues complicating the nature of TBT STCs. The diverse behaviour of consumers across these economies affecting their tastes for various products and qualities is one major reason behind this issue. In this study, the unit value of imports was a simple proxy for the quality of products. As a future avenue for the research, it would be interesting to extend the study to quality-adjusted prices considering both supply and demand sides, and analyse the influence of TBT STCs on the quality of traded goods. Then, it would be easier to identify the role of consumer preferences in the determinants and implications of these policy instruments as compared to other factors. Moreover, considering the supply side of trade in such a framework, it would be feasible to find some evidence regarding the role of TBTs on extensive and intensive margins of trade.

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Appendix 1. Robustness check for the EU

Table 4 / HT regression of import values to the EU (2002-2011)

Import Value	M1	M2	Food	Non-Food	Low	Low-mid	Upp-mid	High
TBT STC	-0.0083		0.019	-0.027***	0.055**	0.022	-0.038***	-0.0022
	(0.0044)		(0.014)	(0.0048)	(0.021)	(0.011)	(0.0099)	(0.0053)
TBT STC $_{(t-1)}$	-0.0076		-0.034**	-0.0093	0.020	-0.0078	-0.032***	0.0033
	(0.0042)		(0.013)	(0.0048)	(0.020)	(0.011)	(0.0095)	(0.0050)
T	-0.018***	-0.019***	-0.029***	0.0059*	0.0042	0.0084*	-0.047***	-0.019***
	(0.0017)	(0.0017)	(0.0023)	(0.0024)	(0.0073)	(0.0037)	(0.0035)	(0.0028)
No. CN8	0.037***	0.037***	0.028***	0.039***	0.022***	0.032***	0.048***	0.048***
	(0.00074)	(0.00074)	(0.0015)	(0.00086)	(0.0022)	(0.0015)	(0.0016)	(0.0010)
GDP	15.5***	15.7***	11.3***	15.8***	96.8***	16.0***	20.1***	17.0***
	(0.23)	(0.23)	(0.63)	(0.25)	(3.54)	(0.47)	(1.21)	(0.26)
SimY	4.79***	4.76***	3.25***	5.13***	14.2***	7.34***	6.09***	7.47***
	(0.11)	(0.11)	(0.30)	(0.12)	(1.47)	(0.37)	(0.39)	(0.29)
SimF	0.29***	0.29***	0.25***	0.30***	-0.036	0.021	0.69***	0.13***
	(0.010)	(0.010)	(0.026)	(0.011)	(0.042)	(0.028)	(0.029)	(0.018)
WTO	0.46***	0.47***	0.49***	0.46***	0.43***	0.52***	1.02***	2.50***
	(0.017)	(0.017)	(0.046)	(0.018)	(0.037)	(0.025)	(0.073)	(0.22)
FTA	-0.069***	-0.069***	-0.0046	-0.061***		0.18***	0.044	-0.33***
	(0.015)	(0.015)	(0.039)	(0.016)		(0.024)	(0.038)	(0.028)
EU Partner	0.64***	0.64***	1.12***	0.58***			0.74***	0.068***
	(0.010)	(0.010)	(0.031)	(0.011)			(0.018)	(0.020)
Language	0.070*	0.066*	0.50***	0.0050	-0.93***	-0.55***	-0.86***	0.60***
	(0.031)	(0.031)	(0.084)	(0.034)	(0.10)	(0.057)	(0.081)	(0.040)
Colony	-0.47***	-0.46***	-0.53***	-0.46***	0.49***	-0.26***	0.73***	-1.10***
	(0.034)	(0.034)	(0.092)	(0.037)	(0.12)	(0.063)	(0.069)	(0.043)
D	-1.02***	-1.02***	-0.65***	-1.08***	0.0090	-0.025	-0.54***	-1.81***
	(0.017)	(0.017)	(0.047)	(0.019)	(0.14)	(0.036)	(0.042)	(0.025)
Disc. STC $_{(t-1)}$		-0.039***						
		(0.0068)						
Disc. STC		-0.054***						
		(0.0061)						
UBT. STC $_{(t-1)}$		-0.010						
		(0.0072)						
UBT. STC		0.048***						
		(0.0075)						
Rest. STC $_{(t-1)}$		0.036***						
		(0.0081)						
Rest. STC		-0.021**						
		(0.0070)						
Constant	-457.9***	-461.4***	-333.0***	-469.4***	-2930.3***	-482.8***	-604.4***	-499.4***
	(7.04)	(6.98)	(18.9)	(7.55)	(107.1)	(14.1)	(36.6)	(7.77)
N	701392	701392	98673	602719	49850	140641	155730	355171
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5 / FE Poisson regression of import values to the EU (1995-2011)

Period	1995-2011				2002-2011			
Import Value	M1	M2	Food	Non-Food	M1	M2	Food	Non-Food
TBT STC	0.050***		-0.033**	0.053***	0.043***		-0.027**	0.042***
	(0.0080)		(0.011)	(0.0090)	(0.0094)		(0.0090)	(0.010)
TBT STC $_{(t-1)}$	0.019**		-0.025*	0.014	0.013		-0.019	0.0057
	(0.0063)		(0.013)	(0.0074)	(0.0070)		(0.011)	(0.0081)
T	-0.0030	-0.0028	-0.010**	0.00051	-0.012*	-0.012	-0.013*	-0.010
	(0.0038)	(0.0038)	(0.0039)	(0.0053)	(0.0063)	(0.0063)	(0.0060)	(0.0084)
No. CN8	0.015***	0.015***	0.0029	0.016***	0.022***	0.021***	-0.0028	0.022***
	(0.0024)	(0.0024)	(0.0020)	(0.0025)	(0.0027)	(0.0028)	(0.0030)	(0.0028)
GDP	1.47	1.54	-2.02	1.65	1.91	1.99*	1.85*	1.86
	(0.88)	(0.87)	(1.15)	(0.92)	(1.02)	(1.02)	(0.82)	(1.07)
SimY	6.72***	6.64***	4.10***	6.90***	6.31***	6.23***	3.34***	6.56***
	(1.14)	(1.13)	(0.93)	(1.21)	(1.13)	(1.12)	(0.90)	(1.19)
SimF	0.066	0.062	0.063	0.071	0.066	0.065	0.094	0.064
	(0.059)	(0.058)	(0.051)	(0.065)	(0.063)	(0.062)	(0.050)	(0.070)
WTO	0.34***	0.34***	0.53***	0.31***	0.22**	0.22**	0.65***	0.16
	(0.067)	(0.067)	(0.12)	(0.073)	(0.082)	(0.082)	(0.15)	(0.089)
FTA	-0.070	-0.070	-0.025	-0.073	-0.11	-0.11	0.013	-0.12
	(0.061)	(0.061)	(0.11)	(0.064)	(0.069)	(0.069)	(0.17)	(0.071)
EU Partner	0.075	0.078	0.62***	0.044	0.031	0.035	0.67***	-0.0073
	(0.060)	(0.059)	(0.087)	(0.062)	(0.056)	(0.055)	(0.084)	(0.058)
Disc. STC		0.014				0.033*		
		(0.013)				(0.015)		
Disc. STC $_{(t-1)}$		0.025*				0.038***		
		(0.011)				(0.010)		
UBT. STC		0.047***				0.029*		
		(0.011)				(0.012)		
UBT. STC $_{(t-1)}$		0.062***				0.047***		
		(0.010)				(0.0089)		
Rest. STC		0.062***				0.061***		
		(0.015)				(0.015)		
Rest. STC $_{(t-1)}$		-0.041**				-0.043**		
		(0.014)				(0.013)		
N	851867	851867	121360	730507	706283	706283	99364	606919
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AIC	5.48316e+09	5.47344e+09	342676026.9	5.10740e+09	3.54778e+09	3.53962e+09	199772979.1	3.32431e+09
BIC	5.48316e+09	5.47344e+09	342676279.3	5.10740e+09	3.54778e+09	3.53962e+09	199773169.2	3.32431e+09

Robust standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6 / HT regression of import quantities to the EU (1995-2011)

Import Quant.	M1	M2	Food	Non-Food	Low	Low-mid	Upp-mid	High
TBT STC	-0.0096*		0.0083	-0.023***	0.029	0.012	-0.050***	0.0046
	(0.0044)		(0.014)	(0.0050)	(0.021)	(0.012)	(0.011)	(0.0052)
TBT STC (t-1)	-0.0062		-0.021	-0.0099*	0.072***	-0.0062	-0.030**	0.00028
	(0.0043)		(0.013)	(0.0049)	(0.020)	(0.012)	(0.010)	(0.0051)
T	0.00054	0.00072	-0.016***	0.021***	-0.0048	0.0012	-0.015***	0.014***
	(0.0011)	(0.0011)	(0.0016)	(0.0015)	(0.0057)	(0.0023)	(0.0024)	(0.0019)
No. CN8	0.023***	0.023***	0.017***	0.022***	0.014***	0.020***	0.033***	0.029***
	(0.00068)	(0.00068)	(0.0014)	(0.00078)	(0.0023)	(0.0015)	(0.0016)	(0.00088)
GDP	11.5***	11.4***	7.79***	11.8***	61.8***	12.3***	16.6***	11.3***
	(0.19)	(0.19)	(0.52)	(0.20)	(2.17)	(0.48)	(1.31)	(0.23)
SimY	4.17***	4.18***	3.39***	4.39***	21.6***	6.42***	5.24***	9.99***
	(0.11)	(0.11)	(0.29)	(0.12)	(1.50)	(0.34)	(0.38)	(0.26)
SimF	0.17***	0.17***	0.20***	0.16***	-0.0052	0.066**	0.76***	0.12***
	(0.0097)	(0.0097)	(0.024)	(0.011)	(0.037)	(0.023)	(0.028)	(0.018)
WTO	0.27***	0.27***	0.17***	0.29***	0.39***	0.18***	0.75***	1.93***
	(0.014)	(0.014)	(0.038)	(0.015)	(0.034)	(0.022)	(0.050)	(0.28)
FTA	-0.041**	-0.041**	-0.057	-0.022		0.075***	0.067*	-0.34***
	(0.013)	(0.013)	(0.034)	(0.014)		(0.021)	(0.029)	(0.026)
EU Partner	0.50***	0.50***	1.05***	0.45***			0.66***	0.11***
	(0.010)	(0.010)	(0.030)	(0.011)			(0.018)	(0.021)
Language	0.048	0.048	0.51***	-0.060	-0.78***	-0.69***	-1.02***	0.46***
	(0.037)	(0.037)	(0.095)	(0.040)	(0.11)	(0.062)	(0.085)	(0.047)
Colony	-0.50***	-0.51***	-0.60***	-0.49***	0.77***	-0.21**	0.70***	-1.02***
	(0.040)	(0.040)	(0.10)	(0.043)	(0.14)	(0.066)	(0.079)	(0.050)
D	-1.13***	-1.13***	-0.84***	-1.16***	-0.17	-0.20***	-0.68***	-2.00***
	(0.020)	(0.020)	(0.052)	(0.021)	(0.13)	(0.038)	(0.047)	(0.029)
Disc. STC (t-1)		-0.039***						
		(0.0069)						
Disc. STC		-0.065***						
		(0.0065)						
UBT. STC (t-1)		-0.0057						
		(0.0069)						
UBT. STC		0.041***						
		(0.0071)						
Rest. STC (t-1)		0.014						
		(0.0079)						
Rest. STC		0.011						
		(0.0073)						
Constant	-333.3***	-331.0***	-224.8***	-342.2***	-1871.2***	-370.0***	-492.0***	-324.9***
	(5.58)	(5.56)	(15.4)	(5.94)	(65.4)	(14.5)	(39.2)	(6.96)
N	793420	793420	117410	676010	47459	142049	153058	450854
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses
* p < 0.05, ** p < 0.01, *** p < 0.001

Table 7 / HT regression of import prices to the EU (1995-2011)

Import Price	M1	M2	Food	Non-Food	Low	Low-mid	Upp-mid	High
TBT STC	0.0069**		-0.0023	0.011***	0.016	0.020**	0.018**	-0.0048
	(0.0026)		(0.0067)	(0.0030)	(0.013)	(0.0068)	(0.0061)	(0.0032)
TBT STC (t-1)	0.0083**		0.0043	0.010***	-0.017	0.0093	0.011	0.0077*
	(0.0025)		(0.0064)	(0.0030)	(0.013)	(0.0066)	(0.0058)	(0.0032)
T	-0.0060***	-0.0063***	-0.0016*	-0.011***	-0.0052	-0.0068***	-0.0020	-0.0049***
	(0.00063)	(0.00063)	(0.00076)	(0.00090)	(0.0036)	(0.0013)	(0.0014)	(0.0012)
No. CN8	0.0051***	0.0049***	0.0023***	0.0084***	0.0032**	0.0046***	0.0031***	0.0050***
	(0.00039)	(0.00039)	(0.00058)	(0.00046)	(0.0012)	(0.00080)	(0.00086)	(0.00054)
GDP	-0.22*	-0.36***	-0.062	-0.34**	-5.75***	-0.83**	3.29***	0.37**
	(0.11)	(0.11)	(0.23)	(0.12)	(1.20)	(0.27)	(0.69)	(0.14)
SimY	0.39***	0.41***	0.19	0.42***	-1.86*	0.55**	-0.12	-1.67***
	(0.064)	(0.064)	(0.13)	(0.071)	(0.80)	(0.18)	(0.21)	(0.16)
SimF	-0.029***	-0.030***	-0.021	-0.028***	-0.081***	-0.050***	-0.18***	0.0094
	(0.0056)	(0.0056)	(0.011)	(0.0063)	(0.022)	(0.013)	(0.016)	(0.011)
WTO	0.022**	0.023**	0.026	0.025**	-0.039	0.093***	-0.074**	0.22
	(0.0080)	(0.0080)	(0.018)	(0.0088)	(0.021)	(0.012)	(0.027)	(0.16)
FTA	-0.033***	-0.033***	0.018	-0.046***		-0.060***	0.039*	0.094***
	(0.0075)	(0.0075)	(0.016)	(0.0083)		(0.012)	(0.016)	(0.016)
EU Partner	0.085***	0.083***	-0.049***	0.10***			0.072***	0.12***
	(0.0060)	(0.0060)	(0.014)	(0.0065)			(0.010)	(0.013)
Language	0.15***	0.16***	0.098**	0.20***	0.16**	0.16***	0.15***	0.19***
	(0.020)	(0.020)	(0.036)	(0.022)	(0.054)	(0.033)	(0.043)	(0.028)
Colony	-0.057*	-0.062**	-0.029	-0.066**	-0.28***	-0.032	0.033	-0.072*
	(0.022)	(0.022)	(0.040)	(0.024)	(0.069)	(0.035)	(0.040)	(0.029)
D	0.34***	0.34***	0.31***	0.33***	0.30***	0.28***	0.24***	0.45***
	(0.011)	(0.011)	(0.020)	(0.012)	(0.068)	(0.020)	(0.024)	(0.017)
Disc. STC (t-1)		-0.0070						
		(0.0041)						
Disc. STC		0.021***						
		(0.0038)						
UBT. STC (t-1)		0.018***						
		(0.0041)						
UBT. STC		0.014***						
		(0.0041)						
Rest. STC (t-1)		0.0029						
		(0.0046)						
Rest. STC		-0.026***						
		(0.0043)						
Constant	5.27	9.45**	-0.31	9.17**	174.1***	24.5**	-98.9***	-12.6**
	(3.22)	(3.21)	(6.98)	(3.51)	(36.0)	(8.14)	(20.6)	(4.16)
N	793376	793376	117398	675978	47457	142048	153040	450831
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

* p < 0.05, ** p < 0.01, *** p < 0.001

Appendix 2. Robustness check for the United States

Table 8 / HT regression of import values to the USA (2002-2011)

Import Value	M1	M2	Food	Non-Food	Low	Low-mid	Upp-mid	High
TBT STC	0.047***		0.032	0.021**	-0.013	0.056***	0.063***	0.049***
	(0.0059)		(0.018)	(0.0073)	(0.026)	(0.013)	(0.013)	(0.0079)
TBT STC (t-1)	0.039***		0.0066	0.042***	0.011	0.033*	0.048***	0.048***
	(0.0061)		(0.019)	(0.0073)	(0.028)	(0.013)	(0.013)	(0.0080)
T	-0.0018	-0.0022*	-0.00028	-0.0032**	-0.019***	0.018***	0.019***	0.0023
	(0.00099)	(0.00099)	(0.0023)	(0.0011)	(0.0014)	(0.0024)	(0.0026)	(0.0026)
No. CN8	0.020***	0.020***	0.014***	0.021***	0.024***	0.020***	0.026***	0.029***
	(0.00084)	(0.00084)	(0.0016)	(0.00099)	(0.0030)	(0.0017)	(0.0017)	(0.0012)
GDP	12.1***	12.1***	5.84***	12.9***	51.3***	13.1***	25.8***	20.3***
	(0.22)	(0.22)	(0.56)	(0.24)	(3.40)	(0.37)	(0.86)	(0.61)
SimY	0.88***	0.90***	-0.23	1.20***	38.4***	3.30***	4.08***	-1.86***
	(0.13)	(0.13)	(0.34)	(0.14)	(3.53)	(0.58)	(0.52)	(0.44)
SimF	-0.016	-0.014	-0.16***	0.027*	-0.16*	0.11***	0.56***	0.043
	(0.012)	(0.012)	(0.029)	(0.014)	(0.061)	(0.031)	(0.037)	(0.023)
WTO	0.56***	0.56***	0.40***	0.58***	0.29***	0.19***	1.18***	4.12***
	(0.023)	(0.023)	(0.052)	(0.025)	(0.040)	(0.038)	(0.11)	(0.27)
FTA	0.12***	0.12***	0.21***	0.077***		0.13***	0.21***	0.024
	(0.012)	(0.012)	(0.024)	(0.014)		(0.023)	(0.027)	(0.021)
EU Partner	0.12***	0.12***	-0.31***	0.17***			0.12***	0.073*
	(0.015)	(0.015)	(0.044)	(0.016)			(0.022)	(0.035)
Language	0.19***	0.19***	0.37***	0.17***	-0.82***	-0.16*	-0.21*	0.65***
	(0.039)	(0.039)	(0.10)	(0.043)	(0.12)	(0.079)	(0.11)	(0.058)
Colony	0.26***	0.26***	0.21	0.26***		0.38*		-0.67***
	(0.065)	(0.065)	(0.18)	(0.070)		(0.15)		(0.087)
D	-0.38***	-0.38***	-0.85***	-0.30***	0.80***	0.91***	-0.36***	-1.21***
	(0.035)	(0.035)	(0.085)	(0.038)	(0.15)	(0.062)	(0.059)	(0.060)
Disc. STC (t-1)		0.16***						
		(0.013)						
Disc. STC		0.13***						
		(0.013)						
UBT. STC (t-1)		0.085***						
		(0.0092)						
UBT. STC		0.016						
		(0.010)						
Rest. STC (t-1)		-0.00095						
		(0.0081)						
Rest. STC		0.042***						
		(0.0082)						
Constant	-358.0***	-357.0***	-163.6***	-383.9***	-1552.7***	-401.1***	-772.8***	-600.4***
	(6.70)	(6.70)	(16.9)	(7.26)	(102.5)	(11.2)	(25.9)	(18.3)
N	389020	389020	47040	341980	22698	79553	84301	202468
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 9 / FE regression of import values to the USA (1995-2014)

Period	1995-2011				2002-2011			
Import Value	M1	M2	Food	Non-Food	M1	M2	Food	Non-Food
TBT STC	0.098***		0.12***	0.073***	0.041***		0.030	0.013
	(0.0065)		(0.021)	(0.0080)	(0.0060)		(0.022)	(0.0075)
TBT STC $_{(t-1)}$	0.072***		0.087***	0.070***	0.029***		0.0024	0.028***
	(0.0069)		(0.020)	(0.0083)	(0.0061)		(0.020)	(0.0074)
T	-0.015***	-0.015***	-0.0025	-0.025***	-0.0029	-0.0032	0.0019	-0.0052*
	(0.0025)	(0.0025)	(0.0020)	(0.0027)	(0.0019)	(0.0019)	(0.0043)	(0.0021)
No. CN8	0.012***	0.012***	-0.0061	0.014***	-0.00044	-0.00043	-0.0054	-0.00094
	(0.0019)	(0.0019)	(0.0037)	(0.0021)	(0.0022)	(0.0022)	(0.0044)	(0.0024)
GDP	9.49***	9.51***	5.06***	10.2***	8.89***	8.94***	3.87***	9.80***
	(0.36)	(0.36)	(0.89)	(0.38)	(0.39)	(0.39)	(0.96)	(0.42)
SimY	-0.60	-0.60	0.38	-0.54	-1.59*	-1.61**	-0.14	-1.81**
	(0.54)	(0.54)	(1.13)	(0.60)	(0.62)	(0.62)	(1.28)	(0.69)
SimF	-0.11***	-0.11***	-0.15***	-0.083***	-0.091***	-0.088***	-0.19***	-0.051
	(0.020)	(0.020)	(0.044)	(0.022)	(0.024)	(0.024)	(0.053)	(0.026)
WTO	0.48***	0.47***	0.31***	0.48***	0.47***	0.46***	0.32***	0.48***
	(0.031)	(0.031)	(0.062)	(0.034)	(0.049)	(0.049)	(0.080)	(0.056)
FTA	0.022	0.020	0.12**	-0.043	0.087***	0.084***	0.18***	0.036
	(0.025)	(0.025)	(0.046)	(0.028)	(0.022)	(0.022)	(0.040)	(0.025)
EU Partner	0.34***	0.34***	-0.040	0.39***	0.17***	0.16***	-0.27***	0.22***
	(0.031)	(0.031)	(0.086)	(0.033)	(0.029)	(0.029)	(0.073)	(0.031)
Disc. STC		0.18***				0.16***		
		(0.014)				(0.013)		
Disc. STC $_{(t-1)}$		0.14***				0.13***		
		(0.014)				(0.012)		
UBT. STC		0.13***				0.076***		
		(0.011)				(0.0097)		
UBT. STC $_{(t-1)}$		0.037**				0.0042		
		(0.012)				(0.011)		
Rest. STC		0.055***				-0.0075		
		(0.0085)				(0.0086)		
Rest. STC $_{(t-1)}$		0.076***				0.026**		
		(0.0093)				(0.0089)		
Constant	-278.3***	-278.9***	-146.9***	-300.5***	-261.4***	-263.0***	-110.6***	-289.0***
	(10.6)	(10.6)	(26.7)	(11.4)	(11.6)	(11.6)	(29.1)	(12.6)
N	586544	586544	71018	515526	389020	389020	47040	341980
R^2	0.049	0.049	0.085	0.048	0.023	0.023	0.050	0.023
adj. R^2	0.049	0.049	0.085	0.048	0.023	0.023	0.050	0.023
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AIC	1779057.3	1778907.8	192672.9	1581143.4	1072024.1	1071816.9	112998.1	955013.3
BIC	1779339.4	1779235.0	192902.2	1581422.3	1072230.7	1072066.9	113164.5	955217.4

Robust standard errors in parentheses
* p < 0.05, ** p < 0.01, *** p < 0.001

Table 10 / HT regression of import quantities to the USA (1995-2011)

Import Quant.	M1	M2	Food	Non-Food	Low	Low-mid	Upp-mid	High
TBT STC	0.11***		0.13***	0.053***	-0.042	0.078***	0.15***	0.11***
	(0.0097)		(0.023)	(0.013)	(0.038)	(0.021)	(0.022)	(0.013)
TBT STC (t-1)	0.067***		0.099***	0.043**	-0.072	-0.029	0.088***	0.079***
	(0.011)		(0.024)	(0.014)	(0.043)	(0.023)	(0.023)	(0.014)
T	-0.014***	-0.014***	-0.0027**	-0.026***	-0.038***	-0.0025	0.019***	0.0019
	(0.00086)	(0.00086)	(0.00099)	(0.0012)	(0.0015)	(0.0022)	(0.0027)	(0.0014)
No. CN8	0.017***	0.017***	0.011***	0.017***	0.029***	0.021***	0.021***	0.022***
	(0.0011)	(0.0011)	(0.0017)	(0.0014)	(0.0035)	(0.0021)	(0.0023)	(0.0016)
GDP	13.7***	13.7***	7.15***	15.0***	34.6***	16.4***	32.0***	5.91***
	(0.26)	(0.26)	(0.53)	(0.29)	(2.05)	(0.50)	(1.30)	(0.53)
SimY	-2.65***	-2.61***	-1.56***	-2.33***	47.3***	-0.32	2.51***	3.90***
	(0.19)	(0.19)	(0.39)	(0.21)	(3.99)	(0.74)	(0.63)	(0.62)
SimF	-0.12***	-0.11***	-0.16***	-0.068***	-0.0086	0.10**	0.55***	0.098**
	(0.015)	(0.015)	(0.029)	(0.018)	(0.067)	(0.033)	(0.047)	(0.033)
WTO	0.42***	0.41***	0.30***	0.41***	0.29***	0.14***	0.59***	3.97***
	(0.023)	(0.023)	(0.043)	(0.027)	(0.060)	(0.034)	(0.086)	(0.45)
FTA	0.16***	0.15***	0.15***	0.079***		0.21***	0.30***	-0.048
	(0.017)	(0.017)	(0.027)	(0.020)		(0.032)	(0.040)	(0.027)
EU Partner	0.10***	0.11***	-0.14**	0.16***			0.099**	-0.24***
	(0.022)	(0.022)	(0.047)	(0.024)			(0.033)	(0.049)
Language	0.42***	0.42***	0.54***	0.38***	-0.48***	0.037	0.027	0.36***
	(0.060)	(0.060)	(0.13)	(0.066)	(0.14)	(0.12)	(0.16)	(0.084)
Colony	0.14	0.14	-0.099	0.14		-0.086		0.58***
	(0.096)	(0.096)	(0.22)	(0.10)		(0.23)		(0.11)
D	-0.82***	-0.82***	-1.17***	-0.69***	0.83***	0.39***	-0.84***	-1.80***
	(0.053)	(0.053)	(0.11)	(0.059)	(0.20)	(0.089)	(0.091)	(0.090)
Disc. STC (t-1)		0.24***						
		(0.021)						
Disc. STC		0.21***						
		(0.020)						
UBT. STC (t-1)		0.083***						
		(0.016)						
UBT. STC		-0.047*						
		(0.020)						
Rest. STC (t-1)		0.083***						
		(0.014)						
Rest. STC		0.056***						
		(0.015)						
Constant	-392.1***	-393.9***	-194.8***	-434.5***	-1045.1***	-491.1***	-948.6***	-157.4***
	(7.69)	(7.71)	(16.1)	(8.61)	(61.7)	(15.1)	(39.1)	(16.0)
N	415532	415532	65541	349991	29154	84087	85799	216492
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 11 / HT regression of import prices to the USA (1995-2011)

Import Price	M1	M2	Food	Non-Food	Low	Low-mid	Upp-mid	High
TBT STC	0.025*** (0.0059)		-0.0093 (0.012)	0.047*** (0.0081)	0.063** (0.021)	0.036** (0.012)	-0.0045 (0.013)	0.025** (0.0086)
TBT STC (t-1)	0.054*** (0.0064)		-0.0071 (0.013)	0.087*** (0.0085)	0.13*** (0.024)	0.086*** (0.013)	0.023 (0.014)	0.043*** (0.0092)
T	0.0038*** (0.00052)	0.0039*** (0.00052)	-0.00013 (0.00053)	0.0071*** (0.00075)	-0.0012 (0.00084)	0.0091*** (0.0013)	0.0037* (0.0016)	0.0023** (0.00089)
No. CN8	0.011*** (0.00068)	0.011*** (0.00068)	-0.00095 (0.00086)	0.019*** (0.00084)	-0.0027 (0.0018)	0.0036** (0.0012)	0.0058*** (0.0014)	0.013*** (0.0010)
GDP	-1.86*** (0.16)	-1.89*** (0.16)	-1.32*** (0.28)	-2.01*** (0.18)	-1.76 (1.04)	-1.99*** (0.29)	-3.63*** (0.80)	1.14** (0.35)
SimY	2.09*** (0.12)	2.07*** (0.12)	1.19*** (0.19)	1.94*** (0.13)	-7.20*** (2.07)	1.91*** (0.41)	1.06** (0.38)	-0.99* (0.40)
SimF	0.019* (0.0093)	0.018 (0.0093)	0.0095 (0.015)	0.012 (0.011)	-0.063 (0.037)	0.032 (0.019)	-0.14*** (0.028)	-0.0018 (0.022)
WTO	-0.036* (0.014)	-0.035* (0.014)	0.0016 (0.023)	-0.034* (0.017)	0.0056 (0.033)	0.023 (0.020)	-0.16** (0.052)	-0.20 (0.30)
FTA	-0.030** (0.010)	-0.029** (0.010)	0.012 (0.015)	-0.028* (0.012)		-0.026 (0.019)	-0.051* (0.024)	0.014 (0.017)
EU Partner	0.034** (0.013)	0.034** (0.013)	0.066** (0.025)	0.029* (0.015)			0.0039 (0.020)	0.080* (0.032)
Language	-0.11** (0.038)	-0.11** (0.038)	-0.11 (0.063)	-0.074 (0.042)	0.076 (0.071)	-0.053 (0.066)	-0.017 (0.10)	-0.088 (0.056)
Colony	0.034 (0.060)	0.031 (0.060)	0.13 (0.11)	0.0095 (0.066)		0.24 (0.13)		-0.21** (0.076)
D	0.32*** (0.034)	0.32*** (0.034)	0.33*** (0.051)	0.25*** (0.038)	0.046 (0.097)	0.17*** (0.049)	0.38*** (0.057)	0.37*** (0.060)
Disc. STC (t-1)		0.017 (0.013)						
Disc. STC		0.014 (0.012)						
UBT. STC (t-1)		0.077*** (0.0095)						
UBT. STC		0.076*** (0.012)						
Rest. STC (t-1)		-0.0028 (0.0084)						
Rest. STC		0.069*** (0.0089)						
Constant	47.4*** (4.68)	48.6*** (4.70)	31.1*** (8.58)	52.9*** (5.31)	48.2 (31.4)	53.9*** (8.68)	101.1*** (24.1)	-41.3*** (10.4)
N	415532	415532	65541	349991	29154	84087	85799	216492
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix 3. Robustness check for China

Table 12 / HT regression of import values to China (1995-2011)

Import Value	M1	M2	Food	Non-Food	Low	Low-mid	Upp-mid	High
TBT STC	0.095***		-0.021	0.12***	0.11	0.21***	0.15***	0.042***
	(0.0097)		(0.050)	(0.010)	(0.056)	(0.028)	(0.026)	(0.011)
TBT STC $_{(t-1)}$	0.14***		0.031	0.17***	0.33***	0.25***	0.22***	0.072***
	(0.0098)		(0.047)	(0.011)	(0.059)	(0.027)	(0.026)	(0.011)
T	-0.0049***	-0.0050***	-0.0087***	-0.0045***	-0.011***	-0.0041	-0.0079***	-0.0039***
	(0.00066)	(0.00066)	(0.0012)	(0.00083)	(0.0031)	(0.0022)	(0.0019)	(0.00078)
No. CN8	0.025***	0.025***	0.0086***	0.031***	0.023***	0.025***	0.023***	0.029***
	(0.0011)	(0.0011)	(0.0022)	(0.0012)	(0.0042)	(0.0026)	(0.0025)	(0.0014)
GDP	0.77***	0.76***	1.00***	0.73***	1.53*	3.64***	0.74**	0.73***
	(0.036)	(0.036)	(0.11)	(0.038)	(0.67)	(0.34)	(0.26)	(0.037)
SimY	-1.54***	-1.55***	2.35***	-2.06***	10.7***	-2.16**	-1.82*	-1.39***
	(0.16)	(0.16)	(0.48)	(0.17)	(1.23)	(0.68)	(0.73)	(0.41)
SimF	0.082***	0.082***	0.27***	0.059***	-0.46***	-0.21***	-0.39***	-0.49***
	(0.017)	(0.017)	(0.054)	(0.018)	(0.11)	(0.060)	(0.078)	(0.036)
WTO	0.46***	0.46***	-0.030	0.53***	-0.094	-0.26**	0.48***	-11.0***
	(0.041)	(0.041)	(0.12)	(0.044)	(0.079)	(0.083)	(0.14)	(1.60)
FTA	-0.54***	-0.54***	-0.46***	-0.54***	0.36***	0.10*	-0.41***	-1.19***
	(0.014)	(0.014)	(0.045)	(0.015)	(0.069)	(0.046)	(0.044)	(0.019)
EU Partner	0.66***	0.66***	-0.56***	0.74***			0.41***	-0.095
	(0.030)	(0.030)	(0.12)	(0.031)			(0.052)	(0.058)
Language	0.55***	0.54***	0.44	0.54***			0.69***	-0.23
	(0.092)	(0.092)	(0.24)	(0.098)			(0.16)	(0.12)
Colony	-1.66***	-1.66***	0.081	-1.85***	0.40	0.11		
	(0.43)	(0.43)	(1.01)	(0.47)	(0.50)	(0.47)		
D	-1.46***	-1.46***	0.13	-1.66***	0.85***	-0.52***	-1.67***	-1.66***
	(0.037)	(0.037)	(0.094)	(0.039)	(0.15)	(0.083)	(0.056)	(0.057)
Disc. STC $_{(t-1)}$		0.15***						
		(0.040)						
Disc. STC		0.14***						
		(0.022)						
UBT. STC $_{(t-1)}$		0.032*						
		(0.014)						
UBT. STC		0.12***						
		(0.019)						
Rest. STC $_{(t-1)}$		0.13***						
		(0.012)						
Rest. STC		0.17***						
		(0.012)						
Constant	-6.61***	-6.42***	-26.8***	-3.75**	-51.4**	-96.3***	-2.97	10.4***
	(1.09)	(1.09)	(3.41)	(1.16)	(18.7)	(10.5)	(7.51)	(2.25)
N	338287	338287	31900	306387	15893	46287	52407	223700
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 13 / FE regression of import values to China (1995-2011)

Period	1995-2011				2002-2011			
Import Value	M1	M2	Food	Non-Food	M1	M2	Food	Non-Food
TBT STC	0.077***		-0.0095	0.098***	-0.053***		-0.17***	-0.031**
	(0.012)		(0.053)	(0.013)	(0.010)		(0.049)	(0.011)
TBT STC (t-1)	0.13***		0.050	0.15***	-0.0077		-0.11*	0.014
	(0.011)		(0.047)	(0.012)	(0.010)		(0.044)	(0.011)
T	-0.0041**	-0.0040**	-0.0081**	-0.0036*	-0.013***	-0.013***	-0.015**	-0.011***
	(0.0014)	(0.0014)	(0.0027)	(0.0016)	(0.0023)	(0.0023)	(0.0050)	(0.0025)
No. CN8	0.011**	0.011**	-0.021*	0.014***	0.017***	0.020***	0.012	0.018***
	(0.0034)	(0.0035)	(0.0084)	(0.0037)	(0.0033)	(0.0034)	(0.0099)	(0.0035)
GDP	-0.17*	-0.17*	0.45	-0.23**	0.16	0.13	0.10	0.21*
	(0.071)	(0.071)	(0.26)	(0.073)	(0.096)	(0.096)	(0.36)	(0.099)
SimY	1.38**	1.38**	3.80**	1.06*	-0.015	-0.054	2.09	-0.24
	(0.45)	(0.45)	(1.25)	(0.48)	(0.52)	(0.52)	(1.47)	(0.55)
SimF	0.34***	0.34***	0.42***	0.32***	0.091*	0.090*	0.18	0.073
	(0.035)	(0.035)	(0.10)	(0.037)	(0.039)	(0.039)	(0.11)	(0.042)
WTO	0.56***	0.56***	0.11	0.64***	0.47***	0.47***	-0.20	0.56***
	(0.086)	(0.086)	(0.23)	(0.092)	(0.082)	(0.082)	(0.21)	(0.088)
FTA	-0.41***	-0.41***	-0.43***	-0.41***	-0.12***	-0.12***	-0.049	-0.14***
	(0.026)	(0.026)	(0.082)	(0.028)	(0.028)	(0.028)	(0.085)	(0.030)
EU Partner	0.98***	0.98***	-0.0036	1.03***	0.65***	0.64***	0.92	0.65***
	(0.080)	(0.080)	(0.29)	(0.082)	(0.12)	(0.12)	(0.60)	(0.12)
Disc. STC		0.13**				-0.23***		
		(0.042)				(0.047)		
Disc. STC (t-1)		0.12***				-0.10***		
		(0.022)				(0.025)		
UBT. STC		0.022				-0.070***		
		(0.015)				(0.014)		
UBT. STC (t-1)		0.12***				0.027		
		(0.020)				(0.019)		
Rest. STC		0.11***				-0.039**		
		(0.014)				(0.012)		
Rest. STC (t-1)		0.14***				-0.0053		
		(0.014)				(0.012)		
Constant	9.26***	9.30***	-9.00	8.91***	-0.51	0.095	1.04	-2.18
	(2.04)	(2.04)	(7.37)	(2.02)	(2.73)	(2.73)	(10.4)	(2.81)
N	338287	338287	31900	306387	241670	241670	21418	220252
R²	0.119	0.119	0.111	0.121	0.045	0.045	0.081	0.043
adj. *R²*	0.119	0.119	0.111	0.121	0.045	0.045	0.080	0.042
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AIC	1217581.4	1217556.8	115593.0	1101545.1	802172.5	802122.6	69813.7	732153.7
BIC	1217817.6	1217835.9	115777.2	1101779.0	802349.2	802340.9	69949.2	732328.8

Robust standard errors in parentheses
* p < 0.05, ** p < 0.01, *** p < 0.001

Table 14 / HT regression of import quantities to China (2002-2011)

Import Value	M1	M2	Food	Non-Food	Low	Low-mid	Upp-mid	High
TBT STC	-0.084***		-0.20***	-0.042**	0.11	0.056	-0.13***	-0.14***
	(0.014)		(0.056)	(0.016)	(0.069)	(0.042)	(0.039)	(0.016)
TBT STC (t-1)	-0.033*		-0.13*	-0.0013	0.33***	0.10*	-0.079*	-0.11***
	(0.014)		(0.053)	(0.016)	(0.075)	(0.040)	(0.040)	(0.017)
T	-0.014***	-0.015***	-0.021***	-0.0093***	-0.034***	-0.012**	-0.022***	-0.0092***
	(0.0017)	(0.0017)	(0.0034)	(0.0020)	(0.0061)	(0.0043)	(0.0051)	(0.0024)
No. CN8	0.029***	0.030***	0.016***	0.030***	0.011	0.018***	0.030***	0.037***
	(0.0018)	(0.0018)	(0.0029)	(0.0023)	(0.0070)	(0.0044)	(0.0041)	(0.0023)
GDP	1.17***	1.17***	0.94***	1.30***	-0.13	17.1***	3.24***	1.04***
	(0.075)	(0.075)	(0.21)	(0.080)	(1.26)	(1.03)	(0.69)	(0.073)
SimY	-2.70***	-2.72***	0.92	-3.10***	15.0***	7.96***	10.9***	-7.25***
	(0.26)	(0.26)	(0.73)	(0.28)	(2.30)	(1.19)	(1.57)	(0.61)
SimF	-0.17***	-0.18***	-0.043	-0.19***	0.14	0.33**	0.11	-1.26***
	(0.029)	(0.029)	(0.080)	(0.031)	(0.21)	(0.099)	(0.14)	(0.058)
WTO	0.21***	0.21***	-0.50***	0.33***	-0.14	-0.83***	0.39	-13.6***
	(0.055)	(0.055)	(0.14)	(0.059)	(0.094)	(0.12)	(0.22)	(1.82)
FTA	-0.17***	-0.17***	-0.036	-0.20***	0.18*	-0.17*	-0.13	-0.44***
	(0.027)	(0.027)	(0.072)	(0.029)	(0.092)	(0.074)	(0.069)	(0.044)
EU Partner	-0.35***	-0.35***	-0.86***	-0.25***			0.035	-0.40***
	(0.063)	(0.063)	(0.17)	(0.067)			(0.17)	(0.081)
Language	-0.072	-0.074	-0.30	-0.016			1.26***	-0.86***
	(0.12)	(0.12)	(0.32)	(0.13)			(0.25)	(0.16)
Colony	0.53	0.53	0.53	0.53	1.55*	2.62***		
	(0.53)	(0.53)	(1.19)	(0.58)	(0.75)	(0.64)		
D	-1.34***	-1.34***	-0.13	-1.53***	0.50	-1.02***	-0.99***	-1.63***
	(0.053)	(0.053)	(0.13)	(0.058)	(0.26)	(0.12)	(0.14)	(0.072)
Disc. STC (t-1)		-0.30***						
		(0.060)						
Disc. STC		-0.17***						
		(0.032)						
UBT. STC (t-1)		-0.091***						
		(0.019)						
UBT. STC		0.022						
		(0.026)						
Rest. STC (t-1)		-0.068***						
		(0.017)						
Rest. STC		-0.034*						
		(0.017)						
Constant	-12.8***	-12.8***	-15.8*	-15.2***	4.40	-482.8***	-79.4***	9.78**
	(2.29)	(2.29)	(6.24)	(2.45)	(36.3)	(30.1)	(20.0)	(3.28)
N	185490	185490	20270	165220	8060	25030	28766	123634
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 15 / HT regression of import prices to China (2002-2011)

Import Price	M1	M2	Food	Non-Food	Low	Low-mid	Upp-mid	High
TBT STC	0.040***		0.047*	0.039***	-0.061	0.023	0.077***	0.060***
	(0.0077)		(0.023)	(0.0090)	(0.034)	(0.021)	(0.020)	(0.0095)
TBT STC $_{(t-1)}$	0.026***		0.012	0.032***	-0.042	0.036	0.064**	0.045***
	(0.0078)		(0.022)	(0.0091)	(0.037)	(0.020)	(0.021)	(0.0096)
T	-0.0039***	-0.0044***	0.0012	-0.0070***	0.0038	-0.0061**	-0.0073**	-0.0060***
	(0.00095)	(0.00095)	(0.0014)	(0.0011)	(0.0030)	(0.0021)	(0.0026)	(0.0014)
No. CN8	0.0079***	0.0077***	0.00037	0.020***	0.013***	0.0082***	0.0028	0.0082***
	(0.0010)	(0.0010)	(0.0011)	(0.0013)	(0.0031)	(0.0021)	(0.0021)	(0.0014)
GDP	0.19***	0.17***	0.16	0.15***	2.00***	-1.28**	-1.25***	0.028
	(0.041)	(0.041)	(0.084)	(0.045)	(0.56)	(0.49)	(0.36)	(0.042)
SimY	-0.99***	-0.99***	-0.75*	-1.14***	-2.46*	-0.16	-4.84***	0.075
	(0.14)	(0.14)	(0.29)	(0.16)	(1.05)	(0.58)	(0.81)	(0.35)
SimF	-0.094***	-0.092***	0.00032	-0.11***	-0.021	-0.10*	-0.23**	0.22***
	(0.016)	(0.016)	(0.033)	(0.017)	(0.10)	(0.049)	(0.071)	(0.034)
WTO	0.016	0.015	0.13*	0.00044	0.11*	0.26***	-0.12	3.11**
	(0.030)	(0.030)	(0.059)	(0.033)	(0.046)	(0.061)	(0.12)	(1.04)
FTA	-0.031*	-0.033*	-0.0032	-0.035*	0.041	-0.072*	-0.018	0.041
	(0.015)	(0.015)	(0.030)	(0.017)	(0.046)	(0.037)	(0.036)	(0.025)
EU Partner	0.44***	0.44***	0.24***	0.42***			0.15	0.32***
	(0.035)	(0.035)	(0.069)	(0.038)			(0.086)	(0.046)
Language	0.049	0.039	0.12	-0.0073			-0.51***	-0.063
	(0.069)	(0.069)	(0.13)	(0.075)			(0.13)	(0.089)
Colony	-1.51***	-1.52***	-0.59	-1.60***	-0.81*	-1.46***		
	(0.30)	(0.30)	(0.47)	(0.32)	(0.32)	(0.30)		
D	0.19***	0.19***	0.23***	0.18***	0.22	0.16**	0.13	0.17***
	(0.030)	(0.030)	(0.050)	(0.032)	(0.11)	(0.055)	(0.072)	(0.041)
Disc. STC $_{(t-1)}$		0.12***						
		(0.033)						
Disc. STC		0.053**						
		(0.018)						
UBT. STC $_{(t-1)}$		0.021						
		(0.011)						
UBT. STC		-0.0058						
		(0.014)						
Rest. STC $_{(t-1)}$		0.051***						
		(0.0094)						
Rest. STC		0.037***						
		(0.0094)						
Constant	-11.3***	-10.8***	-12.4***	-9.91***	-64.8***	31.1*	31.3**	-9.95***
	(1.26)	(1.26)	(2.54)	(1.37)	(16.0)	(14.5)	(10.3)	(1.89)
N	185490	185490	20270	165220	8060	25030	28766	123634
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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