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**Research Report**

## Hidden Protectionism: Non-Tariff Barriers and Implications for International Trade

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# Hidden Protectionism: Non-Tariff Barriers and Implications for International Trade

*Erdal Yalcin, Gabriel Felbermayr, Luisa Kinzius*





# Hidden Protectionism: Non-Tariff Barriers and Implications for International Trade

Study on Behalf of the Bertelsmann Foundation

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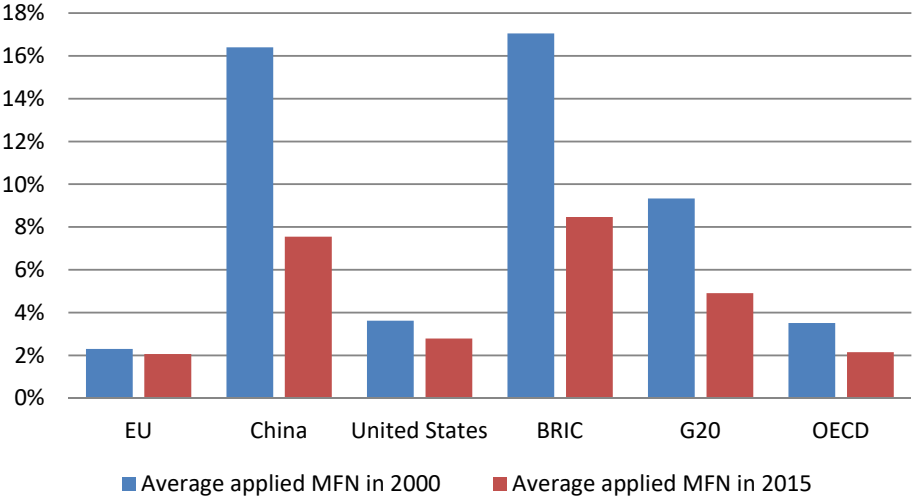
## List of Acronyms

<b>BRICS</b>	Brazil, Russia, India, China and South Africa
<b>CEPII</b>	Centre d'Etudes Prospectives et d'Informations Internationales
<b>CEPR</b>	Centre for Economic Policy Research
<b>CPC</b>	Central Product Classification
<b>EU</b>	European Union
<b>GTA</b>	Global Trade Alert
<b>HS</b>	Harmonized Commodity Description and Coding Systems
<b>IDB</b>	Integrated Data Base
<b>IMF</b>	International Monetary Fund
<b>ITC</b>	International Trade Center
<b>I-TIP</b>	Integrated Trade Intelligence Portal
<b>MFN</b>	Most-Favored Nation
<b>NTB</b>	Non-tariff barrier
<b>OLS</b>	Ordinary Least Square
<b>PPML</b>	Poisson Pseudo-Maximum Likelihood
<b>SPS</b>	Sanitary and Phytosanitary
<b>TBT</b>	Technical barriers to trade
<b>TRAINS</b>	Trade Analysis Information System
<b>UN</b>	United Nations
<b>UNCTAD</b>	United Nations Conference on Trade and Development
<b>WTO</b>	World Trade Organization

# 1 Introduction

Over the past months there has been a steady increase in international anti-trade rhetoric around the world. In fact, already after the dramatic collapse of international trade in the wake of the financial crisis in 2007/08, there was a common fear that governments may respond to domestic economic challenges by increasing tariffs and other trade barriers to protect their economies. Such an uncoordinated trade policy would have possibly satisfied domestic interests in the short run as a symbolic reaction but at the same time it would have resulted in an even stronger slow-down in economic growth. One big difference in how countries reacted to the recent global financial crisis of the 21<sup>st</sup> century in contrast to the crises of the last century has been a stronger cooperation in international trade policies under the shelter of the WTO that has successfully prohibited a surge in border tariffs.

Figure 1: Average Most-Favored-Nation Tariffs Across Different Regions



Source: World Integrated Trade Solution Data (own calculation).

Figure 1 illustrates for different regions how average Most-Favored Nation (MFN) tariffs have developed over the past 15 years within the World Trade Organization (WTO) member states. While the level of average tariffs across different regions still differs substantially, tariffs have been on the decline in all regions. Hence, despite the increasing domestic economic challenges across the world, one is tempted to conclude, that policy makers have resisted to increase trade protection.

At the same time Figure 2 illustrates how global merchandise trade has developed over the past decades. While international trade was steadily growing until 2007, the succeeding years are characterized by a slowdown and even a reversal in global trade.

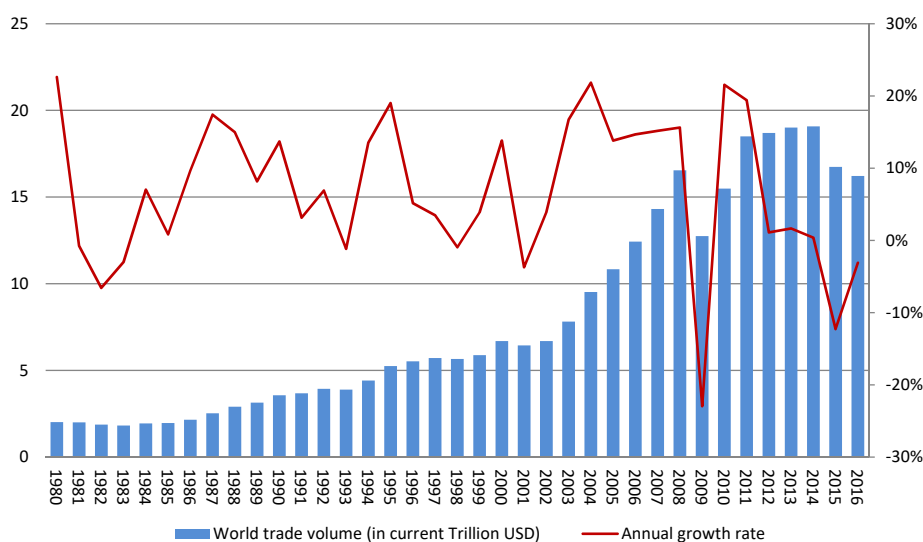
How can this trade pattern be explained with the finding that customs duties over the past years have been declining? Is it possible, that trade protection has been on the rise not in form of tariffs but based on alternative trade restricting measures which are probably not regulated within the WTO rules? Furthermore, is there a justification for the rising criticism by policy makers lead by the newly elected US administration: namely, that an increasing number of countries is applying

## 1 Introduction

protective trade policies that necessitates counter action to recreate a level playing field with faire trade?

Clearly, the reasons which have lead to a global trade slowdown are manifold. The related literature traces the slowdown back to e.g. a temporary reduction of trade in commodities due to a higher self-sufficiency in energy consumption. Moreover, the special role of China in the last decade: after a period of strong export based growth not only has China's import demand for commodities been falling, but the country has been also importing a smaller volume of manufactured goods, resulting in a lower global trade. Finally, the change in global value chains, with multinational enterprises reducing their new foundation of offshore companies, may also contributed to a slowdown of cross-border trade growth. While the questions of which forces and to what extend shape global trade flow development itself is an important and interesting questions, the focus of this study is put on a very particular related aspect.

**Figure 2: Global Merchandise Trade Development**



Source: World Development Indicators from the World Bank. Own calculations.

The purpose of the underlying study is to shed light on the latter questions by illustrating how trade protection in form of non-tariff barriers has emerged over the past years. A major focus is put on illustrating what type of non-tariff barriers have been implemented by policy makers to reduce import competition. Moreover, a new contribution of the underlying study is the empirical evaluation of how newly implemented non-tariff barriers impact international trade.

Accordingly, the first part of this study provides a detailed descriptive analysis of applied non-tariff barriers to assess the role of non-tariff barriers in global protectionism. The analysis is based on recently released data from the Global Trade Alert (GTA) lately documented by [Evenett and Fritz, 2017]. It focuses on different types of non-tariff barriers as well as differences across countries and sectors. The second part of this study focuses on the econometric analysis of non-tariff barriers. Based on a structural gravity model it is illustrated how non-tariff barriers have shaped international trade.

## 2 Major Results of the Analysis

### **Protectionism in international trade has been on the rise**

Customs duties have not been used in a significant manner to protect domestic markets from foreign competition since the financial crisis in 2008. Instead, the presented GTA data illustrates a strong increase in non-tariff barriers that aim at reducing imports. Since 2009, only 20% of all implemented protectionist interventions can be attributed to an increase in tariffs. In contrast, non-tariff barriers accounted for on average 55% of all implemented protectionist interventions. The usage of non-tariff barriers increased steadily relative to trade defense measures. While in 2010 only 54% of all protectionist interventions were non-tariff barriers the usage of non-tariff barriers increased to 61% in 2016.

### **High income countries increasingly use non-tariff barriers**

The usage of non-tariff barriers is highly correlated with the income level of an economy. High income countries appear to use non-tariff barriers more often than low or middle income countries. Despite the difference in the number of non-tariff barriers implemented, the relative importance of non-tariff barriers compared to traditional trade defense measures or tariff increases also varies across income levels. The implementation of non-tariff barriers substantially varies across countries. The United States implemented by far the largest number of non-tariff barriers. With close to 800 non-tariff barriers the US government implemented twice as much protectionist policies as the Indian government, which ranks second. The two BRICS economies, India and Russia rank second and third among the countries that implemented the most non-tariff barriers, with 310 and 204 implemented measures, respectively. Larger European economies like Germany, the United Kingdom and France implemented between 50 and 100 non-tariff barriers, which is only about one tenth of the amount of non-tariff barriers implemented by the United States.

### **Subsidies and state aid measures are increasingly applied**

Subsidies and state aid measures make up the largest number of implemented non-tariff barriers in the considered database. These measures are mainly driven by the extensive provision of financial grants provided to domestic companies that discriminate against foreign competitors. Over 500 such financial grants have been provided in the period between 2009 and 2017. Other important subsidies and state aid instruments have been state loans, bailouts and taxes or social-insurance reliefs. Localisation requirements in public procurement are the second most often applied non-tariff barriers, with over 360 implemented restrictions.

### **Non-tariff barriers significantly reduce trade**

Not only have non-tariff barriers been increasingly applied as trade restricting measures, but they also have had a significant import reducing effect. On average bilateral imports decrease in response to the implementation of at least one non-tariff barrier by 12%. Similarly, on average yearly-bilateral trade decrease by around 11%, if at least one trade defense measure is implemented. However, non-tariff barriers are used substantially more often than trade defense measures, which include anti-dumping, anti-subsidy and safeguard measures.

## 2 Major Results of the Analysis

### **Trade reducing effect of non-tariff barriers is highly heterogeneous**

The effect of non-tariff barriers on imports turns out to be very diverse across different industries, countries with different income levels and individual countries. A main reason for this heterogeneity can be found in the strong variation on how often and which type of non-tariff barriers are implemented in the different groups.

### **Non-tariff barriers contributed to the global trade slowdown**

The underlying analysis illustrates that non-tariff barriers may be responsible for about 16% of the observed global trade slowdown.

### **Differences of observed non-tariff barriers across data sources**

The study illustrates that the identification of non-tariff barriers remains a major challenge. Contrary to data on non-tariff barriers provided by other sources, the GTA database for example records only very few Sanitary and Phytosanitary (SPS) and Technical barriers to trade (TBT) measures. One reason for this pattern may stem from the fact that other sources like the WTO do not distinguish between non-tariff barriers and non-tariff measures. Different to non-tariff barriers, non-tariff measures do not necessarily have a protectionist character, but could also liberalize trade.

### 3 Non-Tariff Barriers: Definition and Measurement

Non-tariff barriers are hard to assess. Different to tariffs, which are transparent and accessible via each countries' custom authority, non-tariff barriers are often much more hidden. Moreover, there is no clear-cut definition of non-tariff barriers. In this study we consider any government policy that potentially leads to a discriminatory treatment of foreign competitors relative to domestic agents as a non-tariff barrier. We specifically separate the three WTO safeguarding measures: anti-dumping duties, safeguards and countervailing duties. These temporary trade policy instruments are collectively referred to as trade defense measures. Our definition thus can include any direct border controls that do not represent tariff increases, such as quotas, bans or licensing requirements. This convention also accounts for policies that only indirectly affect trade, such as discriminatory public procurement and localisation policies or state aid measures.

It has been, in particular, the financial crisis in 2007/08 that triggered a debate about increasing protectionism, which emphasized the role of non-tariff barriers. This international political but also academic debate led to multiple data collection initiatives that improved the scarce data provision of non-tariff barriers.<sup>1</sup> One of these initiatives is the GTA database. An initiative of the Centre for Economic Policy Research (CEPR), which is based in London and coordinated by a research team in St. Gallen.

The GTA database collects protectionist policies that were implemented worldwide since 2009. In July 2017 a comprehensive update of the database was released. It covers an outstanding range of non-tariff barriers, which makes a detailed and up-to-date assessment of implemented non-tariff barriers possible. Therefore, this study builds on the outstanding new data from the GTA to assess the role of non-tariff barriers.

The database distinguishes forty-four different protectionist measures that can affect trade in goods. These could either be standard trade policies such as tariff increases and trade defense measures or non-tariff barriers. For each policy intervention the GTA database provides information on a) which trading partners are likely to be affected, b) which products are targeted and c) the date of implementation. Typical examples of non-tariff barriers included in the database are state aid measures, changes in public procurement rules, trading quotas, licensing requirements or trade finance instruments. Until July 2017, the GTA database recorded more than 6,800 protectionist interventions. The last intervention added dates back to 1st July 2017 - an increase of the export tax on crude palm oil by the Malaysian government.<sup>2</sup>

Different to data collection efforts of the WTO, United Nations Conference on Trade and Development (UNCTAD), the International Trade Center (ITC) and the World Bank, the GTA data collection does not rely on official government notifications. Instead the GTA researchers systematically monitor official government websites and other official sources to depict all policy changes that potentially affect trade. The set of policies covered is not predefined. Each policy intervention that is included in the GTA database has to pass a six-step evaluation process. During this process it is evaluated whether the policy discriminates against foreign exporters to the benefit of domestic producers.

<sup>1</sup> Examples are the Trade Analysis Information System (TRAINS) database, NTM business surveys and the Integrated Trade Intelligence Portal (I-TIP) database.

<sup>2</sup> <http://www.globaltradealert.org/latest/state-acts>, last accessed: 7.7.2017

### 3 Non-Tariff Barriers: Definition and Measurement

The GTA database provides simple indicators of whether a protectionist measure is implemented between two trading partners. This has the advantage that the data is very timely available. A clear disadvantage is that simple indicators do not reflect the degree of protectionism. State aid, for example, provided to a specific company is likely to hamper trade to a different degree than a direct border measures, like e.g. an import ban. However, only measures, which are likely to impose a significant relative change on the treatment of domestic to foreign agents pass the mentioned six-step evaluation process. For example a non-binding import quota would not be counted.

As this study aims to assess the average effect of non-tariff barriers on trade, the GTA database has several other advantages over alternative data sources. Firstly, it clearly distinguishes between discriminatory and non-discriminatory non-tariff measures. The TRAINS database, which is collectively published by the WTO, UNCTAD, the ITC and the World Bank and one of the largest databases on non-tariff measures for example does not make this distinction. This leads firstly to multiple entries regarding SPS standards and TBT measures, which are not necessarily protectionist, but could also be trade enhancing. Secondly, the definition of non-tariff barriers according to GTA is not restricted to merely trade policies. The TRAINS database, as well as I-TIP, a database provided by the WTO, restrict their collection of non-tariff measures to explicit trade policies. According to I-TIP, non-tariff measures are "defined as the measures subject to monitoring through notification under GATT-WTO agreements. Measures that are not subject to monitoring are not considered."<sup>3</sup> As a consequence, these databases do not include state aid or bailout measures as non-tariff measures. Still, it might be that this kind of hidden protectionism plays an increasingly important role for developed economies. WTO regulations significantly reduced the scope to use standard trade policies to restrict trade. Furthermore, both TRAINS and I-TIP rely on government notifications only, which makes underreporting of the actual degree of protectionism likely. The Non-Tariff-Measure business surveys, which are published by the ITC provide very detailed information on how specific non-tariff measures affect businesses. However, these surveys are only conducted country-wide and are therefore not suitable for a cross-country comparison.

The greatest drawbacks of the GTA database are that it only contains information on non-tariff barriers after 2009. As a consequence, unfortunately a comparison with pre-crisis levels of protectionism is not possible. In addition, its data collection method strongly relies on the transparency of governments publishing their policies online. To illustrate: Saudi-Arabia was listed as the least protectionist country among the G20 economies in 2015. Only after its state development fund made information about all loans and financial grants given to domestic companies publicly available, it jumped to the seventh rank in 2016 ([Evenett and Fritz, 2016], p.38). Similarly, governments differ in how they announce policies. As noted by GTA, the US government tends to announce each policy separately, while European governments tend to announce policies in bundles. This has to be kept in mind when looking at counts of implemented non-tariff barriers.

It is important to note that the GTA data, which is used in this analysis, cannot provide a comprehensive overview of all trade hurdles faced by exporters. As delineated there are many reasons why still unobserved trade barriers may exist. Nevertheless, the presented data cover the most update NTB measures on the global scale. An empirical analysis promises to shed light on how NTBs are shaping international trade.

The study focuses on policy interventions that affect trade in goods only. Policy interventions that

<sup>3</sup> <http://i-tip.wto.org/goods/Default.aspx>. (For a comprehensive list of measures subject to notification, see: [https://www.wto.org/english/docs\\_e/legal\\_e/33-dnotf\\_e.htm](https://www.wto.org/english/docs_e/legal_e/33-dnotf_e.htm))

affect the commercial flow of services, labor migration and investment are not considered. All data in the next section refers to protectionist interventions identified in the GTA database. The dataset covers 151 countries that implemented protectionist policies between 2009 and 2017.<sup>4</sup> In total 214 countries have at least once been affected by a protectionist policy.

<sup>4</sup> The dataset includes only those interventions for which information on potentially affected trading partners were available. 0.8% observations are excluded as no affected trading partner was identified.



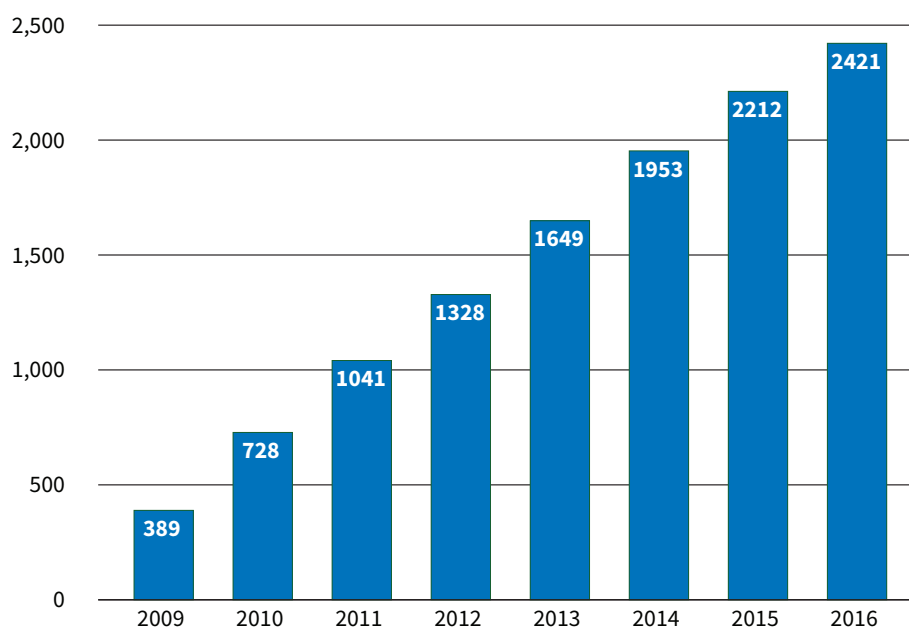
## 4 The Role of Non-Tariff Barriers in Global Protectionism

A core finding of the following chapter is that protectionism is on the rise if non-tariff barriers are accounted for. According to GTA data, protectionism steadily increased since 2009. In total more than 5,600 new protectionist policies have been implemented worldwide between January 2009 and July 2017. More than 3,000 of these protectionist policies have been non-tariff barriers. This increase in the application of non-tariff barriers is a common time trend observed across other data sources.

### 4.1 Non-Tariff Barriers as Means to Restrict International Trade

The stock of non-tariff barriers that are currently in force increased since 2009. Over 2,400 non-tariff barriers that were newly implemented since 2009 were still in force at the end of 2016 (see Figure 3). Only about one third of the non-tariff barriers that were implemented since 2009 have been temporarily.

Figure 3: Number of NTBs Currently in Force (2009-2016)

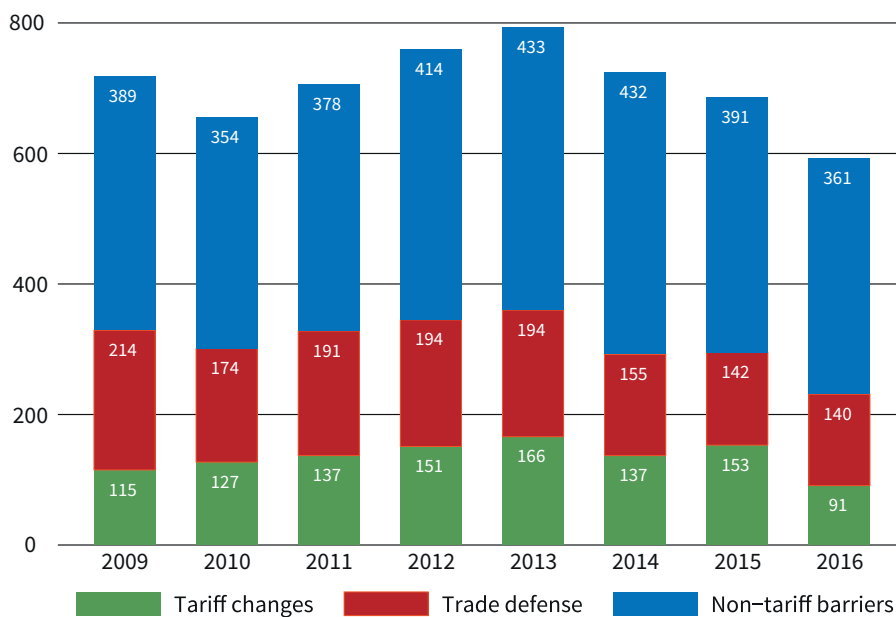


Source: Global trade alert database. Note that only non-tariff barriers that were implemented after 2008 are included.

Figure 4 and 5 show that tariffs are not the major tool for countries to protect domestic economies. Instead, non-tariff barriers are most often applied. Since 2009, only 20% of all implemented protectionist interventions can be attributed to an increase in tariffs. In contrast, non-tariff barriers accounted for on average 55% of the implemented protectionist interventions. The use of non-tariff

barriers increased steadily relative to trade defense measures. While in 2010 only 54% of all protectionist interventions were non-tariff barriers the usage of non-tariff barriers increased to 61% in 2016. Trade defense measures observed a slight backdrop. In 2009, 30% of all applied protectionist policies could still be attributed to either anti-dumping duties, safeguards or countervailing duties. These dropped to only 21% in 2015, while increasing slightly again to 24% in 2016 - mainly driven by the increasing amount of anti-dumping disputes in industries with over-capacities like the steel sector or solar panel products.

**Figure 4: Number of New Protectionist Interventions, by Type (2009-2016)**



Source: Global trade alert database

Looking more specifically on the types of non-tariff barriers applied, it is evident, that financial grants provided to exporting enterprises are the most often applied non-tariff barrier. Figure 6 shows a ranking of non-tariff barriers, sorted by categories of non-tariff barriers, that were most often applied between 2009 and mid-2017. Six categories are distinguished: (1) capital controls and exchange rate policies, (2) export and import policy instruments, (3) subsidies and state aid measures, (4) public procurement policies (5) localisation policies and (6) other instruments. Table 1 provides an overview of intervention types included in each category. Subsidies and state aid measures make up for the largest category. Which is mainly driven by the extensive provision of financial grants provided to domestic companies that discriminate against foreign competitors. Over 500 such financial grants have been provided. Other important subsidies and state aid instruments have been discriminatory state loans, bailouts and taxes or social-insurance reliefs. That subsidies and state aid measures make up for the largest category of non-tariff barriers, especially compared to direct import and export controls underlines the importance of not only considering direct trade policies, but extending the focus on more hidden protectionism.

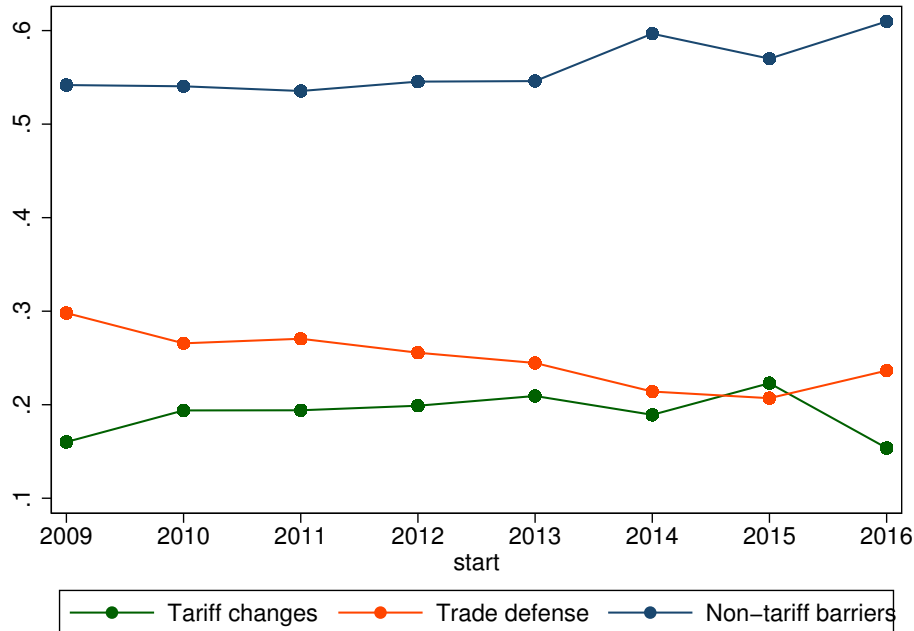
The large amount of newly implemented public procurement and localization policies also em-

## 4 The Role of Non-Tariff Barriers in Global Protectionism

**Table 1: Types of Protectionist Policies**

<b>Tariff changes</b>	
<b>Tariff changes</b>	
<b>Trade defense measures</b>	
<b>Trade defense measures</b>	
Anti-circumvention	
Anti-dumping	
Anti-subsidy	
Safeguard	
<b>Non-tariff barriers</b>	
<b>Import controls</b>	<b>Localisation policy</b>
Import ban	Local operations
Import incentive	Local sourcing
Import licensing requirement	Localisation incentive
Import monitoring	
Import quota	<b>Capital controls and exchange rate policy</b>
Import tariff quota	Competitive depreciation
Import-related non-tariff measure, nes	Price stabilisation
Internal taxation of imports	
Trade balancing measure	<b>Other instruments</b>
Trade payment measure	Instrument unclear
	Sanitary and phytosanitary measure
	Technical barrier to trade
<b>State aid and subsidies</b>	<b>Export controls</b>
Bailout (capital injection or equity participation)	(not included in estimation sample, only descriptives)
Financial assistance in foreign market	Export subsidy
Financial grant	Other export incentive
In-kind grant	Tax-based export incentive
Interest payment subsidy	Trade finance
Loan guarantee	Export ban
Production subsidy	Export licensing requirement
State aid, nes	Export quota
State loan	Export tax
Tax or social insurance relief	Export-related non-tariff measure, nes
<b>Public procurement policy</b>	
Public procurement access	
Public procurement localisation	
Public procurement preference margin	

Figure 5: Share of NTBs, Tariffs and Trade Defense Measures of All New Protectionist Interventions (2009-2016)



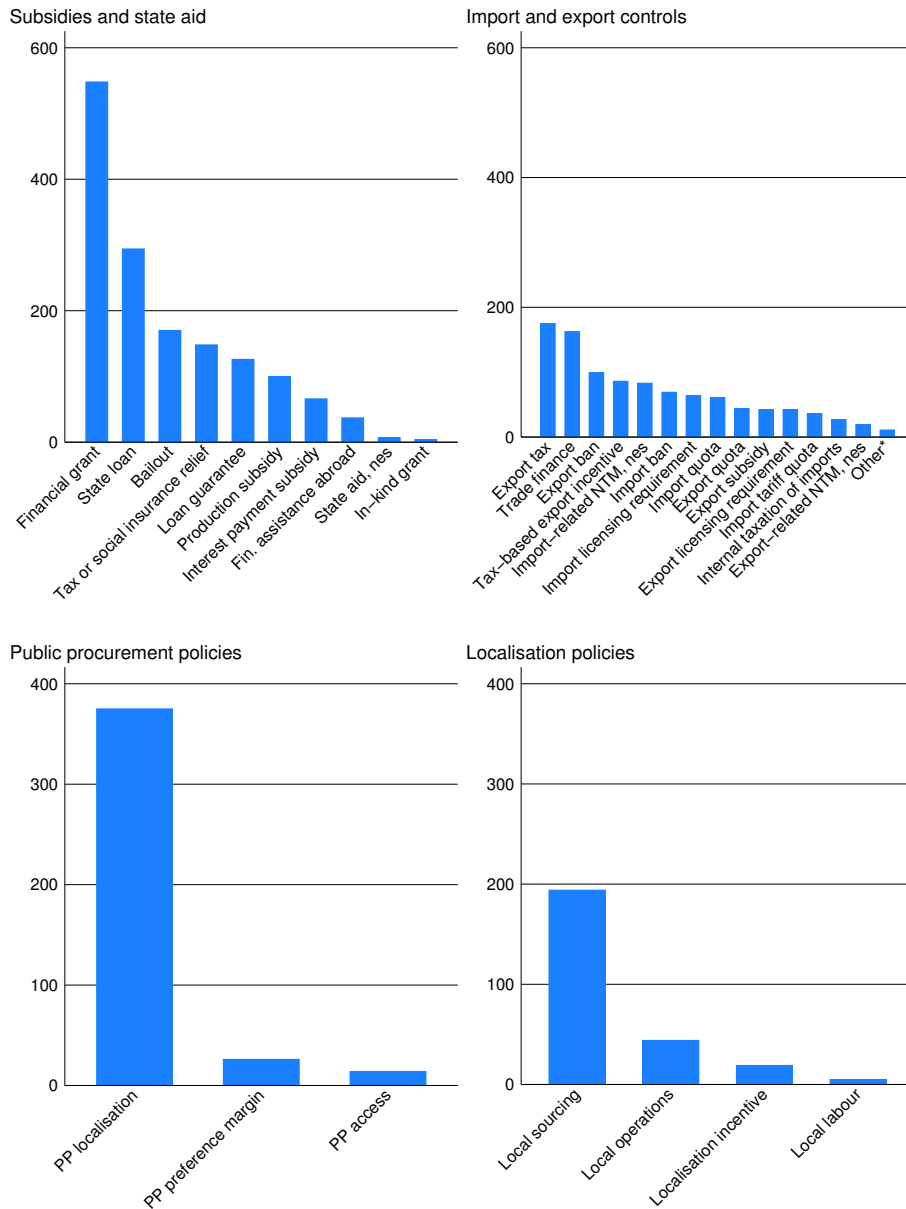
Source: Global trade alert database

phasizes the increasing importance of indirect trade barriers. About 400 discriminating public procurement policies were implemented since 2009. Public procurement localisation restrictions are the second most often applied non-tariff barrier, with over 360 implemented restrictions. Public procurement preference margins and access do play minor roles, with less than thirty applied measures each.

Non-tariff related import and export policies define the most diverse category of intervention types that can be applied. This is not surprising as direct border controls are also most easily to distinguish. Export taxes have been increasingly introduced over the past years, as well as trade finance measures. According to GTA data, a large amount of trade finance measures stems from governments' import-export banks that find creative ways to subsidize their domestic exporters to the disadvantage of other competing foreign exporters in the destination markets ( [Evenett and Fritz, 2017], p.40). About 180 export tax changes and trade finance policies were implemented since 2009. Other common import and export controls are specific trade bans, tax based export incentives or import licensing agreements. The increasing focus on export incentives might reflect the strategy of governments to help companies to increase market shares not only domestically, but also abroad ( [Evenett and Fritz, 2017], p.15). In this sense, non-tariff barriers are not necessarily protectionist but rather represent unfair trade policies.

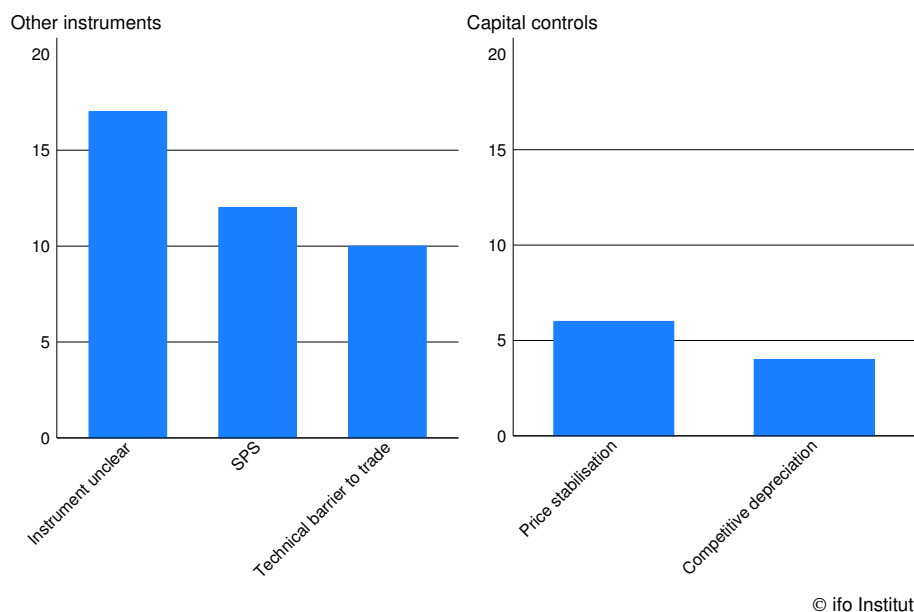
Contrary to data on non-tariff barriers provided by other sources, the GTA database records only very few SPS and TBT measures. Only 12 SPS and 10 TBT measures have been implemented that were protectionist. This could mainly stem from the fact that other sources like the WTO do not distinguish between non-tariff barriers and non-tariff measures. Different to non-tariff barriers, non-tariff measures do not necessarily have a protectionist character, but could also liberalize trade.

Figure 6: Number of Implemented NTBs, by Type (2009-2017)



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Source: Global trade alert database. \* includes the following intervention types: import incentive, other export incentive, trade balancing measure and trade payment measure.



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**Figure 7: Continued: Number of Implemented NTBs, by Type (2009-2017)**

Source: Global trade alert database

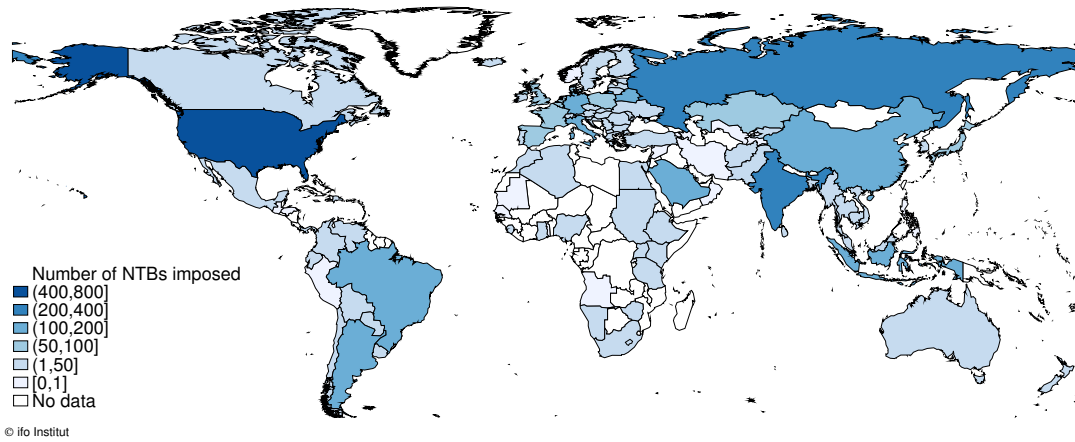
Especially for SPS and TBT measures it is unclear whether a trade supporting or trade hampering effect is expected. This difference can explain the very small amount of SPS and TBT measures recorded in the GTA database.

The usage of capital controls and exchange rate policies has been negligible compared to other protectionist instruments. The GTA database recorded only four competitive devaluations and six price stabilizing policies. However, it is important to note that only counts of implemented measures are reported. Counts of implemented policies give a good overview on how many different types of non-tariff barriers are used by the governments worldwide. Still, counts do not provide an indication of the actual trade impact of each measure. A competitive devaluation e.g. of a national currency that affects all industries and trading partners equally is very much likely to have a larger protectionist effect than a subsidy provided to only one specific company in one specific industry.

## 4.2 Non-Tariff Barriers as Means to Restrict Trade: Differences across Countries

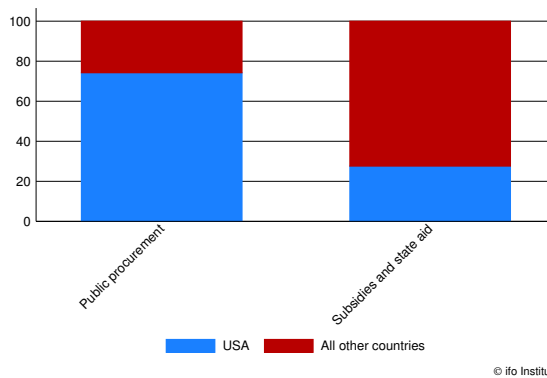
The implementation of non-tariff barriers substantially varies across countries. The United States implemented by far the largest number of non-tariff barriers. With close to 800 non-tariff barriers the US government implemented twice as much protectionist policies as the Indian government, which ranks second (see Table 9 in the appendix, for a complete list of NTBs in each country). The two BRICS economies, India and Russia rank second and third among the countries that implemented the most non-tariff barriers, with 310 and 204 implemented non-tariff barriers, respectively. Larger European economies like Germany, the United Kingdom and France implemented between 50 and 100 non-tariff barriers. Which is only about one tenth of the amount of non-tariff barriers

#### 4 The Role of Non-Tariff Barriers in Global Protectionism



**Figure 8: Number of NTBs Imposed by Country (2009-2017)**

Source: Global trade alert database



**Figure 9: Share of NTBs Implemented by the United States, by Different Types of NTBs (2009-2017)**

Source: Global trade alert database

implemented by the United States. Saudi-Arabia, Indonesia and Belarus are also among the top 10 imposing countries. China, as the world’s largest trading economy and often criticized for its unfair trade practices, ranks 9th, with close to 100 interventions implemented. The world map in Figure 8 shows how the use of non-tariff barriers is restricted to developed and developing economies. Non-tariff barriers hardly play any role for African countries.<sup>5</sup>

What makes the United States in terms of non-tariff barriers the by far most protectionist country? Besides political motives that are difficult to be identified there might be technical reasons, in the way how non-tariff barriers are identified. On the one hand, the observed differences in observed NTB measures could be driven by the tendency of the US government to announce each policy separately, which leads to over-reporting within the GTA database compared to other countries that announce policies in bundles. On the other hand, Figure 9 shows that the United States has a very different pattern of types of non-tariff barriers it uses compared to other countries. The United States made extensive use of discriminatory state aid measures and subsidies as well as public procurement policies. It accounted for more than 70% of all worldwide implemented public procurement policies and about 25% of all subsidies and state aid barriers.

SPS and TBT measures do not play a role in the United State’s protectionist profile. Generally, the comparison across countries depicts that the use of instruments is diverse. India for example mostly applied discriminatory import and export policies and localization policies. In contrast to the United States, public procurement and state aid were not outstandingly more often applied by India than by other countries.

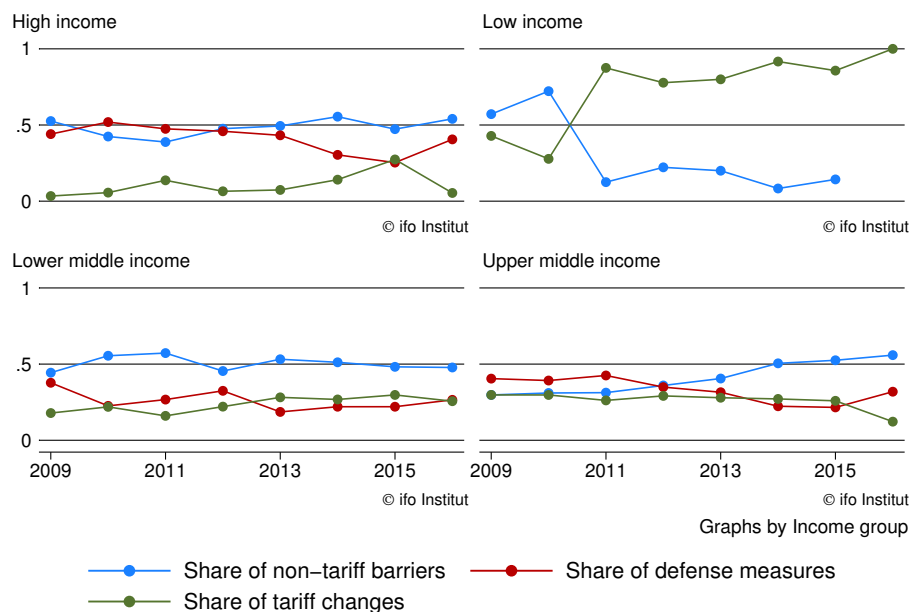


Figure 10: Types of NTBs Implemented, Percentage Share by Income Level of Countries (2009-2017)

Source: Global trade alert database. Income level classification according to World Bank 2016

The usage of non-tariff barriers is highly correlated with the income level of an economy. High income countries appear to use non-tariff barriers more often than low or middle income countries. Despite the difference in the number of non-tariff barriers implemented, the relative importance of non-tariff

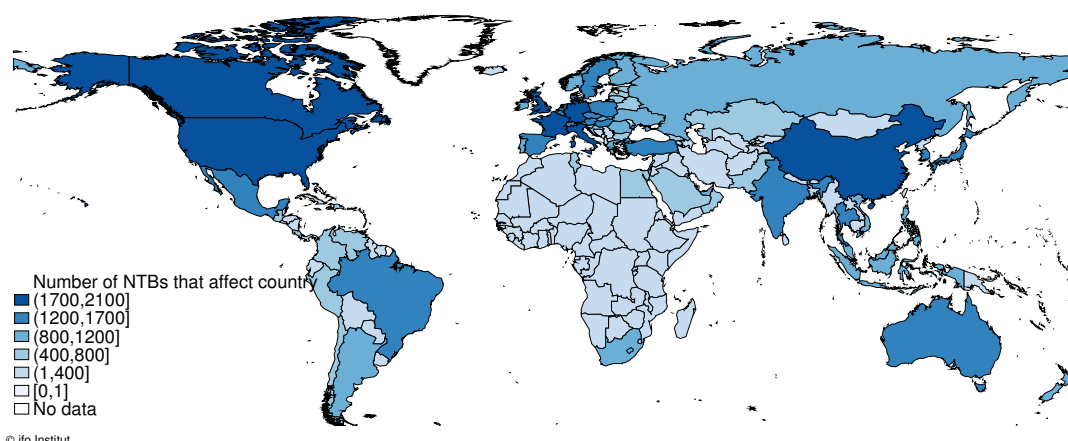
<sup>5</sup> Table 11 lists the top 10 NTB implementing and affected countries.



barriers compared to traditional trade defense measures or tariff increases varies across income levels. This finding is not surprising. Especially large economies that adopted all WTO regulations face little scope for tariff increases within the regulatory framework. The increasing implementation of non-tariff barriers relative to tariff increases might reflect how high income economies substitute towards other instruments to protect their economy. For high income countries, the share of non-tariff barriers of all implemented protectionist is around 50% (see figure 10). Tariffs account only for a small proportion of all implemented protectionist policies. In contrast, low income countries tend to use tariffs rather than non-tariff barriers to protect their economies. Since 2011, more than 80% of all protectionist policies implemented by low income countries were increases in import tariffs.

Non of the low income countries implemented any trade defense measure.<sup>6</sup> This could be explained by the fact that imposing trade defense measures is costly, as the country has to file a lawsuit at the WTO and provide all necessary documents. An interesting pattern shows up in the development in upper middle income countries. In 2009 non-tariff barriers and tariff changes were equally often implemented. Since then, the development diverged and non-tariff barriers account for more than 50% of all protectionist policies, while the share of tariff changes dropped to about 10% in 2016.

### 4.3 Targets of Protectionism: Differences Across Countries



**Figure 11: Number of Times a Country is Affected by Implemented NTBs (2009-2017)**

Source: Global trade alert database

Turning to the targets of protectionism, Germany and China are the two economies that are most often likely to be affected by an implemented non-tariff barrier. German exporters were affected by 2,000, Chinese firms by 1,700 non-tariff barriers between 2009 and 2017. It is not surprising that the two largest trading economies rank first and second. The GTA data is based on an estimation procedure that relies on past trade flows to predict, which countries are likely to be affected by the newly implemented protectionist interventions. Therefore, countries that trade larger volumes in a broad range of products have a much higher likelihood of being affected than countries, that trade only very few products at small scale. The world map in Figure 11 illustrates how often each country was likely to be affected by a non-tariff barrier between 2009 and mid-2017.

<sup>6</sup> Note however that according to the GTA data there have been only about 70 interventions by low income countries and more than 5,500 interventions by high income countries

Most protectionist interventions of high income countries affect other high income countries. Figure 12 plots the amount of implemented non-tariff barriers by income levels of implementing and affected countries. Non-tariff barriers of high income countries rarely affect low income countries. Vice versa, though at a much lower scale, non-tariff barriers of low income countries affect high income countries more often than low income countries. Again, this is not surprising due to the estimation procedure applied to identify, which trading partners are most likely affected.

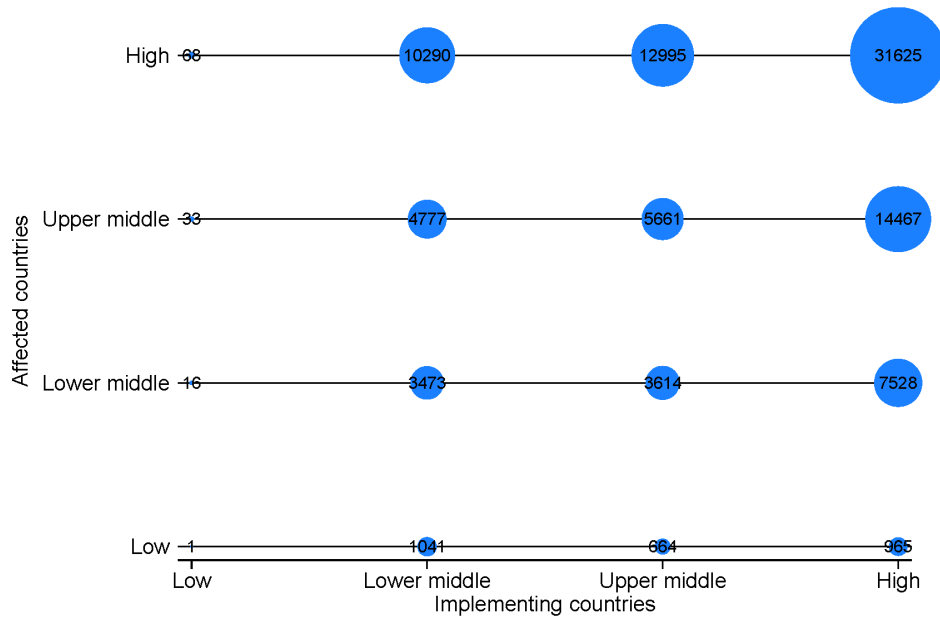


Figure 12: Number of Implemented NTBs, by Income Levels of Countries (2009-2016)

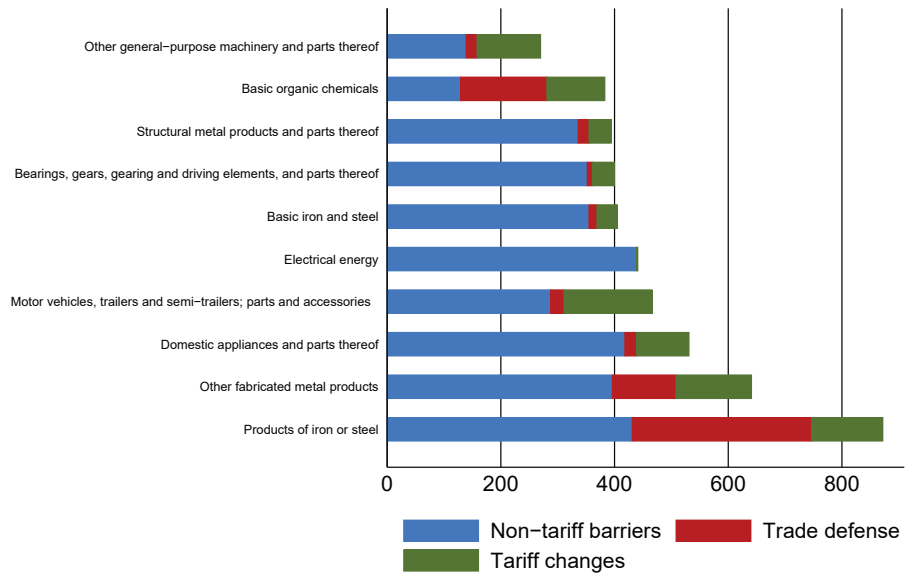
Source: Global trade alert database. Symbol size is proportional to protectionist measures implemented.

#### 4.4 Targets of Protectionism: Differences across Sectors

There are a few product groups that exhibit extensive protectionism.<sup>7</sup> As one would expect, products from sectors that exhibit problems of overcapacity are most often targeted by protectionist policies. This holds for products of iron and steel, which lead to ranking of products that are most often targeted by protectionist policies (Figure 13). Surprisingly, this effect is not only driven by trade defense instruments such as anti-dumping. Instead, non-tariff barriers contribute most to the over 800 interventions targeted at these products. Other fabricated metal products rank second among the products most often targeted by protectionism. This product group contains products of aluminium - an industry that also faces worldwide overcapacity. Figure 13 shows that there is large variation in the types of protectionism applied across products. Products of electrical energy are for instance most often and nearly only targeted by non-tariff barriers. Trade defense measures are mainly concentrated in product groups of iron and steel, as well as basic organic chemicals and other fabricated metal products. Applied tariff changes still seem to play a role in the automotive industry. In contrast to findings from the WTO, which finds that non-tariff measures are more prevalent in the

<sup>7</sup> The product classification follows the Central Product Classification (CPC) three-digit classification scheme of the United Nations.

#### 4 The Role of Non-Tariff Barriers in Global Protectionism



**Figure 13: Number of Protectionist Interventions, by Type and Sector (2009-2017)**

Source: Global trade alert database

agriculture sector than in the manufacturing sector, there are no agricultural products among the top-10 most often targeted products ( [WTO, 2012], p.136).

## 5 The Effect of Non-Tariff Barriers on Trade

As illustrated by the descriptive data, indirect protectionism through non-tariff barriers is on the rise. How do these barriers affect trade flows? To what extent do non-tariff barriers reduce bilateral trade. In the following sections we present empirical estimations which aim at disentangling trade effects caused by different types of non-tariff barriers.

### 5.1 The Gravity Model

The presented estimations are based on a structural gravity equation with tariffs pooled across different products following [Yotov et al., 2016]. To identify the effect of non-tariff barriers on trade, we exploit the fact that for each implemented protectionist measure the GTA database has information about the detailed type of policy measure, trading partners that are most likely affected, products that are affected (at CPC three-digit product level) and the year of implementation. This information is used to construct dummies and counts for different types of protectionist policies. In the baseline specification we distinguish two groups of protectionist policies: trade defense measures and non-tariff barriers. In the second specification we split non-tariff barriers into four subgroups: (1) import controls, (2) state aid and subsidy measures, (3) public procurement and localisation policies and (4) other non-tariff barriers, which include SPS, TBT and capital controls. See Table 2 for an overview of instruments included. Dummies take the value 1, if at least one protectionist policy is in place between two trading partners at a specific product line at time  $t$ . It is zero otherwise. Count variables count the number of active protectionist policies between two trading partners that target a specific product. The baseline estimation equation has the following form:

$$\ln(X_{ijkt}) = \beta_1 PROT_{ijkt-1} + \beta_2 \ln(1 + tariff_{ijkt-1}) + ExpFE_{ikt} + ImpFE_{jkt} + pair_{ijk} + \epsilon_{ijkt}, \quad (1)$$

where  $X_{ijkt}$  are bilateral imports at the product level,  $PROT_{ijkt-1}$  includes either the dummies or counts of the analysed protectionist policies, tariffs are included as  $\ln(1 + tariff_{ijkt-1})$ . All policy variables are lagged by one year.  $ExpFE_{ikt}$  and  $ImpFE_{jkt}$  are vectors of export and importer-product-time fixed effects,  $pair_{ijk}$  a vector of time invariant country-product pair fixed effects, and  $\epsilon_{ijkt}$  is a non-idiosyncratic stochastic error term.

The exporter-product time fixed effects account for all outward multilateral resistance. Outward multilateral resistance can be interpreted as exporter  $i$ 's market access, which is determined by economic size and trade costs. Respectively, inward multilateral resistance reflects importer  $j$ 's market access and is accounted for by the importer-product time fixed effects. We include directional fixed effects at product level, as it is very likely that market access varies across products. Including country-product pair fixed effects absorbs all time invariant trade costs, such as distance, common language or shared border. It is assumed that all trade costs, which vary between country pairs over time and across products are either tariffs or the protectionist policies. We include six time periods from 2010 to 2015.

All explanatory variables are lagged by one year for two reasons: Firstly, non-tariff barriers and

trade defense instruments are often implemented in reaction to an increase in imports due to price dumping or other trade practices that are perceived as unfair. As we only have yearly trade data, we cannot control for the exact date of implementation. This might lead to upward biased estimates, which is caused by an increase in trade prior to the implementation of protectionist policies. Secondly, it is reasonable to assume that intermediate goods do not react immediately to changes in trade costs ([Ghods et al., 2017]). Using lags ensures that we account for changes in trade, which do not follow immediately, but after some time of adaptation.

Given this identification strategy, the estimated coefficient of the protectionist dummy can be interpreted as the average change in bilateral yearly-imports at product level caused by the implementation of at least one protectionist policy. If counts of protectionist policies are used, this interpretation changes to the average change in bilateral imports caused by the implementation of one additional protectionist policy.

### 5.2 Data

All data on non-tariff barriers comes from the GTA database. For the estimation we exclude any outward measures and focus on inward policies only. This means that we include measures that are implemented by the importing country and which hit imports from the affected country into the implementing country. We continue to focus on trade in goods and exclude services from our analysis. The panel is constructed using the date of implementation and date of removal as start and end periods, respectively. Observations that did not at least affect one trading partner are excluded. This was the case for 0.8% of all recorded measures.

Data on bilateral imports is retrieved from BACI, a world trade database developed by Centre d'Etudes Prospectives et d'Informations Internationales (CEPII) based on United Nations (UN) Comtrade trade data. All trade flows are reported in thousands of US-Dollars in current value at HS6 product level using the HS92 classification. We aggregated trade flows to the CPC three-digit product classification in order to merge the data with the non-tariff barriers information.

Data on applied tariffs at HS6 product level originated from TRAINS and the WTO's Integrated Data Base (IDB). As tariff data from TRAINS and IDB is incomplete we used interpolated tariffs to cover all product lines. The most-favoured nation tariff is used as the applied tariff, if there is either no preferential trade agreement between two countries, nor a tariff according to the Generalized System of Preferences (GSP). In all other cases the preferential tariff is used as the applied tariff. Similar to imports, tariffs were aggregated to the CPC three-digit product classification by calculating simple averages. The presented results don't change if trade weighted tariffs are used.

Our dataset covers bilateral trade data for 152 importers and 152 exporters for the years 2010 to 2015. We include only countries that were members of the WTO prior to 2009, due to data availability reasons. The dataset distinguishes 177 products according to the CPC three-digit product code. 23.5% of all products face zero tariffs. The average applied tariff is 8%. At least one non-tariff barrier was imposed on 2.45% of all traded products. In most cases, trade flows are only distorted by one non-tariff barrier.

In order to validate the use of importer-product-time fixed effects, we used the ratio-method applied

**Table 2: Overview of Explanatory Variables**

Tariff changes
Trade defense measures
Non-tariff barriers (NTB)
<ul style="list-style-type: none"> <li>• Import controls</li> <li>• State aid and subsidies</li> <li>• Public procurement localisation policies</li> <li>• Others (includes capital controls, SPS, TBT and other n.e.s)</li> </ul>

by [Henn and McDonald, 2014]. Theoretically variation among exporters is not given for behind-the-border measures, as behind-the-border measures affect all exporters equally. Without variation across exporters, importer-product-time fixed effect would absorb all variation and lead to biased estimates. For each dependent variable we calculate the ratio of non-zero observation within each importer-product-year combination. If this ratio equals one, all exporters are affected and no variation is left after controlling with fixed effects. However, for all dependent variable, the average ratio does not exceed 0.2, with standard deviations ranging between 0.01 and 0.09. Including importer-fixed effects is therefore valid. Variation among exporters, even for behind the border measures, is caused by construction of the GTA dataset. As it is estimated based on past trade flows to identify which trading partners are likely to be affected by a protectionist measure.

### 5.3 Empirical Estimation Results

Estimation results using the OLS estimator are reported in Table 3. We report results using dummies and counts of non-tariff barriers as explanatory variables. The dependent variable is the log of imports in thousand US-Dollars. We control for tariffs and implemented trade defense measures to account for all unilateral trade policies, which could simultaneously affect trade flows. We report all results first for the aggregate measure of non-tariff barriers and then split non-tariff barriers into four different groups to disentangle effects for different types of non-tariff barriers (see Table 2 for an overview). In addition, industry and region specific effects are analysed. Across all specification importer-product-time, exporter-product-time and country-pair-product fixed effects are included. Standard errors are clustered at country-pair-product level. In total 4,405,016 observations are included in the estimation (Table 13 gives an overview of the NTB measures in the used sample). All country-product-pairs, which have zero or missing trade flows are dropped from the analysis, if the OLS estimator is used. Thus, we focus on the intensive margin of trade only. While we control for tariffs in all our regressions, we abstain from reporting estimated coefficients. The reason is that a quantitative analysis of the estimated trade elasticities is limited, as variation across tariffs in our within-estimation is small.

#### 5.3.1 Empirical Estimation Results: Average Effects

Across all our specifications we find that trade decreases, if protectionist measures are implemented. It holds that non-tariff barriers have on average a stronger negative effect on bilateral trade flows

**Table 3: Estimation Results: OLS Using Dummies and Counts**

Dependent Variable	(1)	(2)	(3)	(4)
Log of imports in thousand USD	Dummies	Dummies	Counts	Counts
Trade defense measures	-0.114*** (0.0175)	-0.111*** (0.0175)	-0.0439*** (0.00957)	-0.0412*** (0.00956)
Non-tariff barriers	-0.127*** (0.00761)		-0.00519*** (0.00131)	
Import controls		-0.117*** (0.0129)		-0.0714*** (0.00862)
State aid and subsidies		-0.0559*** (0.0105)		-0.0490*** (0.00789)
Public procurement/localisation policies		-0.183*** (0.0142)		-0.00148 (0.00135)
Other NTBs (SPS, TBT, capital controls)		-0.109*** (0.0248)		-0.104*** (0.0245)
Observations	4,405,016	4,405,016	4,405,016	4,405,016
R-squared	0.913	0.913	0.913	0.913

All estimations include importer-product-time, exporter-product-time and country-pair-product fixed effects. Standard errors are clustered at country-pair-product level. All regressions include lagged tariffs as a control. All explanatory variables are lagged by one year. Except for tariffs all explanatory variables can enter the regression either as dummies or counts. The first two estimations account for non-tariff barriers with dummies, while the last two estimations estimate the effect of a change in the number of implemented non-tariff barriers (counts). \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

than trade defense measures. Trade defense measures can be anti-dumping, countervailing duties and safeguards.

According to our most general specification in column 1 of Table 3 with dummies as indicators of non-tariff barriers, bilateral imports decreased in response to the implementation of at least one non-tariff barrier by 11.9%.<sup>8</sup> This effect is significant at the 1% level. Trade defense measures have a similar large effect on bilateral trade flows. On average yearly-bilateral trade decreased by 10.8%, if at least one trade defense measure is implemented. Note from the descriptives (Table 13) that only in 0.3% of all cases at least one trade defense measure is in place. In 2.6% of all country-product-time pairs at least one non-tariff barrier is implemented. Tariffs have a negative and significant effect on imports across all specification.<sup>9</sup> We estimate an average trade elasticity of 0.2 across all products and countries (not shown but included in all estimations. Extended results are available upon request). This is comparatively low. [Head and Mayer, 2015] compared estimated trade elasticities from 447 studies, where all studies used country fixed-effects estimation methods. The mean trade elasticity across these studies was 4.12, with a standard deviation twice as high as the mean. Hinting at the fact that trade elasticities can vary tremendously.

As our descriptive analysis showed, the types of applied non-tariff barriers are diverse. Therefore we disaggregate our measure for non-tariff barriers to examine in more detail, which type of measures causes the largest reduction in imports. We distinguish four groups: (1) import controls, (2) state aid and subsidies, (3) public procurement and localisation policies and (4) other non-tariff barriers, which include SPS and TBT measures as well as capital controls and exchange rate policies (see

<sup>8</sup> All percentage changes are calculated as follows: Percentage change =  $(e^{\beta_{NTB}} - 1) * 100$

<sup>9</sup> For interested reader we are happy to provide the full estimation results with further regressors upon request.

Table 2).

Results for disaggregated non-tariff barrier effects are reported in Table 3, column 2. The estimated coefficients are highly significant and negative for all types of non-tariff barriers. The parameters vary between -0.06 and -0.18. Public procurement and localisation policies seem to have on average the strongest negative effect on bilateral imports. On average bilateral imports decreased by 16.7%, if at least one measures was implemented. In contrast, state aid and subsidies have the smallest negative impact on imports (-0.0559). Direct import controls, SPS, TBT and capital controls seem to on average decrease trade by 10%.

We also run our estimation using counts of implemented measures instead of dummies. The interpretation of the parameters changes. It now indicates the average effect on yearly-bilateral trade flows at product level caused by one additional policy implementation. All estimated coefficients remain significant, with the exception of the parameter for public procurement and localisation policies. The estimated coefficient for non-tariff barriers is much smaller when using counts and not dummies. This effect seems to be mostly driven by direct border measures and public procurement and localisation policies, where each measure on average seems to have much weaker effects on trade. The coefficient for both import controls and trade defense measures decreases trade by 0.04 and 0.07, respectively. The estimated parameter for public procurement and localisation policies shrinks tremendously in size and does not remain significant. This can be caused by the fact, that there are some country-product pairs, that exhibit an outstanding number of measures implemented (exceeding 100). One additional measure therefore only has very limited additional impact on imports (small marginal effect).

We repeat all estimations and control additionally for unilateral trade policies imposed by the exporter and use zero-trade weighted tariffs instead of simple averages. The coefficients of interest do not significantly change. We therefore abstain from including those in each estimation and assume that the effects of protectionism are well identified across all presented specifications. We use specification (1) and (2) as our baseline specification in the following regressions.



## 5 The Effect of Non-Tariff Barriers on Trade

**Table 4: Estimation Results: by Industry**

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)
Log of imports in thousand USD	Agriculture	Agriculture	Resources	Resources	Consumer goods	Consumer goods
Trade defense measures	-0.0986 (0.132)	-0.0967 (0.132)	0.0668 (0.331)	0.0696 (0.331)	-0.0385 (0.0422)	-0.0342 (0.0422)
Non-tariff barriers	-0.0874*** (0.0233)		-0.300*** (0.0820)		-0.104*** (0.0156)	
Import controls		-0.0932** (0.0396)		-0.0469 (0.159)		-0.137*** (0.0252)
State aid and subsidies		-0.0571** (0.0267)		-0.393*** (0.145)		-0.0437* (0.0224)
Public procurement/localisation policies		-0.108* (0.0632)		-0.347* (0.179)		-0.172*** (0.0313)
Other NTBs (SPS, TBT, capital controls)		-0.204** (0.103)		-0.363** (0.158)		-0.0520 (0.0490)
Observations	316,622	316,622	156,045	156,045	1,014,512	1,014,512
R-squared	0.913	0.913	0.912	0.912	0.917	0.917

Dependent Variable	(7)	(8)	(9)	(10)
Log of imports in thousand USD	Transportable goods	Transportable goods	Metals and machinery equipment	Metals and machinery equipment
Trade defense measures	-0.177*** (0.0245)	-0.174*** (0.0246)	-0.0668** (0.0312)	-0.0688** (0.0312)
Non-tariff barriers	-0.107*** (0.0151)		-0.153*** (0.0120)	
Import controls		-0.112*** (0.0266)		-0.117*** (0.0207)
State aid and subsidies		-0.0310 (0.0232)		-0.0641*** (0.0160)
Public procurement/localisation policies		-0.156*** (0.0293)		-0.202*** (0.0199)
Other NTBs (SPS, TBT, capital controls)		-0.0951** (0.0403)		-0.121*** (0.0446)
Observations	1,330,214	1,330,214	1,587,623	1,587,623
R-squared	0.919	0.919	0.904	0.904

All estimations include importer-product-time, exporter-product-time and country-pair-product fixed effects. All regressions include lagged tariffs as a control. Standard errors, reported in brackets, are clustered at country-pair-product level. All explanatory variables are lagged by one year. Except for tariffs, all explanatory variables enter the regression as dummies. Sectors are classified according to the CPC 1-digit code. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### 5.3.2 Estimation Results: by Industry

We distinguish five industries, according to the 1-digit CPC product classification. These are: (1) Agriculture, forestry and fishery products; (2) Ores and minerals; electricity, gas and water; (3) Food products, beverages and tobacco; textiles, apparel and leather products; (4) Other transportable goods, except metal products, machinery and equipment; (5) Metal products, machinery and equipment.

The degree to which the implementation of non-tariff barriers on average decreases trade flows varies across industries. Across all industries negative effects on trade caused by non-tariff barriers are larger than negative effects caused by trade defense measures (mainly anti-dumping).

Looking at the aggregate measure of non-tariff barriers, trade in the resource sector (including ores, minerals, electricity, gas and water) is most heavily affected by non-tariff barriers. If at least one non-tariff barrier is implemented, trade on average decreased by 25.9%. With the exception of direct import controls, all types of non-tariff barriers equally contribute to this strong negative trade effect (parameter estimates varying from -0.35 to -0.39). The strong negative non-tariff barrier effects appears to be driven by a small number of cases (bilateral relations) as can be seen from

Table 15 in the appendix. Only 1.2% of all country-product-year pairs within this industry observe at least one non-tariff barrier initiation. This is the smallest share across all industries. Metals and machinery and equipment products exhibit the most country-product-time pairs that have at least one non-tariff barrier implemented (3.4%). In this sector, the implementation of at least one non-tariff barriers on average leads to a decrease in bilateral imports by 14.2%. In contrast to the resource sector, state aid and subsidies are less responsible for a trade slowdown while import controls are the major driver of the observed negative effect.

Within the two sectors of consumer goods and transportable goods, non-tariff barriers have very similar effects on trade flows. On average bilateral imports decreased by about 10% if at least one non-tariff barrier was implemented in either sector. The negative effects on trade are mainly caused by public procurement and localisation policies (-0.17 and -0.16 for consumer and transportable goods, respectively) and import controls (-0.14 and -0.11, respectively). If agricultural products are exposed to at least one non-tariff barrier, bilateral imports decrease on average by 8.42%. This is the smallest effect observed across all industries.

### 5.3.3 Estimation Results: by Income Group

While a similar share of imports is affected by non-tariff barriers in high and upper-middle income countries (2.8 and 2.6%, respectively), the estimated coefficient of non-tariff barriers is twice as large for upper-middle income countries (-0.19) than for high income countries (-0.09) (see Table 5, column 1 and 3). This indicates, that if at least one non-tariff barrier is implemented, imports in upper-middle income countries react stronger to this additional trade barriers than in high income countries. In both income groups public procurement and localisation policies affected imports most strongly. In high income countries the implementation of import controls additionally imposed on average large reductions in imports. In upper-middle income countries in contrast, other non-tariff barriers (SPS, TBT and capital controls) as well as state aid and subsidies had significantly negative effects on imports, if implemented.

Within the group of low income countries trade protectionism based on non-tariff barriers only plays a minor role. Probably driven by the fact that trade in general is low. Low income countries implemented no trade defense measures and the usage of non-tariff barriers is also restricted to import controls, which does not significantly affected trade flows.

Comparing the effects of non-tariff barriers and trade defense measures across income groups, the estimation results underline the argument that non-tariff barriers are at least as important protectionist instruments as trade defense measures. Trade defense measures turn out to only negatively impact imports into upper-middle and high income countries.

### 5.3.4 Estimation Results: by Country Groups

In the following we distinguish effects of non-tariff barriers in four groups of countries, namely the G20 economies, the European Union (EU), the United States and the Brazil, Russia, India, China and

## 5 The Effect of Non-Tariff Barriers on Trade

**Table 5: Estimation Results: by Income Groups**

Dependent Variable	(1)	(2)	(3)	(4)
Log of imports in thousand USD	High	High	Upper middle	Upper middle
Trade defense measures	-0.106*** (0.0238)	-0.103*** (0.0238)	-0.119*** (0.0362)	-0.115*** (0.0363)
Non-tariff barriers	-0.0931*** (0.00987)		-0.187*** (0.0164)	
Import controls		-0.131*** (0.0178)		-0.0580** (0.0263)
State aid and subsidies		-0.0442*** (0.0118)		-0.114*** (0.0424)
Public procurement/localisation policies		-0.150*** (0.0228)		-0.240*** (0.0223)
Other NTBs (SPS, TBT, capital controls)		-0.214 (0.161)		-0.133*** (0.0409)
Observations	2,187,396	2,187,396	955,199	955,199
R-squared	0.929	0.929	0.916	0.916

Dependent Variable	(5)	(6)	(7)	(8)
Log of imports in thousand USD	Lower middle	Lower middle	Low	Low
Trade defense measures	-0.0497 (0.0474)	-0.0491 (0.0474)		
Non-tariff barriers	-0.142*** (0.0181)		-0.0525 (0.172)	
Import controls		-0.0832*** (0.0296)		-0.0593 (0.175)
State aid and subsidies		-0.117*** (0.0281)		
Public procurement/localisation policies		-0.147*** (0.0326)		
Other NTBs (SPS, TBT, capital controls)		-0.113*** (0.0317)		0.262 (0.475)
Observations	846,018	846,018	334,582	334,582
R-squared	0.898	0.898	0.851	0.851

All estimations include importer-product-time, exporter-product-time and country-pair-product fixed effects. All regressions include lagged tariffs as a control. Standard errors, reported in brackets, are clustered at country-pair-product level. All explanatory variables are lagged by one year. Except for tariffs, all explanatory variables enter the regression as dummies. Income groups are defined according to the World Bank income classification. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

South Africa (BRICS) economies.<sup>10</sup> Looking just at the descriptives (see Table 17 in the appendix), the high share of non-tariff barriers applied by the United States and the BRICS economies stands out. 17.2% of imports into the United States faced at least one non-tariff barrier - mainly driven by public procurement and localisation policies. In comparison, only 2.6% of imports into the EU are affected by at least on non-tariff barriers. Across the BRICS economies, on average 8.6% of imports were affected by non-tariff barriers (see Table 17).

Non-tariff barriers seem to affect imports more strongly into the United States and the G20 economies (see estimation results in Tables 6). Although the United States imposed by far the biggest number of subsidies, state aid, public procurement and localisation policy measures, imports into the United States do not seem to be outstandingly affected by these instruments. Compared for example with the EU or the G20 economies, public procurement and localisation policies have only a small effect on trade. Outstanding is the large impact of trade defense measures on imports into the EU. Imports into the EU on average decrease by -18.9 %, if at least one trade defense measure is implemented. Among all G20 economies, the effect of trade defense measures on trade is only half as strong as in the EU. These cross country comparison illustrates a large heterogeneity with significant difference across countries, particularly, how non-tariff barriers materialize. With these results it becomes clear that a purely descriptive analysis would lead to wrong conclusions on how non-tariff barriers affect international trade. Only analysing the amount of implemented measures is not sufficient, as the effects on trade can vary substantial across countries and sectors.

## 5.4 Discussion of the Results in Comparison

There are several existing studies that have attempted to identify the trade reducing effect of non-tariff measures. The WTO summarizes for example in its report on non-tariff barriers that NTB are twice as restrictive as tariff measures ( [WTO, 2012], p.136). Also [Kee et al., 2009] and Nikita and Hoekman (2011) both find that non-tariff barriers are generally more restrictive than tariffs. In addition, they also find that non-tariff barriers affect developed countries more than developing countries and that non-tariff barriers have stronger restrictive effects in the agricultural sector than in manufacturing. However, a problem that arises in a comparison with the previous estimations is that most other studies use data on non-tariff barriers based on notifications to the WTO, which does not distinguish between trade liberalising and protectionist impacts of non-tariff measures. Therefore, the underlying data in the mentioned WTO study or academic contributions like the one by [Ghodsi et al., 2017] look very different to the used GTA data base in this study. I.e. most non-tariff barriers are SPS or TBT measures in the agriculture sector. Our data set contains only a handful of SPS and TBT measures and only 0.7% of non-tariff barriers are targeted at agricultural products. This can explain substantial differences in the presented results compared to other studies.

A related study by [Henn and McDonald, 2014] also uses GTA data. However, their study was conducted in 2010 and uses data on non-tariff barriers only from late 2008 until end 2009. The study concludes that border controls (defined as non-tariff and tariff measures) reduce trade by about 8%. For behind the border measures the analysis identifies negative estimates of similar magnitude (about 7%) . Trade defense measures also have the strongest impact in terms of percentage changes on trade (17%).

<sup>10</sup> Russia is excluded from the analysis, due to data availability reasons, as it was not member of the WTO prior to 2009. In case of the EU we exclude Croatia.

## 5 The Effect of Non-Tariff Barriers on Trade

**Table 6: Estimation Results: by Country Groups**

Dependent Variable	(1)	(2)	(3)	(4)
Log of imports in thousand USD	G20	G20	EU w/o Croatia	EU w/o Croatia
Trade defense measures	-0.109*** (0.0243)	-0.106*** (0.0243)	-0.197*** (0.0477)	-0.192*** (0.0477)
Non-tariff barriers	-0.120*** (0.00991)		-0.0605*** (0.0139)	
Import controls		-0.0691*** (0.0165)		-0.152*** (0.0283)
State aid and subsidies		-0.0572*** (0.0133)		-0.0137 (0.0151)
Public procurement/localisation policies		-0.172*** (0.0155)		-0.833*** (0.176)
Other NTBs (SPS, TBT, capital controls)		-0.217** (0.0860)		-0.0668 (0.180)
Observations	989,044	989,044	1,128,986	1,128,986
R-squared	0.939	0.939	0.934	0.934
Dependent Variable	(5)	(6)	(7)	(8)
Log of imports in thousand USD	USA	USA	BRICS	BRICS
Trade defense measures	-0.0443 (0.0537)	-0.0396 (0.0538)	-0.0443 (0.0463)	-0.0410 (0.0463)
Non-tariff barriers	-0.116*** (0.0289)		-0.0554*** (0.0215)	
Import controls		-0.0685 (0.0722)		0.0814** (0.0347)
State aid and subsidies		-0.107*** (0.0413)		-0.00721 (0.0323)
Public procurement/localisation policies		-0.0983*** (0.0291)		-0.110*** (0.0261)
Other NTBs (SPS, TBT, capital controls)				-0.242 (0.174)
Observations	81,140	81,140	214,109	214,109
R-squared	0.935	0.935	0.911	0.911
ImpExpProd FE	YES	YES	YES	YES
ImpProdYear FE	YES	YES	YES	YES
ExpProdYear FE	NO	NO	NO	NO

Estimations for the United States and BRICS exclude exporter-product-time fixed effects due to missing variation across importers. All regressions include lagged tariffs as a control. Standard errors, reported in brackets, are clustered at country-pair-product level. All explanatory variables are lagged by one year. Except for tariffs, all explanatory variables enter the regression as dummies. Data for the EU is not aggregated, all European countries enter the estimation separately. Russia is excluded from the estimations, also for the BRICS economies, as it was not member of the WTO prior to 2009.

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

Furthermore, while the underlying study follows the recommendation of the gravity literature where possible some critical aspects are worth mentioning. Non-tariff barriers are presented as bilateral measures. As mentioned, the bilateral structure is derived by estimating which trading partner would most likely be affected by a respective measure. Clearly, this approach creates some concern, as technically most non-tariff barriers are likely to affect all trading partners of a country equally. The present bilateral structure is hence constructed and makes strong assumptions. Moreover, in case of the EU e.g. intra-EU trade has been included, which may result in a downward bias. Finally, the way how the GTA data is collected, namely, based on policy announcements differing across countries raises also concerns, that might bias the presented effects.

However, given the comprehensively updated GTA data, this study is the first that presents an empirical estimation based on a structural gravity specification. Empirical results on how non-tariff barriers shape international trade are scarce due to the difficult data collection. Without doubt there is a lot to investigate along the mentioned lines. Methodologically, it is worth to consider a restructured GTA data in which the constructed bilateral variation is given up for behind the border measures. Moreover, estimating effects based on Pseudo Maximum Likelihood Methods is also something to be taken into account in the future given the mentioned data peculiarities.

## 6 Impact of Non-Tariff Barriers on Global Trade Slowdown

The main objective of the presented econometric analysis is to quantify the impact of non-tariff measures on international trade. As it has been illustrated, non-tariff barriers turn out to have a significant protective impact on imports. Based on the estimated average effect it is possible to assess how much of the recently observed global trade slowdown may be explained by the increasing usage of non-tariff barriers.

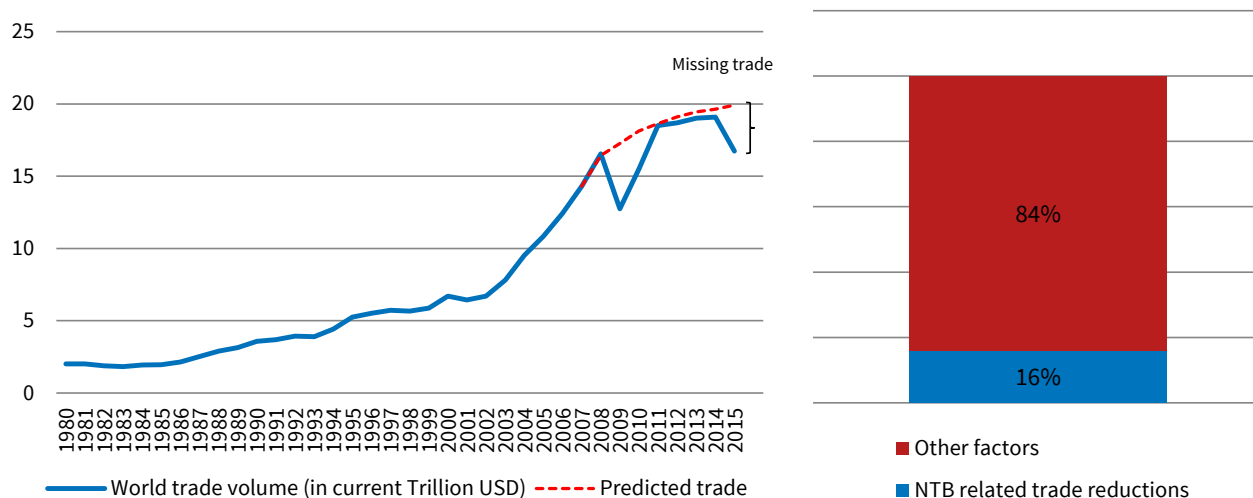


Figure 14: NTBs Contribution to Global Trade Slowdown

We use a very ad-hoc approximation to calculate the share of trade reduction that can be attributed to recently implemented non-tariff barriers following the academic literature in which a potential trade level has been predicted. For example, in "The Global Trade Slowdown - A new normal?" Constantinescu, Mattoo and Ruta from the International Monetary Fund (IMF) and the World Bank provide predictions for global trade growth depending on whether the trade slowdown persists or not ( [Hoekman, 2015], p.47). They use estimated world trade elasticities for the period from 2000 until 2014 to predict average growth rates of global trade, as they assume that these trade elasticities reflect a possible trade development that would have excluded trade reducing phenomena. According to their estimates global trade in 2015 would have been growing by 4.4%. Based on 2014 merchandise trade data from the World Bank, this would predict global imports of 19.9 trillion US Dollars. As a numerical simulation, we assume that 19.9 US Dollars represents the highest possible aggregate world trade volume that would have been achievable without any factors that caused the global trade slowdown. This assumption leads to a gap between potential and actual observed global trade of 3.2 trillion US Dollars for the year 2015. Given our prior estimation results, that bilateral imports of specific products on average decreased by 11.9%, if at least one non-tariff barrier is implemented, we predict from our sample with 152 countries, that non-tariff barriers cause aggregated trade to be lower by 3.07%. Therefore, we can infer, that non-tariff barriers are responsible for about 16% of the missing global trade. This is based on the assumption that our sample with 152 countries is representative for the sample used by Constantinescu et al. (2015). Figure 14 visualizes this simple projection.

**Table 7: Potential changes in nominal trade flows, by country (2015)**

	Germany	EU-28	USA	China
Δ Exports (billion USD)	43	170	48.5	73
Δ Imports (billion USD)	34	165	74.4	54
Δ Exports/GDP (%)	1.16	1.04	0.29	0.83
Δ Imports/GDP (%)	0.92	1.01	0.45	0.61

Source: UN Comtrade and own calculation.

Table 7 summarizes how imports and exports of Germany, the EU, China, and the USA would be affected on average if the analyzed global non-tariff barriers were not in place. Accordingly, Germany for example could realize additional exports worth around 43 billion USD and at the same time imports would increase by around 34 billion USD. The US on the other hand could expect to achieve a higher export volume of around 48 billion USD while imports are predicted to increase even stronger reaching an additional volume of around 74.4 billion USD. The effects represent projections based on partial estimation methods and it is most likely, that a general equilibrium analysis will come to some modified results, due to changes in consumption and production adjustments along the expected trade pattern changes. Still, the presented results illustrate that an elimination of non-tariff barriers can have substantially different effects on the trade balances. Based on the most recent data Germany would increase its trade surplus even more while the US can expect a further widening of its already large trade deficit.

**Table 8: Potential changes in nominal trade flows in the EU, by country (2015)**

Country	Change of exports in billion US-Dollar	Change of imports in billion US-Dollar	Change of exports in percent of GDP	Change of imports in percent of GDP
Austria	4.69	4.76	1.14%	1.16%
Belgium	12.85	11.93	2.54%	2.36%
Bulgaria	0.83	0.94	1.55%	1.75%
Croatia	0.41	0.66	0.71%	1.13%
Cyprus	0.06	0.18	0.27%	0.79%
Czechia	5.08	4.53	2.30%	2.05%
Denmark	3.06	2.74	0.92%	0.83%
Estonia	0.45	0.51	1.93%	2.17%
Finland	1.93	1.94	0.78%	0.78%
France	15.95	18.12	0.58%	0.66%
Germany	42.91	34.02	1.16%	0.92%
Greece	0.91	1.52	0.37%	0.62%
Hungary	3.24	2.92	2.29%	2.06%
Ireland	4.03	2.50	1.55%	0.96%
Italy	14.76	13.22	0.72%	0.64%
Latvia	0.37	0.45	1.32%	1.58%
Lithuania	0.82	0.91	1.85%	2.05%
Luxembourg	0.41	0.62	0.67%	1.02%
Malta	0.13	0.22	1.23%	2.12%
Netherlands	15.30	13.67	1.77%	1.58%
Poland	6.28	6.10	1.13%	1.10%
Portugal	1.78	2.15	0.79%	0.95%
Romania	1.96	2.25	1.04%	1.19%
Slovakia	2.42	2.35	2.41%	2.34%
Slovenia	0.86	0.83	1.74%	1.69%
Spain	8.98	9.82	0.63%	0.69%
Sweden	4.52	4.45	0.84%	0.83%
United Kingdom	15.06	20.27	0.56%	0.76%

Source: UN Comtrade and own calculation.

Table 8 illustrates how trade flows are expected to change along an elimination of non-tariff barriers across the world. Again it becomes clear that some countries are predicted to experience an increase



## 6 Impact of Non-Tariff Barriers on Global Trade Slowdown

in their trade surplus while others would import more than the expected additional exports. The table also illustrates that the expected additional changes in trade flows vary significantly across countries particularly with respect to the relative size expressed as GDP share. Accordingly, smaller countries like Belgium or Slovakia turn out to be affected significantly stronger by NTBs than large economies as for example the United Kingdom or Germany.<sup>11</sup>

<sup>11</sup> Table 18 presents expected average trade flow changes on the sectoral level for Germany, in case of a global NTB elimination.

## 7 Conclusion

Building on the recently released Global Trade Alert data this study illustrates how trade protection in form of non-tariff barriers has emerged over the past years. A major focus is put on illustrating what type of non-tariff barriers have been implemented by policy makers to reduce import competition. Moreover, a further important contribution of the study is the empirical evaluation of how non-tariff barriers impact international trade. Contrary to the fears of different stakeholders import tariffs have not been used in a significant manner to protect domestic markets from foreign competition since the financial crisis in 2008, even though the political pressure in many countries created a large incentive for a protective trade policy. Unfortunately, this result does not mean that countries abstained from protectionism. The presented GTA data illustrates that while tariffs were not used on a large scale to reduce imports at the same time a strong increase in non-tariff barriers has taken place. Since 2009, only 20% of all implemented protectionist interventions can be attributed to an increase in tariffs. In contrast, non-tariff barriers accounted for around 55% of all implemented protectionist interventions. The usage of non-tariff barriers increased steadily relative to trade defense measures. While in 2010 only 54% of all protectionist interventions were non-tariff barriers the usage of non-tariff barriers increased to 61% in 2016.

It turns out that the implementation of non-tariff barriers is highly correlated with the income level of an economy. High income countries appear to use non-tariff barriers more often than low or middle income countries. Despite the difference in the number of non-tariff barriers implemented, the relative importance of non-tariff barriers compared to tariffs as protectionist instruments also varies across income levels. Equally, the usage of non-tariff barriers substantially varies across countries. The United States implemented by far the largest number of non-tariff barriers. With close to 800 non-tariff barriers the US government implemented twice as much protectionist policies as the Indian government, which ranks second. The two BRICS economies, India and Russia rank second and third among the countries that implemented the most non-tariff barriers, with 310 and 204 implemented measures, respectively. Larger European economies like Germany, the United Kingdom and France implemented between 50 and 100 non-tariff barriers, which is only about one tenth of the amount of non-tariff barriers implemented by the United States. Subsidies and state aid measures make up the largest number of implemented non-tariff barriers in the considered database. These measures are mainly driven by the extensive provision of financial grants provided to domestic companies that discriminate against foreign competitors. Over 500 such financial grants have been provided in the period between 2009 and 2017. Other important subsidies and state aid instruments have been state loans, bailouts and taxes or social-insurance reliefs. Localisation requirements in public procurement are the second most often applied non-tariff barriers, with over 360 implemented restrictions.

Not only have non-tariff barriers been increasingly applied as trade restricting measures, but they also have had a significant import reducing effect. On average bilateral imports decrease in response to the implementation of at least one non-tariff barrier by 12%. Similarly, on average yearly-bilateral trade decrease by around 11%, if at least one trade defense measure, which include anti-dumping, anti-subsidy and safeguard measures is implemented. However, non-tariff barriers are used substantially more often than trade defense measures. The effect of non-tariff barriers on imports turns out to be very divers across different industries, countries with different income levels and individual countries. A main reason for this heterogeneity can be found in the strong variation on how often and which type of non-tariff barriers are implemented in the different groups.

## 7 Conclusion

Finally, the study illustrates that the identification of non-tariff barriers remains a major challenge. Contrary to data on non-tariff barriers provided by other sources, the GTA database for example records only very few SPS and TBT measures. One reason for this pattern may stem from the fact that other sources like the WTO do not distinguish between non-tariff barriers and non-tariff measures. Different to non-tariff barriers, non-tariff measures do not necessarily have a protectionist character, but could also liberalize trade.

With all these open challenges the study has a clear message. Protectionism has been on the rise not in form of tariffs but with trade policy instruments which are less harmonized within the WTO. The underlying analysis illustrates that non-tariff barriers may be responsible for about 16% of the observed global trade slowdown. Clearly, making such a projection remains difficult as the prediction of a potential trade level is complicated. Depending on the assumptions made the results may change significantly. Still, the presented example calculation hints on a crucial role of non-tariff barriers for the observed global trade slowdown.

With these results it becomes clear that the world needs to take decisive steps to prevent the further rise of non-tariff barriers. A right step had been taken with free trade agreements such as the Transatlantic Trade and Investment Partnership or the Trans-Pacific Partnership in which the reduction and harmonization of non-tariff barriers was a major aim. Reviving these initiatives should be a major aim in the near future.

Equally, there is a clear message for the multilateral trading system. The world has been very successful in regulating import tariffs but there are new protectionist measures which require international coordination. These challenges give the WTO an important task, namely bringing the member countries together and achieving the same success as in the case of tariffs.

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## Appendix

Table 9: Number of Implemented NTBs, by Country

Country	Number of implemented NTB's	Number of times country is affected by NTB	Country	Number of implemented NTB's	Number of times country is affected by NTB
Afghanistan	3	74	DPR Korea	0	126
Albania	0	351	DR Congo	0	64
Algeria	6	207	Ecuador	11	276
American Samoa	0	29	Egypt	35	769
Andorra	0	45	El Salvador	0	150
Angola	1	104	Equatorial Guinea	0	51
Anguilla	0	19	Eritrea	0	26
Antigua & Barbuda	0	58	Estonia	27	633
Argentina	105	910	Ethiopia	3	155
Armenia	1	140	Fiji	0	80
Aruba	0	50	Finland	44	1191
Australia	16	1269	France	100	1851
Austria	48	1427	French Polynesia	0	40
Azerbaijan	1	236	Gabon	0	54
Bahamas	0	152	Gambia	1	27
Bahrain	0	438	Georgia	0	454
Bangladesh	9	312	Germany	131	2002
Barbados	0	80	Ghana	5	142
Belarus	116	698	Greece	43	866
Belgium	55	1608	Grenada	0	17
Belize	0	106	Guam	0	10
Benin	0	67	Guatemala	1	445
Bermuda	na	108	Guinea	0	59
Bhutan	0	38	Guinea-Bissau	0	10
Bolivia	4	149	Guyana	0	79
Bosnia & Herzegovina	0	204	Haiti	0	61
Botswana	0	82	Honduras	1	197
Brazil	113	1333	Hong Kong	1	1114
Brunei Darussalam	0	87	Hungary	35	1205
Bulgaria	36	749	Iceland	2	332
Burkina Faso	0	62	India	312	1351
Burundi	0	30	Indonesia	127	1056
Cambodia	2	224	Iran	1	288
Cameroon	0	123	Iraq	0	68
Canada	44	1853	Ireland	47	1043
Cape Verde	0	43	Israel	2	962
Cayman Islands	na	66	Italy	110	1871
Central African Republic	na	33	Ivory Coast	0	149
Chad	0	39	Jamaica	1	106
Chile	3	797	Japan	96	1569
China	112	1909	Jordan	0	228
Chinese Taipei	0	93	Kazakhstan	69	628
Colombia	18	639	Kenya	6	171
Comoros	0	26	Kiribati	0	10
Congo	0	85	Kuwait	1	213
Costa Rica	0	534	Kyrgyzstan	3	151
Croatia	22	545	Lao	0	95
Cuba	0	123	Latvia	35	636
Cyprus	26	330	Lebanon	0	215
Czechia	46	1276	Lesotho	0	61
Denmark	55	1262	Liberia	0	46
Djibouti	0	23	Libya	0	123
Dominica	0	35	Liechtenstein	0	15
Dominican Republic	3	499	Lithuania	38	658

Table 10: Number of Implemented NTBs, by Country (continued)

Country	Number of implemented NTB's	Number of times country is affected by NTB	Country	Number of implemented NTB's	Number of times country is affected by NTB
Luxembourg	15	738	Saint Lucia	0	27
Macao	0	1	Saint Pierre & Miquelon	0	4
Macedonia	2	378	Saint Vincent & the Grenadines	0	24
Madagascar	0	137	Samoa	0	37
Malawi	0	77	San Marino	0	41
Malaysia	25	1198	Sao Tome & Principe	0	5
Maldives	0	54	Saudi Arabia	151	743
Mali	0	48	Senegal	1	147
Malta	14	278	Serbia	6	369
Marshall Islands	0	23	Seychelles	0	83
Mauritania	1	65	Sierra Leone	2	52
Mauritius	0	191	Singapore	0	1173
Mayotte	0	6	Slovakia	32	971
Mexico	19	1201	Slovenia	40	770
Micronesia	0	9	Solomon Islands	0	22
Mongolia	0	122	Somalia	0	23
Montenegro	0	58	South Africa	34	1043
Montserrat	0	3	South Sudan	0	1
Morocco	5	383	Spain	75	1623
Mozambique	0	201	Sri Lanka	8	293
Myanmar	2	134	State of Palestine	0	58
Namibia	4	96	Suriname	0	102
Nauru	0	1	Swaziland	0	131
Nepal	0	135	Sweden	47	1497
Netherlands	53	1597	Switzerland	3	1376
Netherlands Antilles	0	30	Syria	1	167
New Caledonia	0	326	Tajikistan	1	109
New Zealand	2	857	Tanzania	4	168
Nicaragua	0	134	Thailand	6	1376
Niger	0	67	Timor-Leste	0	20
Nigeria	17	248	Togo	1	102
Niue	0	9	Tokelau	0	19
Norway	1	986	Tonga	0	2
Oman	1	522	Trinidad & Tobago	0	399
Pakistan	36	644	Tunisia	0	464
Palau	0	4	Turkey	24	1336
Panama	2	302	Turkmenistan	0	130
Papua New Guinea	0	98	Turks & Caicos Islands	0	12
Paraguay	5	197	Tuvalu	0	9
Peru	1	452	Uganda	3	125
Philippines	1	892	Ukraine	33	1006
Pitcairn	0	3	United Arab Emirates	0	957
Poland	82	1363	United Kingdom	93	1792
Portugal	47	1070	United States of America	796	1747
Qatar	0	210	Uruguay	22	377
Republic of Korea	23	1517	Uzbekistan	1	235
Republic of Moldova	4	231	Vanuatu	0	31
Republic of the Sudan	2	102	Venezuela	15	512
Romania	37	1025	Vietnam	22	1041
Russia	250	1200	Western Sahara	0	3
Rwanda	1	47	Yemen	0	127
Saint Helena	0	24	Zambia	0	186
Saint Kitts & Nevis	0	39	Zimbabwe	5	353

## References

**Table 11: Top 10 NTB implementing and affected countries (2009-2017)**

Top 10 NTB implementing countries		Top 10 NTB affected countries	
<b>Country</b>	<b>Number of implemented NTB's</b>	<b>Country</b>	<b>Number of times country is affected by NTB's</b>
United States of America	796	Germany	2002
India	312	China	1909
Russia	250	Italy	1871
Saudi Arabia	151	Canada	1853
Germany	131	France	1851
Indonesia	127	United Kingdom	1792
Belarus	116	United States of America	1747
Brazil	113	Spain	1623
China	112	Belgium	1608
Italy	110	Netherlands	1597

Source: Global Trade Alert, own calculation.

Table 12: Summary Statistics

<b>Variable</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min.</b>	<b>Max.</b>	<b>N</b>
Imports in thousand USD	19725.189	317480.117	1	97142264	4,405,016
Tariff (simple average, in percent)	6.28	20.066	0	2314.286	4,405,016
Trade defense	0.003	0.053	0	1	4,405,016
NTB	0.026	0.159	0	1	4,405,016
Import controls	0.008	0.09	0	1	4,405,016
State aid & subsidies	0.009	0.094	0	1	4,405,016
Other	0.003	0.057	0	1	4,405,016
PP & localisation	0.008	0.092	0	1	4,405,016



References

**Table 13: Descriptives: NTBs Identified by Dummies**

		Count	Percent
Trade defense	0	4.392.584	99,7
	1	12.432	0,3
NTB	0	4.291.291	97,4
	1	113.725	2,6
Import controls	0	4.368.891	99,2
	1	36.125	0,8
State aid & subsidies	0	4.365.324	99,1
	1	39.692	0,9
PP & localisation	0	4.367.799	99,2
	1	37.217	0,8
Other	0	4.390.576	99,7
	1	14.440	0,3

Table 14: Summary Statistics, by Industry

Variable	Mean	Std. Dev.	Min.	Max.	N
<b>Agriculture</b>					
Imports in thousand USD	8163.734	105814.921	1	17147846	316622
Tariff (simple average, in percent)	6.577	13.8	0	1429.455	316622
<b>Resources</b>					
Imports in thousand USD	59140.013	947791.372	1	97142264	156045
Tariff (simple average, in percent)	2.747	5.422	0	107.357	156045
<b>Consumer goods</b>					
Imports in thousand USD	9737.931	137238.545	1	34205232	1014512
Tariff (simple average, in percent)	11.269	39.143	0	2314.286	1014512
<b>Transportable goods</b>					
Imports in thousand USD	17123.145	181391.63	1	21199932	1330214
Tariff (simple average, in percent)	5.18	6.919	0	263.913	1330214
<b>Metals, machinery and equipment</b>					
Imports in thousand USD	26719.036	386309.176	1	70696192	1587623
Tariff (simple average, in percent)	4.302	5.916	0	167.535	1587623

Table 15: Descriptives for Estimations by Industry

		Agriculture		Resources		Consumer goods	
		Count	Percent	Count	Percent	Count	Percent
Trade defense	0	316.550	100	156.037	100	1.012.474	99,8
	1	72	0	8	0	2.038	0,2
NTB	0	308.650	97,5	154.216	98,8	987.777	97,4
	1	7.972	2,5	1.829	1,2	26.735	2,6
Import controls	0	313.628	99,1	155.089	99,4	1.000.743	98,6
	1	2.994	0,9	956	0,6	13.769	1,4
State aid & subsidies	0	312.880	98,8	155.546	99,7	1.007.978	99,4
	1	3.742	1,2	499	0,3	6.534	0,6
PP & localisation	0	315.320	99,6	155.899	99,9	1.008.839	99,4
	1	1.302	0,4	146	0,1	5.673	0,6
Other	0	315.913	99,8	155.745	99,8	1.011.556	99,7
	1	709	0,2	300	0,2	2.956	0,3
		Transportable goods		Metals and machinery equipment			
		Count	Percent	Count	Percent		
Trade defense	0	1.324.278	99,6	1.583.245	99,7		
	1	5.936	0,4	4.378	0,3		
NTB	0	1.307.595	98,3	1.533.053	96,6		
	1	22.619	1,7	54.570	3,4		
Import controls	0	1.324.410	99,6	1.575.021	99,2		
	1	5.804	0,4	12.602	0,8		
State aid & subsidies	0	1.321.868	99,4	1.567.052	98,7		
	1	8.346	0,6	20.571	1,3		
PP & localisation	0	1.324.859	99,6	1.562.882	98,4		
	1	5.355	0,4	24.741	1,6		
Other	0	1.325.627	99,7	1.581.735	99,6		
	1	4.587	0,3	5.888	0,4		

Table 16: Descriptives for Estimations by Income Groups

		High		Upper middle		Lower middle		Low	
		Count	Percent	Count	Percent	Count	Percent	Count	Percent
Trade defense	0	2.180.440	99,7	951.866	99,7	843.889	99,7	334.582	100
	1	6.956	0,3	3.333	0,3	2.129	0,3		
NTB	0	2.126.935	97,2	930.168	97,4	818.420	96,7	334.360	99,9
	1	60.461	2,8	25.031	2,6	27.598	3,3	222	0,1
Import controls	0	2.166.303	99	949.861	99,4	836.704	98,9	334.365	99,9
	1	21.093	1	5.338	0,6	9.314	1,1	217	0,1
State aid & subsidies	0	2.157.598	98,6	951.217	99,6	840.159	99,3	334.582	100
	1	29.798	1,4	3.982	0,4	5.859	0,7		
PP & localisation	0	2.172.983	99,3	942.108	98,6	836.478	98,9	334.582	100
	1	14.413	0,7	13.091	1,4	9.540	1,1		
Other	0	2.187.065	100	949.192	99,4	837.950	99	334.577	100
	1	331	0	6.007	0,6	8.068	1	5	0

Table 17: Descriptives for Estimations by Country Group

		G20		EU		USA		BRICS	
		Count	Percent	Count	Percent	Count	Percent	Count	Percent
Trade defense	0	982.090	99,3	1.123.943	99,6	80.610	99,3	158.476	98,3
	1	6.954	0,7	5.043	0,4	530	0,7	2.730	1,7
NTB	0	913.786	92,4	1.100.064	97,4	67.172	82,8	144.185	89,4
	1	75.258	7,6	28.922	2,6	13.968	17,2	17.021	10,6
Import controls	0	965.383	97,6	1.117.152	99	80.766	99,5	157.295	97,6
	1	23.661	2,4	11.834	1	374	0,5	3.911	2,4
State aid & subsidies	0	960.385	97,1	1.111.157	98,4	77.310	95,3	156.809	97,3
	1	28.659	2,9	17.829	1,6	3.830	4,7	4.397	2,7
PP & localisation	0	955.425	96,6	1.128.797	100	68.558	84,5	149.014	92,4
	1	33.619	3,4	189	0	12.582	15,5	12.192	7,6
Other	0	988.406	99,9	1.128.849	100	81.140	100	161.113	99,9
	1	638	0,1	137	0	0	0	93	0,1

Table 18: Potential changes in nominal trade flows in Germany, by Industry (2015)

	Agriculture	Resources	Consumer goods	Transportable goods	Metals and machinery equipment
Change of exports in billion US-Dollar	0.34	1.25	3.29	8.22	29.81
Change of imports in billion US-Dollar	0.62	6.32	3.52	6.19	17.37

Source: UN Comtrade and own calculation.