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RESEARCH BRIEF

The Impact of Indonesian Non-Tariff Measures on Import: The Case of Sanitary and Phytosanitary and Technical Barriers to Trade

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Non-tariff measures (NTM) are currently becoming an eminent issue in global trade. Liberalization and economic integration have led to a decrease in world tariffs, yet on the other hand, the numbers of NTM are increasing significantly. Based on World Bank Report in 2012, there has been a rising trend in the number of NTM around the globe after 2008, where India, China, Indonesia, Argentina, Russia, and Brazil are found to have almost half of the new NTMs imposed by countries worldwide (Cadot & Malouche, 2012). This recent trend has raised concerns about the use of NTM as a new protectionist trade instrument substituting tariffs.

Technical measures such as Sanitary and Phytosanitary (SPS) and Technical Barrier to Trade (TBT) are the most common features of NTM. In Indonesia, as in many other countries, technical measures are the most widely used NTMs with 70.22% from the total of 638 NTM in 2015, consisting of SPS measure for 19.59% and TBT measures for 50.63% (Ing et al., 2016). Moreover, according to data collected from the UNCTAD Trade Analysis Information System (TRAINS) (United Nations Conference on Trade and Development, n.d.), the use of technical measures on tariff lines has risen significantly from 2006 through 2015, where SPS measures rose 211% ,and TBT measures rose 1150%. Therefore, in reference to these trends, the impact of both SPS and TBT measures in Indonesia needs to be analyzed further.

The main issue on the implementation of SPS and TBT measures is the ambiguous impact of these measures on trade flow. The impact can be both positive and negative, depending on the response of the economic agent (Ganslandt & Markusen, 2001; Thilmany & Barrett, 1997). In line with the theoretical foundation, empirical studies have shown that the impact of technical measures can vary—either trade-impeding or demand-enhancing. The majority of studies show a negative impact (trade-impeding) of technical measures on trade; some examples are Otsuki et al. (2001), Disdier et al. (2008), and Mingque and Slisava (2016). However, limited studies are showing the positive impact (demand-enhancing) of technical measures, such as Xiong and Beghin (2014) and Shepotylo (2016).

Another issue in estimating the impact of technical measures is that, unlike tariffs, the qualitative characteristics of SPS and TBT measures are difficult to translate directly into an ad valorem change in the cost of production and price. Therefore, the direction and size of the effect depend on whether technical measures discriminate against foreign producers and the relative importance of technical measures to production and transportation cost (Shepotylo, 2016). Due to their qualitative characteristics, technical measures are usually estimated using binary variables (Shepotylo, 2016; Mingque & Slisava, 2016) or inventory measures. However, recent studies tend to put more focus on quantifying NTM to produce price effect estimation and translate them into ad valorem equivalent (AVE). Although this method is more complex, it is considered better than using a dummy variable, frequency index, and coverage ratio, as it can convert SPS and TBT measures into more measurable variables.

There are two approaches to estimating the AVE of NTM. The first method is the price-based, also known as price gaps method. Some studies that used this method are Andriamananjara et al. (2004) and Fontagne and Mitaritonna (2013). The second approach is the quantity-based method used by Kee et al. (2009). This study employs the quantity-based method instead of the price-based method for several reasons. First, the indirect calculation in the quantity-based method allows us to estimate the impact of SPS and TBT measures on import before converting it into price effect (ad valorem equivalent), which is in line with the objective of this study. Second, the price-based method mostly produces positive AVE, whereas a quantity-based method can produce either positive or negative AVE (Cadot et al., 2013). Restricting the AVE to be only positive means that SPS and TBT measures can only have a trade-impeding impact on imports, which is not in line with the objective of this study. However, this study will use both methods to compare the result.

To the best of the author's knowledge, specific studies analyzing the quantity and price impacts of SPS and TBT measures in Indonesia are very limited. This is unfortunate because this study is useful to have a better understanding of SPS and TBT measures that could have a different impact across sectors. The majority of the existing studies related to Indonesia are cross-country studies at the aggregated level. Some examples are Fontagne and Mitaritonna (2013), Kee et al. (2009), and Bratt (2017). The only study at the disaggregated level is Cadot et al. (2013), which became the preliminary study of the price impact of NTM in several ASEAN member states, including Indonesia. The result suggests that the SPS measures in Indonesia have a substantial price-rising effect on the foods sector, but less on beverages and tobacco sectors. Nonetheless, this study used a price-based method, and the AVEs mostly have a positive value.

Based on this condition, this study aimed at estimating and identifying the quantity impact and then quantifying the price impact (AVE) of NTM in Indonesia, particularly SPS and TBT measures using the quantity-based AVE method developed by Kee et al. (2009). Unlike the majority of studies, which only focused on estimating the impacts of technical measures in specific sectors, particularly those related to consumer health and safety, such as agriculture and food, this study aims to identify the impacts of technical measures more comprehensively by analyzing various impacts in each sub-sector (HS 2 digit).

Although the methodology used in this study is based on Kee et al. (2009), some adjustments should be recognized. First, this study does not limit the impacts of SPS and TBT measures on imports to be negative (trade-impeding) because the objective of this study is also to identify the positive impacts (demand-enhancing) as explained by Ganslandt & Markusen (2001) and Beghin (2006). A similar strategy was also applied by Cadot et al. (2013) and Bratt (2017) Kee et al. (2009) limited the impacts to be negative as they focused on estimating the impacts of non-tariff barriers (NTB). Theoretically, the protectionist intent of NTB causes negative effects on trade. Second, because the impact of SPS and TBT measures on imports can be both positive and negative, the ad valorem tariff equivalent (AVE) can also have a positive and negative value. The positive AVE represents the percentage of change in prices, which means the SPS and TBT measures are likely to push up prices by imposing compliance costs or by selecting high-quality suppliers. On the other hand, negative AVE means that SPS and TBT policies may act as trade-facilitator by removing uncertainty on product quality (Cadot et al., 2013).

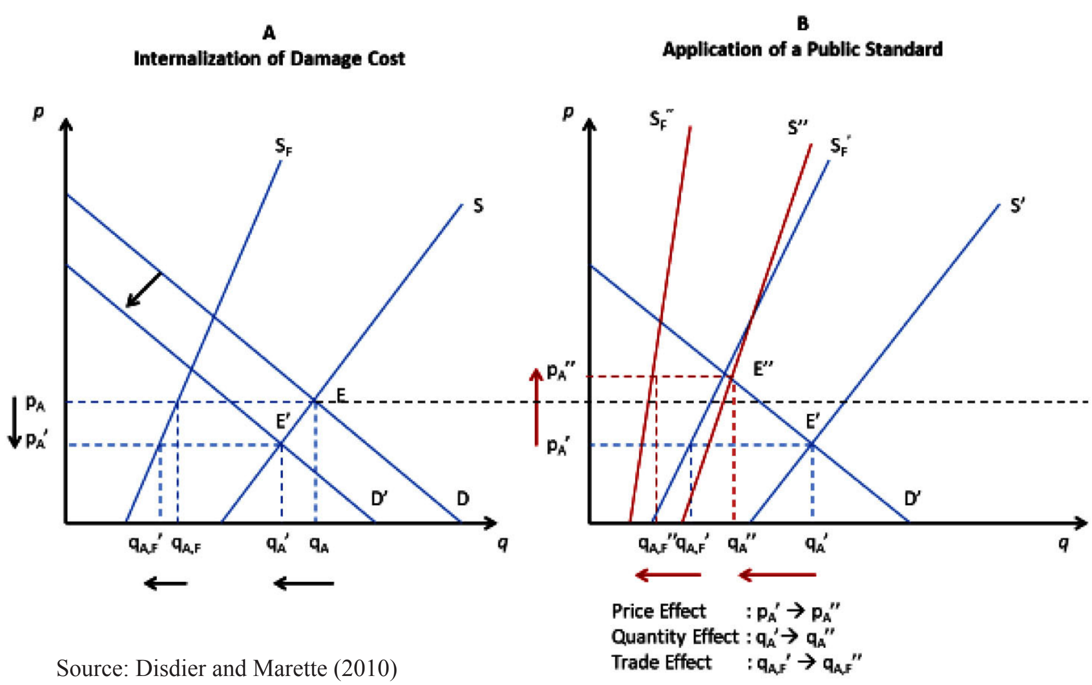
This study found that SPS and TBT measures significantly reduce Indonesian import on an aggregate level. The trade-impeding effect seems to outweigh the demand-enhancing effect. However, the impact on the disaggregated level can be different across sub-sectors (HS 2 digit), which may be trade-reducing or demand-enhancing. It is shown that SPS measures create negative impacts on 17 sub-sectors and positive impacts on 12 sub-sectors, whereas TBT measures create negative impacts on 14 sub-sectors and positive impacts on four sub-sectors. Moreover, the ad valorem equivalent (AVE) suggests that Indonesia tends to have high AVE of SPS and TBT measures in sub-sectors with low tariffs.

Literature Review

Ganslandt and Markusen (2001) explained how standards and technical regulations have both trade-impeding and demand-enhancing effects. The first impact is due to the rising cost of exporters, which Otsuki et al. (2001) called "standard as barriers." The second impact is due to the improvement of product quality and consumer safety. If the new standards and regulations are informative to the consumer, the signal of higher product quality can increase import demands (Thilmany & Barrett, 1997). The theoretical framework of the impact of SPS and TBT measures on imports used in this study is based on the model developed by Disdier and Marette (2010) and adopted by Fugazza (2013). This model focused on specific goods, and the market is assumed to be homogenous except for characteristics potentially dangerous to consumers. If domestic consumers are aware of the dangerous characteristics of goods, they internalize the damage in consuming the goods, as shown in chart A of Figure 1. Another key assumption in this model is that foreign and domestic products are perfectly homogenous and, thus, perfectly substitutable. In this case, the dangerous characteristics are carried by foreign goods only. It means the implementation of the standard by domestic regulators affects foreign producers exclusively, and thus, only the foreign supply curve is affected directly (Chart B of Figure 1). The consequence of this new standard is an increase in the equilibrium price from $p_A{'}$ to $p_A{''}$ and a fall in import and, thus, domestic consumption $q_A{'}$ to $q_A{''}$.

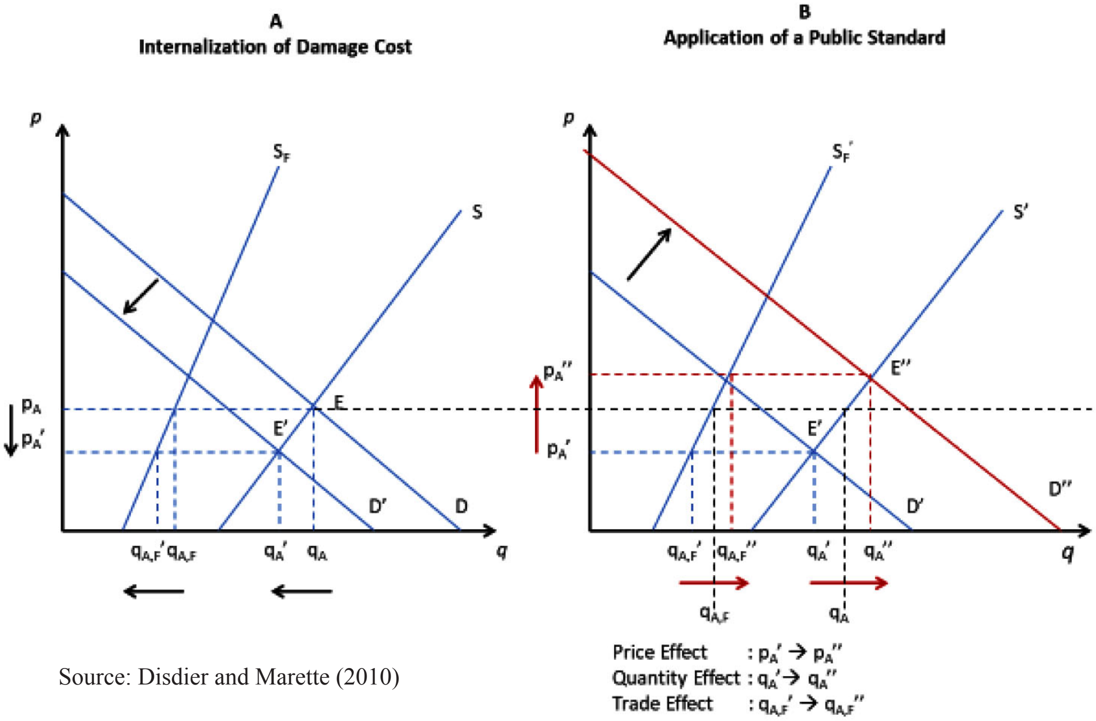
On the other hand, the new standard can also possibly affect consumers' information set and behavior. If the standard appears to be informative and signals a higher quality of the permitted import, it may enhance the demand for import, as shown in chart B of Figure 2. As a response to the new standard, the demand curve would shift to the right from D′ to D″, counteracting the demand shift coming from the internalization of damage by consumers (Chart A of Figure 2). Therefore, import is increased from $q_{A,F}{'}$ to $q_{A,F}{''}$, although the price also increases from $p_A{'}$ to $p_A{''}$.

As mentioned earlier, the empirical work of NTM focuses more on quantifying NTM to produce price effect estimation using a price-based and quantity-based method. Both methods have advantages and disadvantages. The main advantage of the price-based method is that it uses direct measurement to obtain the price impact of NTM (Fugazza, 2013). However, this



Source: Disdier and Marette (2010)

Figure 1. Trade-Impeding Effect of SPS and TBT Measures



Source: Disdier and Marette (2010)

Figure 2. Demand-Enhancing Effect of SPS and TBT Measures

method requires data of detail price in the absence of NTM, which is usually "unobservable." This is the main weakness of the price-based method. Another disadvantage is that it assumes perfect substitution between imported and domestic goods (Beghin & Bureau, 2001) and produces mostly positive AVE. On the other hand, the quantity-based method uses trade flow variations, which are easier to obtain and can produce either a positive or negative AVE (Cadot et al., 2013). The weakness of this method is that the estimation process becomes more complex as it uses indirect measurement. The first step involves estimating the impacts of SPS and TBT on imports, and the second step is converting the impacts of SPS and TBT on import into price effect (ad valorem equivalent) using import demand elasticity.

One of the most prominent quantity-based methods is devised by Kee et al. (2009), who used Leamer's (1986) comparative advantage approach. Kee et al. (2009) ran non-linear least square to restrict the impacts of non-tariff barriers (NTB) on imports to be negative. The reason is that NTB theoretically has protectionist intent and, therefore, has negative effects on trade. As a result, Kee et al. (2009) only produced positive AVE. Cadot et al. (2013) adopted Kee et al. (2009) to estimate the AVE of world NTM but without any restrictions. The impact of NTM on imports can be positive or negative, and it means that the AVE can also have a positive and negative value. Bratt (2017) adopted the same strategies to estimate the bilateral impact of NTM.

Existing studies analyzing the quantity and price impacts of SPS and TBT measures in Indonesia are very limited. Most studies involving Indonesia are cross-country studies on an aggregated level and for a particular sector. Some examples are Fontagne and Mitaritonna (2013), Kee et al. (2009), and Bratt (2017). Fontagne and Mitaritonna (2013) computed price-based AVE for regulation in three service sectors (i.e., telecom, mobile telecom, distribution) applied by 11 emerging countries, including Indonesia. The result shows that more than half of the AVEs are larger than 50%, and one AVE out of six is above 100%. Kee et al. (2009) computed AVEs of non-tariff barriers (NTB) on an aggregate level for 78 developed and developing countries. The study shows that Indonesian AVE is

41.4%. Bratt (2017) also computed AVE of NTM on an aggregate level for 85 countries in the world, including Indonesia. The result suggests that the Indonesian average AVE is 74.3%, and low-income importers tend to have higher average AVEs compared to middle and high-income countries. The only study on a disaggregated level is Cadot et al. (2013), who became the preliminary study of the price impact of NTM in several ASEAN countries, including Indonesia. The result suggests that the SPS measures in Indonesia have a substantial price-rising effect on the foods sector but less on beverages and tobacco sectors. Nonetheless, this study used the price-based method, and the AVEs mostly have positive values.

Methods

This study adopts the quantity-based method developed by Kee et al. (2009). Using Leamer's (1986) comparative advantage approach, Kee et al. (2009) estimated the quantity impact of two broad types of NTB on imports at the HS six-digit tariff line. This quantity impact is then converted into an AVE using import demand elasticities from Kee et al. (2008). The same concept is used in this study with empirical specification as follows:

$$\ln m_{n,t} = \alpha_0 + \varepsilon_n \ln\left(1 + tar_{n,t}\right) + \beta_1 SPS_{n,t} + \beta_2 TBT_{n,t} + \sum_k \alpha_{k,t} C_t^k + \alpha_6 REER_t + \mu_{n,t} \quad (1)$$

where:

$$\sum_k \alpha_{t,k} C_t^k = \alpha_1 \frac{AGRLand_t}{Y_t} + \alpha_2 \frac{CAP_t}{Y_t} + \alpha_3 \frac{LAB_t}{Y_t} + \alpha_4 Y_t + \alpha_5 dist_t \quad (2)$$

$m_{n,t}$ is Indonesia (real) import value of good n in year t (as noted in Kee et al., (2009), if $m_{n,t} = 0$ *then* $ln\left(m_{n,t}\right)$ is not defined. To avoid sample bias, we added 1 to all $m_{n,t}$ (which are measured in thousands of dollars). ε_n is import demand elasticity; $tar_{n,t}$ is ad valorem tariff for good n in year t; $SPS_{n,t}$ and $TBT_{n,t}$ is dummy variable indicating the presence of SPS and TBT for good n in year t; $\left(\beta_1\right)$ dan $\left(\beta_2\right)$ are the parameters that capture the impact of SPS and TBT imposed on good n in year t; C_t^k is a vector of k variable that provides country characteristics as in Leamer's (1990) comparative advantage approach, which consist of factors endowment (agriculture land over GDP, capital over GDP, labor over GDP), and other gravity variables such as economic size (real GDP) and distance (the import-weighted distance to all trading partner); $\alpha_{k,t}$ are parameters in front of the variables that capture country characteristics, REER is the real effective exchange rate, and finally, $\mu_{n,c}$ is an error term.

Equation (1) shows that both tariff and NTMs, in particular SPS and TBT, can deter trade with an effect that varies among goods. The impact of NTMs do not vary across countries like in Kee et al. (2009) as we are only studying the impact of Indonesian NTM multilaterally. To address the endogeneity problem, we move term $\varepsilon_n ln\left(1 + t_{n,t}\right)$ to the left-hand-side as discussed in Lee and Swagel (1997). Given that there is error term when Kee et al. (2008) estimated the import demand elasticities beside the error term in equation (1), then the new error term is denoted as $K_{n,t}$. Equation (3) then becomes:

$$lnm_{n,t} - \varepsilon_n \ln\left(1 + tar_{n,t}\right) = \alpha_0 + \beta_1 SPS_{n,t} + \beta_2 TBT_{n,t} + \sum_k \alpha_{k,t} C_t^k + \alpha_6 \text{ REER}_\text{t} + \text{K}_{\text{n,t}} \quad (3)$$

The impact of Indonesia SPS $\left(\beta_1\right)$ and TBT $\left(\beta_2\right)$ on imports are obtained by estimating Equation (3) using the fixed-effect model (FEM) least square and White correction standard error at HS six-digit tariff lines. We then used a factor variable to gain the sectoral impact of SPS and TBT. Also noted that Kee et al. (2009) used the instrument variable (IV) to address the endogeneity problem in NTBs. However, the instrument variable is not required in this study as SPS and TBT measures are dummy variables which are not continuous variable.

The next step is to transform the sectoral impact of SPS and TBT on import into price effect so we can have an equivalent value of SPS and TBT measure on ad valorem tariff. This is referred to as an AVE of NTM and is noted as follows:

$$\text{AVE} = \frac{\partial \log \text{P}^\text{d}}{\partial \text{ NTM}} \quad (4)$$

where P^d is the domestic price. Equation (4) indicates the impact of change of NTM to the percentage change of price. To obtain our measure of AVE, differentiate Equation (1) with respect SPS_n to TBT_n and :

$$\frac{\partial \log m_n}{\partial \, SPS_n} = \frac{\partial \log m_n}{\partial \log P^d_n} \frac{\partial \log P^d_n}{\partial \, SPS_n} = \varepsilon_n AVE^{sps}_n \quad (5)$$

$$\frac{\partial \log m_n}{\partial \, TBT_n} = \frac{\partial \log m_n}{\partial \log P^d_n} \frac{\partial \log P^d_n}{\partial \, TBT_n} = \varepsilon_n AVE^{tbt}_n \quad (6)$$

where AVE^{sps}_n and AVE^{tbt}_n are respectively the ad valorem equivalent of SPS and TBT of good n. Then, we can transform Equations (5) and (6) to obtain AVE as follow:

$$AVE^{sps}_n = \frac{1}{\varepsilon_n} \frac{\partial \log m_n}{\partial \, SPS_n} = \frac{e^{\tilde{\beta}_1} - 1}{\varepsilon_n} \quad (7)$$

$$AVE^{tbt}_n = \frac{1}{\varepsilon_n} \frac{\partial \log m_n}{\partial \, TBT_n} = \frac{e^{\tilde{\beta}_2} - 1}{\varepsilon_n} \quad (8)$$

where:

$$\tilde{\beta}_1 = 1 - e^{-\beta_1} \quad (9)$$

$$\tilde{\beta}_2 = 1 - e^{-\beta_2} \quad (10)$$

Equations (9) and (10) are squashing functions to reduce large outliers in highly dispersed results. This technique is widely used in situations where large estimates must be squeezed into a pre-determined band (Cadot et al., 2013). We set the band between -100% and 100%, as AVEs lower than -100% are not economically feasible.

We observe the change of Indonesian SPS and TBT measures from 2006 to 2015 at HS six-digit tariff lines. The SPS and TBT data are taken from TRAINS developed by UNCTAD and WTO. SPS and TBT measures in Indonesia are imposed on more or less 5,335 products each year. Import demand elasticities that have been calculated by Kee et al. (2008) are taken from the World Bank.[1] Indonesian import demand elasticities are available for 4,083 six-digit tariff lines using the HS 1992 coding system. Therefore, some data in the empirical specification, such as import, tariff, and GDP, are all converted to the HS 1992 coding system. Import, tariff, and unit value are taken from WTO, where there are 5,200 tariff lines each year. Real import is obtained by dividing import value with Wholesale Price Index (WPI) or Indeks Harga Perdagangan Besar (IHPB) taken from the Indonesian Central Bureau of Statistics (BPS). Tariffs are for the most favored nation.

Converting some data to HS 1992 resulted in a reduction in the number of observations. The causes are, first, not all data of imports and tariffs at six-digit tariff lines have import demand elasticities. Second, newer HS usually has more detailed product descriptions than older versions (m:1 correlation). For example, tariff line 010519 at HS 92 is described as five different tariff lines at HS 12. Hence, the merging process from newer to older HS reduces tariff lines to approximately only 3,700 tariff lines each year.

Distance is calculated based on the trade-weighted average distance of a country to world market method (Guillaumont, 2015). This method requires two types of data: first, geographical distance between Indonesia and other countries taken from CEPII (Centre d'Etudes Prospectives et d'Informations Internationales); second, the market share of each actual and potential trading partner in the world market taken from the United Nations National Account Main Aggregates Database (http://unstats.un.org/unsd/snaama). Oil price is also considered as a factor affecting the economic distance between Indonesia and the world market. The data is taken from a periodical report of the International Energy Agency (IEA).

GDP constant price (2010) is taken from BPS then converted to U.S. dollar using Bank Indonesia's yearly average exchange rate on transaction. Factor endowment data are taken from (a) agriculture land area from World Bank; (b) Gross Fixed Capital Formation from World Bank, then converted to capital stock using perpetual inventory model (PIM; Central Bureau of Statistics of Indonesia, 1997); and (c) labor from labor force survey of BPS (Survei Angkatan Kerja Nasional) (Central Bureau of Statistics of Indonesia, n.d.). The real effective exchange rate is taken from the Bank for International Settlement (BIS) database using 2010 as the base year.

Results

First, we measured the incidence (frequency index and coverage ratio) of SPS and TBT measures in Indonesia to show which product categories have the highest use of NTMs. The result showed that SPS measures incidence are high on animal and animal products (HS 01–05), vegetable products (HS 06–15), and foodstuffs (HS 16–24) with frequency index of 40.71%, 18.83%, and 18.10%, respectively, and the coverage ratios are respectively 39.72%, 20.18%, and 18.73%. TBT measure incidence is high on animal and animal products (HS 01–15), foodstuffs (HS 16–24), and textiles and footwear (HS 50–67), with frequency index of 15.21%, 11.49%, and 15.90%, respectively, and the coverage ratio of 39.72%, 9.48%, and 16.10%, respectively.

Second, the estimation of Equation (3) suggests that all independent variables have a significant impact on imports at a 1% level (Table 1). The main variables of this study, SPS and TBT measures, have a negative impact on imports. This shows that, in general, the increase of SPS and TBT measures in Indonesia are more dominant in creating a trade-impeding effect rather than a demand-enhancing effect, thus reducing import. The import respectively decreases to 21.82% and 13.69% when SPS and TBT measures present are compared to when they are not. This result shows that consumers in Indonesia were more concerned about the price-raising effect of SPS and TBT measures and decided to lessen their consumption, even though there is an enhancement in product safety and quality. It also shows that it is possible that consumers are not aware of the enhancement of product quality as they are not aware of the standards and regulations. According to Thilmany and Barrett (1997), one condition that needs to be fulfilled to create a demand-enhancing effect is that the standards and regulations have to be informative to eventually change consumer behavior.

Third, the estimation results at a disaggregated level (HS 2 digit) shows that the impacts of SPS and TBT measures on sub-sectors import vary based on the direction and magnitude. The majority of SPS and TBT measures generate a trade-impeding effect, but few generate a demand-enhancing effect.

SPS measures significantly affect imports in 29 sub-sectors, where 17 sub-sectors are negative, and 12 sub-sectors are positive. TBT measures significantly affect imports in 18 sub-sectors, where 14 sub-sectors are negative, and four sub-sectors are positive. These results proved that SPS and TBT measures in Indonesia could also create a demand-enhancing effect by affecting consumer behavior to buy products with better quality and safety standards.

If we examine based on sector, the sectors most affected by SPS measures are animal and animal products (HS01–05), vegetable products (HS06–15), foodstuffs (HS16–24), rawhides, skins, and leather (HS41–43), wood and wood products (44–49), and textiles (HS50–63). This result is in line with inventory measures that show that the frequency index and coverage ratio of these sectors are among the highest. The sectors most affected by TBT measures are animal and animal products (HS01–05), chemical and allied industries (HS 28–38), and metals (HS72–83). An anomaly exists in the textiles sector (HS 50–63). The frequency index and coverage ratio of TBT measures on this sector are quite high, but the impact of these measures is only substantial on the wool product (HS 51) and man-made staples fibers (HS 55); the rest are not. This result suggests that the high incidence of SPS and TBT measures on a particular product does not mean that it will also have a substantial impact on imports. If the standards and regulations implemented by the Indonesian government are not discriminative and affecting the exporter production process, for instance, if the exporter is already implementing a high standard, then these standards and regulations will not have a significant impact.

The impact of SPS and TBT measures are converted to implicit tariffs or ad valorem equivalent (AVE). We then compared the result with the price-based method. The quantity-based method generated 17 positive and 12 negative AVE of SPS measures and 14 positive and four negative AVE of TBT measures. The AVE is quite dispersed, with the lowest at -97.2% for salt, sulphur, and others (HS 25), and the highest at 60.72% for nuclear reactors (HS 84). The price-based method generates 25 AVE of SPS measures and 28 AVE of TBT measures, which are all positive. The lowest AVE is 0% for electrical machinery equipment parts (HS 85), optical and photo (HS 89), and base metals (HS 81). The highest AVEs are 99.98% and 99.70% for salt and sulphur, respectively (HS 25), and pulp of wood (HS 74). In brief, we can draw the conclusion that the price-based method tends to have higher AVE than the quantity-based method.

Table 1

Estimation Results

Dependent Variable: ln import (lnM)		
Variable	**Coefficient**	**Standard Error**
SPS	-0.246***	0.051
TBT	-0.147***	0.036
GDP	0.010***	0.001
Agriculture land/GDP	-0.012***	0.001
Labor/GDP	0.0001***	0.000
Capital/GDP	-0.536***	0.044
Distance	-4.E-06***	0.000
REER	-0.155***	0.007
Constanta	14.826***	0.405
No of Observation	37375	
R-square	0.0071	
Prob > F	0.0000	

Notes: ***), **) and *) mean significant respectively at level 1%, 5% and 10%

AVE of SPS and TBT measures is crucial information for policymakers. AVE has implicit tariffs, and it reflects the barrier imposed on certain products besides the applied tariffs. This hidden barrier, whether or not it has political intent, is mostly higher than the applied tariffs themselves. Thus, it is important to identify and compare the AVEs of NTM to tariffs in order to conclude if some trade standards or regulations have protection intent. AVEs are extra cost besides import tariffs to be borne by the exporter. If the AVE of SPS and TBT measures is high on low tariff sub-sectors, then we can conclude that the SPS and TBT measures may have protection motives. As political-economy explains, the numbers of NTMs could have risen as substitutes for shrinking tariffs (the substitutability of tariffs and non-tariff barriers; Ing et al., 2016). On the other hand, if the AVEs of NTMs are trade facilitating (negative AVE), we can conclude that this measure does not have protection motives as the AVEs reduce the protection rate from tariffs.

Table 2 shows that the majority of sub-sectors of AVEs are significantly increasing the rate of protection (AVEs + tariffs), and, as a consequence, the total cost to be borne by exporters are much higher. Nevertheless, there are 14 sub-sector AVEs that reduce the rate of protection, among which are salt, sulphur, among others (HS 25), pharmaceutical products (HS 30), rawhides and skin (HS 41), and pulp of wood (HS 47). The protection intent of Indonesia SPS and TBT measures are clearly seen in Figure 3. Low tariff sub-sectors tend to have high AVEs in live animals (HS 01), oilseeds (HS 12), vegetable plaiting materials (HS 14), and electrical machinery equipment parts (HS 85). Increasing tariffs to protect domestic producers is not a popular policy nowadays and can trigger a trade war. Therefore, NTM is an alternative instrument that could help achieve that objective. However, this information could prove unfavorable for Indonesia in performing trade negotiations as the trading partner will also react to be more protective of Indonesian products.

Conclusion

This study found that SPS and TBT measures significantly reduce Indonesian import. The trade-impeding effect seems to outweigh the demand-

Table 2

Comparison of AVEs of SPS and TBT Measures and Tariffs

HS Code	Sub-sectors	AVE (%)			Weighted Average Tariff (%)	Total Tariff (%)
		SPS	TBT	Total		
01	Live animals	–	46.79	46.79	2.84	49.64
02	Meat and edible meat offal	10.50	10.73	21.23	5.07	26.30
03	Fish & crustacean, mollusk & other	–	17.26	17.26	5.79	23.05
04	Dairy prod; birds' eggs; natural honey; etc.	30.44	25.73	56.17	5.34	61.51
06	Live tree & other plants; bulb, root; cut flowers	24.91	–	24.91	13.33	38.24
07	Edible vegetables and certain roots and tubers	9.89	20.18	30.07	4.89	34.96
08	Edible fruit and nuts; peel of citrus fruit, etc.	16.49	26.76	43.25	5.39	48.64
09	Coffee, tea, matï and spices	-9.09	14.73	5.64	5.09	10.73
11	Prod.mill.indust; malt; starches; inulin; wheat	14.50	–	14.50	5.13	19.63
12	Oilseed, oleagi fruits; miscellaneous grain, seed	51.16	–	51.16	3.58	54.73
14	Vegetable plaiting materials; vegetable product	57.95	–	57.95	1.92	59.88
16	Prep of meat, fish or crustaceans, mollusks, etc.	10.50	17.50	28.00	6.47	34.47
21	Miscellaneous edible preparations	37.45	–	37.45	9.49	46.93
22	Beverages, spirits and vinegar	–	18.92	18.92	54.64	73.56
24	Tobacco and manufactured tobacco substitutes	22.82	–	22.82	16.45	39.28
25	Salt; sulphur; earth & stone; plastering mat	-97.20	–	-97.20	3.44	-93.77
29	Organic chemicals	–	22.34	22.34	3.82	26.16
30	Pharmaceutical products	-48.17	–	-48.17	3.68	-44.49
34	Soap, organic surface-active agents, etc.	-66.97	36.45	-30.52	6.58	-23.94
41	Raw hides and skins (other than furskins), etc.	-56.99	–	-56.99	2.61	-54.38
43	Furskins and artificial fur	35.61	–	35.61	5.35	40.96
44	Wood and articles of wood; wood charcoal	-16.96	–	-16.96	3.97	-12.98
45	Cork and articles of cork	-49.06	–	-49.06	4.75	-44.30
46	Manufactures of straw, esparto/other plaiting	26.05	–	26.05	6.56	32.60
47	Pulp of wood/of other fibrous cellulosic mat	–	-70.62	-70.62	1.53	-69.09
48	Paper & paperboard; art of paper pulp, etc.	-31.13	–	-31.13	4.78	-26.35
51	Wool, fine/coarse animal hair, horsehair yarn	-51.91	22.84	-29.07	6.51	-22.56
53	Other vegetable textile fibers; paper yarn, etc.	-80.11	–	-80.11	6.26	-73.86
55	Man-made staple fibers	–	-9.22	-9.22	8.84	-0.38
61	Art of apparel & clothing access, etc.	15.51	–	15.51	15.85	31.37
62	Art of apparel & clothing access, not knitted	14.53	–	14.53	15.48	30.01
69	Ceramic products	-49.81	–	-49.81	13.68	-36.12
70	Glass and glassware	-58.13	–	-58.13	5.65	-52.48
72	Iron and steel	–	17.50	17.50	5.68	23.18
73	Articles of iron or steel	–	28.14	28.14	9.97	38.11
80	Tin and articles thereof	–	-51.47	-51.47	4.47	-47.00
84	Nuclear reactors, boilers, machinery & mech appliance	60.72	-41.11	19.61	4.18	23.79
85	Electrical machinery equip parts thereof, etc.	46.06	–	46.06	5.71	51.77

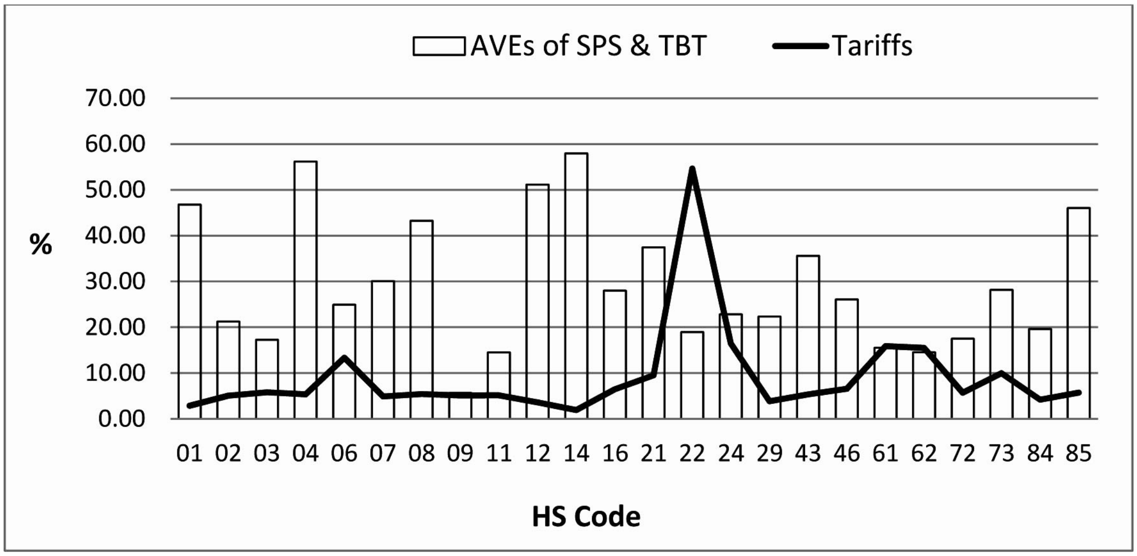


Figure 3. Comparison of AVEs of SPS and TBT Measures and Tariffs

enhancing effect. This result shows that consumers in Indonesia are more concerned about the price-raising effect of SPS and TBT measures and decided to lessen their consumption, even though there is an enhancement in product safety and quality. Another reason is that it is possible that consumers are not aware of the enhancement of product quality as they are not aware of the standards and regulations. This study also shows that the impacts of SPS and TBT measures on sub-sector import (HS 2 digit) vary based on direction and magnitude. The majority of SPS and TBT measures generate trade-impeding effects, but few that generate a demand-enhancing effect. SPS measures create a negative impact on 17 sub-sectors and positive impact on 12 sub-sectors, whereas TBT measures create a negative impact on 14 sub-sectors and positive impact on four sub-sectors.

Converting the impacts of SPS and TBT measures on import to ad valorem equivalent (AVE) generate some result. First, SPS and TBT measures are trade facilitating (negative AVE) in some sub-sectors, even though the majority effect is still trade-impeding (positive AVE) and raising the price of goods. Second, in this study, the price-based method tended to have higher AVE than the quantity-based method. Lastly, the comparison between quantity-based AVE and tariffs shows that the majority of SPS and TBT measures are significantly higher than import tariffs. Therefore, we can conclude that SPS and TBT measures in Indonesia tend to be protectionist in some sectors as the AVE resulted in increasing the protection level, and, as a consequence, the total tariff borne by the exporter is significantly higher.

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This report is our original work.

Conflict of interest:

None.

Ethical clearance:

This study was approved by the institution.

Endnote:

1 Retrieved November 30, 2017 from http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:21085337~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html. Updated import demand elasticities can be retrieved from https://datacatalog.worldbank.org/dataset/overall-trade-restrictiveness-indices-and-import-demand-elasticities/resource/38c9b6dd-39e5

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