Trade and tax evasion in Indonesia

Yubiwini and Arianto Patunru

ABSTRACT

Based on an analysis of trade data between Indonesia and Singapore at the six-digit level of classification, we find evidence of import tax evasion: exports from Singapore to Indonesia are under-reported to Indonesian Customs, and the evasion increases in line with duty rates. Interestingly, evasion appears to have more to do with value-added tax, which is imposed on almost all imported goods. We also examine whether tariff discrimination under free trade agreements can result in an increase in goods from other countries being imported via Singapore and then re-exported to Indonesia, potentially violating the rules of origin (ROO). Finally, we find that the presence of non-tariff barriers designed to protect national industries may also motivate smuggling.

1. Introduction

The role of tax collection as the primary source of government revenue is very important, prompting many countries to develop more effective tax collection systems. There are many ways that government can improve their taxation systems, for instance by adjusting tariff rates, increasing the tax base, simplifying the tax reporting system, and minimising tax evasion. Tax evasion has become a significant problem that is regularly discussed at the international level because it can significantly endanger tax collection systems and hence decrease government revenue (Miskam et al., 2013). In this regard, import tax evasion is a well-known form of tax evasion that contributes to huge losses in government revenue.

Smuggling goods or products is one form of import tax evasion—when a product is smuggled, the government loses revenue. The purpose of import tax evasion is to avoid tariff and non-tariff barriers; resulting in both monetary and non-monetary benefits to the smuggler. To address this problem, it is essential to find the best way of detecting import tax evasion and, more importantly, the main reasons behind it.

Researchers have explored various possible determinants of tax evasion. When duty is levied on an imported good, the price of that good will increase. As a result, the potential benefits to be gained by firms or importers might be reduced, and smugglers are using several methods to avoid this outcome. First, they may under-report their goods, or not report them at all. Fisman and Wei (2004) show that tariff levels and tax evasion in export and import between China and Hong Kong is undoubtedly related. They provide evidence of smuggling through under-reporting. Second, smugglers may misclassify their goods as a different (often similar) product on which the tariff is lower or zero. Fisman and Wei (2004), followed by Van Dunem and Arndt (2006), Stoyanov (2012), and Levin and Widell (2014), find evidence of smugglers falsely classifying their goods as other goods that are subject to lower tariff. They show that when the tariff of similar products is lower than that of the actual good, tax evasion tends to increase.

Furthermore, free trade agreements (FTAs) and non-tariff barriers may also encourage tariff evasion. Tariff discrimination under an FTA creates an incentive for smugglers to reroute products from non-member countries through member countries so as to pay a lower tariff. Stoyanov (2012) shows that different tariff rates due to the implementation of FTA among Canada and the U.S. has led to such evasion. Moreover, the presence of non-tariff barriers represents another form of restriction on imported goods. In absence of tariffs, demand for goods will be higher than with tariffs applied. Thus, when

non-tariff barriers are implemented, the potential benefit for smugglers will be high as well. As a result, smugglers will either misclassify or under-report their goods. Margono (2011) shows evidence of this practice, claiming that the non-tariff barrier is statistically significant in causing smuggling.

In Indonesia, smuggling has become a serious problem for the government. In 2015, Indonesian Customs reported an increase in customs enforcement by 33.6 per cent, and recovered IDR 3.7 trillion (approximately USD 284 million) (Jahansyahtono, 2016). In 2017, the government established an anti-illegal imports taskforce to fight against smuggling (Sawitri, 2017). Even though import tax evasion has become a serious problem in Indonesia, unfortunately, the ability to detect it is still limited. The study by Margono (2011) was one of few in this area. He demonstrated that tariffs, products with similar tariffs, and non-tariff barriers contribute significantly to smuggling in Indonesia in 2005 and 2008. On the other hand, whether or not FTA contributes to smuggling remains inconclusive (Stoyanov, 2012).

Thus, in this paper, there are four phenomena to be investigated. First, since it joined the ASEAN Free Trade Agreement (AFTA), Indonesia has reduced import tariffs gradually to 0–5 per cent for almost all imported products. Noting that high tariff rates contribute to high evasion (Fisman & Wei, 2004; Van Dunem & Arndt, 2006; Stoyanov, 2012; Levin & Widell, 2014), we are interested to see how much the reduction of tariffs—both own tariffs and tariffs of similar products—affect import tax evasion in Indonesia. In addition to tariffs, Indonesia also charges other taxes on imported goods, for instance value added tax (VAT) and luxury tax, which are higher than the customs tariff. This condition leads us to the second question: what is the impact of other taxes on tax evasion in Indonesia? Third, even when tariff rates are low or zero, non-tariff barriers might still be present, especially when domestic industries are highly protected. Margono (2011) only looked at the effect of tariffs; in contrast, we will also examine how far non-tariff barriers contribute to smuggling in Indonesia.

Last, we look at the role of trade agreements. According to the World Integrated Trade Solution (2017), in 2013 the average tariff for Singapore under AFTA is just 0.43 per cent, while the average of most favoured nations (MFN) tariffs charged by Indonesia is about 5.37 per cent. This situation might also motivate smuggling, as Stoyanov (2012) has shown. When a good is produced in a non-member country, and it is charged a high tariff in the destination country—the latter being a member of the FTA, a smuggler will be able to enjoy the preferential tariff instead of MFN tariff by falsifying the origin of the good, inferring that it came from the member country. Often, this is done by first shipping the good from the non-member country to an AFTA member. In the latter country the good is just regarded as being in transit, hence, it does not need to pay any tax. Then it proceeds to the destination country with a fake certificate of origin and enjoys the lower tariff. We are interested in investigating whether such rules of origin (ROO) violations due to the implementation of AFTA also occur in Indonesia. In particular, we will examine Indonesia's imports from Singapore under the implementation of AFTA from 2012 to 2016.

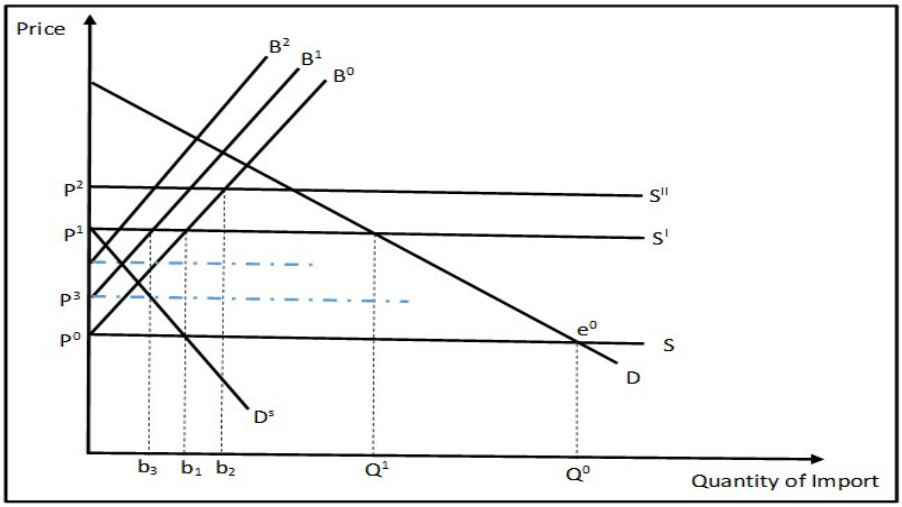
The paper is constructed as follows: the second part provides a preview of the theories and empirics related to import tax evasion; in section three, we explain the data and methodology used in this paper; the empirical evidence will be presented and analysed in the next section; and the fifth section provides a brief conclusion.

2. Literature review

A number of theoretical explanations that discuss tax evasion has been developed. The pioneering work in this area is Allingham and Sandmo (1972). They state that the probability of detection and the rate of tariff are two factors that are highly related to tax evasion. Bhagwati and Hansen (1973) conclude that in the presence of high tariffs, smuggling would be more prevalent. These claims are also strengthened by Sheikh (1977), who, by using the partial equilibrium model, shows how incentives for smuggling work. Furthermore, Sheikh (1989) introduced new approaches to explain the risk of smuggling when the government's effort in detecting illegal trade is taken into account.

In his earlier research, Sheikh (1977) claims that anything that results in a price discrimination between national and foreign markets of a good creates an incentive for smuggling. Thus, when the domestic government puts a high tariff on an imported product, the price of that product will be more expensive. Therefore, considering the trade costs, smugglers will be motivated to illegally sell their goods in order to obtain extra benefits. Figure 1 shows Sheikh's (1977) explanation. In this diagram, when there is no trade barrier, such as tariffs, firms from a foreign country can sell their goods at price P^0. This happens when the supply function (S) intersects with the demand for imported goods (D). As tariffs, or other forms of tax like VAT and luxury tax are imposed, the cost increases. Hence, the price increases to P^1. As a consequence, the quantity demanded for that good falls from Q^0 to Q^1. Thus, the difference in the price before and after tariffs attracts the attention of smugglers.

Figure 1: Demand and supply curve for smuggled goods



Source: Sheikh 1977.

In Figure 1, the supply of illegal goods is described by B^0. This function can be a linear, increasing, or decreasing line depending on many factors, such as enforcement and risk attitude (Sheikh, 1977). But here, following Sheikh (1977), it is assumed that the function is increasing. In this situation, the supply of smuggled goods increases following the after-tariff price. When the after-tariff price is P^1, the quantity of smuggled goods offered is maximised at b_1. When the quantity of smuggled goods increases, the quantity of legal goods offered in the legal market becomes lower (Sheikh, 1977), in this case from Q^1 to b_1 Q^1. If the legal market price is higher than P^1, it will encourage more smuggling. Thus, when the government imposes a higher tariff, prompting the price to move to P^2, more goods will be smuggled, that is, until b_2. On the other hand, when the government cuts the tariff, the supply of illegal goods will decrease. Eventually, when the tariff is zero, there will be no incentive to smuggle. However, one factor

that must be considered by a smuggler is the smuggling costs. Sheikh (1977) argues that trade costs for smugglers is an important factor when determining the level of smuggling. Bribery is one example of this. As an effect of this cost, the supply of smuggled goods will shift from B^0 to B^1. Therefore, a smuggler will be in action when the legal import price (price after tariff) is higher than P^3. Another consequence of this cost is the declining supply of smuggled goods. That is, when the price is at P^1, the quantity supplied falls from b_1 to b_3.

In the case of ROO fraud, where an FTA is in force, the smuggling costs would increase. Before arriving at the destination country, the goods will transit a partner country that belongs to an FTA. As a consequence, smugglers will incur additional costs, for instance transportation and transit costs. Thus, the supply line will shift to B^3. However, the difference in tariffs (preferential and MFN tariffs) create another incentive for smuggling. When the expected benefits exceed the costs, the smuggler will continue detouring the good for transit, forging certificates of origin, and hence pay a lower tariff.

Figure 1 also shows the demand for smuggled goods. According to Sheikh (1977), the demand for illegal products depends on various factors that include risk attitude and moral standards, and also the existence of anti-smuggling laws. Therefore, before deciding to switch from a legal to an illegal market, consumers will consider these factors. Larger price differences between legal goods and illegal goods lead much more people to feel that the gain is worth the risk. Thus, higher tariffs indirectly lead to increases in trade evasion. As shown in Figure 1, when the price changes from P^0 to P^1 because of tariffs, consumers will seek lower prices from illegal markets. The lower the price, the higher the demand for the illegal products.

In contrasts, Sheikh (1989) argues that an increase in tariff is not always followed by higher illegal trade. Tariff is not the only consideration, as smuggling also depends on the risk function of the smuggler. The more risk-averse the smuggler is, the fewer illegal goods will be traded. In addition, when there is an improvement in the law enforcement that increases the probability of detection, the expected profit for smugglers will decrease. This would be a disincentive for smuggling. Ultimately, Sheikh (1989) concludes that the benefits of smuggling increase when customs officials can be bribed or when there is no serious government effort to prevent smuggling. However, a more recent theoretical study argues that the effect of tax rates toward evasion depends on the assumptions used (Slemrod & Yitzhaki, 2002). Therefore, further empirical works are needed to examine the extent to which import tax evasion is at play.

3. Methodology and data

To examine the effects of tariffs, other taxes, non-tariff barriers and FTAs on import tax evasion we first define import tax evasion following Fisman and Wei (2004). They used trade gap as a proxy, that is by calculating the difference between the value or quantity of imports reported from one country and the export value or quantity of the same international transaction reported by the counterpart country. We apply this method at the six-digit Harmonized Commodity Description and Coding System (HS) level. We examine the gap in the reported trade between Indonesia and Singapore by observing the difference between the export data from Singapore to Indonesia as reported by Singaporean authorities and the import data from Singapore to Indonesia as recorded by Indonesia during 2012 to 2016. Therefore, the equation for trade gap is:

$$trade\_gap_{it} = \ln exports_{it} - \ln imports_{it} \quad (1)$$

Where $trade\_gap_{it}$ is the gap in the trade records of product i in period t. In the case of Indonesia, we calculate this gap as the difference between log of exports reported by Singapore (In *exports*) to Indonesia and log of imports from Singapore as reported by Indonesia (In *imports*). The subscript *i* refers to product at the six-digit HS levels, and *t* refers to specific year (between 2012 and 2016). Similar to

Fisman and Wei (2004), we use both value and quantity in measuring the trade gap. In some cases, we might observe 'complete smuggling', where within the six-digit HS code, there is an export transaction to Indonesia recorded by Singapore while Indonesia does not have any record of this transaction, and vice versa. To allow for this possibility, we use Mishra et al.'s (2008) alternative method, that is:

$$trade\_gap_{it} = \ln(1 + exports_{it}) - \ln(1 + imports_{it}) \quad (2)$$

We then regress this trade gap on tariff variables. In particular, we include average tariff, taxes, tariff of similar products, and non-tariff barriers. To investigate the effect of FTA on smuggling, we also add MFN tariff into the model, following Stoyanov (2012). The effect of tariff may be non-linear, so we add the squared-tariff into the equation, too, following Fisman and Wei (2004), Mishra et al. (2008), Van Dunem and Arndt (2006), and Levin and Widell (2014). Hence, the econometric model is:

$$trade\_gap_{it} = \beta_0 + \beta_1 tariff_{it} + \beta_2 tariff_{it}^2 + \beta_3 tariff\_sim_{it} + \beta_4 tariff\_mfn_{it} + \beta_5 tax_{it} + \beta_6 nontariff_{it} + u_{it} \quad (3)$$

In this model, $tariff_{it}$ is defined as the simple average of duties of product *i* (at six-digit HS code) in year *t* (between 2012 and 2016). Since Indonesia and Singapore are members of the AFTA, we will use the ASEAN Trade In Goods Agreement (ATIGA) tariff for all products included in the agreement. Fisman and Wei (2004), Mishra et al. (2008) and Van Dunem and Arndt (2006) found positive relationships between tariff and import tax evasion ($\beta_1 > 0$). If Indonesia imposes a higher tariff on a product, a smuggler would avoid it by reporting or declaring the good falsely. As a result, the export value/quantity reported by Singapore is higher than the import value/quantity in Indonesia's record.

The nonlinearity in equation (3) indicates that the marginal effect of an increasing rate of tariff on evasion differs across different tax rates. Fisman and Wei (2004) and Van Dunem and Arndt (2006) found the relation between tariff and tax evasion to be nonlinear, but Mishra et al. (2008) and Levin and Widell (2014) found no nonlinearity. We are therefore interested to test this in the Indonesian context.

The variable $tariff\_sim_{it}$ is used to detect misreporting of products into similar groups but with lower tariffs. When a smuggler faces a higher tariff for his product, he would falsify the classification of the product so as to enjoy lower or no tariff. In such situations, the export value/quantity reported by Singapore will be higher than import value/quantity recorded by Indonesia at the six-digit HS category. Unlike the previous studies (Fisman & Wei, 2004; Van Dunem & Arndt, 2006; Stoyanov, 2012; Levin & Widell, 2014) that used the average of all other six-digit HS tariffs within the four-digit group, in this paper we use the average of only the lower tariffs within the same four-digit HS. This definition makes more sense, since we are interested to see the effect of 'more competitive', that is, lower tariff compared to the tariff of the good of interest. If we use a simple average of all the other tariffs imposed on the other goods in the same four-digit category, the existence of lower tariffs could be eroded by other, higher tariffs (those higher than the actual tariff for the smuggled good), whereas only the lower tariffs provide an incentive to smuggle. Thus, including all other tariffs will potentially bias the results. Therefore, we define the variable $tariff\_sim_{it}$ as the simple average of all the other, *lower* six-digit HS level tariff within the same four-digit category in period *t*. Similar to $tariff_{it}$, we will use the ATIGA tariff for all products included in the FTA. Similar products' tariff (*tariff_sim*) is expected to be negatively correlated with trade gap ($\beta_3 < 0$), as found by Fisman and Wei (2004), Van Dunem and Arndt (2006), Stoyanov (2012), and Levin and Widell (2014).

$Tariff\_mfn_{it}$ is the simple average of Indonesia's MFN tariffs of product *i* (at six-digit HS category) in period *t* (from 2012 to 2016). When a product from a third country is charged with a high tariff at the Indonesian border, the smuggler will detour the good via Singapore. In Singapore, since it is only a transit movement, the smuggler can ask for a tariff exemption and then continue to ship the product to Indonesia by using a false Certificate of Origin (COO) that claims that the product is made in Singapore and hence is subject to a lower tariff. In the end, Singapore will have no record of the export of this

product (as it is only a transitory movement). But on the other hand, Indonesia will report it as an import from Singapore (due to the fake COO). Thus, we expect that the trade gap negatively correlates with *tariff_mfn* ($\beta_4 < 0$).

Tax_{it} is the simple average of import taxes other than duties that are imposed on product *i* (at six-digit HS category) in period *t* (from 2012 to 2016). There are three different types of taxes charged, namely VAT, luxury tax and import income tax. Similar to $tariff_{it}$, the effect of tax on evasion is expected to be positive ($\beta_5 > 0$). That is, when a smuggler faces a high tax, they tend to under-report or to misclassify it.

To show the non-tariff barrier effect on tariff evasion, we have added one more independent variable to the model, $nontariff_{it}$. This variable represents the non-tariff barriers contained in six-digit HS level *i* in year *t*. According to Margono (2011), when a product is an object of a non-tariff barrier, the importer must prove that the goods satisfy additional requirements. In this paper, non-tariff barriers cover import bans, import licensing requirements, import quotas, import-related non-tariff measures, local sourcing, localisation incentives, public procurement access, public procurement localisation, sanitary and phytosanitary, and technical barriers to trade. An importer who is reluctant or cannot fulfil the requirement tends to mislabel the product or simply not report it. Therefore, implementation of non-tariff barriers might encourage smuggling activities, hence, an increase in the trade gap ($\beta_6 > 0$).

The export and import data used in this study were taken from the United Nations' Comtrade database (www.comtrade.un.org). The trade data from this resource are recorded at the six-digit HS. Next, the data of Indonesia's tariffs, both ATIGA and MFN tariffs, were collected from the regulation of Ministry of Finance of Indonesia. These data are available at the ten-digit HS levels. However, since we need the data at six-digit levels, then we applied the simple average method of the ten-digit HS tariffs within the same six-digit category. In addition, VAT, luxury tax, and import income tax are also counted, based on the regulation of Ministry of Finance. The non-tariff barrier data of Indonesia come from the Global Trade Alert database (www.globaltradealert.org), which contains information of government interventions that affect trade flows in and out of a country. The interventions can be either harmful or liberalising, however, since we focus on the effects of trade barriers, we only took into account harmful interventions.

4. Results

4.1 Descriptive statistics

Table 1 describes some characteristics of data used in this paper. All data are at the six-digit HS level, spanning from 2012 to 2016. During this period, the averages of exports, both in value and in quantity, are higher than those of imports. This indicates that there were less exports from Singapore reported as imports into Indonesia during 2012–2016. Thus, we can suspect that smuggling took place between Singapore and Indonesia. During 2012–2016, tariff applied for exports and imports within the two countries is the ATIGA tariff. From the summary statistics, on average, this tariff is close to zero. However, the maximum tariff in this observation is 100 per cent. Therefore, there is an incentive for under-reporting or misclassification.

Table 1: Summary statistics

Variable	Mean	Median	Min	Max	SD	N
ln import (value)	9.5612	11.0429	0	23.1475	5.2847	18,705
ln export (value)	12.5067	12.7925	0	23.1058	3.1639	18,705
trade_gap (value)	2.9455	1.75710	–19.15	17.9127	4.5839	18,705
ln import (quantity)	6.6056	7.5596	0	23.0877	5.3685	16,505
ln export (quantity)	8.8900	9.7190	0	23.0592	4.5414	16,505
trade_gap (quantity)	2.2844	1.8892	–19.82	22.2831	6.0275	16,505
tariff	0.0033	0	0	1	0.0236	18,705
VAT (value added tax)	0.0961	0.1	0	0.1	0.0189	18,705
Import Income Tax	0.0270	0.025	0	0.1	0.0101	18,705
Luxurious Tax	0.0059	0	0	0.75	0.0467	18,705
tariff_sim	0.00078	0	0	0.3	0.0078	18,705
tariff_mfn	0.0690	0.05	0	1.0167	0.0526	18,705
nontariff	0.4054	0	0	9	0.9518	18,705

Note: SD: standard deviation, N: number of observations.

Source: Author's estimations.

Among the three other taxes outside import tariff, VAT on average, is highest. Even though luxury tax shows higher maximum levels (75%) than VAT (10%), it is only imposed on certain goods while VAT is spread more evenly across almost all goods. Thus, we expect VAT to have a more significant effect on smuggling than the other taxes. Therefore, in our regression we will focus on the effect of VAT.

Furthermore, the tariff imposed for non-members of FTA (tariff_mfn) is very different from the tariff imposed for FTA members. The average of MFN tariff is 6.9 per cent, while the FTA tariff only 0.3 per cent. This huge gap will encourage goods from non-members of FTA to transit firstly in Singapore before being re-exported to Indonesia. Thus, we can suggest that there will be a high possibility of ROO violation within this period.

4.2 Empirical results

In this paper, we applied six-digit HS level panel data for five years. Since we included almost all products in our regression, we needed to control for their own characteristics. Hence, a fixed effect model is more beneficial to show the effect of all variables towards the trade gap. This is also supported by Hausman test (Table 2).

Table 2: Hausman test result

H_0 = Random effect model
H_1 = Fixed effect model

Estimated results:	Dependent variable: trade_gap (value)	Dependent variable: trade_gap (quantity)
chi2(5)	247.02	63.27
Prob>chi2	0.000	0.000

Source: Author's estimations.

Table 2 shows the probability of accepting the null hypothesis is very small, it means we reject this hypothesis and, therefore, the fixed effect model is better than the random effect model. In addition, we also tested whether the fixed effect model is better than the pooled least square model. To solve this, we used the Lagrangian Multiplier test. Table 3 presents the result of this test and confirms that the fixed effect model is better than the others.

Table 3: Breusch and Pagan Lagrangian multiplier test result

H_0 = Pooled Least Square
H_1 = Random effect model

Estimated results:	Dependent variable: trade_gap (value)		Dependent variable: trade_gap (quantity)	
	Var	sd	Var	sd
trade_gap	21.0120	4.5839	36.3304	6.0275
e	8.6318	2.9380	12.2580	3.5011
u	10.2123	3.1957	23.1094	4.8072
Test: Var(u) = 0				
chibar2(01)	11030.73		14249.04	
Prob > chibar2	0.0000		0.0000	

Source: Author's estimations.

Table 4: Variance inflation factor (VIF) test result

Variable	VIF	1/VIF
tariff	4.66	0.2146
tariff2	3.66	0.2732
tariff_sim	1.57	0.6369
tariff_oc	3.05	0.3279
tax	6.21	0.1610
nontariff	1.2	0.8333
year		
2013	1.97	0.5076
2014	1.97	0.5076
2015	2.00	0.5000
2016	2.01	0.4975
Mean VIF	2.83	

Source: Author's estimations.

Table 5: Wald test result

H_0 = sigma(i)^2 = sigma^2 for all i
$H_1 \neq$ sigma(i)^2 = sigma^2 for all i

Estimated results:	Dependent variable: trade_gap (value)	Dependent variable: trade_gap (quantity)
chi2 (3741)	4.30E+08	5.80E+09
Prob>chi2	0.0000	0.0000

Source: Author's estimations.

In addition to the product fixed effect, we controlled for the year fixed effect. We also applied other tests to the data. First, to check the presence of multicollinearity we used the variance inflation factor test, and the result shows there is no problem with multicollinearity (Table 4). Second, the Wald test result exhibits a heteroscedasticity problem in our regression (Table 5). To tackle this issue, we used robust standard error instead of ordinary standard error.

Table 6 describes the results of our estimation. According to this, the value of R^2 in our regression is low. This problem also occured in previous studies. The R^2 value estimated for the model with the trade gap (the dependent variable) in value and in quantity are 0.066 and 0.061 (Fisman & Wei, 2004). Javorcik and Narciso (2008) found the R^2 varied from 0.000 up to 0.769 in several countries. In addition,

Stoyanov (2012) found it ranged from 0.02 to 0.04. Levin and Widell (2014) estimated the R^2 values between 0.000 and 0.14. Fisman and Wei (2004) argued that this appears because of noise in the data, which resulted from misclassification of indirect imports. In addition, the regression included almost all products at the six-digit HS level, and their characteristics are different from each other. Therefore, the effect of our explanatory variables in the model might differ for each of them.

Table 6: Regression results

Variables	Dependent variable: trade_gap (value)	Dependent variable: trade_gap (quantity)
	(1)	(2)
tariff	6.483**	24.258***
	(3.099)	(4.852)
tariff2	7.945	–84.452***
	(22.305)	(29.488)
tariff_sim	1.047	2.498
	(4.716)	(6.006)
tariff_mfn	–0.345	0.104
	(1.979)	(2.125)
tax	40.727**	50.118**
	(17.555)	(21.611)
nontariff	0.109*	0.160*
	(0.066)	(0.095)
F statistic	8.75	106.19
p-value	0.000	0.000
N	18,705	16,505
R2	0.0414	0.0001

*Note: *significant at 10%, **significant at 5%, ***significant at 1%. Robust standard errors are in parentheses. All regressions include 6-digit HS fixed effects and year fixed effects. N is number of observations.*

Source: Author's estimations.

Based on these results, almost all variables were significant and are consistent with our hypotheses. The results show a significant relationship between tariffs and tax evasion. The magnitude of tariff variables both in value and in quantity are high. This might happen because, even though the average tariff is very low, there are some product tariffs that remain high. In terms of value, the coefficient of tariff (β_1) is approximately 6.48. This means that when a product's tariff increases by one percentage point, unreported exports increase by 6.48 per cent, if all else is equal. However, the magnitude in terms of quantity is higher. That is, when tariff increases by one percentage point, the quantity of goods being unreported rises by 24.25 per cent. The results for the *tariff*^{2} variable are mixed. In terms of value, it is insignificant. However, in quantity terms, the result shows that as the tariff increases, the tax evasion also increases, albeit at a lower rate.

We found an insignificant relationship between similar products' tariff and trade gap in both value and quantity. This indicates that smuggling through product misclassification is not evident in the Singapore–Indonesia trade flow. Similarly, there is no evidence of ROO violation in trade between Singapore and Indonesia under the AFTA.

In contrast to the tariffs for similar product and MFN tariffs, our estimation on tax shows that VAT and import tax evasion is highly correlated (both in value and in quantity), which is not surprising because almost all goods are subject to 10 per cent VAT. Thus, the effect of VAT on smuggling activity in Indonesia is higher than the tariff effect. This is because, although Indonesia has cut tariffs to a very low level, as mandated by AFTA, other taxes are still imposed. In particular, if the government adds one more per cent of VAT then smuggling will increase by 40 per cent in terms of value and 50 per cent in terms of quantity.

Last, we found that non-tariff barriers affect tax evasion significantly in both value and quantity. Since Indonesia applies non-tariff barriers as a form of domestic industry protection in the absence of tariff, smuggling remains high. The results show that non-tariff barriers encourage smuggling in both value and quantity by approximately 0.11 and 0.16 respectively (Table 7).

Table 7: Robustness check result

Variables	Dependent variable: trade_gap (value)	Dependent variable: trade_gap (quantity)
	(1)	(2)
tariff	6.616**	24.207***
	(3.077)	(4.854)
tariff2	4.981	–84.989***
	(22.178)	(29.513)
tariff_sim	1.289	2.747
	(4.719)	(6.010)
tariff_mfn	–0.24	0.166
	(1.979)	(2.125)

Table 7: continued

Variables	Dependent variable: trade_gap (value)	Dependent variable: trade_gap (quantity)
	(1)	(2)
tax	1.534	0.468
	(1.003)	(1.441)
nontariff	0.109*	0.159*
	(0.066)	(0.095)
F statistic	7.58	57.23
p-value	0.000	0.000
N	18,705	16,505
R2	0.0041	0.0085

*Note***:** **significant at 10%, **significant at 5%, ***significant at 1%. Robust standard errors are in parentheses. All regressions include 6-digit HS fixed effects and year fixed effects. N is number of observations.*

*Source***:** Author's estimations.

To support our evidence on the effect of tariffs, we performed the robustness check. We set up this test by adding together VAT, luxury tax and import income tax into the tax variable. The result of this is presented in Table 7. It shows that the result is indifferent with our previous estimation, and hence, confirms the effect of tariff on trade evasion is robust.

5. Conclusions

We replicated the approaches taken by Fisman and Wei (2004) and Mishra et al. (2008) to measure the effect of tariff on tax evasion for the trade flow between Singapore and Indonesia . Using panel data at the six-digit HS level during 2012–2016, we found evidence that the rate of tariff is highly correlated with import tax evasion in Indonesia. Even though the tariff rate is close to zero during the period 2012–2016, tax evasion is still significant. In addition, the presence of other taxes, in particular VAT, exacerbates the problem as smugglers get more profits if they avoid the tariff and other taxes imposed on their goods. However, the effect of an increasing rate of tariffs on tariff evasion is different between tax evasion in value and in quantity.

We also found that the tariff on similar products does not affect the trade gap in Indonesia in 2012–2016. These results indicate that smugglers prefer underreporting to product misclassification. Our findings with respect to the effect of FTA differ from that of Stoyanov (2012). Even though Indonesia applies very different tariff structures for members and non-members of the FTA, there is no evidence of ROO violation. Furthermore, we saw that non-tariff barriers may also encourage smuggling.

This finding should be of concern to the government, as it indicates that they will continue to lose potential revenue. There are three alternatives that can be taken. First, increase customs enforcement. When it is

implemented, the probability of detecting illegal goods will be higher and increased enforcement will discourage smuggling. Second, increase the penalties. Indonesia applies specific penalty amounts and rates, but they seem to be ineffective. To increase the deterrent effect, the government should increase the penalty. As a result, the risk for smugglers to illegally distribute goods to Indonesia will be higher. Third, charge consumers with penalties. Sheikh (1977) considered the demand for smuggling goods as an integral part of smuggling. When the demand is high, motivation for smuggling rises. Therefore, to keep the demand low, penalty rates should not only be imposed on the smugglers, but also on consumers, hence, it makes the risk of purchasing smuggling goods higher, and demand will be lower.

As a broader contribution to the literature, further research in this area is undoubtedly important. In this paper, we set aside the possibility of bribery, which makes smuggling easier, and hence future research needs to take this into account. It is also beneficial to increase the intensity of customs enforcement to see the effectiveness of customs action towards smuggling. Lastly, since the behaviour of smugglers changes over time, the way smugglers act will be different. Therefore, a more precise methodology is needed to detect tax evasion, and no less important is identifying another determinants of import tax evasion.

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Yubiwini

Yubiwini has been a senior staff member in the Directorate General of Customs and Excise of Indonesia since 2013. Previously, he worked at the Indonesian Capital Market and Financial Institution Supervisory Agency. He holds two master's degrees: Master of Science in Economics from Universitas Indonesia and Master of International and Development Economics from the Australian National University.

Arianto Patunru

Patunru joined the Arndt-Corden Department of Economics in October 2012. He was previously the head of Institute for Economic and Social Research, Department of Economics, Universitas Indonesia (LPEM-FEUI). He holds a PhD from the University of Illinois at Urbana-Champaign. His research interests include trade, development and environment.