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Impacts of Tariff Rates on Input Source Choice: Evidence from Indonesia

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Keywords: Indonesia; Tariffs; Inputs

JEL Classification: F15; F53

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Impacts of Tariff Rates on Input Source Choice: Evidence from Indonesia[§]

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Abstract: This study empirically examines how a reduction in input tariffs changes firms' choices between domestic and foreign inputs. In order to do so, we employed Indonesian manufacturing surveys from 2002 to 2010, and from there, computed the share of imported inputs among total inputs at the firm-product level. With this dataset, we examined the effect of preferential tariffs for ASEAN countries, that is, ASEAN free trade area (AFTA) tariffs. Our findings can be summarized as follows: First, we found that a reduction in AFTA tariffs in Indonesia encouraged plants to raise their share of foreign inputs. Second, such an effect of AFTA tariffs was observed only for indigenous plants, or those whose primary sales market is the domestic market. Third, we found that the more productive plants experience a greater impact of AFTA tariffs on foreign inputs. In short, the reduction in AFTA tariffs encouraged input reallocation, at least in some specific firms in Indonesia.

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1. Introduction

Trade liberalization for the import of inputs is expected to enhance domestic firms' performance. The use of imported inputs plays a key role in improving product quality, especially in developing countries. However, there could be various types of barriers or bottlenecks in increasing the import of inputs. For example, it may be difficult for firms in developing countries to find reliable input suppliers abroad. Furthermore, they may need

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to adjust their output to match high-quality foreign inputs. Tariff rates constitute another typical barrier. Firms need to pay import duties for inputs procured from abroad, unlike for those obtained domestically. Therefore, the procurement costs of foreign inputs are expectedly higher than those of domestic inputs. Lowering such barriers encourages firms to increase the use of imported inputs.

This study empirically examines how a reduction in input tariffs changes firms' choices between domestic and foreign inputs. If no other type of barrier exists, the reduction in import tariffs directly raises the share of imported inputs. The inelastic response of foreign inputs to tariff reduction implies the existence of other types of barriers for import. We examine this choice using plant input data in Indonesia. Indonesia has reduced or eliminated import tariffs against member countries of the Association of Southeast Asian Nations (ASEAN) since the 1990s. The ASEAN Free Trade Area (AFTA) was established in 1993 among six ASEAN countries: Brunei, Indonesia, Malaysia, the Philippines, Singapore, and Thailand. Vietnam joined in 1995, followed by Laos and Myanmar in 1997, and Cambodia in 1999. Subsequently, the AFTA was updated as the ASEAN Trade in Goods Agreement (ATIGA) in 2010. Indonesia completed all scheduled tariff reductions or eliminations in 2010 (Okabe and Urata, 2013). We empirically investigate the effect of such tariff reductions on firms' input choices in Indonesia.

In addition to the tariff reduction exercise described above, the availability of unique data is another reason for our study in Indonesia. We employed Indonesian manufacturing surveys conducted from 2002 to 2010 for the study. The survey contained plant input information. It reports the value and quantity of domestic and foreign inputs separately at a nine-digit level of product classification, which is equivalent to a six-digit level of the harmonized system (HS) in trade statistics. Therefore, we can compute the share of imported inputs out of the total inputs at the plant-product level, using this dataset. By linking product-level tariff data with this dataset, we examine how tariff changes affect the share of imported inputs at the plant-product level. Specifically, we examine the role of most favoured nation (MFN) tariffs and AFTA preferential tariffs separately. Furthermore, we investigate the heterogeneous effects of tariffs in various dimensions.

Our findings can be summarized as follows: First, we found that the reduction of AFTA tariffs in Indonesia encouraged plants to raise the share of foreign inputs, although the changes in MFN tariffs did not have significant effects on their share. Second, such an effect of AFTA tariffs was observed only for plants whose main sales market is the domestic market, or for indigenous plants. This result is likely because plants selling mainly to foreign markets or foreign-owned plants enjoy other schemes for duty exemption, such as special economic zones or duty drawback regimes. Third, we found that more productive plants experience a greater effect of AFTA tariffs on foreign inputs. This result may be attributed to the existence of some costs for importing *per se*, or for changing the share of imported inputs in production. In short, the reduction in AFTA tariffs encouraged input reallocation,

at least in some specific firms in Indonesia.

Our study contributes to at least three strands of literature. The first is the literature that studies the firm-level relationship between exports and domestic sales (Salomon and Shaver, 2005; Vannoorenberghe, 2012; Berman et al., 2015; Bugamelli et al., 2015; Ahn and Mcquoid, 2017; Bardaji et al., 2019). While these studies investigate the allocation of sales between domestic and foreign markets, we examine allocation of inputs. Second, some studies examine the effects of tariffs on import prices and quality (Bas and Strauss-Kahn, 2015; Fan et al., 2015), while Amiti and Konings (2007) explore the effects of input (and output) tariffs on plant productivity. These studies show that reducing input tariffs improves firm performance. Our findings indicate that one source of improvement in firm performance is the increased share of foreign input. Finally, several studies examined the economic effects of duty-drawback regimes. Examples include Cadot, de Melo, and Olarreaga (2003), Ianchovichina (2004, 2007), Mah (2007), Dai et al. (2016), Brandt and Morrow (2017), and Vu et al. (2017). Tariff reduction is irrelevant for firms that already enjoy duty-free imports, such as those using duty-drawback regimes. Although we cannot directly examine the role of this regime, we found an insignificant effect of tariff reduction on export-oriented or foreign-owned plants, which tend to enjoy duty-drawback regimes.

The remainder of this paper is organized as follows. The next section discusses previous studies on the economic impacts of AFTA on ASEAN member states in general, and Indonesia in particular. Section 3 explains the empirical framework used to examine the effects of both AFTA and MFN tariff reductions on the share of foreign inputs in plant-level production. We report our estimation results in Section 4. Finally, Section 5 concludes the study.

2. Economic Effects of AFTA in Indonesia

This section reviews several studies on the economic effects of AFTA in Indonesia. AFTA is a type of preferential trade agreement (PTA), among hundreds of free trade agreements (FTAs) or regional trade agreements (RTAs), which have flourished around the world. In the case of AFTA, members adopted what may appear to be a formal PTA. Yet, in practice, ASEAN embraces what is called 'open regionalism' (Hill and Menon, 2010). Given that AFTA was implemented within a complex international trading architecture in which Indonesia and other ASEAN member states (AMS) are actively engaged, it is not straightforward to measure its impact on the economy.

Similar to other PTAs, AFTA may lead to both trade creation and diversion. For the former, AFTA can lead to the expansion of trade within ASEAN. Meanwhile, it can also lead to a reduction in trade with non-ASEAN countries. The removal of trade barriers within ASEAN allows firms in Indonesia to profitably export goods to another AMS, thus creating

trade within the region. Nevertheless, the preferential tariff within the AFTA will shift demand from a lower-cost producer outside ASEAN to one within the region, thus diverting trade patterns. Hence, the spirit of AFTA is to provide a cost advantage to firms in AMS by lowering tariffs within ASEAN. This cost advantage is expected to increase imports from the ASEAN countries.

An early analysis of AFTA demonstrated a minor impact of the agreement on economic welfare in five ASEAN countries. DeRosa (1995) used computable general equilibrium (CGE) modeling to analyze the impacts of both tariff and non-tariff barrier elimination in Indonesia, Malaysia, the Philippines, Singapore, Thailand, and their major trading partners. DeRosa's analysis revealed that AFTA would only result in minor improvements in economic welfare in the five ASEAN countries. Moreover, although there would be a small gain in intra-ASEAN trade, the gains from an alternative policy of unconditional MFN liberalization would be more than three times larger.

Several studies have investigated the effect of AFTA on trade by estimating gravity equations. For example, Wang and Winters (1992) and DeRosa (2008) reveal that AFTA has a positive and significant impact on intra-ASEAN trade flow. In addition, they found that AFTA was the most effective regional grouping among those included in the studies. Elliot and Ikemoto (2003) use a modified gravity equation to examine intra- and extra-ASEAN trade before and after the signing of AFTA, from 1982 to 1999. Their findings revealed that neither type of trade flow was significantly affected in the years immediately following the signing of the AFTA. In the long term, they argue that AFTA increased both intra- and extra-ASEAN trade conditional on ASEAN's continued openness to external partners.

Okabe and Urata (2013) examined the impact of AFTA on intra-ASEAN trade using a gravity model. They found positive and significant trade creation effects from tariff elimination for a wide range of products. They also found that the elasticity of tariff reduction on imports tends to be much larger than that on exports. Trade creation effects for new ASEAN members are relatively small compared to those for old members. Their results suggest that tariff elimination under the Common Effective Preferential Tariff Scheme facilitates production and sales networks for AFTA's original member countries, including Indonesia. Wong et al. (2017) examine the effects of AFTA on bilateral manufacturing trade between ten ASEAN countries and their trading partners. Their results suggest that AFTA has generated trade creation effects in exports, while its trade creation effects in imports outweigh its import diversion effects.

Hayakawa (2022) empirically explored the causal impacts of imports from China on intra-ASEAN trade by estimating the gravity-type equations for intra-ASEAN trade during 2000-2019. His motivation is that, although ASEAN countries have devoted significant efforts toward increasing intra-ASEAN trade by reducing or eliminating tariffs in the region, in effect, this share has not changed much. Instead, the share of imports from China in ASEAN has grown dramatically. The regression analyses show that imports from China

significantly increased, rather than reduced, intra-ASEAN trade. This surprising result was obtained by estimating observations with zero-valued trade and addressing endogeneity in the gravity equation with multiple high-dimensional fixed effects.

On the other hand, Hapsari and Mangunsong (2006) used the "complementarity" and "similarity" indices to examine the nature of bilateral trade between ASEAN economies. The more complementary the supply and demand of countries, the more they trade. In contrast, the more similar the supply and demand of countries, the less they trade. Their analysis found that the exports of ASEAN countries are generally more complementary to each other than to countries outside the association. Interestingly, in Indonesia, they found that exports were more complementary to Japan and the USA, than to other ASEAN countries. In terms of the similarity index, Indonesia shared a common export structure, mostly with Malaysia and Thailand. However, despite a higher similarity index, bilateral trade among these countries remains strong, measured by a positive association with bilateral exports. Since the export and import profiles of these countries have become more complementary to each other over time, we see sizeable intra-industry trade between them. Moreover, the similarity of the export structure of ASEAN members is one of the critical factors influencing the growth of intra-industry trade among ASEAN members, facilitating countries' participation in the global and regional production network.

In summary, previous ex-post studies on the trade effect of AFTA have mainly used product-level trade data. These studies have uncovered interesting findings, particularly regarding the significant trade creation effect of AFTA. On the other hand, this study examines this effect at a more detailed level, that is, the plant-product level. Such an analysis can uncover the heterogeneous trade creation effect according to plant characteristics such as productivity. Furthermore, we examine the share of imported inputs out of total inputs, not the value of imported inputs. Positive shocks to plant production may increase not only imported, but also domestic, inputs. The analysis of only imported inputs cannot identify whether the increase of imported inputs is greater than that of domestic inputs. Our analysis of the share of imported inputs enables us to examine the effect of the relative magnitude of domestic and imported inputs.

It is worth mentioning two dominant features of Indonesia's trade with ASEAN. First, Indonesia's share of trade with ASEAN is lower than that with the rest of the world, meaning that Indonesia trades predominantly with the rest of the world. Indonesia's exports to extra-regional markets are dominated by natural resources. Figure 1 shows that the share of exports to ASEAN increased slightly from around 19% of Indonesia's total exports to the world in 1998 to around 25% in 2019.[1] The share of imports from ASEAN initially increased from around 17% of Indonesia's total imports from the world in 1998,

[1] Prior to the establishment of AFTA, Indonesia's exports to the ASEAN countries amounted only to 10 percent of its total exports. After AFTA was established, Indonesia increased its export to the five ASEAN countries to 20 percent. (Hapsari and Mangunsong, 2006).

reaching a peak of 32% in 2008, and then gradually declining to around 24% in 2019. Second, within ASEAN, Singapore is the leading trade partner for Indonesia given its role as a regional entrepot.

=== Figure 1 ===

More detailed figures are as follows. Figure 2 shows that Indonesia's imports from ASEAN countries have increased significantly since 2003. They fell in 2009 due to the global financial crisis but recovered quickly until they peaked in 2013. Since 2014, Indonesia's imports from ASEAN have somewhat declined. On the contrary, imports from China have increased rapidly, surpassing imports from ASEAN in 2019. We also notice that Indonesia's imports from Japan have been declining, particularly since 2012. Figure 3 shows that Indonesia's exports to ASEAN countries have increased significantly since 2003. They fell in 2009 due to the global financial crisis but recovered quickly until reaching their peak in 2011. Since 2012, Indonesia's exports to ASEAN have somewhat declined. Interestingly, exports to China increased rapidly since 2017. Japan used to be Indonesia's number one export destination until 2009. Since then, Indonesia's exports to Japan have declined rapidly.

=== Figures 2 & 3 ===

3. Empirical Framework

This section explains our empirical framework for investigating the effects of tariffs on firms' input allocation. Our empirical model for firm *f*, product *p*, and year *t* is as follows:

$$Vshare_{fpt} = \alpha_1 \times \ln(1 + MFN_{pt}) + \alpha_2 \times \ln(1 + AFTA_{pt}) + u_{fp} + u_{ft} + \epsilon_{fpt}, \quad (1)$$

$$\text{where } Vshare_{fpt} \equiv \frac{Imports_{fpt}}{Domestic_{fpt} + Imports_{fpt}}.$$

Imports and *Domestic* represent the values of imports and of domestic inputs, respectively. Thus, the dependent variable is the share of import values, out of the total input values of for product *p* for firm *f* in year *t*. Product *p* refers to the HS six-digit code. *MFN* and *AFTA* are the MFN tariffs and AFTA preferential tariffs, respectively, in Indonesia. Negative coefficients for these tariff variables indicate that a reduction in tariffs increases the share of imported inputs. We control for two types of fixed effects (u_{fp} and u_{ft}), which are explained below. ϵ_{fpt} is a disturbance term.

Our framework is based on firm-level demand functions of the inputs. Regardless of the input source, the demand for inputs depends on factor prices, firms' productivity, and

the magnitude of the firm's output values. The factor prices include labor wages, capital rent, and input prices. In the case of imported inputs, prices include not only factory-gate input prices, but also tariffs. This part of the tariff appears in our main independent variables in Equation (1). The time-invariant firm-input fixed effects and time-variant firm fixed effects jointly control for the other elements. For example, a firm's productivity may have an input-specific component controlled by firm-product fixed effects. In addition, firms' investment in R&D activities enhances their productivity as a whole, which is captured by firm-year fixed effects. This type of fixed effect also controls for firms' output values. To some extent, the year component in firm-year fixed effects controls for prices for primary factors (e.g., labor or capital). We estimate Equation (1) using the ordinary least squares (OLS) method.

We employed Indonesian manufacturing surveys by Indonesia's Statistical Agency (Badan Pusat Statistik; BPS) covering 2002-2012. As shown in Figures 1 and 2, Indonesia's imports from ASEAN rose during this period. These surveys included all manufacturing plants with 20 or more workers, and consisted of two types of datasets. One dataset contains production and cost information at the plant level, including foreign ownership, total number of workers, amount of capital stock, total value of production, and costs of material inputs and labor. The other dataset is a plant product-level dataset. The output side includes the value, quantity, and export share of each product produced by a plant as well as the nine-digit level of the Commodity Classification of Indonesia (KKI). On the input side, we have data on the value and quantity of domestic and imported inputs separately at the nine-digit level. We converted this nine-digit code into an HS six-digit code. We constructed our dependent variable using input information. Data on tariffs were obtained from the World Integrated Trade Solution (WITS). We took a simple average of tariffs at the tariff-line level using the HS six-digit code.

There are two noteworthy issues with these data. First, although we establish Equation (1) at the firm level, our analysis is conducted at the plant level because our plant-level data cannot be aggregated according to the firm. Therefore, our fixed effects to be included are plant-product and plant-year fixed effects. An analysis at the firm level may be better if the choice of input allocation is made at that level. However, this difference may be trivial because most firms in Indonesia are single-plant firms. Indeed, information on firm structures, which is available only in the data for 2006, shows that only about 5% of manufacturing firms are multi-plant firms.

Second, there was no selection of products with tariff reductions, because Indonesia eliminated tariffs under the AFTA regime for almost all products in 2010. AFTA tariffs decreased gradually to zero. Thus, the cross-product variation in AFTA tariffs comes mainly from the base rates in the pre-liberalization period. Furthermore, a significant part of the tariff reduction schedule was determined in the 1990s (i.e., the pre-study period). Depending on the base rates, the basic timeframe for reducing or eliminating tariffs was

specified for each product. As a result, the time-series changes in AFTA tariffs were also determined mainly on the basis of product characteristics of the pre-study period, which are time-invariant in our study and are controlled by product fixed effects. This framework reduces the risk of an endogeneity bias.

Before reporting our estimation results, we provide a brief overview of the tariffs in Indonesia during the study period. Figure 4 depicts the simple averages of the MFN and AFTA tariffs. The AFTA tariffs were approximately 5% in 2002. However, as mentioned above, they were gradually reduced thereafter. As a result, in 2010, the AFTA tariffs were zero for almost all products. One observation is that although the average AFTA tariffs rose slightly in 2004, this rise was due to the aggregation of tariffs. The tariff data are available at the nine-digit level in 2003 and the ten-digit level in 2004. Taking a simple average of different-digit tariffs yielded an increase in AFTA tariffs, although AFTA tariffs never rose for any product. On the contrary, MFN tariffs show greater volatility. They rose in 2004. This increase is caused not only by the aggregation issue, but also by the actual tariff rise in some products, such as base metals, to protect the domestic industry.[2]

=== Figure 4 ===

Finally, we checked the difference in unit prices between foreign and domestic inputs. To do this, we computed the ratio of the foreign input price to the domestic input price and then took its log. We computed this logged ratio at the plant product-year level. A positive value indicates that foreign input prices are higher than domestic ones. In the computation, we restricted plant-product pairs only to those with positive values in both foreign and domestic inputs. The total number of study observations was 2,044. The kernel density is depicted in Figure 5, which shows a peak around a small positive value. Indeed, the mean and median values are 0.76 and 0.15, respectively. Since unit prices are taken as a proxy for quality, these positive values indicate that foreign inputs imported into Indonesia are of better quality than domestic inputs. Thus, the rise in foreign input shares due to tariff reductions may result in improved output quality.

=== Figure 5 ===

4. Empirical Results

[2] Due to this systematic fluctuation based on the concurrent product characteristics, MFN tariffs may become a source of endogeneity bias. However, it is difficult to find time-variant product characteristics that can explain the fluctuation of MFN tariffs, which might be used as an instrument. Nevertheless, the coefficients for MFN tariffs are insignificant in almost all specifications as shown later.

This section presents our estimation results. Table 1 presents the basic statistics of these variables. We clustered standard errors by product in all estimations. The baseline result of equation (1) is shown in Column (I) of Table 2. While MFN tariffs do not have significant effects, the reduction in AFTA tariffs raises the share of imported inputs. The insignificant result for MFN tariffs may be due to fewer changes. Indeed, as shown in Table 1, the coefficient of variation is smaller for MFN tariffs than for AFTA tariffs. However, a one-percentage-point reduction in AFTA tariffs significantly raises the share of imported inputs by four percentage points. This magnitude appears economically significant.

=== Tables 1 & 2 ===

We conducted three types of robustness checks. First, we restricted the study plants to only (potential) importers. If importing requires firms to incur fixed costs, the effect of tariffs on imports will not be uniform between importers and non-importers. In particular, non-importers may not start importing until the tariffs are reduced to a certain level. To shed light on the continuous effect of tariffs, we focused on importers. Specifically, we selected only those with any positive imports in at least one year during the study period. The results are presented in column (II) and are similar to those in column (I). The coefficient of MFN tariffs is insignificant, while the coefficient of AFTA tariffs is significant and negative. The absolute magnitude of the coefficient for AFTA tariffs significantly increases compared with that in column (I). In column (II), a one-percentage-point reduction in AFTA tariffs significantly raises the share of imported inputs by 27 percentage points. This magnitude was very large. The decrease in AFTA tariffs may induce importing firms to switch almost completely to inputs from ASEAN.

The other two robustness checks are as follows. The reduction of AFTA tariffs is irrelevant for products which do not require imports from ASEAN because AFTA tariffs are preferential tariffs only for ASEAN countries. Therefore, as a second check, the study products in column (III) are restricted to those with positive imports from ASEAN, although this restriction does not significantly reduce the number of observations. Third, as found in previous studies (e.g., Feenstra, 1989; Ludema and Yu, 2016; Görg et al., 2017), tariff reductions change import prices. Thus, even if the import quantity does not change, AFTA tariffs shift the share of imported inputs. To focus on the quantity change, we evaluate the foreign input share in terms of quantity and report the results in column (IV). The results in these two columns are somewhat similar to those in column (I), particularly regarding the absolute magnitude of the coefficient for AFTA tariffs, which is approximately −0.04. In sum, on average, the reduction in AFTA tariffs significantly raises firms' share of imported inputs in total inputs, which is consistent with our expectations.[3]

[3] One drawback in our dataset is that it cannot differentiate source countries in foreign inputs. Therefore, if firms increase inputs from ASEAN countries by reducing those from other foreign countries, the share

Next, we investigated the two types of heterogeneous tariff effects. One is the role of special economic zones or duty drawback regimes, which exempt duties for imported inputs used for the manufacture of export products. The reduction of AFTA tariffs does not matter for firms that enjoy the facilities offered by these regimes because they are already exempted from paying import duties. However, because we do not have direct information on these regimes, we adopt two indirect approaches. First, we divided the study plants based on whether their primary sales market is domestic or abroad. Since the regimes above can be applied only when imported inputs are used to produce export goods, plants producing for the domestic market are likely to benefit from input tariff reduction. Second, we divided the plants into indigenous and foreign-owned plants. The latter kind of firms tends to be located in special economic zones. Thus, indigenous plants are likely to be significantly affected owing to tariff reductions.

The results are presented in Table 3. The results based on the first and second approaches are presented in columns "Main market" and "Capital source," respectively. In the first approach, only domestic market-oriented plants have a significantly negative coefficient for AFTA tariffs, consistent with our expectation that exporters are likely to enjoy the aforementioned regimes when importing foreign inputs. Similarly, the results based on the second approach show a significantly negative coefficient for AFTA tariffs only for indigenous plants. Although both results for AFTA tariffs are significant at the 10 percent level, these results show that the effect of AFTA tariffs on the share of imported inputs is insignificant in plants that are likely to enjoy other types of preference regimes in importing. The coefficients of the MFN tariffs were again estimated to be insignificant.

=== Table 3 ===

The second type of heterogeneity is sourced from plant productivity. Specifically, we introduce the interaction terms of the plant's total factor productivity (TFP) with tariff variables.[4] As shown in Table 1, we also estimate this model for importers or quantity-based shares. The results are presented in Table 4. All columns show significantly negative coefficients for the interaction term of TFP with AFTA tariffs. Non-interacting AFTA tariffs have positive coefficients, although they are insignificant when focusing on importers. These results imply that the reduction of AFTA tariffs raises the foreign input share to a greater extent in more productive plants than in less productive ones. This result may indicate the existence of costs for adjusting the share of imported inputs in production. In other words, only plants that are productive enough to cover those costs may be able to adjust these. As found in existing studies, an increase in imported inputs contributes to

of foreign inputs, i.e., our dependent variable, may not change. Namely, we cannot identify the input reallocation across foreign inputs but can do only that between foreign and domestic inputs.

[4] We employ the TFP measure proposed in Wooldridge (2009).

enhancing firms' productivity. Therefore, our result implies that trade liberalization leads to an expansion in the productivity gap among firms by further increasing productive firms' productivity.

=== Table 4 ===

5. Concluding Remarks

This study empirically examines how a reduction in input tariffs changes firms' choices between domestic and foreign inputs. To do so, we shed light on the gradual decrease in AFTA tariff rates in Indonesia. As a result, we found that the reduction of AFTA tariffs encouraged input reallocation, at least in a few types of firms in Indonesia, including those whose primary sales market is the domestic market, indigenous plants, and the more productive plants. These results uncover the source of the finding in Amiti and Konings (2007), that the reduction of input tariffs contributed to raising plant productivity in Indonesia. This implies that the rise in the share of foreign inputs, driven by the input tariff reduction, leads to an increase in plant productivity, perhaps due to the increase in high-quality inputs. Since enhancing productivity is one of the most important elements of economic growth in middle-income countries such as Indonesia, the elimination of input tariffs would be a crucial policy measure in the country. In addition, governments should not impose restrictions on firms' input sources (e.g., local content rules) so that they can flexibly change their inputs according to tariffs.

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Table 1. Basic Statistics

	Obs	Mean	Std. Dev.	Min	Max
Vshare	97,692	0.064	0.237	0	1
Qshare	97,692	0.062	0.235	0	1
ln (1+MFN)	97,692	0.059	0.056	0	1.194
ln (1+MFN) * ln TFP	97,692	0.223	0.214	0	5.506
ln (1 + AFTA)	97,692	0.021	0.050	0	1.194
ln (1 + AFTA) * ln TFP	97,692	0.081	0.189	0	5.506

Source: Authors

Table 2. Estimation Results

	(I)	(II)	(III)	(IV)
ln (1+MFN)	0.047	0.281	0.051	0.048
	[0.033]	[0.172]	[0.033]	[0.034]
ln (1 + AFTA)	-0.042*	-0.267**	-0.044*	-0.042*
	[0.022]	[0.130]	[0.023]	[0.023]
Sample	All	Importers	ASEAN	All
Share	Value	Value	Value	Quantity
Number of obs.	97,692	21,239	95,229	97,692
Adj. R-squared	0.894	0.863	0.892	0.891

Notes: This table reports the estimation results obtained using the OLS method. ***, **, and * indicates, respectively, the 1, 5, and 10 % levels of statistical significance. Standard errors clustered at the HS six-digit level are reported in parentheses. In all specifications, we control for the plant-product and plant-year fixed effects. In column "Importers," we restrict the study plants to only those with any positive imports in at least one year during our study period. The study products in column "ASEAN" are restricted to those with positive imports from ASEAN. We examine the share of foreign inputs evaluated on a value or quantity basis.

Table 3. Heterogeneous Effects according to Main Market and Capital Source

	Main market		Capital source	
	Domestic	Foreign	Domestic	Foreign
ln (1+MFN)	0.061	-0.044	0.05	-0.011
	[0.037]	[0.220]	[0.035]	[0.145]
ln (1 + AFTA)	-0.039*	-0.186	-0.043*	-0.01
	[0.022]	[0.139]	[0.023]	[0.170]
Number of obs.	77,369	10,167	88,975	8,717
Adj. R-squared	0.899	0.888	0.879	0.916

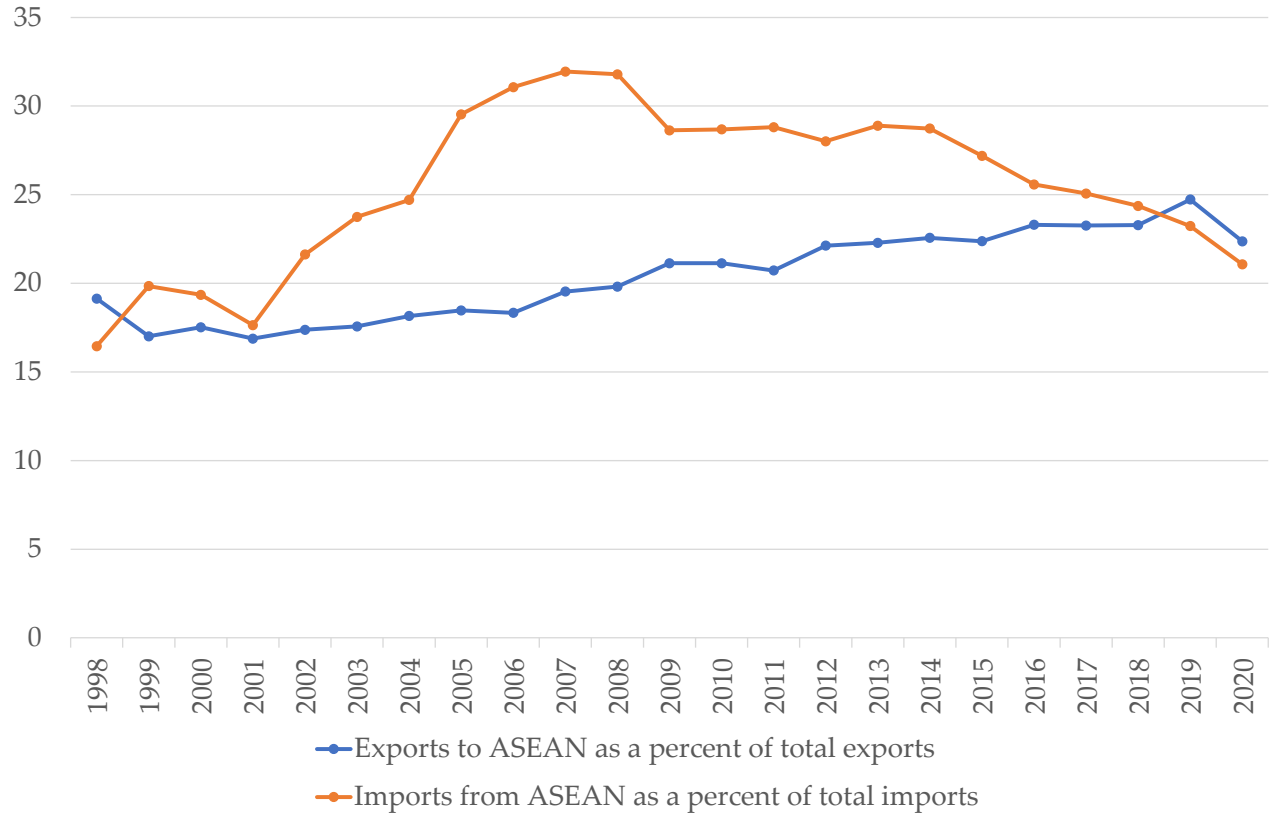
Notes: This table reports the estimation results obtained using the OLS method. ***, **, and * indicates, respectively, the 1, 5, and 10 % levels of statistical significance. Standard errors clustered at the HS six-digit level are reported in parentheses. In all specifications, we control for the plant-product and plant-year fixed effects. In column "Main market," plants are classified based on whether the share of foreign sales out of total sales is greater than 50% or not. In "capital sources," plants are classified into either indigenous firms or foreign-owned firms. We examine the share of foreign inputs evaluated on a value basis.

Table 4. Heterogeneous Effects according to Productivity

	(I)	(II)	(III)	(IV)
ln (1+MFN)	-0.139	-0.191	-0.119	-0.087
	[0.106]	[0.500]	[0.104]	[0.471]
ln (1+MFN) * ln TFP	0.050*	0.117	0.045	0.093
	[0.030]	[0.115]	[0.030]	[0.110]
ln (1 + AFTA)	0.282**	0.794	0.288**	0.839
	[0.131]	[0.591]	[0.129]	[0.574]
ln (1 + AFTA) * ln TFP	-0.086**	-0.259*	-0.088**	-0.270**
	[0.036]	[0.140]	[0.036]	[0.137]
Sample	All	Importers	All	Importers
Share	Value	Value	Quantity	Quantity
Number of obs.	97,692	21,239	97,692	21,239
Adj. R-squared	0.894	0.863	0.891	0.861

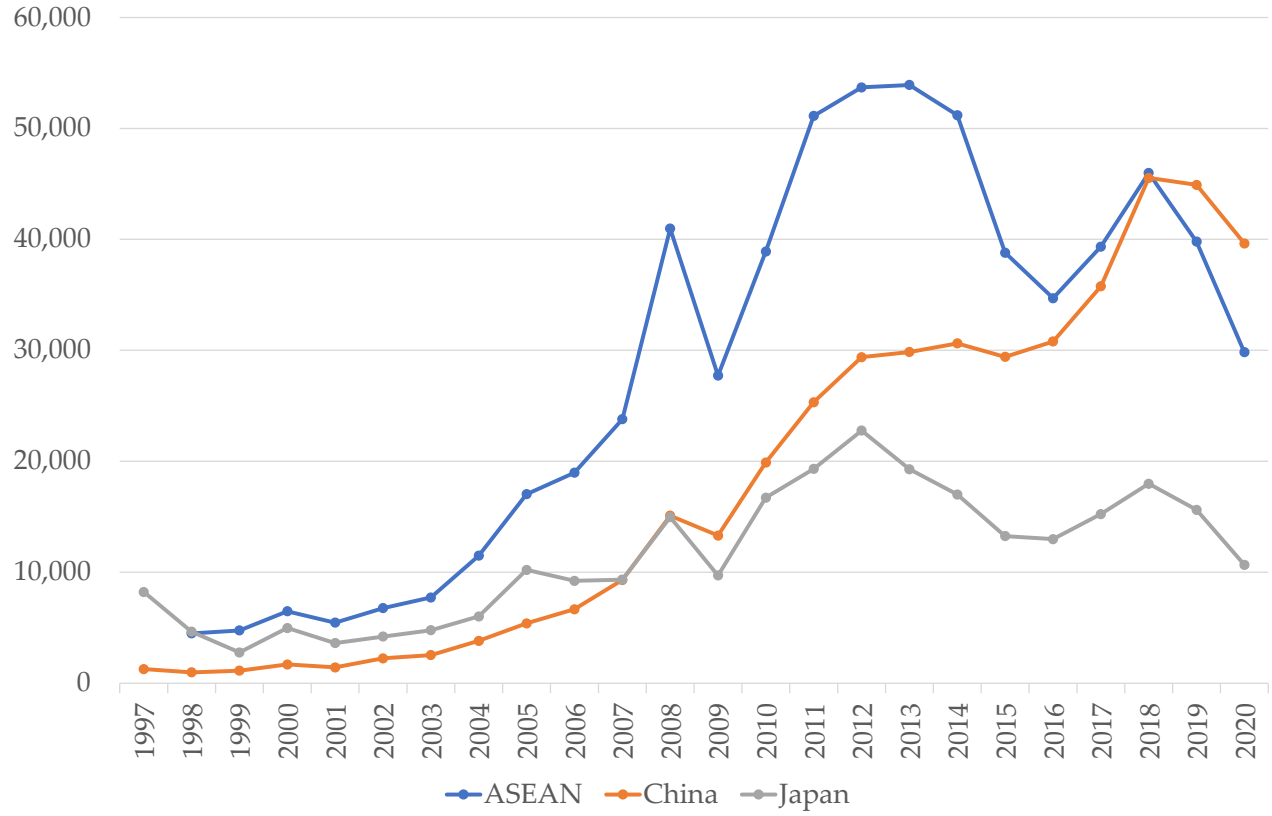
Notes: This table reports the estimation results obtained using the OLS method. ***, **, and * indicates, respectively, the 1, 5, and 10 % levels of statistical significance. Standard errors clustered at the HS six-digit level are reported in parentheses. In all specifications, we control for the plant-product and plant-year fixed effects. In column "Importers," we restrict the study plants to only those with any positive imports in at least one year during our study period. We examine the share of foreign inputs evaluated on a value or quantity basis.

Figure 1. Shares of Indonesia's Trade with ASEAN out of Total Trade (%)



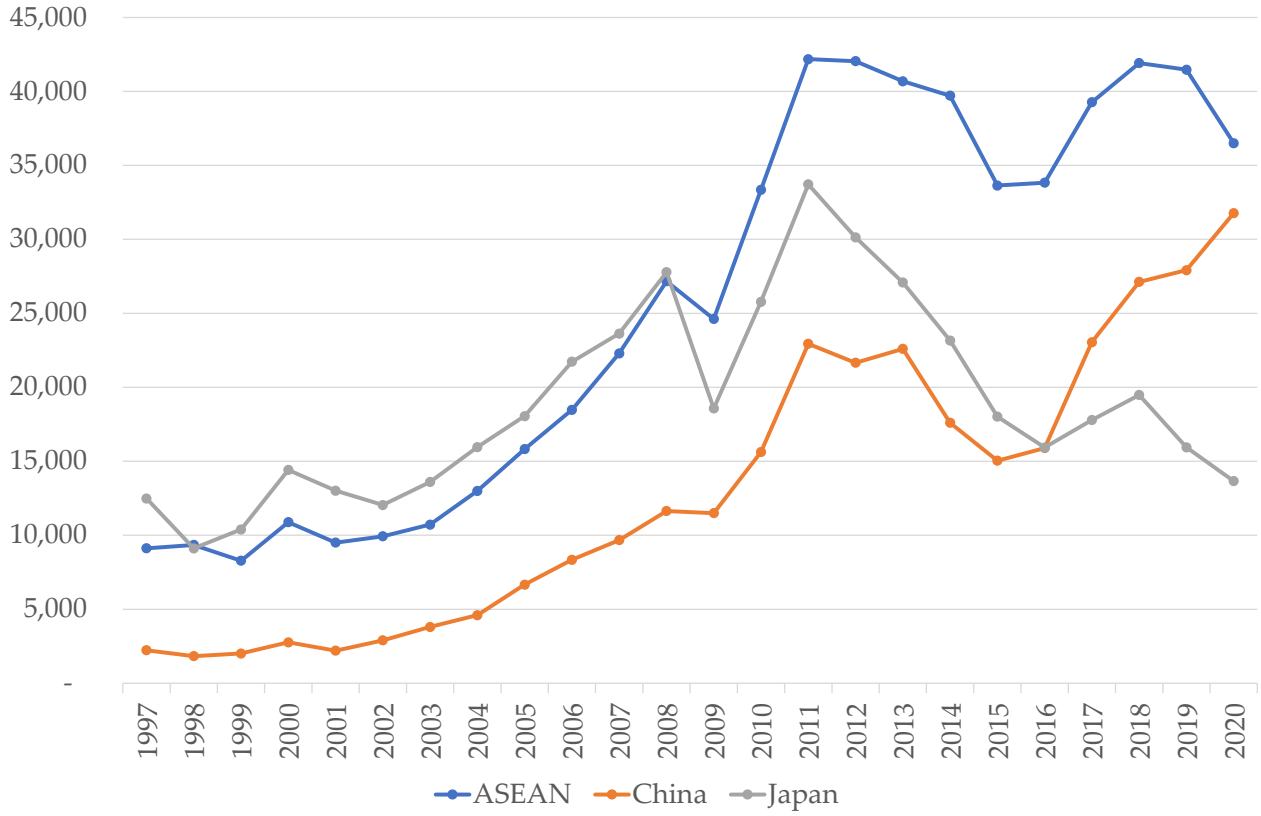
Source: Statistics Indonesia (BPS)

Figure 2. Indonesia's Imports (Million US dollars)



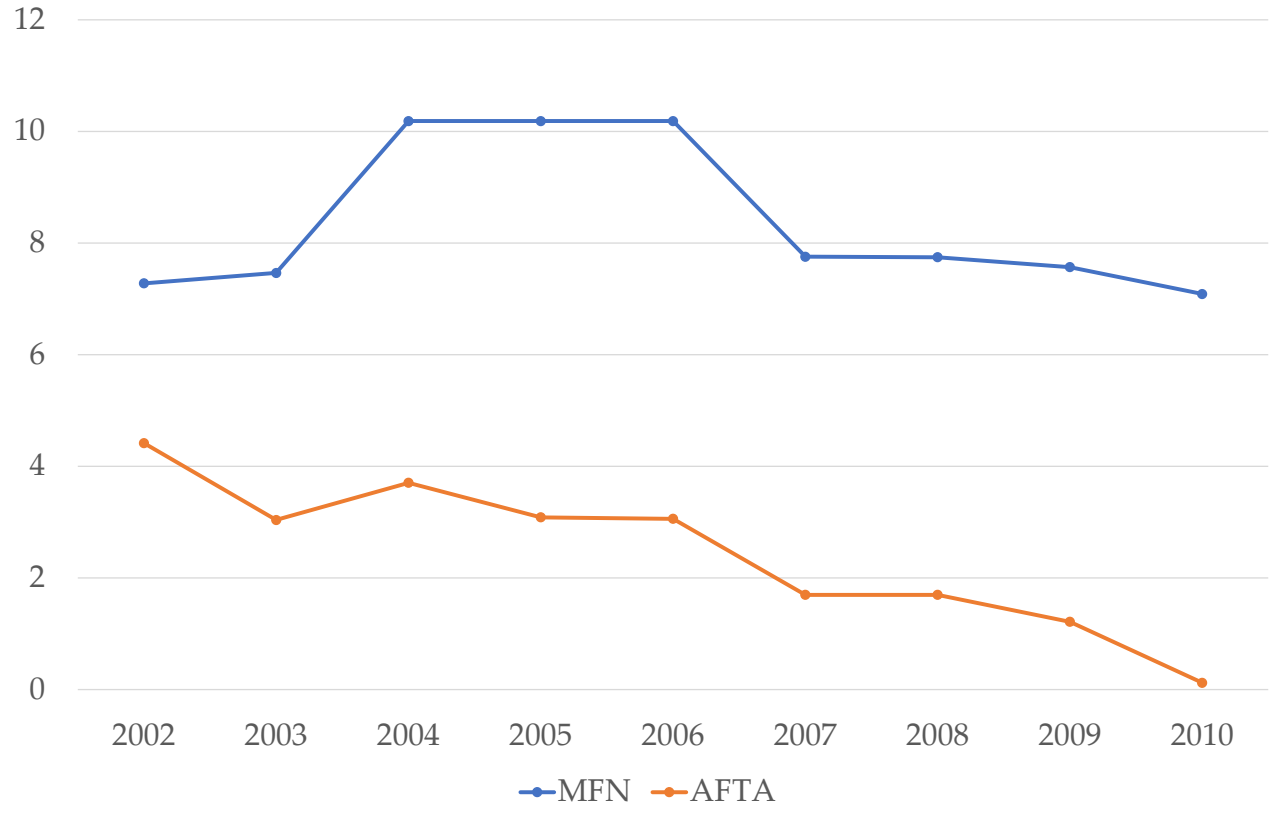
Source: Central Bureau of Statistics (BPS)

Figure 3. Indonesia's Exports (Million US dollars)



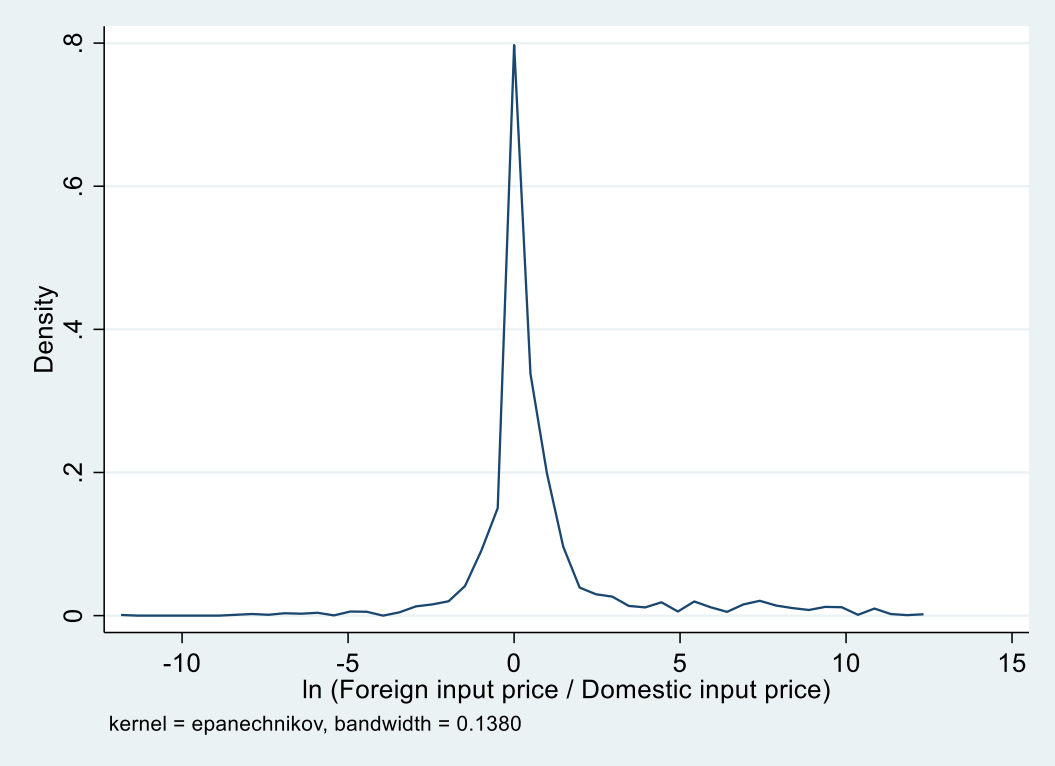
Source: Central Bureau of Statistics (BPS)

Figure 4. Tariffs in Indonesia (%)



Source: WITS

Figure 5. Distribution of Unit Price Differentials



Source: Indonesian manufacturing surveys (BPS)

Notes: In this figure, we restrict plant-product pairs only to those that have positive values for both foreign and domestic inputs. The total number of study observations is 2,044. The mean and median values are 0.76 and 0.15, respectively.