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Impact of Free Trade Agreement Utilisation on Import Prices[§]

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Abstract: We examine the impact of free trade agreement (FTA) utilisation on import prices. For this analysis, we employ establishment-level import data with information on tariff schemes, that is, the FTA and most-favoured-nation schemes used for importing. Unlike previous studies in this literature, we estimate the effects of FTA utilisation on prices by controlling for the differences in importing firms' characteristics. Our main findings are as follows. First, the effect of FTA use is overestimated when not controlling for the importing firm-related fixed effects. Second, the average effect of the tariff reduction induced by FTA utilisation is a 3.6–6.7 percent rise in import prices. Third, in general, we do not find a price rise resulting from the costs of compliance with the rules of origin. Fourth, we also find several other factors that affect import prices in the case of FTA utilisation.

Keywords: FTA; Prices; Thailand

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Introduction

The economic impact of trade liberalisation has received much attention from not only researchers but also policymakers. This attention is because both export-led growth and import-led growth have emerged as important tools for development strategies (see, for example, Lawrence and Weinstein [1999]). The reduction of tariffs has been implemented under the most-favoured-nation (MFN) principle, which is the backbone of policy discipline for the General Agreement on Tariffs and Trade (GATT) and the World Trade Organization (WTO). Tariff reductions under the WTO, however, have not advanced well in the Doha Development Agenda. As a result, most countries in the world have started to aggressively exploit the 'exceptions' to the MFN principle, of which a typical form is the free trade agreement (FTA).[1] By July 2016, nearly 500 FTAs had been notified to the GATT and the WTO.

The purpose of this paper is to empirically investigate the effects of firms' FTA utilisation on trade prices.[2] One of the drivers of the economic impact of FTAs is the change in trade prices. The reduction of tariffs through FTAs basically lowers the consumer prices of imported products, benefiting consumers and promoting more efficient resource allocation. These effects result in improving welfare in importing countries. Meanwhile, the rise in (tariff-exclusive) trade prices amplifies the exporting country's benefits through increasing the value of exports and thus exporters' profits. Besides these benefits, the increased gains from exporting may reallocate resources from less productive firms to more productive firms, and thereby improve macro-level

[1] In this paper, we interchangeably use the following expressions: free trade agreement (FTA), regional trade agreement, and economic partnership.

[2] Although another important factor will be the extent of the increase in export quantities, this paper focuses on the export price rise. We use the following expressions interchangeably: trade price, export price, and import price.

productivity, as suggested by Melitz (2003). Such a change in trade prices may be driven by firms that start using FTA schemes or by the entry and exit of exporters and/or importers. In this paper, among those changes, we focus on and examine the within-transaction change of trade prices (i.e. the change by firms starting FTA utilisation).[3]

There are some channels for within-transaction price changes through FTA utilisation. The traditional channel is based on the change of markup due to the use of FTA preferential rates, which are lower than MFN rates. As is well summarised in Feenstra (2003), under some conditions, the reduction of tariff rates raises export prices. We call this effect the 'tariff effect.' Another possible channel is the rise of production costs due to the change of procurement sources in order to comply with the rules of origin (RoO). In this paper, we call this the 'RoO effect.' Price bargaining between exporters and importers may also raise export prices. The costs of FTA utilisation are borne by the exporters, while importers can benefit without incurring substantial costs. In addition to the above-mentioned procurement adjustment costs for RoO compliance, exporters incur costs in collecting several kinds of documents in order to certify the origin of goods, including lists of inputs, production flow charts, production instructions, invoices for each input, and contract documents. Because of these costs, potential FTA exporters bargain over export prices with importers.

[3] We do not consider the price change by non-FTA users through the increased competition with FTA users. If this change is significant, our estimates in the empirical analysis will be biased, as in those found in all previous studies in this literature. Also, our focus on the within-transaction change is to identify the effects of FTA utilisation on import prices by controlling for firm-related fixed effects. In short, one of the aims of this paper is to show some of the biases that exist in previous studies.

Several studies have empirically quantified the effects of FTAs on trade prices.[4] Most of these studies employ product-level import data to differentiate trade values according to tariff scheme. Cadot *et al*. (2005) found a rise in export prices by Mexican textile and apparel exporters through the use of the North American Free Trade Agreement of around 80 percent of the tariff margin (the difference between the FTA and MFN rates). Ozden and Sharma (2006) examined the United States' Caribbean Basin Initiative's impact on the prices received by eligible apparel exporters and found that export prices rose by around 65 percent of the tariff margin. African apparel exporters captured 16–53 percent of the tariff margin under the African Growth and Opportunity Act (Olarreaga and Ozden, 2005). Cirera (2014) found the rise of export prices to the European Union through the use of the generalised scheme of preferences and its related schemes to be 17–80 percent of the tariff margin. Overall, previous studies using product-level data have found higher export prices for exporters trading under FTA schemes than under MFN schemes.

The difference in export prices may reflect not only the use of different tariff schemes but also the characteristics of the firms. Indeed, as demonstrated by Demidova and Krishna (2008), exporters under MFN and FTA schemes are systemically different in terms of, say, productivity.[5] Thus, for example, if productive firms have lower export prices due to having lower marginal costs and are likely to use FTA schemes when exporting, the export prices under the FTA schemes will be related not only to the effects of the FTA use but also the effect of the exporter's productivity when using the FTA scheme. In addition to these exporter characteristics, importer characteristics may also

[4] Feenstra (1989) was the first to examine the effects of tariff rates on trade prices, though he did not examine the tariff changes of FTAs. The general changes to trade prices by tariff rates are called the 'tariff pass-through'. For example, Gorg *et al*. (2010) examined the tariff pass-through for Hungarian exports at the firm level but did not find significant tariff pass-through.

[5] Demidova and Krishna (2008) introduce the choice of tariff schemes into Melitz's (2003) firm-heterogeneity model.

affect the use of FTA schemes in trading and yield biases for the estimates on the effects of FTAs on export prices. In sum, obtaining unbiased estimates on the effects of FTAs on export prices requires consideration of firm-level factors. Indeed, to the best of our knowledge, there have not been any studies that have dealt with these problems successfully.

To examine the effects of FTA utilisation on import prices, we employ import data for Thailand. As mentioned above, exporting firm characteristics, such as productivity, play a crucial role in the choice of tariff schemes. Therefore, it is ideal to directly control for such exporting firm characteristics by employing export-side data. However, in general, the use of exporter-side data in the FTA literature has the following problems. First, the data on FTA utilisation for exports is difficult to obtain. FTA utilisation data is usually obtained from customs records in the case of imports and from issuance of certificates of origin (CoO) in the case of exports. In the case of FTAs adopting the self-certification system, there is no way of knowing the tariff scheme of the exports, since the CoO information is kept by the exporting company.[6] Second, as in the case of regular trade data, import data is believed to be more accurate than export data. In the case of FTA utilisation data, export-side data based on the issuance of CoO is likely to overestimate the true value because exporters do not necessarily export the products under FTA schemes, even if they have obtained CoO.[7]

[6] For example, these include the North American Free Trade Agreement, the United States (US)-Australia FTA, the US-Singapore FTA, the Trans-Pacific Partnership, the Singapore-New Zealand FTA, the Thailand-New Zealand FTA, the Australia-New Zealand FTA, the Mexico-Chile FTA, and the US-Republic of Korea FTA.

[7] The difference in the tariff line-level harmonized system codes between exporting and importing countries is another reason for the difficulty in the use of export-side data. Since FTA eligibility or preferential rates are defined at the tariff line-level in importing countries, a correspondence table of tariff line-level harmonized system codes between exporting and importing countries is necessary. For more details on the non-use of preferential exports after obtaining CoO or the differences between export-side data and import-side data in the context of FTA utilisation, see Hayakawa *et al*. (2013a).

Our dataset is based on transaction-level import data for Thailand during 2007–2011.[8] It enables us to identify not only the date of import, firm, branch, exporting country, and commodity (at the 2007 harmonized system (HS) eight-digit level) but also the tariff scheme (e.g. FTA scheme or MFN scheme) used by the importing firm and branch.[9] For the period 2007–2011, Thailand had bilateral and/or plurilateral FTAs with 15 countries.[10] Among those FTAs, we focus on the effects of utilising the FTA with the Republic of Korea (henceforth, Korea) (the ASEAN-Korea FTA, AKFTA). One of the main reasons for this choice is that the AKFTA entered into force in the middle of our sample period, in 2010. Also, the FTA came into force at a time that was unpredictable for firms in Thailand due to exogenous events, such as the coup d'état. These features make our empirical identification on the effects of FTA utilisation more valid. Another reason is that we can avoid firms' complicated decisions on tariff schemes. Most of the FTAs by Thailand have overlapped in country coverage. For example, Thailand has not only bilateral but also plurilateral FTAs with Japan, Australia, New Zealand, and India. When multiple FTA schemes are available, firms can choose the tariff scheme from among the MFN rates, bilateral FTA rates, and plurilateral FTA rates. Since our aim is not to examine such complicated decisions on tariff schemes, we focus on imports from Korea, which has a single FTA scheme with Thailand.

[8] This period includes the global financial crisis in 2007/2008. If the rise of export prices is less likely to be accepted by the importers due to the crisis, our estimates on the effects of FTA utilisation may be underestimated.

[9] Although several recent empirical papers have used firm-level trade data (e.g. Amiti *et al*. (2014); Berman *et al*. (2012); and Eaton *et al*. (2011)), few studies have used data that enable us to identify the tariff scheme. One exception is Cherkashin *et al*. (2015), however, their dataset covered only the apparel industry, while our dataset covers all sectors. Takahashi and Urata (2010) and Hayakawa (2014) employed firm-level survey data that can identify firms' FTA use in their trading. However, the survey data these studies used only covered some of the trading firms and did not enable them to identify commodities at a detailed level.

[10] These countries are Australia, China, Japan, Korea, India, New Zealand, Philippines, Brunei Darussalam, Cambodia, Lao PDR, Myanmar, Malaysia, Indonesia, Singapore, and Viet Nam.

More specifically, we examine the effects of FTA utilisation by controlling for various fixed effects. To do so, our estimation sample includes imports from not only Korea but also countries with which Thailand did not have an FTA. Furthermore, we estimate import price equations at the importing establishment-level rather than at the importing firm level. Since this yields more variation across observations within a given importing firm, it becomes easy to control for importing firm characteristics. As a result, we can examine how import prices change for the same establishment before and after AKFTA utilisation by controlling for time-variant importing firm fixed effects in addition to importing establishment-exporting country-product fixed effects and time-variant exporting country-sector fixed effects. Our estimates will thus be less biased compared to those obtained by previous studies.

With these strategies, we conduct various analyses on the effects of FTA utilisation on import prices. We first simply regress import prices on an FTA utilisation dummy in order to see how the results change when we control for various importing firm-related fixed effects. This analysis will uncover the existence of biases in the estimates found in previous studies. Then, we examine the tariff and RoO effects separately. As far as we know, no studies have presented these separate estimates. Such separate examination of the effects of FTA utilisation is important once one realises that the simple reduction of MFN rates yields the tariff effect but not the RoO effect. Namely, the RoO effect does not appear in the reduction of MFN rates because firms do not need to comply with RoO when exporting under MFN rates. In this sense, the effects of FTA utilisation on import prices may be qualitatively different from those from the reduction of MFN rates. Finally, we further investigate how the effects of FTA utilisation differ according to the size of the importing firm, the existence of competitors in terms of FTA users, and the invoicing

currency. These analyses will contribute to enhancing our understanding on how the benefits from FTA utilisation are realised.

The rest of this paper is organised as follows. In Section 2, we theoretically demonstrate how FTA utilisation affects import prices, focusing particularly on the tariff and RoO effects. After specifying our empirical framework in Section 3, we report our estimation results in Section 4. Section 5 concludes the paper.

1. Theoretical Framework

This section explains the theoretical background of our estimation. We first set up our model. Specifically, we consider a monopolistic competition model where products are differentiated within the same product category. Then, we examine how the tariff reduction and RoO compliance through FTA utilisation change import prices. Finally, in order to demonstrate that the choice of FTA schemes is not random across firms, we consider the selection of tariff schemes by exporters.

1.1. Basic Setup

Consider an economy with *L* consumers, who have symmetric preferences over a continuum of imported varieties of products supplied within the same product category. The utility of each consumer is given by

$$U = \int_{i \in \Omega} u(c_i) di, \tag{1}$$

where c_i is each individual's consumption of product variety i and Ω is the set of available product varieties. We assume $u(0) = 0$, $u'(c_i) > 0$, and $u''(c_i) < 0$ for $c_i > 0$. Each consumer supplies one unit of labour and earns w. Without loss of generality, we set $w = 1$. Let p_i denote the consumer price of product variety i.

Consumers individually maximise U subject to $\int_{i\in\Omega} p_i c_i di \leq 1$. By the first-order condition, the inverse individual demand becomes

$$p_i(c_i) = \frac{u'(c_i)}{\lambda}, \tag{2}$$

where $\lambda = \int_{i\in\Omega} u'(c_i)c_i di$ is the marginal utility of income. We can calculate the price elasticity of individual demand as

$$\varepsilon_i(c_i) = -\frac{p_i(c_i)}{p_i'(c_i)c_i} = -\frac{u'(c_i)}{u''(c_i)c_i}. \tag{3}$$

The elasticity needs to satisfy $\varepsilon_i(c_i) > 1$ to derive the equilibrium price. Under constant elasticity of substitution preferences, which are often assumed for tractability in monopolistic competition models, the price elasticity of demand is constant and does not depend on c_i. Under constant price elasticity, however, a tariff reduction does not affect the import price, as we will see below. We need a variable price elasticity of demand to examine how a tariff reduction affects the import price.

Here, we focus on imported product varieties. Since demand is symmetric for all imported product varieties, we drop the variety index hereafter. The (tariff-exclusive) import price is denoted by p^{imp}. Let $T \in \{T^{FTA}, T^{MFN}\}$ be the ad valorem tariff imposed on the imports. Then, we have $p = (1+T)p^{imp}$. The tariff under the FTA scheme should be lower than the tariff under the MFN scheme: $T^{FTA} < T^{MFN}$. If the firm utilises the FTA scheme, however, it must incur the fixed documentation cost to certify the origin of products, which is given by F.

Because consumers are symmetric, the production of each product variety is the sum of their individual consumptions and is given by $q = cL$. Let θ denote a parameter that takes $\theta = 1$ if the firm utilises the FTA or takes $\theta = 0$ if it chooses the MFN tariff. Then, the tariff level that the firm faces is given by $T(\theta) = \theta T^{FTA} + (1-\theta)T^{MFN}$. The

marginal cost of the firm is given by $\Gamma(\theta) = \{\theta\delta + (1-\theta)\}\gamma$, where γ is the firm-specific unit cost of production, i.e. the inverse of firm productivity. In order to comply with the RoO, firms may need to adjust their procurement sources. We capture the degree of an increase in the unit cost for such procurement adjustment by δ (> 1). The operating profit of the firm (i.e. the profit including the fixed cost) in a foreign country that produces each variety is given by

$$\pi(q,\theta) = \left[\frac{p(q/L)}{1+T(\theta)} - \Gamma(\theta)\right]q. \tag{4}$$

We follow the standard model of monopolistic competition and assume that the number of varieties is sufficiently large. Then, firms regard the level of λ as given. The firm maximises profit with respect to q. By the first-order condition of profit maximisation, the optimal level of production, $\tilde{q}$, is determined to satisfy

$$\frac{\partial\pi(\tilde{q},\theta)}{\partial q} = \frac{p(\tilde{q}/L)}{1+T(\theta)}\left[1 - \frac{1}{\varepsilon(\tilde{q}/L)}\right] - \Gamma(\theta) = 0. \tag{5}$$

Accordingly, the equilibrium level of individual consumption and the equilibrium consumer price, respectively, become $\tilde{c} = \tilde{q}/L$ and $\tilde{p} = p(\tilde{c})$. The second-order condition of the profit maximisation requires

$$\frac{\partial^2\pi(\tilde{q},\theta)}{(\partial q)^2} = -\frac{p(c)\{2-\eta(c)\}}{\{1+T(\theta)\}q\varepsilon(c)} < 0, \tag{6}$$

where $\eta(c) = -cp''(c)/p'(c)$ is the elasticity of the slope of the inverse demand function. The demand curve is concave if $\eta(c) \leq 0$ and convex if $\eta(c) > 0$. To satisfy (6), $2 > \eta(c)$ must hold. By rearranging (5), the equilibrium import price of each variety is given by

$$\tilde{p}^{imp} = \frac{\tilde{p}}{1+T(\theta)} = m(\tilde{c})\Gamma(\theta), \tag{7}$$

where $m(c) = \varepsilon(c)/\{\varepsilon(c)-1\} > 1$ is the markup over the marginal cost.

1.2. Effects of FTA Utilisation on Import Prices

An ad valorem tariff does not directly affect $\tilde{p}^{imp}$, but it may indirectly change $\tilde{p}^{imp}$ because it increases the consumer price, $\tilde{p}$. Specifically, an increase in $\tilde{p}$ decreases $\tilde{c}$, and thereby changes $\varepsilon(c)$ and the price-cost markup. By differentiating (5) with respect to $1+T(\theta)$ and $\Gamma(\theta)$, we have

$$\frac{d\ln\tilde{c}}{d\ln\{1+T(\theta)\}}=\frac{d\ln\tilde{c}}{d\ln\Gamma(\theta)}=-\frac{\varepsilon(\tilde{c})-1}{2-\eta(\tilde{c})}<0. \tag{8}$$

An increase in $T(\theta)$ or $\Gamma(\theta)$ reduces the individual consumption of the variety. Then, the effect of an increase in a tariff on the import price is given by

$$\frac{d\ln\tilde{p}^{imp}}{d\ln\{1+T(\theta)\}}=-\frac{d\ln m(\tilde{c})}{d\ln\tilde{c}}\frac{d\ln\tilde{c}}{d\ln\{1+T(\theta)\}}<0. \tag{9}$$

Hence, whether an import tariff increases or decreases the import price depends on the sign of $d\ln m(\tilde{c})/(d\ln\tilde{c})$, that is, on how a change in $\tilde{c}$ affects the price-cost markup. If $d\ln m(\tilde{c})/(d\ln\tilde{c})>0$, then $d\ln\tilde{p}^{imp}/[d\ln\{1+T(\theta)\}]<0$ holds. In this case, a lower consumer price and an increase in consumption induced by the tariff reduction raise the markup and the import price. If $d\ln m(\tilde{c})/(d\ln\tilde{c})<0$, however, the tariff reduction lowers both the consumer price and the import price. If $d\ln m(\tilde{c})/(d\ln\tilde{c})=0$, in other words, if consumer preferences follow a constant elasticity of substitution function, the tariff reduction lowers the consumer price but the import price remains unchanged.

More specifically, we have

$$\frac{d\ln m(\widetilde{c})}{d\ln\tilde{c}}=\frac{1}{\varepsilon(\tilde{c})-1}\left[1+\frac{1}{\varepsilon(\tilde{c})}-\eta(\tilde{c})\right]. \tag{10}$$

Therefore, $d\ln m(\tilde{c})/(d\ln\tilde{c})>0$ holds if the demand curve is not sufficiently convex to satisfy $\eta(\tilde{c})<\hat{\eta}\equiv 1+1/\varepsilon(\tilde{c})$. A tariff reduction lowers the consumer price and increases the equilibrium consumption, and the increased consumption decreases the price elasticity of demand (i.e. $\varepsilon'(\tilde{c})<0$) unless the demand curve is highly convex. The

decreased elasticity in turn increases the price-cost markup because consumers become less sensitive to price changes. In addition, by substituting (8) and (10) into (9), we have

$$\frac{d\ln\tilde{p}^{imp}}{d\ln\{1+T(\theta)\}} = -\frac{\hat{\eta}-\eta(\tilde{c})}{2-\eta(\tilde{c})}. \tag{11}$$

A larger $\eta(\tilde{c})$ diminishes the price-increasing effect of the tariff reduction.

Notice that the decreasing price elasticity of demand is not specific to our specification of the model. Krugman (1979) assumes the decreasing price elasticity in his seminal paper on intra-industry trade. Bertoletti and Epifani (2014) and Kichko, Kokovin, and Zhelobodko (2014) show that a decreasing elasticity of substitution in the utility function yields $\varepsilon'(\tilde{c}) < 0$. The decreasing price elasticities are also obtained by Melitz and Ottaviano (2008) with a linear demand function and by Behrens and Murata (2007) with additively quasi-separable functions.

We have examined how changes in the import tariff affect the import price. Next, we examine the effect of an increase in the marginal cost, $\Gamma(\theta)$, on the equilibrium import price. We have

$$\frac{d\ln\tilde{p}^{imp}}{d\ln\Gamma(\theta)} = 1 + \frac{d\ln m(\tilde{c})}{d\ln\tilde{c}}\frac{d\ln\tilde{c}}{d\ln\Gamma(\theta)} = \frac{1}{m(\tilde{c})\{2-\eta(\tilde{c})\}} > 0. \tag{12}$$

Hence, a higher marginal cost of a firm always leads to a higher import price. Note that a larger $\eta(\tilde{c})$ increases the price-increasing effect of the marginal cost. As a result, we have the following proposition.

Proposition 1 *If the demand curve is not sufficiently convex so that increased consumption decreases the price elasticity of demand, a reduction in the tariff increases the import price. Otherwise, it decreases or does not affect the import price. An increase in the marginal cost always increases the import price.*

Proposition 1 provides an important implication for the impact of FTA utilisation on import prices. By utilising an FTA scheme, a firm on one hand faces an FTA tariff that is lower than the MFN tariff (the tariff effect). On the other hand, the firm must incur the costs of meeting the RoO, part of which increases the marginal cost of the firm and thus the import price (the RoO effect). If the demand curve is not extremely convex, the tariff effect is more likely to increase the import price, while the RoO effect is less likely to increase the import price. If the demand curve is more convex, however, the tariff effect is less likely to increase (or will even decrease) the import price, while the RoO effect is more likely to increase the import price. This implies that, if an FTA utilisation increases the import price, the increased markup is the main driving force when the demand curve is not extremely convex, while the RoO effect plays an important role when the demand curve is more convex. In other works, if the RoO effect is not so significant, the firm gains more and consumers gain less from FTA utilisation in the former case, while a large part of the gains goes to consumers in the latter case.

We have shown that several exogenous parameters govern the equilibrium import price. However, we cannot explicitly solve the equilibrium import price from (7), because the price elasticity of demand that affects $\tilde{p}^{imp}$ is not constant and varies with $\tilde{c}$, which recursively depends on the level of $\tilde{p}^{imp}$. Hence, we implicitly define the import price function as

$$\tilde{p}^{imp} = f(T(\theta), \Gamma(\theta), L). \tag{13}$$

The effects of $\Gamma(\theta)$ on the import price are positive, while those of $T(\theta)$ and L depend on the shape of the demand curve. If the demand curve is less convex and satisfies $\hat{\eta} > \eta(\tilde{c})$, $T(\theta)$ and L have negative impacts on $\tilde{p}^{imp}$. If the demand curve is highly convex

and satisfies $\eta(\tilde{c}) > \hat{\eta}$, $T(\theta)$ and L have positive impacts on $\tilde{p}^{imp}$.[11] This equation is estimated in the following empirical sections.

1.3. Choice between FTA and MFN Schemes

In this last subsection, we investigate a firm's choice between an FTA scheme and an MFN scheme. By substituting (7) into (4), the equilibrium operating profit of the firm is given by

$$\tilde{\pi}(\tilde{c}, \theta) = [m(\tilde{c}) - 1]\Gamma(\theta)\tilde{c}L. \tag{14}$$

By differentiating (14) with respect to $\tilde{c}$, we have

$$\frac{d \ln \tilde{\pi}(\tilde{c}, \theta)}{d \ln \tilde{c}} = 1 + \frac{m(\tilde{c})}{m(\tilde{c}) - 1} \frac{d \ln m(\tilde{c})}{d \ln \tilde{c}} = m(\tilde{c})\{2 - \eta(\tilde{c})\} > 0. \tag{15}$$

Then, by differentiating (14) with respect to $\Gamma(\theta)$, and using (10) and (15), we can confirm that an increase in the marginal cost reduces the firm's operating profit:

$$\frac{d \ln \tilde{\pi}(\tilde{c}, \theta)}{d \ln \Gamma(\theta)} = 1 + \frac{d \ln \tilde{\pi}(\tilde{c}, \theta)}{d \ln \tilde{c}} \frac{d \ln \tilde{c}}{d \ln \Gamma(\theta)} = -\{\varepsilon(\tilde{c}) - 1\} < 0. \tag{16}$$

Similarly, the effect of tariffs on the profit is given by

$$\frac{d \ln \tilde{\pi}(\tilde{c}, \theta)}{d \ln\{1 + T(\theta)\}} = \frac{d \ln \tilde{\pi}(\tilde{c}, \theta)}{d \ln \tilde{c}} \frac{d \ln \tilde{c}}{d \ln\{1 + T(\theta)\}} = -\varepsilon(\tilde{c}) < 0. \tag{17}$$

Based on these derivatives, we discuss the situation under which the producer of each product variety chooses an FTA scheme over an MFN scheme. If the producer chooses the FTA scheme, θ = 1 holds and the equilibrium price and the individual consumption are respectively denoted by p^{FTA} and c^{FTA}. Similarly, if it chooses the MFN scheme, we have θ = 0, and the equilibrium price and the consumption are respectively denoted by p^{MFN} and c^{MFN}. Substituting these prices and consumption

[11] An increase in L decreases $\tilde{c}$. Therefore, it decreases the import price if $\varepsilon'(\tilde{c}) < 0$ and increases the import price if $\varepsilon'(\tilde{c}) > 0$.

into (14) yields the operating profit in each scheme:

$$\pi^{FTA} \equiv \tilde{\pi}(c^{FTA}, 1) = (p^{FTA} - \delta\gamma)c^{FTA}L = \{m(c^{FTA}) - 1\}\delta\gamma c^{FTA}L, \quad (18)$$

$$\pi^{MFN} \equiv \tilde{\pi}(c^{MFN}, 0) = (p^{MFN} - \gamma)c^{MFN}L = \{m(c^{MFN}) - 1\}\gamma c^{MFN}L. \quad (19)$$

The difference between π^{FTA} and π^{MFN} is given by $\Delta\pi \equiv \pi^{FTA} - \pi^{MFN}$.

First, we examine the tariff effect of FTA utilisation on the profit. Suppose $\delta = 1$, that is, the RoO do not raise the marginal cost and the FTA utilisation only lowers the applied tariff from T^{MFN} to T^{FTA}. From (17), we have $\Delta\pi > 0$, meaning that the gain in the operation profit from utilising the FTA is positive with $\delta = 1$. $\Delta\pi$ becomes larger as the tariff margin, $T^{MFN} - T^{FTA}$, becomes larger. If the gain is high enough to exceed the fixed cost of the FTA utilisation, $\Delta\pi > F$, the firm chooses the FTA scheme over the MFN scheme.

Next, we discuss the RoO effect of FTA utilisation. An increase in δ reduces π^{FTA}, but does not affect π^{MFN}. From (16) and (18), we have

$$\frac{d\ln\Delta\pi}{d\ln\delta} = \frac{\pi^{FTA}}{\Delta\pi}\frac{d\ln\pi^{FTA}}{d\ln\delta} = -\frac{\pi^{FTA}}{\Delta\pi}\{\varepsilon(c^{FTA}) - 1\} < 0. \quad (20)$$

Therefore, as the RoO become more stringent, firms are less likely to utilise the FTA scheme. In addition, a larger F obviously discourages FTA utilisation.

Finally, let us examine how a firm's productivity affects the FTA utilisation. Equation (16) tells us that an increase in γ reduces the firm's profit. By comparing the effect of γ on π^{FTA} and π^{MFN}, we have

$$\frac{d\ln\Delta\pi}{d\ln\gamma} = -\{\varepsilon(c^{FTA}) - 1\} + \frac{\pi^{MFN}}{\Delta\pi}\{\varepsilon(c^{MFN}) - \varepsilon(c^{FTA})\}. \quad (21)$$

Given that $\Delta\pi > 0$, the effect of γ on $\Delta\pi$ is always negative if $\varepsilon(c^{FTA}) > \varepsilon(c^{MFN})$ holds, i.e. if the demand curve is sufficiently convex to satisfy $\eta(\tilde{c}) \geq \hat{\eta}$ and $\varepsilon'(\tilde{c}) > 0$ holds. However, when the demand curve is not as convex (i.e. $\hat{\eta} > \eta(\tilde{c})$), the effect of γ

on $\Delta\pi$ can be positive if $\varepsilon(c^{MFN}) - \varepsilon(c^{FTA})$ is large and $\Delta\pi$ is small. Note that $\Delta\pi$ becomes larger as the tariff margin becomes higher and the RoO less stringent. If $d\ln\Delta\pi/(d\ln\gamma) < 0$ holds, firms with a higher productivity (i.e. lower γ) are more likely to choose the FTA scheme.

The following proposition summarises the firm's choice of tariff scheme.

Proposition 2 *A firm is more willing to use an FTA scheme as the preference margin of utilising the FTA (i.e.* $T^{MFN} - T^{FTA} > 0$*) becomes larger. However, the firm is more likely to choose the MFN scheme if the costs of the RoO (F and δ) are high. It is ambiguous whether a firm with higher productivity will tend to utilise an FTA. If the demand curve is sufficiently convex, the tariff margin is large, or the costs of meeting the RoO are small, productive firms are more likely to utilise the FTA scheme.*

Previous studies that assume a constant price elasticity of demand (e.g. Demidova and Krishna (2008)) all show a positive relationship between firm productivity and FTA utilisation. However, the above proposition reveals that this relationship becomes ambiguous if we assume a variable price elasticity of demand. Nevertheless, it does not change the conclusion that the selection of FTA utilisation is systematically determined and is not random.

2. Empirical Framework

This section explains our empirical strategy to examine the effects of FTA utilisation on import prices, as described in Proposition 1. We first introduce our equation to be estimated and our dataset, then give a brief overview of FTA utilisation in our dataset.

2.1. Specification

As mentioned in the introductory section, our main dataset is comprised of transaction-level import data for Thailand from 2007 to 2011, obtained from the Customs Department of Thailand.[12] The dataset covers imports of all commodities for Thailand and contains data on the customs clearing dates, HS eight-digit codes, exporting countries, importing firm codes, firm branch codes, invoicing currencies, tariff schemes (e.g. FTA or MFN), and import values in Thai baht. We classify the tariff schemes into three categories: MFN schemes, FTA schemes, and other schemes. The other schemes include imports under the schemes of bonded warehouses, free zones, investment promotion, duty drawbacks under Section 19, and duty drawbacks for re-exports.[13] Although it is interesting to take into account the choice of these other schemes, we do not include imports under the other schemes in our sample, in order to keep our analysis simple.

During our sample period, Thailand had 10 FTAs, most of which overlap in country coverage. Thailand had both bilateral and plurilateral FTAs with Japan, Australia, New Zealand, and India. With other members of ASEAN, Thailand had six plurilateral FTA schemes: ASEAN FTA, ASEAN-Australia-New Zealand FTA, ASEAN-China FTA, ASEAN-Japan Comprehensive Economic Partnership, AKFTA, and ASEAN-India FTA. In this paper, we define the following 15 countries as 'FTA member countries': Australia,

[12] The data was collected confidentially. We have been given permission to use it for academic purposes only.

[13] Goods imported under the schemes of bonded warehouses, free zones, and investment promotion may be exempted from the customs duties, subject to certain conditions. The duty drawback under Section 19 or for re-exports enables exporting firms to obtain a refund on customs duty paid on imported goods when those goods are used as an input for goods for export or are re-exported without any transformation. Under these schemes, only firms with approval from the authorities in charge can claim such privileges. Eligible imported goods and duty privileges vary among the schemes. For example, virtually all goods imported under bonded warehouse and free zone schemes are duty-free. Under the investment promotion scheme, raw materials are duty-free, while machinery may be either duty-free or subject to a 50 percent tariff reduction. On the other hand, machinery is ineligible for a refund on import duty paid under duty drawback schemes.

Brunei, Cambodia, China, India, Indonesia, Japan, Korea, Lao PDR, Malaysia, Myanmar, New Zealand, Philippines, Singapore, and Viet Nam. Except for Korea, with which Thailand concluded an FTA in 2010, all these countries have been FTA partner countries for Thailand since at least the beginning of our sample period of 2007. Other countries are defined as 'FTA non-member countries'.

One empirical issue that needs attention when examining the effects of FTA utilisation on import prices is that FTA utilisation and import prices are simultaneously determined. Also, as shown in Proposition 2 in Section 2.3, the selection of FTA utilisation is not random. Our identification strategy is the following. First, by taking advantage of the nature of our transaction-level panel data, we conduct a difference-in-differences (DID) analysis on the effects of FTA utilisation on import prices. To do so, in addition to all FTA non-member countries, we include only one FTA member country, Korea, as an exporting country. As mentioned, the FTA with Korea was the only one to enter into force during our sample period (i.e. in 2010). Therefore, during 2007–2009, the sample firms could not utilise an FTA scheme, but some were able to do so during 2010–2011.

Second, another advantage of focusing on the AKFTA is that firms at the time were not able to accurately predict when the FTA would enter into force. The ASEAN countries and Korea began the FTA negotiations in 2003. However, the suspicion of illegal equity trading by Prime Minister Thaksin Shinawatra and his family and the coup d'état by the Royal Thai Army caused significant political turmoil in Thailand in 2006. As a result, proceedings on various kinds of external economic policy, including FTA policy, stopped in Thailand. As a result, the AKFTA was signed by Korea and the ASEAN member states, with the exception of Thailand, in 2006. The AKFTA entered into force for all other

countries in either 2007 or 2008, but for Thailand it was unclear when or whether the negotiations on AKFTA would restart. The agreement was finally signed in 2009 and entered into force in 2010. This unpredictable situation of the AKFTA for Thailand due to exogenous shocks to firms may enhance our identification for DID.[14]

Third, we examine establishment-level import prices rather than firm-level import prices.[15] We identify establishments by combining firm and branch identification codes. Also, as mentioned, our sample's exporting countries include FTA non-member countries.[16] These two notable characteristics of our dataset enable us to easily control for all time-variant importing firm characteristics (e.g. productivity) in addition to fixed effects with various dimensions. Namely, we can completely control for importing firm-specific elements that affect both FTA utilisation and import prices.[17] As a result, we use the data on imports aggregated by importing firms, their branches, exporting countries, HS eight-digit codes, tariff schemes, and years.

For empirical analysis, we parameterise the import price equation specified in (13). In particular, we assume that it can be log-linearised as follows.

$$\ln p_{fbcpt} = \alpha\theta_{fbcpt} - \beta \ln\left(1 + T_{fbcpt}\right) + u_{fbcp} + u_{ft} + u_{cst} + \varepsilon_{fbcpt}, \qquad (22)$$

where

$$1 + T_{fbcpt} = \begin{cases} 1 + MFN_{pt} & if\ \theta_{fbcpt} = 0 \\ 1 + FTA_{pt} & if\ \theta_{fbcpt} = 1 \end{cases}. \qquad (23)$$

p_{fbcpt} denotes the import price (average unit value) by branch b of firm f for an HS eight-

[14] As mentioned in the introductory section, another advantage of focusing on AKFTA is to avoid firms' complicated decisions on tariff schemes, which arise under the existence of multiple FTA schemes.

[15] We have greater firm-level variation if we examine transaction-level import prices, not the annual average of import prices.

[16] We also estimate our model for all exporting countries, including the other FTA member countries. We will introduce the estimation result for this case later.

[17] Instead of a model that controls for firm-specific elements, we also estimate a model that takes into account to some extent the decision on FTA utilisation. The estimation results for this case are reported in Table B1, Appendix B.

digit product p from country c in year t. θ_{fbcpt} indicates the tariff scheme and takes the value one if an observation is based on an import under AKFTA, and zero otherwise (called the 'FTA dummy'). T_{fbcpt} is the tariff rate, which differs according to the tariff scheme used for importing. *MFN* and *FTA* are the MFN rates and AKFTA preferential rates, respectively. The coefficient α captures the RoO effect, i.e. δ in Section 2, while the coefficient β is related to the tariff effect. As shown in Proposition 1, both coefficients are expected to be positively estimated, particularly when the (inverse) demand curve is not highly convex. Specifically, when an establishment starts to import product p under AKFTA in year t, the magnitude of the tariff effect can be expressed as[18]

$$-\beta\{\ln(1+FTA_{pt})-\ln(1+MFN_{pt-1})\}>0. \quad (24)$$

As mentioned, we control for various elements. u_{fbcp} are the time-invariant, importing establishment-exporting country-product fixed effects, which will control for the importing establishment-product-specific inherent characteristics. u_{ft} are the time-variant firm fixed effects used to control for all of the time-variant importing firm characteristics. u_{cst} are the time-variant, exporting country-sector fixed effects. We define sectors by their HS two-digit level codes. The fixed effects will control for production factor prices (e.g. wages) in the exporting countries, in addition to the sector-level demand sizes (i.e. L in Section 2) or the degree of competition in the importing country, i.e. Thailand. We expect that these various fixed effects control for elements that affect both import prices and the tariff scheme choice.

As mentioned in the introductory section, our specification controls for biases that were not controlled for in previous studies. The estimates of the product-level studies, such as Cadot *et al*. (2005), Ozden and Sharma (2006), and Olarreaga and Ozden (2005),

[18] Note that MFN rates are unchanged in 99.98 percent of all observations during our sample period.

include not only the effect of FTA utilisation but also the differences in exporter and/or importer characteristics between FTA users and non-users. Our inclusion of time-variant importing firm fixed effects controls for all of the importing firm characteristics, such as firm productivity. Moreover, if importing firms do not change their country-product-level trading partners frequently, our importing establishment-country-product dummy variables will, to some extent, be able to control for exporting firm characteristics (e.g. exporter productivity, $1/\gamma$ in Section 2).

The remaining noteworthy point is that some establishments import products from Korea under both the MFN and FTA schemes. There are some possible reasons for this use of multiple tariff schemes. One is that firms may import from different firms under different tariff schemes (e.g. a productive export firm under the FTA scheme and a less productive export firm under the MFN scheme). The other is that firms may make a decision on the tariff scheme for each transaction and choose the FTA scheme for transactions with a large trade value.[19] For such observations, in the estimation sample, we keep those importing under the FTA scheme but drop those importing under the MFN scheme in order to control for exporter characteristics as much as possible through our importing establishment (-product-country) fixed effects.[20]

[19] Indeed, we find significant evidence that transactions with larger values are more likely to be under FTA schemes. The results are shown in Table B2, Appendix B.

[20] Imagine that establishment A imported a product from firms B and C under the MFN scheme in 2009, and again imported that product from firm B under the MFN scheme and from firm C under the FTA scheme in 2010, although our dataset does not enable us to explicitly identify whether firms B and C are different or not. In this example, we drop the observation of importing under the MFN scheme in 2010, i.e. that of importing from firm B in 2010. Otherwise, our import establishment(-product-country) dummy variable would take the value of one for two observations (i.e. two tariff schemes) in 2010. To focus on the impacts of changing from the MFN to the FTA scheme, we drop observations of importing under the MFN scheme for establishments that import products under both the MFN and FTA schemes. As a result, in terms of the share of observations, 0.2 percent are dropped.

2.2. Data Overview

Before reporting our estimation results, we give an overview of AKFTA utilisation. As mentioned, the AKFTA entered into force for Thailand in 2010 (signed in October 2009). Under the agreement, tariffs were reduced according to the category in which each product is classified. The categories are normal track products, sensitive list products, and highly sensitive list products. Since the tariff reduction for the products in the sensitive and highly-sensitive lists started in 2012, AKFTA preferential rates are available only for products placed in the normal track during our sample period after the enactment of AKFTA (i.e. 2010 and 2011). The eligibility and level of the AKFTA preferential rates did not change in 2010 or 2011. In both years, 70 percent of all tariff-line products (8,300 products) were eligible under the AKFTA. The average preferential margin, the difference between the FTA and MFA rates, for the eligible products was approximately 12 percent. The median and the maximum margins were 7 percent and 266 percent, respectively. The most commonly applied RoO was for a 'change in heading or regional value content', accounting for 77 percent of all tariff-line products. Other rules with a relatively high share include 'change in chapter or regional value content' and 'wholly-obtained' (8%).[21]

Next, we give a brief overview of Thai imports from Korea. Table 1 reports various statistics on Thai imports from Korea, including the number of importing establishment-product observations, total import values, and the average import values at the importing establishment-product level by year and tariff scheme. The left-hand panel shows the statistics for the products with the same MFN rate as the FTA rate in 2011 and the right panel shows those for products with a lower FTA rate than the MFN rate in 2011. Since our sample FTA is a multilateral FTA (i.e. an FTA among Korea and 10 ASEAN member

[21] More detailed statistics on the RoO and the preference margin are provided in Appendix A.

states) with cumulation rules, firms have incentives to use FTA schemes, even for products with the same MFN rate as the FTA rate, as they can enjoy the benefits from cumulation. When firms export their products to other AKFTA member countries, such as Indonesia, under the AKFTA by using materials from Korea as inputs for their products, those materials are imported under the AKFTA even if the MFN rate for those materials is zero (see Hayakawa *et al*. [2013b]).

Table 1: Number of Importing Establishment-product Observations and Import Values for Imports from Korea

	MFN = FTA (# = 2,527)			MFN > FTA (# = 5,773)		
	MFN	**FTA**	**Others**	**MFN**	**FTA**	**Others**
Number of importing establishment products						
2007	11,073		4,116	19,467		6,589
2008	11,664		5,050	20,909		8,275
2009	9,902		3,406	19,287		5,942
2010	10,495	272	3,124	21,014	1,644	5,303
2011	11,162	302	3,084	22,513	2,218	5,585
Total import value (B million)						
2007	58,916		53,549	34,880		38,418
2008	66,090		81,097	36,875		43,260
2009	53,738		63,628	27,298		41,251
2010	79,404	1,728	73,016	30,139	14,712	54,910
2011	79,165	1,662	62,478	31,372	29,719	46,138
Average import value (B million)						
2007	5.3		13.0	1.8		5.8
2008	5.7		16.1	1.8		5.2
2009	5.4		18.7	1.4		6.9
2010	7.6	6.4	23.4	1.4	8.9	10.4
2011	7.1	5.5	20.3	1.4	13.4	8.3

B = Thai baht, FTA = free trade agreement, LPM = linear probability model, MFN = most-favoured nation.
Source: Customs Department, Thailand.

In this table, we focus on the right-hand panel, and define the products for which the FTA rates are lower than MFN rates as ‘eligible products’. Taking a look at the number of importing establishment-product observations, we can see that the number of FTA

users is small compared to the number of MFN users and importers under other schemes. In particular, the number of MFN users is at least 10 times larger than that of FTA users. However, total import values do not differ much between MFN and FTA users, particularly for 2011. These observations imply that average imports at the importing establishment-product level are much larger in FTA users than in MFN users, although they are not so different between FTA users and the importers under other schemes. The FTA users have nearly 10 times larger average import values than the MFN users. This pattern is likely to reflect the qualitative differences in importing firms' characteristics between FTA users and MFN users.

Table 2 reports the changes in tariff schemes at the importing establishment-product-level between 2007 and 2011. In the table, we restrict the sample products to those in which FTA rates were lower than MFN rates in 2011. 'Both' indicates observations for which an establishment imported a product under both the FTA and MFN schemes. 'None' comprises cases of no imports under the MFN and FTA schemes, but includes imports under other schemes. There are a large number of 'only MFN' users that started or stopped importing. Each case accounts for more than 40 percent of the observations. A relatively large number also started importing under only the FTA scheme. The number of observations that changed from 'MFN' to 'only FTA' is the smallest, accounting for 0.1 percent. This is even smaller than for the case of 'both' in terms of numbers.

Table 2: Importing Establishment-product-level Changes in Tariff Scheme Status for Imports from Korea, 2007–2011

		Scheme in 2011			
		None	**Only MFN**	**Only FTA**	**Both**
Scheme in 2007					
None	Number		21,092	1,408	723
	Share (%)		49	3	2
MFN	Number	18,777	580	23	63
	Share (%)	44	1.4	0.1	0.2

FTA = free trade agreement, MFN = most-favoured nation.

Note: 'Share' indicates the share of the total observations.
Source: Customs Department, Thailand.

Table 3 reports the means and medians of the log-differences of importing establishment-product-level changes in import prices (import unit values) from 2007 to 2011. In this table, we restrict the sample to observations that existed in both 2007 and 2011 and that used the MFN scheme in 2007. In the case of 'both', we calculated the price changes for the MFN and FTA schemes separately. The 'nominal' row shows a relatively large increase in import prices for observations that changed in status to 'only FTA'. The median also shows a positive change in observations that changed in status to the FTA scheme under 'both'. These results are unchanged when we deflate import prices using the commodity-level consumer price index (normalised to 1 in 2007) obtained from the Bureau of Trade and Economic Indices (Ministry of Commerce) of Thailand. The results for real import price changes are shown in the row titled 'real'. In sum, a relatively large increase in import prices is observed for the products for which the status changed to importing under the FTA scheme.

Table 3: Log-difference of Importing Establishment-product-level Import Prices for Imports from Korea, 2007–2011

		Scheme in 2011			
		Only MFN	Only FTA	Both	
				MFN	FTA
Nominal	Mean	-0.106	0.002	-0.285	-0.124
	Median	-0.064	0.022	-0.082	0.024
Real	Mean	-0.131	-0.003	-0.314	-0.153
	Median	-0.090	0.009	-0.144	0.004

FTA = free trade agreement, MFN = most-favoured nation.

Notes: The importing establishment-product observations are restricted to those for which the MFN scheme was used in 2007. 'Nominal' indicates nominal price changes, while 'real' shows the change in prices, deflated by the product-level consumer price index in Thailand.
Sources: Customs Department, Thailand; Bureau of Trade and Economic Indices (Ministry of Commerce), Thailand.

3. Empirical Results

This section reports our estimation results on the effects of FTA utilisation on import prices. We first present our basic estimation results to show how the results change when we control for various importing firm-related fixed effects. Then, we report the estimation results for equation (22). We also examine the role of some elements that are not explicitly considered in Section 2. The basic statistics are provided in Table 4.

Table 4: Basic Statistics

	Obs	Mean	Std. Dev.	Min	Max
ln Price	1,071,985	6.720	2.886	-11.575	20.976
FTA Dummy	1,071,985	0.003	0.051	0	1
ln (1+Tariff)	1,071,985	0.074	0.074	0	1.164
FTA Dummy * ln Total Imports	1,071,985	0.008	0.150	0	3.252
FTA Dummy * Preference Share	1,071,985	0.001	0.024	0	1
FTA Dummy * THB Invoice	1,075,739	0.000	0.004	0	1

FTA = free trade agreement, THB = Thai baht.

Note: 'Total Imports', 'Preference Share', and 'THB Invoice' are defined in Section 4.3.
Source: Authors' computation.

3.1. Basic Estimation

Before estimating equation (22), we examine the existence or magnitude of the bias in the estimation of the effects of FTA use on import prices when not controlling for importing firm-related characteristics. To do so, we simply regress the log of import prices on the FTA dummy variable by including only country-sector-year fixed effects. The estimation result is reported in column (I) in Table 5. As in previous studies at the product level, the coefficient for the FTA dummy is estimated to be significantly positive, indicating that import prices were 12 percent higher in international transactions under the FTA scheme than in those under the MFN scheme. Since, as was noted above, the average reduction in tariff rates for the FTA scheme was 12 percentage points, this result implies that, on average, the FTA tariff margins were absorbed by the increase in import prices.

Table 5: Basic Estimation Results

	(I)	(II)	(III)
FTA Dummy	0.110**	0.023	0.013
	[0.051]	[0.034]	[0.039]
Country-Sector-Year FE	YES	YES	YES
Importing Establishment-Country-Product FE	NO	YES	YES
Importing Firm-Year FE	NO	NO	YES
Number of obs	1,071,985	1,071,985	1,071,985
Adj R-squared	0.2863	0.8688	0.8719

FE = fixed effects, FTA = free trade agreement.

Notes: The dependent variable is the log of import prices at the importing establishment-country-product-year level. ***, **, and * indicate 1%, 5%, and 10% significance, respectively. Robust standard errors are in brackets.

Source: Authors' computation.

The result changes significantly if we control for importing firm-related fixed effects. Column (II) includes importing establishment-country-product fixed effects. The coefficient for the FTA dummy is insignificant and its magnitude is greatly reduced. This result implies that the estimates of the effect found in previous studies contain the inherent characteristics of importing firms (establishments), which contributed to overestimation of the effect. When controlling for not only importing establishment-country-product fixed effects but also importing firm-year fixed effects, the coefficient is estimated to be insignificant, as shown in column (III). Its magnitude is further reduced. Our findings indicate that not only the inherent characteristics of importing firms but also the time-variant characteristics resulted in overestimation in previous studies. In short, the effects of FTA use on import prices are overestimated when not controlling for these importing firm-related fixed effects.

3.2. Tariff and Rules of Origin Effects

Next, we estimate equation (22), which decomposes the effects of FTA utilisation into tariff and RoO effects. Table 6 shows the results of the estimation, which control for importing establishment-exporting country-product, importing firm-year, and exporting country-sector-year fixed effects. In column (I), we include only the tariff rates, of which the coefficient is estimated to be significantly negative. This result is consistent with the theoretical prediction for the case of an insufficiently convex (inverse) demand curve, as is demonstrated in Section 2. Namely, the tariff reduction resulting from the FTA utilisation raises import prices. From the quantitative perspective, the average MFN and AKFTA rates among eligible products are 12.8 percent and 0.8 percent, respectively. Therefore, based on equation (24), the tariff effect contributes on average to raising import

prices by 3.6% (=−0.737*(0.0034−0.0525)*100). This rise implies that approximately 30% (=100*3.6/12.0) of the tariff margin is allocated to exporters based on the tariff effect.

Table 6: Tariff and Rules of Origin Effects

	(I)	(II)
FTA Dummy		-0.075
		[0.059]
ln (1+Tariff)	-0.737*	-1.374**
	[0.391]	[0.596]
Number of obs	1,071,985	1,071,985
Adj R-squared	0.8719	0.8719

FTA = free trade agreement.

Notes: The dependent variable is the log of import prices at the importing establishment-country-product-year level. ***, **, and * indicate 1%, 5%, and 10% significance, respectively. Robust standard errors are in brackets. All specifications include importing establishment-country-product, importing firm-year, and sector-country-year fixed effects.

Source: Authors' computation.

Column (II) of Table 6 includes both the FTA dummy and the tariff rate, which respectively capture the RoO and tariff effects. The coefficient for the tariff rate is again estimated to be significantly negative. Its absolute magnitude rises sharply from 0.737 to 1.374. A similar calculation as above indicates that, on average, the tariff effect raises import prices by 6.7 percent and that approximately 56 percent of the tariff margin is attributed to exporters. On the other hand, the coefficient for the FTA dummy is estimated to be insignificant. These results are consistent with the theoretical demonstration in Section 2.2., in that the tariff and RoO effects are more and less likely, respectively, to raise import prices if the demand curve is not extremely convex. In short, on average, the effects of FTA utilisation on import prices are mainly based on the tariff effect, not the RoO effect. This implies that the effects of tariff reduction on import prices may be indifferent between the cases based on FTA enactment and on multilateral liberalisation (i.e. tariff reduction on the MFN basis).

We conduct some robustness checks.[22] First, we estimate our model for the imports from all countries, including those from other FTA member countries. We obtain significant results for the FTA dummy and the tariff rate when introducing the variables separately. In particular, the coefficient for the FTA dummy is estimated to be significantly positive. However, the coefficient for the tariff rate is insignificant when introducing both variables. Second, we use transaction-level data rather than aggregated data according to the year. The results are similar to those in the first robustness check when introducing the two variables separately, although the coefficient for the FTA dummy is negative when introducing both variables. Third, in order to examine the differences in the RoO effect across RoO, we introduce interaction terms of the FTA dummy variable with various dummy variables indicating RoO. The results show that only the interaction term with the regional value content rule is significantly negative. This sign is not consistent with our expectation. Furthermore, the absolute magnitude of the coefficient is abnormally large.

3.3. Other Estimations

We also examine how the coefficient for the FTA dummy is related to some elements not explored in our theoretical model. First, we consider the difference in the bargaining power between an importer and an exporter in the determination of import prices. Specifically, we examine the role of an importing firm's size, since larger importers are expected to have stronger bargaining power in price negotiation and may thus curtail the extent of a price rise. To investigate this effect, we introduce an interaction term of the FTA dummy with the importing firms' total imports of all products from the

[22] The results are shown in Tables B3–B5 in Appendix B. In Appendix B, we also report the estimation results for the equations with an interaction term of the tariff variable with demand elasticity.

rest of the world (denoted by *Total Imports*). The use of importing firms' total imports rather than importing establishments' total imports reduces the biases that arise from the fact that importing establishments' import prices and values are simultaneously determined.

The results are shown in column (I) in Table 7. The coefficient for the FTA dummy is estimated to be significantly positive. Its interaction term with the importing firm's size has a significantly negative coefficient. These results imply that, as is consistent with the above expectation, the rise in import prices through the FTA utilisation is smaller when the importer size is larger. From a quantitative perspective, since the average of the log of total imports among AKFTA users is 2.913, the resulting magnitude of the FTA dummy coefficient is −0.055 (=1.687−0.598*2.913). The additional rise in import prices is found when trading under the AKFTA with importers that are smaller than the average size, probably because of their weak bargaining power in price negotiation.

Second, we take the presence of competitors into account. The larger the number of FTA users, including users of FTAs other than AKFTA, the smaller the advantage of utilising the AKFTA scheme will be. In such a situation, importers may not allow exporters to raise import prices by large percentages. To examine this effect, we introduce an interaction term of the FTA dummy with the share of imports under all FTA schemes in total imports for each tariff-line product (denoted by *Preference Share*). In the computation of this variable, we do not include an establishment's own imports (i.e. the establishment's imports of a given product from Korea). As reported in column (II), we do not find a significant result for either the FTA dummy or its interaction term with Preference Share.

Table 7: Other Estimations

	(I)	(II)	(III)
FTA Dummy	1.687*	-0.102	-0.089
	[0.993]	[0.072]	[0.060]
FTA Dummy * ln Total Imports	-0.598*		
	[0.338]		
FTA Dummy * Preference Share		0.100	
		[0.128]	
FTA Dummy * THB Invoice			0.376*
			[0.212]
ln (1+Tariff)	-1.327**	-1.286**	-1.510**
	[0.598]	[0.608]	[0.604]
Number of obs	1,071,985	1,071,985	1,075,739
Adj R-squared	0.8719	0.8719	0.8721

FTA = free trade agreement, THB = Thai baht.

Notes: The dependent variable is the log of import prices at the importing establishment-country-product-year level. ***, **, and * indicate 1%, 5%, and 10% significance, respectively. Robust standard errors are in brackets. The specifications in columns (I) and (II) include importing establishment-country-product, importing firm-year, and sector-year fixed effects. Column (III) includes importing establishment-country-product-THB invoice, importing firm-year, and sector-country-year fixed effects. 'Total imports' are the importing firms' total imports of all products from the rest of the world. 'Preference share' indicates the share of imports under all FTA schemes in total imports for each tariff-line product. 'THB invoice' is a variable taking the value one if the invoicing currency is the Thai baht, and zero otherwise.

Source: Authors' computation.

Lastly, we introduce an interaction term between the FTA dummy and the invoicing currency. The invoicing currency dummy variable is constructed so the dummy variable takes the value one if the invoicing currency is in Thai baht (THB), i.e. the local currency, and zero otherwise (denoted by *THB Invoice*). The literature has revealed that more productive exporters, i.e. exporters with a higher market share, are more likely to choose the local currency (i.e. the importing country's currency) as an invoicing currency (Devereux *et al*., 2015).[23] Therefore, the interaction term may capture the effects of FTA utilisation on import prices through the exporter's characteristics. For this estimation, we use data on imports aggregated by importing firm, their branches, HS eight-digit codes,

[23] See also Asprilla *et al*. (2015) for several analyses on pricing-to-market.

tariff schemes, years, and the value of *THB Invoice*. Similarly, we introduce importing establishment-country-product-*THB Invoice* indicator fixed effects. The results are shown in column (III). While the FTA dummy has an insignificant coefficient, the coefficient for its interaction with *THB Invoice* is estimated to be significantly positive. This finding appears to indicate that productive exporters raise import prices, probably because of their strong bargaining power in price negotiation.

4. Concluding Remarks

In this paper, we examined the impact of FTA use on import prices. For the analysis, we employed establishment-level import data with information on the tariff scheme, the FTA or MFN scheme, used for importing. Unlike previous studies in this literature, we estimated the effects of FTA use on prices by controlling for the differences in importing firm characteristics. Our main findings are as follows. First, the effect of FTA use on import prices is overestimated when not controlling for importing firm-related fixed effects. Second, the average effect of a tariff reduction based on FTA utilisation was a 3.6–6.7 percent rise in import prices. Third, in general, we did not find evidence of a price rise due to the costs associated with RoO compliance. Fourth, we found several factors that affect import prices. Specifically, importing firms with higher total import values are found to reduce the rise of import prices. Also, the effect of FTA utilisation on import prices is found to be larger for Thai baht invoiced transactions. These findings probably reflect the difference in bargaining power between importers and exporters.

These results have the following implications. First, the rise in import prices through FTA utilisation, accompanied by a fall in consumer prices, will become one of the sources

for welfare improvement, not only in importing countries but also in exporting countries. This effect is based mainly on tariff reduction, which can be realised even in the case of multilateral liberalisation (i.e. tariff reduction on the MFN basis). Although exporters need to incur the additional costs of RoO compliance when utilising FTA schemes, these costs are not passed through to export prices, and under such circumstances, exporting countries may not enjoy additional welfare improvement. Second, the rise of import prices becomes micro-level evidence for the benefit of the use of FTA schemes for exporters. It is easy for policymakers to encourage importers to use FTA schemes because importers can enjoy the visible benefits of saving tariff payments. On the other hand, the benefits for exporters are not very clear because the use of FTAs requires documentation-related work and procurement adjustments. According to our results, exporters are likely to benefit from the use of FTAs because importers are likely to allow exporters to raise export prices. Policymakers should encourage exporters to use FTA schemes by explaining these benefits, in addition to the benefits resulting from increasing their exports.

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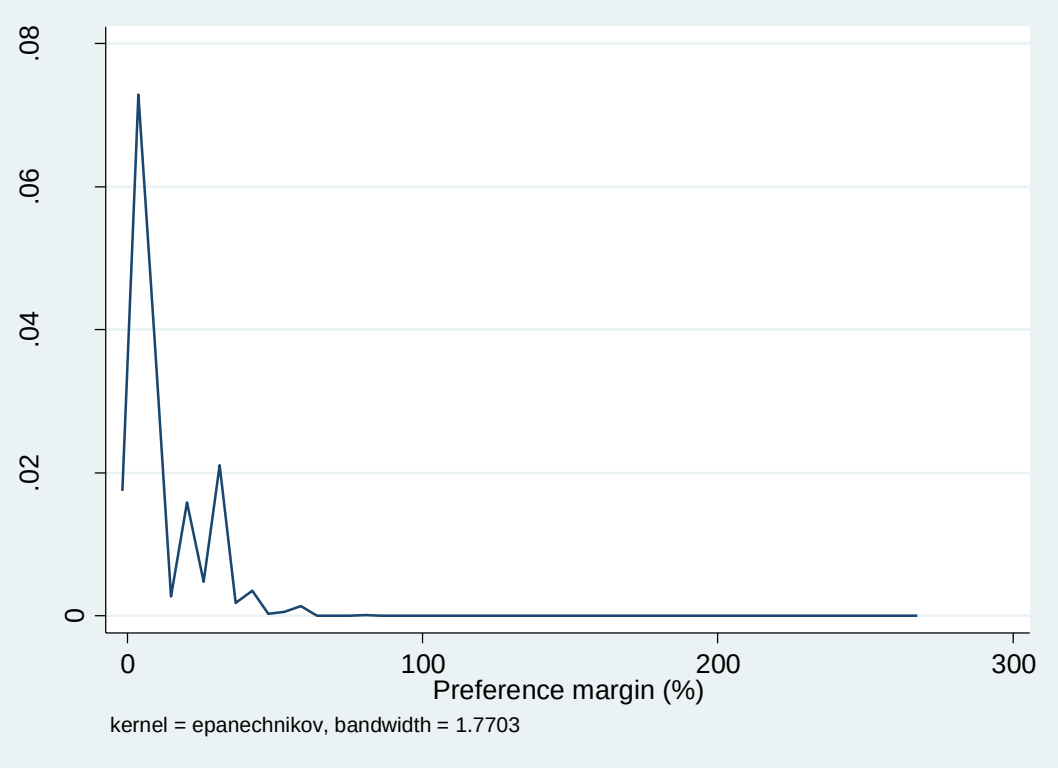
Appendix A. AKFTA Basic Statistics

Table A1: Number and Share of RoO at the Tariff-line Level

	Number of RoO	Share of RoO (%)
CC	6	0.07
CC&RVC	13	0.16
CC/RVC	669	8.06
CH	17	0.2
CH&RVC	5	0.06
CH/RVC	6,394	77.04
CS/RVC	192	2.31
RVC	315	3.8
WO	689	8.3
Total	8,300	100

Notes: CC = change-in-chapter, CH = change-in-heading, CS = change-in-subheading, RoO = rules of origin, RVC = regional value content, WO = wholly obtained rule.
Source: Authors' computation using the legal text of the AKFTA.

Figure A1: Distribution of the Preferential Margin in 2010/2011



Note: Products are restricted to those with a positive preference margin.
Source: Authors' computation using the legal text of the AKFTA.

Appendix B. Other Estimation Results

In this appendix, we report some results of other estimations. Table B1 reports the estimation results for the endogenous switching regression model in order to explicitly incorporate firms' decisions on tariff schemes into our empirical model.[24] Specifically, our model to be estimated is as follows.

$$\theta_{fbcpt} = 1 \quad \text{if } \gamma_0 + \gamma_1 \ln\left(1 + T_{fbcpt}\right) + \gamma_2 \ln TIM_{ft} + \gamma_3 \ln Margin_{pt} + \epsilon_{fbcpt} > 0$$
$$\theta_{fbcpt} = 0 \quad \text{if } \gamma_0 + \gamma_1 \ln\left(1 + T_{fbcpt}\right) + \gamma_2 \ln TIM_{ft} + \gamma_3 \ln Margin_{pt} + \epsilon_{fbcpt} \leq 0$$
$$\ln p_{fbcpt} = \beta_{10} + \beta_{11} \ln\left(1 + T_{fbcpt}\right) + \beta_{12} \ln TIM_{ft} + \varepsilon_{1fbcpt} \quad \text{if } \theta_{fbcpt} = 1$$
$$\ln p_{fbcpt} = \beta_{20} + \beta_{21} \ln\left(1 + T_{fbcpt}\right) + \beta_{22} \ln TIM_{ft} + \varepsilon_{2fbcpt} \quad \text{if } \theta_{fbcpt} = 0$$

TIM_{ft} and $Margin_{pt}$ are the importing firm f's total imports from the world in year t and the AKFTA preference margin for product p in year t, respectively. The former variable is introduced to control for time-variant importing firm characteristics. The latter variable is one of the main variables in the selection equation, as shown in Proposition 2 in Section 2.3. The results are shown in column (I) in Table B1. As is consistent with the theoretical discussion in Section 2, firms are more likely to utilise the AKFTA scheme when importing products with a larger preference margin. As in the results of the FTA dummy in Table 6, the constant term is not different between the FTA and MFN schemes and is a little smaller in the FTA scheme. We also see significantly negative coefficients for tariff rates and their quantitative difference between the FTA and MFN schemes. Notice that these coefficients are based on the cross-product differences in tariff rates rather than the over-time differences because the AKFTA rates do not change at all and the MFN rates do not change in 99.98 percent of the observations during the sample period.

We also estimate this model by introducing a dummy variable that takes the value one if the preference margin is greater than a certain cut-off level and zero otherwise,

[24] As for the endogenous switching regression model, see Maddala (1983).

instead of a continuous variable of the margin. We estimate the model, changing the cut-off level from 1 percent to the maximum level of our sample, i.e. 60 percent, by 1 percent increments and find that log pseudo-likelihood becomes highest when the cut-off is set to 3 percent.[25] This cut-off may be taken as the tariff equivalent rates of the FTA utilisation cost. Indeed, 3 percent lies within the range of such rates found in previous studies.[26] The results when the cut-off is set to 3 percent are shown in column (II) and are qualitatively unchanged with those in column (I).

In Table B2, we examine the determinants of AKFTA utilisation by employing transaction-level data. Unlike the dataset used in the text, we do not aggregate according to the year. The dependent variable is an indicator variable taking the value of one for imports under the AKFTA scheme and zero for imports under the MFN scheme. Based on the discussion in Section 2.3, independent variables are chosen. In particular, the exporting firm-specific unit cost, i.e. the inverse of productivity, is negatively associated with transaction values, as demonstrated in the following.

$$\frac{d \ln \tilde{p}^{imp} \tilde{c} L}{d \ln \Gamma(\theta)} = \frac{d \ln \tilde{p}^{imp}}{d \ln \Gamma(\theta)} + \frac{d \ln \tilde{c}}{d \ln \Gamma(\theta)} = -\frac{\varepsilon(\tilde{c}) - 1}{m(\tilde{c})\{2 - \eta(\tilde{c})\}} < 0.$$

We include tariff margin and transaction values as independent variables. Sample observations are restricted to imports from Korea in 2010–2011. In columns (I) and (II), we estimate the probit model, controlling for sector-year fixed effects to control for the role of RoO. We obtain the natural results that the AKFTA is more likely to be chosen in

[25] This grid search is based on the idea of the threshold regression model, which is proposed by Hansen (2000).

[26] For example, applying the threshold regression approach to the utilisation rate of Cotonou preferences, Francois *et al*. (2006) found that the tariff equivalent costs of preference utilisation ranged between 4 percent and 4.5 percent. Hayakawa (2011) also showed that by employing the threshold regression method that the average tariff equivalent of fixed costs for use of an FTA for all existing FTAs in the world is estimated to be around 3 percent. Cadot and de Melo (2007), in a survey article on this literature, conclude that such fixed costs range between 3 percent and 5 percent of the product price.

the case of a larger preference margin or larger transaction values. In columns (III) and (IV), we estimate a linear probability model by controlling for importing establishment-product, importing firm-year, and sector-year fixed effects, and obtain similar results.

Table B1: Endogenous Switching Regression Model

	(I)			(II)		
	Select	FTA	MFN	Select	FTA	MFN
ln (1+Tariff)	-36.365***	-11.898***	-3.496***	-25.613***	-19.667***	-3.564***
	[1.897]	[1.352]	[0.106]	[1.013]	[1.805]	[0.107]
ln TIM	0.009***	-0.035*	-0.056***	0.006**	-0.034*	-0.056***
	[0.003]	[0.019]	[0.002]	[0.003]	[0.019]	[0.002]
Margin	32.431***					
	[1.608]					
D (Margin > 3%)				2.155***		
				[0.046]		
Constant	-1.979***	6.118***	7.381***	-2.012***	5.667***	7.394***
	[0.054]	[0.356]	[0.045]	[0.053]	[0.361]	[0.045]
σ_1	3.088***			3.103***		
	[0.013]			[0.013]		
σ_2	3.109***			3.109***		
	[0.002]			[0.002]		
ρ_1	0.099***			0.219***		
	[0.014]			[0.024]		
ρ_2	-0.074***			0.017***		
	[0.010]			[0.014]		
Number of obs.	159,511			159,511		
Log pseudolikelihood	-417,466			-418,399		

FTA = free trade agreement, MFN = most-favoured nation.

Notes: In the 'select' column, the dependent variable is an indicator variable taking the value of one for imports under the AKFTA scheme and zero for imports under the MFN scheme. In columns 'FTA' and 'MFN', the dependent variables are logs of the import prices under the AKFTA and MFN schemes, respectively. ***, **, and * indicate 1%, 5%, and 10% significance, respectively. Robust standard errors are in brackets. 'Total imports' indicates total imports of a given product from the world. 'D (Margin > 3%)' takes the value one if the preference margin is greater than 3% and zero otherwise.
Source: Authors' computation.

In Tables B3–B6, we again estimate equation (22). Table B3 reports the results of the estimation for importing from all countries, including FTA member countries. As mentioned in Section 3, some countries have both bilateral and plurilateral FTAs. When

constructing the FTA dummy, we do not distinguish between these FTAs, while the tariff variable is constructed from the corresponding tariff scheme. We obtain significant results for the FTA dummy and tariff rates when introducing those variables separately. In particular, the coefficient for the FTA dummy is estimated to be significantly positive. The coefficient for the tariff rate proves to be insignificant when introducing both variables. In Table B4, we use transaction-level data. As in Table B2, we do not aggregate according to year. The results are similar when introducing the two variables separately, although the coefficient for the FTA dummy is negative when introducing both variables. These results are unchanged, even when controlling for transaction-level values, as shown in column (IV), though the transaction-level values and prices are simultaneously determined.

Table B2: Selection of AKFTA Utilisation at the Transaction Level

	(I)	(II)	(III)	(VI)
Margin	3.934***	6.447***	0.224***	0.224***
	[0.042]	[0.052]	[0.022]	[0.022]
ln Value		0.233***		0.005***
		[0.001]		[0.000]
Method	Probit	Probit	LPM	LPM
Number of obs	884,967	884,967	862,327	862,327
Log pseudolikelihood	-203,180	-177,294		
Adj R-squared			0.803	0.8037

FTA = free trade agreement, LPM = linear probability model, MFN = most-favoured nation.

Notes: Observations are defined at the transaction level. The dependent variable is an indicator variable taking the value of one for imports under the AKFTA scheme and zero for imports under the MFN scheme. ***, **, and * indicate 1%, 5%, and 10% significance, respectively. Robust standard errors are in brackets. The sample exporting country is restricted to Korea. The sample years are 2010–2011. The probit model includes sector-year fixed effects. 'LPM' indicates a linear probability model and includes importing establishment-product, importing firm-year, and sector-year fixed effects. 'Value' indicates import values while 'margin' is the difference between the MFN rates and the AKFTA rates.

Source: Authors' computation.

The RoO effects might be different depending on the rule. Therefore, we introduce interaction terms between the FTA dummy variable and various dummy variables indicating the RoO. Specifically, we classify the RoO into the following five types and their combinations based on 'and' (&) or 'or' (/): CC is change-in-chapter; RVC is regional value content; CH is change-in-heading; CS is change-in-subheading; and WO is wholly obtained rule. We set WO as the base rule. The results are reported in column (I) in Table B5. The tariff rates again have a significantly negative coefficient. The coefficient for the FTA dummy is insignificantly estimated, indicating that the RoO effect does not exist when the RoO are WO. Also, most of the interaction terms have insignificant coefficients. Only the interaction term with RVC is estimated to be significantly negative. This sign is not consistent with our expectation. Furthermore, the absolute magnitude of its coefficient is abnormally large.

These results are unchanged, even when we change the definition of the RoO and the sample products. First, we define the RoO more broadly. Specifically, we classify CC, CH, and CS into change-in-tariff classification (CTC). As shown in column (II), the abnormal result in the interaction term of the FTA dummy with RVC is unchanged. Second, the RoO effect should exist (if any) even when imported products are ineligible for the AKFTA. Even in this case, importers still have an incentive to request exporters to use FTA schemes in order to enjoy cumulation. Therefore, we also tried the estimation by restricting sample products only to such ineligible products, in order to focus on the effects of FTA utilisation other than the tariff effect. In this estimation, we do not include a tariff rate variable because the MFN rates are unchanged in 99.98 percent of all observations during our sample period. The effects of the tariff rates are absorbed by the product fixed effects. As shown in column (III), we again obtain similar results for the

interaction terms with the RoO dummy variables.

Last, we examine the relationship between the tariff effect and demand elasticity. By substituting equations (8) and (10) into (9), we have

$$\frac{d \ln \tilde{p}^{imp}}{d \ln\{1 + T(\theta)\}} = -\frac{\hat{\eta} - \eta(\tilde{c})}{2 - \eta(\tilde{c})}.$$

As $\varepsilon(\tilde{c})$ becomes larger, $\hat{\eta} = 1 + 1/\varepsilon(\tilde{c})$ becomes smaller and $d \ln \tilde{p}^{imp}/[d \ln\{1 + T(\theta)\}]$ increases. This implies that the extent of the price-increasing effect of the tariff reduction becomes smaller (or the price-decreasing effect of the tariff reduction becomes larger) as the price elasticity of demand, $\varepsilon(\tilde{c})$, increases. Therefore, introducing the interaction term between tariff rates and the demand elasticity in Thailand (*Demand elasticity*), we empirically investigate how demand elasticity affects the tariff effect. We obtain the information on demand elasticity from Broda and Weinstein (2006) and Kee *et al*. (2008), which provide the estimates at the HS three-digit level and at the HS six-digit level, respectively.

Table B6 reports the estimation results. The results for the FTA dummy and tariff variable are unchanged from those in Table 6. The coefficient for the interaction term is estimated to be insignificant or significantly negative. This result is not consistent with the above prediction. One important reason for this inconsistent result might be that the estimates of demand elasticity are derived under the assumption of a constant price elasticity of demand. However, as we demonstrated in Section 2, under the constant price elasticity of demand, a change in the tariff rate does not affect the import price. Instead, to obtain the significant tariff effect, we need to assume variable price elasticity of demand. In sum, our result may indicate that the use of such estimates is not appropriate to examine the relationship between the tariff effect and demand elasticity.

Table B3: Estimation Including Other FTA Member Countries as Exporters

	(I)	(II)	(III)
FTA Dummy	0.042***		0.038***
	[0.008]		[0.011]
ln (1+Tariff)		-0.272***	-0.053
		[0.067]	[0.088]
Number of obs	2,343,542	2,343,542	2,343,542
Adj R-squared	0.8842	0.8842	0.8842

FTA = free trade agreement.

Notes: The dependent variable is the log of import prices at the importing establishment-country-product-year level. ***, **, and * indicate 1%, 5%, and 10% significance, respectively. Robust standard errors are in brackets. The sample exporting countries are all countries in the world, including all FTA member countries. All specifications include importing establishment-country-product, importing firm-year, and sector-year fixed effects.

Source: Authors' computation.

Table B4: Estimation at the Transaction Level

	(I)	(II)	(III)	(IV)
FTA Dummy	0.028***		-0.079***	-0.282***
	[0.010]		[0.015]	[0.016]
ln (1+Tariff)		-0.553***	-1.083***	-1.056***
		[0.098]	[0.157]	[0.137]
ln Value				0.370***
				[0.000]
Number of obs	16,010,533	16,010,533	16,010,533	16,010,533
Adj R-squared	0.7451	0.7451	0.7451	0.7958

FTA = free trade agreement.

Notes: The dependent variable is the log of import prices at the transaction-level. ***, **, and * indicate 1%, 5%, and 10% significance, respectively. Robust standard errors are in brackets. All specifications include importing establishment-country-product, importing firm-year, and sector-year fixed effects.

Source: Authors' computation.

Table B5: Decomposition of Rules of Origin Effects

	(I)	(II)	(III)
FTA Dummy	0.111	0.136	0.442
	[0.288]	[0.287]	[0.585]
FTA Dummy * CC/RVC	-0.291		
	[0.276]		
FTA Dummy * CH/RVC	-0.174		-0.722
	[0.266]		[0.601]
FTA Dummy * CS/RVC	0.161		-0.612
	[0.373]		[0.611]
FTA Dummy * CH&RVC	0.215		
	[0.507]		
FTA Dummy * RVC	-1.050**	-1.073**	-1.764*
	[0.463]	[0.463]	[0.911]
FTA Dummy * CTC/RVC		-0.199	
		[0.264]	
FTA Dummy * CTC&RVC		0.198	
		[0.507]	
ln (1+Tariff)	-1.299**	-1.209*	
	[0.644]	[0.642]	
Base RoOs	WO	WO	WO
Products	All	All	Ineligible
Number of obs	1,071,985	1,071,985	315,636
Adj R-squared	0.8719	0.8719	0.8763

CC = change-in-chapter, CH = change-in-heading, CS = change-in-subheading, FTA = free trade agreement, RVC = regional value content, WO = wholly obtained rule.

Notes: The dependent variable is the log of import prices at the importing establishment-country-product-year level. ***, **, and * indicate 1%, 5%, and 10% significance, respectively. Robust standard errors are in brackets. All specifications include importing establishment-country-product, importing firm-year, and sector-year fixed effects. In this table, we interact the RTA dummy with dummy variables indicating various RoO. 'Ineligible' in the category of products indicates that the estimation sample products are restricted to those in which the AKFTA rates are same as the MFN rates.

Source: Authors' computation.

Table B6: Tariff Effect and Demand Elasticity

	BW	KNO
FTA Dummy	-0.077	-0.064
	[0.060]	[0.065]
ln (1+Tariff)	-1.551**	-1.458*
	[0.727]	[0.751]
ln (1+Tariff) * Demand elasticity	0.049	-0.102***
	[0.115]	[0.038]
Number of obs	1,062,859	985,482
Adj R-squared	0.872	0.8716

FTA = free trade agreement.

Notes: The dependent variable is the log of import prices at the importing establishment-country-product-year level. ***, **, and * indicate 1%, 5%, and 10% significance, respectively. Robust standard errors are in brackets. All specifications include importing establishment-country-product, importing firm-year, and sector-country-year fixed effects. In column 'BW', we use the demand elasticity obtained from Broda and Weinstein (2006). That of Kee *et al*. (2008) is used in column 'KNO'.

Source: Authors' computation.

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