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Effect of Import Time on Export Patterns

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March 2016

Abstract: This study examines how the importing process time affects export patterns at an establishment level. We first theoretically discuss the effects of import time on not only exports but also export shipment frequency and exports per shipment. Then, we derive some propositions regarding those effects. Next, by employing highly detailed customs data for Thailand from 2007 to 2011, we empirically investigate those propositions. In this study, the time to import is measured at an establishment level using the difference between the dates on which import shipments arrived in ports and then were released from the container yard. Our main finding is that a longer time reduces total exports, particularly through decreasing export frequency. Significantly negative effects on exports per shipment appear in some specific cases. A longer time to import also reduces total imports, particularly through decreasing import frequency.

Keywords: Customs; Time; Thailand
JEL classification: F15, F53

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1. Introduction

In today's interconnected global economy, efforts to streamline, speed up, and coordinate trade procedures, as much as efforts to further liberalize trade policies, will

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drive the expansion of world trade and help countries to integrate into an increasingly globalized production system, rather than being left on the margins of world trade.

World Trade Organization (2015)

In the modern era, which features sophisticated international supply chains, a delay in one stage may result in delays in subsequent stages. The long importing process (e.g., customs clearance) has been considered one of the major obstacles in international trade. The time needed to import depends on various elements, such as inefficient cargo handling at ports. The import process is also longer if customs physically inspects cargos. Such delays in importing have significant effects on firms' activities. They require importers to pay extra storage costs. Furthermore, firms' production can also be delayed. This delay in production may result in the late delivery of the order. If the firm is engaged in exporting, delays in importing may lead to the loss of sales opportunities abroad due to product delays. As a result, a delay in one stage may affect all stages of an international production network.

This study theoretically and empirically investigates how the time to import affects export activities at an establishment level. In the theoretical section, we discuss the effects on not only exports but also export shipment frequency and exports per shipment. Then, we derive some propositions regarding those effects. Inspired by Hummels and Schaur (2013), we introduce a productivity parameter affected by the time to import into finished-goods producers' production function. Therefore, a longer time to import leads to a fall in production efficiency and thus to a rise in marginal costs. Furthermore, when examining the determinants of export frequency, following Kropf and Sauré (2014), we introduce fixed costs per shipment and ad-valorem storage costs. As a result, we demonstrate that a long time to import reduces the establishments' export shipment frequency as well as exports per shipment and thus their total exports.

In the empirical section, we employ highly detailed customs data for Thailand from 2007 to 2011 to investigate these theoretical predictions.[1] In this study, the time to import is measured at an establishment level using the difference between the dates at which import shipments arrived in ports and were then later released from the container yard. Specifically, it captures the time for not only cargo handling but also customs clearance. The results indicate that a longer time to import reduces establishments' total exports, particularly by decreasing the number of export shipments. Significantly negative effects on exports per shipment appear in some specific cases, such as the case of exporting non-differentiated products. These results are important in Thailand. For

[1] Detailed trade procedures for Thailand are introduced in Appendix A.

example, the classification of Harmonized System (HS) codes is an important issue in customs clearance. The classifications used by importers are sometimes different from those given by customs officers. Since importers need to contact officers when such inconsistencies in HS codes between importers and customs occur, it takes a much longer time to clear customs. It is thus important to clarify the effects of import time on firms' business activities in Thailand.

This paper is related to several strands of literature. First, there is a growing body of literature on trade frequency. Eaton et al. (2008) conducted an early micro-level study on this literature and provided various basic statistics on the number and frequency of export transactions in Columbia. Alessandria et al. (2010) demonstrated that the existence of fixed costs per import shipment leads to the lumpiness of import transactions. Kropf and Sauré (2014) computed fixed costs per export shipment using Swiss export data. Hornok and Koren (2014) and Békés et al. (2014) shed more light on the correlation of shipment frequency with several variables. The former study used export data for the United States and Spain showing that export shipments are less frequent and larger when exporting to countries with larger per-shipment costs. Using French export data, the latter study showed that firms adjust to increased uncertainty by reducing their numbers of shipments and increasing their shipment sizes. Against the background of these studies, our paper sheds light on the correlation of the export shipment frequency and size with a novel element, i.e., the time needed for the importation process.

Second, our paper is also closely related to the literature on the effects of trade facilitation.[2] Some studies have examined those effects on trade (Feenstra and Ma, 2014; Persson, 2013; Hornok and Koren, 2015). For example, Feenstra and Ma (2014) found that port efficiency significantly affects the extensive trade margins. Country-level studies on the effects of customs clearance time include Djankov, Freund, and Pham (2010), Freund and Rocha (2011), and Portugal-Perez and Wilson (2012). By estimating gravity equations, these studies found a significant effect of customs clearance time on trade values using country-level data obtained from Doing Business in the World Bank. Using the same variable of customs clearance time, some studies examined firm-level exports (Dollar, Hallward-Driemeier, and Mengistae, 2006; Li and Wilson, 2009; Shepherd, 2013). Martincus, Carballo, and Graziano (2015) also conducted a firm-level study but used actual shipment dates to measure the time in customs clearance, as in our paper. For Uruguay's exports, they found that a longer time for customs clearance in *exporting* has significantly negative effects on exports. In

[2] Also see World Trade Organization (2015).

contrast to their paper, we examine the effects of *import* time on exports to determine the effects of a delay in one process on international production and distribution networks. Another difference with their paper is that we provide a specific theoretical model to enhance our understanding of these effects.

Third, as in Kasahara and Lapham (2013), Aristei, Castellani, and Franco (2013), and Muuls and Pisu (2009), this paper investigates the firm (establishment)-level interrelationship between imports and exports. These studies found that firms with past experience in exporting (importing) tend to also start importing (exporting) activities because some sunk costs are common between importing and exporting. This literature may also include Amiti, Itskhoki, and Konings (2014) and Chung (2016). While the former study examined the relationship between import intensity and the exchange rate pass-through in exporting, the latter study revealed that exporters' dependence on imported inputs affects their choice of invoice currency when exporting. Our analysis on the effects of import time on exports provides novel facts regarding the firm (establishment)-level interrelationship between imports and exports.

The rest of this paper is organized as follows. Section 2 theoretically discusses the effects of import time on exports and derives some propositions. After explaining our dataset in Section 3, we empirically investigate those propositions in Section 4. Finally, Section 5 concludes this paper.

2. Theoretical Discussion

In this section, we theoretically examine the effects of import time on exports. Specifically, we model a small open economy considering the time to import process. Based on as simple a framework as possible, we demonstrate potential paths through which the import time affects exports.

2.1. Time Sensitivity and Storage Cost

The home country contains final-good firms that import intermediate inputs from the rest of the world (ROW), produce output, and sell the resulting products to a representative consumer in the ROW. The demand function of the representative consumer in the ROW on each home firm's output is given by

$$q = p^{-\sigma}B \qquad 1 < \sigma,$$

where q is the demand, p is the export price of a home product, σ is the elasticity of substitution, and B is the exogenous demand component.

We consider two potential effects of import time on exports. First, we assume that final-good firms prefer timely delivery of imported intermediate inputs. Hummels and Schaur (2013) modeled exporters' choice between fast but expensive air cargo and slow but cheap ocean cargo by introducing the delivery time of each shipment mode.[3] They assumed that fast delivery leads to greater utility because it results in importers' ability to ensure timely consumption. By applying this idea, we introduce the benefit of timeliness of importing into the production side. If final-good firms can receive and use imported inputs exactly when they recognize the need for those inputs, they are then assumed to be able to move smoothly into the production processes, meaning that better production efficiency can be realized. In contrast, if the delivery of those imported inputs takes a long time, final-good producers have to postpone their final-good production until they receive the required imported inputs. To introduce such a benefit of timely delivery as simply as possible, we assume that the production technology of a home final-good firm follows the CES function

$$y = a\left(l^{\frac{\nu-1}{\nu}} + \lambda m^{\frac{\nu-1}{\nu}}\right)^{\frac{\nu}{\nu-1}} \qquad 1 < \nu,$$

where y is the output; l and m represent amounts of domestic and imported intermediate inputs, respectively; and ν is the elasticity of substitution between domestic and imported inputs.

We define each firm at the establishment level to be consistent with our dataset. For simplicity, we assume that production decisions are independent across establishments, and we do not consider the existence of economies of scale. Thus, a is interpreted as the establishment-specific total factor productivity (TFP). λ captures the benefit of timeliness of import in the production and is defined as follows:

$$\lambda \equiv e^{-\delta T}$$

where T is the time spent for import processes, including cargo handling and customs clearance, which is exogenous to each home firm.[4] δ is a positive fixed parameter that represents the time sensitivity of imported intermediate inputs. If the quality of an imported input is sensitive to time, a longer time needed for importing leads to a larger loss for final-good firms. For instance, in a case where a firm imports perishable foods, processes them, and produces final consumer products, timely delivery is a key factor that defines the firm's efficient production outcome. Such a loss of production efficiency is captured by λ in our framework.[5]

[3] The focus of Hummels and Schaur (2013) is delivery time from exporters' location to importers' location. In contrast, we focus on the time spent for importing processes, such as cargo handling and customs clearance at the importers' port.

[4] Therefore, we assume that, for example, the amount of imports does not affect the import time.

[5] In our model, importers make their decisions on final-good production after observing import time.

Second, we assume that the ad-valorem storage cost at the port is shifted onto the import price.[6] As a result, a longer import time leads to a higher import price. To incorporate this aspect, we let z represent the mill price of imported intermediate inputs. For simplicity, we do not explicitly introduce transportation costs and tariff payments for imported inputs, but this setting does not lead to any qualitative changes in our theoretical consequences. Thus, the import price of those inputs is represented by $e^{RT}z$, where R is a positive parameter.

Exporters' cost minimization leads to the following demand functions of domestic and imported intermediate inputs:

$$l = a^{\nu-1}\left(\frac{\omega}{w}\right)^{-\nu} y, \qquad m = a^{\nu-1}\left(\frac{e^{RT}z}{\lambda w}\right)^{-\nu} y,$$

where ω and z are prices of domestic and imported intermediate inputs that are exogenous. The marginal cost w is given by

$$w = \frac{1}{a}\left(\omega^{1-\nu} + e^{-[\delta\nu+(\nu-1)R]T}\right)^{\frac{1}{1-\nu}}. \tag{1}$$

This is one of our key equations, and it states that a longer time spent for imports (higher T) leads to a higher marginal cost (higher w) through lowering the efficiency and increasing the storage costs for imported inputs.

2.2. Firms' Decisions

For the remaining part of our model, we basically follow Kropf and Sauré (2014). In their model, the arrival time of traded products at their destination is assumed to be different from the time at which those products are sold and consumed. Then, consumer prices are assumed to become higher; thus, the demanded quantity of exports shrinks when a larger gap exists between those two time points because storage costs accrue. Exporters are also assumed to pay for fixed costs per shipment. As a result, the number of shipments and exports per shipment are determined based on the trade-off between paying a larger amount of total fixed costs per shipment by shipping more frequently or paying more storage costs by shipping greater quantities of product at a time.

Given the monopolistic competition of the final-good market in the ROW, the mill price of final goods is given by

$$\tilde{p} = \frac{\sigma}{\sigma-1}w.$$

In other words, we do not assume any uncertainty in the time to import.

[6] As in the case of export in Kropf and Sauré (2014), we do not consider the possibility that economies of scale apply to storage costs.

Let t' represent the gap between the date of arrival at the ROW and the date of sale. Taking ad-valorem storage costs (R) and iceberg type trade costs (τ) into account, the consumer price at the date of sale (t') is represented by[7]

$$p(t') = \tau e^{Rt'} \frac{\sigma}{\sigma - 1} w.$$

The flow operating profit $[\pi(t')]$ can be provided in the following manner:

$$\pi(t') = \sigma^{-\sigma} \left(\frac{\tau e^{Rt'}}{\sigma - 1} w \right)^{1-\sigma} B.$$

Home firms do not make a new shipment until all the products exported in the last shipment are sold. Defining the interval between shipments by Δ, the present value of per-shipment profit $[\Pi(\Delta)]$ is given as

$$\Pi(\Delta) = \int_0^{\Delta} e^{-rt'} \pi(t') dt' = \sigma^{-\sigma} \left(\frac{\tau}{\sigma - 1} w \right)^{1-\sigma} B \frac{1 - e^{-[r+(\sigma-1)R]\Delta}}{r + (\sigma - 1)R},$$

where r is the exporters' discount rate for future sales ($0 < r$). Given the existence of fixed costs per shipment (f), an exporter makes a shipment only if $\Pi(\Delta) \geq f$. Note that by normalizing a period by unity, $\Theta \equiv \Delta^{-1}$ represents the number of shipments, i.e., the shipment frequency.

Defining γ and A, respectively, as

$$\gamma \equiv e^{-\Delta}, \qquad A \equiv \sigma^{-\sigma} \left(\frac{\tau}{\sigma - 1} w \right)^{1-\sigma} B,$$

then the net present value over all shipments in a period (NPV) is given by

$$NPV = \frac{1}{1 - \gamma^r} \left(A \frac{1 - \gamma^{r+(\sigma-1)R}}{r + (\sigma - 1)R} - f \right).$$

Home firms determine the number of shipments by maximizing NPV with respect to γ. The first-order condition is derived as

$$\frac{r + (\sigma - 1)R\bar{\gamma}^{r+(\sigma-1)R} - [r + (\sigma - 1)R]\bar{\gamma}^{(\sigma-1)R}}{r + (\sigma - 1)R} - \frac{rf}{A} = 0.$$

Here, $\bar{\gamma}$ is the optimized value of γ, which defines the optimized number of shipments ($\bar{\Theta}$). We take implicit derivatives to get

$$\frac{\partial \bar{\gamma}}{\partial A} = r \left(1 + \frac{f}{A^2} \right) \frac{1}{[r + (\sigma - 1)R](\sigma - 1)R\bar{\gamma}^{(\sigma-1)R-1}(1 - \bar{\gamma}^r)} > 0.$$

Given $\partial A / \partial T < 0$ and $\partial \bar{\Theta} / \partial \bar{\gamma} > 0$, we can state that a smaller number of shipments is associated with longer time to import ($\partial \bar{\Theta} / \partial T < 0$). Thus, our first proposition is stated in the following manner:

[7] Again, we do not consider the possibility that economies of scale operate in storage costs.

Proposition 1. *When the time to import* (T) *is longer, the number of export shipments* ($\bar{\Theta}$) *is smaller.*

The intuition is as follows. A longer import time raises the marginal costs of production by lowering the production efficiency and increasing the storage cost, as implied by equation (1). This rise of marginal costs lowers the firm's total operating profit. Given that firms have to pay fixed costs for each export shipment, the total operating profit will not cover the total fixed costs without decreasing the number of export shipments. As a result, firms with experience in longer import times are more likely to decrease the number of export shipments.

Next, we examine the relationship between import time and value per export shipment. The optimal value per export shipment ($\bar{x}$) is given by

$$\bar{x} = \int_0^{\Delta} \tau \tilde{p} q(t') dt' = \frac{A}{R}(1 - \bar{\gamma}^{\sigma R}). \qquad (2)$$

Following the same procedure as Kropf and Sauré (2014), we can prove that $d\bar{x}/dA > 0$. Given that w is increasing in T and that A is decreasing in w, we prove that $dA/dT < 0$. Thus, it is revealed that $d\bar{x}/dT < 0$, which provides our second proposition in the following manner:

Proposition 2. *When the time to import* (T) *is longer, the value per export shipment* ($\bar{x}$) *is smaller.*

As implied by Proposition 1, a longer import time (higher T) leads to a longer shipment interval (higher $\bar{\Delta}$ or lower $\bar{\gamma}$) and thus to a higher export price and smaller demand (lower $q(t')$). According to the equation (2), lower $\bar{\gamma}$ and lower $q(t')$, respectively, result in larger and smaller values per export shipment. Thus, there are positive and negative effects of T on $\bar{x}$. Proposition 2 states that the negative effect dominates the positive one, and the effect of T on $\bar{x}$ becomes negative in sum.

The reason for this dominance can be summarized in the following manner. On the one hand, firms increase the value per export shipment when the shipment interval lengthens. However, this increase is limited because future demand is small due to the significantly high consumer price onto which the storage cost has been shifted.[8] Accordingly, the positive effect of T on $\bar{x}$ comes to be limited. On the other hand, the

[8] In the model, as in Kropf and Sauré (2014), storage costs are assumed to be large enough (specifically $R \geq r$).

negative effect becomes significantly large as a result of demand being significantly elastic to price changes (remember $\sigma > 1$). As a result, the negative effect dominates the positive effect, as shown in Proposition 2.

The total exports of a home producer are defined by the product of per-shipment value and number of shipments ($\bar{X} \equiv \bar{x}\bar{\Theta}$). Based on Propositions 1 and 2, we can easily prove that the total exports are decreasing in time to import ($d\bar{X}/dT < 0$). This can be stated in the following proposition:

Proposition 3. *When the time to import (T) is longer, the total value of exports (X) is smaller.*

Longer import times lead to a smaller number of shipments and smaller per export shipment values. Straightforwardly, the total value of exports has been defined as the product of those two factors. Thus, it is naturally expected that the total value of exports shrinks when the import time becomes longer. In the following section, the propositions provided above will be examined empirically.

3. Empirical Issues

We now empirically investigate the validity of the propositions presented in the previous section by employing detailed data for Thailand, which are obtained from the Customs Office, Kingdom of Thailand. We use transaction-level export and import data from 2007 to 2011 that cover all commodity exports and imports in Thailand. In our sample period, we retain the consistency of the HS version for product classification, i.e., HS2007. Our dataset contains the HS eight-digit code, export/import country, export/import value, and firm and branch identification codes. Using two identification codes, we can identify establishments. In addition, several dates are available for each shipment in the export and import data. In particular, the import data include dates at which shipments arrived in ports and were released from the container yard. We use the difference between these two dates as time to import. Since establishments may import multiple times within a year, we use a median of such two-date differences in all import transactions by each establishment, as in Martincus, Carballo, and Graziano (2015).

Our time variable includes time spent for not only customs clearance but also cargo handling. As mentioned in the introductory section, the former time depends on various elements. One crucial element is whether the import declaration is classified as red line or green line. Such classification is based on predetermined customs selectivity criteria. In the case of a red line, cargo must undergo physical inspection. Another element is inconsistencies in HS codes between importers and customs officers. In this case, importers must contact customs officers and thus take more time to pay customs duties. On the other hand, the time for cargo handling is related to cargo congestion, handling facilities (e.g., cranes, trailers, or forklift trucks), inefficient port management, and unprofessional practices by port officers and workers. In particular, unexpected cargo congestion leads to unexpectedly long import times. In addition, the inclusion of the time needed for cargo handling implies that our variable of time covers a broader scope than that in Martincus, Carballo, and Graziano (2015), which focused on customs clearance time. In other words, our interest lies in not only customs facilitation but also facilitation in a broader sense, which may be termed trade facilitation.[9]

Based on the discussion in Section 2, we examine the effects of import time on exports, number of export shipments, and average exports per shipment. To this end, we simply estimate the following reduced-form equation using the ordinary least squares (OLS) method:

$$\ln \mathbf{X}_{fipt} = \beta_1 \mathrm{Import}_{ft} + \beta_2 \ln(1 + \mathrm{Time}_{ft}) + \mathrm{u}_{fip} + \mathrm{u}_{ipt} + \epsilon_{fipt} \quad (3)$$

A vector of $\mathbf{X}_{fipt}$ includes total exports, the number of export shipments, and average exports per shipment of product p to country i by establishment f in year t. The former element is equal to the product of the latter two elements. Import_{ft} is an indicator variable that takes a value of one if establishment f engaged in importing in year t and is zero otherwise. To avoid suffering from sample selection biases, we include non-importers in our sample.[10] Then, to examine the effects of import time, we introduce a variable Time_{ft}, which is the abovementioned difference between the two dates in importing.[11]

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[9] Our dataset does not allow us to differentiate between times for cargo handling and customs clearance.

[10] Chung (2016) also introduced non-importers in the estimation sample and the importer dummy variable. In our estimation, time is set to the value of zero for non-importers. This treatment is natural in the sense that non-importers do not suffer from any delivery delay for imported inputs. Nevertheless, significant differences may exist between importers and non-importers, both of which have a zero-value variable of ln(1 + Time). Some differences will be controlled for by the import dummy variable. We will take care of such differences by using another approach in the robustness checks on our results.

[11] One may propose to introduce the time to export, as in Martincus, Carballo, and Graziano (2015). Our export data also enable us to compute the difference between dates at which customs procedures start and goods are shipped from ports. However, in the case of Thailand, firms have to specify the shipment date in advance on the export declaration form. That date cannot be further away than the next 20 days. Therefore, most exporters fill in 20 days after the date for submission of export declaration, i.e., the maximum number of days. As a result, in our export dataset, approximately 80% of all export transactions record 20 days as the difference between the above-mentioned two dates. Thus, this difference is an inappropriate indicator for measuring the time to export.

u_{fip} and u_{ipt} are establishment-destination-product and destination-product-year fixed effects, respectively. The former fixed effects contribute to controlling for establishments' inherent product-specific productivity in addition to establishments' destination-product-specific experience or knowledge. All time-variant destination-product characteristics (e.g., tariff rates and demand sizes) are controlled by the latter type of fixed effects. In addition, the latter type of fixed effects will control for storage costs in Thailand and in export destination countries in addition to fixed costs per shipment between Thailand and export destination country. In short, using these fixed effects enables us to isolate time-variant establishment-specific elements in the estimation equation.[12]

Before reporting our estimation results, we will offer a brief overview of time to import. Figure 1 depicts the distribution of time to import, i.e., the difference in dates define above, for the year 2011. As mentioned above, we measure this by using the median of all import transactions for each establishment. The figure shows that most of the sampled importers take approximately three days for importing. The World Bank's Doing Business Database reports a period of 13 days as the time to import for Thailand in 2011, which is 19th out of 151 countries. Although their definition of import time differs from ours, the latter is much longer. In addition, our three-day time period may be similar to the case of Uruguay, as found by Martincus, Carballo, and Graziano (2015). Although Uruguay's case shows the time for exporting and time only for customs clearance, the distribution of customs clearance time peaks at around two days for Uruguay's exports.[13]

=== Figure 1 ===

4. Empirical Results

This section reports our estimation results. We first report our baseline results on the effects of import time on export patterns followed by our results for several varieties of robustness checks. Finally, some other estimation results are reported.

4.1. Baseline Results

The effects of import time on export patterns are examined by estimating equation

[12] Due to data limitations, we cannot control for other time-variant establishment/firm-specific characteristics, such as total factor productivity.

[13] Some other basic statistics are available in Appendix B.

(3). The results are shown in Table 1. There are two noteworthy points. One is that the coefficients on the Import Dummy are estimated to be significantly positive for all three specifications. Importers have a larger number of export shipments and a larger value per export shipment, resulting in larger exports than non-importers. The other point to note is that the coefficients for import time are negative in all three specifications. Furthermore, they are statistically significant for total values and number of export shipments but not for values per export shipment. The former results imply that importers with experience in longer import times decrease total exports, particularly by decreasing the number of export shipments. From a quantitative point of view, the double increase in import days decreases total exports by 3.3% and the number of export shipments by 2.9%.

=== Table 1 ===

Section 2 discussed the existence of positive and negative effects on exports per shipment arising from import time. That result can also be interpreted from the view of customers' preference for timely delivery. Longer importation times might lead to longer times for final-good production and result in the late delivery of final goods to customers. If customers prefer timely delivery and consumption, as discussed by Hummels and Schaur (2013), they motivate exporters to increase the export value per shipment and accumulate inventory stock of final products. In contrast to Proposition 3, this case implies possible positive effects of import time on exports per shipment other than those so far discussed in our theoretical framework. Those two countervailing effects can lead to the insignificant result found for exports per shipment.

4.2. Robustness Checks

We conduct several robustness checks on the above results on exports. First, using the list of time-sensitive products in Djankov et al. (2006), we examine time-sensitive and time-insensitive products separately. The results are shown in Table 2. In these robustness checks, we only report heteroscedasticity-consistent standard errors, though the clustering method does not change our conclusion. The results in Table 2 are qualitatively unchanged from those in Table 1, though the statistical significance is decreased to a 10% level in the case of time-sensitive products. Namely, for time-sensitive products and time-insensitive products, the coefficients for import time are significantly negative for both total values and number of shipments. Although we do not statistically test the difference in coefficient magnitudes, the absolute magnitude is slightly larger in the case of time-sensitive products.[14]

=== Table 2 ===

Second, we examine the effects of import time on export patterns of differentiated and non-differentiated products separately. Table 3 shows our estimation results. The classification of differentiated products is based on the "liberal" classification of products by Rauch (1999). The negative effect of import time on total exports is estimated to be larger when the exported products are less differentiated. A similar magnitude relationship between differentiated and non-differentiated products can be also found in the cases of number of export shipments and exports per shipment.[15] In particular, the coefficient for import time is estimated to be significantly negative even for exports per shipment in the case of non-differentiated products.

=== Table 3 ===

Third, we examine the effects of import time on export patterns according to transport modes used for importation. The results are shown in Table 4. For example, the panel "Only Sea Transport" shows that establishments that import only using sea transport in addition to non-importers are included in the estimation sample. The "Other" mode of transport includes truck, railway, and postal transportations. Results similar to our previous ones were found in the case of "Only Sea Transport." In this case, the coefficients for import time are estimated to be significantly negative in all specifications, including exports per shipment. On the other hand, in the case of "Only Air Transport," a significantly negative effect is found only on total exports. No significantly negative effects can be found in "Only Other Transport." One possible interpretation is that per-unit storage costs are likely to be expensive in the case of products transported by sea because such products are relatively large in size. Therefore, our results may indicate that storage costs in imports, which were discussed as one possible potential path in the theory section, play an important role in the effects of

[14] We also estimate the models by pooling data for time-sensitive and time-insensitive products and introduce an interaction term of our import time variable with the dummy variable taking the value of one for time-sensitive products and zero otherwise. However, its coefficient is insignificant in the estimations for all cases (i.e., total exports, number of export shipments, and exports per shipment).

[15] When estimating the models by pooling data for the differentiated and non-differentiated products and introducing the interaction term of our import time variable with the dummy variable taking a value of one for differentiated products, we obtain a significantly positive coefficient in the cases of total exports and number of export shipments.

import delays on export patterns.

=== Table 4 ===

Fourth, we focus on the time needed to import intermediate inputs rather than finished products. As mentioned in the previous section, our time variable is a median of the aforementioned two-date differences in all import transactions for each establishment. However, imported inputs are not necessarily used for an examined exported product, but they may be used for other exported products or for products for domestic sale. Since we do not have information on inputs according to products, it is impossible to address this issue directly. Nevertheless, following Amiti et al. (2014), we try to minimize this inconsistency. Specifically, we construct a time variable excluding information on finished product imports, which are identified using Broad Economic Categories (BEC).[16] The results on import time using this new measure are shown in Table 5 and are qualitatively unchanged. The coefficients are estimated to be significantly negative for both total exports and export frequency.

=== Table 5 ===

The next two checks entail dropping some establishments. First, as in Martincus, Carballo, and Graziano (2015), we drop importers that have more than 100 annual import transactions because the larger the number of transactions becomes, the more likely establishments are to experience a longer time to import. It is naturally expected that a firm's reaction to a long import time depends on how frequently a firm experiences a longer duration. Thus, we examine importers for which a long import time is relatively unusual, i.e., firms with fewer than 100 annual import transactions. The other check involves dropping non-importers. As mentioned in the previous section, we set our time variable to zero for not only importers with same-day time for import but also non-importers. However, the effects of the zero value might differ between these two kinds of establishments. Therefore, to directly examine the difference in exporting between importers with and without import delays, we simply drop non-importers from our estimation sample, though this drop may yield sample selection biases. The estimation results for these two robustness checks are provided in Table 6 and the upper panel of Table 7, respectively. Again, the results are qualitatively unchanged. The coefficients for import time are significantly negative for both total

[16] We exclude importers of only finished products.

values and number of shipments.

=== Tables 6 & 7 ===

Last, we also address possible endogeneity biases. As mentioned in Section 3, the classification into either red or green lines is based on selectivity criteria predetermined by customs officials, which are unknown to us and which might become a source of endogeneity of our variable of time. Reverse causality might also be an issue. Namely, if the possibility of being classified into a red line is higher when import values are larger and if establishments with larger export volumes have larger import volumes, the time to import may be larger for those with larger export volumes. To tackle the endogeneity arising from these sources, we use the instrumental variable (IV) method. In the selection of instruments, we exploit the incentive behind the aforementioned inconsistency in HS codes between importers and customs officers. In general, importers have an incentive to classify into HS codes with lower most-favored-nation (MFN) rates, particularly when the HS code of the concerned product is unclear. In this case, on the other hand, customs may choose HS codes with the higher MFN rates to increase customs revenue. In short, MFN rates play a key role in such inconsistencies in HS codes. Therefore, we use MFN rates in Thailand as an instrument, restricting observations only to importers as above.[17] The results are shown in the lower panel of Table 7. The F statistic is sufficiently high. and it shows that our instrument is not weak.[18] The coefficients for import time are significantly negative only for the case of export frequency.[19]

4.3. Other Estimations

In this last subsection, we report the results in our other estimations. First, we consider the possibility that home producers adjust import patterns to minimize the negative effect of import time on the production process and thus on export patterns. To examine this possibility, we estimate the following equation for all importers, including non-exporters:

$$\ln \mathbf{M}_{fjpt} = \gamma_1 \ln(1 + \text{Time}_{fjpt}) + \text{u}_{fjp} + \text{u}_{jpt} + \epsilon_{fjpt} \quad (4)$$

A vector of $\mathbf{M}_{fjpt}$ includes total imports, number of import shipments, and average

[17] We use a median of MFN rates if establishments import multiple products.

[18] The first-stage estimation shows that the establishments importing products with higher MFN rates are more likely to experience a longer import time.

[19] This result is obtained for our establishment-level analysis but does not change for a firm-level analysis. These results are available upon request.

imports per shipment of product *p* from country *j* by establishment *f* in year *t*. Unlike the case in equation (3), we use a median of two-date differences in each establishment-import source-product pair, not in all import transactions by each establishment. This model could be considered the import version of the analysis in Martincus, Carballo, and Graziano (2015), which examined the effects of export time on exports. We control for establishment-import source-product and import source-product-year fixed effects.

The results are reported in Table 8. The coefficient for import time is estimated to be significantly negative, indicating that a longer time to import decreases total imports. Specifically, a 100% (i.e., doubling) increase of days to import results in total imports decreasing by 2.7%. Taking a closer look at such a decrease, we can see that it mainly arises from a decrease in the number of import shipments, the coefficient of which is also estimated to be significantly negative. On the other hand, the coefficient for import values per shipment is positively significant. Specifically, establishments that experience a doubling in the number of days to import decrease the number of import shipments by 3.6% and increase imports per shipment by 0.1%. Such adjustments in import patterns may reflect a desire to minimize the negative effects of longer import times on exports.

=== Table 8 ===

Finally, we consider the possibility of lagged effects of import time on export patterns. This examination reflects the fact that trade contracts between home producers and their customers may be signed before home producers know how many days will be taken up by importing their inputs. In this case, firms' responses to import time may appear at the next opportunity (e.g., a half year or full year later) to reconsider the contract's details. In addition, our examination of any instantaneous relationship between import time and export patterns may not show the exact effects of import time on export patterns pertaining to the case in which establishments experience a longer time to import after they finish exporting in a concerned year. To account for these issues, we examine the one-year lagged variable on import time in addition to a one-year lagged importer dummy.

The OLS results are shown in Table 9. The coefficients for all import dummy variables, including the one-year lagged variable, are estimated to be positively significant. Interestingly, while the coefficients for the current-year import time are negatively significant only for total values and number of shipments, those for the one-year lagged import time are negatively significant in all cases, including that of the exports per shipment. These results indicate that the negative effects of import time on number of export shipments persist into the next year while those on values per shipment take a little time to appear.

=== Table 9 ===

5. Concluding Remarks

This study examined the effects of import time on export patterns at an establishment level. Our main finding is that the import time affects export patterns. Specifically, a longer import time reduces establishments' exports, particularly by decreasing the number of export shipments. Our estimation shows that a doubling of the number of days needed to import will decrease total exports by 3.3% and decrease the number of export shipments by 2.9%. We also find a significant effect of import time on import patterns. An increase in import time reduces establishments' import shipment frequencies but raises their imports per shipment. Specifically, establishments that experience a doubling of the number of days needed to import will decrease the number of import shipments by 3.6% and increase imports per shipment by 0.1%. As a result, their total imports are reduced. In sum, these results imply that the time spent in one stage has significant effects on both upstream and downstream stages in international production networks.

As mentioned in the introductory section, customs delays due to inconsistencies in HS codes between importers and customs have been a serious issue in Thailand. If importers and customs have incentive to select HS codes with lower and higher tariff rates, respectively, such inconsistencies are likely to occur, particularly when the correct applicable HS code is unclear in the concerned product. However, a long import time arising from such delays is harmful to importers because it reduces their exports, i.e., sales revenue. It is also harmful for the government because of the decrease in national exports, which will be larger than the increase in customs revenues in absolute terms. Therefore, the issue of HS classification should be solved by, for example, an "advance ruling" system. Although such a system has been used in Thailand since 2010, it does not necessarily work well in practice due to, for instance, the cumbersome application process.[20] Therefore, customs should continue to improve that system.

[20] The advance ruling system allows importers to receive official information on the tariff classification of imported goods and corresponding duty rates before they lodge import declarations.

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Importers who seek such information must make an advance inquiry at least 30 days before the importation date. Once announced, such information is valid for any imports of such goods for the next two years.

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Appendix A. Customs Procedures in Thailand[21]

A1. General Information

The Thai Customs Department is the nation's border enforcement agency responsible for controlling, regulating, and facilitating the movement of goods between Thailand and other countries. Its main task is not only assessing and collecting duties, taxes, and fees at borders but also detecting, interdicting, and investigating smuggling and trafficking as well as any fraudulent activities intended to avoid the payment of such duties, taxes, and fees. Together with other authorities, it also detects, interdicts, and investigates cross-border activities of products specified in any relevant restriction or prohibition measures. Hence, procedures and documents are required at the border before goods are successfully delivered from exporters to importers.

In response to the country's increasing volume of imports and exports, the Thai Customs Department has continuously simplified and modernized import and export procedures using information and communication technologies. Currently, various automated systems are implemented, such as e-customs, national single window, computerized risk management, and high-technology facilities for non-intrusive inspection.

Adopted in 2007, e-customs is an integrated system that embraces paperless import customs clearance of ordinary goods (e-import), paperless export customs clearance of ordinary goods (e-export), paperless customs clearance for the importation and exportation of airborne express goods (e-express), paperless cargo management (e-manifest), and online duty/tax/fee payment (e-payment). Under e-customs, there is no need for relevant parties to submit paper documents because all data is transmitted electronically. In a much more comprehensive version of e-customs, the national single window is a unified system that seamlessly delivers all types of e-documents among a massive network of users in trade and logistics circles, including not only customs authorities, ports authorities, importers, exporters, customs brokers, forwarders, airlines, shippers, warehouses, transporters, and banks but also other authorities related to import and export controls. Nonetheless, the development of Thailand's national single window is still in progress and not yet complete.

Computerized risk management is a system in which decisions about the need for a physical customs inspection are automatically made based on risk profiles that have been gathered, analyzed, and categorized by customs headquarters and local customs offices. In principle, there are six risk indicators adopted by the Thai Customs

[21] The information in this appendix is based on the official Thailand Customs Department's website.

Department: type of goods, country of origin, port of discharge, purpose of import/export (e.g., whether claiming duty drawbacks), historical record of the specific importer and exporter, and historical record of the customs broker.

Last, some selected ports have begun using electronic equipment to enable customs inspectors to identify the contents of transport devices without opening the transport device and without any having physical contact with the contents, i.e., through use of x-ray scanners for container inspection and electronic seals (e-seals) that apply radio frequency identification (RFID) technology during the container-sealing process.

A2. Import Procedures

The customs procedures for clearing imports into Thailand arriving by land, air, or sea are similar. Prior to or upon a carrier's arrival, a carrier company electronically submits a carrier arrival report, a manifest, and a container list to customs. Once approved, the carrier company forwards relevant information to the importer. When the carrier arrives at a port, the carrier notifies customs, the port authority, and the importer before a cargo is unloaded into a warehouse.

Then, the importer or its customs broker electronically submits an import declaration and supporting documents to customs. The supporting documents required include an airway bill or bill of lading, an invoice, and a packing list. For some shipments, other documents may also be required, e.g., a certificate of origin if preferential tariff treatment is to be claimed, a license or permit for the importation of controlled goods that require approval from other authorities, and a certificate required in accordance with technical measures. All data provided are then automatically validated, and any errors are reported for immediate online correction. If there are no errors, declaration and payment numbers are automatically generated. With these numbers, the importer or its customs broker proceeds to pay any duty, tax, and fee stipulated in the payment form.[22]

The computerized risk management system automatically advises the importer and its customs broker whether physical inspection by a customs officer is needed. Once the payment is complete and certain conditions are met, the port authority, importer, and customs broker are notified that the goods are ready for release. The conditions that must be met are as follows: a) physical inspection is not needed, which is widely known as being subject to the "green line," b) a customs officer finds no grounds for suspicion; and c) an officer from other licensing authorities, if any, finds no reason for suspicion. If

[22] In practice, the payment may take place either before or after unloading the cargo into the warehouse.

physical inspection is needed, which is widely known as being subjected to the "red line," or if the customs or licensing authorities officers request a thorough inspection, the port authority, importer, and its customs broker will be notified. The importer or its customs broker then makes arrangements with the port authority to prepare the container for inspection. When ready, the port authority notifies customs and, if applicable, the licensing authorities.[23] The automated customs system then automatically assigns a customs officer in charge. Assignment procedures for the other licensing authorities may differ. Once inspection is completed and approved, the port authority, importer, and customs broker are notified that the goods are ready for release. Once released from the warehouse or container yard, the cargo is loaded onto trucks, trains, ships, and/or planes and delivered to the importer.

A3. Export Procedures

Like import procedures, customs procedures for the clearance of exports out of Thailand by land, air, or sea are similar. After confirming the sales contract and transaction terms, such as payment terms, with an importer, the exporter or its customs broker prepares export documents and applies for an export license or a certificate when necessary. The exporter or its customs broker then electronically submits the export declaration and supporting documents to customs. The supporting documents required include an invoice and a packing list. For some shipments, other documents may also be required, e.g., a license or permit for the exportation of controlled goods that require approval from other authorities and a certificate required in accordance with technical measures. All data provided are then automatically validated, and any errors are reported for immediate online correction. If there are no errors, declaration and payment numbers are automatically generated. Using these numbers, the exporter or its customs broker proceeds to pay any duty, tax, and fees[24] stipulated in the payment form.[25]

After that, a freight forwarder loads the cargo into a container and electronically submits a cargo control report to customs. All data provided are then automatically validated and any errors are reported for immediate online correction. If there are no errors, the cargo control report number is automatically generated and sent to the freight forwarder and exporter/customs broker. The freight forwarder then moves the cargo to

[23] If the licensing authorities successfully link their operations with the national single window, they will be automatically notified. If not, the importer or its customs broker will notify them.
[24] During 2007 and 2011, all exported goods were duty-free except some bovine animal hides and some types of wood, sawn wood, and articles made of those woods.
[25] Because most exported goods are duty-free, the payment date is practically the same as the submission date of the export declaration. It is also noted that e-customs does not allow the shipment date planned to be more than 20 days after the export declaration submission date.

the port of exit for customs inspection.

With the computerized risk management system, the exporter and customs broker are automatically advised whether a physical inspection by a customs officer is needed. The physical inspection for exports by customs officers and, if applicable, officers from other licensing authorities follows steps identical to those previously mentioned in the import procedures. Once the inspection is complete, the cargo is released from the warehouse or container yard. The cargo is then loaded onto a carrier. The carrier notifies customs, the port authority, the exporter, and the customs broker of the departure date when it departs. After that, the carrier or shipping company electrically submits the manifest information to customs. The exportation is considered successful when the information provided is correct after being automatically validated.

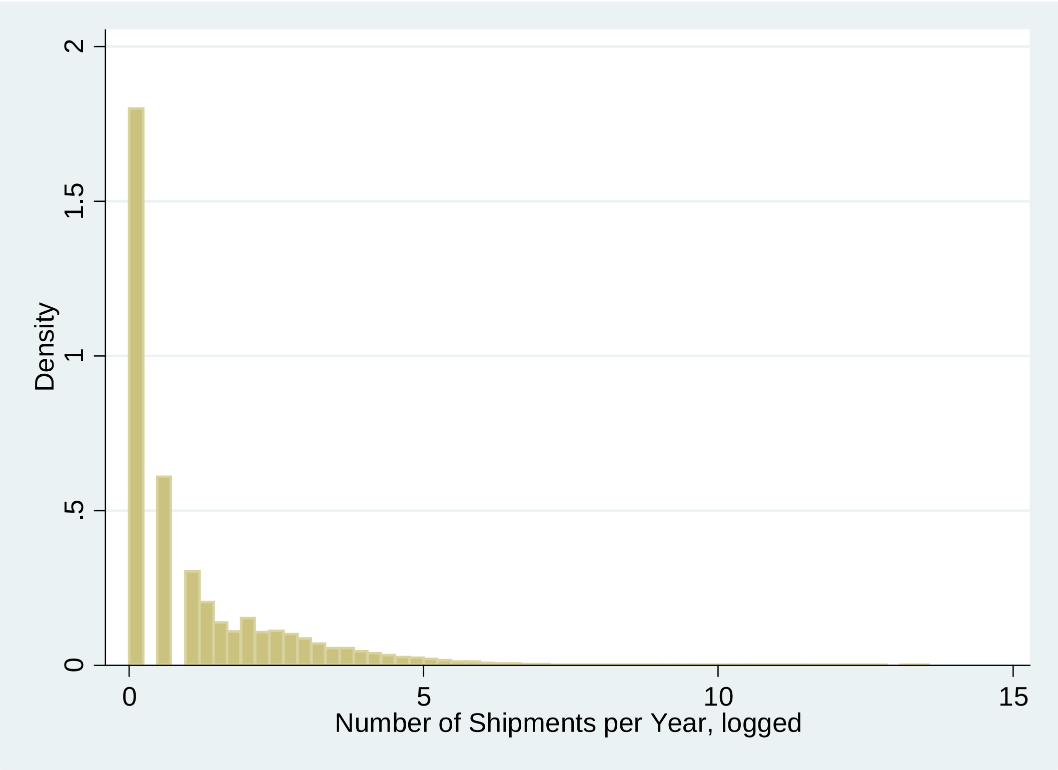
Appendix B. Some Basic Statistics

Table B1. Basic Statistics of the Estimation Sample in Table 1

Variable	Obs	Mean	Std. Dev.	Min	Max
ln Total Values	1,140,079	12.441	3.165	0	25.804
ln Number of Shipments	1,140,079	1.742	1.638	0	13.568
ln Values per Shipment	1,140,079	10.699	2.422	0	21.206
Import Dummy	1,140,079	0.730	0.444	0	1
ln (1+Time)	1,140,079	0.870	0.718	0	2.6391

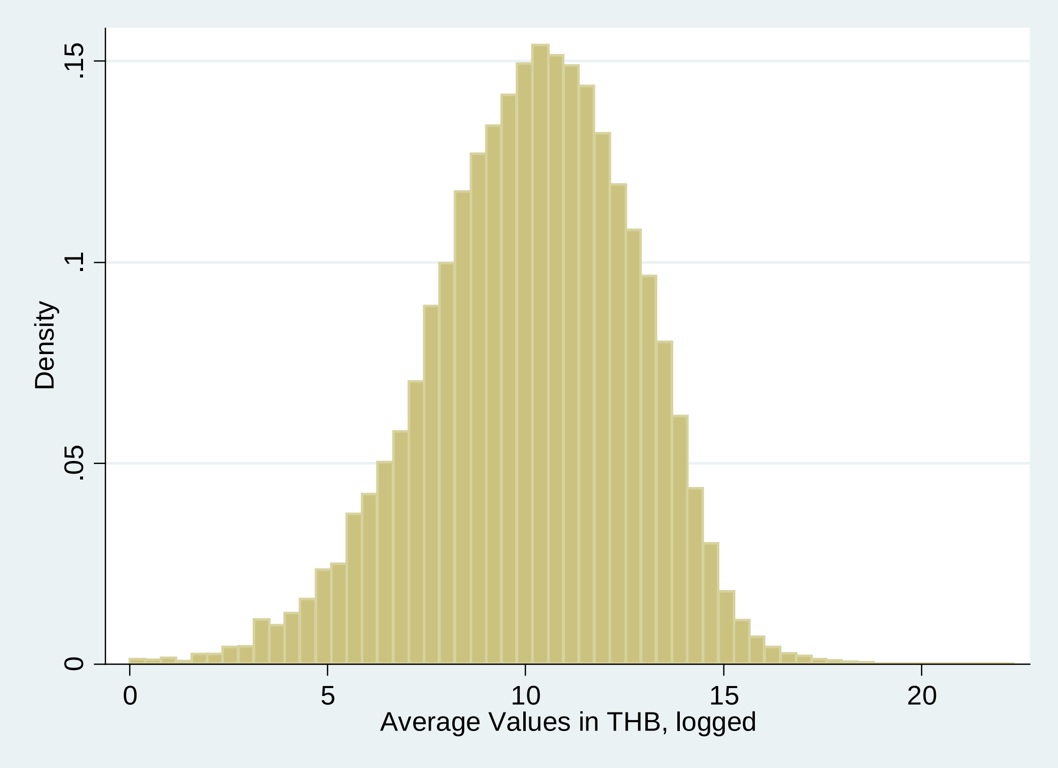
Source: Authors' computation

Figure B1. Density of Export Frequency in 2011



Source: Customs, Kingdom of Thailand

Figure B2. Density of Average Export Shipment in 2011



Source: Customs, Kingdom of Thailand

Table 1. Effect of Import Time on Export Patterns

	Total Values	Number of Shipments	Values per shipment
Import Dummy	0.331	0.272	0.059
Heteroscedasticity-consistent	[0.012]***	[0.007]***	[0.009]***
Cluster establishment-product-destination	[0.012]***	[0.007]***	[0.009]***
Cluster establishment	[0.030]***	[0.022]***	[0.015]***
Cluster product	[0.017]***	[0.012]***	[0.010]***
Cluster product-destination	[0.013]***	[0.008]***	[0.009]***
Cluster establishment-product	[0.014]***	[0.009]***	[0.010]***
Cluster establishment-destination	[0.022]***	[0.016]***	[0.012]***
ln (1+Time)	-0.033	-0.029	-0.004
Heteroscedasticity-consistent	[0.006]***	[0.004]***	[0.005]
Cluster establishment-product-destination	[0.006]***	[0.004]***	[0.005]
Cluster establishment	[0.017]*	[0.013]**	[0.009]
Cluster product	[0.008]***	[0.005]***	[0.005]
Cluster product-destination	[0.006]***	[0.004]***	[0.005]
Cluster establishment-product	[0.008]***	[0.005]***	[0.005]
Cluster establishment-destination	[0.012]***	[0.009]***	[0.007]
Number of observations	1,140,079	1,140,079	1,140,079
Adjusted R-squared	0.7809	0.7228	0.7893

Notes: ***, **, and * represent significance at the 1%, 5%, and 10% statistical levels, respectively. Parentheses contain the various kinds of standard errors. In all specifications, establishment-destination-product fixed effect and destination-product-year fixed effects are included.

Table 2. Effect of Import Time on Export Patterns: Time-Sensitive Products versus Time-Insensitive Products

	Total Values	Number of Shipments	Values per shipment
Sensitive Products			
Import Dummy	0.395***	0.291***	0.104**
	[0.065]	[0.037]	[0.048]
ln (1+Time)	-0.067*	-0.031*	-0.036
	[0.034]	[0.018]	[0.025]
Number of observations	99,356	99,356	99,356
Adjusted R-squared	0.7144	0.7245	0.6691
Insensitive Products			
Import Dummy	0.327***	0.272***	0.055***
	[0.012]	[0.008]	[0.009]
ln (1+Time)	-0.030***	-0.029***	-0.002
	[0.006]	[0.004]	[0.005]
Number of observations	1,040,723	1,040,723	1,040,723
Adjusted R-squared	0.7894	0.7218	0.8018

Notes: ***, **, and * represent significance at the 1%, 5%, and 10% statistical levels, respectively. Parentheses contain the heteroscedasticity-consistent standard error. In all specifications, establishment-destination-product fixed effect and destination-product-year fixed effects are included. The list of time-sensitive products is derived from Djankov et al. (2006).

Table 3. Effect of Import Time on Export Patterns: Differentiated Products versus Non-Differentiated Products

	Total Values	Number of Shipments	Values per shipment
Non-differentiated products			
Import Dummy	0.338***	0.260***	0.078***
	[0.019]	[0.012]	[0.014]
ln (1+Time)	-0.051***	-0.036***	-0.015*
	[0.010]	[0.006]	[0.007]
Number of observations	332,909	332,909	332,909
Adjusted R-squared	0.8083	0.7178	0.8246
Differentiated products			
Import Dummy	0.326***	0.279***	0.048***
	[0.016]	[0.009]	[0.011]
ln (1+Time)	-0.024***	-0.026***	0.002
	[0.008]	[0.005]	[0.006]
Number of observations	807,170	807,170	807,170
Adjusted R-squared	0.7610	0.7244	0.7617

Notes: ***, **, and * represent significance at the 1%, 5%, and 10% statistical levels, respectively. Parentheses contain the heteroscedasticity-consistent standard error. In all specifications, establishment-destination-product fixed effect and destination-product-year fixed effects are included. The list of differentiated products is derived from Rauch (1999).

Table 4. Effect of Import Time on Export Patterns: Transport Mode

	Total Values	Number of Shipments	Values per shipment
Only Sea Transportation			
Import Dummy	0.310***	0.239***	0.071***
	[0.035]	[0.024]	[0.024]
ln (1+Time)	-0.076***	-0.048***	-0.028**
	[0.018]	[0.012]	[0.013]
Number of observations	277,764	277,764	277,764
Adjusted R-squared	0.8126	0.7049	0.8419
Only Air Transportation			
Import Dummy	0.222***	0.150***	0.072***
	[0.025]	[0.015]	[0.019]
ln (1+Time)	-0.028*	-0.01	-0.018
	[0.016]	[0.010]	[0.012]
Number of observations	276,905	276,905	276,905
Adjusted R-squared	0.8014	0.7058	0.8228
Only Other Transportation			
Import Dummy	0.151***	0.101***	0.051**
	[0.036]	[0.028]	[0.022]
ln (1+Time)	0.028	0.047*	-0.019
	[0.037]	[0.026]	[0.025]
Number of observations	217,555	217,555	217,555
Adjusted R-squared	0.8059	0.7028	0.8397

Notes: For example, in the “Only Sea Transport” panel, establishments that import only using sea transport and non-importers are included in the estimation sample. The transport mode “Other” includes truck, railway, and postal transportations. ***, **, and * represent significance at the 1%, 5%, and 10% statistical levels, respectively. Parentheses contain the heteroscedasticity-consistent standard error. In all specifications, establishment-destination-product fixed effect and destination-product-year fixed effects are included.

Table 5. Effect of Import Time on Export Patterns: Excluding Import of Finished Products in Import Time

	Total Values	Number of Shipments	Values per shipment
Import Dummy	0.500***	0.408***	0.092***
	[0.018]	[0.011]	[0.013]
ln (1+Time)	-0.049***	-0.043***	-0.007
	[0.008]	[0.005]	[0.006]
Number of observations	839,466	839,466	839,466
Adjusted R-squared	0.7781	0.7325	0.7835

Notes: In this table, we construct the time variable using the information on import of products other than finished products. ***, **, and * represent significance at the 1%, 5%, and 10% statistical levels, respectively. Parentheses contain the heteroscedasticity-consistent standard error. In all specifications, establishment-destination-product fixed effect and destination-product-year fixed effects are included.

Table 6. Effect of Import Time on Export Patterns: Excluding Importer with Over 100 Shipments

	Total Values	Number of Shipments	Values per shipment
Import Dummy	0.257***	0.211***	0.046***
	[0.013]	[0.008]	[0.010]
ln (1+Time)	-0.018**	-0.014***	-0.004
	[0.007]	[0.004]	[0.005]
Number of observations	530,139	530,139	530,139
Adjusted R-squared	0.8076	0.7032	0.8245

Notes: In this table, we drop importers that have more than 100 annual import transactions because the larger the number of transactions, the more likely the establishments are to experience a longer time to import. ***, **, and * represent significance at the 1%, 5%, and 10% statistical levels, respectively. Parentheses contain the heteroscedasticity-consistent standard error. In all specifications, establishment-destination-product fixed effect and destination-product-year fixed effects are included.

Table 7. Effect of Import Time on Export Patterns: Excluding Non-Importers

		Total Values	Number of Shipments	Values per shipment
OLS				
	ln (1+Time)	-0.019**	-0.022***	0.003
		[0.008]	[0.005]	[0.006]
	Number of observations	755,470	755,470	755,470
	Adjusted R-squared	0.7765	0.7337	0.7781
IV				
	ln (1+Time)	-1.142	-0.817*	-0.325
		[0.752]	[0.427]	[0.559]
	Number of observations	755,470	755,470	755,470
	Cragg-Donald Wald F statistic	45.35	45.35	45.35

Notes: In this table, we restrict sample exporters only to importers. In the upper panel, we estimate using the OLS method. The IV method is employed in the lower panel. We use MFN rates for imported products as an instrument. ***, **, and * represent significance at the 1%, 5%, and 10% statistical levels, respectively. Parentheses contain the heteroscedasticity-consistent standard error. In all specifications, establishment-destination-product fixed effect and destination-product-year fixed effects are included.

Table 8. Effect of Import Time on Import Patterns

	Total Values	Number of Shipments	Values per shipment
ln (1+Time)	-0.027***	-0.036***	0.009***
	[0.003]	[0.002]	[0.002]
Number of observations	2,665,178	2,665,178	2,665,178
Adjusted R-squared	0.7618	0.6769	0.7942

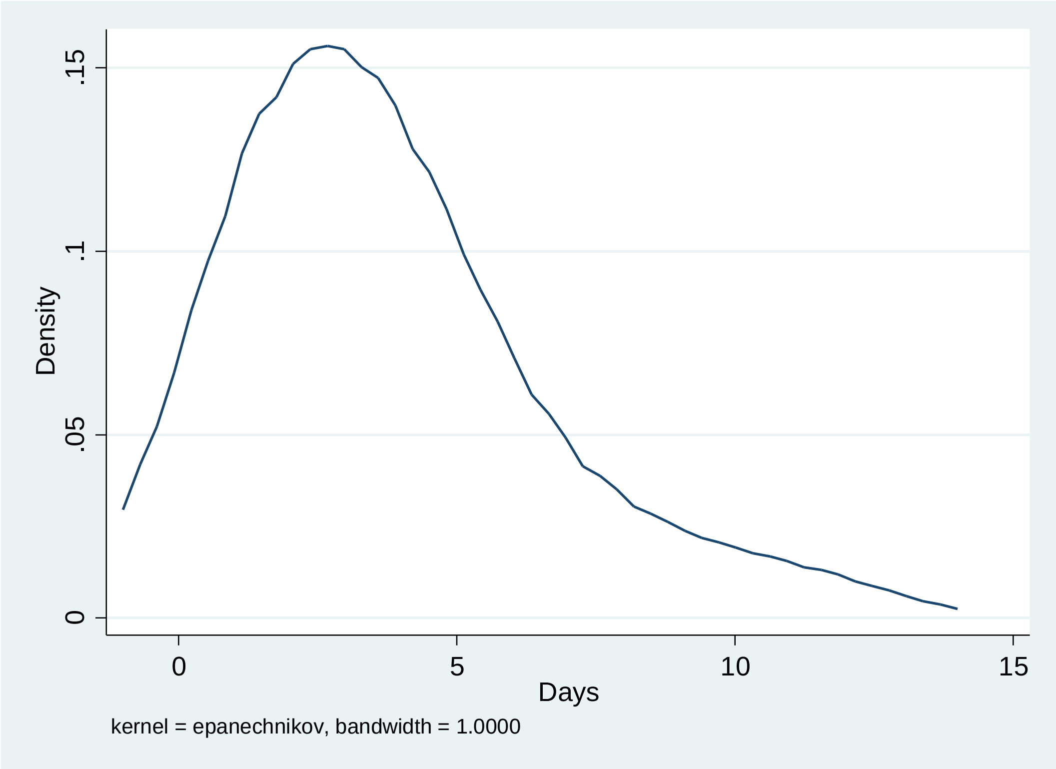
Notes: ***, **, and * represent significance at the 1%, 5%, and 10% statistical levels, respectively. Parentheses contain the heteroscedasticity-consistent standard error. In all specifications, establishment-source-product fixed effect and source-product-year fixed effects are included.

Table 9. Lagged Effects of Import Time on Export Patterns

	Total Values	Number of Shipments	Values per shipment
Import Dummy	0.136***	0.117***	0.019*
	[0.014]	[0.008]	[0.010]
Import Dummy ($t-1$)	0.097***	0.048***	0.049***
	[0.012]	[0.007]	[0.009]
ln (1+Time)	-0.019***	-0.024***	0.004
	[0.007]	[0.004]	[0.005]
ln (1+Time ($t-1$))	-0.025***	-0.011***	-0.015***
	[0.007]	[0.004]	[0.005]
Number of observations	934,569	934,569	934,569
Adjusted R-squared	0.8013	0.7699	0.7970

Notes: ***, **, and * represent significance at the 1%, 5%, and 10% statistical levels, respectively. Parenthesis contain the heteroscedasticity-consistent standard error. In all specifications, establishment-destination-product fixed effect and destination-product-year fixed effects are included.

Figure 1. Days for Import



Source: Customs, Kingdom of Thailand

Note: This figure depicts the median days experienced by all shipments of product *p* by establishment *f* in year 2011.