

ORIGINAL ARTICLE

# Learning to Use Trade Preferences: A Firm and Transaction Level Analysis of the EU–South Korea FTA

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## Abstract

This article examines imports by Swedish firms and the utilization of the tariff preferences offered by the EU–South Korea Free Trade Agreement. To benefit from tariff preferences, the importer must make a formal request to use the preferences and also document the origin of the imported products (with a certificate of origin provided by the foreign exporter). This may be costly, and some importers choose to pay import tariffs even when tariff preferences are available. Hence, the preferences are not fully utilized. Using a detailed firm–transaction level data set on Swedish imports from South Korea, we analyse the determinants of preference utilization and how firms learn to use preferences. The results show that preference utilization is strongly correlated with potential duty savings, which depend on the preference margin and the size of the import transaction. From a learning perspective, we find that preference utilization is closely related to the number of import transactions undertaken by the firm, suggesting a learning-by-doing mechanism. The length of time the firm has been involved in importing activities plays a smaller role.

**Keywords:** FTA; tariff preference; preference utilization; imports; learning; transaction-level data

## 1. Introduction

The number of bilateral free trade agreements (FTAs) has increased dramatically during recent decades. Around 50% of world trade takes place between countries that have signed an FTA. Excluding intra-EU trade, it is estimated that one-third of world trade takes place within the scope of an FTA (UNCTAD, 2018).

The key feature of FTAs is the elimination or reduction of tariffs between the partner countries. For an importer to benefit from the tariff preferences in the agreement, the importer must make a formal application and document the origin of the imported products, which typically requires a certificate of origin from the foreign exporter.<sup>1</sup> For many firms, the administration of these requirements can be demanding, and it is common that firms choose to pay import tariffs even when there is an FTA in force. Consequently, FTAs are not always fully utilized. Understanding the firm-level determinants of preference utilization is obviously important for ensuring that the potential economic benefits of FTAs are realized.

Since decisions about the utilization of tariff preferences are made by the importer, possibly for each individual import transaction, it is appropriate to study the phenomenon using

<sup>1</sup>The certificate of origin is not needed if the transaction value is below EUR 6,000 (instead, the exporter in South Korea can use a simplified invoice declaration, which states that the products originate in South Korea).

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firm-transaction level data. However, most existing studies of preference utilization are based on aggregated data. The purpose of this study is to analyse preference utilization and learning at the firm-transaction level. To achieve this goal we use linked transaction and firm level data on Swedish imports from South Korea covering the period 2008–2018.

The article is organized as follows: Section 2 highlights some of the main findings in the literature on preference utilization. Section 3 describes the dataset and introduces some central definitions. Section 4 provides a descriptive analysis of the utilization of tariff preferences over time, focusing on import values, importing firms, and transaction frequency. Section 5 presents an econometric analysis of the determinants of preference utilization. Section 6 concludes and presents policy recommendations.

## 2. Literature Review

Studies on the determinants of preference utilization can mainly be identified from 2005 onwards and the literature is now fast growing. Our purpose here is not to provide a comprehensive review of the literature but rather to highlight some of the main themes that have been discussed in earlier contributions.

Looking at *the level of preference utilization*, Nilsson (2016) found the overall preference utilization for EU exports to be around 75% but with significant variations across country-pairs and products. Kasteng and Inama (2018) analysed both EU exports and imports and found that preferences were used in about 70% of EU exports and 90% of EU imports (in value terms). Their overall conclusion was that tariff preferences were fairly well utilized among EU's importers but that preference utilization in EU exports – or rather partner country imports – could be improved. Moreover, Kasteng *et al.* (2022) showed that the same firm may use tariff preferences in some of its import transactions but pay the tariffs in other transactions.

When it comes to *the determinants of preference utilization*, there is a strand of research dealing with the administrative costs of rules of origin and their impact on preference utilization. Hayakawa *et al.* (2014) and Kim and Cho (2010) showed that more restrictive rules of origin reduced the utilization of tariff preferences, and Takahashi and Urata (2010) noted that utilization rates are lower when origin is difficult to prove. Anson *et al.* (2005) estimated the administrative costs of rules of origin to correspond to 6% of the import value, while Albert and Nilsson (2016) estimated the fixed cost of utilizing tariff preferences to fall within the range of EUR 20 to EUR 260. Furthermore, it has been observed that strict rule of origin requirements can reduce the trade-creating effect of trade liberalization (Chase, 2008; Conconi *et al.*, 2018; Felbermayr *et al.*, 2019). However, Decoster (2021) and Kasteng and Almufti (2021) found in different firm surveys that about 70% of Belgian exporters and about 80–90% of Swedish exporters did not consider rules of origin as cumbersome. A potential cause of concern is that the number of respondents was relatively low in both surveys: Decoster (2021) surveyed 70 exporters, while Kasteng and Almufti (2021) covered 88 exporters.

Another proposed driver of preference utilization is the size of the tariff reduction that can be achieved by using the tariff preference (often labelled as the 'preference margin'). Several studies, including Bureau *et al.* (2007), Keck and Lendle (2012), Hayakawa *et al.* (2013), Hayakawa *et al.* (2014), and Nilsson (2016) identified a positive correlation between the size of the preference margin and preference utilization. However, Lukaszuk and Legge (2019) detected a negative correlation. Using transaction level data, Kasteng *et al.* (2022) showed that the size of the preference margin had little impact on preference utilization, and that the import transaction value was instead the most important determinant of preference utilization.

Other studies on preference utilization have identified a set of additional drivers of preference utilization. Lukaszuk and Legge (2019) showed a positive impact of potential duty savings and trade values on preference utilization. Wignaraja (2014) and Hayakawa (2015) analysed the

role of firm size and experience for preference utilization. Another study focusing on firm characteristics is Demidova and Krishna (2008), who showed a positive relation between productivity and preference utilization. Further, Takahashi and Urata (2010) showed evidence of a large firm advantage in preference utilization. However, neither Wignaraja (2014) nor Kasteng et al. (2022) found any significant large firm advantage in preference utilization.

Among the studies cited above, and to the best of our knowledge, Albert and Nilsson (2016), Krishna et al. (2021), and Kasteng et al. (2022), are the only ones based on transaction level data. Nilsson (2022) examined preference utilization and learning during the early stages of the EU–Canada Comprehensive Economic and Trade Agreement and the EU–South Korea FTA but used more aggregated country and industry level data. Krishna et al. (2021) analysed learning over time at the transaction level, but from an exporter-cost perspective. Hence, studies based on transaction level data, focusing on how importers learn to use trade preferences, are scarce. More generally, firm and transaction level analyses are much demanded as they can offer insights into firm behaviour and micro-level drivers of preference utilization (Nilsson, 2022).

### 3. Data and Definitions

#### 3.1 Data

The data used in this article are based on Swedish firms' import transactions from South Korea during the period 2008–2018. The data cover about 1 million import transactions carried out by 8,500 firms. The information available for each import transaction includes the name and identification number of the importer, the name of the exporter, import value, tariff codes at Taric (10-digit) level, mode of import (direct imports vs. customs warehousing), and customs duties. The transaction level data were obtained from the Swedish Customs.

The transaction data also include the date of the import transaction. Since each import transaction might be part of a consignment (customs ID) that contains several products, a single firm can record more than one transaction per day from the same exporter.<sup>2</sup> The time between import transactions can therefore be zero days, meaning that the data lack a panel structure where each import transaction can be identified using a time-ID marker, which complicates the use of panel-data methods.

The firm level data are only available for Swedish joint-stock companies (*aktiebolag*) importing goods from South Korea (6,445 unique firms) during the period of observation.<sup>3</sup> In our data, imports attributed to these firms cover 89% of the total value. Firm-level variables were sourced from Upplysningscentralen (UC), a Swedish credit reference agency, and include firm name and identification number, net turnover, number of employees, net profit, group affiliation, and industry classification code (SNI).<sup>4</sup>

Import values and selected firm-level variables (including nominal values for imports, duty savings and duty costs, turnover, profit, and capital) have been deflated using importer and producer price indices obtained from Statistics Sweden (SCB). These price indices show the average price trend by different product groups in accordance with the SPIN nomenclature.<sup>5</sup>

The tariff reduction schedule in the EU–Korea FTA provides that the tariff reductions take place on 1 July every year after the provisional entry into force of the free trade agreement on 1 July 2011. To align the import transaction and firm level data with the tariff reduction schedule,

<sup>2</sup>A customs ID is a number covering all products shipped from one exporter to one importer in a single consignment.

<sup>3</sup>Information on foreign registered firms, other Swedish firm entities, and private imports are not included in the analysis.

<sup>4</sup>The Swedish SNI (*svensk näringsgrensindelning*) codes are a statistical standard for industry classification based on the EU's recommended standard, NACE Rev. 2 (*Nomenclature statistique des activités économiques dans la Communauté européenne*).

<sup>5</sup>SPIN (*standard för svensk produktindelning efter näringsgren*) is a statistical standard for classification of products (and services) by industrial origin in production and is approved by the EU according to the Classification of Products by Activity (CPA) Regulation (EC) No. 451/200, which is the corresponding EU classification.

a semi-annual time index is applied. In line with this, the period 1 July 2011 to 1 July 2012 corresponds to ‘Year 1’. The years 2008–2018 are in the data description denominated as ‘Year -3’ to ‘Year 7’, i.e. the three full years before the FTA entered into force and the seven years with the FTA in force. Additional data on most favoured nation (MFN) and preferential tariffs have been obtained from the European Commission’s Directorate General for Trade.

### 3.2 Definitions

#### 3.2.1 Import Modes

Firms may use two different import modes. *Direct imports* take place as imports pass customs clearance and enter into free circulation directly upon their arrival in an EU member state. For direct imports, the value of the import transaction is known. *Customs warehousing* refers to cases where goods are stored in premises authorized by the customs authorities (so-called customs warehouses) upon their arrival in the destination country (EU member state). The products are under customs supervision and will not be subject to import duties or other related charges as long as they remain in the customs warehouse. The import transaction is not registered (and decisions about preference utilizations are not made) until the item is extracted from the customs warehouse.

This means that the customs data related to customs warehousing refer to the warehouse extraction value rather than the underlying import transaction value. The value and size of the underlying import shipment are not known, only the size of the ‘withdrawal transaction’.<sup>6</sup> Customs warehousing is typically used by companies trading in seasonal products or high-value products that are imported infrequently in larger quantities and subsequently sold in smaller lots. There are usually no time limits for storing products in customs warehouses.

Customs warehousing might be used regardless of whether a product is eligible for tariff preferences or not. The customs warehouses for imports to Sweden can be located within the national borders or in any other EU member state.

#### 3.2.2 Import Transactions versus Consignments

In this article, an import transaction is defined as the import of a specific product (at the 10-digit Taric level) from a specific exporter at a given day in time. Firms may, however, import several different products from the same exporters at the same moment in time (here referred to as a ‘consignment’, which is identified by a unique customs ID. A consignment may, accordingly, include various separate import transactions (products).

#### 3.2.3 Firm Size

To categorize firm size, we apply the EU’s definition – micro, small, medium, and large – which is based on the number of employees and the turnover or balance sheet total. As firms develop over time, due to changes in number of employees and turnover, they may switch category once or several times over the period of observation. For a detailed review of firm size definitions, see European Commission (2003).<sup>7</sup>

#### 3.2.4 Duty Savings Rate versus Preference Utilization Rate

Both the duty savings rate (DSR) and the preference utilization rate (PUR) aim to define the degree to which firms utilize tariff preferences. The PUR is defined as the value of preferential imports (i.e. the import value where tariff preferences are utilized) as a share of the preference

<sup>6</sup>We do not know how long a specific item has been kept in the customs warehouse, since the shipments made to the warehouse are not registered in our data set.

<sup>7</sup>Large: turnover >EUR 50 million and >250 employees; Medium: turnover ≤EUR 50 million and ≤250 employees; Small: turnover ≤EUR 10 million and ≤50 employees and Medium: turnover ≤EUR 2 million and ≤10 employees.

eligible import value. However, the DSR is defined as the value of duty savings from utilizing tariff preferences on preferential imports as a share of the potential duty savings (i.e. the possible duty savings on all preference eligible imports).<sup>8</sup> We use the DSR as the main measure of firms' utilization of tariff preferences in Section 4. In the econometric analysis in Section 5, where the focus is on individual transactions, the key dependent variables are instead the probability that preferences are utilized.<sup>9</sup>

## 4. Descriptive Analysis

### 4.1 Learning-over-Time

The main purpose of a free trade agreement is to reduce tariffs and other barriers to trade with the aim of increasing trade and welfare. Both exporters and importers are involved in decisions about preference utilization. The exporter must prepare a certificate of origin or other document to show that the exported goods comply with the relevant rules of origin. The importer must formally request to use the available tariff preferences and include the certificate of origin provided by the exporter in this application. Hence, utilization of tariff preferences requires decisions and actions from both the exporter and the importer. The focus in this article is on the import side – the export side is analysed e.g. by Krishna et al. (2021).

Trade can increase in two ways. Trade can increase either when existing importers and exporters trade more (the 'intensive margin') or when new traders enter the market (the 'extensive margin'). Since the utilization of a tariff preference is associated with learning costs, there are reasons to compare preference utilization across existing as well as new importers and to follow changes in behaviour over time.

The following sub-sections describe the Swedish firms engaged in imports from South Korea, and how their preference utilization has changed over time. The description is to some extent focused on direct imports since information about the value of the underlying import transactions is not available for customs warehousing. Imports at zero MFN tariffs are not included since they are not relevant for the analysis of preference utilization. This section is based on firm-level data, while section 4.2 provides some additional descriptions using transaction-level data.

#### 4.1.1 Import Values and the Duty Savings Rate

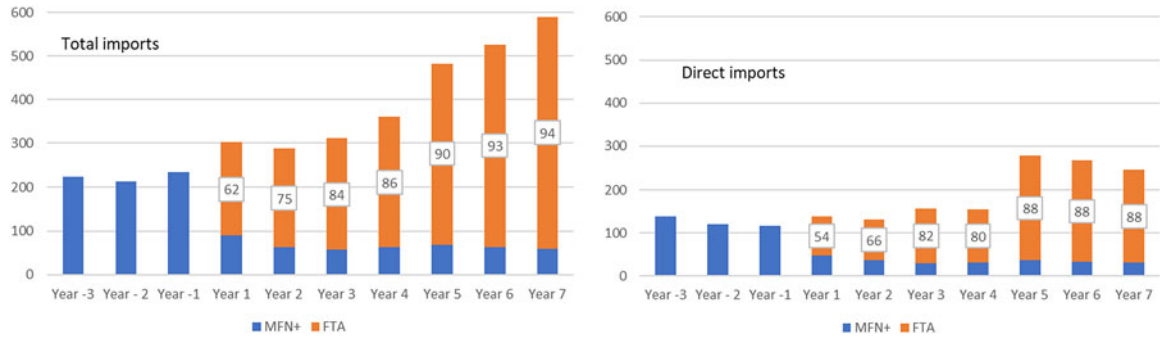
Figure 1 shows the value of Swedish imports from South Korea and the duty savings from three years prior to the entry into force of the free trade agreement (Year -3) until seven years into the agreement (Year 7). As seen in Figure 1, total values seemed to take off about four years after the provisional implementation of the free trade agreement in 2011 (Year 1), suggesting that it may have taken three years or more for importers to start responding strongly to the FTA. For direct imports, there was a relatively sharp increase in imports five years into the free trade agreement, which is likely to be explained by legal changes leading to a shift from customs warehousing to direct imports.<sup>10</sup>

From Figure 1, it can also be seen that the utilization of preferences does not necessarily start from a very low level, since the duty savings rate for total imports was above 60% already from the first year (Year 1). In addition, the share of imports utilizing the tariff preferences increased over time. The DSR for total imports exceeded 80% the third year and levelled out to a rate of slightly

<sup>8</sup>The concept 'duty savings rate' (or 'preference savings rate') was introduced in Kasteng and Inama (2018) and used in Kasteng et al. (2022).

<sup>9</sup>The traditionally used measure, PUR, omits the size of the tariff and/or preference margin, which differ among products, and focuses on the value of preferential imports as a share of all preference eligible imports. Normally, the DSR and PUR differ by some percentage points.

<sup>10</sup>Changes in value added tax legislation made customs warehousing less favourable, which led many firms to shift from customs warehousing to direct imports.



**Figure 1.** Import values and duty savings rates. Note: Bars are marked with the duty savings rate  
 Sources: Swedish Customs Agency, European Commission, and own calculations.

above 90% in the sixth and seventh years of the FTA (2017–18). The development for direct imports was similar. This pattern suggests a learning curve where it takes about three to five years for preference utilization to reach a level where it stabilizes.<sup>11</sup>

#### 4.1.2 Number of Importing Firms

A first thing to examine is what happened with the number of importing firms when the FTA came into provisional use in 2011. As seen in [Figure 2](#), the number of firms engaged in total imports from South Korea was about 620 per year during the three years before the FTA entered into force, and about 750 firms per year after seven years. This corresponds to a 20% increase in the number of importing firms. At the same time, the value of imports more than doubled during this period, suggesting that the average value of imports per firm also increased after the establishment of the FTA. A similar pattern can be seen if we look only at firms engaged in direct imports. Comparing the number of direct importers one year before the agreement entered into force (Year -1) with the corresponding number eight years later (Year 7), there was an increase of about 50%.<sup>12</sup> The value of direct imports more than doubled over the same period.

A second notable observation is that the number of firms utilizing tariff preferences for all their imports from South Korea increased over time (grey area of bars in [Figure 2](#)). At the same time, the number of non-users decreased (blue area). There were also an increasing number of firms that sometimes utilized, and sometimes did not utilize the tariff preferences (orange area). Combining this observation with the information from [Figure 1](#) on import values reveals that the relatively high number of importers that did not utilize tariff preferences represented only a small share of total imports.

#### 4.1.3 Firms and Trade Flow Survival

There has been a high turnover of firms involved in direct imports from South Korea. Examining the period before the free trade agreement entered into force (Year -3 to Year -1), about 240 firms started importing each year while about 170 firms stopped importing ([Figure 3](#)). Three to four years into the free trade agreement, the number of both entries and exits increased notably. The number of entrants rose from about 200 to 400, and the number of exits grew from about 150 to 270 between Year 2 and Year 4.

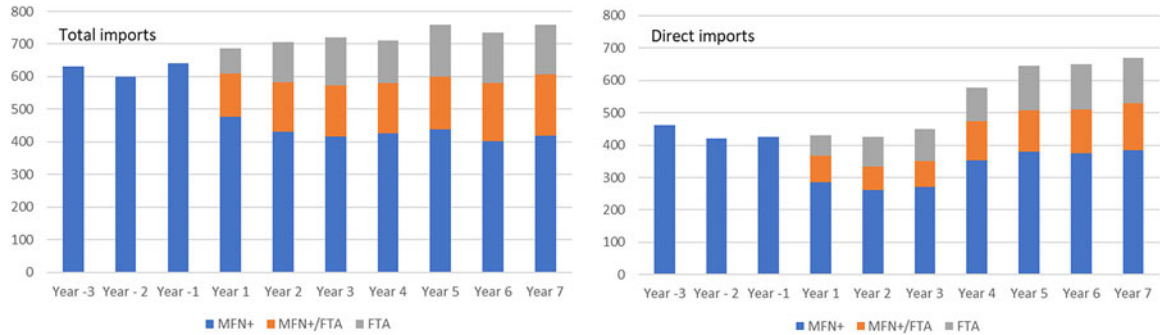
A concept related to the entry and exit of firms is trade flow survival. Before the FTA entered into force, the one-year survival rate of new trade flows was about 60%. During the first years of the free trade agreement, the one-year survival rate of trade flows fell to 56% and reached 43% seven years into the free trade agreement.

These numbers are broadly in line with the findings of Söderlund and Tingvall (2013), who showed that about 50% of all new firm-country export flows survived only one year, and that only 15% of the original new trade flows were still active after six years. This micro-level turbulence is often explained by search/matching models where buyers are scanning the market for matching suppliers. That is, firms engage in trade with various suppliers trying to find a trading partner with whom a long-term relationship can be established. A partial explanation for the decrease in trade survival rates over time may therefore be that the establishment of the FTA enticed smaller and less experienced firms to enter into trade searching (and often failing to find) for appropriate suppliers.

As the FTA gradually matures, it is relevant to ask whether the duty savings rates of newcomers change over time. It could be hypothesized that firms learn to utilize tariff preferences as the FTA becomes better known among market participants, suggesting that the DSR among newcomers should increase over time. However, from [Figure 4](#) it is not apparent that firms starting to import at a later date necessarily record higher DSRs than early entrants. This could indicate that

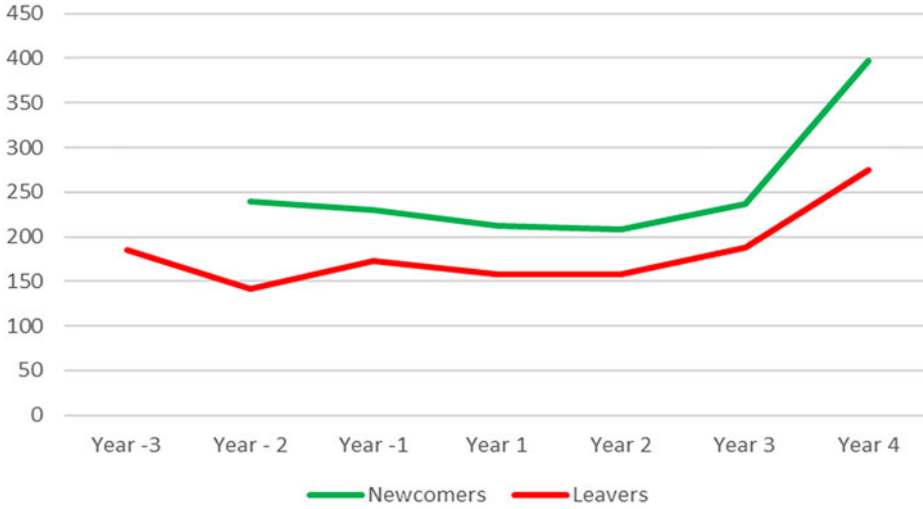
<sup>11</sup>This observation includes all firms taking part in imports at a given moment in time.

<sup>12</sup>The sharp increase in direct imports (Year 5) is also partly due to the legislative changes noted in footnote 11.



**Figure 2.** Number of firms by mode of import in Swedish imports from South Korea over time  
*Sources:* Swedish Customs Agency, European Commission, and own calculations.



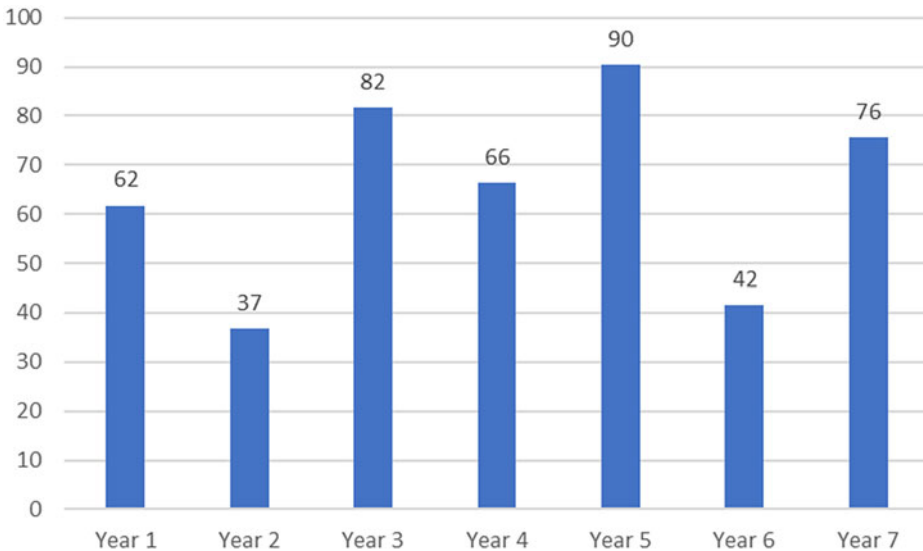


**Figure 3.** Number of newcomers and leavers in direct imports  
 Sources: Swedish Customs Agency, European Commission, and own calculations.

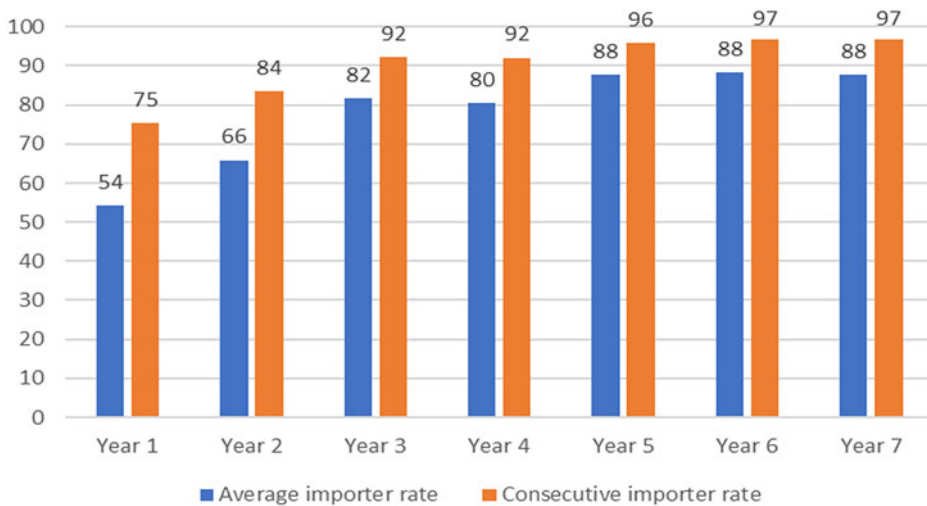
own experiential learning may matter more than the experiences of other firms and publicly available information about the FTA. It is also possible that many of the newcomers only planned to make one or a few ad hoc import transactions and did not intend to invest in learning to utilize the tariff preferences due to a limited time perspective.

*4.1.4 Continuous Importers over Time*

In order to analyse the preference utilization for firms that appear continuously in the data set, we have identified so called ‘continuous importers’. Continuous importers are defined as firms that



**Figure 4.** Duty savings rates by firms importing to Sweden from South Korea during their first year as an importer (over time)  
 Sources: Swedish Customs Agency, European Commission, and own calculations.



**Figure 5.** Duty savings rates for all importers and continuous importers

Sources: Swedish Customs Agency, European Commission, and own calculations.

have made at least one import transaction per year during the entire period of observation (including the years before the free trade agreement entered into force). These continuous importers are interesting to study for at least two reasons. First, despite their small number, they represent a relatively large share of direct imports. Secondly, following a homogenous group of firms over time allows us to avoid compositional changes caused by sporadic importers. Learning and behavioural changes in preference utilization are easier to detect in this fixed sub-sample.

The share of continuous importers in the total value of imports from South Korea decreased from about 40% in Year -3 to about 30% in Year 7. Their share in the number of importers fell from about 20% to 10% over the same period. Hence, the continuous importers are relatively few but account for a relatively large share of total import value. Their annual import value has remained stable over time, which means that the overall increase in imports can mainly be attributed to newcomers and irregular importers.

Figure 5 displays the duty saving rates for continuous importers and all importers over the period under study. Two observations seem to distinguish the continuous importers from other firms. First, their DSR had already reached 75% during the first year of the FTA, while the average for all importers was only slightly above 50%. Second, it stabilized at a level well above 90% after only three years, which was significantly above the average DSR for all firms. This pattern applies for continuous importers of all size categories.

These observations suggests that the continuous importers quickly learned to become efficient users of tariff preferences and made almost full use of the tariff preferences after only three to five years into the agreement. Hence, the lower DSR at the aggregate level is to some extent explained by the entry and exit of less experienced firms. This observation also suggests that there is a learning-over-time and/or a learning-by-doing process involved in preference utilization.

#### 4.2 Learning-by-Doing

When analyzing learning-by-doing, it is natural to turn to the individual import transaction as the unit of analysis. If we consider the execution of an import transaction as an opportunity for learning, both the number of import transactions and the length of time during which the firm has been an active importer can be thought of as proxies for experiential learning. This

section explores how the number of import transactions undertaken by the firm and the length of time (in years) it has been an active importer are related to preference utilization. The focus is on firms engaged in direct imports.

#### 4.2.1 Number of Direct Import Transactions and Transaction Values over Time

Figure 6 (left panel) shows that the number of annual import transactions, where positive MFN tariffs were paid (MFN+) or where tariff preferences were utilized (FTA), increased from about 8,200 just before the entry into force of the free trade agreement to over 10,000 in the third year of the FTA, and further to about 12,200 import transactions towards the end of the period under study. During the first years of the FTA, the number of direct import transactions not utilizing the tariff preferences was more than twice as large as the number of import transactions where tariff preferences were utilized. The number of import transactions utilizing the tariff preferences increased during the first years of the FTA to level out after about four years. This is consistent with the findings from Figure 1, where it was noted that it took about three to five years for the DSR to stabilize at a rate of above 90%.

A second observation from Figure 6 (right panel) is that the number of import transactions per firm undertaken by firms utilizing the tariff preferences was slightly larger than the number of transactions carried out by firms not utilizing the tariff preferences. It can also be noted that the average number of import transactions per firm seemed to decline four years into the free trade agreement. One possible explanation behind the decline in the number of import transactions per firm may be that the new importers that entered into trade with South Korea carried out fewer transactions than experienced firms.

The firms utilizing tariff preferences have also adjusted by pooling imports to fewer but larger transactions. The third panel of Figure 6 shows that the average transaction values were about eight times higher for import transactions utilizing the tariff preferences than for transactions not utilizing these preferences. Moreover, the average value of the transactions not utilizing tariff preferences has diminished over time. This indicates that the threshold value where firms preferred to utilize tariff preferences was falling, which is in line with the hypothesis that learning effects will make preference utilization trickle down to lower value transactions. Part of this learning is likely to take the form of investment in human capital, software, and routines to meet the requirements for preference utilization, which will reduce the marginal cost for using preferences in subsequent transactions. There is also an increasing gap in the size of transactions utilizing and not utilizing tariff preferences, supporting the assertion that transactions not utilizing tariff preferences were, on average, low value transactions.

#### 4.2.2 Import Transaction Frequency and Duty Savings Rates over Time

The analysis of import transaction frequency aims to differentiate between firms making a few import transactions and firms carrying out a large number of transactions during the period under study. This distinction is useful when examining the learning effects of repeated transactions. For this purpose, firms are categorized into four groups according to the total number of direct import transactions during the 7-year period: Low (1–5 transactions); Intermediate (6–25 transactions); High (26–100 transactions); and Very High (+100 transactions). This grouping gives us about 220 direct importers in each category. There is no systematic relationship between transaction frequency and average transaction size. The average import transaction value of firms in the categories Low and High was around EUR 6,000, rising to EUR 10,000 for the Very high category, and EUR 12,000 for the Intermediate group, but with very large variation within the different categories.<sup>13</sup>

Figure 7 examines the relation between the DSR, transaction frequency, and firm size. The left panel of the figure shows that the DSR tended to increase over time for all transaction frequency categories, although the rates for firms in the Low (1–5 transactions) and Intermediate (6–25

<sup>13</sup>These averages refer to the full seven-year period, 2011–2018.



**Figure 6.** Number of direct import transactions and transaction values by tariff mode in Swedish imports from South Korea over time

*Note:* Figures are based on direct imports.

*Source:* Swedish Customs Agency, European Commission, and own calculations.

transactions) categories fluctuated notably between years – this is not surprising considering the relatively high weights of individual transactions in these categories. In addition, there was a pattern where firms making many transactions tended to have a higher DSR than firms making fewer transactions. The exception was a surprisingly large DSR for firms in the Intermediate category in 2016 and 2017. Hence, Figure 7 supports the hypothesis that there is learning over time, as well as the idea that learning is linked to the number of repeated import transactions. These two features will be further scrutinized in the econometric analysis below.

The right-hand panel of Figure 7 shows how preference utilization varied across firm size and the four transaction frequency categories. The data shown are the average DSRs for the entire seven-year period. It is apparent that the level of duty savings was more closely related to the number of repeated import transactions than to the size of the firm. This result is in line with Kasteng et al. (2022), who showed that there are only minor differences in the utilization of preferences across micro, small, medium, and large firms.

## 5. Econometric Analysis

When importing within the scope of a FTA, firms face a choice between utilizing tariff preferences or paying the MFN duty every time they carry out an import transaction. The descriptive analysis showed that non-utilization seemed to be concentrated in low-value transactions and that there were indications of learning effects, either linked to the number of years of experience, or to the number of import transactions undertaken by the firm. In the following analysis, we will examine whether these observations reflect robust relationships between variables or whether there are confounding factors driving the comparisons. To analyse the dichotomous choice of either utilizing or not utilizing the tariff preference, a logit regression model is applied. The estimation model takes the following form:

$$\ln\left(\frac{p_{ijkt}}{1 - p_{ijkt}}\right) = \mathbf{X}_{ijkt}\beta + \mu_k + \gamma_t + \varepsilon_{ijkt} \quad (1)$$

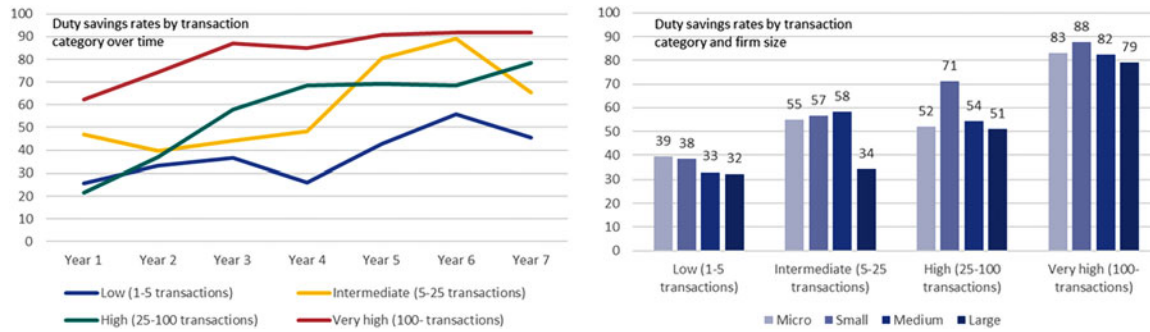
$p_{ijkt}$  is the probability that the tariff preference is utilized in import transaction  $I$ , performed by firm  $j$ , in industry  $k$ , at time  $t$ .  $\mathbf{X}_{ijkt}$  is a set of variables that affect firms' decisions to utilize the tariff preference, (see the description below).  $\mu_k$  and  $\gamma_t$  are industry and time fixed effects and  $\varepsilon_{ijkt}$  is the error term.

The structure of the data set, where several firm-level transactions may take place in one day does not allow for a traditional panel (ID-time) identification. However, to explore potential panel data approaches and the robustness of the results, we have created a set of artificial panel structures that will be discussed before the concluding section. It is also worth noting that the analysis covers both direct imports and customs warehousing. Moreover, only import transactions with MFN duties presented as *ad valorem* tariffs are considered.<sup>14</sup>

In the analysis of preference utilization, there is a strand of research exploring threshold values for preference utilization by applying a knot/threshold analysis (Keck and Lendle, 2012; Albert and Nilsson, 2016).<sup>15</sup> However, we do not aim to estimate threshold values. One reason for not focusing on a knot-analysis is the findings from Kasteng et al. (2022), who used transaction level data to show that the empirical distribution of preference utilization reflects a continuous increase with the import transaction value, rather than a well-defined cut-off point. The analysis covers firms engaged in trade while the selection into trade is not modelled. The estimations are presented as odds ratios. The usage of odds ratios means that an estimated coefficient greater than

<sup>14</sup>The data set contains 620,893 observations with positive preference margins for the period 2011–2018. After dropping observations with missing values (mainly for firm characteristics), the data set used in the regression analysis covers 332,263 observations (i.e., transactions).

<sup>15</sup>A threshold analysis is motivated when the utilization of the tariff preferences is in the form of a fixed cost, which suggests a large firm advantage in preference utilization because of scale effects.



**Figure 7.** Duty savings rates by transaction frequency over time and by firm size  
*Notes:* The notation low to high denotes the number of transactions undertaken in each category. Micro to large denotes firm size  
*Sources:* Swedish Customs Agency, European Commission, UC, and own calculations.

one indicates an increased probability of utilizing the tariff preferences (a positive relation) and a value less than one indicates a reduced probability of utilizing the tariff preferences. Hence, the term ‘preference utilization’ in this section refers to the probability that preferences are utilized. Standard errors are clustered at the firm level. In the discussion of results, the odds ratios are systematically translated into marginal effects, and Figures 9 and 10 also show marginal effects.

### 5.1 Baseline Results

Table 1 presents a set of baseline results where we stepwise add variables to the model. The variables used in the estimations comprise firm characteristics, import transaction characteristics, and indicators of import diversification. More specifically, Model 1 includes firm characteristics and dummy variables (turnover, capital intensity, profits, productivity proxied by sales per employee, and period and industry fixed effects) estimated over all import transactions.

Model 2 adds import transaction characteristics (potential duty savings and a warehousing dummy), a dummy variable for intra-firm trade in multinational enterprises (MNEs), and two proxies for import diversification (a proxy for network diversity measured by the number of unique exporters that the importing firm is sourcing from, and the number of HS-4 level products that the firm imports).<sup>16</sup> In Models 3 and 4, and Models 5 and 6, we separate between direct imports (DI) and customs warehousing (CW). In Models 5 and 6, we also split the potential duty savings into its two components, the import transaction value and the preference margin.

#### 5.1.1 Firm Characteristics

*Firm Size.* It is commonly assumed that large firms are better equipped than small firms to handle the costs associated with the utilization of tariff preferences (Albert and Nilsson, 2016). One reason is that the fixed costs associated with preference utilization are less of a burden for large firms that can distribute them over a larger volume of sales. However, in line with Kasteng et al. (2022), the results in Table 1 suggest that firm size seemed to be unrelated to preference utilization (once firms decided to import from South Korea). Figure 8 examines the relevance of firm size by comparing preference utilization across different firm size categories using micro firms as our reference group. The results indicate that there was no significant difference in preference utilization across firm size classes, and that this holds true for both direct imports and customs warehousing.<sup>17</sup>

One reason for the insignificance of firm size for preference utilization may be that the selection into trade is the decisive threshold.<sup>18</sup> That is, once firms have overcome the costs of engaging in international trade, the cost of utilizing tariff preferences may be relatively small. In that case, no significant differences in preference utilization across size classes should be expected. This relationship may be particularly true for distant markets where the barriers to trade, such as language, transportation time, time zone differences, and institutions are relatively large.

*Profitability, Productivity, and Capital Intensity.* Non-utilization of tariff preferences is associated with a lost opportunity to reduce costs. Hence, all things being equal, it could be expected that low profitability is associated with a low likelihood that preferences are utilized. It is also reasonable to assume that productive firms are efficient utilizers of tariff preferences. How capital intensity is related to preference utilization is to some extent an empirical question.

Table 1 suggests that the variable *profits* is mostly insignificant, suggesting that preference utilization has little to do with profits. For direct imports, the results suggest a positive and significant relation between preference utilization and *productivity*. Specifically, the results in Models 3 and 5 suggest that a 1% increase in productivity raises the odds that preferences will be used with

<sup>16</sup>The HS4 digit level is chosen because many rules of origin are defined at that level of aggregation.

<sup>17</sup>The results in Figure 8 are based on estimations 3–4 in Table 1 with the firm size variable replaced with firm-size group dummies.

<sup>18</sup>Limited firm level information blocks the possibility to analyze the selection into trade.

**Table 1.** Preference utilization

	All <sup>a</sup> (Model 1)	All (Model 2)	DI (Model 3)	CW (Model 4)	DI (Model 5)	CW (Model 6)
<b>Firm characteristics</b>						
$\ln(\text{turnover})_{jt}$	0.973 (0.077)	0.975 (0.099)	0.864*** (0.043)	1.017 (0.167)	0.863*** (0.043)	0.990 (0.148)
$\ln(K/L)_{jt}$	2.060*** (0.547)	1.929** (0.507)	0.826 (0.147)	2.259** (0.926)	0.828 (0.148)	2.104* (0.833)
(profit) <sub>jt</sub>	1.000 ( $3.93 \times 10^{-8}$ )	1.000 ( $4.74 \times 10^{-8}$ )	1.000** ( $1.89 \times 10^{-8}$ )	1.000 ( $1.95 \times 10^{-7}$ )	1.000** ( $1.96 \times 10^{-8}$ )	1.000 ( $1.87 \times 10^{-7}$ )
$\ln(\text{productivity})_{jt}$	0.864 (0.270)	0.919 (0.279)	1.754*** (0.316)	0.641 (0.343)	1.757*** (0.321)	0.736 (0.333)
(MNE) <sub>jt</sub>		1.180 (0.356)	1.204 (0.286)	1.847 (0.918)	1.122 (0.255)	2.092 (1.026)
<b>Import transaction characteristics</b>						
(intra-MNE) <sub>jt</sub>		0.929 (0.398)	0.518** (0.153)	4.980* (4.243)	0.571* (0.168)	4.179* (3.328)
(warehousing) <sub>jt</sub>		2.806*** (0.744)				
$\ln(\text{duty savings})_{hijt}$		0.640*** (0.109)	0.672*** (0.0771)	0.843 (0.223)		
$\ln(\text{duty savings})_{hijt}^2$		1.038*** (0.009)	1.040*** (0.006)	1.019 (0.014)		
(margin) <sub>hijt</sub>					1.020 (0.113)	0.728 (0.178)
$\ln(\text{value})_{hijt}$					0.683*** (0.078)	0.863 (0.196)



$[\ln(\text{value}) \cdot (\text{margin})]_{ijt}$				1.027***	1.002
				(0.009)	(0.012)
$(\text{margin})_{ijt}^2$				0.978***	1.030
				(0.007)	(0.019)
$\ln(\text{value})_{ijt}^2$				1.039***	1.021*
				(0.007)	(0.012)
Import diversification					
$\ln(\#\text{exporters})_{jt}$	1.162	1.262*	1.003	1.283*	1.006
	(0.138)	(0.164)	(0.165)	(0.169)	(0.167)
$\ln(\#\text{product groups})_{jt}$	0.985	1.180	0.944	1.161	0.942
	(0.113)	(0.126)	(0.165)	(0.123)	(0.159)
Observations	332,263	312,991	82,308	226,979	82,308
				82,308	226,979

Logit models, odds ratios.

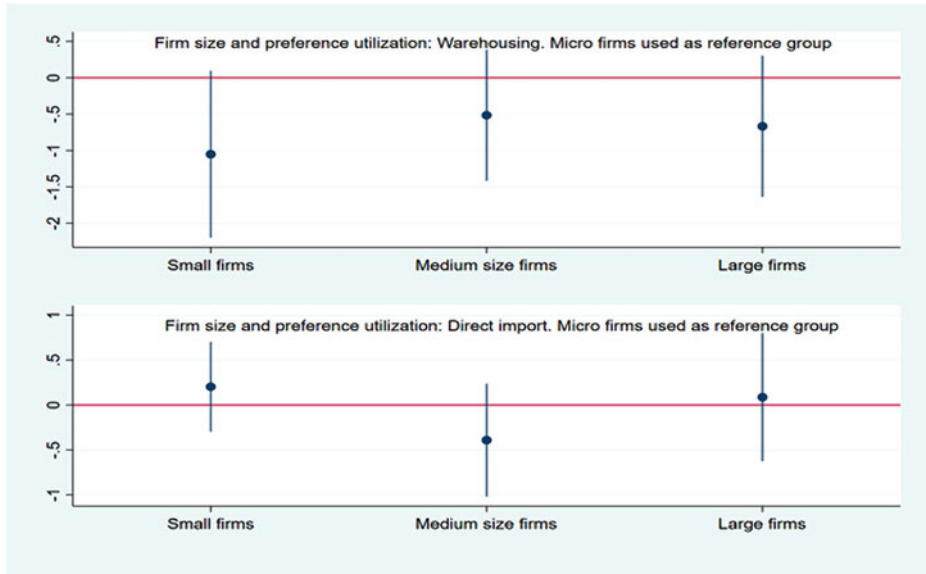
Notes: \*\*\*, \*\* and \* indicate significance at the 10, 5, and 1% level respectively.

(a) The term 'All' refers to regressions using all transactions (direct imports and customs warehousing); DI and CW refer to the analyses on direct imports and customs warehousing separately.

Robust standard errors clustered at the firm level within parenthesis (.).

Fixed effects at the HS2-digit (or Chapter) level and each half-year included in all regressions.

Sources: Swedish Customs Agency, European Commission, UC, and own calculations.



**Figure 8.** Firm size and preference utilization

Note: Based on full model (Table 1, Models 3 and 4). If the estimated 95% confidence band for a given size class crosses the (red) zero-line, preference utilization of that size category is not significantly different (higher or lower) from the reference group (micro firms). Sources: Swedish Customs Agency, European Commission, UC, and own calculations.

approximately 0.6%.<sup>19</sup> We also note that preference utilization seems to increase with capital intensity when engaged in customs warehousing.

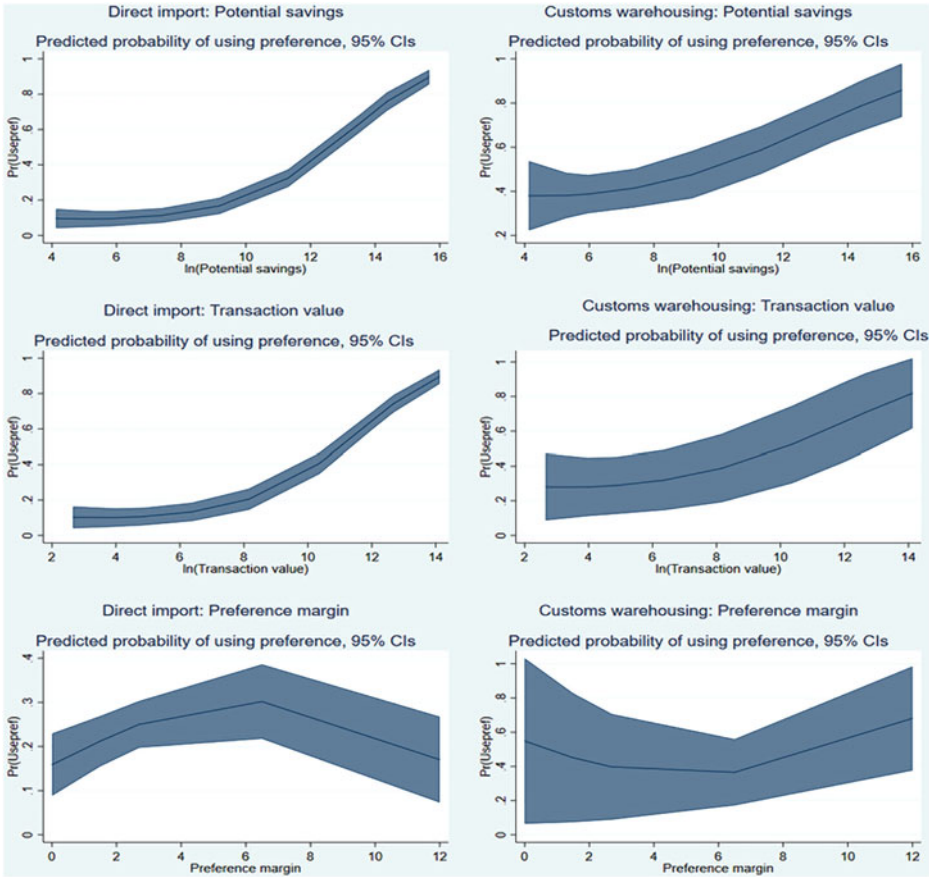
*Intra-firm Trade.* Nearly two-thirds of the import transactions in the data set are undertaken by firms that are part of a company group.<sup>20</sup> This means that some import transactions stem from firms located in South Korea that are part of the same company group as the importing firm (i.e. intra-firm import transactions). The results in Table 1 suggest that the preference utilization in intra-firm trade differs between customs warehousing and direct import transactions. For customs warehousing, there is a strong positive impact of intra-firm trade on the likelihood that tariff preferences will be utilized. The estimated coefficient for the *intra-firm* variable in Models 4 and 6 shows values well above unity. The estimated odds ratio suggests that there is a 4.2–5 times higher probability that tariff preferences will be utilized when the import mode is customs warehousing and the import transactions take place between related parties. For direct imports (Models 3 and 5), the results are the opposite. It is significantly less likely that tariff preferences will be utilized when firms carry out direct imports from related firms (intra-firm trade) than from unrelated firms. Hence, for intra-firm transactions, the degree of preference utilization is highly dependent on the mode of import (direct imports or customs warehousing). A closer analysis of why intra-firm decisions differ between direct imports and customs warehousing operations is left for future research.

### 5.1.2 Import Transaction Characteristics

Using a sample consisting of all Swedish import transactions from South Korea for November 2016, Kasteng *et al.* (2022) analysed the impact of the import transaction value, the preference

<sup>19</sup>The effect of a 1% increase in productivity is calculated according to the formula  $e^{\ln(1.75) \cdot \ln(1.01)}$ , where 1.01 is the relative change in productivity and 1.75 is the estimated odds ratio.

<sup>20</sup>The data do not provide any precise identification of imports from firms within the company group. However, we have included a dummy for the cases where the importing and exporting firms have identical names as a proxy for intra-firm imports. Since the matching is based on the similarity in firm names, it is likely that the extent of intra-firm trade is underestimated.



**Figure 9.** Potential duty savings, import transaction value and the preference margin  
 Note: Based on Model 3 (for direct import) and Model 4 (for customs warehousing, in Table 1).  
 Sources: Swedish Customs Agency, European Commission, UC, and own calculations.

margin, and the potential duty savings on preference utilization. Their data set was a subsample of the data used in this article. The results obtained here, which are summarized in Figure 9, are very similar to those of Kasteng et al. (2022).

Figure 9 shows how preference utilization varies across the full range of duty savings, transaction values, and preference margins. The major takeaways are that preference utilization increases as we move from small to large potential duty savings and from small to large import transactions, while the preference margin is of minor importance for preference utilization. This pattern holds for both direct imports and customs warehousing.

More specifically, Figure 9 shows that the predicted probability of utilizing tariff preferences in direct imports increases from approximately 8% to almost 90% when the potential duty savings go from the lowest to the highest observed value (holding other variables constant). For customs warehousing, the corresponding increase in the probability that tariff preferences are utilized is from approximately 35% to almost 90%. Hence, larger monetary values are positively related to the likelihood that tariff preferences will be utilized.

The observation that there is a significantly higher likelihood that preferences will be used in customs warehousing should also be noted. The average import transaction in customs warehousing is smaller than that in direct imports, and one factor contributing to the higher utilization rate could be that the preference application process is simpler for transactions valued below EUR

6,000. Instead of providing a formal certificate of origin, the South Korean exporter can submit an invoice declaration stating that the goods originate in South Korea. Another possible explanation, proposed by Kasteng *et al.* (2022), is that many of the smallest firms importing through customs warehouses may use intermediaries in logistics and customs brokerage, which could reduce the information cost of preference utilization.

### 5.1.3 Import Diversification

Both the policy debate and the literature on preference utilization suggest that rules of origin are associated with a fixed cost (Keck and Lendle, 2012; Nilsson and Dotter, 2012; Albert and Nilsson, 2016). This means that managing many products with different rules of origin, possibly sourced from several different exporters, may require a greater effort than handling one product from one exporter.

However, once a firm has learned to handle one type of rule of origin, it is plausible to assume that the administrative costs for handling subsequent transactions from the same exporter will be lower. That is, a learning process should take place. It is, however, unclear whether learning is more effective if imports are limited to a small set of products (and a small number of product-specific rules of origin) or many products with a large variety of product-specific rules of origin.

There can also be learning effects associated with having many business relations. Importing goods from several different exporters could allow the importer to gather valuable knowledge from its trade partners. For example, an importer with multiple trade partners is more likely to come into contact with a foreign exporter that will inform it about the possibility to import without tariffs or encourage it to apply for tariff preferences.

To explore these two types of learning, we have included data for the number of business relations with South Korean exporters (*#exporters*) and the number of product groups imported from South Korea (*#product groups*) by each firm during the period 2011–2018 into the estimations presented in Table 1. The number of product groups is defined by counting the number of different HS 4-digit codes, since most product-specific rules of origin are defined at that level. The average number of product groups per firm was 2.4 per six-month period, with a maximum of 121 and a standard deviation of 4.53.

The result for the number of product groups appears clear. Table 1 shows that there is no significant impact of *#product groups* on preference utilization. This suggests that the additional transaction cost faced by firms by importing a larger number of products is not very high. A possible reason is that much of the fixed costs are borne by the exporters, who prepare and supply the documentation that is used by the importer to prove the origin of the products. This result is also consistent with results from surveys on preference utilization (Decoster, 2021; Kasteng and Almufti, 2021) which indicate that the great majority of exporters do not consider rules of origin a major problem.

When it comes to the number of business relations, the results for the variable *#exporters* show that importing goods from a large set of exporters is positively related with preference utilization among direct importers (Table 1, Columns 3 and 5). The estimated odds ratio of 1.28 suggests that doubling the number of suppliers in the foreign market raises the chance that the tariff preferences will be utilized by 89%.<sup>21</sup> In other words, managing multiple supplier relationships seems to make importers better at utilizing tariff preferences. There is no significant impact of multiple suppliers in customs warehousing.

## 5.2 Learning and Preference Utilization

In addition to the possible effects of the number of trade partners and import products, learning about preferences may be related to the firm's experience of international trade. The following section focuses on two types of experiential learning – learning-over-time and learning-by-doing (controlling for the other determinants of preference utilization discussed above).

<sup>21</sup>  $e^{\ln(1.28) \cdot \ln(2)}$ .

### 5.2.1 'Learning-over-Time' versus 'Learning-by-Doing'

Learning-over-time is related to the length of time during which the firm has been an active importer, while learning-by-doing depends on the accumulated number of import transactions undertaken by the firm. The descriptive analysis in Section 4 found evidence for both learning-over-time and learning-by-doing effects. Apart from the observations that the DSR was generally higher for firms carrying out a larger number of transactions and that it increased over time, the existence of learning effects was supported by the fact that continuous importers reached higher levels of preference utilization than other importers.

Table 2 introduces three new variables to explore the learning process. The variable *#periods* proxies the length of time (measured as the cumulated number of six-month periods) that the firm has been actively importing from South Korea. The variables *#transactions* and *#ID* are firm level variables measuring the cumulated number of import transactions and import consignments (customs IDs) handled by a firm. To analyse potential interdependence between time and the number of import transactions or import consignments, we also add interaction terms between *#periods* and the cumulated number of import transactions/consignments to the estimation model. These interaction terms allow us to analyse whether the impact of one additional import transaction will successively increase or decrease with time. All other variables from Table 1 are included in the estimations (and all results remain qualitatively unchanged) but are not shown to save space.

The top half of Table 2 shows that there is no significant relation between the length of time a firm was engaged in customs warehousing and its preference utilization. For direct imports, shown in the bottom half of the table, there is even a negative relationship between *#periods* and preference utilization in two out of four estimations. That is, the longer a firm has been active in direct imports, the less likely it is that tariff preferences will be utilized.

The estimated relationship between time and preference utilization is depicted in the first panel in Figures 10a and 10b. Figure 10a shows that preference utilization in customs warehousing is unaffected by the number of periods a firm has been an importer. Figure 10b indicates that preference utilization in direct imports is lower for firms that have been importing for a longer time. Hence, the econometric results give no support for the learning-over-time hypothesis.

Turning to the learning-by-doing hypothesis, the results in Table 2 (Models 1 and 3) suggest that preference utilization increases with the number of import transactions and import consignments, both for direct imports and customs warehousing. The middle and right-hand panels of Figures 10a and 10b illustrate these findings. Two observations are particularly notable. First, the estimated levels of significance reveal that there is a closer relationship between learning-by-doing and preference utilization in direct imports than in customs warehousing. The middle panel of Figure 10b shows that the predicted probability that tariff preferences will be utilized in direct imports increases from about 5% to almost 70% as we move from firms undertaking a few too many import transactions (percentile 1 to 99). The corresponding change in preference utilization in customs warehousing is roughly from 5 to 60%.<sup>22</sup> Secondly, the significance is stronger when we use the number of import transactions as compared to the number of import consignments (customs IDs). This suggests that firms learn not only from the number of consignments handled, but that the number of transactions also adds to the learning process.<sup>23</sup>

A further detail to note (Models 2 and 4) is the interdependence between time and the number of import transactions [ $(\#periods) \cdot \ln(\#transactions)$ ]. For customs warehousing withdrawal transactions, this relationship is insignificant, while there is a weak negative relation for direct import transactions. This negative relation suggests that the learning from the  $n$ th import transaction is

<sup>22</sup>In this experiment, all other independent variables are set to zero which explains that the highest value of preference utilization is relatively low. Focus is on the change in probability as we move along the x-axis.

<sup>23</sup>The average importer recorded 13.5 import consignments (maximum 1,890, standard deviation 75) and 24 import transactions (maximum 6,636, standard deviation 190) per six-month period between 2011 and 2018.

**Table 2.** Learning-by-doing

	Customs warehousing			
	(Model 1)	(Model 2)	(Model 3)	(Model 4)
$(\#periods)_{jt}$	1.027	1.092	1.057	0.993
	(0.044)	(0.081)	(0.041)	(0.063)
$\ln(\#transactions)_{jt}$	1.372***	1.545***		
	(0.127)	(0.209)		
$[(\#periods) \cdot \ln(\#transactions)]_{jt}$		0.990		
		(0.013)		
$\ln(\#ID)_{jt}$			1.192	1.051
			(0.178)	(0.174)
$[(\#periods) \cdot \ln(\#ID)]_{jt}$				1.011
				(0.011)
Full set of controls	Yes	Yes	Yes	Yes
Observations	226,979	226,979	226,979	226,979
	Direct imports			
$\#periods_{jt}$	0.925***	1.025	0.936**	1.054
	(0.022)	(0.033)	(0.026)	(0.038)
$\ln(\#transactions)_{jt}$	1.472***	1.653***		
	(0.108)	(0.138)		
$[(\#periods) \cdot \ln(\#transactions)]_{jt}$		0.984***		
		(0.006)		
$\ln(\#ID)_{jt}$			1.282***	1.616***
			(0.121)	(0.191)
$[(\#periods) \cdot \ln(\#ID)]_{jt}$				0.977***
				(0.008)
Full set of controls	Yes	Yes	Yes	Yes
Observations	82,308	82,308	82,308	82,308

Logit models, odds ratios.

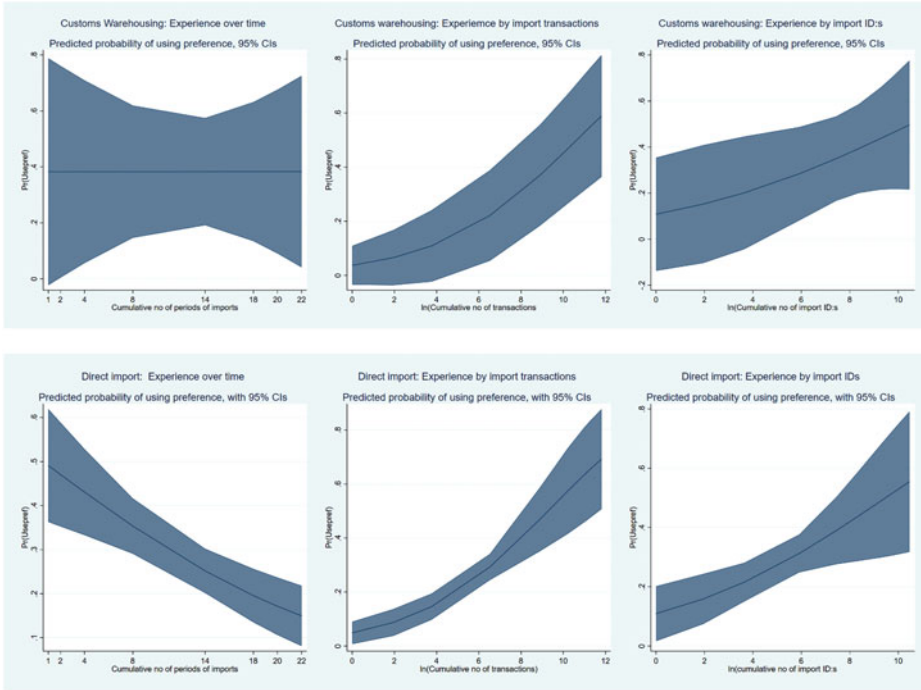
Notes: \*, \*\*, and \*\*\* indicate significance at the 10, 5, and 1% level respectively. Robust standard errors clustered at the firm level within parenthesis (.). For control variables included, see Table 1 columns 5–6.

Fixed effects at the HS-2 level and each half year included in all regressions.

Sources: Swedish Customs Agency, European Commission, UC, and own calculations.

higher if the total amount of import transactions is compressed over a short period of time. A possible explanation could be that corporate routines may change over time, that employee turnover may lead to losses of experience, and that people tend to forget administrative procedures if they are not repeated frequently enough.

It should be noted that our data do not reflect leaning from other FTAs. With more comprehensive data, it would be interesting to examine if there are spillover effects between FTAs. For example, are importers with experience from the EU–South Korea FTA more likely to utilize preferences when they import from Japan, which entered an Economic Partnership Agreement and FTA with the EU in 2019?



**Figure 10.** (a) Learning and preference utilization. Customs warehousing. (b) Learning and preference utilization. Direct imports.

Note: Based on Table 2.

Sources: Swedish Customs Agency, European Commission, UC, and own calculations.

### 5.3 Robustness Test

As pointed out above, the transaction data lack a natural panel structure. However, as a robustness test, we created an artificial panel structure that allows us to apply the logit random effect and logit fixed effect estimators to examine the robustness of the results.

The idea underlying the artificial panel structure is that instead of using years or months to order the observations, we capture events occurring over time by using a count variable for the firm’s import transactions. That is, instead of comparing events at specific points in time for each firm, we keep track of the import transaction count and use this as the within-variation. Transactions recording a lower count have taken place before transactions with a higher count.<sup>24</sup> Hence, we have a firm-transaction count panel.<sup>25</sup>

In Table 3, Model 1 shows results from the default cross-sectional logit estimator to which the results in Model 2 (FE-estimator) and Model 3 (RE-estimator) are to be compared. In Model 4, we aim to replicate the base-line model of Kasteng et al. (2022) using the same time window of November 2016. In Model 5, we re-estimate Model 4 using all available years.

The results in Table 3 indicate a great deal of stability. Summarizing, the artificial fixed and random effect results in Models 2 and 3 are in line with the pooled baseline Model 1. In addition, using the full sample period returns similar results as those found by Kasteng et al. (2022) who

<sup>24</sup>In cases where firms undertake more than one transaction in one day (more than one import transaction of the same Taric 10-digit code from the same exporter on the same day), the count among these observations is arbitrary.

<sup>25</sup>It may even be argued that transaction count is a better grouping criterion than calendar time if learning is related to experience of specific events.

**Table 3.** Robustness

	Model 1	Model 2	Model 3	Model 4	Model 5
VARIABLES	Base <sup>a</sup>	FE <sup>b</sup>	RE <sup>c</sup>	Nov. 2016 data	Full sample
$\ln(\text{sales})_{jt}$	0.975 (0.099)	0.939*** (0.008)	0.941*** (0.014)	1.178 (0.224)	1.143 (0.128)
$\ln(K/L)_{jt}$	1.929** (0.507)	1.594*** (0.046)	1.942*** (0.432)		
(profit) <sub>jt</sub>	1.000 ( $4.7 \times 10^{-8}$ )	1.000*** ( $7.3 \times 10^{-9}$ )	1.000*** ( $6.5 \times 10^{-9}$ )		
$\ln(\text{productivity})_{jt}$	0.919 (0.279)	0.758*** (0.027)	0.929 (0.145)		
$\ln(\#\text{sources})_{jt}$	1.162 (0.138)	1.262*** (0.019)	1.184** (0.088)		
$\ln(\#\text{product groups})_{ijt}$	0.985 (0.113)	0.561*** (0.011)	0.833 (0.111)		
(MNE) <sub>jt</sub>	1.180 (0.356)	1.575*** (0.045)	1.105 (0.940)		
(intra-firm) <sub>jt</sub>	0.929 (0.398)	0.991 (0.057)	0.836** (0.070)		
(warehousing) <sub>jt</sub>	2.806*** (0.744)	1.471*** (0.096)	2.179* (0.907)		
$\ln(\text{savings})_{hijt}$	0.640*** (0.109)	0.672*** (0.015)	0.665 (0.318)		
$\ln(\text{savings})_{hijt}^2$	1.038*** (0.009)	1.037*** (0.001)	1.038 (0.034)		
$\ln(\#\text{transactions})_{jt}$				0.973	1.130



				(0.162)	(0.123)
$(\text{margin})_{hijt}$				1.469***	1.251***
				(0.120)	(0.049)
$\ln(\text{value})_{hijt}$				0.400***	0.577***
				(0.106)	(0.099)
$[\ln(\text{value}) \cdot (\text{margin})]_{hijt}$				1.071***	1.052***
				(0.017)	(0.011)
Observations	312,991	264,607	312,991	3,818	316,211

Artificial panel structure and period sensitivity. Logit models, odds ratios.

Notes: \*, \*\*, and \*\*\* indicate significance at the 10, 5, and 1% level respectively. Fixed effects at the HS-2 level and half year included in all regressions.

(a) Cross sectional estimator. Robust standard errors clustered by firm.

(b) Xtlogit, panel by firm-transaction. Bootstrapped standard errors by transaction count.

(c) Xtlogit, artificial panel by firm-transaction. Robust standard errors clustered by transaction count.

Source: Swedish Customs Agency, European Commission, UC, and own calculations.

used observations from November 2016 only. Hence, the results of the study do not seem to be dependent on the use of a specific estimator, time period, or estimation technique.

## 6. Conclusions

A major objective of this article has been to examine how firms learn to utilize tariff preferences. The analysis has been carried out using combined firm-transaction level data on Swedish imports from South Korea during the period 2008–2018.

Beginning with how preference utilization develops over time, the descriptive analysis found that the aggregate DSR reached about 80% after three years and levelled out at about 90% after five years. Hence, learning to use trade preferences seems to be a process that extends over several years.

However, the population of importers has varied over time, partly because a FTA reduces barriers to trade and attracts new firms into trade. In this context, it is relevant to study the behaviour of ‘continuous importers’, which are firms carrying out import transactions throughout the whole sample period. Among the continuous importers, the DSR was found to be higher and to increase faster than among other firms. Specifically, we noted that continuous importers reached an average DSRs of 97% five years into the agreement. This suggests a connection between experience in importing and preference utilization.

A closer econometric analysis of the learning process revealed that it is the number of import transactions rather than the number of years the firm has been an importer that seems to matter for preference utilization. The fact that the probability that preferences are utilized increased with the number of import transactions supports the learning-by-doing hypothesis, but there was only limited support for the learning-over-time hypothesis.

The lack of support for the learning-over-time hypothesis could possibly have to do with changes in trade partners or labour turnover, where the employees administrating imports are replaced over time with new and less experienced employees. Hence, if routines and employees change, it is likely that skills and capabilities need to be updated.

Learning is not necessarily linked only to the number or frequency of import transactions. The two alternative sources of learning explored were the number of different types of imported goods and the character of the supplier network. The results indicate that the number of business relations, defined as the number of foreign suppliers that an importer works with, is positively related with preference utilization (for direct imports). This suggests that each supplier may contribute with specific knowledge on how preferences can be utilized. However, we did not find any evidence suggesting that the number of different products imported by the firm, had any impact on its preference utilization.

In line with Kasteng *et al.* (2022), we found that the DSR increased rapidly as we moved from small to large value transactions. For the smallest transactions, the estimated DSR was around 10%, while it was over 90% for large value transactions. That is, value matters for firms’ incentives to claim tariff preferences. The preference margin on its own seemed to be of minor importance for preference utilization.

We did not find any significant differences in preference utilization across firm-size classes in our econometric analysis. However, there were significant differences between different import modes. Controlling for other determinants, the probability that preferences were utilized was significantly higher for firms using customs warehousing rather than direct imports. One possible reason is the less demanding rules of origin for small import transactions (which are more common in customs warehousing) but it has also been suggested that small firms using customs warehousing are also more likely to use services provided by intermediaries in logistics and customs brokerage to reduce the costs for preference utilization. The role of intermediaries in preference utilization is an area where further research is warranted.

A novel finding from the econometric analysis is that the probability that tariff preference is utilized in intra-firm import transactions depends on the import mode. The probability was relatively high for customs warehousing but relatively low for direct imports. The lack of data on the nature of the value chains of the multinational enterprises engaged in trade between Sweden and South Korea precludes more detailed analysis here, but this is also a question that deserves more attention in future research. Furthermore, analyses of other FTA and importers other than Sweden would be of high value to determine whether results can be generalized across countries and agreements.

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