New evidence on preference utilization

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Abstract

We analyse the degree of preference utilization in four major importing countries (Australia, Canada, EU and US) and provide evidence that preferences are more widely used than previously thought. For Australia and Canada, we have obtained a new dataset on imports by preferential regime that has so far not been publicly available. For the EU and US, we make use of more disaggregated data than previously used in the literature. We empirically test what determines utilization rates. In line with previous studies, we find that utilization increases with both the preferential margin and the volume of exports, suggesting that using preferences can be costly. However, we also find that utilization rates are often very high, even for very small preferential margins and/or very small trade flows, which contradicts numerous estimates that average compliance costs are as high as 2-6%. We extend the existing literature in relation to both data and methodological issues. In particular, we construct "pseudo transaction-level" data that allows us to assess more precisely when available preferences are utilized. Using this methodology, we obtain a more realistic estimate of what determines utilization. Rather than constituting a percentage share of the trade value, our findings indicate that utilization costs involve an important fixed cost element. We provide estimates for such fixed costs, which appear to be in the range of USD 14 to USD 1,500.

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1 Introduction

Much has been written about the utility of preferences to beneficiaries, or rather the lack of it.[3] Major concerns relate to exclusion of sensitive products from the coverage of such schemes and to the low preference margins accorded to included products. WTO (2011) and Carpenter and Lendle (2010) show that only 16 per cent of world trade are eligible for preferential tariffs, with a global trade-weighted preference margin of no more than 1 per cent. Less than 2 per cent of imports are eligible to receive preferences with margins above 10 percentage points.[4] From a dynamic perspective, preferences have also been criticized for their structural and political economy implications. The provision of preferences can lead to an inefficient allocation of resources in sectors where a receiving country does not have a comparative advantage. This makes it harder to restructure the economy when preferences are removed or eroded over time (Hoekman & Özden, 2005). It has also been noted that preferences create interests opposed to further non-discriminatory liberalization (Limão, 2006; Özden & Reinhardt, 2005). Kleen & Page (2005) note that, overall, preferences have engendered rent transfers to interest groups rather than promoted broad-based industrial development. Nevertheless, cases like Mauritius have shown that in sectors where meaningful market access is provided, countries can benefit from preferences as long as they last, while using rents to diversify their economy in preparation of their eventual disappearance (Subramanian & Roy, 2001).

In order to determine the economic usefulness of preferences to beneficiary countries, preferences have to be utilized in the first place. "Preference utilization" here is narrowly defined as the degree to which imports that are eligible for preferences enter under these rates. Only a limited set of studies have looked into this issue. So far, the literature seems to concur that preference utilization is suboptimal owing to a combination of insufficient preferential margins and excessive costs attached to their utilization in certain sectors. This paper challenges this view by using highly disaggregated data on preference utilization in a larger set of countries than the previous literature. We find that preference utilization rates (u) are often high even where margins are low and duty savings (whether absolute or relative) are small. Our results suggest that either the costs of using preferences are much lower than previously estimated (and sometimes practically zero) and/or other benefits exist in connection with claiming preferential market access.[5]

In the next section, we give an overview of the existing literature on preference utilization and identify some shortcomings in the data and methodology of existing studies, and we explain how these shortcomings are addressed in this paper. Section 3 discusses the definition of preference utilization. Section 4 explains data sources and provides descriptive statistics. In particular, we characterize the degree of preference utilization using a wide range of aggregates. Section 5 sets out our empirical approach to identify the determinants of u for both exporter/product-level and "pseudo-transaction-level" data – explained in detail below - and to obtain a more realistic estimate of the costs of using preferences. Section 6 presents and interprets the results obtained from our estimations, including estimates of the range in which the fixed costs of using preferences are likely to fall. Section 7 concludes.

[3] See, for example, Özden and Reinhardt (2005) who find no effect of GSP preferences on various measures of export performance in the beneficiary countries.

[4] These figures are based on a sample of major importing countries and all their partners, covering about 90% of world trade.

[5] One such benefit could be that preferential imports could more easily qualify for preferences in third countries if they are re-exported to another country that allows regional cumulation. We do not investigate this further in this paper.

2 Literature review

The main benefit of using a preference is the reduction in duties, in most cases to zero. Therefore, the higher is the preferential margin, the higher should be the probability that a preference is used. But as costs are attached to using a preference, such as costs related to fulfilling rules of origin (ROO) requirements and other formalities that can be specific to each shipment (or a bundle of shipments of one firm), preferences may not be used unless volumes are important enough to result in substantial duty savings. A number of studies using various methodologies confirm that utilization rates vary with the size of preferential margins and export volumes for a range of regimes. All of these studies have been undertaken for either the EU or US market (sometimes in relation to specific sectors), the only markets for which, to our knowledge, such data is readily available. Candau *et al.* (2004) assess preference utilization in the EU for 2001. Utilization rates are generally rather high (82% on average) and higher for products with high preferential margins. Bureau *et al*. (2007) use a probit model using detailed 2002 data at exporter-product level for agricultural products in the EU and US. Their results show a positive relationship between the probability of using preferences and preferential margins as well as export values, with overall utilization rates well above 80%. Hakobyan (2010) uses panel data to assess utilization rates of the US GSP. She also finds a positive impact of the preference margin and export volumes. Brenton and Ikezuki (2004) focus on exports of AGOA beneficiaries to the US. They show that while utilization rates are relatively high overall, they remain low (below 50%) for a range of countries, in particular for garment products.

Although utilization is high overall, it is less than full, and sometimes low for individual countries and products. This is why most studies on the determinants of preference utilization examine more closely the costs involved in utilizing preferences and seek to provide an average cost estimate. Francois *et al.* (2006) and Manchin (2006) estimate a threshold margin that is required for exporters to use preferences in the case of ACP-(non-LDC) exporters to the EU. Their often-quoted result is 4-4.5%, which falls squarely in the range of cost estimates obtained by other researchers of between 2-6% (see Bureau *et al*. (2007) for an overview). It is common to these studies that costs are expressed as tariff margin equivalents, i.e. as variable costs. Yet, preferences also entail fixed costs, such as documentation requirements, which do not increase with the size of the shipment.[6] Hakobyan (2010) controls for variation in the production structure in beneficiary countries that leads to differing fixed costs of utilizing preferences. She uses data on value added, where a higher value makes it easier to fulfill costly ROO requirements, and indeed finds a positive impact of the share of value added (at country level) on preference utilization. Cadot and de Melo (2007) test directly the effect of value-content rules on the utilization of EU GSP and ACP preferences. They find that utilization is lower the higher the minimum value content is. Similarly, Carrere and de Melo (2004), looking at preferential access for Mexican exports to the US under NAFTA, explain the variation in utilization rates for different categories of goods with the different cost impact that various types of ROO have on these goods. Building on the same data set, Anson *et al.* (2005) find that administrative costs of ROO constitute up to one third of utilization costs expressed as a tariff margin equivalent of 6% on average. Beyond that, not much is said in the literature on the size of these fixed costs or the relative importance between variable and fixed costs. Hakobyan (2010), at least indirectly, acknowledges the importance of fixed costs by accounting for the non-linear relationship between the preference margin and the utilization rate. She estimates a breakpoint beyond which the positive relationship between the two variables vanishes. Similarly, Manchin (2006) finds that the preferential margin does not affect

[6] Hakobyan (2010) suggests that variable costs of claiming preferences may be more associated with the specific country-product characteristics of the beneficiary, such as remoteness or the local content of the product, whereas fixed costs arise from country-product characteristics in the importing country and are mostly related to the bureaucratic requirements related to claiming preferences.

the amount of preferential trade, once the decision to request preferences has been taken. Building on this approach, Agostino *et al.* (2010) confirm this result using the residuals from the stage one utilization equation as a proxy for compliance costs in the stage two gravity equation.[7]

Despite the quality of these studies and uniformity of results, the existing literature can be developed further, not least owing to recent advances in electronic data collection at a more disaggregated level. First, we increase the scope of study in terms of both preference-providing and receiving countries as well as in terms of the products covered. As mentioned above, almost all existing studies focus on either the US or the EU. Some address a particular policy concern and therefore concentrate on a subset of beneficiary countries. Manchin (2006), for example, given the political discussions surrounding Economic Partnership Agreements (EPAs), has focused on preferential access of non-LDC ACP countries to the EU. Others are interested in specific sectors, such as Agostino *et al.* (2010), Bureau *et al.* (2007) or OECD (2005), who examine agricultural/food products. Conducting their analysis at the HS-6 level, several studies, such as Agostino *et al.* (2010), also use a relatively high product aggregation. By increasing the country and product scope we aim at deriving more general conclusions about the utilization of preferences and the factors driving it. In this paper, we enlarge the range of preference-providing countries by two main importers, Australia and Canada, using highly disaggregated data not currently publicly available. To the best of our knowledge, preference utilization in these countries has never been analyzed before in any comprehensive and systematic fashion.[8] We also consider all beneficiaries – including developed countries - and products at the tariff line level. In this way, we hope to validate from bottom-up the results on the degree and the determinants of preference utilization for a comprehensive set of countries and products.

Second, the extended dataset at our disposal allows us to go beyond the focus on one specific preference regime, as most existing studies do. For example, Hakobyan (2010) examines GSP preferences provided by the US, while Brenton and Ikezuki (2004) look at US AGOA. The isolated examination of a specific programme overlooks the important fact that preference regimes overlap, i.e. that for many products individual exporting countries have the choice among several preferential regimes in a given importing country. It can therefore be misleading to calculate utilization rates for a specific regime alone. In the examples above, a range of African countries can use either the US GSP scheme or AGOA preferences. Taken in isolation, the utilization of GSP preferences may appear to be quite low, as countries eligible to both may mainly claim AGOA preferences. This then gives the wrong impression that GSP preferences may not provide sufficient benefits or entail utilization costs that are too high. However, taking both regimes together, overall preference utilization is high. The correct way of examining preferential schemes needs to take into account the choice among alternative preference regimes, i.e. in this case, the fact that GSP preferences would be claimed more often in the

[7] More precisely, the authors show that while the effect of the preference margin is positive, the interaction term with the cost of compliance residual is negative, which indicates a vanishing effect of the margin, when compliance costs increase. A key difference to other papers, Agostino *et al.* (2010) define the margin as a relative margin: m = (MFN – PREF) / MFN. In our view, using the absolute difference is preferable. In practice, most preferential rates are zero. Therefore, the relative margin is mainly 100%, no matter whether the MFN rate is 2% or 50%. We believe that the *absolute* difference should matter more for traders, which is also in line with most of the literature.

[8] One possible exception is Pomfret *et al.* (2010), who provide an overview of Australia's utilization rates over the last decade. However, it is not quite clear whether the underlying data shows actual use of regimes or only eligibility. Also, Low *et al.* (2009) in their paper on preference erosion in relation to industrial goods seek to account for less than full utilization, but concede that "we were unable to obtain sufficient data to make this adjustment except in the case of the United States" (page 5). In an earlier version, the authors mention the attempt to obtain utilization data also for Canada, but abandoned this endeavour owing to inconsistencies with other data sources used in the analysis. ITC (2010) managed to obtain non-public data from the Australia Statistics Office and Canada Statistics on the utilization of non-reciprocal preferences by LDCs aggregated at the country level. See Figures 20 and 21 at page 51; no further empirical analysis is contained in this study.

absence of AGOA. To our knowledge, our paper is the first study to fully address this problem by defining the most beneficial regime in each case.[9]

Third, the decision to utilize available preferences can vary at the level of individual transactions.[10] Due to the lack of publicly available information in this regard, the literature to date has not employed transaction-level data. OECD (2005) and Bureau *et al*. (2007) explain utilization decisions at the level of annual import flows (HS-8 level) using probit estimations. This data is likely to hide widely varying transaction sizes and leads to the conclusion that preferences are not used in small transactions, where the absolute amount of duties saved is low. Introducing a dummy to control for small-scale transactions does not solve the problem, as large annual import flows can also consist of a large number of smaller transactions. Nilsson (2012) looks at preference utilization of small import flows in the EU.[11] He finds a significant, but small positive effect of the margin on the utilization rate, as well as a positive effect of the value. Thus, his results are qualitatively in line with ours. As far as transaction-level data is concerned, we are obviously subject to the same data constraints. However, we propose a partial fix having assembled higher-frequency data by month at the customs district/member level for the US and EU. This allows us to construct "pseudo-transaction-level" data. Using simple combinatorics we can make assumptions about the likelihood of observing more than one transaction per month in individual districts/members and, on this basis, derive a subset of the data that is likely to be close to individual transactions.

Finally, the results in the literature to date are not easily comparable because of the differences in scope, data and methodologies. This paper is also an attempt to condense and extend the best practices identified so far and characterize more accurately the size and nature of the costs involved in utilizing preferences. In terms of methodology, we examine the determinants of preference utilization directly, controlling for both variable and fixed cost elements. This appears preferable to the gravity approach pursued by Manchin (2006), Francois *et al.* (2006) and several other studies thereafter (see above), as noted in the review by Bureau *et al.* (2007) regarding its suitability to address the question at hand. Using our more comprehensive and highly disaggregated dataset and relevant alternative estimation approaches, such as fractional logit, we determine that previous estimates of the costs of utilizing preferences appear to be too high. Most importantly, as we are able to show that preferences are often used even when preference margins are very small (<1%) and/or transaction values are low, we demonstrate that fixed costs are essential for preference utilization and provide cost estimates in this regard.

[9] An exception is Bureau *et al.* (2007) who, for the agri-food sector in the US and EU, also make adjustments similar to ours: The authors either divide imports under any preferential regime by the total value of imports eligible for a given preference regime or calculate the ratio of the imports from a given country under any regime and the imports eligible under all of these regimes. Others, like Hakobyan (2010), control for the presence of alternative preferential regimes, but do not calculate overall utilization rates.

[10] At most, exporters are likely to take a utilization decision for a range of similar transactions.

[11] Nilsson (2012) chooses a threshold of, for example, € 10,000 for all HS8-partner combinations to separate small and large flows. The threshold is applied to the value of preferential imports, which includes items featuring zero preferential imports but comprising high-value non-preferential transactions, such as oil. These high-value imports are nevertheless used to calculate the aggregate utilization rates for all transactions below the threshold. That way, he obtains utilization rates that are much lower than rates calculated by applying the same threshold to eligible rather than preferential imports, i.e. truly small imports at the product level. In our summary statistics, we therefore show utilization rates for different value ranges using eligible imports to define these ranges. Nilsson (2012) also uses preferential imports in his regressions, while we use eligible imports, and our summary figures and regression results are therefore difficult to compare to his work, including in respect of Nilsson & Matsson (2009) who provide a range of summary statistics on overall preference utilization in the EU. Which method is preferable can be debated, but we believe that our method more accurately reflects preference utilization for different ranges of import flows and implies much higher utilization rates for “small” flows.

3 Definition of preference utilization

We define preference utilization as the degree of usage of existing preferences. A *preference* is a reduced tariff rate – as compared to the MFN[12] rate - granted by an importing country for a product originating from a specific exporter. Such a preference could be granted within a reciprocal PTA (such as NAFTA) or a non-reciprocal preference scheme (such as GSP). Dutiable imports (MFN > 0) could come from a country that does not receive preferences (e.g. EU imports from US). Even if imports come from a preference-receiving country, the particular product may not be eligible. In almost all cases, preferential regimes do not cover all products from a preference-receiving country. PTAs and non-reciprocal regimes have exclusion lists with sometimes only a few items (such as NAFTA) or a large share of products (such as the EU's or US' GSP). In addition, MFN rates for many products are at zero – which means that no preference can be granted.[13] Having this in mind, we can categorize all import flows (at the importer-exporter-product level) as one of the following *mutually exclusive* types A, B, C and D, as shown in Figure 1.

The preference utilization rate *u* is defined as "imports under preferential regime / eligible imports", i.e. D/(C+D), while flows of type A and B are ignored.[14] An import is considered *eligible* for a particular preference if the product from the country is covered by the preference regime according to the tariff schedule. This requires that the MFN tariff *t* is not zero. Hence, all products with zero MFN tariffs are disregarded. The preferential tariff *p*, which in most cases is zero, needs to be smaller than *t*. Country/product-specific exemptions, e.g. in the EU and US GSP schemes, are taken into account. Obviously, whether a preference will actually be used depends on whether transaction-specific requirements (in particular fulfilment of rules) are met.

Using the above definition of preference utilization, for product k (at tariff-line level) from exporting country x, we have:

$$u_{k,x} = \frac{pref_{k,x}}{elig_{k,x}}$$

For an individual transaction, the *u* is either 0 or 1. We do not have transaction-level data, but we mimic such data, as we will describe below. Data at the exporter-product level is usually an aggregate across several transactions, thus *u* ranges between 0 and 1. For descriptive statistics, we aggregate data at the importer-product level across exporters, HS chapters, tariff regimes etc. This can be done in several ways.[15] The aggregation can be made using a trade-weighted average (with eligible trade used as weights), a duty-weighted average (using the amount of duties that can be saved as weights) or by using a simple average.

[12] Importers typically apply MFN rates to all exporters, whether WTO members or not. The US uses a higher "general tariff" for exports from Korea (DPRK) and Cuba. However, there are no imports from these countries.

[13] Technically, countries could use negative tariff rates, but this does not happen in practice. Note that products with a zero MFN tariff could still be *covered* by a preferential regime (and possibly their imports could even appear as preferential imports in the data), but that would only have an impact if the MFN rate would be increased. As our commentator Olga Solleder rightly pointed out, PTAs for such products could still be beneficial for exporters because they increase predictability, unless WTO bound rates are also at zero.

[14] Note that other ratios, using the above categorization into A, B, C and D, can also be interesting. The share of imports eligible for a preference – either as a share of all imports (i.e. (C+D)/(A+B+C+D) or as a share of dutiable imports (i.e. (C+D)/(B+C+D) could be seen as a measurement of the coverage of preferences. Some authors, such as Candau *et al*. (2004) refer to this rate as the coverage ratio. The share of preferential imports over all imports (i.e. (D)/(A+B+C+D) or all dutiable imports (i.e. (D)/(B+C+D) has been referred to as the utility ratio (Inama, 2003). It is important to clearly distinguish these different concepts from ours used in this paper.

[15] Note that we do not aggregate data across importing countries. The empirical analysis is also done separately for each of the four importing countries.

Utilization rate by import value: This is defined as the aggregated import value of preferential imports divided by the aggregated import value of eligible imports, where we can aggregate across any subset of product-exporter combinations $\bar{k}, \bar{x}$

$$u_{value,\bar{k},\bar{x}} = \frac{\sum_{k\in\bar{k}} \sum_{x\in\bar{x}} pref_{k,x}}{\sum_{k\in\bar{k}} \sum_{x\in\bar{x}} elig_{k,x}}$$

Utilization rate by import duty: We define u_{duty} as the share of duty reduction that is "utilized", i.e. the import duties to be paid for preferential imports[16] divided by aggregated import duties to be paid for all eligible imports. For a single observation at product-exporter level, this is identical to u_{value} (note that the MFN tariff *t* does not vary across exporters):

$$u_{duty,k,x} = \frac{(t_k - p_{k,x})pref_{k,x}}{(t_k - p_{k,x})elig_{k,x}} = u_{value,k,x}$$

For an aggregate of product-exporter combinations $\bar{k}, \bar{x}$ we get:

$$u_{duty,\bar{k},\bar{x}} = \frac{\sum_{k\in\bar{k}} \sum_{x\in\bar{x}} (t_k - p_{k,x})pref_{k,x}}{\sum_{k\in\bar{k}} \sum_{x\in\bar{x}} elig_{k,x}\,(t_k - p_{k,x})elig_{k,x}}$$

When we aggregate across products with different preferential margins, u_{duty} and u_{value} can be different and we usually find that $u_{duty} > u_{value}$ because products with higher preferential margins tend to have higher utilization rates.

Simple average utilization rate: We define u_{avg} as the simple average of all $u_{k,x}$ across a subset of observations.

$$u_{avg,\bar{k},\bar{x}} = \frac{1}{|\bar{k}| + |\bar{x}|}\left(\sum_{k\in\bar{k}} \sum_{x\in\bar{x}} \frac{pref_{k,x}}{elig_{k,x}}\right)$$

This measure has only limited value when we aggregate product-exporter data because the underlying number of transactions varies across $u_{k,x}$. It would be more meaningful for transaction-level data, where this is the share of import transactions that use the preference. For aggregates, we typically find that $u_{value} > u_{avg}$ because product-exporter combinations with smaller trade values tend to have smaller utilization rates.

Note that all three utilization rates are the same for individual observations (at the product-exporter level), which we use in the empirical analysis. If, for example, 70% of imports of bananas from Belize enter the EU under preferences, then the utilization rate by value and by duties saved is also 70%. However, when aggregating the data by exporter, product group, type of regime etc., this ratio can be different because import values and tariff rates vary across observations. Table 21 in the appendix provides a simple aggregation example with two products.

Which measurement should be preferred? It depends. Certainly the best way to measure utilization of preferences for an exporting country as a whole (or a product group or country group) is u_{value} or u_{duty}. In contrast, the simple average is usually biased downwards because preferences are not used in many small transactions. We aggregate by exporting country, product category (HS Section), different ranges of preferential margins, import values and duty reductions.

[16] In most cases, no duties have to be paid if the preferential regime is used, but reduced duties exist in some cases.

We also aggregate by import regime. However, utilization rates cannot always be calculated for a specific regime because preferential regimes overlap. For example, some countries can use both the GSP scheme and preferential access under a PTA or another non-reciprocal regime. Sometimes three or four different regimes can overlap, e.g. the four beneficiaries (Bolivia, Colombia, Ecuador and Peru.) of the US Andean Trade Preference Act (ATPA) are also eligible for the GSP and some products are eligible for a preference under both regimes. Overall, 87% of US imports from those countries that are eligible under at least one of the schemes enter under ATPA, but only 3% under GSP. The remaining 10% enter under MFN. What would be the utilization rate of GSP alone? Taking into account only products that are covered by GSP, the utilization rate is 25%. But 72% of GSP-eligible imports enter under ATPA, which brings the overall utilization rate to 97%. Therefore, defining utilization rates for specific regimes in isolation can give the wrong impression that overall utilization is low, even though GSP might be used a lot more if the ATPA did not exist. This is why we define utilization rates by identifying one regime as the most beneficial regime.[17] While we take into consideration all preferential imports under all regimes, in order to summarize overall utilization "by regime", we subsume all imports under the "best regime". PTA's are considered more beneficial than GSP, and special GSP-type schemes (e.g. APTA) are considered more beneficial than GSP.[18] Of course, this may not always be true for each single product. We address this by taking into account the additional utilization under alternative regimes. For example, the utilization rate of the Andean Trade Preference Act (ATPA) is the ratio of *all* preferential imports from ATPA beneficiaries under ATPA or GSP over all eligible imports under ATPA or GSP. This results in an overall utilization rate of 90% (87% + 3%).[19] The margin $t_k - p_{k,x} = m_{k,x}$ is defined as the difference between the MFN rate and the lowest preferential rate applicable to that country, which can sometimes be the rate for a regime other than the "best regime".

4 Data sources and descriptive statistics

Data sources

Our data covers 2008 import data by tariff regime for the EU, US, Australia and Canada. For the EU and US, we use public data available through Eurostat and USITC, respectively. We use monthly data by EU member state or US customs district to create a separate subset of the data that is close to transaction-level data, as we explain in detail in the appendix. The more aggregated version that we use in our first set of regressions is at exporter-HS8 level. For Australia and Canada, we use new data

[17] In the case of the US, the import data shows us which regime was actually used and usually the more beneficial regime is used a lot more than other regimes. In the case of the EU, no information is available on the actual regime used.

[18] The most beneficial regimes are defined as follows:
Australia & Canada: FTAs and special GSP regimes (e.g. for Caribbean countries) are considered more beneficial than standard GSP regimes.
EU: FTA's (incl. customs unions and EPA's with ACP countries) are considered more beneficial than any other regime. GSP+ and GSP for LDC's are more beneficial than the GSP.
US: FTA's are considered more beneficial than any other regime. AGOA, ATPA and CBI are more beneficial than the GSP scheme. CBTPA is more beneficial than CBI. Within the GSP scheme, a distinction is made between LDC's and other countries.

[19] Some papers try to assess preference utilization for specific preference schemes. One example is Hakobyan (2010). The author investigates underutilization of the US GSP and controls for the existence of other preferential schemes. We believe that directly taking into consideration all available schemes is the preferable approach, especially if the data is as easily available as for the case of the US.

that the WTO Secretariat obtained directly from Australia and Canada.[20] To our knowledge, this data has not yet been used in any academic publication. The data is annual and thus does not allow us to create a dataset that resembles transaction-level imports.

Other authors (e.g. Hakobyan 2010) use panel data. Although we have several years of data for Canada and two years for Australia, we have so far only used one year of data. The main reason is that tariffs do not vary much between years, but adding years nevertheless requires significant manual coding of tariff schedules. We do however use the panel dimension of the monthly EU and US data.

Overall share of preference-eligible imports

We first provide summary statistics of imports by importing country and type of import flow. As explained above, all imports can be divided in four different groups: Imports under zero MFN tariffs, imports under a positive MFN rate and no preference eligibility, imports subject to a positive MFN rate where a preference exists and is not used and lastly imports that enter under a preference (A, B, C & D as defined above in Figure 1). Table 1 shows that 48-63% of import flows in the four countries that we consider enter under zero MFN rates. By definition, preferences cannot be used for such imports. A sizable share of imports – 20-33%, except for Canada with only 8% - enters under positive MFN rates and is not eligible for any preference. These can either be imports from countries that are not eligible for preferences (such as all trade flows between the EU and US), or imports from countries that receive preferences, but for which these particular products are excluded. The import flows that we are interested in – those eligible for a preference (C & D) account for only between 14% (Australia) and 29% (Canada) of all imports. These numbers may appear surprisingly low; however they are in line with global shares of preferential trade flows.[21] From C & D, we can already calculate the overall utilization rate D/(C+D) = u_{value}, which is 61% in the case of Australia, and very high (87-92%) for the other countries.

Aggregates at exporter-product level

The following tables summarize utilization rates, hence ignoring all imports that enter under MFN zero rates or that are not eligible for preferences. We show summary statistics based on u_{value} for different subsets of the data.[22] Table 2 shows utilization rates for different ranges of preferential margins (overall utilization rates are also shown in this and subsequent tables). We find – as we expected – that u increases with the preferential margin m. However, u_{value} is very high even for very low margins, at least in the EU and US. For example, in the US u_{value} reaches 90% for imports with a margin of 1% or less.[23] Table 3 similarly shows utilization rates for different ranges of import values (defined by eligible imports). As expected, utilization rates increase with trade values. It should be kept in mind, however, that this is not transaction-level data. Observations with high trade values are likely to consist of several import transactions. One notable result is that even fairly small import

[20] This data was provided to the WTO Secretariat by governments and will be used to provide summaries of preference usage under the WTO transparency mechanism for PTAs.

[21] Carpenter & Lendle (2010) and WTO (2011) show that only roughly 16% of global trade in 2008 were eligible for preferences, whether such preferences were actually used or not.

[22] As explained above, we can define u in three distinct ways when we aggregate individual observations: u_{value} , u_{duty} and u_{avg}. Results using u_{duty} and u_{avg} can be found in the appendix.

[23] US imports with such a low margin are mainly crude oil imports, with an MFN rate of 5-10 US ct. per barrel (estimated AVE of less than 0.1%) and duty-free access for some preference beneficiaries, e.g. in AGOA countries. These preferences, although providing only a very small margin, are highly utilized.

flows into the US have high utilization rates. For other countries, utilization is markedly lower for small margins. However, one cannot observe any clear "threshold" above which utilization increases markedly, which should be the case if there is a "minimum margin" below which utilization is very low, as claimed previously in the literature. The only exception is Canada: For margins below 1%, *u* is only 17%, but it increases steeply to 75% for margins above 1%.[24]

Table 4 can be interpreted as a combination of the previous two tables. It shows utilization rates by different ranges of duty reduction – which is the product of the preferential margin and the import value. Again, we find that utilization rates increase with the amount of duties that can be saved by using preferences. Strikingly, utilization rates in the US are very high, even if the amount of duty saved is very small (e.g. 70% utilization for duties below USD 10). This suggests that utilization costs for individual transactions might be very small.[25] In other countries, small duties result in fairly low utilization rates. In Canada and the EU, utilization rates only go above 50% when duties reach the range of USD 1,000-10,000. In Australia, even higher duty savings are required for utilization to increase noticeably. As for the margin, from mere visual inspection of these summary tables no specific threshold can be identified above which utilization starts to take off.

The descriptive statistics show that *u* increases with both the margin and the value of eligible imports – but what matters more? Before testing empirically for the key drivers of *u* in the next section, we show in Table 5 simple average utilization rates (u_{avg}) for different combinations of *m* and the import value.[26] A clear pattern can be seen: *u* increases mainly with the import value (as we move to the right), and less so with the margin (as we move down).

We also aggregated import flows by HS Section. Table 6 shows utilization rates for each section. One pattern common to all countries is that utilization rates are fairly high across agricultural products (Sections 1-4). Textiles feature average utilization rates. One may expect that rates are lower for textiles because of stricter ROO, but textiles often benefit from high preferential margins.

Table 7 shows utilization rates for the largest exporters to each country (by eligible imports), while Table 8 aggregates by "best regime". This is basically an aggregation across country groups. Each country gets a "best regime" assigned. For example, the utilization rate of "GSP (plus)" in the case of the EU is based on all preference-eligible exports to the EU from countries for which "GSP (plus)" is – overall – the best regime, even if some exports may enter the EU under another regime (such as the standard GSP). This avoids the problem of overlapping regimes. As we explained before, calculating utilization rates by regime makes no sense in the presence of overlapping regimes. Utilization rates across countries or "best regimes" appear to be fairly uniform. However, some outliers appear, in particular in the case of Australia.[27]

[24] There is no such clear pattern for u_{avg} (see Table 24 in the appendix).

[25] Note that although the data is not at transaction-level, observations with very small import flows or import duties likely consist of a small number of transactions. The fact that utilization rates (at least in the US) can be very high even for small values is even more striking when we take into consideration that these small observations could be an aggregate of even smaller transactions.

[26] These numbers are similar when using u_{value} instead of u_{avg}. The table also looks fairly similar when showing combinations of margin and duties.

[27] Australia's comparatively low overall utilization rate of 61% is mainly driven by low utilization rates from its largest trading partner (in terms of preference-eligible imports). Only 49% of imports from the US enter under a preference. The data shows large import flows that enter under MFN, even though the FTA schedule clearly shows that these products are eligible for a preference. This could simply happen for "normal" reasons – stringent ROO in particular. However, the lower utilization rate compared to other countries suggests that there could be an issue with the data. We could so far not verify what the reason might be. One possible explanation

"Transaction-level" data at exporter-product-month-district/member level (EU & US only)

Table 11 to Table 15 show summary statistics for our transaction-level type of data. In a nutshell, building on simple combinatorics and the assumption that individual transactions are equally likely to occur in any month of the year, we can estimate the expected number of months without trade for given numbers of transactions. Observations in which no trade occurs in several months are likely to be close to individual transactions (see data appendix for details). Table 11 shows that most trade (by value) falls under observations with trade flows during all 12 months. This is not surprising. Heavily imported products in large customs districts (US) or member countries (EU) tend to be imported frequently. However, for many observations we count 6 or less months of trade. In order to identify transaction-type data, we principally prefer to use a 6-months cut-off, although we conduct robustness checks with other cut-offs.[28] The following tables show aggregates for observations that we consider as being close to "transaction-level", i.e. those that fall into the category of 6 months of trade or less. As in previous tables, we aggregate by preference-margin ranges, import value ranges and duty-reduction ranges. The key difference is that *u* now represents a simple average across what we consider to be individual transactions, and import-value ranges are the actual transaction values, not an aggregate across many transactions.[29] Results are similar: *u* tends to be higher the higher the margin, the larger the transaction value and the larger the amount of duties that can be saved when utilizing the preference. However, for the US (less so for the EU) we observe fairly high utilization rates even when margins, values and duties are small. For example, preferences are used in 71% of transactions with a margin of below 1%, in 48% of cases where the import value is below USD 1,000 and – possibly most striking – in 55% of cases where the duty reduction is less than USD 10.

5 Empirical model

The descriptive statistics presented in the previous section show that preference utilization increases with the percentage margin, but also with the import value. Do these stylized facts support the view that small preferences do not matter because the costs of accessing these preferences (e.g. rules of origin or additional paperwork) exceed the benefits – as suggested by previous authors? It is true that on average smaller imports have lower utilization rates, and products with high preferential margins have higher utilization rates. However, on the basis of the highly disaggregated data presented above it appears more appropriate not to make the general assumption that accessing preferences always comes at a cost. Depending on the conditions of the preferential regime and the underlying product, these costs may often be practically zero. There are many items with tariffs well below 1% that show very high utilization rates. One example is EU imports of Swiss luxury watches: Despite an ad-valorem equivalent of 0.02% to 0.08%[30], utilization rates are 94-98%. So either the cost of using the preference is negligible (e.g. filling in one form instead of another), or other benefits are linked to its use. These very high utilization rates for low-value / low-tariff items, in particular in the US, indicate that the

could be that some of these imports (e.g. mining equipment) are eligible for certain duty waivers that we do not observe in the data, while our data records them as normal MFN imports.

[28] Other than the large number of observations that we can preserve by choosing this cut-off, we also note that the likelihood of observing two transactions per month on average instead of one is less than 10 per cent.

[29] The key message of the results presented here remains the same even if our "pseudo" transactions might actually consist of a small number of individual transactions. This would mean that many observations would actually fall into even lower brackets of import-value or duty ranges and *u* would be even higher in these low-value ranges.

[30] The tariff is 0.80€ for those watches, with average unit values of 1000-5000€.

assumption of high "utilization costs" needs further investigation. By the same token, we also frequently observe low utilization rates despite high trade volumes and high margins. Table 10 shows examples of exporter-product combinations with high trade volumes, a margin of at least 10% and low utilization rates (70% or lower), for both the EU and the US. We find – as one may expect – that textile products appear as the main "victims" of low utilization. Examples are garments from Bangladesh (in the case of the EU) and garments from CAFTA members, especially Nicaragua and Guatemala (US). Obviously, rules of origins matter a lot in this sector. Bangladesh, which has duty-free access to the EU market as an LDC and mainly exports garments to that market, has an overall utilization rate of 80% in the EU market. But on certain items, exporters prefer paying MFN duties rather than adapting their production patterns for the sake of fulfilling specific rules of origin.

Overall, these observations suggest that the use of preferences is associated with both variable *and* fixed costs, which are more likely to exceed the tariff benefit when the transaction value is small. Margins, import values and total duty reductions seem to have less of an effect on utilization rates in the US compared to the other preference-providers in our sample. In the US, 70% of all product-country observations for which the duties saved are below 10 USD are still imported under a preferential regime. The respective figures for the other countries are merely 11-23%.

The main aim of the empirical part of this paper is to examine the factors that determine utilization rates, and, in particular, assess the relative importance of the preferential margin and the import value. This would give an indication of whether utilization costs are mainly variable costs (i.e. a percentage share of the export value), or a fixed cost. *Variable costs* could be related to higher input costs. For example, a garment producer may have to source certain inputs from a more expensive supplier (e.g. from the same country or a country that qualifies for cumulation) or has to produce the inputs himself at a higher cost. Such costs are likely to be proportional to the value of exports. *Fixed costs* could occur at different stages of the production process. A necessary change in the production process could raise costs one time (e.g. finding a new input supplier, changing production processes or becoming familiar with ROO requirements). Fixed costs therefore do not necessarily have to be associated with a single transaction, but could apply to a range of transactions of one type of product by one firm exporting to a range of buyers. Similarly, fixed costs could also occur periodically. For example, a certificate of origin (COO) may be issued – at some cost - once per year for all export transactions to a certain destination country. Fixed costs could also be transaction-specific, e.g. if issuance of a COO is required for each shipment.

While the costs of using a preference could thus vary with the export value or consist of fixed costs – or a combination of the two - the benefit is always a variable one. This allows us to test whether the costs are rather variable – as portrayed at least implicitly by previous authors – or fixed. The descriptive statistics shown above suggest that fixed costs matter relatively more. If costs are purely variable costs, the utilization should vary with the preferential margin, but should be independent of the export value (when controlling for the margin). If costs are fixed – whether at the transaction-level, annually or one-off costs in the production process – then utilization should increase with both the value and the margin (or rather with the product of the two, i.e. the dollar amount of the duty that can be saved).

Aggregates at exporter-product level:

We use a simple empirical model to explain the preference utilization rate u at the exporter-product level, before using our more detailed dataset that resembles transaction-level data. Note that all

regressions are done separately for each of the four importers.[31] The main explanatory variables are the preferential margin *m* and the import value (measured by eligible imports (in logs), i.e. the sum of preferential imports and MFN imports that are eligible). We test several variations of the following model:[32]

$$u_{k,x} = \beta_0 + \beta_1 m_{k,x} + \beta_2 \log(elig_{k,x}) + \beta_4 primary_k + \beta_5 agri_k + \gamma_k + \delta_x + \varepsilon_{k,x} \qquad (1)$$

with $u_{k,x} = \frac{pref_{k,x}}{elig_{k,x}}$.

We expect that *u* increases both with the preferential margin *m* and with the import value: Using a preference is costly and traders would only incur these costs if the benefits outweigh the costs. If costs include a fixed element, then a higher trade value – for a given margin - would make it more likely that the duty savings outweigh the costs.[33] If the import value has no influence on *u*, this would be a clear indication that costs are purely of a variable nature. If the margin is significant, this does not necessarily imply that only variable costs are involved. As explained above, we would still expect a positive effect of *m* on *u*, even if costs are purely fixed costs.

Primary is a dummy for a product being a primary product as defined by the WTO.[34] We expect such products to have higher utilization rates because ROO should be easier to fulfil for such items. Similarly, *agri* is a dummy for products of HS chapters 1-24. We capture product-specific effects using product-group dummies γ_k at HS Section, HS2 or HS4 level. These product-specific controls should capture product-specific ROO restrictiveness.[35]

We also use a dummy δ_x for preferential regimes, which is basically an exporter-group dummy. As explained above, we attach one "best" preference regime to each exporter. For countries that are eligible for several regimes, the "best" regime is attached to that country. Therefore, controlling for regimes basically means that we control for groups of countries that are eligible for the same "best" regime. Alternatively, we use exporter-dummies.

We also use combinations of these dummies, e.g. HS-Section – exporter-group dummies. That way we control for the fact that ROOs may vary across both products and regimes.

[31] One could of course combine the four datasets, but our main interest lies in estimating importer-specific determinants of preference-utilization, which makes it more appropriate to use separate estimations.

[32] An alternative specification is to directly measure the effect of the absolute amount of duties that can be saved when fully using preferences ($m_{k,x} * elig_{k,x}$). We have done this as well, and duties have almost always a highly significant positive effect on utilization rates. However, our main specification is preferable to this alternative. Note that using $\ln(m_{k,x} * elig_{k,x}) = \ln(m_{k,x}) + \ln(elig_{k,x})$ in the regression instead of our main specification is in fact quite similar (we use $m_{k,x} + \ln(elig_{k,x})$), but the coefficients for the (logs of) margin and value are assumed to be identical when using $\ln(m_{k,x} * elig_{k,x})$.

[33] As each observation in this dataset can be an aggregate of an unknown number of individual transactions, the effect of the import value *elig* does not directly show the effect of individual transaction sizes. For the standard dataset at exporter-product level, we do not know whether observations with a higher *elig* actually contains transactions with higher values or simply more transactions with similar values than for other products.

[34] We took this idea from Hakobyan (2010). The WTO classifies products into unprocessed, semi-processed and processed products. We consider the unprocessed products as *primary*.

[35] One could instead use a direct measure of ROO restrictiveness, such as the index developed by Estevadeordal et al. (2009). This index is constructed based on an analysis of the text of the ROO annex of individual agreements. We have not yet used this index because data is so far only available for a small subset of the preference regimes that we cover (we did some initial tests for some regimes, and results were ambiguous). In a way, one could also interpret the regime dummies of our regression as an indicator for ROO restrictiveness. After we control for a range of variables that should have an impact on *u* (except for ROO), the main missing variable that should explain the residual is the restrictiveness of rules of origins. In that way, our approach could complement the text-based ROO restrictiveness estimations and be a way to verify the accuracy of such indices.

By definition, *u* ranges from 0 to 1. Therefore, a fractional logit is the appropriate empirical approach (Papke & Woolridge, 1996). For comparison, we also provide OLS results.[36] We ignore all observations for which the preferential margin is unknown, which is the case when either the MFN rate and/or the preferential rate is specific.[37]

Our dataset contains between about 13,000 observations (Canada) and 123,000 observations (EU). Table 9 shows how these observations are distributed across different ranges of *u*. Both *u*=0 and *u*=1 are very common, especially for low-value product-country combinations, for which the data might often represent just one single transaction – in which case the preference was either used or not. The share of observations for which *u* lies somewhere in between 0 and 1 is around 40% in all four importing countries.

"Transaction-level" data at exporter-product-month-district/member level:

In the (pseudo-)transaction-level dataset, *u* is either 0 or 1, therefore a logit model is used.[38] Otherwise the empirical approach remains the same. We run regressions using three different datasets: We use the full dataset, which is basically identical to the dataset used above, except that observations now are much further disaggregated.[39] We then use a subset of this data that is likely to represent transaction-level data, as explained above.

A key advantage of this dataset compared to the aggregated data is that the interpretation of *elig* is easier. We can assume that *elig* represents the actual transaction value and, thus, we can directly estimate the effect of the transaction size on *u*.

We also construct a panel using the monthly information and aggregating the data in a way that is similar to what we have done for the annual data. We aggregate data at exporter-product-month-district/member level, such that *u* can be between 0 and 1 (instead of being binary). We then estimate a fixed effects panel to test for the effect of *elig* on *u* within an exporter-product-district/member combination.[40] By definition, tariffs remain unchanged.[41]

6 Results

Aggregates at exporter-product level:

Results of the regressions using the standard dataset at exporter-product for each of the four importers are shown in Table 16 and Table 17. GLM results are marginal effects at the mean.[42] In the tables, we show no product and exporter dummies (for comparison) and our preferred specification using dummies at HS Section and country group (or "best regime") level and provide results for both OLS

[36] Like previous authors, we also use tobit, which leads to similar results (not reported). However, tobit is not the ideal approach because *u* is not censored at 0/1, but is *by definition* between 0 and 1.
[37] We use ad-valorem equivalents for the US only. Very little trade (1-4%) of other countries is affected by specific rates.
[38] We also provide OLS results. Probit leads to very similar results.
[39] An observation at exporter-product level could possibly still be split into many observations at exporter-product-month-regime-district/member level.
[40] Alternatively, we look at the effects within an exporter-product combination.
[41] Tariffs may indeed change within a year, but we only use one tariff dataset for any year.
[42] Note that means for *m* are: AUS 4.8%, CAN 5.6%, EU 5.0% and USA 6.5%.

and GLM (fractional logit).[43] Results are as expected. Both *m* and *elig* are positive and significant for all four countries. When controlling for HS Sections and exporter groups, the effect of *m* becomes smaller (except for Australia). Overall, the impact of *m* is smallest in the US, and largest in Australia. This is in line with our summary results in Table 5, which show that average utilization rates in the US tend to be very high for all ranges of preferential margins, while they tend to be lower for small margins in other countries, in particular Australia. While statistically significant, the effect of *m* is very small for Canada, the EU and the US: When using product- and regime fixed effects (column (4)), an increase in the margin by 1 percentage-point increases *u* by only 0.1-0.7 percentage-points (note that margins are fairly limited - in most cases between just over 0% and 20%). The effect of the import value appears to be economically more significant: A doubling of imports increases *u* by between 2 (US) and 6 (EU) percentage-points.[44] The range of import values is very large – from almost zero to above USD 1 billion, so imports at the mean can vary a lot more than *m*. These results are in line with our summary statistics in Table 5 – utilization increases with trade value for all countries, but the effect appears less strong in the US compared to other countries. Similarly, we can compare the effect of a one standard deviation increase of either *m* or *log(elig)*. This is shown in Figure 2. While the effect is almost identical in the case of Australia, the effect of an increase in *m* is very small compared to the effect of an increase in the import value for the other countries. Figure 3 shows marginal effects of *m* for different levels of *elig*, and vice versa. This confirms that *u* is determined mainly by *elig*, and not by *m*. It can clearly be seen that the marginal effect of *m* can be either positive or negative (except for Australia), while the marginal effect of *elig* is always positive for any level of *m* and does not change much with the level of *m*.

As a robustness check, we clustered standard errors at different levels of product categories (HS Section, HS2, HS4, HS6 or HS8) to account for possible correlations among similar products at various levels. The results for *elig* remain significant for all importers. However, for the EU and US, the margin becomes insignificant in some specifications, or remains significant only at the 10% level. This is further evidence that the margin alone does not have a large impact on utilization.

<u>"Transaction-level" data at exporter-product-month-district/member level:</u>

Table 18 (EU) and Table 19 (US) show results for OLS and logit regression using the more detailed dataset by month and district/member. Upper tables show results using the complete dataset, while lower tables show results using a subset of the data that is even closer to transaction-level data. Logit results are marginal effects at the mean.

For the EU, results for the effect of import value are largely similar to our findings using aggregated data. A doubling of import value increases *u* by around 6 percentage-points. However, the effect of the preferential margin *m* is ambiguous: As long as we do not control for product- or regime-specific effects (columns (1) and (5)), a higher margin leads to a higher utilization rate – as one may expect. However, using controls for products and regimes (columns (2) and (4)), the coefficient for *m* becomes slightly negative (full sample) or insignificant (6-months sample). This result, although it disappears in some alternative specifications, suggests that utilization of EU preferences is not driven

[43] For all four importing countries, these results are qualitatively (and in most cases also quantitatively) very similar when using tobit, HS2 / HS4 dummies, or country dummies instead of country group ("best regime") dummies. We also used product-exporter dummies (such as HS-Section – exporter-group dummies) as a robustness check. This leaves results for *elig* virtually unchanged, but reduces the coefficient for *m* even further (except for the US). Taking out small trade flows below USD 100 (for CAN and EU), which may be subject to different RoO, changes results slightly. The coefficient for m is somewhat higher.

[44] Using the results in column (4) and multiplying them by ln(2)=0.69.

by the margin. Although our summary statistics (see Table 12 and Table 13) suggest that *u* increases with *m*, preference utilization seems to be more driven by the import value. This result suggests that fixed-cost elements are more important for the use of preferences than variable costs.

Results for the US are qualitatively similar to what we found using the aggregated dataset. These results hold for a variety of subsets of the transaction level type of data[45] and when country rather than country group dummies or HS2 rather than HS4 product dummies are employed.

Similar to the results using the aggregated data, an increase in the preference margin by 1 percentage-point increases *u* by only 0.1-0.2 percentage-points, while a doubling in the transaction value increases *u* by 4-6 percentage-points. Marginal effects (not shown) also confirm what we saw for aggregated data: The value always has a positive effect on *u* for any level of *m*. The effect of *m* is ambiguous.[46]

As a further robustness check, panel results confirm the importance of the trade value for utilization. Using a fixed-effects panel regression, we find that *elig* is positive and significant (results are not shown). This result holds for different subsets of the data with different numbers of months featuring no trade (i.e. moving "closer" to transaction level). A doubling of the import value increases utilization by around 3 (EU) and 1.5 (US) percentage-points.

These results confirm our presumption that using preferences entails fixed costs. We cannot make a similarly strong conclusion on the presence or absence of variable costs, because the margin should have a significant effect on utilization even in the presence of fixed costs only. However, the fact that the effect of *m* on *u* is less robust and less significant in terms of its economic importance is a strong indication that fixed costs matter more.

Is there a threshold cost value for the use of preferences?

Having found that utilization is mainly driven by the trade value (or the absolute amount of duties that can be saved), we must ask whether there is a threshold value above which utilization becomes much more likely. Any such threshold certainly is not a definite or "unique" value – for a range of observations we find preference utilization even for very small margins, trade values and amounts of duty; only the average utilization rates across such observations are lower. Already from the summary statistics it has been clear that no obvious "structural break" exists in the data, whether utilization for different ranges of the margin, value or duty is considered.

The picture becomes even clearer when we analyse average utilization rates for all percentiles of values or duties, as is shown in Figure 4 and Figure 6 (for the aggregate dataset) and Figure 5 and Figure 7 (for "pseudo-transaction" data). While there is a clear positive and almost linear relationship between duty and *u* (with different impact across importers), it is not possible to identify a breakpoint at which utilization suddenly increases. If one assumes that utilizing a preference for an individual transaction (or a range of transactions) entails a fixed cost *f*, then one should observe no utilization for

[45] We also use a threshold of 11 months instead of 6 months, or a threshold at exporter-product-month-district-regime level rather than exporter-product-month-district level. Results (not shown) are very similar for both EU and US. As a further robustness check, we also used combinations of HS-Section and country group dummies. Similar to the aggregated data, this has almost no effect on *elig*, but the coefficient for the margin becomes significantly smaller in the EU and just slightly larger in the US.

[46] We also clustered standard errors at different levels of product categories (HS Section, HS2, HS4, HS6 or HS8). We get similar results for EU and US: The coefficient for *elig* remains always significant at the 1% level. However, *m* becomes insignificant in some specifications, especially when we do not use product and exporter dummies.

observations with duty savings below *f*, and full utilization above. This is not the case. However, if fixed costs were in some way distributed across a range of possible fixed costs between f_1 *and* f_2, then we would observe that *u* is low [high] and independent of the duty for values below f_1 [above f_2]. When the duty is within that range, then *u* should increase with the duty.

A first simple test whether this is the case is to use the alternative specification of our main regression (1), in which we test directly for the effect of the absolute amount of duties that can be saved (*m*elig*) on utilization *u*, and to do that separately for small, medium and large duty values:

$$u_{k,x} = \beta_0 + \beta_3 log(m_{k,x} * elig_{k,x}) + \beta_4 primary_k + \beta_5 agri_k + \gamma_k + \delta_x + \varepsilon_{k,x} \qquad (2)$$

We first run regression (2) separately for tertiles of duties.[47] Results are summarized in Figure 8. We can see that the impact of the duty is always positive and significant, but smaller in the first and third tertile (small and large duty values), and larger in the medium one. This result is robust across a range of specifications. In order to estimate f_1 and f_2, we are using a spline regression for which we assume two knots - f_1 and f_2 – and which we estimate using OLS. Estimates for f_1 and f_2 and the slope parameters for β_3 are shown in Table 20.[48] We can see that β_3 is indeed low for small and large values, and higher in between f_1 and f_2. In the case of the US, β_3 is even not significantly different from zero below f_1. The estimates for f_1 range from USD 14 to USD 62 and are thus fairly small. The exception is Australia, where utilization only starts to go up at USD 429. The higher threshold ranges from USD 33,000 to USD 146,000 USD when using aggregated data, but is much lower for the "pseudo transaction-level" data – only USD 1,400 to USD 1,500. These results point again to the importance of using transaction type data in order to address this question, as observations with large duty values are more likely to consist of several transactions and threshold estimates using the aggregate data are therefore probably not reliable. Using the complete detailed dataset (and not only observations with enough zero months to consider the remaining flows as "transactions"), we get very similar estimates for the lower thresholds, but the upper thresholds are around USD 2,600 (EU) to USD 3,100 (US); see columns (5) and (6).

All of these results depend on the exact specification and could vary when using other estimation methods or when making other assumptions regarding the number of knots in the spline regression. Hence, the results presented above should only be seen as a rough indication of the possible cost range. Utilization costs seem to be highest in Australia, which is in line with the fact that overall utilization rates are smaller in Australia than in the other countries. However, it is important to note that the reporting threshold for import values in the Australian data is USD 800 (there is a USD 250 threshold for the US, and none for Canada and EU). With the smallest margin being 1%, the smallest observed duties are USD 8 for Australia – which is higher than for the other countries. With few observations of small duties, the estimated threshold should be higher. This result does not necessarily prove that utilization costs are higher in Australia. Also, the estimates only represent a *range* in which utilization costs may lie in most cases, but we do not know how costs are distributed within and outside that range. This implies as well that utilization may not necessarily be very low for duties below f_1. These caveats are borne out in Figure 9, where the results of the spline regressions are plotted. Utilization in the US is already fairly high for low duty values (below f_1), thus the fact that the estimated threshold in the US is higher than, for example, in the EU does not mean that utilization is more costly in the US.

[47] Using quintiles gives similar results.

[48] b_1 is the estimate for β_3 for duties below f_1, b_2 is the estimate for duties between f_1 and f_2, and b_3 is the estimate for duties above f_2.

7 Conclusions

This paper has shed new light on the utilization of preferences looking at a larger set of products/countries at a higher level of disaggregation. We find that overall preference utilization rates are very high. By value, around 90% of preference-eligible imports in Canada, the EU and the US use available preferences. In Australia this number is lower at only 61%.[49] As far as the determinants of preference utilization are concerned, our analysis confirms that utilization increases with the size of the preferential margin and the export value. However, in contrast to previous findings, we find that even though preferential margins do matter, many imports with small preferential margins feature high utilization rates. By value, at least 80% of preference-eligible imports in both the EU and US with margins of less than 1% enter under preferential regimes. In the US, many low-value imports with low margins still enter under a preference, even when saved duties are less than USD 10. This strongly suggests that utilization costs are often negligible, or may even be negative, i.e. using a preference might entail other benefits in addition to a reduced duty.

Several authors have attempted to estimate a preference margin threshold, below which the cost of utilizing preferences exceeds its benefits. Estimates mostly are around 5%. By contrast, our estimations show that, while percentage tariff savings matter, import values have a more important impact on utilization rates. In Canada, the US and EU, the marginal effects at the mean of a one standard deviation increase in the import value are at least 8-28 times larger compared to a similar increase in the preference margin. This leads us to the conclusion that utilization costs are principally of a fixed cost nature. These fixed costs may arise either on a per transaction basis or periodically (e.g. annually) and are then spread across a number of transactions from a single exporter. In order to corroborate these results we construct pseudo transaction-level data applying simple combinatorics to highly disaggregated data at the exporter-product-month-district/member level for the US and EU. Using this data, we find that the predominance of the import value in explaining preference utilization stands out even more clearly. This result is remarkably stable. We use various samples, model set-ups and estimation techniques which all lead to the same outcome.

We also estimate the size of the fixed costs attached to using preferences. Using our transaction-level dataset, we find these fixed costs to be on the order of USD 14 to USD 1,500. In terms of policy implications, our findings highlight that given the importance of fixed costs small exporters may be at a disadvantage. At the same time, in many cases these costs appear to be negligible suggesting that improvements can be made across the board to further reduce bureaucratic requirements. The importance of fixed rather than variable costs also has the advantage that exporters can organize themselves in order to realize scale economies on their shipments. From a practical point of view, further research is required into the nature of fixed utilization costs as well as possible "side-benefits" of utilizing preferences, such as preferential clearance times, that may not be captured by the margin advantage.

[49] Even though overall preference utilization is generally high, there remain exceptions, in particular in the garment sector. Since we do not observe any exports in cases where preferences cannot be used because rules of origins may be too restrictive and MFN rates may be prohibitive for exporters in beneficiary countries, the problem of “underutilization” could in practice be more severe, despite high utilization rates.

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9 Figures and Tables

Table 1. MFN and preferential imports by importer

Import type	Australia		Canada		EU		USA	
	Imports (USD million)	*%*	*Imports (USD million)*	*%*	*Imports (USD million)*	*%*	*Imports (USD million)*	*%*
All imports	171,725	100.0%	341,169	100.0%	2,013,347	100.0%	1,914,677	100.0%
A - MFN zero	90,080	52.5%	215,299	63.1%	1,267,960	63.0%	912,903	47.7%
B - MFN > 0 / no preference	57,224	33.3%	27,418	8.0%	406,572	20.2%	552,908	28.9%
C - MFN > 0 / preference not used	9,531	5.6%	10,099	3.0%	43,240	2.1%	35,773	1.9%
D - MFN > 0 / preference used	14,891	8.7%	88,352	25.9%	295,575	14.7%	413,092	21.6%
C + D = preference-eligible	24,422	14.2%	98,451	28.9%	338,815	16.8%	448,865	23.4%
u_{value} = D / (C + D)	0.61		0.90		0.87		0.92	

Table 2. Preference utilization by preferential margin

Preferential margin *m*	u_{value}			
	Australia	Canada	EU	USA
All imports	0.61	0.90	0.87	0.92
$0 < m \leq 1.0\,\%$	0.45	0.17	0.83	0.90
$1.0\,\% < m \leq 2.5\,\%$	0.41	0.75	0.82	0.95
$2.5\,\% < m \leq 5.0\,\%$	0.63	0.87	0.85	0.94
$5.0\,\% < m \leq 10.0\,\%$	0.73	0.94	0.93	0.95
$10.0\,\% < m \leq 15.0\,\%$	.	0.96	0.90	0.91
$15.0\,\% < m \leq 20.0\,\%$	0.96	0.85	0.95	0.87
$20.0\,\% < m \leq 30.0\,\%$	.	1.00	0.99	0.98
$30.0\,\% < m \leq 50.0\,\%$	.	.	0.97	0.91
$50.0\,\% < m \leq 100.0\,\%$	.	.	0.93	0.99
$m > 100.0\,\%$	.	.	.	1.00
m = ? (specific rates)	0.77	0.94	0.89	0.92

Table 3. Preference utilization by import value range

Eligible imports (*elig*, USD)	u_{value}			
	Australia	Canada	EU	USA
All imports	0.61	0.90	0.87	0.92
0 < *elig* ≤ 10	.	0.12	0.12	.
10 < *elig* ≤ 100	.	0.13	0.13	.
100 < *elig* ≤ 1,000	0.29	0.20	0.18	0.49
1,000 < *elig* ≤ 10,000	0.31	0.32	0.31	0.62
10,000 < *elig* ≤ 100,000	0.41	0.52	0.51	0.73
100,000 < *elig* ≤ 1M	0.48	0.68	0.70	0.82
1M < *elig* ≤ 10M	0.56	0.82	0.81	0.88
10M < *elig* ≤ 100M	0.60	0.88	0.87	0.90
100M < *elig* ≤ 1B	0.61	0.93	0.89	0.91
elig > 1B	1.00	0.92	0.94	0.93

Note: Small import flows do not appear in AUS and USA data, which is likely because of reporting thresholds.

Table 4. Preference utilization by absolute duty reduction

Duty reduction (*duty*, USD)	u_{value}			
	Australia	Canada	EU	USA
All imports	0.61	0.90	0.87	0.92
0 < duty ≤ 10	0.23	0.16	0.11	0.70
10 < duty ≤ 100	0.24	0.24	0.17	0.70
100 < duty ≤ 1,000	0.30	0.38	0.35	0.75
1,000 < duty ≤ 10,000	0.36	0.55	0.56	0.79
10,000 < duty ≤ 100,000	0.48	0.70	0.74	0.79
100,000 < duty ≤ 1M	0.59	0.81	0.84	0.87
1M < duty ≤ 10M	0.60	0.86	0.89	0.91
10M < duty ≤ 100M	0.81	0.97	0.90	0.92
100M < duty ≤ 1B	.	0.97	0.93	1.00
duty > 1B	.	.	.	1.00

Note: “Duty reduction” is the difference between MFN duties that would be applicable in the absence of a preference and the duties to be paid when preferences are fully used.

Table 5. Preference utilization by preferential margin and import value range

Australia	All imports	0 < *elig* ≤ 10	10 < *elig* ≤ 100	100 < *elig* ≤ 1,000	1,000 < *elig* ≤ 10,000	10,000 < *elig* ≤ 100,000	100,000 < *elig* ≤ 1M	1M < *elig* ≤ 10M	10M < *elig* ≤ 100M	100M < *elig* ≤ 1B	*elig* > 1B
All imports	0.42			0.29	0.30	0.40	0.48	0.55	0.58	0.59	1.00
0 < *m* ≤ 1.0 %	0.28			0.23	0.22	0.28	0.31	0.34	0.48	0.63	
1.0 % < *m* ≤ 2.5 %	0.32			0.35	0.28	0.28	0.37	0.45	0.35		
2.5 % < *m* ≤ 5.0 %	0.46			0.27	0.30	0.42	0.52	0.61	0.61	0.54	1.00
5.0 % < *m* ≤ 10.0 %	0.44			0.27	0.34	0.44	0.49	0.59	0.57	1.00	
10.0 % < *m* ≤ 15.0 %											
15.0 % < *m* ≤ 20.0 %	0.69			0.52	0.47	0.76	0.91	0.98			

Canada	All imports	0 < *elig* ≤ 10	10 < *elig* ≤ 100	100 < *elig* ≤ 1,000	1,000 < *elig* ≤ 10,000	10,000 < *elig* ≤ 100,000	100,000 < *elig* ≤ 1M	1M < *elig* ≤ 10M	10M < *elig* ≤ 100M	100M < *elig* ≤ 1B	*elig* > 1B
All imports	0.39	0.12	0.13	0.18	0.30	0.48	0.64	0.79	0.87	0.91	0.82
0 < *m* ≤ 1.0 %	0.32	0.04	0.08	0.24	0.28	0.39	0.55	0.59	0.62	-	0.01
1.0 % < *m* ≤ 2.5 %	0.29	0.07	0.10	0.15	0.23	0.36	0.48	0.66	0.74	0.80	
2.5 % < *m* ≤ 5.0 %	0.37	0.12	0.15	0.19	0.28	0.47	0.60	0.76	0.86	0.87	0.99
5.0 % < *m* ≤ 10.0 %	0.45	0.15	0.13	0.17	0.32	0.52	0.72	0.85	0.91	0.94	0.98
10.0 % < *m* ≤ 15.0 %	0.61	0.17	0.15	0.29	0.55	0.74	0.87	0.94	0.92	0.98	
15.0 % < *m* ≤ 20.0 %	0.44	0.17	0.12	0.19	0.38	0.61	0.75	0.84	0.86		
20.0 % < *m* ≤ 30.0 %	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	

EU	All imports	0 < *elig* ≤ 10	10 < *elig* ≤ 100	100 < *elig* ≤ 1,000	1,000 < *elig* ≤ 10,000	10,000 < *elig* ≤ 100,000	100,000 < *elig* ≤ 1M	1M < *elig* ≤ 10M	10M < *elig* ≤ 100M	100M < *elig* ≤ 1B	*elig* > 1B
All imports	0.46	0.11	0.12	0.15	0.27	0.46	0.66	0.80	0.87	0.89	0.94
0 < *m* ≤ 1.0 %	0.54	-	0.06	0.15	0.23	0.59	0.76	0.84	0.81	0.81	0.98
1.0 % < *m* ≤ 2.5 %	0.35	0.08	0.08	0.09	0.16	0.33	0.53	0.68	0.79	0.91	0.94
2.5 % < *m* ≤ 5.0 %	0.41	0.12	0.11	0.13	0.22	0.40	0.62	0.78	0.86	0.85	0.90
5.0 % < *m* ≤ 10.0 %	0.58	0.11	0.19	0.26	0.39	0.58	0.77	0.89	0.93	0.93	0.97
10.0 % < *m* ≤ 15.0 %	0.62	0.10	0.10	0.20	0.49	0.70	0.84	0.88	0.90	0.90	0.96
15.0 % < *m* ≤ 20.0 %	0.73	0.40	0.26	0.31	0.66	0.78	0.88	0.94	0.96	0.99	0.94
20.0 % < *m* ≤ 30.0 %	0.80	-	0.43	0.42	0.66	0.79	0.82	0.98	0.99	1.00	
30.0 % < *m* ≤ 50.0 %	0.77	1.00	0.25	0.24	0.80	1.00	0.89	0.99			
50.0 % < *m* ≤ 100.0 %	0.25	-	-	-	0.14	0.44	0.89	0.66	1.00		

USA	All imports	0 < *elig* ≤ 10	10 < *elig* ≤ 100	100 < *elig* ≤ 1,000	1,000 < *elig* ≤ 10,000	10,000 < *elig* ≤ 100,000	100,000 < *elig* ≤ 1M	1M < *elig* ≤ 10M	10M < *elig* ≤ 100M	100M < *elig* ≤ 1B	*elig* > 1B
All imports	0.73			0.49	0.61	0.71	0.80	0.87	0.90	0.91	0.95
0 < *m* ≤ 1.0 %	0.79			0.44	0.72	0.80	0.84	0.85	0.83	0.85	0.93
1.0 % < *m* ≤ 2.5 %	0.69			0.46	0.57	0.65	0.75	0.83	0.89	0.89	0.97
2.5 % < *m* ≤ 5.0 %	0.71			0.51	0.59	0.68	0.78	0.87	0.92	0.95	0.96
5.0 % < *m* ≤ 10.0 %	0.75			0.49	0.65	0.75	0.84	0.91	0.91	0.98	0.99
10.0 % < *m* ≤ 15.0 %	0.75			0.49	0.63	0.79	0.88	0.92	0.91	1.00	
15.0 % < *m* ≤ 20.0 %	0.69			0.42	0.50	0.70	0.78	0.84	0.91	0.83	0.99
20.0 % < *m* ≤ 30.0 %	0.75			0.43	0.62	0.76	0.82	0.86	0.91	1.00	1.00
30.0 % < *m* ≤ 50.0 %	0.78			0.59	0.56	0.76	0.90	0.92	0.89	0.93	
50.0 % < *m* ≤ 100.0 %	0.81			0.67	0.78	0.82	0.91	1.00			
m > 100.0 %	0.93				0.50	1.00	1.00	1.00	1.00		

Note: Blank fields indicate that no such combination exists in the data. Small import flows do not appear in AUS and USA data, which is likely because of reporting thresholds.

Table 6. Preference utilization by product group

HS Section	u_{value}			
	Australia	Canada	EU	USA
All imports	0.61	0.90	0.87	0.92
01' - Animal products	1.00	0.99	0.88	1.00
02' - Vegetable products	0.96	0.97	0.89	0.99
03' - Fats and oils	0.85	0.92	0.96	0.98
04' - Prep. food, bev., tob.	0.90	0.96	0.91	0.97
05' - Mineral products	0.46	0.92	0.80	0.89
06' - Chemical products	0.56	0.91	0.85	0.94
07' - Plastics and rubber	0.61	0.94	0.93	0.98
08' - Leather	0.43	0.75	0.91	0.94
09' - Wood and articles of wood	0.90	0.88	0.91	0.97
10' - Paper	0.80	.	.	.
11' - Textiles	0.73	0.88	0.85	0.86
12' - Footwear	0.55	0.71	0.90	0.93
13' - Stone, cement	0.59	0.91	0.92	0.96
14' - Precious stones, jewellery	0.81	0.68	0.85	0.92
15' - Base metals	0.52	0.89	0.95	0.97
16' - Machinery	0.43	0.85	0.83	0.91
17' - Transport equipment	0.72	0.91	0.91	0.97
18' - Optical and other apparatus	0.38	0.71	0.82	0.77
19' - Arms and ammunition	0.66	0.88	0.88	0.93
20' - Miscellaneous articles	0.62	0.82	0.86	0.93
21' - Works of art	.	0.81	.	.

Note: All products of HS Section 10 (21) have zero MFN duties except in Australia (Canada).

Table 7. Preference utilization by exporter

Australia		Canada		EU		USA	
Exporter	u_{value}	*Exporter*	u_{value}	*Exporter*	u_{value}	*Exporter*	u_{value}
Total	0.61	Total	0.90	Total	0.87	Total	0.92
USA	0.49	CHN	0.73	CHE	0.94	CAN	0.91
THA	0.80	MEX	0.96	TUR	0.95	MEX	0.97
NZL	0.97	KOR	0.22	IND	0.84	NGA	0.95
CHN	0.56	BRA	0.73	NOR	0.93	AGO	0.96
SGP	0.25	BGD	0.91	THA	0.66	COL	0.94
KOR	0.08	THA	0.68	ZAF	0.90	ECU	0.87
MYS	0.69	IND	0.64	MAR	0.95	AUS	0.84
TWN	0.04	MYS	0.67	TUN	0.95	COG	0.53
CAN	0.46	CHL	0.90	BRA	0.80	CHL	0.98
BRA	0.84	KHM	0.80	ISR	0.91	PER	0.90
IND	0.46	IDN	0.61	VNM	0.69	ZAF	0.95
FJI	0.97	ISR	0.80	BGD	0.80	IND	0.85
HKG	0.28	AUS	0.65	MEX	0.76	THA	0.83
VNM	0.56	TTO	0.92	MYS	0.63	TTO	0.70
ARG	0.84	PHL	0.50	IDN	0.74	GNQ	0.84
BHR	0.79	HKG	0.50	SAU	0.91	TCD	0.94
ISR	0.21	NZL	0.96	RUS	0.58	HND	0.92
WSM	0.99	GTM	0.98	EGY	0.91	ISR	0.91
MEX	0.40	PER	0.93	PAK	0.91	BRA	0.89
SWZ	1.00	ARG	0.85	CHN	0.63	GTM	0.71
TUR	0.65	SGP	0.19	HRV	0.92	GAB	0.99
ARE	0.47	PAK	0.78	CHL	0.88	IDN	0.81
BGD	0.91	RUS	0.45	UKR	0.85	DOM	0.92
CHL	0.91	DOM	0.04	ISL	0.98	SLV	0.88
PHL	0.72	CRI	0.44	ARE	0.69	CRI	0.89

Note: The table shows the 25 largest exporters (by preference-eligible exports) for each importer.

Table 8. Preference utilization by best regime

Australia		Canada		EU		USA	
Best regime	u_{value}	Best regime	u_{value}	Best regime	u_{value}	Best regime	u_{value}
Total	**0.61**	**Total**	**0.90**	**Total**	**0.87**	**Total**	**0.92**
FTA USA	0.49	NAFTA (USA)	0.94	FTA CHE	0.94	NAFTA (CAN)	0.91
FTA THA	0.80	NAFTA (MEX)	0.96	FTA TUR	0.95	NAFTA (MEX)	0.97
FTA NZL	0.97	FTA Chile	0.90	FTA EEA (ISL, LIE, NOR)	0.94	FTA DR_CAFTA	0.82
FTA SGP	0.25	FTA ISR	0.80	FTA ZAF	0.90	FTA AUS	0.84
FTA MYS	0.69	FTA AUS	0.65	ACP (EPA)	0.94	FTA CHL	0.98
FTA CAN	0.46	FTA NZL	0.96	FTA MAR	0.95	FTA ISR	0.91
GSP (general)	0.58	FTA CRI	0.44	FTA TUN	0.95	FTA JOR	0.99
GSP (HKG, KOR, TWN)	0.08	GSP (general)	0.66	FTA ISR	0.91	FTA SGP	0.60
Pacific preferences	0.94	GSP (LDC)	0.86	FTA MEX	0.76	FTA BHR	0.99
GSP (LDC)	0.70	GSP (Caribbean)	0.89	FTA Balkan	0.92	FTA MAR	0.73
				FTA EGY	0.91	GSP (AGOA)	0.92
				FTA HRV	0.92	GSP (Andean)	0.90
				FTA CHL	0.88	GSP (general)	0.86
				FTA DZA	0.81	GSP (CBI & CBTPA)	0.81
				FTA MKD	0.94	GSP (PAL)	0.91
				FTA FRO	0.98	GSP (Micronesia)	1.00
				FTA SYR	0.92		
				FTA LBN	0.84		
				FTA JOR	0.72		
				FTA AND	0.87		
				FTA PSE	0.70		
				GSP (general)	0.77		
				GSP (plus)	0.88		
				GSP (LDC / non-ACP)	0.80		
				GSP (LDC / ACP)	0.87		
				GSP (OCT)	0.89		
				GSP (non-LDC / ACP)	0.86		

Note: Reciprocal regimes are shown first, followed by non-reciprocal regimes. Regimes are then sorted by eligible imports. EU: The GSP LDC regime is shown separately for different country groups (ACPs / non-ACPs). Those ACP countries that receive EPA preferences are shown separately under "ACP (EPA)". "GSP (general)" and "GSP (non-LDC / ACP)" are basically the same preferences since the expiration of Cotonou preferences at the end of 2007.

Table 9. Number of observations for regressions by importer and ranges of *u*

Observations by *u* ranges	Australia		Canada		EU		USA	
	observations		*observations*		*observations*		*observations*	
All imports	13,040	100.0%	31,686	100.0%	122,747	100.0%	34,049	100.0%
$u = 0$	5,062	38.8%	15,015	47.4%	52,651	42.9%	5,874	17.3%
$0 < u < 0.25$	1,419	10.9%	2,095	6.6%	6,646	5.4%	1,371	4.0%
$0.25 \leq u < 0.50$	1,005	7.7%	1,593	5.0%	5,134	4.2%	1,325	3.9%
$0.50 \leq u < 0.75$	1,084	8.3%	2,385	7.5%	7,189	5.9%	2,067	6.1%
$0.75 \leq u < 1$	2,252	17.3%	7,131	22.5%	29,406	24.0%	8,507	25.0%
$u = 1$	2,218	17.0%	3,467	10.9%	21,721	17.7%	14,905	43.8%

Table 10. High-value imports with low utilization rates (EU and US)

Importer	HS Section	HS8	Exporter	MFN rate	Preferential rate	Best regime	Eligible imports (USD million)	*u*
EU	11' - Textiles	62034235	BGD	12.0%	free	GSP (LDC / non-ACP)	390.0	0.62
EU	11' - Textiles	62034231	BGD	12.0%	free	GSP (LDC / non-ACP)	328.0	0.54
EU	11' - Textiles	62052000	BGD	12.0%	free	GSP (LDC / non-ACP)	287.0	0.27
EU	02' - Vegetable products	8081080	CHL	specific	specific	FTA CHL	283.0	0.27
EU	02' - Vegetable products	10062098	IND	specific	free	GSP (general)	261.0	0.49
EU	11' - Textiles	62046239	BGD	12.0%	free	GSP (LDC / non-ACP)	246.0	0.39
EU	11' - Textiles	61091000	MAR	12.0%	free	FTA MAR	199.0	0.65
EU	11' - Textiles	62046231	BGD	12.0%	free	GSP (LDC / non-ACP)	125.0	0.51
EU	11' - Textiles	62053000	BGD	12.0%	free	GSP (LDC / non-ACP)	109.0	0.21
EU	02' - Vegetable products	10062098	PAK	specific	free	GSP (general)	101.0	0.21
USA	11' - Textiles	61102020	GTM	16.5%	free	FTA DR_CAFTA	496.0	0.50
USA	11' - Textiles	61102020	NIC	16.5%	free	FTA DR_CAFTA	277.0	0.34
USA	11' - Textiles	61091000	GTM	16.5%	free	FTA DR_CAFTA	154.0	0.63
USA	11' - Textiles	62034240	NIC	16.6%	free	FTA DR_CAFTA	141.0	0.38
USA	11' - Textiles	61091000	NIC	16.5%	free	FTA DR_CAFTA	136.0	0.52
USA	11' - Textiles	62046240	NIC	16.6%	free	FTA DR_CAFTA	76.4	0.22
USA	11' - Textiles	61046220	MEX	14.9%	free	NAFTA (MEX)	45.4	0.54
USA	11' - Textiles	61103030	GTM	32.0%	free	FTA DR_CAFTA	45.0	0.65
USA	11' - Textiles	61046220	GTM	14.9%	free	FTA DR_CAFTA	37.0	0.38
USA	11' - Textiles	61142000	GTM	10.8%	free	FTA DR_CAFTA	34.2	0.09

Note: This table shows for each importer the ten largest imports (measured by preference-eligible imports) at product-country level with preferential margins of at least 10% and a utilization rate below 70%.

Table 11. Overview of data by month & district / member

Number of months with trade	EU				
	observations	*total trade value (USD million)*	*share of trade value*	*avg trade value (USD)*	*avg u*
All imports	2,202,692	338,815	100.0%	153,819	0.60
1	278,443	7,595	2.2%	27,277	0.36
2	187,788	7,053	2.1%	37,559	0.44
3	154,548	5,990	1.8%	38,756	0.50
4	137,744	7,189	2.1%	52,190	0.54
5	130,520	6,839	2.0%	52,395	0.56
6	125,436	8,585	2.5%	68,440	0.60
7	120,918	9,574	2.8%	79,181	0.61
8	121,952	9,092	2.7%	74,556	0.62
9	124,434	12,569	3.7%	101,007	0.65
10	140,690	13,546	4.0%	96,285	0.67
11	178,343	25,150	7.4%	141,022	0.70
12	501,876	225,633	66.6%	449,579	0.76

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Number of months with trade	USA				
	observations	*total trade value (USD million)*	*share of trade value*	*avg trade value (USD)*	*avg u*
All imports	534,119	448,865	100.0%	840,384	0.72
1	60,674	4,821	1.1%	79,453	0.55
2	40,970	6,233	1.4%	152,124	0.62
3	33,996	5,948	1.3%	174,953	0.64
4	31,204	4,477	1.0%	143,463	0.67
5	29,315	4,058	0.9%	138,430	0.70
6	28,188	4,194	0.9%	148,773	0.69
7	28,063	6,671	1.5%	237,707	0.72
8	27,656	6,834	1.5%	247,121	0.72
9	28,935	7,970	1.8%	275,433	0.75
10	31,970	13,589	3.0%	425,067	0.76
11	40,436	13,214	2.9%	326,799	0.78
12	152,712	370,857	82.6%	2,428,476	0.84

Table 12. Preference utilization by preferential margin – detailed data by month and district / member

Preferential margin *m*	EU		USA	
	observations	u_{avg}	*observations*	u_{avg}
All imports	1,014,479	0.48	224,347	0.63
$0 < m \leq 1.0\,\%$	5,355	0.55	10,450	0.71
$1.0\,\% < m \leq 2.5\,\%$	247,790	0.39	32,118	0.59
$2.5\,\% < m \leq 5.0\,\%$	424,766	0.44	85,116	0.62
$5.0\,\% < m \leq 10.0\,\%$	182,313	0.57	57,481	0.66
$10.0\,\% < m \leq 15.0\,\%$	106,505	0.55	14,794	0.68
$15.0\,\% < m \leq 20.0\,\%$	8,885	0.71	14,245	0.57
$20.0\,\% < m \leq 30.0\,\%$	2,302	0.77	6,633	0.62
$30.0\,\% < m \leq 50.0\,\%$	144	0.80	2,664	0.61
$50.0\,\% < m \leq 100.0\,\%$	238	0.45	53	0.79
$m > 100.0\,\%$	.	.	39	0.92
$m = ?$ (specific rates)	36,181	0.64	754	0.44

Table 13. Preference utilization by import value range – detailed data by month and district / member

Eligible imports (*elig*, USD)	EU		USA	
	observations	u_{avg}	*observations*	u_{avg}
All imports	1,014,479	0.48	224,347	0.63
$0 < elig \leq 10$	13,153	0.20	.	.
$10 < elig \leq 100$	85,014	0.23	.	.
$100 < elig \leq 1{,}000$	210,695	0.33	30,887	0.48
$1{,}000 < elig \leq 10{,}000$	396,669	0.47	104,658	0.59
$10{,}000 < elig \leq 100{,}000$	259,507	0.64	73,442	0.71
$100{,}000 < elig \leq 1M$	44,767	0.72	13,287	0.77
$1M < elig \leq 10M$	4,201	0.79	1,509	0.80
$10M < elig \leq 100M$	468	0.82	539	0.73
$100M < elig \leq 1B$	5	1.00	25	0.60
$elig > 1B$	.	.	.	.

Table 14. Preference utilization by absolute duty reduction – detailed data by month and district / member

Duty reduction (*duty*, USD)	EU		USA	
	observations	u_{avg}	*observations*	u_{avg}
All imports	978,298	0.48	223,593	0.63
$0 < duty \leq 10$	173,215	0.24	3,781	0.55
$10 < duty \leq 100$	287,257	0.37	54,092	0.53
$100 < duty \leq 1{,}000$	342,627	0.55	110,086	0.62
$1{,}000 < duty \leq 10{,}000$	152,627	0.69	46,497	0.74
$10{,}000 < duty \leq 100{,}000$	20,453	0.78	8,285	0.79
$100{,}000 < duty \leq 1M$	1,951	0.83	804	0.85
$1M < duty \leq 10M$	168	0.84	46	0.96
$10M < duty \leq 100M$	.	.	2	1.00
$100M < duty \leq 1B$	.	.	.	.
$duty > 1B$	.	.	.	.

Note: Items with specific duties not shown.

Table 15. Preference utilization by product group – detailed data by month and district / member[50]

HS Section	EU		USA	
	observations	u_{avg}	*observations*	u_{avg}
All imports	1,014,479	0.48	224,347	0.63
01' - Animal products	15,485	0.73	1,615	0.86
02' - Vegetable products	33,528	0.65	11,565	0.84
03' - Fats and oils	3,110	0.62	1,148	0.82
04' - Prep. food, bev., tob.	53,142	0.68	15,301	0.85
05' - Mineral products	5,199	0.51	1,385	0.62
06' - Chemical products	51,630	0.57	9,177	0.72
07' - Plastics and rubber	65,218	0.50	22,055	0.59
08' - Leather	27,939	0.45	8,076	0.62
09' - Wood and articles of wood	10,669	0.58	6,683	0.75
10' - Paper	.	.	.	.
11' - Textiles	229,666	0.50	51,063	0.57
12' - Footwear	36,323	0.49	5,239	0.63
13' - Stone, cement	38,934	0.52	10,400	0.73
14' - Precious stones, jewellery	7,720	0.35	4,635	0.70
15' - Base metals	90,343	0.48	19,625	0.64
16' - Machinery	216,051	0.37	32,608	0.49
17' - Transport equipment	31,342	0.40	8,455	0.52
18' - Optical and other apparatus	47,312	0.31	7,864	0.55
19' - Arms and ammunition	1,279	0.63	343	0.67
20' - Miscellaneous articles	49,589	0.44	7,110	0.65
21' - Works of art	.	.	.	.

[50] MFN rates in EU and US are zero for all items of HS Sections 10 and 21.

Table 16. Regression results – aggregated dataset – Australia and Canada

Australia

Dependent variable: *u*	OLS		GLM (marginal effect)	
VARIABLES	(1)	(2)	(3)	(4)
m	2.521***	2.499***	2.662***	3.102***
	(0.0912)	(0.121)	(0.107)	(0.168)
log(elig)	0.0379***	0.0355***	0.0399***	0.0471***
	(0.00135)	(0.00128)	(0.00150)	(0.00176)
agri		0.515***		3.667***
		(0.0733)		(0.158)
primary		0.000327		-0.00262
		(0.0362)		(0.0500)
Constant	-0.125***	-0.0372		
	(0.0164)	(0.0666)		
Observations	13,040	13,040	13,040	13,040
R-squared	0.097	0.366		
Product dummies	none	HS Section	none	HS Section
Exporter dummies	none	groups	none	groups

Canada

Dependent variable: *u*	OLS		GLM (marginal effect)	
VARIABLES	(1)	(2)	(3)	(4)
m	1.115***	0.449***	1.328***	0.660***
	(0.0472)	(0.0687)	(0.0571)	(0.103)
log(elig)	0.0579***	0.0447***	0.0686***	0.0602***
	(0.000451)	(0.000552)	(0.000723)	(0.000833)
agri		0.0548		-0.0161
		(0.0444)		(0.0955)
primary		-0.0441**		-0.0752***
		(0.0217)		(0.0277)
Constant	-0.182***	-0.0873**		
	(0.00510)	(0.0377)		
Observations	31,686	31,686	31,686	31,686
R-squared	0.284	0.396		
Product dummies	none	HS Section	none	HS Section
Exporter dummies	none	groups	none	groups

Robust standard errors in parentheses. Significance level: *** p<0.01, ** p<0.05, * p<0.1

Table 17. Regression results – aggregated dataset – EU and USA

EU

Dependent variable: *u*	OLS		GLM (marginal effect)	
VARIABLES	(1)	(2)	(3)	(4)
m	2.250***	0.214***	3.190***	0.374***
	(0.0445)	(0.0379)	(0.0553)	(0.0605)
log(elig)	0.0674***	0.0583***	0.0871***	0.0860***
	(0.000294)	(0.000309)	(0.000549)	(0.000594)
agri		0.398***		0.499***
		(0.0171)		(0.0225)
primary		-0.0337***		-0.0557***
		(0.0104)		(0.0163)
Constant	-0.343***	-0.242***		
	(0.00372)	(0.0129)		
Observations	122,747	122,747	122,747	122,747
R-squared	0.279	0.409		
Product dummies	none	HS Section	none	HS Section
Exporter dummies	none	groups	none	groups

USA

Dependent variable: *u*	OLS		GLM (marginal effect)	
VARIABLES	(1)	(2)	(3)	(4)
m	0.117***	0.0655***	0.188***	0.146***
	(0.0224)	(0.0246)	(0.0351)	(0.0436)
log(elig)	0.0380***	0.0311***	0.0416***	0.0342***
	(0.000655)	(0.000685)	(0.000783)	(0.000822)
agri		0.124***		0.160***
		(0.0458)		(0.0341)
primary		0.00220		0.00142
		(0.0104)		(0.0158)
Constant	0.298***	0.312***		
	(0.00853)	(0.0455)		
Observations	34,049	34,049	34,049	34,049
R-squared	0.081	0.199		
Product dummies	none	HS Section	none	HS Section
Exporter dummies	none	groups	none	groups

Robust standard errors in parentheses. Significance level: *** p<0.01, ** p<0.05, * p<0.1

Table 18. Regression results – monthly and by member dataset – EU

EU - complete data

Dependent variable: *u*	OLS		logit (marg. effects)	
VARIABLES	(1)	(2)	(3)	(4)
m	1.427***	-0.168***	1.859***	-0.121***
	(0.00884)	(0.0106)	(0.0117)	(0.0144)
log(elig)	0.0664***	0.0645***	0.0758***	0.0826***
	(0.000108)	(0.000105)	(0.000157)	(0.000170)
agri		0.285***		0.288***
		(0.00535)		(0.00624)
primary		-0.0448***		-0.0739***
		(0.00312)		(0.00489)
Constant	-0.0732***	-0.0740***		
	(0.00110)	(0.00496)		
Observations	2,130,302	2,130,302	2,130,302	2,130,302
R-squared	0.144	0.242		
Product dummies	none	HS Section	none	HS Section
Exporter dummies	none	groups	none	groups

EU - observations with 1 to 6 months with trade

Dependent variable: *u*	OLS		logit (marg. effects)	
VARIABLES	(1)	(2)	(3)	(4)
m	1.859***	-0.0551***	2.290***	-0.0239
	(0.0158)	(0.0167)	(0.0189)	(0.0232)
log(elig)	0.0653***	0.0654***	0.0744***	0.0872***
	(0.000197)	(0.000190)	(0.000274)	(0.000310)
agri		0.411***		0.427***
		(0.00855)		(0.0104)
primary		-0.0727***		-0.107***
		(0.00503)		(0.00773)
Constant	-0.0994***	-0.163***		
	(0.00174)	(0.00739)		
Observations	863,016	863,016	863,016	863,016
R-squared	0.119	0.251		
Product dummies	none	HS Section	none	HS Section
Exporter dummies	none	groups	none	groups

Robust standard errors in parentheses. Significance level: *** p<0.01, ** p<0.05, * p<0.1

Table 19. Regression results – monthly and by district dataset – USA

USA - complete data

Dependent variable: *u*	OLS		logit (marg. effects)	
VARIABLES	(1)	(2)	(3)	(4)
m	0.174***	0.0891***	0.239***	0.135***
	(0.00803)	(0.00873)	(0.00989)	(0.0125)
log(elig)	0.0494***	0.0490***	0.0543***	0.0534***
	(0.000253)	(0.000259)	(0.000304)	(0.000313)
agri		0.341***		0.222***
		(0.00800)		(0.0120)
primary		-0.0164***		-0.0246***
		(0.00322)		(0.00606)
Constant	0.218***	-0.0408***		
	(0.00283)	(0.00887)		
Observations	532,522	532,522	532,522	532,511
R-squared	0.061	0.137		
Product dummies	none	HS Section	none	HS Section
Exporter dummies	none	groups	none	groups

USA - observations with 1 to 6 months with trade

Dependent variable: *u*	OLS		logit (marg. effects)	
VARIABLES	(1)	(2)	(3)	(4)
m	0.227***	0.131***	0.325***	0.234***
	(0.0151)	(0.0162)	(0.0178)	(0.0221)
log(elig)	0.0485***	0.0475***	0.0529***	0.0524***
	(0.000570)	(0.000609)	(0.000667)	(0.000730)
agri		0.221***		0.234***
		(0.0276)		(0.0212)
primary		-0.0200***		-0.0189**
		(0.00595)		(0.00964)
Constant	0.240***	0.112***		
	(0.00551)	(0.0274)		
Observations	197,535	197,535	197,535	197,524
R-squared	0.035	0.113		
Product dummies	none	HS Section	none	HS Section
Exporter dummies	none	groups	none	groups

Robust standard errors in parentheses. Significance level: *** p<0.01, ** p<0.05, * p<0.1

Table 20. Regression results – spline regressions using absolute duty savings with two knots

	aggregated data				monthly data (<= 6m)	
Dependent variable: *u*	**Australia**	**Canada**	**EU**	**USA**	**EU**	**USA**
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
f1	6.062***	3.616***	4.021***	4.023***	2.661***	4.134***
	(0.907)	(0.133)	(0.0618)	(0.213)	(0.0358)	(0.0618)
f2	11.89***	11.88***	10.50***	10.03***	7.253***	7.328***
	(0.444)	(0.267)	(0.0822)	(0.289)	(0.0408)	(0.0814)
b1	0.0335***	0.0181***	0.0158***	-0.0137	0.0294***	-0.00366
	(0.00684)	(0.00220)	(0.00171)	(0.00983)	(0.000862)	(0.00333)
b2	0.0496***	0.0763***	0.0943***	0.0474***	0.0913***	0.0707***
	(0.00285)	(0.00118)	(0.000761)	(0.00152)	(0.000511)	(0.00146)
b3	0.000397	0.0251***	0.0295***	0.0179***	0.0329***	0.0158***
	(0.0133)	(0.00600)	(0.00201)	(0.00253)	(0.00131)	(0.00214)
Constant	0.126***	0.131***	0.105***	0.607***	0.234***	0.587***
	(0.0326)	(0.00470)	(0.00454)	(0.0315)	(0.00142)	(0.0112)
Observations	13,040	31,686	122,747	34,049	863,016	197,535
R-squared	0.076	0.299	0.287	0.080	0.124	0.037
e^f1	429	37	56	56	14	62
e^f2	145,801	144,351	36,316	22,697	1,412	1,522

Robust standard errors in parentheses. Significance level: *** p<0.01, ** p<0.05, * p<0.1
f1 and f2 are estimates for the knots and b1, b2 and b3 are the slope parameters.
e^f1 and e^f2 are the estimated thresholds in absolute USD values.

Figure 1. Types of import flows

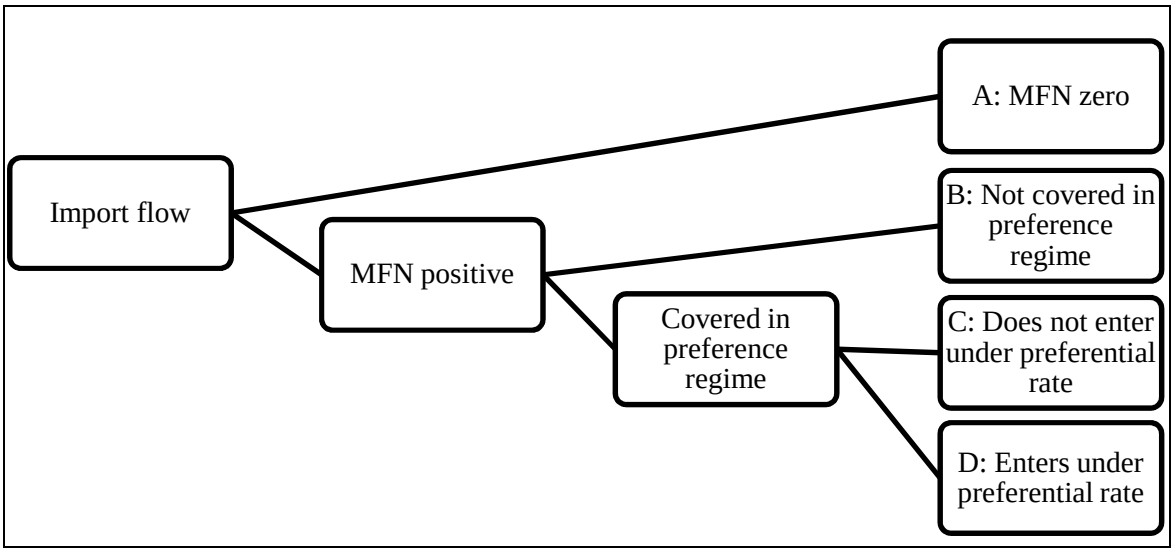


Figure 2: Effect of a one standard deviation increase of *m* or *log(elig)* on *u*.

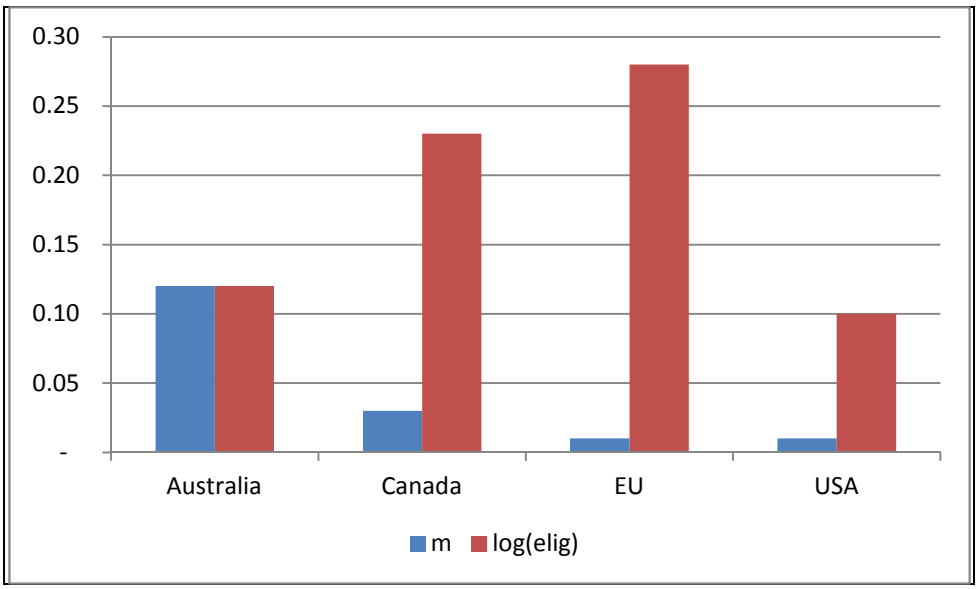
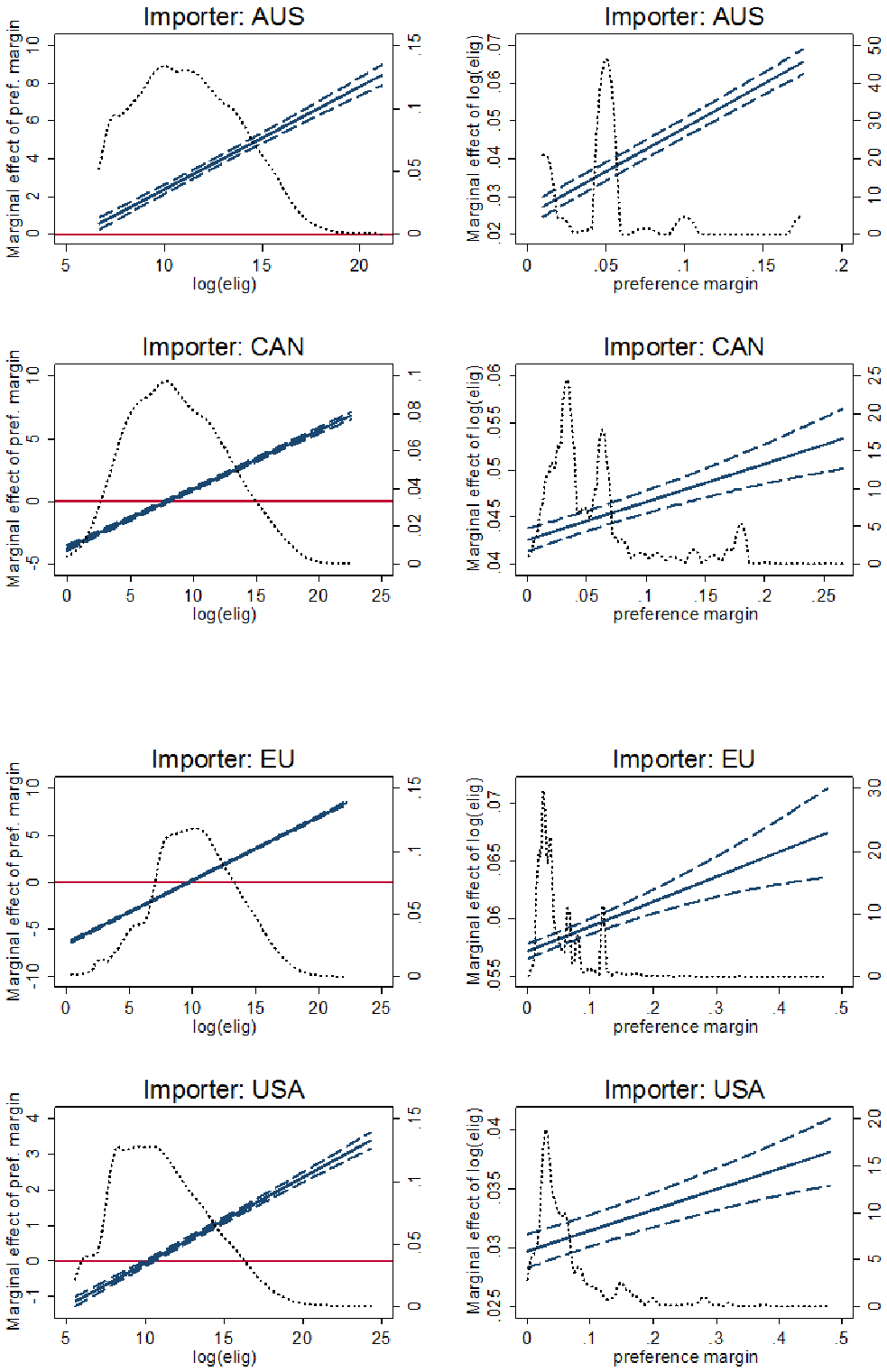


Figure 3: Marginal effects – aggregated dataset



The graphs show marginal effects based on OLS regressions with HS Section and country group dummies (as in column (3) in Table 16 and Table 17 above). The dashed lines show 95% confidence intervals and the dotted line shows the kernel density of the x-axis variable. Observations with margins above 50% have been excluded.

Figure 4: Utilization rate by percentiles of absolute duty reduction – aggregated dataset for four importers

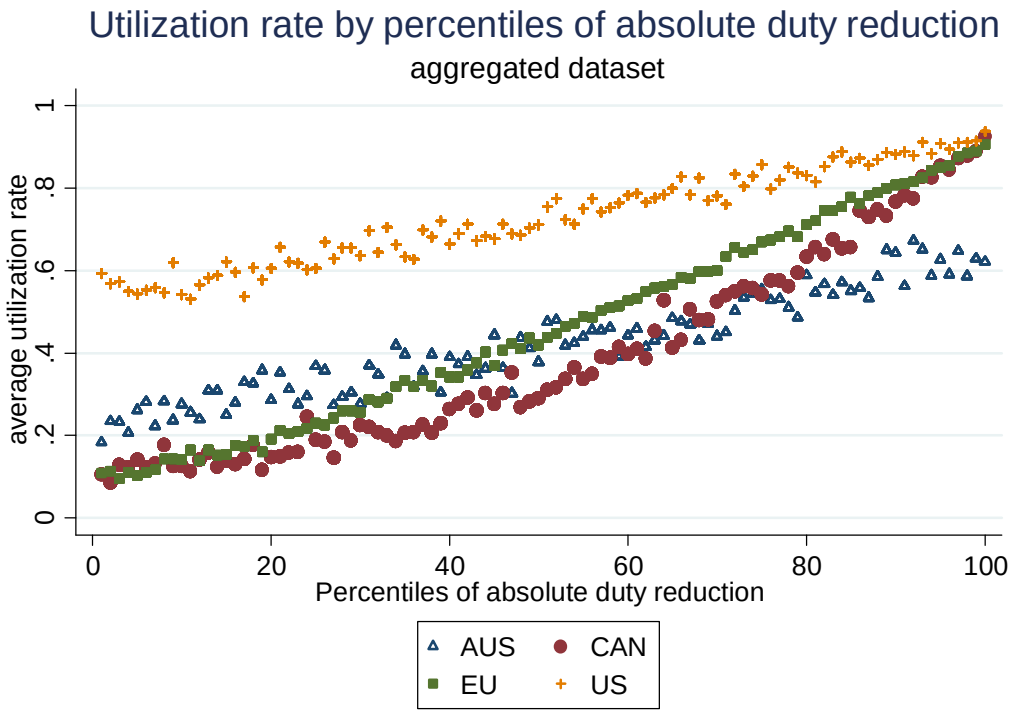


Figure 5: Utilization rate by percentiles of absolute duty reduction – "pseudo-transaction" dataset for EU and US

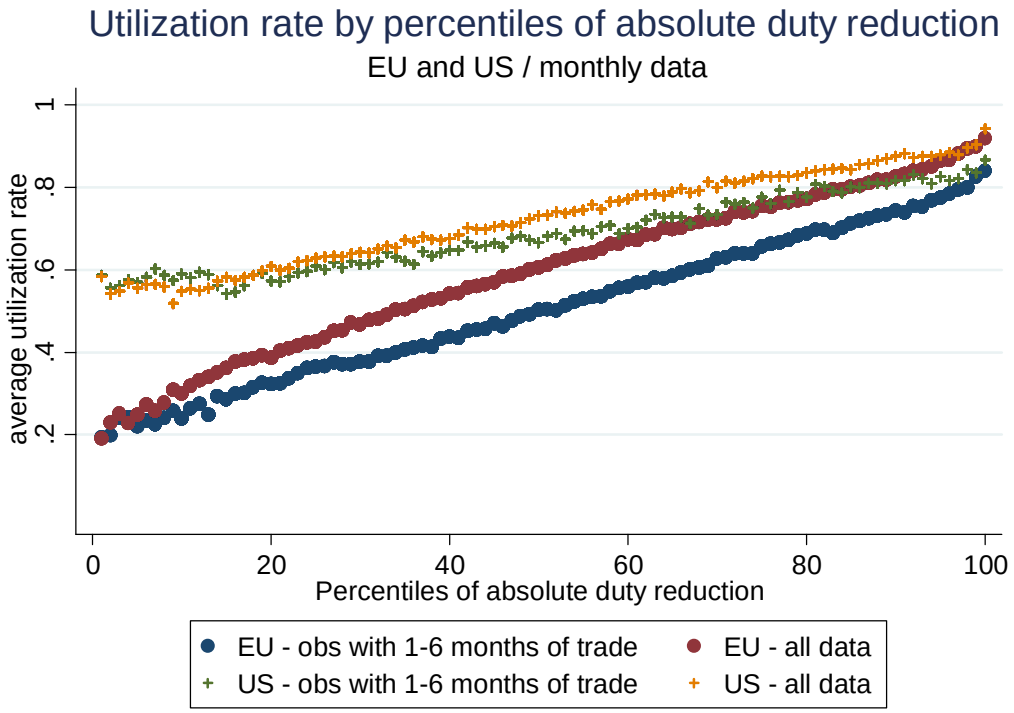


Figure 6: Utilization rate by percentiles of import value – aggregated dataset for four importers

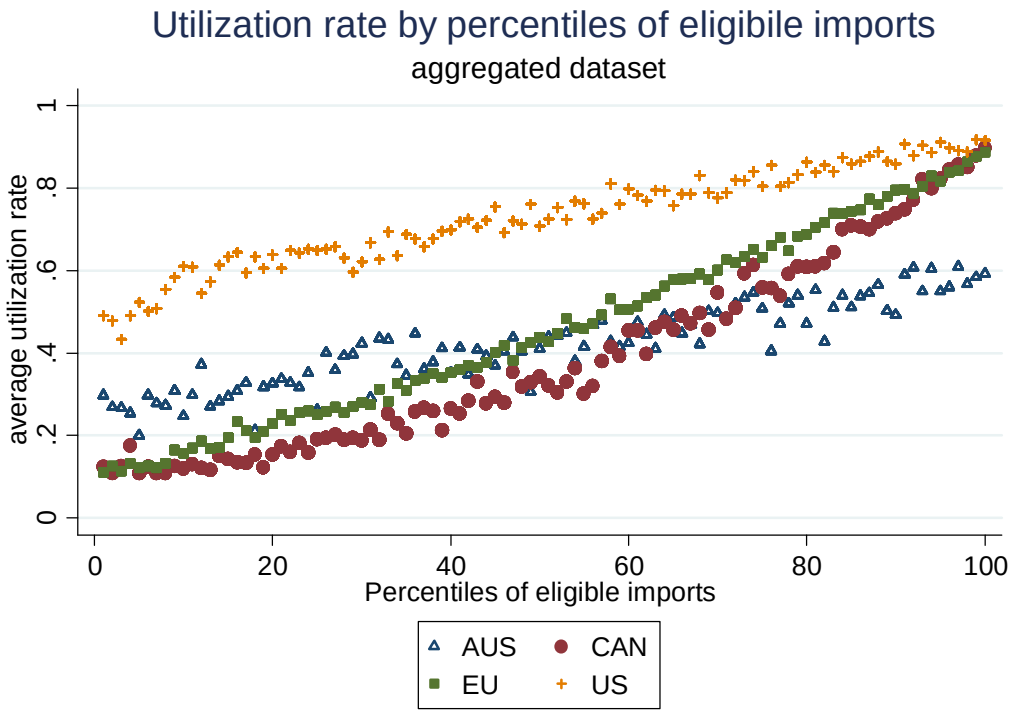


Figure 7: Utilization rate by percentiles of import value – "pseudo transaction" dataset for EU and US

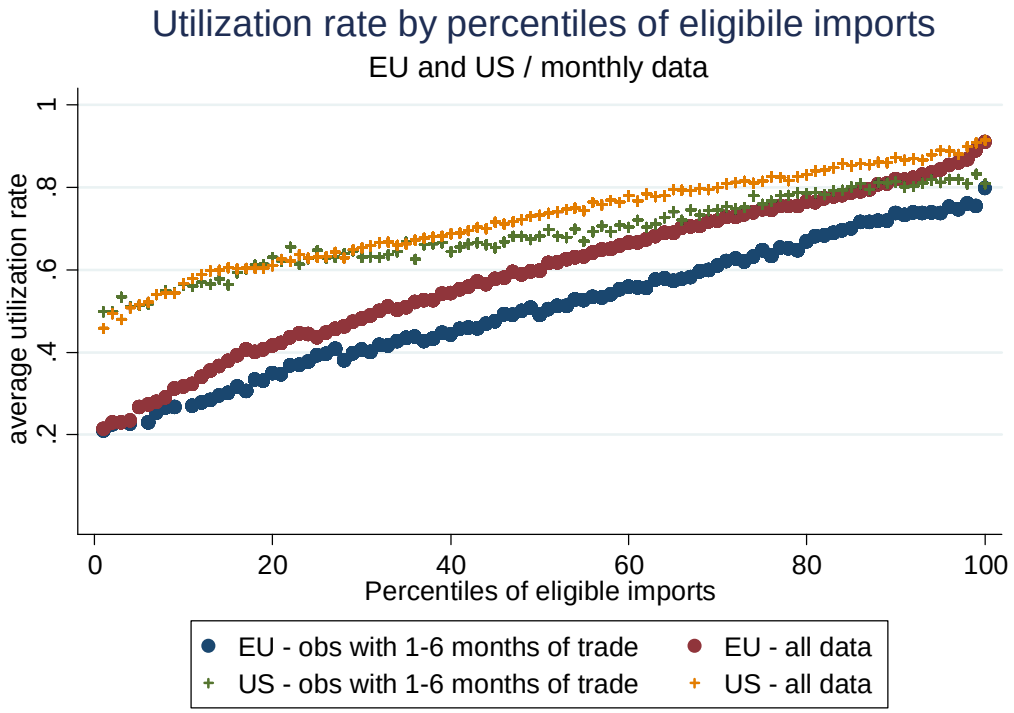
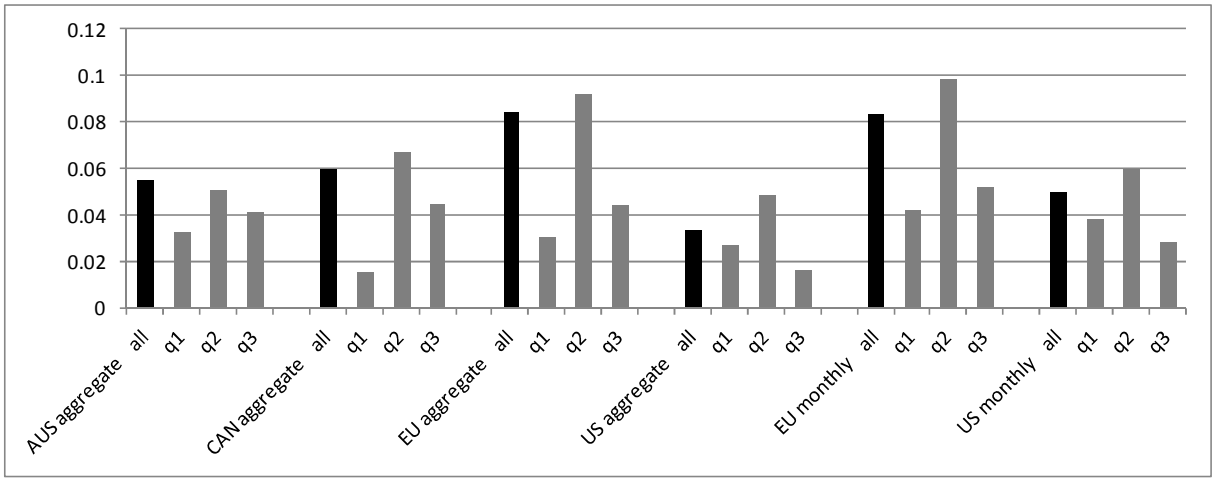
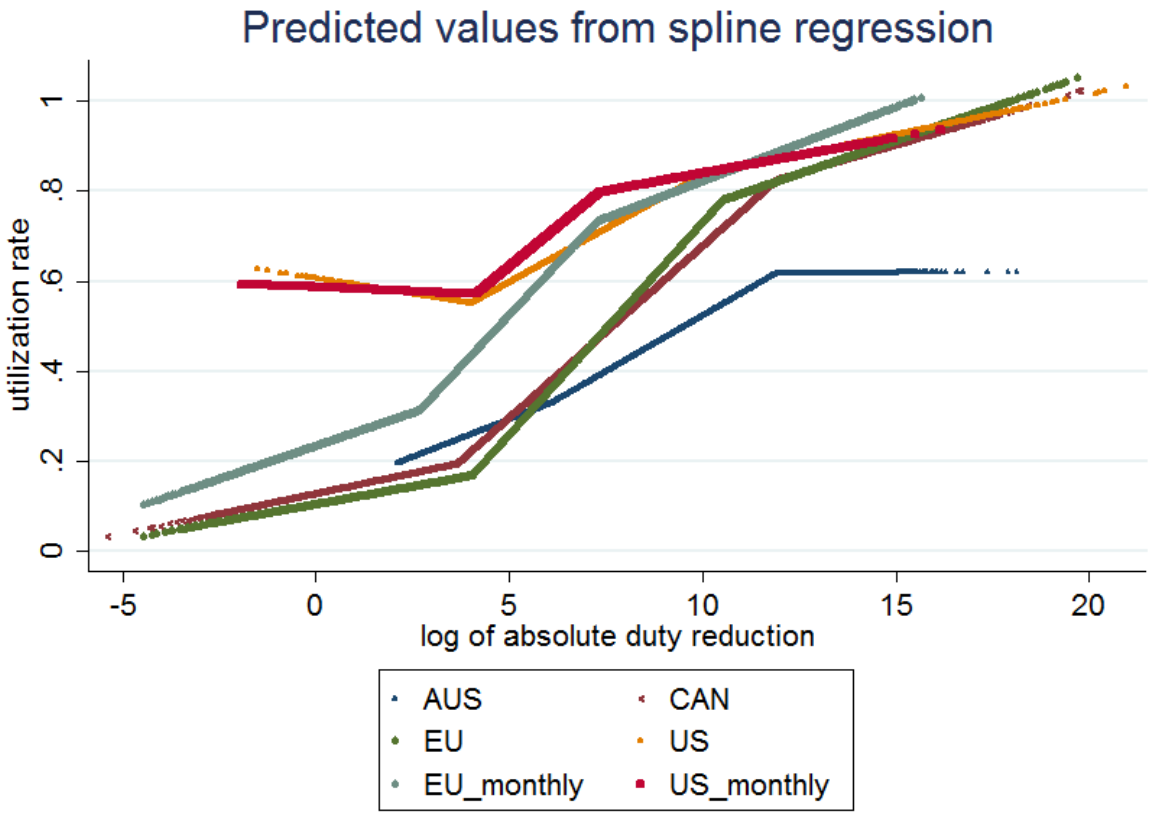


Figure 8: Duty coefficient for different tertiles of duty



The chart shows results for the duty coefficient for regressions as shown in column (4) of the result tables, but with "duty" as coefficient, instead of margin and value. "Monthly" results refer to the subset of data with at least 6 months of zero trade. All coefficients are significant at the 1% level.

Figure 9: Spline regressions



10 Appendix

Definitions of aggregated preference utilization:

Table 21. Example of different definitions of aggregated preference utilization rates:

	Product A	Product B
MFN rate	50%	20%
Preferential rate	10%	0%
Eligible imports	200	100
Preferential imports	160	60
Duties to be saved	(0.5 - 0.1)*200=80	0.2*100=20
Duties actually saved	(0.5 - 0.1)*160=64	0.2*60=12
$u_{duty} = u_{value} = u_{avg}$	0.80	0.60
Overall u_{value}	(160 + 60) / (200 + 100) ≈ 0.73	
Overall u_{duty}	(64 + 12) / (80 + 20) = 0.76	
Overall u_{avg}	(0.80 + 0.60)/2 = 0.70	

Note that this example is chosen such that $u_{duty} > u_{value} > u_{avg}$, which is the order typically observed in the data.

Data sources:

EU: Import data for the EU is taken from Eurostat, which allows downloading import data by preference eligibility and by import regime.[51] Unfortunately, no information is given on the type of regime and whether the product entered under a preferential quota regime. The EU offers overlapping regimes to a range of countries (for example EPA and GSP preferences to many ACP countries), but the data does not show which regime was actually used. The import data is then matched with MFN and preferential tariffs taken from TARIC (as of mid-2008). Imports for which the regime used is "unknown" are ignored (this affects for example confidential imports). One particular problem with the EU data is that it is difficult to distinguish between preferential quota imports and "normal" preferential imports. However, imports under quota regimes can at least be partly identified. If products enter under a preference, but no preferential rate applies to that product from the particular country, then it can be assumed that the import occurred under a preferential quota. Such trade flows have been removed from the dataset.[52] Around 4% of preference-eligible imports are affected by specific tariff rates. These products are excluded from the regression analysis because we do not know the preferential margin, but they are accounted for in summary statistics.

[51] The data actually shows imports by eligibility (MFN or PREF) and by *requested* import regime, but this is usually also the regime that is then used. See EC document TRADE/H3/SLG/D(2006) for more details (available from the authors).

[52] The European Union has a fairly complex system of import regimes, ranging from normal MFN imports to preferential quotas subject to certain end uses (see Nilsson, 2010, for a very detailed description of the EU import data). We have implemented most of these regimes into our dataset, in particular also suspended rates. The EU regularly suspends tariffs on an MFN basis for some heavily traded items, which we have taken into account. One major challenge with the EU data is that import data is only available at the 8-digit level, even though tariffs vary on the 10-digit level for around 5% of tariff lines. For example, products may enter duty-free if they fall under "pharmaceuticals". The import data at 8-digit level does not show whether such imports are pharmaceuticals. However, the EU import data by regime allows to indirectly distinguish such duty-free imports from dutiable imports. If imports are duty-free under some special regime, then they are categorized under "MFN zero imports". Other difficulties are seasonal tariffs, tariffs subject to an entry-price system or based on product specifications, such as sugar content.

US: Data for the US is taken from USITC. 8-digit import data for 2008 was matched with the tariff schedule for 2008 and complemented by using other sources (such as MacMap).[53] Special import regimes for pharmaceuticals, dies and civil aircraft as well as products with seasonal tariffs were ignored. The US uses specific tariffs for some items, including for some heavily traded products. We therefore use ad-valorem equivalents, for which we use the ratio of actually paid duties over MFN imports. The main affected product is crude oil, which has an MFN rate of 5-10 US ct. per barrel. The estimated ad-valorem rate is 0.06-0.08%.[54]

EU and US transaction-level data: The raw data taken from Eurostat is disaggregated by EU member state (i.e. by importing country) and by month. Similarly, USITC provides import data by month and customs district.[55] This allows us to create a dataset that resembles (otherwise unavailable) transaction-level data. This can best be explained using an example. Table 22 shows the 2008 US import data for one particular product (6101.20.00) imported from Guatemala by month and customs district. While the aggregated data would consist of only two elements (MFN imports of USD 20,000 and preferential imports of USD 836,000 under DR-CAFTA preferences), the more detailed data contains a total of 25 observations, of which 3 are related to MFN imports and 22 to preferential imports. The key feature of this data is that for each importer-exporter-product combination, imports do not always occur in every month. In the example, 35 out of 60 possible observations are zero. If imports only occur in a few months over the whole year 2008, we assume that these imports consist of only a single or a very small number of transactions. This is based on the assumption that individual transactions occur equally likely in each month,[56] which makes it unlikely that many transactions would cluster around a small number of months and would not occur at all in other months. We have calculated how transactions are distributed across months for a specific number of transactions and assuming that each individual transaction falls in any month with probability 1/12. The results are shown in Table 23 for 1-25 transactions. For example, we have that

- with a single transaction only, we always observe just one month with trade.
- with 5 transactions, one would usually see 4-5 months with trade, never more than 5 months with trade and in a few cases 3 or even less months with trade.
- with 20 transactions, one would usually see 9-11 months with trade, with $p \approx 0.51$ one gets 12 months with trade and in a few cases trade clusters across 7-8 months. However, trade being clustered across 6 months or less is very unlikely ($p \approx 0.001$)

Higher numbers of transactions make it increasingly unlikely that trade is clustered across 6 months or less. We only observe the number of months with trade, but we do not know the distribution of "number of transactions" – otherwise we could calculate exactly the likelihood distribution of transactions *given a certain number of months with trade*. However, it appears plausible to follow that *given a small number of months with trade (6 or less),* the likelihood that these observations include a large number of transactions (20 or more) is very small – simply because if that was the case, it would be very unlikely that trade is clustered across so few months. We thus choose a cut-off of 6 or fewer months with trade, i.e. if trade occurs in only 6 or fewer months, we assume that these observations are close to transaction-level.

[53] In particular, preferences for garments under AGOA or CBTPA are not explicitly shown in the US tariff schedule.
[54] Crude oil (HS 2709.10/20) alone accounts for 41% of the US preference-eligible imports. Despite the very low preferential margin, the utilization rate is 90%.
[55] USITC provides import and export data separately for each of the US 43 customs districts, which roughly resemble US states (see http://www.census.gov/foreign-trade/guide/sec2.html#district for details).
[56] This assumption is certainly contestable. There could be seasonal patterns or other reasons why transactions are lumped together in certain months.

Dropping observations with more than 6 months of trade would result in more observations to be dropped for which we observe preference-usage. This can be seen from Table 11: Observations with few months of trade tend to have lower utilization rates. The reason is that, overall, observations with u=1 are more frequent and hence more likely to cover more months within a year. This is also the case in our example in Table 22: Observations with u=1 appear more frequently and would be dropped when using the 6-months cut-off (except for imports into Savannah, GA). We therefore use a slightly modified cut-off, where we only consider those observations with a maximum number of 6 months with trade within any exporter-product-district/member combination, i.e. whether MFN or preferential. Using our example in Table 22, the second observation would be ignored, even though there are less than 6 months of trade, because the first observation, which has the same exporter-product-district combination, has 9 months of trade. Similarly, the third and fourth observation would be dropped, but the last one would remain. Overall results are similar whether we use this modified threshold or one that is purely based on the number of months with trade.

Table 22. Example of raw data at month/district level: Imports of 6101.20.00 from Guatemala (USD 1,000)

District	Import regime	Jan	Feb	Mrz	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total imports	Months with trade
Los Angeles, CA	DR-CAFTA	88	88	-	-	66	152	21	9	109	64	-	64	661	9
Los Angeles, CA	MFN	-	-	-	-	-	-	-	-	-	18	-	-	18	1
Miami, FL	DR-CAFTA	8	9	14	32	12	40	25	12	8	2	11	2	175	12
Miami, FL	MFN	-	-	-	-	-	-	-	-	-	-	1	1	2	2
Savannah, GA	DR-CAFTA	-	-	-	-	-	-	-	1	-	-	-	-	1	1

Table 23. Distribution of transactions across months

Number of months with trade	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	1.000	0.083	0.007	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2		0.917	0.229	0.045	0.008	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3			0.764	0.382	0.133	0.040	0.011	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4				0.573	0.477	0.259	0.116	0.047	0.018	0.007	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5					0.382	0.477	0.371	0.232	0.128	0.065	0.032	0.015	0.007	0.003	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6						0.223	0.390	0.412	0.341	0.245	0.161	0.099	0.058	0.033	0.018	0.010	0.005	0.003	0.001	0.001	0.000	0.000	0.000	0.000	0.000
7							0.111	0.260	0.357	0.379	0.344	0.281	0.213	0.153	0.106	0.071	0.046	0.030	0.019	0.012	0.007	0.004	0.003	0.002	0.001
8				p = 0 by definition				0.046	0.139	0.242	0.319	0.356	0.354	0.325	0.281	0.231	0.184	0.142	0.107	0.079	0.057	0.041	0.029	0.021	0.014
9									0.015	0.058	0.124	0.199	0.268	0.319	0.348	0.354	0.343	0.318	0.286	0.250	0.214	0.180	0.148	0.121	0.098
10										0.004	0.018	0.046	0.088	0.140	0.197	0.251	0.298	0.334	0.358	0.370	0.371	0.362	0.347	0.326	0.302
11											0.001	0.004	0.011	0.025	0.046	0.075	0.111	0.151	0.194	0.237	0.279	0.318	0.352	0.380	0.403
12												0.000	0.000	0.001	0.003	0.007	0.013	0.023	0.035	0.051	0.071	0.094	0.121	0.150	0.182

This was calculated using Stirling number of second kind (k = number of months with trade, n = number of transactions). It can be shown that the probability of having exactly k months with trade is given by $\frac{\binom{12}{k} * 12! * S_{n,k}}{12^n}$.

Australia & Canada: Data for Australia and Canada were obtained from the WTO Secretariat. The dataset contains 2008 tariff-line imports by exporting country and tariff regime. We matched this data with MFN and preferential tariffs.[57] Both countries use some specific tariff rates (for MFN and preferential rates), however imports of such items account for only around 1% (AUS) and 2% (CAN) of preference-eligible imports and 32 (AUS) and 509 (CAN) observations. Unfortunately, we do not have more detailed data for these countries that would allow us to create a separate dataset that resembles transaction-level data.

[57] Australia's tariffs were taken from the WTO's TAO database. Canada's tariffs were obtained directly from the WTO Secretariat.

Table 24. Preference utilization by preferential margin

Preferential margin *m*	Australia			Canada			EU			USA		
	u_{value}	u_{duty}	u_{avg}	u_{value}	u_{duty}	u_{avg}	u_{value}	u_{duty}	u_{avg}	u_{value}	u_{duty}	u_{avg}
All imports	0.61	0.65	0.42	0.90	0.93	0.39	0.87	0.90	0.47	0.92	0.94	0.73
$0 < m \leq 1.0\,\%$	0.45	0.45	0.29	0.17	0.45	0.32	0.83	0.84	0.54	0.90	0.93	0.79
$1.0\,\% < m \leq 2.5\,\%$	0.41	0.40	0.32	0.75	0.76	0.29	0.82	0.81	0.35	0.95	0.95	0.70
$2.5\,\% < m \leq 5.0\,\%$	0.63	0.63	0.46	0.87	0.87	0.37	0.85	0.86	0.41	0.94	0.95	0.71
$5.0\,\% < m \leq 10.0\,\%$	0.73	0.73	0.44	0.94	0.94	0.45	0.93	0.93	0.58	0.95	0.95	0.75
$10.0\,\% < m \leq 15.0\,\%$	.	.	.	0.96	0.96	0.61	0.90	0.90	0.62	0.91	0.91	0.75
$15.0\,\% < m \leq 20.0\,\%$	0.96	0.96	0.69	0.85	0.85	0.44	0.95	0.94	0.74	0.87	0.87	0.69
$20.0\,\% < m \leq 30.0\,\%$	.	.	.	1.00	1.00	1.00	0.99	0.99	0.80	0.98	0.98	0.75
$30.0\,\% < m \leq 50.0\,\%$	.	.	.	.	.	.	0.97	0.97	0.77	0.91	0.91	0.78
$50.0\,\% < m \leq 100.0\,\%$	.	.	.	.	.	.	0.93	0.92	0.25	0.99	1.00	0.81
$m > 100.0\,\%$	.	.	.	.	.	.	.	.	.	1.00	1.00	0.93
m = ? (specific rates)	0.77	n/a	0.27	0.94	n/a	0.60	0.89	n/a	0.63	0.92	n/a	0.58

Table 25. Preference utilization by import value range

Eligible imports (*elig*, USD)	Australia			Canada			EU			USA		
	u_{value}	u_{duty}	u_{avg}	u_{value}	u_{duty}	u_{avg}	u_{value}	u_{duty}	u_{avg}	u_{value}	u_{duty}	u_{avg}
All imports	0.61	0.65	0.42	0.90	0.93	0.39	0.87	0.90	0.47	0.92	0.94	0.73
$0 < elig \leq 10$	.	.	.	0.12	0.14	0.12	0.12	0.13	0.11	.	.	.
$10 < elig \leq 100$	.	.	.	0.13	0.13	0.13	0.13	0.14	0.13	.	.	.
$100 < elig \leq 1{,}000$	0.29	0.35	0.29	0.20	0.20	0.18	0.18	0.21	0.16	0.49	0.49	0.49
$1{,}000 < elig \leq 10{,}000$	0.31	0.37	0.30	0.32	0.36	0.30	0.31	0.39	0.28	0.62	0.63	0.61
$10{,}000 < elig \leq 100{,}000$	0.41	0.51	0.40	0.52	0.58	0.48	0.51	0.59	0.47	0.73	0.76	0.71
$100{,}000 < elig \leq 1M$	0.48	0.58	0.48	0.68	0.74	0.65	0.70	0.76	0.66	0.82	0.84	0.80
$1M < elig \leq 10M$	0.56	0.62	0.55	0.82	0.85	0.80	0.81	0.86	0.80	0.88	0.90	0.87
$10M < elig \leq 100M$	0.60	0.61	0.59	0.88	0.90	0.87	0.87	0.90	0.87	0.90	0.92	0.90
$100M < elig \leq 1B$	0.61	0.66	0.61	0.93	0.95	0.91	0.89	0.91	0.89	0.91	0.92	0.91
$elig > 1B$	1.00	1.00	1.00	0.92	0.97	0.82	0.94	0.95	0.94	0.93	0.99	0.95

Note: Small import flows do not appear in AUS and USA data, which is likely because of reporting thresholds.

Table 26. Preference utilization by absolute duty reduction

Duty reduction (*duty*, USD)	Australia			Canada			EU			USA		
	u_{value}	u_{duty}	u_{avg}	u_{value}	u_{duty}	u_{avg}	u_{value}	u_{duty}	u_{avg}	u_{value}	u_{duty}	u_{avg}
All imports	0.61	0.65	0.42	0.90	0.93	0.39	0.87	0.90	0.47	0.92	0.94	0.73
$0 < duty \leq 10$	0.23	0.23	0.23	0.16	0.15	0.14	0.11	0.12	0.11	0.70	0.59	0.59
$10 < duty \leq 100$	0.24	0.26	0.25	0.24	0.23	0.22	0.17	0.19	0.18	0.70	0.56	0.56
$100 < duty \leq 1{,}000$	0.30	0.34	0.33	0.38	0.39	0.35	0.35	0.37	0.33	0.75	0.66	0.64
$1{,}000 < duty \leq 10{,}000$	0.36	0.44	0.42	0.55	0.56	0.53	0.56	0.59	0.55	0.79	0.77	0.74
$10{,}000 < duty \leq 100{,}000$	0.48	0.56	0.54	0.70	0.74	0.71	0.74	0.77	0.74	0.79	0.85	0.83
$100{,}000 < duty \leq 1M$	0.59	0.62	0.62	0.81	0.86	0.84	0.84	0.87	0.85	0.87	0.89	0.89
$1M < duty \leq 10M$	0.60	0.60	0.62	0.86	0.90	0.90	0.89	0.91	0.89	0.91	0.92	0.92
$10M < duty \leq 100M$	0.81	0.84	0.84	0.97	0.97	0.96	0.90	0.91	0.91	0.92	0.92	0.93
$100M < duty \leq 1B$	.	.	.	0.97	0.97	0.97	0.93	0.95	0.93	1.00	1.00	0.99
$duty > 1B$	.	.	.	.	.	.	.	.	.	1.00	1.00	1.00

Note: "Duty reduction" is the difference between MFN duties that would be applicable in the absence of a preference and the duties to be paid when preferences are fully used.

Table 27. Preference utilization by product group

HS Section	Australia			Canada			EU			USA		
	u_{value}	u_{duty}	u_{avg}	u_{value}	u_{duty}	u_{avg}	u_{value}	u_{duty}	u_{avg}	u_{value}	u_{duty}	u_{avg}
All imports	0.61	0.65	0.42	0.90	0.93	0.39	0.87	0.90	0.47	0.92	0.94	0.73
01' - Animal products	1.00	1.00	0.86	0.99	1.00	0.83	0.88	0.94	0.82	1.00	0.99	0.93
02' - Vegetable products	0.96	0.98	0.71	0.97	0.96	0.58	0.89	0.94	0.72	0.99	1.00	0.91
03' - Fats and oils	0.85	0.66	0.60	0.92	0.92	0.58	0.96	0.96	0.62	0.98	0.98	0.89
04' - Prep. food, bev., tob.	0.90	0.91	0.68	0.96	0.97	0.58	0.91	0.96	0.71	0.97	0.99	0.92
05' - Mineral products	0.46	0.61	0.38	0.92	0.92	0.48	0.80	0.79	0.48	0.89	0.92	0.70
06' - Chemical products	0.56	0.56	0.40	0.91	0.92	0.41	0.85	0.85	0.55	0.94	0.94	0.79
07' - Plastics and rubber	0.61	0.62	0.46	0.94	0.95	0.37	0.93	0.93	0.52	0.98	0.98	0.72
08' - Leather	0.43	0.53	0.36	0.75	0.78	0.37	0.91	0.91	0.51	0.94	0.93	0.69
09' - Wood and articles of wood	0.90	0.95	0.61	0.88	0.90	0.46	0.91	0.93	0.59	0.97	0.98	0.83
10' - Paper	0.80	0.80	0.55	.	.	.	.	.	.	.	.	.
11' - Textiles	0.73	0.88	0.50	0.88	0.88	0.42	0.85	0.88	0.53	0.86	0.87	0.66
12' - Footwear	0.55	0.57	0.42	0.71	0.76	0.35	0.90	0.92	0.54	0.93	0.89	0.68
13' - Stone, cement	0.59	0.60	0.40	0.91	0.92	0.46	0.92	0.93	0.53	0.96	0.96	0.80
14' - Precious stones, jewellery	0.81	0.81	0.41	0.68	0.76	0.29	0.85	0.85	0.34	0.92	0.90	0.79
15' - Base metals	0.52	0.61	0.36	0.89	0.91	0.34	0.95	0.96	0.46	0.97	0.95	0.75
16' - Machinery	0.43	0.44	0.28	0.85	0.88	0.28	0.83	0.83	0.28	0.91	0.93	0.59
17' - Transport equipment	0.72	0.76	0.38	0.91	0.96	0.45	0.91	0.95	0.37	0.97	0.98	0.60
18' - Optical and other apparatus	0.38	0.37	0.26	0.71	0.74	0.25	0.82	0.72	0.20	0.77	0.83	0.60
19' - Arms and ammunition	0.66	0.72	0.35	0.88	0.90	0.34	0.88	0.89	0.58	0.93	0.92	0.77
20' - Miscellaneous articles	0.62	0.65	0.42	0.82	0.87	0.37	0.86	0.87	0.41	0.93	0.94	0.77
21' - Works of art	.	.	.	0.81	0.81	0.50	.	.	.	.	.	.

Note: All products of HS Section 10 (21) have zero MFN duties except in Australia (Canada).