Abstract

Using product-level data on trade between Canada and the U.S., this paper presents evidence of tariff evasion and rules of origin violations occurring under the Canada-U.S. free trade agreement (CUSFTA). It shows that more imports end up unreported at the destination country when tariffs are higher. Consistent with the tariff evasion hypothesis, this result implies that the trade creation effect of a free trade agreement may in fact be due to less underreporting. Further, it shows that larger Canadian tariff preference margin for the U.S. is associated with more goods originated in third countries being trans-shipped through the U.S. territory for re-exports. The preference margin is also positively correlated with the value of "excess" imports from the U.S. which qualify for preferential treatment. Both results suggest the presence of persistent violations of the Rules of Origin within the CUSFTA.

*JEL Classification codes: F13, H26.*

*Keywords: International trade, tariff evasion, free trade agreements.*
1 Introduction

Recent studies have provided extensive evidence on tariff evasion in many developing countries using discrepancies in national trade statistics of exporting and importing countries. High import tariffs stimulate traders to undertake various activities in order to minimize duty payments and to reduce the value of imports reported to customs officials. This paper demonstrates the presence of tariff evasion between Canada and the U.S., two developed countries with low level of corruption and strong law enforcement. It shows that as tariff cuts under the Canada-U.S. Free Trade Agreement (CUSFTA) remove the incentives to evade tariffs between cooperating countries, the conventional estimates of the trade creation effect of this agreement will tend to be overestimated because of an increased proportion of imports being reported correctly. Moreover, the paper documents presence of tariff evasion schemes practiced by firms from the third countries who exploit the preferential tariff treatment under the agreement and ship goods to a high-tariff country duty-free through its FTA partner in violation of the CUSFTA Rules of Origin (ROO).

The method to detect tariff evasion was first developed in a pioneering work by Fisman, Moustakerski, and Wei (2008). Tariff evasion is detected by comparing the source country’s export data with the destination country’s import data for a given product. Thus, Fisman, Moustakerski, and Wei (2008) argue that a negative correlation between Chinese tariff rates and the difference between Chinese imports from Hong Kong and Hong Kong’s exports to China is evidence for tariff evasion. Later literature has confirmed this finding for other countries (see also Mishra, Subramanian, and Topalova (2008) on India and Levin and Widell (2007) on Africa) and shed light on some of the circumstances influencing the extent of tariff evasion. For instance, Javorcik and Narciso (2008), applying the same methodology to industry-level trade data between ten East European countries and Germany, discover that trade record discrepancies between countries are influenced by the degree of product differentiation. Since trade fraud is more difficult to detect for differentiated products, more imports would be ‘lost’ in industries with high tariff rates and diversified products. Rotunno and Vezina (2010) show that misreporting of Chinese exports is positively related to the share of Chinese immigrants in the destination countries. In a related study, Ferrantino, Liu, and Wang (2010) find a negative effect of Chinese value-added tax (VAT) on its value of exports to the U.S. reported by Chinese exporters to local authorities in order to get the VAT tax rebate.

In my analysis I apply Fisman and Wei’s method to Canadian and U.S. trade data for the year 1989. The year 1989, following the implementation of the CUSFTA, was chosen because it saw tariffs between Canada
and the U.S. being (partially) abolished for some products while yet maintained for others. Thus, the gradual change of the trade regime between the two countries, which happened that year, provides a unique variation in the Most Favoured Nation (MFN) and preferential tariff rates for different products, which allows to analyze the tariff evasion between the FTA members and violation of the ROO regulation at the same time. My findings can be summarized as follows. First, I show that tariff rates between Canada and the U.S. have a strong and significant effect on the ‘missing trade’ between the two countries. This result is robust to a variety of specifications and implies that even in developed countries with low corruption, good law enforcement, and relatively low tariff rates firms are still engaged in tariff evasion schemes.

Second, having detected tariff evasion, I argue that its presence before a free trade agreement (FTA) implies a higher growth of reported as compared to real trade thereafter, because the incentive to underreport real trade in order to evade tariffs will be removed. This ‘whitening’ of undisclosed trade may be mistakenly attributed to the trade-creating effect of an FTA, leading to distorted inferences about the economic impact of trade liberalization policies. The data on Canadian and U.S. trade growth rates during the active phase of the CUSFTA tariff cuts (years 1990-98) support this argument. Specifically, industries with larger shares of misreported imports prior to the formation of the CUSFTA experienced faster trade growth in the later years, controlling for the intensity of trade liberalization and industry fixed effects.

Third, the paper presents extensive evidence on tariff evasion by third countries through violations of the ROO requirement within the CUSFTA. The discrepancies in the official trade statistics provide the first piece of evidence here. Thus, I find that some goods (around 0.8% of the total) that arrive in Canada from the U.S. and qualify for CUSFTA preferential treatment were in fact exported to Canada via the U.S. from third countries. Furthermore, the share of such goods in total imports is higher for products for which the difference between the Canadian MFN and preferential import tariffs (the Canadian preference margin towards the U.S.) is higher. This relationship is consistent with the presence of the CUSFTA’s ROO violations by traders trying to minimize customs duty payments. On the other hand, the effect of the U.S.’s preference margin on its excess imports from Canada is negligible, presumably due to low average level of U.S. import tariffs and therefore weak incentives for ROO violations.

The second piece of evidence on the CUSFTA ROO violations comes from the observed information on indirect trade flows. I find that the volume of re-exports by third countries to the U.S. is positively related to the Canadian preference margin for U.S. imports. The fact that larger Canadian tariff preferences stimulate
third country firms to ship more goods through the U.S. territory and claim refund of U.S. duties is again consistent with the ROO violation hypothesis. This result echoes with Firsman and Wei’s finding that indirect trade may facilitate tariff evasion.\(^1\) Summing up the above evidence on the ROO violations, I conclude that FTAs provide an additional motive for third countries to evade external tariffs by using an FTA’s partner country as a port of preferential access to the rest of FTA’s internal market. The extent of the ROO violations is non-negligible: my calculations suggest that about 25% of all transshipments going through the U.S. (0.63% of U.S. total imports from outside of CUSFTA) are designated to the Canadian market in violation of the CUSFTA ROO. As before, no evidence of transshipment to the U.S. through Canada in violation of the ROO was found.

The rest of the paper is organized as follows: In Section 2, I describe the data used in the study; Section 3 describes the nature of the trade gap and explains possible reasons why a source country’s exports and the destination’s imports for the corresponding product may not equate; Section 4 describes empirical strategies and the evidence on tariff evasion in the CUSFTA. Therein I also discuss implications of evasion activities for evaluating the effect of the agreement on trade flows; the results on the ROO violation in the CUSFTA are presented in Section 5; and Section 6 concludes.

2 The Data

The Canadian trade data for this project comes from Statistics Canada’s Canadian Trade Database. The import data, collected at the 10-digit Harmonized System (HS) product level, is measured in current Canadian dollars and contains information on the quantity and F.O.B. value of imports as well as the applied tariffs. For Canadian exports, the data captures the quantity and value at the 8-digit HS level. The U.S. product-level trade data, obtained from Feenstra, Romalis, and Schott (2002), includes information on the value of U.S. exports and imports (F.O.B.) with other countries measured in current U.S. dollars and recorded according to the 10-digit HS industry classification. It also has information on the quantity of trade, import duties collected by the U.S. customs, associated transportation costs, and distinguishes imports that fall under the CUSFTA

\(^1\)Fisman, Moustakerski, and Wei (2008) find that higher Chinese tariff rates result in an increase in indirect imports from Hong Kong despite the absence of any tax advantage of shipping goods in so doing. They explain this result as evidence towards Hong Kong’s advantage in exporting goods to China without paying import tariffs and postulate that countries, actively involved in indirect trade, may act as mediators in tariff evasion schemes.
tariff preferences. Since industry classification is not harmonized beyond a six-digit level between two countries, all trade data are aggregated up to six-digit HS industry classification.

The research is conducted for the year 1989\(^2\) as this was the first year of the CUSFTA and increased trade liberalization amongst the countries. Concentrating on year 1989 gives two important advantages. Firstly, many of the tariffs between Canada and the U.S. were still in place in 1989. For example, the trade weighted and simple average Canadian tariff rates for U.S. imports in 1989 were 2.6% and 6.8%, respectively, only a modest reduction relative to 1988’s tariff rates of 2.8% and 7.3%. Presence of substantial trade barriers imply that in 1989 traders had incentives to underreport imports between the two countries even in the presence of the free trade agreement.

Secondly, as early as in 1989, the CUSFTA had already provided substantial tariff preferences for foreign firms within the FTA and nearly all industries enjoyed a preference margin ranging from 10% to 100% of the external tariff. The trade-weighted and simple average Canadian tariff preference for the U.S. were 3.2% and 1.1%, respectively, an increase from 1.9% and 0.6% in 1988. The corresponding U.S. tariff preference for Canada in 1989 were 3.3% and 2.6%.\(^3\) These tariff preferences would stimulate domestic importers and foreign exporters to seek for opportunities to violate the CUSFTA rules of origin and export to the CUSFTA through a country with the lowest external tariff rate, if such opportunities were present. Therefore, focusing on the first year of the agreement provides a unique setting where the within-agreement tariff are still high enough for the participants to have incentives to engage in tariff evasion, while considerable tariff preferences encourage ROO violations. By exploiting cross-industry variation in tariffs and trade gap in 1989 we can identify tariff evasion and ROO violations at the same time.

### 3 The nature of trade gap

In this paper I use Fisman and Wei’s (2004) methodology to analyze tariff evasion by looking at the effect of a country’s trade policy on the difference between its reported value of imports from a partner country and the corresponding value of exports of the same product reported by the trading partner. Following Javorcik and

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\(^2\)I limit the time period to the sole year 1989 for technical reasons that will be explained in Section 3.

\(^3\)The trade-weighted and simple average US tariffs for Canada were 1.1% and 6.5% in 1988 and 0.8% and 5.1% in 1989. However, since industry classifications were different in two years, the simple average tariffs are not directly comparable.
Narciso (2008), I call this difference the “trade gap”:

\[
\text{trade gap}_{cpi} = \ln(\text{Imports}_{cpi}) - \ln(\text{Exports}_{pcit})
\]

(1)

where \(\text{Imports}_{cpi}\) is the value of imports for country \(c\) of product \(i\) from a partner country \(p\) at time \(t\), and \(\text{Exports}_{pcit}\) is the value of exports reported by a partner country \(p\) to country \(c\) of the same product \(i\) at time \(t\).

Although it could seem that a country’s imports would mirror its partner country’s export data, this is often not the case. As Table 1 shows, in 1989 the mean value of the Canadian trade gap with the U.S. was equal to 0.5, while for the U.S. the mean value was -0.16 with a standard deviation of 1.55. Aggregating across industries and converting all values to the U.S. dollars, the total value of Canadian exports to the U.S. 1% lower than U.S. imports from Canada and the total value of Canadian imports was 5% higher than U.S. exports. The rest of this section explains possible reasons for these differences and describes how they may reflect trade smuggling activities. Section 4.4 verifies that controlling for these other factors of the trade gap does not affect tariff evasion estimates.

One of the main reasons for observed discrepancies in trade statistics is the unit of measurement used since each country measures trade flows in its own currency. Converting Canadian monthly trade data into U.S. dollars using monthly-average exchange rates (ranging from 1.16 to 1.19 Canadian dollars per one U.S. dollar) reduces the mean value of the Canadian trade gap to 0.35 and raises the mean value of the U.S. trade gap to 0.01. However, the exchange rate transformation only affects the mean of the gap while its variance remains just as high as in Table 1 and the correlation between the trade gap measured in the same and in different currencies is over 0.99. For this reason, I use trade statistics measured in national currencies in construction of all trade gap measures throughout the paper and let the exchange rate to be absorbed by the constant term in the regression analysis.

To understand how a trade gap between two countries can arise, it is first necessary to understand how Canadian and U.S. import and export data are collected and compiled by national statistical agencies. In general, the two systems are very similar so I mostly focus on the Canadian one. The national data on merchandise imports is based on the information submitted to Canadian customs by importers. On the import declarations, importers are required to present information on the value, quantity, weight, origin, and 10-digit Harmonized

\footnote{Converting Canadian trade flows into the US dollars lowers Canadian trade gap through reduction in the value of Canadian imports and raises US trade gap through reduction in the value of Canadian exports to the US.}
Tariff Schedule of the good imported. This information is used by customs officials to determine import duties to be collected as well as whether the goods fall under quantitative or any other restrictions. Export statistics, in turn, are based on export declarations by traders. In both countries, reporting exports is mandatory and requires a similar set of information; each exporter has to declare the value and quantity of the good exported together with the certificate of origin and final destination of the good exported.

As the official trade statistics are derived from the import and export declarations made by the dealers, there are at least five reasons why Canadian imports from the U.S. may differ from the corresponding U.S. exports to Canada. In what follows, I will discuss them in-depth individually.\(^5\)

**Tariff evasion.** Various actions undertaken by traders in order to avoid paying import duties can be one of the reason for a trade gap to be different from zero. Fisman and Wei (2004) found that the Chinese trade gap with Hong Kong had a strong negative relationship with Chinese tariffs against imports from Hong Kong. Javorcik and Narciso (2008) found similar results for the German trade with ten East European countries studied. In both papers it is implicitly assumed that if the trade gap is driven by a measurement error only, it should be unrelated to any measure of trade policy. Thus, a statistical relationship between a trade gap and tariffs is interpreted as evidence of tariff evasion in industries with high trade barriers. However, given the nature of import and export data, this assumption implies that in industries with high tariffs, traders would tend to underreport the value of imports at the destination country and report the true value of exports at the source country. Are there any reasons to believe that smugglers truthfully report their exports if they can use the same set of documents for export and import declarations? Until it is known how a trade gap and import tariffs are related to a firm’s incentive to report its imports and exports, we cannot be sure that the relationship between trade gap and tariffs, found in previous studies, pertains to tariff evasion.

As it turns out, firms’ incentives to report imports and exports truthfully vary across countries, depending on the systems of trade controls, penalties for misreporting, and trade law enforcement. Historically, border customs of both countries are more concerned about law enforcement with respect to imports. Cargo examinations, review of import documents, and penalties for non-compliance with import regulations, either monetary or merchandise seizure, were set to ensure importers would do their best to obey import regulations. Export controls are typically much weaker as customs do not strictly enforce the requirements for filling out export declarations properly. This has been especially a problem in the U.S., where traders were not at all forced to

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\(^5\)Since both countries collect information on F.O.B. imports, we do not consider transportation costs as a potential reason for differences between imports and exports data.
report their exports accurately. Consequently, non-compliance with export regulations is the main reason for severe underreporting of exports in the U.S. and a large positive mean value of the Canadian trade gap equal to 0.35 when measured in the same currency. Therefore, it is unclear why a U.S. firm that willingly underreports its imports to Canada may want to fill out export declarations truthfully if there is no risk of punishment for not doing so. Without proper enforcement of export regulations, tariff evasion will reduce both import and export statistics and will not be reflected in the trade gap measure.

Canadian export regulation, on the other hand, is different from the U.S. and provides more inducement for compliance with export rules. Canadian traders who fail to submit an appropriate declaration or to truthfully answer all of its questions are penalized in the same way regardless of whether they are exporters or importers. Although customs officials are typically more vigilant with respect to goods entering the country than they are with goods leaving the country, Canadian traders who misreport imports at the source country will still have the reason to report exports truthfully, unless by doing so it increases the chance of detection in the source country. The latter would be possible only if Canadian and U.S. customs exchange transaction-level data, which did not occur until 1990 when the MOU was signed. Therefore, unlike their U.S. counterparts, Canadian traders who violate U.S. trade laws in order to avoid paying import duties still have incentives to report truthfully on their exports in Canada. This was probably one of the reasons why in 1986 the amount of export undercount in Canada was only one tenth of the U.S., and the value of the U.S. trade gap in 1989 was only 0.1 as opposed to 0.35 for Canada. Consequently, a negative relationship between the U.S. trade gap and the U.S. import tariff may signal tariff evasion activities by U.S. importers. However, since U.S. traders have little incentive to report on their exports accurately or at all, the same relationship is less likely to be found in Canadian trade data even if tariff evasion is taking place.

**Tariff evasion in violation of the CUSFTA rules of origin.** In the presence of the free trade agreement between the U.S. and Canada in 1989, the variation in tariff schedules can encourage foreign firms to export to one FTA country through another where import duties are lower. Supposedly, such practices are precluded by customs through rules of origin (ROO) requirements. In practice, however, verification of the country of

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6In 1989, U.S. traders were expected to voluntarily drop off declaration forms before their exports left the country but faced no penalty for not doing so (United States General Accounting Office (1994)).

7For example, a person who intentionally declares false information on the required import or export declaration forms can be penalized either $6000 or 60% of the value of the goods, whichever is greater (Canada Customs Act, 1985).

8Even after the MOU was implemented, the countries were not quick to exchange information on importers’ identities in order to comply with national laws and regulations protecting confidentiality of traders’ data. Also, the countries agreed to exchange trade data for statistical purposes only.
origin and detection of falsifications may be difficult, given personnel constraints and the increasing complexity of manufacturing and assembly processes. Although marking and county label violations, which include ROO misrepresentation, accounted for almost two thirds of all violations detected by the U.S. customs in 1990, ROO enforcement still remains a problem. In its 1990 report to the Congress, the U.S. Treasury Advisory Committee expressed serious concerns regarding the effectiveness of the enforcement of ROO labeling.

If ROO violations are taking place in both the U.S. and Canada, these actions may be reflected in national trade statistics and can thus be quantitatively estimated. Suppose, for instance, that a foreign firm will pay less on duties if instead of shipping a good directly to Canada, the firm can ship it through the U.S. In so doing the firm could disguise the actual origin of the product and claim it as American upon entry into Canada. In the U.S., such a transaction would be recorded under “goods for re-export” and not be reflected in its exports statistics whereas in Canada it will be observed as an import from the U.S., thus increasing the value of Canadian trade gap. The following section explores the relationship between the trade gap and differences in Canadian and U.S. tariff schedules in more details.

**Undercount of export data.** Exporters’ failure to properly file export declarations is one of the main reasons for discrepancies in trade statistics. Some shippers do not file declarations due to the lack of understanding of filing requirements while others simply do not bother to file. Historically, enforcement for complying with import regulations was stricter than with exports regulations, and the resulting undercount of exports data has been a problem for many years. In a 1988 study conducted by the Federal Reserve (Ott, 1988), it was estimated that the total U.S. exports was $10 to $20 billion more than what was officially reported.

To eliminate large discrepancies between import and export data, Canada and the U.S. signed a Memorandum of Understanding (MOU) in 1987 to exchange import data, and as of January 1990 they started substituting each other’s import data for their export data. From this date, Canadian and U.S. exports to each other were no longer based on export declarations but rather depend on imports statistics of the counterpart country. To make data exchange possible, the two countries also adopted the Harmonized System (HS) of industry classification in 1989.

The MOU also imposes a restriction on the time frame available for this project due to the formation of shared data. Prior to 1989, Canada and the U.S. would use different industry classification for trade statistics, making it impossible to compare the two countries imports and exports at the product level. After its application

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in 1990, the data exchange program under the MOU eliminated all discrepancies between Canadian and U.S. trade statistics, which makes the trade gap equal to zero by construction.\textsuperscript{10} This leaves us with the single year 1989 when U.S. and Canadian trade data is compatible and was independently collected by two statistical agencies.

**Transit trade.** Another reason for a non-zero trade gap is related to transit trade with third countries. For example, Canadian exporters passing their goods to Mexico through the U.S. may fail to declare the outbound movement from the U.S. in their exports declaration, i.e. they may treat exports to Mexico through the U.S. in the same way as they treat direct exports to the U.S., especially when preferential tariff rate is zero. Such transactions will be captured as direct exports to the U.S. in Canadian statistics, while in the U.S. it will be classified as re-exports and will not be reflected in trade data with Canada, thus, leading to a negative U.S. trade gap.

**Data adjustments.** The methodological differences between statistical agencies of Canada and the U.S. can as well be a source of discrepancy in trade statistics. Each agency edits trade data according to its own procedures. As a result, differences in trade definition, currency conversion, coverage, valuation, etc. can lead to an imbalance in trade statistics between the two countries.

4 Empirical evidence on tariff evasion in the CUSFTA

4.1 First look at the data

The previous section outlined several reasons for discrepancies in trade statistics between importing and exporting countries. However, only two of them, tariff evasion and ROO violation, are related to importer’s trade policy. If the other three reasons, namely the undercount of export data, goods in transit, and data adjustments by statistical agencies, are independent of import tariffs at the source country, then in the presence of tariff evasion by a firm within an FTA, it is reasonable to expect a negative relationship between a country’s trade gap and its tariffs towards an FTA partner. An association as such will reflect the stronger incentive of firms to avoid paying import duties when these duties are high. Figure 1 illustrates the basic relationship between

\textsuperscript{10}Some discrepancy still remained mostly due to the difference in the adjustment procedures applied to the data by the two nation’s statistical agencies. The mean value for trade gaps in 1990 is almost zero, and the standard deviation falls by a factor of ten relative to the previous year.
trade gaps and tariffs for both countries. The horizontal axis represents the ten decile average tariff rates and the vertical axis plots the corresponding average trade gap values. For example, the rightmost point on the left panel of the graph shows that the average Canadian tariff for 10% of industries with the highest tariffs is 20.8%, and the average trade gap for this group of industries being 0.51. Figure 1 shows that the trade gap tends to decrease steadily with an increase in the average import tariff. Industries that are subject to higher duties are more likely to report a smaller value of imports to customs, which is consistent with the hypothesis that higher tariffs create stronger incentives for evasion.

As discussed in the previous section, trade data discrepancies can also be associated with tariff evasion in violation of the ROO. For example, high Canadian and low U.S. tariff rates for a certain good may stimulate foreign firms to export to Canada through the U.S. and violate Canadian ROO regulation. If this happens, foreign goods exported to the U.S. for re-exportation are shipped to Canada with the deception of being of the U.S. origin. One would then expect a positive relationship between the Canadian trade gap and the difference between Canadian and U.S. external tariffs. To operationalize this hypothesised relationship, I construct the following “tariff savings” measure

$$\text{tariff}_{\text{save}_{c_{pit}}} = \text{tariff}_{\text{row}_{c_{cit}}} - \text{tariff}_{\text{row}_{p_{pit}}} - \text{tariff}_{\text{pta}_{c_{pit}}}$$

(2)

where \(\text{tariff}_{\text{pta}_{c_{pit}}}\) is the preferential tariff rate of country \(c\) for the FTA partner country \(p\) on imports of good \(i\) at time \(t\), and \(\text{tariff}_{\text{row}_{p_{pit}}}\) and \(\text{tariff}_{\text{row}_{c_{cit}}}\) are the tariffs of countries \(p\) and \(c\), respectively, on imports from the rest of the world. This measure shows by how much a third country firm can save on import duties if it indirectly exports to country \(c\) through the partner country \(p\) disobeying the ROO. In the presence of such violations, one would expect that the more a firm can save on tariff differences, the stronger are its incentives to engage in evasive activities and the larger will be the trade gap. Since negative savings do not affect firms’ choice of shipment route, I replaced all negative values of \(\text{tariff}_{\text{save}}\) measure with zeroes.

Figure 2 illustrates the relationship between the decile average “tariff savings” and the trade gaps. On the graph one can see that, contrary to our expectations, trade gaps do not increase with the tariff savings measure. However, the graph also shows that in industries where tariff arbitrage opportunities exist (\(\text{tariff}_{\text{save}}\) measure is positive) the trade gap is almost always greater than in industries without such opportunities. That is, industries that can benefit from exporting goods through an FTA partner country as opposed to direct trade are characterized by an increase in the trade gap, which is consistent with the hypothesis of tariff evasion and the CUSFTA ROO infraction by third country firms.
4.2 Basic regression analysis

I start by estimating a simple model of tariff evasion as in Fisman and Wei (2004):

\[ \text{trade gap}_{cpi} = \beta_0 + \beta_1 \text{tariff}_{pta} + \epsilon_{cpi} \]  

(3)

Estimation results for equation (3), presented in Table 2, are consistent with the hypothesis of tariff evasion being present in both countries. In columns (1) and (2) the coefficient \( \beta_1 \) is estimated to be negative and significant, implying that higher tariff rates are associated with lower values of imports reported at the destination country. The estimated \( \beta_1 \) for Canada is \(-0.847\), which means that a 1% increase in a Canadian import tariff reduces the value of dutiable U.S. imports reported to Canadian customs by 0.847\%. Note that for the U.S. the magnitude of this effect is five times greater than that for Canada. This result should not be surprising given the stronger export reporting enforcement in Canada. In fact, one can be surprised to find any significant effect of a tariff on the Canadian trade gap given the lack of incentives for U.S. traders to report the true value of their exported goods. Yet a lower \( \beta_1 \) for Canada does not necessarily mean less evasion since the value of this coefficient for Canada is likely to be biased towards zero due to the low quality of the U.S. exports data.

The magnitude of the effect for the U.S. is pretty large though as an additional percentage point in the U.S. tariff lowers reported imports from Canada by 4.6\%. This estimated trade gap elasticity with respect to tariffs is greater than what was found in previous studies. Fisman and Wei (2004) estimated the value of \( \beta_1 \) at approximately 3 for the Chinese trade gap with Hong Kong, while the estimates by Javorcik and Narciso (2008) for their ten countries of study varied in range from 0 in Slovenia to 4.5 in Ukraine. However, in the absence of strict enforcement mechanisms with regards to coercing dealers to file export reports in the source country, \( \beta_1 \) underestimates the true magnitude of tariff evasion. Since none of the above studies explain traders’ incentives to report exports truthfully, it is impossible to assess a potential downward bias in their estimates. Moreover, given that in 1989 a simple average U.S. tariff rate for Canada was 2.1\%, our estimates imply that in an average U.S. industry, imports from Canada was underreported by 9.7\%. This result is more realistic than the results for China (108\%) and Ukraine (38\%), implied by estimates of Fisman and Wei (2004) and Javorcik and Narciso (2008).

Columns (3) and (4) in Table 2 include 2-digit HS industry fixed effects to take into account any possible differences between industries, such as cargo inspection frequencies and others. The results indicate that tariff variation within 2-digit HS product categories have a similar effect on the trade gap as before.
4.3 Sources of tariff evasion

The preceding analysis demonstrates a positive relationship between tariff rates and the propensity to underreport the shipment value of dutiable goods. In this section we identify some of the channels that traders use to falsely report the value of imports to customs officials, such as underinvoicing the shipment value, split invoicing, where the value of the shipment is distributed on two or more invoices, and product misclassification.

One of the most popular forms of tariff evasion is product misidentification, such as falsely labeling the product in order to claim special exemption from tariffs or misclassification of a high-tax product as a low-tax one. As long as traders themselves are responsible for determining a correct 10-digit HS tariff classification number for each of their imported items, they may have the temptation to pick a “similar” classification number which is subject to a lower duty rate. To investigate this possibility, I add additional controls to the benchmark equation (3). In line with Fisman and Wei (2004), I add an average tariff for “similar” goods, defined as a trade-weighted average tariff rate for all other 6-digit goods within the same 4-digit HS category. If misclassification takes place at the 4-digit level, then we would expect this newly constructed variable, $\text{tariff}_o$, to have a positive effect on the trade gap because a reduction in $\text{tariff}_o$ would encourage exporters to reclassify their product to a “similar” 6-digit category with lower tariff, thus having a negative effect on the trade gap.\footnote{We continue to assume that all information in the exports declarations is correct, including information on the shipments’ industry classification.}

To control for potential misclassification within 6-digit categories I introduce a variable, $\text{tariff}_{var}$, which measures tariff variance between the 10-digit varieties within the same 6-digit industry. The prior is that in 6-digit industries with high tariff variation at the 10-digit level, there are more opportunities for traders to misclassify imported items to their own advantage.\footnote{For about 40% of all 6-digit industries with only one subindustry, the tariff variance is unidentifiable. To preserve these observations in my sample, I replace these values with zeros and introduce a dummy variable which takes the value of one for industries with unidentified variance and zero for all others.}

I also construct two additional controls to better isolate the non-tariff determinants of tariff evasion. The first one, transportation costs, is measured as the share of transportation expenses in the value of imports ($\text{transp\_costs}$).\footnote{Transportation costs include freight, insurance, and other charges incurred in bringing the good to the country and applied beyond the port of exportation.} Trade statistics collected in Canada and in the U.S. measures transportation costs on a free on board (F.O.B.) basis, implying that in the absence of tariff evasion, trade costs must be independent of the trade gap. Nevertheless, transportation expenses can be an indicator of split invoicing: a tariff evasion scheme
where the exporter will send two invoices for each purchase order while the importer will submit only one to customs and, therefore, pay duty on one invoice only. The invoice that was not submitted by the importer is usually added as “packaging/transportation costs” to avoid arousing suspicion. Thus, a negative coefficient on \( \text{transp\_costs} \) can indicate tariff evasion activities through masking the value of imports as transportation costs.\(^{14}\) The second additional explanatory variable is the share of imports from a partner country within the 6-digit HS industry that fall under tariff-free market access (\( \text{share\_free} \)). Duty-free market access would disrupt incentives for tariff evasion. Moreover, a large share of products that are duty free can be related to importers’ false claims for tariff exemptions. In either case, an increase in the share of tariff-free market access would lead to an increase in the value of reported imports and, hence, to an increase in the trade gap. Table 1 reports summary statistics for these additional control variables.

To examine the relevance of these channels for tariff evasion in Canadian and the U.S., I estimate the following model:

\[
\text{trade gap}_{\text{cpi}} = \beta_0 + \beta_1 \text{tariff\_pta}_{\text{cpi}} + \beta_2 \text{tariff\_o}_{\text{cpi}} + \beta_3 \text{tariff\_var}_{\text{cpi}} + \\
\quad + \beta_4 \text{share\_free}_{\text{cpi}} + \beta_5 \text{transp\_costs}_{\text{cpi}} + \varepsilon_{\text{cpi}}
\]  

(4)

Table 3 provides estimates of equation (4). The second row shows the effect of tariff evasion from the misclassification of goods (\( \beta_2 \)). All the estimates in columns (1)-(5) are positive and mostly significant, which is consistent with our expectation that lower tariffs for similar goods stimulate traders to misclassify imported items and to underreport the value of imports. In other words, firms tend to reclassify their shipments to a different 4-digit industry code in order to save on import duties. In contrast, there is no evidence of misclassification at the 6-digit product level as the coefficient on tariff variance (\( \beta_3 \)) is statistically insignificant. In the presence of misclassification at the 4-digit industry level, this result is surprising as one would expect more tariff evasion by misclassification at a higher level of product disaggregation where commodities are more homogeneous. A possible explanation for this result can be the low variation in tariff rates at the 6-digit product level, which is only 1/8 of that for the 4-digit industries. When mislabelling within 6-digit level is not possible, firms look for other opportunities to save on import duties.

The coefficient on the share of duty-free trade within the 6-digit industry (\( \beta_4 \)) is positive and significant only for Canada. This result implies that the larger share of free trade either weakens the incentives for tariff evasion activities or encourages importers to seek opportunities to falsely qualify for tariff preferences. It may

\(^{14}\)The data on transportation costs does not exist for Canada, so I use this variable only for the analysis of the U.S. trade gap.
also indicate the misclassification of goods into those product categories that fall under free trade preferences thus making trade gap bigger. Yet at the same time, there is little evidence of such tariff evasion schemes among U.S. importers as the coefficient $\beta_4$ for the U.S. is positive and significant only for the specification with industry fixed effects. Finally, the coefficient on transportation costs for the U.S. equation, $\beta_5$, is negative but insignificant, thus not allowing us to assess the role of split invoicing schemes in tariff evasion in the U.S.

Overall, there is a consistently strong and significant effect of U.S. import tariffs on the reported value of imports whereas the same relationship in Canada is much weaker. The difference in results is likely to reflect the differences in trade data collected by the statistical agencies of the two countries. A small or insignificant $\beta_1$ coefficient for Canada should not be interpreted as less tariff evasion happening in Canada relative to the U.S. but may well imply weak enforcement of export filing regulations in the U.S., making trade gap analysis inappropriate for investigation of tariff evasion in Canada.

4.4 Is it really tariff evasion?

Section 4.3 demonstrates the negative and statistically significant relationship between import tariffs on one hand and the U.S. and Canadian trade gaps on the other. This relationship is consistent with the hypothesis that stronger incentives for evasion arise when tariffs are high. However, as discussed in Section 3, tariff evasion is only possible source of discrepancies between national trade statistics. In this section I show that the effect I have found is indeed tariff evasion and is not related to other factors, discussed in Section 3, that may lead to non-zero values in the trade gap measure.

4.4.1 Trade data adjustments

One of the reasons for a source country exports not to match a destination country imports is that statistical agencies of two countries may process trade data differently according to their own trade definitions. There is little reason to believe that such data processing is systematically related to trade policy measures though. Nevertheless, it is important to verify that the negative effect of tariffs on the trade gap is not related to such data adjustment differences in two countries. To show that this is the case, I estimate equation (3) for 1990-1997, i.e. for the rest of the CUSFTA tariff phase-out period when the trade data exchange program between Canada and the U.S. was in place. As it was discussed in Section 3, even under the data exchange program
the discrepancies in trade statistics persevered, mainly due to data adjustments by national statistical agencies, although the trade gap variance fell by a factor of ten. Once the data exchange program was implemented, however, there were no reasons for the trade gap to be different from zero, other than data adjustments. As all methodological modifications associated with implementing the data exchange program were completed by 1989, the data adjustment procedures of that year and the following ones were similar. Therefore, if the effect found in the previous section is a consequence of data processing by national statistical agencies, we would expect to find the same results for the time period after 1989.

Columns (5) and (6) of Table 2 provide the estimates of $\beta_1$ for 1990-97 time period. The results show that $\beta_1$ becomes insignificant for the U.S. and even slightly positive for Canada, although not statistically significant at the 5% confidence level. These results are in line with the hypothesis that trade data adjustments, undertaken by national statistical agencies, are not related to trade policy measures. Therefore, it is safe to conclude that data adjustments, one of the four sources of trade data discrepancies identified in Section 3, cannot be the reason for the observed negative relationship between the trade gap and tariffs in 1989.

4.4.2 Transit trade

Another source causing ambiguities in the trade data is transit trade. As it was discussed earlier, traders may export goods to non-CUSFTA countries through a partner country without properly documenting the transactions, which will tend to decrease the value of the trade gap. Firms export goods through a partner country mostly for logistical reasons, and with a tariff free market access to a partner country’s market many firms see no reason to follow procedural requirements for in-bound trade. Therefore, such data-distorting behavior is more likely to take place in industries with a high share of tariff-free market access, and $share_{\text{free,cpi}}$ variable, already included in all specifications, should control for this effect. Moreover, the 2-digit industry fixed effects capture the time-invariant logistical advantage of re-exporting different product categories through a partner country. Finally, if traders do not report re-exports properly only to avoid procedural hassles, then it is reasonable to assume that the share of exports improperly declared to third countries is fixed and thus proportional to the total value of exports to third countries. However, including the log of exports to non-CUSFTA countries to the equation (4) does not alter any of the results.
4.5 Estimating trade effect of an FTA in the presence of tariff evasion

It was demonstrated in Sections 4.2 and 4.3 that higher tariffs have the propensity to lead to lower values of reported imports. If this is the case, then formation of an FTA and the following trade liberalization would remove all incentives for tariff evasion and lead to an increase in value of reported imports. Therefore, we would expect that trade liberalization, imposed by the free trade agreement between the U.S. and Canada, will increase the amount of trade for industries that undergo largest tariff cuts for two reasons. Firstly, through the direct effect of tariff cuts on consumer prices of imported goods by raising the demand for imports and the volume of trade. Secondly, the amount of trade recorded by national statistical agencies for high-tariff industries would increase because of the ‘whitening’ of pre-existing undisclosed trade. Since 1989 was the first year of the CUSFTA, we can analyze the relationship between the amount of pre-FTA undisclosed trade and the future growth of trade following deeper trade liberalization. If a portion of the increased volume of trade under the CUSFTA is indeed related to the reduction in undisclosed imports, then we would expect more rapid growth of trade in industries originally with a higher share of ‘missing’ imports.

To test this hypothesis, we estimate the following equation:

$$\% \Delta \text{imports}_{cpi} = \gamma_0 + \gamma_1 (\Delta \text{tariff}_{pta,cpi}) + \gamma_2 (\text{trade gap}_{cpi,1989}) + Z' \gamma_3 + \gamma_t + \varepsilon_{cpi}$$  \hspace{1cm} (5)

where $\Delta x$ is the change in variable $x$ between 1990 and 1991 and $\gamma_t$ is year fixed effects.\(^{15}\) This equation is similar to that of Clausing (2001) who derived the relationship between the growth rate of imports and changes in tariffs from a simple import demand and export supply model. The coefficient $\gamma_1$, expected to be negative, measures the effect of falling imports prices, caused by trade liberalization, on import demand. The coefficient $\gamma_2$ measures the effect of the trade gap in 1989 for the subsequent growth rate of imports. If trade liberalization provides more reasons for traders to comply with trade regulations, one would expect the reported amount of imports to grow faster for industries with high share of misreported imports prior to the CUSFTA. In other words, $\gamma_2$ if expected to be negative. $Z$ represents additional controls, such as the unit of measurement of imports and the share of industry $i$ in total imports in 1989. This variable is used to control for possibly faster growth rates in industries with low starting values of imports.

One may also be concerned about potential endogeneity of the trade gap since it is measured with error.\(^{16}\) Since imports is also used in the construction of the trade gap measure, I focus on the import growth rate between 1990 and 1999 to minimize potential simultaneity problem with trade gap$_{cpi,1989}$ variable.
and only a small fraction of its variation is related to incentives to avoid import duties. Furthermore, the measurement error shocks in imports data can be time persistent. To address trade gap endogeneity issue, I instrument the \( \text{trade gap}_{cpi, 1989} \) variable with the tariff rate from 1989 in combination with other determinants of the trade gap, identified in Section 4.3 as being associated with tariff evasion schemes.\(^{16}\) The GMM estimation results for equation (5) are presented in Table 4. We already know that most of the instruments for the trade gap are statistically significant at the first stage. Moreover, the hypothesis of exogeneity of the instruments is never rejected by the Hansen test and it is possible to conclude that we have a valid set of instruments.

Negative and highly significant coefficients for the trade gap confirm the hypothesis that faster trade growth rates occur in industries that had a larger share of under reported import values in 1989. That is, the pre-FTA tariff evasion, as reflected in the trade gap measure, leads to faster trade growth rates under the trade agreement. It is important to note that, controlling for pre-FTA tariff evasion in columns (3)-(4), the coefficient on import demand elasticity with respect to tariff (\( \gamma_1 \)) is smaller in absolute values only for Canada and not for the U.S. This reduction in \( \gamma_1 \) coefficient is consistent with an upward bias of trade-creation effect of an FTA when pre-FTA tariff evasion is not controlled for. Moreover, this bias can be even stronger for other trade agreements formed by countries with higher levels of corruption. In columns (5)-(8) I estimate equation (5) using annual observations for import growth rates and tariff changes for the time period after 1990 until 1998 when all CUSFTA tariffs were eliminated. Again, the estimation results confirm our earlier findings that the share of misreported imports before CUSFTA trade liberalization affects future trade growth. These results imply that although the CUSFTA tariff reduction does promote trade between two partisan countries, some of this growth came as a result of an increase in the accuracy of import reporting by traders and ergo the improved quality of the trade data. Therefore, the effect of preferential trade agreements on trade and welfare may be overestimated if one does not take into account the “whitening” of pre-existing undisclosed trade.

Another way to indirectly test the relationship between tariff evasion and trade growth under the FTA is to compare the corollary of tariff reduction on a country’s import and export growth rates separately. The tariff evasion hypothesis implies that there is a greater value of under reported imports relative to exports. Consequently, when the FTA is implemented, we would expect the destination country’s amount of imports to be more responsive to tariff changes than the corresponding value of exports in the source country. To examine this possibility, I compare Canadian and U.S. export elasticities with respect to Canadian import tariffs, and

\(^{16}\) The only two variables excluded from the list of instruments are \( \text{tariff\_var} \) and \( \text{tariff\_o} \). The former is excluded because of its insignificance at the first stage, the latter does not pass exogeneity test.
vice versa. We can only perform this analysis for the year 1990, since the earlier growth rates are unavailable and afterwards the MOU on data exchange effectively eliminating any trade data discrepancies.

Table 5 provides the results for Canadian import and export elasticities with respect to tariffs. In columns (1)-(4) one can see a huge difference between Canadian import and U.S. export elasticities. Using the OLS estimates, a one percentage reduction in Canadian tariffs will increase Canadian imports from the U.S. by 3.953% but only increase U.S. exports to Canada by 0.175%, and the latter effect is statistically insignificant. Without tariff evasion, this result is very surprising because in the presence of severe export undercount in 1989, the expectation would be that exports grow faster than imports. Instead, export undercount effect is entirely captured by a positive and significant constant term in the U.S. export equation. The fact that imports are more responsive to tariffs than exports in the presence of an FTA is consistent with the tariff evasion hypothesis since the growth rate of imports also includes growth in reported trade. The U.S. estimate draws similar conclusions: U.S. imports from Canada are twice as responsive to tariff cuts than corresponding Canadian exports to the U.S. Thus, as hypothesized, the CUSFTA tariff reductions lead to a greater increase in imports than exports in both countries. These results provide additional support in demonstrating the occurrence of tariff evasion and highlight a necessity to take the effect of evasion into account when attempting to estimate the various trade effects of regional trade agreements using national trade statistics.

5 Tariff evasion by third country firms in violation of ROO

The preceding sections document extensive evidence of tariff evasion by domestic importers and exporters in Canada and in the U.S. It further suggests that firms do respond to trade barriers with false statements to customs in order to minimize duty payments. If non-compliance behavior is practiced by firms trading within the CUSFTA, it is natural to assume that such practices are also available to firms trading with countries which are not party to the trade agreement. As discussed previously, differences in external tariffs between FTA partner countries can stimulate firms to export to a high-tariff country through a low-tariff FTA partner in violation of the ROO. In this section we present two alternative tests for the rules of origin violation (ROOV) hypothesis. First, we show that in industries with high external tariff rates the trade gap tends to be larger,

\[ \text{It is still possible though that lower sensitivity of exports with respect to tariff changes can be driven by the lower quality of exports data. Although the results of this test are consistent with the hypothesis that trade effects of FTAs are overestimated in the presence of tariff evasion, the alternative explanation of low export data quality cannot be ruled out.} \]
which is consistent with the ROOV hypothesis as goods qualifying for preferential treatment at the destination
are not reported as exports by an FTA partner country. Second, we show that both the MFN and preferential
tariffs have positive association with the share of indirect trade through an FTA partner country, meaning
that transshipment by third countries though an FTA member is larger in those industries where its partner
country’s MFN tariffs are high.

5.1 Identifying rules of origin violations with the trade gap

If a firm can save on duties by exporting to Canada through the U.S. in violation of the CUSFTA ROO,
the shipment will be declared to U.S. officials as “re-exports” in order to avoid paying the U.S. import duty.
Therefore, it will not be part of exports to Canada in the trade data collected by American officials. In Canada,
however, the good will arrive camouflaged as a product of the U.S., inflating the value of the Canadian trade
gap. Accordingly, if high Canadian external tariff stimulate the ROOV in a certain industry, we would expect to
find larger value of the trade gap measure compared to an observationally identical industry with low tariff rate
and without tariff evasion. Note that since “re-exports” is not included into total exports flow, tariff evasion
by third country firms though the ROOV is not affected by the quality of the exports data. Therefore, we are
just as likely to find this form of evasion for Canada as for the U.S., regardless of the differences in reliability of
their export data.

When firms export to one FTA country through its partner, they claim tariff exemption in the transit
country by reporting their shipment as goods for re-exports. Thus the incentives for indirect trade and the
ROOV will only be affected by the intra-CUSFTA tariff rate and the external tariff in the country of the
ultimate destination. To test for the hypothesis of ROOV by third country firms we augment the model (4)
with the external tariff rate (\(\text{tariff}_\text{row}\)):

\[
\text{trade gap}_{\text{cpi}} = \beta_0 + \beta_1 \text{tariff}_\text{pta}_{\text{cpi}} + \beta_2 \text{tariff}_\text{row}_{\text{cpi}} + \beta_3 \text{tariff}_\text{o}_{\text{cpi}} + \\
+ \beta_4 \text{tariff}_\text{var}_{\text{cpi}} + \beta_5 \text{share}_\text{free}_{\text{cpi}} + \beta_6 \text{transp costs}_{\text{cpi}} + \varepsilon_{\text{cpi}}
\]  

If firms can circumvent the CUSFTA ROO by reporting transshipments through a transit country as goods for
re-exports, we would expect a country’s external tariff to have a positive effect on the trade gap (\(\beta_2 > 0\)).
Moreover, the effect of its preferential tariff for an FTA partner country will continue to be negative for two
reasons. First, as it was previously documented, high preferential tariff stimulates tariff evasion. Secondly, it
will discourage the ROOV. Therefore, we would expect $\beta_1$ to remain negative.

The estimation results for equation (6) are reported in Table 6. In all specification the coefficient on internal tariff rate remains negative when the effect of external tariff is controlled for, suggesting that the channels for tariff evasion used by FTA and non-FTA firms are independent from each other. Furthermore, the coefficients on the \textit{tariff\_row} variable are all positive and significant at least at 10% confidence level for Canada and insignificant for the U.S. The results for Canada indicate that in industries where exporting through an FTA partner country in violation of the ROO allows firms to save on tariffs, there are more imports reported in Canada than exports reported in the U.S. In other words, some share of imports that traders report to Canadian customs as being originated from the U.S. was not registered is the U.S. as exports to Canada. The finding that a portion of traders declare foreign goods as American-made is consistent with the ROO fraud hypothesis as any other source contributing to a positive trade gap, such as exports undercount, will not be correlated with the difference between external and internal tariff rates.

The coefficient 1.345 on the Canadian external tariff means that an additional percentage point increase in Canadian tariff preferences for U.S. imports will raise indirect trade within the CUSFTA in circumvention of the ROO by 1.345 percentage points. With the sample-average tariff preferences equal to 0.6%, the estimates of Table 6 imply that 0.8% of within-CUSFTA imports in 1989, worth of $706 million CAD, was falsely qualified for preferential treatment. Of course we would expect this share to rise by the end of the CUSFTA grace period when tariff preferences increased to MFN tariff rates.

As for the insignificant coefficient on the U.S. external tariff, there are two possible explanations for this result. Firstly, the benefits of violating the ROO by exporting through an FTA partner country must outweigh all additional costs associated with these activities, such as increased transportation expenses and more complicated logistics. Since Canadian external tariffs in 1989 were considerably higher than in the U.S., there were more benefits to exporters to Canada to violate the ROO, making them more responsive to differences in external tariffs. The mean U.S. tariff preference rate of 0.2% is probably not enough to stimulate indirect trade to the U.S. Secondly, in many cases transportation costs to Canada can be even lower when goods are shipped through the U.S. When this is the case, even small differences in external tariff rates may motivate third country exporters to Canada to get involved into the ROO fraud. In sum, the findings in this section demonstrate that in the presence of tariff preferences traders from outside of trade agreement seek to qualify for preferential treatment in violation of the ROO when these preferences are large enough to outweigh all associated costs.
5.2 Identifying rules of origin violations with indirect trade flows

The test of the ROOV hypothesis in the previous section is based on the premise that in the transit country transshipment is declared as goods for re-exports. In our second approach to test the ROOV hypothesis we use the data on re-exports as well as the insight of Fisman, Moustakerski, and Wei (2008) that indirect trade can indicate tariff evasion activities. Suppose for some industry $i$ Canadian MFN tariff is greater than preferential tariff for the U.S., and the preference margin is high enough to encourage transshipment of goods produced in third countries though U.S. territory to Canada in violation of the CUSFTA ROO. To claim a refund of duties paid to the U.S. customs, these goods will be declared in the U.S. as goods for re-exports (to Canada or elsewhere). However, at the Canadian border they will arrive as being manufactured in the U.S. in order to qualify for preferential tariff rate. Therefore, in the presence of the ROOV there will be more re-exports between the CUSFTA members in industries with high external tariffs. Thus, the share of re-exports in total exports of third countries to the CUSFTA can reflect the ROOV, and to test this hypothesis we use the following specification:

\[
\text{reexport}_{pi} = \gamma_0 + \gamma_1 \text{tariff}_{pta_{ci}} + \gamma_2 \text{tariff}_{mfn_{ci}} + \gamma_3 \text{tariff}_{mfn_{pi}} + \delta_t + \epsilon_{pi} \tag{7}
\]

\[
\text{reexport}_{pi} = \frac{\sum_j \text{indirect exports}_{jpi}}{\sum_j (\text{indirect exports}_{jpi} + \text{direct exports}_{jpi})} \forall j \neq p, c \tag{8}
\]

The dependent variable \( \text{reexport}_{pi} \) is the share of re-exports going through a partner country $p$ of product $i$ and is equal to the ratio of re-exports by all non-CUSFTA countries $j$ to country $p$ divided by their total value of exports to $p$.\(^{18}\) As previously defined, \( \text{tariff}_{pta_{ci}} \) is the preferential tariff rate of a country $c$ on imports of good $i$ from a partner $p$, and \( \text{tariff}_{mfn_{ci}} \) and \( \text{tariff}_{mfn_{pi}} \) are the MFN tariff rates of countries $c$ and $p$, respectively. If the ROOV takes place, we would expect the share of re-exports from third countries to country $p$ to be positively correlated with country $c$’s MFN tariff ($\gamma_2 > 0$) and negatively with country $c$’s preferential tariff on imports from $p$ ($\gamma_1 < 0$).

It is important to emphasize two important differences between equations (6) and (7). First, equation (7) does not rely on the trade gap measure and hence can be estimated for all years subsequent to CUSFTA.

\(^{18}\)An alternative measure of re-export would be re-exports of product $i$ by partner country $p$ to country $c$ relative to total exports. However, the information on the destination of goods in transit is reported by traders upon exporting and can be unreliable (see Section 4.4.2).
establishment. Second, its estimation requires the data on indirect imports of Canada and the U.S. from the rest of the world, which are missing in the official trade statistics of the two countries. Therefore, we estimate equation (7) with the annual trade data from 1989 to 2008 derived from the World Bank WITS Comtrade database collected at 6-digit HS industry classification. The information on preferential and MFN tariff rates, constructed as simple averages of product categories within 6-digit industry, was retrieved from WITS TRAINS database.

Table 7 presents estimation results for equation (7) which confirm our previous findings on ROOV in Section 5.1. The estimates for Canada in the first column show that high Canadian MFN tariff rates are associated with more re-exports by third countries’ firms to the U.S., implying that the decision of traders from outside of the CUSFTA to ship goods through the U.S. is related to the Canadian trade policy. The estimate on the U.S. MFN tariff rate is only one tenth of that on the Canadian MFN tariff and is statistically insignificant. The decision to use the U.S. as a transit country is thus unaffected by the U.S. tariff rate, which supports our hypothesis that all goods for re-exports are exempted from paying import duties. Overall, the result that re-exports by third country to the U.S. is more responsive to Canadian than to U.S. MFN tariffs is consistent with the CUSFTA ROOV hypothesis. The negative and highly significant coefficient on the Canadian preferential tariff rate suggests that an increase in CUSFTA tariff preferences stimulates re-exports through the U.S. territory and thus provides further support to the ROOV hypothesis. Adding industry fixed effects in column (2) reduces the estimate on the Canadian MFN tariff rate to 0.065 but it still remains highly significant.

The slope coefficient on the Canadian MFN tariff rate implies that a 1% increase in tariff is associated with 0.139% increase in the share of indirect exports to the U.S. Quantitatively, the re-export share in an industry with the sample average value of the Canadian MFN tariff of 6.21% is $0.139 \times 6.21 = 0.86\%$ greater than in an industry with zero MFN tariff rate, all else equal. Given the sample mean U.S. re-export share of 3.2%, this result implies that more than 25% of all transshipments through the U.S. is driven by the ROO violation motive. On the other hand, the negative effect of the Canadian preferential tariff (with the sample mean value of 1.04%) reduces the share of re-exports for an average industry by $0.223 \times 1.04 = 0.23\%$. Thus, 0.63 percentage points of total U.S. imports from third countries, or 878 million U.S. dollars per year, is then exported to Canada in violations on the ROO, generating $(0.0621 - 0.0104) \times 878 = $45.4 million USD loss in Canadian tariff revenue per year.

The results for equation (7), estimated for the U.S., are presented in columns (3) and (4) of Table 6. Two
main coefficients of interest, $\gamma_1$ and $\gamma_2$, are both statistically insignificant, implying that both the U.S. MFN and preferential tariffs are uncorrelated with the Canadian re-export share. This is no surprise, since the average U.S. tariff preference margin is only 2.59% and, as discussed in the previous section, can be not big enough to outweigh the tariff evasion costs.

Another important result of columns (3) and (4) is that the coefficient on the Canadian MFN tariff rate is positive and significant, implying that high external tariffs are associated with the larger share of Canadian imports being declared as goods for re-exports. Since goods for re-exports are exempted from import duties, positive $\gamma_3$ provides another piece of evidence in favor of tariff evasion activities in Canada. This result is in line with Fisman, Moustakerski, and Wei (2008), who suggest that positive relationship between import tariff and re-export share can indicate evasion-motivated activities. Furthermore, that the coefficient $\gamma_3$ is significant for Canada but insignificant for the U.S. lends further support to the results of Section 4.3 that tariff evasion took place in Canada but not in the U.S. most likely due to low external tariffs of the latter country.

As a robustness test, in columns (5)-(6) we present estimation results for equation (7) for the case when tariff preference margin is less than 1%. Presumably, a preference margin under 1% is not high enough to cover evasion costs and to provide strong enough incentives to circumvent the ROO. The coefficients on $\gamma_1$ and $\gamma_2$ are both statistically insignificant, implying that the ROO violations are not occurring when incentives are too low.

6 Conclusion

This paper provides new empirical evidence for several important features of tariff evasion in the presence of an FTA. First, using trade data between Canada and the U.S. during the first year of the CUSFTA, it shows that even in developed countries with low corruption and good law enforcement, firms are still actively involved in tariff evasion activities. The analysis of this paper reveals that an additional percentage point increase in import tariff reduces the value of reported imports by 3-5% in the U.S. and by at least 1% in Canada. Second, I found that tariff cuts, implied by an FTA, may have a strong effect on subsequent growth in trade by removing incentives for tariff evasion and the ‘whitening’ out of trade flows. I show that industries with a higher share of unreported trade before the CUSFTA experienced faster growth in trade after the CUSFTA trade liberalization. Finally, I found that tariff preferences between FTA members create additional opportunities for tariff fraud
by means of exporting to a high-tariff country through a its FTA partner in violation of the ROO. The results suggest that an additional percentage point increase in tariff preferences will increase Canadian indirect imports through the U.S. by 3% and U.S. indirect imports through Canada by 1%.

References

Canada Customs Act (1985):


Table 1. Descriptive statistics for protection measures and market shares, 1989.

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Table 2. Effect of tariffs on evasion.

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</tr>
<tr>
<td>N</td>
<td>4,809</td>
<td>3,887</td>
<td>4,809</td>
<td>3,887</td>
<td>38,789</td>
<td>34,759</td>
</tr>
</tbody>
</table>

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%. Robust standard errors are in parentheses. All regressions include units of measurement dummies as controls. Columns (3) and (4) include 2-digit HS industry fixed effects, and columns (5) and (6) and include time fixed effects.
Table 3. Extended regression analysis of tariff evasion.

<table>
<thead>
<tr>
<th>Importer:</th>
<th>CAN</th>
<th>USA</th>
<th>USA</th>
<th>CAN</th>
<th>USA</th>
<th>CAN</th>
<th>USA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(7)</td>
</tr>
<tr>
<td>tariff_p.ta</td>
<td>-0.889*</td>
<td>-4.782***</td>
<td>-4.784***</td>
<td>-1.317*</td>
<td>-3.653*</td>
<td>0.259</td>
<td>-0.119</td>
</tr>
<tr>
<td></td>
<td>(0.459)</td>
<td>(1.684)</td>
<td>(1.683)</td>
<td>(0.680)</td>
<td>(1.970)</td>
<td>(0.510)</td>
<td>(0.085)</td>
</tr>
<tr>
<td>tariff_o</td>
<td>2.790***</td>
<td>1.619*</td>
<td>1.617*</td>
<td>2.265***</td>
<td>2.710***</td>
<td>-0.309</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(0.419)</td>
<td>(0.843)</td>
<td>(0.841)</td>
<td>(0.427)</td>
<td>(0.945)</td>
<td>(0.250)</td>
<td>(0.046)</td>
</tr>
<tr>
<td>tariff_var</td>
<td>-0.167*</td>
<td>0.119</td>
<td>0.121</td>
<td>-0.080</td>
<td>0.502</td>
<td>-0.021**</td>
<td>-0.009</td>
</tr>
<tr>
<td></td>
<td>(0.090)</td>
<td>(0.495)</td>
<td>(0.495)</td>
<td>(0.065)</td>
<td>(0.680)</td>
<td>(0.009)</td>
<td>(0.056)</td>
</tr>
<tr>
<td>share_free</td>
<td>0.210***</td>
<td>0.058</td>
<td>0.054</td>
<td>0.242***</td>
<td>0.206**</td>
<td>-0.016</td>
<td>-0.022***</td>
</tr>
<tr>
<td></td>
<td>(0.067)</td>
<td>(0.082)</td>
<td>(0.082)</td>
<td>(0.084)</td>
<td>(0.088)</td>
<td>(0.014)</td>
<td>(0.005)</td>
</tr>
<tr>
<td>transp_costs</td>
<td>-0.641</td>
<td>-1.671*</td>
<td>-1.671*</td>
<td>-0.309</td>
<td>0.000</td>
<td>-0.309</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(0.056)</td>
<td>(0.082)</td>
<td>(0.082)</td>
<td>(0.084)</td>
<td>(0.088)</td>
<td>(0.014)</td>
<td>(0.005)</td>
</tr>
</tbody>
</table>

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%. Robust standard errors are in parentheses. All regressions include units of measurement dummies as controls. Columns (4) and (5) include 2-digit HS industry fixed effects, and columns (6) and (7) include time fixed effects.

Table 4. Pre-NAFTA trade gap and post-NAFTA trade growth rates.

<table>
<thead>
<tr>
<th></th>
<th>CAN</th>
<th>USA</th>
<th>CAN</th>
<th>USA</th>
<th>CAN</th>
<th>USA</th>
<th>CAN</th>
<th>USA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(7)</td>
<td>(8)</td>
</tr>
<tr>
<td></td>
<td>(1.123)</td>
<td>(1.303)</td>
<td>(1.209)</td>
<td>(1.764)</td>
<td>(0.441)</td>
<td>(0.530)</td>
<td>(0.442)</td>
<td>(0.558)</td>
</tr>
<tr>
<td>trade_gap_1989</td>
<td>-0.501**</td>
<td>-0.429**</td>
<td>-0.099*</td>
<td>-0.191***</td>
<td>-0.099*</td>
<td>-0.191***</td>
<td>-0.099*</td>
<td>-0.191***</td>
</tr>
<tr>
<td></td>
<td>(0.216)</td>
<td>(0.219)</td>
<td>(0.055)</td>
<td>(0.062)</td>
<td>(0.055)</td>
<td>(0.062)</td>
<td>(0.055)</td>
<td>(0.062)</td>
</tr>
<tr>
<td>Hansen J-stat., p-value</td>
<td>0.90</td>
<td>0.73</td>
<td>0.94</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>N</td>
<td>4,907</td>
<td>4,030</td>
<td>4,765</td>
<td>3,628</td>
<td>38,563</td>
<td>32,349</td>
<td>37,392</td>
<td>28,529</td>
</tr>
</tbody>
</table>

Notes: The dependent variable is imports growth rate between 1990 and 1991 period in columns (1)-(4), and annual imports growth rate during 1991 to 1999 period in columns (5)-(8). * significant at 10%, ** significant at 5%, *** significant at 1%. Columns (3), (4), (7) and (8) are estimated with the GMM. Robust standard errors are in parentheses. All regressions include units of measurement dummies and the share of imports from partner country in 1989 as controls. Columns (5) -(8) also include year fixed effects. Under the null hypothesis of the Hansen J-statistics is that all instruments are exogenous.

Table 5. The effect of NAFTA trade liberalization on imports and exports growth rates.

<table>
<thead>
<tr>
<th>Dep.var.:</th>
<th>CANADA</th>
<th>USA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Δ tariff_p.ta</td>
<td>-3.953***</td>
<td>-0.175</td>
</tr>
<tr>
<td></td>
<td>(0.755)</td>
<td>(1.094)</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.022</td>
<td>0.405***</td>
</tr>
<tr>
<td></td>
<td>(0.020)</td>
<td>(0.039)</td>
</tr>
<tr>
<td>sample</td>
<td>1990</td>
<td>1990</td>
</tr>
<tr>
<td>ind FE</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>r2</td>
<td>0.024</td>
<td>0.012</td>
</tr>
<tr>
<td>N</td>
<td>4,921</td>
<td>4,774</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dep.var.:</th>
<th>USA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(5)</td>
</tr>
<tr>
<td>Δ tariff_p.ta</td>
<td>-3.529***</td>
</tr>
<tr>
<td></td>
<td>(1.230)</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.102**</td>
</tr>
<tr>
<td></td>
<td>(0.034)</td>
</tr>
<tr>
<td>sample</td>
<td>1990</td>
</tr>
<tr>
<td>ind FE</td>
<td>no</td>
</tr>
<tr>
<td>r2</td>
<td>0.007</td>
</tr>
<tr>
<td>N</td>
<td>4,071</td>
</tr>
</tbody>
</table>

Notes: dependent variable: in columns (1)-(4) is Canadian imports and US exports growth rate in 1990; in columns (5)-(8) is US imports and Canadian export growth rates in 1990. * significant at 10%, ** significant at 5%, *** significant at 1%. Robust standard errors are in parentheses.
### Table 6. Trade gap and FTA external tariffs.

<table>
<thead>
<tr>
<th></th>
<th>CAN</th>
<th>USA</th>
<th>CAN</th>
<th>USA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>tariffpta</td>
<td>-2.033***</td>
<td>-4.437***</td>
<td>-2.255***</td>
<td>-3.341***</td>
</tr>
<tr>
<td></td>
<td>(0.743)</td>
<td>(1.688)</td>
<td>(0.794)</td>
<td>(0.971)</td>
</tr>
<tr>
<td>tariffrow</td>
<td>1.345**</td>
<td>-0.503</td>
<td>1.100*</td>
<td>-0.272</td>
</tr>
<tr>
<td></td>
<td>(0.669)</td>
<td>(0.529)</td>
<td>(0.613)</td>
<td>(0.487)</td>
</tr>
<tr>
<td>tariffo</td>
<td>2.441***</td>
<td>1.428*</td>
<td>2.102***</td>
<td>2.452***</td>
</tr>
<tr>
<td></td>
<td>(0.421)</td>
<td>(0.857)</td>
<td>(0.368)</td>
<td>(0.833)</td>
</tr>
<tr>
<td>tariffvar</td>
<td>-0.102</td>
<td>0.023</td>
<td>-0.039</td>
<td>0.370</td>
</tr>
<tr>
<td></td>
<td>(0.084)</td>
<td>(0.829)</td>
<td>(0.150)</td>
<td>(1.067)</td>
</tr>
<tr>
<td>share_free</td>
<td>0.155**</td>
<td>0.056</td>
<td>0.172**</td>
<td>0.210**</td>
</tr>
<tr>
<td></td>
<td>(0.069)</td>
<td>(0.082)</td>
<td>(0.082)</td>
<td>(0.084)</td>
</tr>
<tr>
<td>transp_costs</td>
<td>-0.674</td>
<td>-1.803**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.959)</td>
<td>(0.897)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Industry FE | no | no | yes | yes |
N | 4,491 | 3,835 | 4,491 | 3,835 |

Notes: Dependent variable is the trade gap. * significant at 10%, ** significant at 5%, *** significant at 1%. Robust standard errors are in parentheses. All regressions include units of measurement dummies as controls. Columns (7)-(8) include 2-digit HS industry fixed effects.

### Table 7. Indirect trade and FTA external tariffs.

<table>
<thead>
<tr>
<th></th>
<th>CAN</th>
<th>CAN</th>
<th>USA</th>
<th>USA</th>
<th>CAN</th>
<th>CAN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
</tr>
<tr>
<td>tariffpta</td>
<td>-0.223***</td>
<td>-0.181***</td>
<td>0.069</td>
<td>-0.005</td>
<td>0.291</td>
<td>0.575</td>
</tr>
<tr>
<td></td>
<td>(0.021)</td>
<td>(0.019)</td>
<td>(0.071)</td>
<td>(0.053)</td>
<td>(0.622)</td>
<td>(0.382)</td>
</tr>
<tr>
<td>own MFN tariff</td>
<td>0.139***</td>
<td>0.065***</td>
<td>0.032</td>
<td>0.063</td>
<td>-0.463</td>
<td>-0.684*</td>
</tr>
<tr>
<td></td>
<td>(0.021)</td>
<td>(0.011)</td>
<td>(0.026)</td>
<td>(0.054)</td>
<td>(0.555)</td>
<td>(0.344)</td>
</tr>
<tr>
<td>partner country’s MFN tariff</td>
<td>0.013</td>
<td>-0.011</td>
<td>0.088***</td>
<td>0.039***</td>
<td>0.012</td>
<td>0.011</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td>(0.027)</td>
<td>(0.022)</td>
<td>(0.014)</td>
<td>(0.031)</td>
<td>(0.046)</td>
</tr>
</tbody>
</table>

Industry FE | no | yes | no | yes | no | yes |

sample | all | all | all | all | (’own MFN tariff’ - tariff_pta) < 1 |
N | 43,347 | 43,347 | 31,885 | 31,885 | 11,303 | 11,303 |

Notes: Dependent variable is the share of re-exports in total exports of third countries to the U.S. Time period covered is 1989-1998. * significant at 10%, ** significant at 5%, *** significant at 1%. Robust standard errors are in parentheses. All regressions include units of measurement dummies as controls.
Figure 1. Trade gap and import tariffs, 1989.

Figure 2. Trade gap and tariff savings from importing through FTA partner country, 1989.