# The trade effects of tariffs and non-tariff changes of preferential trade agreements☆

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## ARTICLE INFO

## ABSTRACT

The recent literature on preferential trade agreements (PTAs) emphasizes the distinction between the extensive and intensive margins. What has been missing is the distinction between tariff and non-tariff changes under PTAs. Tariff reduction is a quintessential feature of PTAs. But member countries of a PTA often pursue deeper integration through agreements on non-tariff matters as well. Some member countries, however, may want to use non-tariff barriers to compensate for tariff cuts. The current study isolates the effects of tariff and non-tariff changes under PTAs. It involves the construction of a new dataset of bilateral tariff rates for 90 importing and 149 exporting countries over 1996-2010, covering the Harmonized System 2-digit level of product varieties. Given the complexity of non-tariff arrangements, we allow for heterogeneity across three different types of PTAs, namely custom unions (CUs), free trade agreements (FTAs), and partial scope agreements (PSAs). We further consider heterogeneity within each of these three PTAs regarding responding time, partner type, and product type. The key findings are: (i) non-tariff changes under PTAs on average increase both the intensive and extensive margins of trade; (ii) PSAs do not have discernible trade impacts unlike FTAs and CUs; (iii) CUs have a stronger trade impact than FTAs; (iv) the impact of CUs comes mostly from non-tariff changes, while that of FTAs comes from both tariff and non-tariff changes; (v) non-tariff changes associated with CUs have a stronger trade effect than those associated with FTAs, which in turn are stronger than those associated with PSAs; (vi) non-tariff changes take a longer time than tariff changes to impact on the intensive margin; (vii) non-tariff changes under FTAs and CUs between industrial and developing countries increase the exports from the former to the latter more than the other way around; and (viii) there is substantial heterogeneity across sectors in their response to trade liberalization.

## 1. Introduction

Preferential trade agreements (PTAs) have dramatically proliferated since the mid-1990s, prompting numerous studies on their effects. Most studies, including Baier and Bergstrand (2007, 2009); Magee (2003, 2008); Eicher et al. (2012) and Cheong et al. (2015a, 2015b), find the effects on trade volume between PTA signatures to be significant and positive, with Ghosh and Yamarik (2004) being an exception. The recent literature goes beyond trade volume and emphasizes the distinction between the intensive and extensive margins of trade (Eaton and Kortum, 2002; Melitz, 2003; Chaney, 2008). Dutt et al. (2013) show that the growth in trade since the 1980s has been largely driven by trade in new products (i.e. the extensive margin)

instead of by the growth in old products (i.e. the intensive margin). Some studies find that product variety is an important source of gains from trade (e.g. Broda and Weinstein, 2006), but some others suggest otherwise (e.g. Arkolakis et al., 2012).

Studying the extensive margin of trade requires disaggregate data at the firm, industry or product level, as seen in Trefler (2004); Bernard et al. (2009) and Kehoe and Ruhl (2013). Because these studies focus on a few selective countries, their findings cannot be generalized to others. Dutt et al. (2013) cover a large number of countries over a long period, but their focus is on the World Trade Organization (WTO) membership instead of PTAs. Foster et al. (2011) and Baier et al. (2014) are two exceptions, investigating the PTA effects on the product margins covering a substantial number of countries.

What has been missing in the aforementioned studies is the distinction between tariff and non-tariff changes under PTAs. Tariff reduction is a quintessential feature of PTAs as member countries aim to gain better access to each other's market. However, member countries often pursue "deeper integration" through agreements on non-tariff matters as well. Non-tariff measures (NTMs) typically cover competition policies, product standards, regulatory regimes, investment codes, environmental policies, labor standards and so on.[1] *Ex ante* the trade effect of NTMs can be either positive or negative. On the one hand, legally binding agreements can reduce uncertainty for traders arising from unilateral policy interventions (Bagwell and Staiger, 2002). On the other hand, some member countries may use NTMs to protect import-competing industries, especially those with strong lobbying power. Under the General Agreement on Tariffs and Trade (GATT), PTAs are allowed as an exception to the clause of Most Favored Nation (MFN) only if all duties are eliminated on "substantially all" trade between the member countries within a "reasonable length of time". As such, countries wanting to protect specific industries can only resort to non-tariff barriers (NTBs) disguised as GATT-complying NTMs. Ray (1981) provides empirical evidence that NTBs have been utilized in part to compensate for internationally agreed-upon tariff reductions, and Limao and Tovar (2011) show that tariff commitments in trade agreements increase the likelihood and restrictiveness of NTBs.

In fact, NTBs have risen during the mid-1990s to 2000 and then again after the Global Financial Crisis (WTO, 2012). And there has been a steady increase in sanitary and phytosanitary (SPS) measures and technical barriers to trade (TBTs) notifications by WTO members since 1995 (Bacchetta and Beverelli, 2012). Because the GATT and WTO have already reduced tariffs substantially, as evident in the merely five percent average duty worldwide, tariff reduction arising from future PTAs will be moderate; consequently, NTMs may become increasingly important in determining the impact of PTAs.

Against this background, the objective of this paper is to examine the effects of tariff and non-tariff changes[2] under PTAs on trade flows and product margins of trade. If non-tariff changes are found to have positive effects on trade, then it implies that countries' liberalization is beyond what the GATT initially aimed to accomplish through tariff reduction; if the effects are negative, it is the other way around. In the scenario that both tariff and non-tariff changes has positive trade effects, it is useful to compare their quantitative differences. This is because the negotiation for a PTA usually takes years to conclude, and NTMs are often the most time-consuming items, therefore, it is important to know how those efforts on NTM negotiation pay off regarding trade gain. Non-tariff barriers are one but not all sources of non-tariff changes associated with PTAs. Preferential trade agreements could be a form of commitment to more stable and predictable policies, making firms more likely to incur the fixed costs of selling in the market. Signatory governments of a PTA may also implement some economic reform policies to complement a PTA.

The empirical strategy adopted in this paper is able to separate the effects of NTMs associated with PTAs from the effects of potential complementary policy changes using import-country fixed effects (FEs). Using this strategy, we first estimate the effects of PTAs as a composite, and then separate it into two distinct components: the effect from tariff-cut and the effect from other remaining policy (i.e. non-tariff) changes associated with the adoption of PTAs, respectively. We focus on the heterogeneity in non-tariff changes by distinguishing three types of PTAs, namely partial scope agreements (PSAs), free trade agreements (FTAs), and custom unions (CUs). In our framework, the estimated effect from tariff cuts is common to all PTAs while that from

other remaining policy changes is the average effect from various non-tariff changes for each type of PTA. We test, regarding the degree of economic integration, whether CUs dominate FTAs which in turn dominate PSAs. Baier et al. (2014) find that CUs, which provide the deepest form of economic integration among the three, have the largest effects on bilateral trade. However, it is not entirely clear whether the results are due to CUs entailing the deepest tariff cut or the deepest non-tariff changes or both. It is also not clear, regarding the quantitative effects on trade, how the three types of PTA fare relative to each other. Equally unknown is the relative importance of tariff and non-tariff changes associated with each type of PTA and across different types of partner, e.g. industrial-industrial countries versus industrial-developing countries. In this paper, we aim to provide answers to these questions.

To our knowledge, this paper is one of the first studies to isolate the trade effects of tariff and non-tariff changes associated with PTAs in a gravity equation framework and to differentiate PTAs among and between developing countries and industrial countries. Such differentiations are important if there is uneven bargaining power between them. For instance, Bergsten (1997) asserts that in the North America Free Trade Agreement (NAFTA) negotiation, Mexico "accepted virtually every demand placed upon it" and "made virtually all the concessions." In addition, we consider the lagged effects of trade integration. Because NTMs tend to be more complex as well as heterogeneous than tariffs, countries may take a longer time to respond to non-tariff changes than to tariff cuts. Lastly, we also consider the sectoral heterogeneity in countries' responses to trade liberalization.

To accomplish our objective, we have constructed a comprehensive bilateral tariff dataset covering 90 importing and 149 exporting countries over the period of 1996 to 2010 at the Harmonized System 2-digit (HS2) level. The dataset allows us to compute the average tariff rates on goods between any two WTO member countries. This dataset also allows us to contribute to the recent trade literature on the fixed and variable trade costs (Melitz, 2003; Chaney, 2008). Baier et al. (2014) show that the elasticity of variable costs is larger for the intensive margin than for the extensive margin. Dutt et al. (2013) show that while the extensive margin increases with a drop in either the fixed costs or the variable costs, the intensive margin decreases with a drop in the fixed costs, but its response to a drop in the variable costs is ambiguous. Inferring from their empirical findings, they argue that the WTO membership incurs a reduction in the fixed costs for developing countries and a reduction in the variable costs for industrial countries. However, when merely a dummy variable for PTAs (or WTO memberships for that matter) is used in the gravity equation to capture changes in trade costs, it is not clear if it is capturing the fixed costs or the variable costs or both. In other words, the effects of fixed and variable costs as identified in the current literature are mostly based on *deduction* instead of *detection*. Our contribution here is that, by separating tariff from NTMs, we can explicitly examine the trade effects of changes in the variable costs because of tariff reduction.[3]

Our key findings are: (i) non-tariff changes under PTAs on average increase both the intensive and extensive margin of trade; (ii) PSAs do not have discernible trade impacts unlike FTAs and CUs; (iii) CUs have a stronger trade impact than FTAs; (iv) the impact of CUs comes mostly from non-tariff changes, while that of FTAs comes from both tariff and non-tariff changes; (v) non-tariff changes associated with CUs have a stronger trade effect than those associated with FTAs, which in turn are stronger than those associated with PSAs; (vi) non-tariff changes take a longer time than tariff changes to impact on the intensive margin; (vii) non-tariff changes under FTAs and CUs between industrial and

[1] See pp. 78 of Baier and Bergstrand (2007) for the related literature.
[2] For simplicity, we use "non-tariff changes" to denote "changes in non-tariff measures".

[3] We cannot explicitly examine the trade effects of changes in the fixed costs using NTMs, because non-tariff changes could affect either the fixed costs or the variable costs or both. For instance, compiling with pre-shipment inspection or the rule of origin incurs fixed administrative costs, but alternating product material or design to meet higher health or environmental standards could incur both fixed and variable costs.