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## Are preferential agreements stepping stones to other markets?

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# Are preferential agreements stepping stones to other markets?

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## Abstract

This paper investigates whether preferential trade agreements (PTA) promote exports to third nations through the expansion of the extensive margin (i.e. larger number of export goods). The analysis covers 11 South-South and South-North PTAs involving 36 countries that exported to 118 different destinations during the 5 years before and after the PTA. Using a conditional logit model, and trade data at the SITC 5-digit level, we estimate the effect of new within-PTA exports on the subsequent exports to third-nation markets. The results suggest that PTAs have a positive indirect effect, i.e. spillover-effect, on exports to third countries. Previous export experience in a given product in the preferential area is shown to have a positive effect on the probability that the same product is subsequently exported to a non-member market. The size of the effect, however, varies across PTAs.

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# Are preferential agreements stepping stones to other markets?

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**Abstract:** This paper investigates whether preferential trade agreements (PTA) promote exports to third nations through the expansion of the extensive margin (i.e. larger number of export goods). The analysis covers 11 South-South and South-North PTAs involving 36 countries that exported to 118 different destinations during the 5 years before and after the PTA. Using a conditional logit model, and trade data at the SITC 5-digit level, we estimate the effect of new within-PTA exports on the subsequent exports to third-nation markets. The results suggest that PTAs have a positive indirect effect, i.e. spillover-effect, on exports to third countries. Previous export experience in a given product in the preferential area is shown to have a positive effect on the probability that the same product is subsequently exported to a non-member market. The size of the effect, however, varies across PTAs.

**Keywords:** Trade policy, spillovers, market entry

**JEL classifications:** D21, F13, L10

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E-mail: [anacristina.molina@graduateinstitute.ch](mailto:anacristina.molina@graduateinstitute.ch). I thank Richard Baldwin for his support and invaluable discussions. I am also extremely grateful to Olivier Cadot for helpful comments and suggestions, as well as to Nicolas Berman and Pierre-Louis Vézina. All remaining errors are mine.

# 1. Introduction

Market access and market expansion have been the main economic drivers behind the proliferation of preferential trade agreements (PTAs) of the last twenty years. Although the vigorous spread of PTAs is relatively recent, researchers have been studying their direct effects, namely trade diversion<sup>1</sup> and creation effects<sup>2</sup> for over fifty years (see Viner, 1950, and for a review of the literature see Freund and Ornelas, 2009). But little has been said on the dynamic effects of PTAs and in particular on the spillovers that they could produce on the exports to non-members. Yet, taking into account these indirect effects is essential to accurately measure the net effects of trade agreements. By ignoring these positive externalities, one could underestimate the trade creation effect and, therefore, the net effects of PTAs. The purpose of this paper is to assess whether a positive externality affecting third countries exists and can be associated with preferential trade agreements. Using SITC-5digit level mirrored import data for 36 countries, we test whether their participation in a PTA affect the probability to export to other markets outside the trade bloc.

Determining whether such spillovers exist is important not only to correctly assess the net effects of a PTA, but also to gain better understanding on how exporters expand into markets. A positive externality generated by a PTA could have implications for market expansion, as exporters could use PTAs as stepping stones (i.e. testing grounds) to break into other markets. From a policy perspective, this also implies that a PTA could promote both product and, indirectly, market diversification.

Recent trade models with heterogeneous firms highlight the relationship between trade costs and the number of exported products (i.e. the number of exporters). Melitz (2003)'s baseline model with symmetric countries, beachhead costs (i.e. market entry costs) and fixed export costs predicts that following a decline in tariffs new firms will start to export to markets whose tariffs have declined. According to this framework, more firms will enter markets within the preferential area, as access to members' markets becomes easier. At the product level, this implies that new products will be exported to a market within the PTA area. The model does not have any theoretical implications for the effects of PTAs on the decision to enter markets outside the trade bloc.<sup>3</sup> Yet, one can expect that as firms start to export a product to the preferential area, they may, conditional on their survival, try to expand into other markets outside the bloc. This expansion into markets outside the bloc could be explained by different mechanisms, namely learning by exporting or economies of scale at the production or export level. These channels are not exclusive and will be detailed in the next section.

This paper investigates whether trade agreements have promoted exports to non-members through the expansion of the extensive margin (i.e. the number of exported goods). The analysis studies 11 South-South and South-North PTAs involving 36 countries, which export to 118 different destinations, over a period covering the 5 year periods preceding and following the entry into force of the PTA. If the extensive margin expanded within the preferential area following the agreement, more products will benefit from previous experience which could increase their likelihood to be exported to other countries.

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<sup>1</sup> I.e. trade that is diverted from a more efficient exporter outside the preferential area towards a less efficient one within the preferential area.

<sup>2</sup> I.e. trade that is created within the preferential area.

<sup>3</sup> By taking foreign markets as a single entity, the model ignores the dynamics behind export expansion and so behind the persistence of export status. Such dynamics could entail that firms keep selling in the same market or expand to other markets.

Using a conditional logit model, we estimate at the SITC 5-digit level the effect of previous export experience within the preferential area on the probability to export the same product to a market outside the bloc. Then we interact a PTA dummy with the experience variable to test for the existence of a trade externality due to the PTA. Our results suggest that such spillover can exist, but this varies with the agreement considered. We also test our result using the tariffs within the preferential area, instead of a PTA dummy. In this case, the evidence in favor of the spillover is not conclusive.

The literature examining the relationship between PTAs and the extensive margin has mainly focused on the effects within the preferential area and has overlooked the effects on exports outside the PTA area. This literature has found that PTAs encourage existing trade as well as new exports to the preferential area. In an influential contribution, Helpman, Melitz and Rubinstein (2008) find that the existence of a PTA increases the probability that the participating countries trade with each other. In another study Gómez and Volpe (2008) analyze the effect of tariffs and tariff preferences on the number of exported products from Colombia to the United States for the period 1989-2005. They find a negative relationship between tariffs and the extensive margin. Debaere and Mostshari (2005) obtain similar results in the case of all United States' partners for the period 1989-2001. Kehoe and Ruhl (2009) also investigate the evolution of the extensive margin in the case of the Canada-U.S. Free Trade Agreement and the North American Free Trade Agreement (NAFTA)<sup>4</sup> and find that they have had a positive effect on new exports. Finally, Amurgo and Pierola (2008) also find that FTAs favor export product diversification in a group of 24 developed and developing countries.

To our knowledge only two studies have looked at the effect of PTAs on exports to third countries: Nicita et al. (2003), for the case of MERCOSUR, and Borchert (2007), for the case of NAFTA. These two studies differ on the mechanism behind the spillover and find mixed evidence of the existence of a trade externality. The present study contributes to this fledgling body of literature. Nicita et al. (2003) try to assess whether MERCOSUR helps the expansion of exports from members to countries outside the preferential area by reducing the information asymmetries faced by both exporters and importers. Information asymmetries in the case of importers arise because the latter are uncertain about exporters' reliability and product quality. As for exporters, they also face an imperfect information problem as they are unfamiliar with customs procedures, export regulations, customers' tastes and standards in the markets they intend to export to. The authors argue that by selling to the preferential area exporters can earn a reputation and reveal their competencies to other potential importers. This could reduce the uncertainty faced by importers. In the case of exporters, they can mitigate the information asymmetry problem by taking PTA markets as a learning ground to gain experience before entering more distant or "difficult" markets. The authors test the effect of these information spillovers (generated within the preferential area) on the exports to countries outside the bloc<sup>5</sup>, as well as a platform effect that is an interaction term between the information variable and the preferential tariffs within MERCOSUR. Using a Tobit model they estimate the impact of the spillover effects and the platform factor on the exports at the SITC 3-digit level for each of the MERCOSUR members for the period 1980-1998. For each member they regress the exports to 54 different partners on the information effect and the platform effect. They

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<sup>4</sup> They also study the structural transformation episodes in Chile, Korea, and China.

<sup>5</sup>The export information spillovers are proxied by the share of newspapers (information trade flows) traded between a MERCOSUR' partner and a third country, multiplied by the past market share of a MERCOSUR member in all of its trading partners. The platform effect is captured by interaction between preferential tariffs, the information trade flows and past market share of a MERCOSUR member within the bloc.

find a positive platform effect working through the information spillovers but only in the case of Paraguay. Unlike the present study, the authors do not distinguish whether the effect on exports at the industry level goes through the extensive margin or the intensive margin.

Borchert (2007) analyzes whether NAFTA triggered a geographic spread of Mexican exports to countries outside NAFTA. The mechanism behind this effect works through the existence of economies of scale at the export level (i.e. due to the existence of a product export fixed cost that is a decreasing function of the number of markets served). As a result, in the model, firms' efficiency increases with the number of markets it serves. The author uses HS 6-digit level trade and tariff data to analyze the exports from Mexico to the US and 16 Central and South American countries between 1990 and 1997. Using a logit model with fixed effects, he estimates the effect of previous exports to the US on the probability of exporting the same product to third markets. He finds that Mexican post-NAFTA exports to the US were subsequently exported to other Latin American countries. Moreover, the results suggest that the expansion of the extensive margin is mainly due to the increase in the number of exported goods with little or no technology content. The study do not control for the fact that a product could have been exported to other markets than the US, and so the spillover effect may be overestimated. The present paper proposes to address this limitation.

The rest of the paper is organized as follows. The next section presents the mechanisms through which a PTA could affect the exports to third countries. Section 3 describes the empirical strategy employed to identify the spillover effects. Sections 4 and 5 present the data and the stylized facts on the pattern of new goods. Section 6 details the empirical analysis and its results. Section 7 concludes.

## 2. Market expansion and its mechanisms

In this section we review the mechanisms that can explain the spillovers from PTAs to exports to non-member countries.

Once a product has been exported to at least one market, expansion into additional markets requires decisions about which markets to enter. Despite its importance, the interest on the patterns of market expansion and its determinants is relatively new. The geographic dimension was only recently incorporated in trade models with heterogeneous firms (which until now assumed markets symmetry). These models highlight the differences among markets and the factors that may affect exporters' decision to serve or not a given market. In Melitz and Ottaviano (2008), the market entry depends not only on the usual determinants (i.e. productivity, trade costs) but also on market characteristics such as its size and the "intensity" of competition in foreign markets. In their model, larger markets show "tougher" competition, which in turn results in lower mark-ups (hence lower prices) and higher aggregate productivity. As a consequence, these markets are more difficult to break into. In another paper, Lawless (2009)<sup>6</sup> analyzes the determinants of market penetration by incorporating a destination dimension into the Melitz model. In this framework, each market has a productivity requirement, so that firms do not export to every market, but only to those that are profitable. This suggests that if a firm is efficient enough to enter the  $z$ -market with a productivity threshold  $z$ , it will also serve all markets with a threshold lower than  $z$ . By matching their productivity with markets' cut-off, firms determine which countries they enter and which ones they

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<sup>6</sup> Lawless (2009) develops a model à la Melitz in which firms face not only export fixed costs but also export variable costs that are market-specific, generating a cut-off for each destination.

don't. Eaton et al. (2007) document the patterns of market expansion using a sample of Colombian firms. In their study, the authors describe the behaviour of “cohorts” of Colombian exporters between 1996 and 2005 and find that market expansion takes place gradually. New exporters start selling in a single foreign market and, conditional on their survival they expand into additional destinations. The initial destination market appeared as an important determinant of exporters’ geographic expansion and of their probability of survival. Firms exporting to “neighbours” seemed to have greatest probability of diversifying into more distant markets, while the opposite does not occur.

We have identified in the literature three mechanisms that could explain the expansion into other markets and that could be catalyzed by the entry into force of a PTA. These are (i) the presence of economies of scale at the production level (i.e. production fixed costs); (ii) the existence of learning effects (i.e. “learning by exporting”); and (iii) the presence of economies of scale at the export level (i.e. export entry costs).<sup>7</sup>

The presence of economies of scale in the production stage is a possible explanation for the correlation between exports within the bloc and future exports to third markets. The consumer base in many countries is often too small to favour goods whose production is characterized by increasing returns to scale (i.e. with declining average costs). In these cases, because of the size of the market, firms can not produce profitably as they cannot generate the necessary sales to cover their fixed costs. In the new trade theory, this relationship between market size and production is known as the “home market effect” (HME) (see Krugman, 1980; Helpman and Krugman, 1985, chap. 10). According to this logic, in models with imperfect competition, increasing returns to scale and trade costs, larger markets will attract a more than proportional share of firms (this implies greater number of varieties) and become a net exporter of the differentiated good.<sup>8</sup> This implies that by enlarging the home market, a PTA would make the location/production of products subject to increasing returns to scale more attractive inside of the preferential area. Firms will therefore produce within the bloc and then export to countries outside the bloc, thus making the preferential area the base for exports to countries outside the bloc as suggested in Baldwin et al. (2003, chapter 14).

To make this point clearer, we consider the following example. Assume three countries  $A$ ,  $B$  and  $C$  of different sizes:  $A=20$ ,  $B=20$  and  $C=30$ .  $A$  and  $B$  are two small markets, such that it is not profitable to produce certain goods.  $A$  and  $B$  are therefore net importers of these goods. Countries  $A$  and  $B$  sign a PTA, which removes all tariffs. As a result their home market expands ( $A+B=40$ ), now making it profitable to produce goods characterized by increasing returns to scale. The “newly” formed market attracts a more than proportional number of firms, which will serve markets  $A$  and  $B$ , but also market  $C$ . Thus the preferential area between  $A$  and  $B$  becomes the export base.<sup>9</sup>

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<sup>7</sup> Each of this three mechanism can be represented in a standard profit function:  $\pi = q(p - a) - f - F_e$ , where  $q$  is the quantity,  $p$  is the price,  $a$  is the marginal cost,  $f$  is a production fixed cost and  $F_e$  is the export fixed cost. Mechanism 2 refers to a change in the marginal costs ( $a$ ), while mechanisms 1 and 3 refers respectively to the existence of the fixed cost  $f$  and the export fixed cost  $F_e$ .

<sup>8</sup> In other words, due to economies of scale and in presence of transport costs, the differentiated product will be produced in only one country, the one with the larger home market, and serve both countries. The formation of a larger market allows firms to distribute fixed costs over a larger consumer base and markets.

<sup>9</sup> It is worth noting that depending on countries’ comparative advantage, endowments and market size, a product could be produced only in  $A$  or  $B$ . However, the distribution of industries within the bloc goes beyond the scope of

Learning by exporting, the second mechanism that can be at play, describes the positive impact of export participation on firm's productivity (i.e. marginal cost). According to this mechanism, firms improve their productivity as a consequence of their presence in export markets. Through their interaction with competitors and buyers, exporters can be exposed to new technologies in international markets (i.e. technology transfer) and greater expertise, which may help them to improve their manufacturing process, reduce their production costs and encourage innovation (i.e. quality upgrading).<sup>10</sup> This mechanism could be at play for firms exporting into the preferential area. The productivity gains thus generated could then allow them to enter third markets previously not profitable.<sup>11</sup> In this respect a few studies show that there is a positive relationship between a firm's productivity and the number of markets the firm serves (Bernard, Redding and Schott, 2006; Lawless, 2009).<sup>12</sup> This implies that the entry into an additional market is costly and therefore suggests that an increase in firms' productivity could induce firms to export to another market. The relationship between firm productivity and the number of markets has been documented in Bernard et al. (2009) in the case of the US, Eaton, Kortum and Kramarz (2004, 2008) in the case of French firms and Amador and Oromolla (2008) in the case of Portuguese firms. In the context of our analysis, if exporting to the PTA area improves firm's performance through learning by exporting, this could change firm's incentives to enter markets outside the bloc.

Finally, the existence of export entry costs can also constitute a reason behind the expansion into other markets outside the preferential area, as they can generate economies of scale for the export activity. These exports costs include the costs associated with learning about export and customs procedures, markets and consumer tastes, and with establishing distribution channels. Improved market access could help exporters to overcome these fixed costs. Once the latter are paid, the average cost of exporting the same product to additional destinations should be lower, as in Borchert (2007).

Learning about the export activity and the accumulation of knowledge could also reduce the uncertainty of entering a market and generate information spillovers as in Nicita et al. (2003), which in turn may reduce the fixed costs associated with entering new markets. The importance of information and uncertainty related to export activities has also been highlighted in Alborno et al. (2009). The authors build a model where export success is uncertain and this uncertainty is correlated across markets. As a result, exporting is a gradual process (i.e. sequence of exporting) driven by the accumulation of experience across markets. In their model, firms discover their profitability as exporters only after they enter foreign markets. Their success in export markets is therefore unknown before entry. Once they enter a market, they learn about their real capabilities and have to decide whether (i) to stay in the market and adjust their quantities; (ii) to exit the current market; or (iii) to enter a new market or not. Since the entry into new markets often requires significant and unrecoverable costs, firms have an incentive to enter one market after the other, starting with the "easiest" one. The latter is presumably less costly to break into

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this study. Here we focus on the effects of the formation of a larger market through a PTA on the exports to countries outside the area.

<sup>10</sup> One could expect this mechanism to be stronger when trade involves a developed country or at least more developed country than the exporting country.

<sup>11</sup> The empirical evidence on "learning by exporting" is mixed and so far there is no consensus on the existence of such effects. Examples of studies suggesting learning by exporting include De Loecker, J. (2007), Van Biesbroeck (2005) and Clerides, Lach and Tybout (1998).

<sup>12</sup> The authors also find that the number of exporting firms and the number of exported products decline with distance and increase with market size. Another main result is that new exporters begin selling a single product in a single market and then, conditional on survival, they grow both along the destination and product dimension.



and so can be used as a “testing ground” before serving more distant or “difficult” markets. Their authors suggest that a PTA would increase the number of exporters outside the bloc, as a result of greater export experimentation in “easier” markets within the bloc.

Provided that any of these mechanisms is at work, one expects PTAs to increase the number of products into markets situated outside the bloc. Moreover it is worth noting that while the first mechanism is specific to the creation of a larger market and thus of a preferential area, the two other mechanisms provide a more general explanation for market expansion.

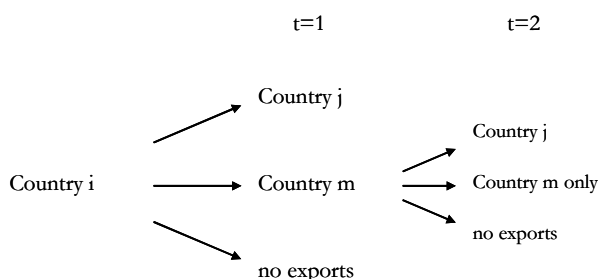
### 3. The spillover of PTAs to third markets

In this section, we look at how PTAs can affect exports to third markets – the spillover – by triggering the expansion mechanisms described above. More specifically, we describe how PTAs can provide a ground for export experimentation, where exporters can develop their competencies, enhance their productivity and benefit from economies of scale, all of which mechanisms can then help them break into third markets.

Once a new product is introduced in a foreign market, exporters will presumably want to expand their sales and serve one or several other markets. This is compatible with existent empirical evidence, which shows that most of the exporters start selling in a single destination and then, conditional on their survival, expand progressively to other markets (see *inter alia* Alvarez et al., 2007; Eaton et al., 2007).

Figure 1 describes the export sequence. In  $t=1$ , a firm in country  $i$  has to choose whether to export or not and, if it exports, it has to decide where. In  $t=2$ , a firm has again to decide to export or not, to keep exporting to country  $m$  only, provided it entered that country in  $t=1$ , or to enter an additional market (i.e. country  $j$ ). For clarity purposes, we only depict the choice in  $t=2$  for a firm which serves country  $m$  in  $t=1$ . The choices in the remaining nodes of the decision tree are analogous.

Figure 1: Export sequence



Assuming that any of the mechanisms (i.e. or a combination of them) described in section 2 are at play (i.e. learning by exporting, economies of scale at the production level, or economies of scale at the export level) the probability of exporting product  $k$  to country  $j$ , given that it was first exported to country  $m$  should be greater than without a previous experience in exporting product  $k$ . Formally this implies that:

$$p(\text{Export}_{kjt} | \text{Export}_{kmt-1}) > p(\text{Export}_{kjt}) \quad (1)$$

This relationship is independent of the existence of a PTA,<sup>13</sup> that is, any previous export experience would positively affect the probability to export to other markets.<sup>14</sup> However, following the implementation of a PTA (i.e. a decline in tariffs), markets within the bloc become presumably easier to access for most or all products. One can therefore expect an increase in the number of new products exported to the preferential area (Melitz, 2003), here country  $m$ . The probability to export a given product to a member country should increase during the years post-PTA, that is:

$$p(\text{Export}_{kmt})_{\text{without PTA}} < p(\text{Export}_{kmt})_{\text{with PTA}} \quad (2)$$

If this is the case, the number of new products that can be potentially exported to non-member countries also should increase. In other words, the probability of exporting product  $k$  to both markets  $j$  outside the PTA area, and  $m$ , inside the PTA area should increase in the post-PTA years.<sup>15</sup> This probability is given by:<sup>16</sup>

$$p(\text{Export}_{kjt} \cap \text{Export}_{kmt-1}) = p(\text{Export}_{kjt} | \text{Export}_{kmt-1}) \times p(\text{Export}_{kmt-1}) \quad (3)$$

If  $p(\text{Export}_{kmt-1})$  increases following a decline in tariffs in market  $m$ , the probability  $p(\text{Export}_{kjt} \cap \text{Export}_{kmt-1})$  of exporting the same product to  $j$  and  $m$  would also increase according to equation 3. This is the spillover of the PTA, and is conditional on the increase in the number of new exported products to the PTA area. Formally, we have:

$$p(\text{Export}_{kjt} \cap \text{Export}_{kmt-1})_{\text{without PTA}} < p(\text{Export}_{kjt} \cap \text{Export}_{kmt-1})_{\text{with PTA}} \quad (4)$$

To test the existence of any spillover effect due to PTAs, we look only at the new exports (i.e. the extensive margin) to markets outside the preferential area and use the order in which countries penetrate markets to first assess whether any previous experience had a positive effect on the likelihood to enter a market outside the preferential area. We then check how this effect changes once we control for the existence of a PTA.<sup>17</sup> If the PTA did not promote the export of new products to member markets, the probability of exporting should not change, and so there should be no effect on the new exports to non-members associated with the implementation of the agreement. If the PTA boosted the number of new products to member countries, this can generate an indirect positive effect on the number of opportunities to export to non-member markets.

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<sup>13</sup> Indeed, any previous exporting experience regardless of the market (i.e. member or non-member) will have a positive impact on the exports to countries outside the area (e.g. Robert and Tybout, 1997; Bernard and Jensen, 2004).

<sup>14</sup> One could also expect that the size of the probability  $p(\text{Export}_{kjt} | \text{Export}_{kmt-1})$  would depend on the correlation (e.g. similarities) between countries  $m$  and  $j$ .

<sup>15</sup> If the number of new products to the member countries increases, this implies that the chances to reach a market outside the PTA area with any of these new products also increase. The larger the number of exported products is, the larger is the number of opportunities or chances a country has to enter an additional market.

<sup>16</sup> According to Bayes theorem:  $P(A/B) = P(A \cap B) / P(B)$ .

<sup>17</sup> The first market that an exporter served can be either a market within or outside the bloc. Exports could also take place simultaneously and be directed to both type of markets. However in this case we can not disentangle the effect of the PTA on subsequent exports to a country outside the bloc.

## 4. The data

In this section, we present the data used to sketch the geographical spreading of new products exported following the entry into force of eleven trade agreements. The same data is then employed in the empirical analysis.

The data for the trade agreements comes from the World Trade Organization Regional Trade Agreements Database and include both regional (i.e. seven in total which are among the most important in the world)<sup>18</sup> and bilateral agreements.<sup>19</sup> The agreements involve a total of 36 countries and were selected mainly according to two criteria. First, a PTA was selected if it was the only agreement signed by a country within a period of six years. In other words, no trade agreement was signed in the three years preceding and following the selected PTA. By doing so, we are controlling for any overlapping effects of multiple agreements. Today most countries have more than one PTA. The lapse of time between each trade agreement is therefore particularly important to accurately identify the effects of an agreement. Once the trade agreement was identified, only those for which trade data were complete for the observation period were selected (this is the second criterion). The oldest trade agreement considered dates back to 1991 (i.e. MERCOSUR) and the most recent one to 2003 (i.e. Lebanon-EU). Appendix 1 shows the list of the retained trade agreements and their members.<sup>20</sup>

As for the trade data, we only look at new exported products during the 5 years before and after the agreement. We build an 11-year window centred around the date of the agreement for each of the 36 countries considered. We employ mirrored import data at the SITC<sup>21</sup> 5-digit level collected from UNCTAD's COMTRADE database. Mirror flows are used in order to have a greater accuracy of the zeros (i.e. absence of trade) in the trade matrix. The data covers 36 exporters and 118 export destinations (see Appendix 2). We focus on new products in order to identify the patterns of market expansion. We define new products as those that were not exported to any country in any of the previous years considered in our sample or at least in any of the three last years for the observations at the beginning of the observation window.<sup>22</sup>

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<sup>18</sup> These are: the CAN (Andean Community), MERCOSUR, NAFTA, AFTA (ASEAN Free Trade Area), SADC (Southern African Development Community), WAEMU/ UEMOA (West African Economic and Monetary Union) and EAC (East African Community).

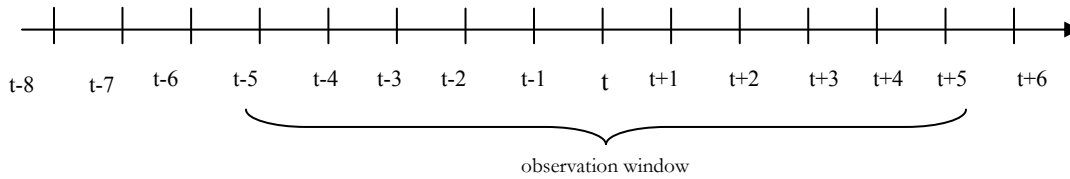
<sup>19</sup> These are agreements signed by the EU and Turkey, Tunisia, Morocco and Lebanon.

<sup>20</sup> There are three exceptions to these criteria: Morocco, Turkey and Mexico. In these cases, criteria 1 is violated, but because of the potential importance of the effects of their agreements they were included in the sample. In the case of Morocco, it signed an FTA with EFTA in 1999 and the following year with the EU (i.e. violation of criteria 1). The trade effects resulting from the agreement with EFTA and the EU can not be disentangled. However, we focus on the effect of this structural break on the exports from Morocco to third countries. The second case is Turkey who signed an FTA with the EU in 1996 and the following year another one with Israel. Finally, Mexico signed NAFTA in 1994 and then the following year signed an agreement with Costa Rica.

<sup>21</sup> Total number of products under this classification is 1,466. The SITC classification offers in the case of this exercise the best trade-off between time coverage and product aggregation.

<sup>22</sup> We considered a 3-year lag is a reasonable assumption to identify new products at the beginning of the observation period.

**Figure 2: Observation window**



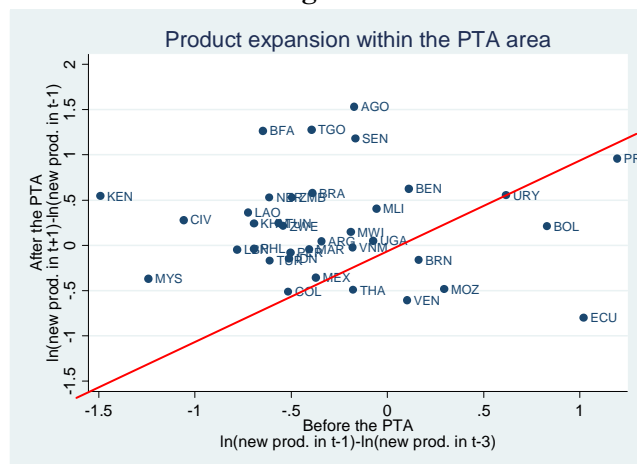
According to this definition, products introduced in t-5 were not exported in any of the 3 previous years and those introduced in t+2 were not exported in any of the previous 10 years like shown in figure 2.

## 5. New exports to members and third markets

In this section, we look at the geographical expansion of goods. The purpose is to determine whether the entry into force of a PTA leads to a change in the number of new products exported to the preferential area and whether the same products are subsequently exported to other markets.

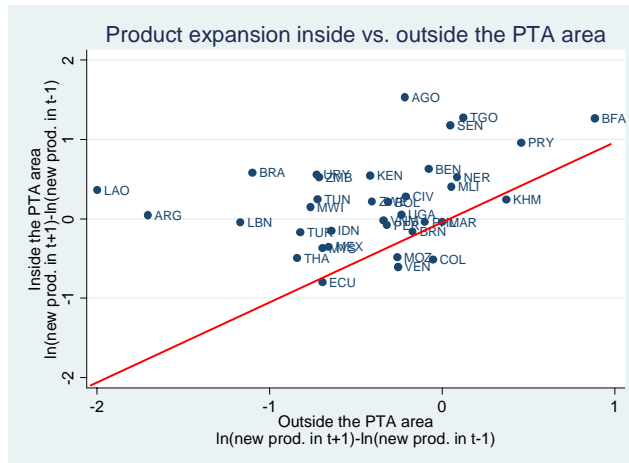
Figure 3 reveals that for most countries the number of products exported to the PTA area tend to grow faster in the years that follow the agreement. This is line with the empirical evidence suggesting that a decline in tariffs leads to an expansion of the extensive margin (see *inter alia* Debaere and Mostshari, 2005; Gomez and Volpe, 2008; Kehoe and Ruhl, 2009). The countries, for which the number of products did not grow faster or even decline during the years post-agreement, were most of the members of the Andean Community namely Bolivia, Ecuador and Venezuela, as well as Paraguay, Uruguay, Thailand, Mozambique, and Brunei.

**Figure 3**



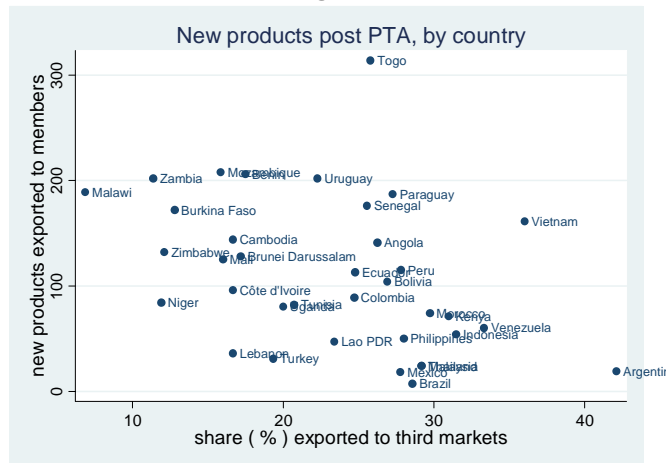
We also compare how the number of new exported products evolved inside and outside the preferential area. Figure 4 shows that for the majority of countries in our sample the product expansion during the post-PTA years was greater within than outside the PTA area, except for a few countries (i.e. Ecuador, Venezuela, Colombia, Mozambique and Cambodia). These figures suggest that for most countries the entry into force of a PTA benefit the exports of new products.

**Figure 4**



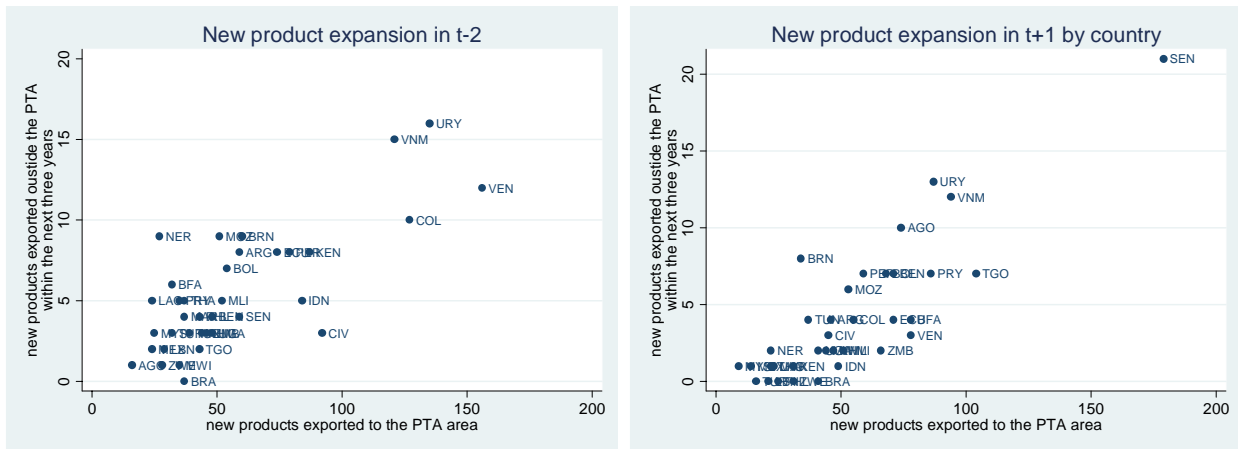
We now identify the new products, as previously defined, and then determine whether the same products were exported simultaneously or subsequently (i.e. within the next three years) to a market outside the preferential area. Figure 5 plots the number of new products exported to a PTA market during the first 3 years (see Appendix 3) following the agreement and the share of products that were also exported to a third market. The number of new products exported to the preferential area varies greatly across countries. The share of products exported to markets outside the bloc also exhibits a large heterogeneity. This share ranges from 2% (Malawi) to 44% (Argentina).

**Figure 5**



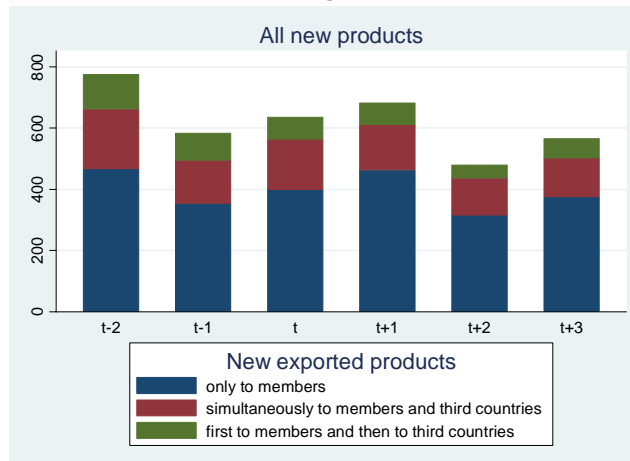
Finally, in order to assess whether there is a positive correlation between the number of products exported to third countries (given a previous entry in a member market) and the number of new products exported to a member market, we plot each of these numbers for  $t-2$  (Figure 6a) and for the second year,  $t+1$ , of the agreement (Figure 6b).

Figures 6a and 6b



We find a positive correlation between the new exports to third countries and the new exports to member markets. This suggests that if a PTA increases the likelihood to export to member countries and raises the number of products within the preferential area, this can subsequently increase the likelihood to break into a third country. This proportionality is also visible at the aggregate level. Figure 7 shows for all countries the new products that break into the preferential area.

Figure 7



For each product, we determine whether, the product was exported (i) only to a member market, (ii) to both member and non-member markets simultaneously, or (iii) to both markets, starting with a member market. At the aggregate level, we see that there is an increase in the number of all new products from one year before,  $t-1$ , to the year after the agreement,  $t+1$ . However in  $t+2$ , the total number of new products drops. Moreover, the pattern of the expansion of new products is relatively stable over time. Figure 7 shows that around 65% of the new products exported to the preferential area were only exported to the PTA area, 25% where exported to the preferential area and then to outside the bloc (i.e. within the next three years).<sup>23</sup> Finally, 10% were exported simultaneously to both outside and inside the bloc, again

<sup>23</sup>Three years seems like a reasonable time frame to look for the spillover on the exports to third countries. Although imperfect because of right censoring, this method allows us to have an idea of the expansion patterns. Indeed,

suggesting that if the total number of products changes, the number of products exported to other countries will also change. Although looking at the aggregates is necessarily an imperfect exercise, it allows us to get a sense of the trends among the countries in the sample.

The data shows that through the exports of new products, a PTA could not only generate trade within the bloc but also outside the bloc. There is evidence that there is a positive correlation between the new exports within and outside the preferential area. A larger number of products within the bloc implies a larger number of opportunities to break into markets outside the PTA area.

## 6. Empirical strategy and results

In this section we test formally whether preferential trade agreements had any impact on the probability to export a new product to outside the bloc. Based on the sequence of exporting and on equation (3), we first test whether serving first a member country affects the probability to export to other destinations outside the preferential area. Then we estimate whether the PTAs can indirectly affect the exports to third countries by increasing export experimentation within the preferential area.

Before proceeding with the empirical exercise and presenting our results, a main caveat related to our exercise need to be mentioned. One main concern in this type of exercise is the possibility of an omitted variable that explains new exports and is correlated with the implementation of the PTA. The best way to control for such problem would be to have a control group (i.e. counterfactual) composed of *twin* countries that did not implement any trade agreement but for which we could design a potential preferential area. Unfortunately, this *ideal* counterfactual does not exist. To mitigate this issue, we control for other time-specific events and use the tariffs applied within the PTA area as a proxy for the PTA, in addition to the usual PTA dummy. The advantage of using tariff data is that they provide an additional source of variation at the product level, which should improve the estimation of the probability of exporting a given product to third countries. However, the inclusion of the tariffs within the PTA area comes at a cost. The data on preferential tariffs is incomplete for many countries and years and this, therefore, greatly reduces the number of observations in our sample.

### 6.1 Introduction of new products to non-member markets

For the empirical exercise we start by identifying the new products introduced by each country into foreign markets. This set of products can be defined as following:

$$I \equiv NewP_{ikt} = \begin{cases} 1 & \text{if } x_{ikt} > 0 \text{ and } x_{ikt^*} = 0 \text{ for } t^* < t \\ 0 & \text{otherwise} \end{cases} \quad (5)$$

A product  $k$  exported by country  $i$  is new if it belongs to the set  $I$ , that is, if it was exported in  $t$ , given that it was not exported at all before. We look only at this set of products in order to determine the order in which they are exported and where the export experience, if any, was acquired. Once the product has been

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products that were exported to third countries after 4 years or more can not be detected. However, by increasing the time interval, we could be capturing other demand or supply effects.

exported for the first time, it can exhibit different expansion paths. It can be (i) exported only to the PTA area, (ii) only to outside the preferential area or (iii) to both. In this latter case, we need to identify the market that was served first (i.e. whether it was a market inside or outside the PTA area). With the purpose of assessing the effect of PTAs on the probability of introducing a new product in a country  $j$  outside the preferential area, we work only with the new products exported to countries<sup>24</sup> outside the PTA area during the period under consideration. This set of products ( $NM$ ) is a subset of  $I$  and can be given by:

$$NM \equiv NewP_{ijkt} = \begin{cases} 1 & \text{if } x_{ijkt} > 0 \text{ and } x_{ijkt^*} = 0 \text{ for } t^* < t, \\ 0 & \text{otherwise,} \end{cases} \quad \text{given } NewP_{ikt^*} = 1 \text{ for } t^* \leq t \quad (6)$$

Similarly we can defined the set of new products ( $M$ ) that were introduced to country  $m$  inside the PTA area. The set is given by:

$$M \equiv NewP_{imkt} = \begin{cases} 1 & \text{if } x_{imkt} > 0 \text{ and } x_{imkt^*} = 0 \text{ for } t^* < t, \\ 0 & \text{otherwise,} \end{cases} \quad \text{given } NewP_{ikt^*} = 1 \text{ for } t^* \leq t \quad (7)$$

Using a fixed effects logit model (i.e. conditional logit model) we first estimate the effect of previous export experience in a member market on the probability to export for the first time a product to a market  $j$  outside the area. Then we test for the existence of a PTA spillover, by interacting the PTA dummy with a dummy that indicates whether the product was previously exported only to the preferential area. The equation to be estimated is the following:

$$\Pr(NewP_{ijkt} = 1) = G(\beta_1 Inside\_PTA_{ikt} + \beta_2 PTA_{it} + \beta_3 PTA_{it} * Inside\_PTA_{ikt} + \delta Controls + \omega_{ijk} + \gamma_t + \varepsilon_{ijkt}) \quad (8)$$

where the dependent variable  $NewP_{ijkt}$  (as defined in (6)) equals 1 if country  $i$  exports product  $k$  in  $t$  to market  $j$  (outside the bloc) given that product  $k$  was not exported before to  $j$  and is new in the export portfolio of country  $i$ .  $Inside\_PTA_{ikt}$  is a dummy equal to 1 if product  $k$  was previously (i.e. in any of the 3 previous years)<sup>25</sup> exported to a member-market. Formally this variable can be described by:

$$Inside\_PTA_{ikt} = \begin{cases} 1 & \text{if } x_{imkt} > 0 \quad \forall m \text{ and } t \in [t-4; t-1], \\ 0 & \text{otherwise,} \end{cases}$$

If any previous export experience affects the probability to export to a market outside the area through any of three mechanisms discussed in section 3, we expect the coefficient  $\beta_1$  to be positive. The variable

<sup>24</sup> A new product exported to a non-member market, can have a previous experience in another non-member market, in a member market or in none.

<sup>25</sup> We believe a three-year lag is a reasonable lapse of time within which an exporter can enter an additional market.



$PTA_{it}$  equals 1 if the exporter  $i$  was part of a preferential trade agreement in  $t$ , 0 otherwise. We then introduce the interaction term between the variable  $PTA_{it}$  and  $Inside\_PTA_{ikt}$  to determine the existence of a PTA spillover. If the coefficient of the interaction term is positive, this implies that the PTA generated an additional positive effect associated with the initial presence in member markets. In order to control for any previous experience in another market outside the PTA area, we introduce the variable  $Outside\_PTA_{ikt}$  that equals 1 if country  $i$  exported product  $k$  only to non-member markets in any of the 3 previous years. We include the variable  $InOut\_PTA_{ikt}$ , that equals 1 if country  $i$  exported product  $k$  to both a member and a non-member market in any of the 3 previous years.<sup>26</sup> By doing so, we want to take into account the possibility of a previous experience inside and outside the preferential area. We also add the GDP of the exporting and importing countries, the real exchange rate and a measure of similarity between country  $j$  and the first export market. By including the real exchange rate we expect to control for any change in the exporter competitiveness. A real depreciation (i.e. increase in the real exchange rate) should increase the probability of exporting a new product. We use the difference in the GDP per capita as a proxy for the similarity between country  $j$  and the market where product  $k$  was initially sold. We do so with the purpose of capturing the similarity in customers' tastes and standards. We also control for the type of the trade agreement by adding a dummy that equals 1 if the agreement is a North-South agreement, and zero otherwise. In order to control for any change in the market access to other countries we include the applied tariffs for product  $k$  in country  $j$ . The data comes from WITS and is incomplete, which reduces the number of observations in our sample. Finally,  $\gamma_t$  and  $\omega_{ijk}$  are a time and an exporter-importer-product fixed effects.  $\varepsilon_{ijkt}$  is an unobservable error term. Appendix 4 presents the list of all included variables and their sources.

We estimate equation (8) using a conditional logit model. The unit of observation is at the exporter-importer-product level. The advantage of this type of model is that it allows us to include fixed effects and thus to control for unobserved heterogeneity. The model is estimated by maximum likelihood and integrates out the specific effects ( $\omega_{ijk}$ ) by conditioning the sum of responses (i.e.  $\sum NewP_{ijkt} = 1$ ,  $\sum NewP_{ijkt} = 2$ , ...,  $\sum NewP_{ijkt} = T - 1$ ) for a given individual over time. This also implies that observations that do not experience any change over time (i.e. products that were not exported at all during the period of observation or were exported in every year during the period of observation) do not contribute to the maximum likelihood estimation (Cameron and Trivedi, 2005, chapter 23).<sup>27</sup>

Table 1 reports the results. The first specification includes exporter and importer characteristics, as well as the three covariates accounting for past export experience. The second and third columns include the PTA dummy and the interaction term. In column 4, we account for the type of agreement as well as for market similarity between country  $j$  and the first market the product was exported to. Finally, we introduce MFN tariffs applied by country  $j$  (situated outside the PTA area) for good  $k$ , to control for any change in market access conditions.

<sup>26</sup>Formally  $Outside\_PTA_{ikt}$  and  $InOut\_PTA_{ikt}$  can be defined in a similar way than  $Inside\_PTA_{ikt}$ .

<sup>27</sup> Marginal effects can not be computed, because they value depend on the  $\omega_{ijk}$  and the latter can not be estimated since they are integrated out. Only covariates signs can be interpreted as the sign of the effect of the covariates on the dependent variable. Another possibility is to interpret the coefficients in terms of the log-odds.

**Table 1: Estimates on the probability to export a new product to a market outside the preferential area**

variables	(1) NewProd	(2) NewProd	(3) NewProd	(4) NewProd	(5) NewProd
exporter GDP (ln)	2.560*** (0.333)	2.547*** (0.335)	2.573*** (0.334)	2.672*** (0.335)	2.984*** (0.494)
importer GDP (ln)	0.128 (0.339)	0.136 (0.339)	0.130 (0.340)	0.120 (0.336)	-2.569*** (0.914)
exchange rate (ln)	0.546*** (0.129)	0.543*** (0.127)	0.542*** (0.127)	0.532*** (0.126)	0.619*** (0.189)
Experience inside PTA area	0.262*** (0.064)	0.256*** (0.061)	-0.033 (0.084)	-0.024 (0.084)	0.130 (0.215)
Experience outside PTA area	0.452*** (0.058)	0.442*** (0.054)	0.455*** (0.054)	0.450*** (0.054)	0.399*** (0.143)
Experience in both	0.581*** (0.070)	0.567*** (0.067)	0.586*** (0.066)	0.584*** (0.066)	0.375*** (0.124)
exporter PTA		0.081 (0.100)	0.053 (0.097)	-0.003 (0.102)	0.065 (0.106)
PTA*PTA experience			0.519*** (0.107)	0.510*** (0.108)	0.210 (0.217)
market similarity				-0.049 (0.047)	-0.158 (0.107)
N-S agreement				0.380* (0.213)	0.326 (0.353)
MFN applied tariffs					-0.004 (0.004)
Observations	158,028	158,028	158,028	158,028	21,735

Errors are clustered by exporter-importer. Time fixed effects are included but are not reported. Robust standard errors in parentheses. Significance levels \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

*Inside\_PTA*, *Outside\_PTA* and *InOut\_PTA* are statistically significant and positive in all specifications, except for the *Inside\_PTA* variable which becomes insignificant and negative once we introduce the interaction term (columns (4) and (5)). The results show that any previous export experience in product  $k$ , regardless of the market, has a positive effect on the probability of exporting the same product to another country. This is consistent with our assumption on the existence of a learning mechanism or economies of scale at the export level. The PTA variable is not significant in any of the specifications. This should not come as a surprise since the PTA should not have any direct effects on the exports to countries outside the preferential area. On the other hand the interaction term between the PTA variable and the *Inside\_PTA* variable is positive and significant (column 3 and 4). This suggests the existence of an indirect positive effect -the spillover- of the PTA through the existence of a previous experience in a member market. Following the agreement more products could have been exported to the preferential area and thus benefited from a previous experience in the PTA area which could have improved the likelihood to be subsequently exported to a third country. Moreover, when this variable is included the *Inside\_PTA* becomes insignificant. This confirms that the effect of previous export activity in the preferential area on the new exports to third countries was important only during the period post-PTA. As for the measure of

market similarity, it is negative but insignificant. The sign would imply that the larger the similarity between market  $j$  and the initial market is in terms of their GDP per capita (i.e. the smaller their difference), the larger would be the probability to export to country  $j$ . The results also suggest that countries participating in a trade agreement with developed countries exhibit a larger probability to export to a third country. This could suggest that the agreement may have required the implementation of other institutional measures (i.e. trade facilitation, custom modernization, etc.), especially when the agreement was signed with a more developed country, and this could have benefited the export sector as a whole.<sup>28</sup> In the last specification we include a measure of MFN tariffs applied by country  $j$  to control for the improved market access in other countries. The effect is negative, very small and not statistically significant. More importantly, our sample is greatly reduced and the result on the interaction term disappears.

We now estimate the same model, but instead of using a dummy to proxy the effects of the PTA, we use the average preferential tariff applied within the preferential area. One could expect that products that exhibit low tariffs have a higher probability to be exported to a member market and then through any of the expansion mechanisms to a market outside the area. With the implementation of the agreement, the effect of the tariffs within the preferential area on the probability to export to a third country should be larger. The equation to be estimated is the following:

$$\Pr(NewP_{ijkt} = 1) = G(\beta_1 Inside\_PTA_{ikt} + \beta_2 tar\_PTA_{it} + \beta_3 tar\_PTA_{it} * Inside\_PTA_{ikt} + \delta Controls + \omega_{ijk} + \gamma_t + \varepsilon_{ijkt}) \quad (9)$$

where  $tar\_PTA$  is the average tariff of product  $k$  applied within the preferential area in time  $t$ .

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<sup>28</sup> Another possible explanation could be, that independently of the market expansion mechanisms, if an exporter managed to export to a developed country (i.e. self-selection), usually considered as more difficult, it would be probably easier for him to subsequently export to other less difficult destination.

**Table 2: Estimates on the probability to export a new product to a market outside the preferential area using tariff data**

variables	(1) NewProd	(2) NewProd	(3) NewProd
exporter GDP (ln)	2.274*** (0.599)	2.287*** (0.603)	1.972* (1.110)
importer GDP (ln)	-0.124 (0.502)	-0.120 (0.502)	-2.028* (1.065)
exchange rate (ln)	0.325 (0.211)	0.332 (0.212)	-0.039 (0.320)
Experience inside PTA area	0.499*** (0.158)	0.605*** (0.161)	0.054 (0.530)
Experience outside PTA area	0.636*** (0.117)	0.637*** (0.117)	0.442 (0.280)
Experience in both	0.711*** (0.126)	0.713*** (0.126)	0.243 (0.307)
tariffs within PTA area	0.003 (0.003)	0.004 (0.003)	0.008 (0.009)
tariffs*PTA experience		-0.008 (0.008)	-0.019* (0.011)
market similarity			0.388 (0.444)
N-S agreement			0.106 (0.332)
MFN applied tariffs			0.000 (0.007)
Observations	23,127	23,127	3,083

Errors are clustered by exporter-importer. Time fixed effects are included but not reported. Robust standard errors in parentheses. Significance levels \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

The results concerning the effect of previous export experience are similar to the previous estimation. The tariffs applied within the preferential area not significant and thus have no direct effect on the probability to export to a third country. As for the interaction term, its effect is negative, therefore suggesting that lower tariffs had an additional positive impact on the probability to export to non-member countries following the implementation of the PTA. However, its effect is only statistically significant when we control for market access in countries outside the preferential area. This last specification counts with a reduced number of observations, and the results should be therefore taken with precaution.

## 6.2 Introduction of new products to non-member markets by agreement

In order to distinguish among the different agreements included in our sample, we estimate equation 8 but this time we include a dummy for each of the agreements considered as well as the respective spillover covariate (i.e. interaction term). For instance the dummy CAN equals 1, if the exporting country was a member of the CAN, and zero otherwise. The spillover is built as before, that is, it is the interaction between the dummy related to the agreement and the existence of any previous experience in the PTA

area. The results are shown in Table 3. Columns 1 and 2 are the same columns presented in table 1, and are included as reference. In column 3, we control for the agreements.

We find that NAFTA and the ASEAN agreement had a direct positive and significant effect on the probability of exporting to third countries. Although surprising, this could simply imply that these agreements had a broader positive effect on exporters. It is possible that the implementation of the PTA improved the business environment and exporting conditions in general, thus having an impact on all exports and not only on those directed to member countries. On the other hand EAC and SADC had negative and significant direct effect on the probability to export to countries outside the preferential area. This could suggest that these two agreements pushed for a re-orientation of the new exports to member countries. As for the rest of PTAs, their coefficients are not statistically significant.

Results regarding the interaction term between the PTA dummy and a previous experience in the PTA area suggest that there was a spillover on the exports to third countries in the case of MERCOSUR, ASEAN, SADC, UEMOA, EAC and the EU.<sup>29</sup> Finally, like in previous results the effect of a previous experience in the PTA area becomes negative and insignificant when we control for the existence of a trade agreement and a spillover effect.

Ai and Norton (2003) highlight that the signs of the interaction terms in non-linear models can be misleading. To check for this possibility we perform the three regressions using a linear probability model. The sign of the interaction terms are consistent with the results in the logit model in all regressions, except in the case of ASEAN in the third regression. Results are not shown for brevity.

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<sup>29</sup> In the case of EAC and SADC the results suggest that the implementation of the PTA had a negative effect on the probability to export directly to non-members. Yet, they also exhibit a positive spillover. This is not necessarily contradictory, as the spillovers result from the experience that exporters were able to acquire in markets within the bloc and which subsequently triggered the exports to markets outside the PTA area.

**Table 3: Estimates on the probability to export a new product to a market outside the preferential area**

variables	(1) NewProd	(2) NewProd	(3) NewProd
exporter GDP (ln)	2.560*** (0.333)	2.573*** (0.334)	2.222*** (0.299)
importer GDP (ln)	0.128 (0.339)	0.130 (0.340)	0.246 (0.321)
exchange rate (ln)	0.546*** (0.129)	0.542*** (0.127)	0.494*** (0.134)
Experience inside PTA area	0.262*** (0.064)	-0.033 (0.084)	-0.019 (0.084)
Experience outside PTA area	0.452*** (0.058)	0.455*** (0.054)	0.470*** (0.053)
Experience in both	0.581*** (0.070)	0.586*** (0.066)	0.600*** (0.067)
exporter PTA		0.053 (0.097)	
PTA*PTA experience		0.519*** (0.107)	
CAN exporter			-0.007 (0.122)
CAN*CAN experience			0.217 (0.138)
NAFTA exporter			0.660*** (0.225)
NAFTA*NAFTA experience			0.034 (0.391)
MERCOSUR exporter			-0.134 (0.152)
MERCOSUR*MERCOSUR experience			0.322* (0.166)
ASEAN exporter			0.230** (0.113)
ASEAN*ASEAN experience			0.301** (0.153)
SADC exporter			-0.397* (0.220)
SADC*SADC experience			0.595*** (0.225)
UEMOA exporter			-0.130 (0.276)
UEOMA*UEMOA experience			1.273*** (0.208)
EAC exporter			-0.594** (0.275)
EAC*EAC experience			0.808*** (0.141)
EU exporter			0.250 (0.266)
EU*EU experience			0.598** (0.245)
Observations	158,028	158,028	158,028

Errors are clustered by exporter-importer. Time fixed effects are included but are not reported. Robust standard errors in parentheses. Significance levels \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

## 7. Conclusions

Given the increasing role of preferential trade agreements in countries' trade agendas, it is important to determine whether PTAs can promote new exports both within and beyond the bloc. Using trade data for 36 countries at the SITC 5-digit level and for eleven PTAs over an 11-year window, this paper examines whether a PTA can generate a positive indirect effect – or spillover – on the exports to third countries. We identify three mechanisms. The first one is based on the presence of economies of scale at the production level, the second one on learning by exporting, and the last one on scale economies at the export level. All three could explain the spillovers we identify empirically.

To test whether such spillover effect exists, we first estimate the effect of any previous experience within the PTA area on the probability of exporting the same product to a market outside the preferential area. We find that a previous experience in a member market does increase the probability of exporting to a third country. We then test for the existence of a PTA spillover, that is, whether the latter effect changes once the PTA enters into force. To this end, we interact a dummy variable that indicates whether or not there is a trade agreement with a dummy that signals whether the product was exported before to a member country.

Our results suggest that an initial experience in the PTA area has a positive effect on the probability to export to a third country during the years that follow the agreement. This implies that by expanding the extensive margin within the preferential area, PTAs could catalyze market expansion outside the bloc and be stepping stones to enter into other markets. We also test our model using the average tariffs within the preferential area, instead of the PTA dummy. The results supporting the existence of a PTA spillover are not conclusive. Finally, we individually test for the existence of a spillover effect for all the agreements included in our sample and find evidence in the case of MERCOSUR, ASEAN, SADC, UEMOA, EAC and the EU.

Although the precise channels of influence require further study, it seems that by promoting the exports of new products within the preferential area, PTAs catalyze these mechanisms and thus encourage firms to break into extra-PTA markets. Once an exporter has entered the preferential market, it can benefit from economies of scale at the production level, at the export level, and/or from learning effects – all of which can reduce the costs of breaking into markets outside the preferential area. This implies that a larger number of products exported to the bloc increase the likelihood that the country will enter an additional market with one of these products.

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## Appendix 1

Trade agreement	year of entry into force	Exporter	Country group
AFTA	1992	Brunei Darussalam	High income
AFTA	1999	Cambodia	Low income
AFTA	1992	Indonesia	Lower middle income
AFTA	1997	Lao PDR	Low income
AFTA	1992	Malaysia	Upper middle income
AFTA	1992	Philippines	Lower middle income
AFTA	1992	Thailand	Lower middle income
AFTA	1995	Vietnam	Low income
CAN	1993	Bolivia	Lower middle income
CAN	1993	Colombia	Lower middle income
CAN	1993	Ecuador	Lower middle income
CAN	1993	Peru	Lower middle income
CAN	1993	Venezuela	Upper middle income
EAC*	2000	Kenya	Low income
EAC	2000	Uganda	Low income
EC - Lebanon	2003	Lebanon	Upper middle income
EC - Morocco	2000	Morocco	Lower middle income
EC - Tunisia	1998	Tunisia	Lower middle income
EC - Turkey	1996	Turkey	Upper middle income
MERCOSUR	1991	Argentina	Upper middle income
MERCOSUR	1991	Brazil	Upper middle income
MERCOSUR	1991	Paraguay	Lower middle income
MERCOSUR	1991	Uruguay	Upper middle income
NAFTA	1994	Mexico	Upper middle income
SADC**	2000	Angola	Lower middle income
SADC	2000	Malawi	Low income
SADC	2000	Mozambique	Low income
SADC	2000	Zambia	Low income
SADC	2000	Zimbabwe	Low income
WAEMU/UEMOA	2000	Benin	Low income
WAEMU/UEMOA	2000	Burkina Faso	Low income
WAEMU/UEMOA	2000	Côte d'Ivoire	Low income
WAEMU/UEMOA	2000	Mali	Low income
WAEMU/UEMOA	2000	Niger	Low income
WAEMU/UEMOA	2000	Senegal	Low income
WAEMU/UEMOA	2000	Togo	Low income

\*Tanzania was excluded.

\*\*Tanzania and South Africa were excluded.

## Appendix 2

importer	importer	importer
Aruba	Greece	Oman
Albania	Guatemala	Pakistan
United Arab Emirates	Guyana	Panama
Argentina	Hong Kong, China	Peru
Armenia	Honduras	Philippines
Australia	Croatia	Poland
Austria	Hungary	Portugal
Benin	Indonesia	Paraguay
Burkina Faso	India	Qatar
Bangladesh	Ireland	Romania
Bahrain	Iran, Islamic Rep.	Russian Federation
Bahamas	Israel	Rwanda
Belarus	Italy	Saudi Arabia
Belgium	Jamaica	Senegal
Belize	Jordan	Singapore
Bolivia	Japan	El Salvador
Brazil	Kazakhstan	Suriname
Botswana	Kenya	Slovenia
Central African Republic	Cambodia	Sweden
Canada	Korea, Rep.	Syrian Arab Republic
Switzerland	Kuwait	Togo
Chile	Lebanon	Thailand
China	Sri Lanka	Trinidad and Tobago
Cote d'Ivoire	Macao, China	Tunisia
Cameroon	Morocco	Turkey
Colombia	Madagascar	Taiwan, Province of China
Cape Verde	Mexico	Tanzania
Costa Rica	Macedonia, FYR	Uganda
Czech Republic	Mali	Ukraine
Germany	Mongolia	Uruguay
Denmark	Mozambique	United States
Algeria	Mauritania	Venezuela
Ecuador	Mauritius	Vietnam
Egypt	Malawi	South Africa
Spain	Malaysia	Zambia
Finland	Niger	Zimbabwe
France	Nigeria	
Gabon	Nicaragua	
United Kingdom	Netherlands	
Ghana	Norway	
Guinea	New Zealand	

## Appendix 3

### Number of new products following the trade agreement

Treaty	member exporter	Number of new products exported to the PTA area				TOTAL
		t	t+1	t+2	t+3	
AFTA	Brunei Darussalam	31	31	27	39	128
AFTA	Indonesia	14	13	13	14	54
AFTA	Cambodia	23	34	45	42	144
AFTA	Lao PDR	15	8	11	13	47
AFTA	Malaysia	8	6	7	3	24
AFTA	Philippines	8	11	18	13	50
AFTA	Thailand	11	10	3	0	24
AFTA	Vietnam	45	37	39	40	161
CAN	Bolivia	27	38	17	22	104
CAN	Colombia	26	21	20	22	89
CAN	Ecuador	42	24	30	17	113
CAN	Peru	36	36	19	24	115
CAN	Venezuela	25	15	11	9	60
EAC	Kenya	37	14	15	5	71
EAC	Uganda	16	14	23	27	80
EC - Lebanon	Lebanon	6	10	7	13	36
EC - Morocco	Morocco	17	17	25	15	74
EC - Tunisia	Tunisia	20	30	16	16	82
EC - Turkey	Turkey	5	11	11	4	31
MERCOSUR	Argentina	4	10	3	2	19
MERCOSUR	Brazil	2	1	4	0	7
MERCOSUR	Paraguay	34	58	50	45	187
MERCOSUR	Uruguay	48	68	42	44	202
NAFTA	Mexico	4	5	5	4	18
SADC	Angola	25	48	41	27	141
SADC	Mozambique	103	46	24	35	208
SADC	Malawi	62	45	49	33	189
SADC	Zambia	66	66	47	23	202
SADC	Zimbabwe	56	40	25	11	132
WAEMU/UEMOA	Benin	46	59	36	65	206
WAEMU/UEMOA	Burkina Faso	23	48	48	53	172
WAEMU/UEMOA	Côte d'Ivoire	22	31	20	23	96
WAEMU/UEMOA	Mali	15	30	12	68	125
WAEMU/UEMOA	Niger	6	11	10	57	84
WAEMU/UEMOA	Senegal	11	88	53	24	176
WAEMU/UEMOA	Togo	30	62	46	176	314

Note: *t year* refers to the year when the PTA enters into force.

## Appendix 4

variables	description	source
GDP, GDP per capita	in US PPP for the 1988-2006 period.	World Development Indicators
real exchange rate	The real exchange rate is the value of national currency in real terms per USD dollars for the 1988-2005 period.	World Development Indicators
Experience inside PTA area	dummy variable that equals 1 if the product was previously (i.e. in any of the last 3 years) exported only to a PTA market, 0 otherwise.	authors's calculation
Experience outside PTA area	dummy variable that equals 1 if the product was previously (i.e. in any of the last 3 years) exported only to a market outside the PTA area, 0 otherwise.	authors's calculation
Experience in both	dummy variable that equals 1 if the product was previously exported (i.e. in any of the last 3 years) to inside and outside the PTA area, 0 otherwise.	authors's calculation
exporter PTA	dummy variable, equal 1 if the exporter has a PTA in $t$ , 0 otherwise.	RTA database, World Trade Organization
Tariffs outside the PTA area	MFN tariffs in period $t$ applied by non-members for product $k$ (simple average).	WITS
Tariffs within the PTA area	Average applied/preferential tariffs in period $t$ for product $k$ within the PTA area.	WITS
Market similarity	difference in the GDP per capita between the country (largest cities in the country) that was served first and the country (largest cities in the country) that was subsequently served.	World Development Indicators and author's calculation