The DR-CAFTA and the extensive margin

A firm-level analysis

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Abstract: This paper examines the export behavior of Dominican Republic exporters following the implementation of the Dominican Republic–Central America Free Trade Agreement in 2007. Using a firm-level dataset for 2002-2009, the authors investigate the effects of a tariff reduction on the extensive margin. The analysis distinguishes the impact on the entry of new firms, exports of new products, and entry into the Agreement's markets. The paper analyzes whether the agreement prevents incumbent exporters from exiting the market. The results suggest that tariff cuts had a positive although very small effect on the extensive margin. A decline in tariffs also seems to reduce the probability of exit, but the effect is also small. The evidence calls for complementary policies aiming at helping exporters maximize the benefits of the agreement.

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1. Introduction

Regional Trade Agreements (RTAs) have spread rapidly around the world since the 1990s and Latin America is no exception. Today all countries in the region are signatories of at least one RTA. This new economic environment has created both new challenges and opportunities for exporters in the region. Yet, despite its importance to policy makers, exporters' dynamics following an RTA have been under-documented. Previous studies on RTAs have looked at their effects on export flows and especially at the trade creation and diversion effects (for a theoretical and empirical review see Freund and Ornelas, 2009). These studies use product, sectoral or country level data and thus provide little insight as to the effects on exporters' activities and performance. Using a novel firm-level dataset of trade transactions for the Dominican Republic (DR) covering the period 2002-2009, we examine exporters' responses to the Dominican Republic–Central America Free Trade Agreement (DR-CAFTA). The agreement entered into force in 2007[1] and includes the United States – DR's main trade partner, Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua. We test whether DR-CAFTA has had a positive impact on the extensive margin, that is, whether it has increased exports through the entry of new exporters and the introduction of new product-market relationships. Finally, we also analyze whether the agreement has improved exporters' survival in foreign markets.

The adjustments across the four margins (i.e. firms, products, markets and survival) are particularly important. First, exports generated by the entry of new firms and the introduction of new products/or markets are not only a source of growth but also of export diversification, both key elements of a country's development strategy. Second, exporters' survival in foreign markets is crucial for sustained export growth. Finally, it is essential to understand the effects of market access on exporters in order to design policies aiming at helping exporters reap all the benefits from trade liberalization.

For our analysis, we follow the theoretical frameworks outlined in Melitz (2003) and Bernard, Redding and Schott (2009). Melitz' influential paper describes firms' dynamics following trade liberalization. In his framework, firms differ in their productivity (i.e. marginal costs) and have to pay a fixed cost to enter the export market, thus implying that only the most productive firms will export. One of the main implications of the model is that a reduction in trade costs (i.e. tariffs) will lead to the entry of new exporters, as more firms will be able to afford entering the export market. An indirect implication of the model is also that lower tariffs will raise the profits of incumbent exporters, thus increasing their likelihood to stay in the market and decreasing their exit rates. Bernard, Redding and Schott (2009) refine the Melitz model to account for multi-product and multi-destination firms.[2] In their framework, a decrease in variable trade costs induces surviving exporters to start selling products which before were not

[1] The agreement was signed in 2004 but it was only ratified in 2007. Compared to earlier agreements with the U.S., the CBI (Caribbean Basin initiative) and the CBTPA (Caribbean Basin Trade Partnership Act), the DR-CAFTA covers almost all products and, unlike its predecessors, is based on reciprocal trade preferences. In 2008, the DR trade policy with the European Union also changed. The Cotonou agreement which granted non-reciprocal trade preferences to the DR was replaced by Economic Partnership Agreements (EPA), a reciprocal trade regime.

[2] Their setup generates not only firm selection but also product selection by the inclusion of a product-market fixed cost and by taking into account (product-country) demand heterogeneity.

profitable, thus increasing the number of goods exported by each firm.[3] We test these predictions in the case of the Dominican Republic exporters.

Using the export firm-level dataset provided by the Dominican Republic Customs Authorities for the period 2002-2009, we estimate the effect of tariff reductions on the number of new exporters and on the number of incumbents that introduce a new product or enter a market within the CAFTA area. [4] In addition, we evaluate the effect of tariff cuts on the probability of exiting a market. We find that tariff preferences had a positive effect on the number of new exporters, and the number of exporters that introduce new product-market combinations. The effect is however very small. This could suggest that there may be other factors preventing exporters from benefiting from the improved market access. Finally we find that tariff cuts reduce the probability of exiting a CAFTA market. The effect is also small.

This paper contributes to the bourgeoning literature on firm-level export dynamics. Most studies have focused on the relationship between export participation and firm productivity (i.e. firm-selection and learning by exporting). Some others have explored the effects of trade liberalization on the productivity of import competing plants (see for instance Pavcnik, 2002 and Trefler, 2004) but only very few look at the effects of tariffs on firms' export behaviour. Bernard, Jensen and Schott (2003) analyze the effect of tariff reductions on the participation of firms in export markets in the case of U.S. manufacturing plants using survey data for three years over the period 1987-1997. They find that firms in industries with declining export costs face lower probabilities of death and higher probabilities of becoming exporters. Baldwin and Gu (2004) find in the case of Canadian manufacturing firms that the tariffs cuts following the U.S.-Canada FTA (of 1988) promoted the entry of Canadian plants into export markets. Their data, however, do not include a destination dimension. Their estimates are therefore "aggregate" estimates i.e. not market-specific.

Our paper also relates to studies exploring the relationship between tariff cuts and the extensive margin. These studies use trade data at the product level, and can only investigate the effect of tariffs on the range of products but not on firms' dynamics. Kehoe and Ruhl (2009) find evidence that tariff cuts benefited the exports of new goods in the case of NAFTA and the U.S.-Canada FTA, as well as in countries experiencing significant structural changes.[5] Gómez and Volpe (2008) obtain similar results on the effect of tariff preferences on the export of new goods for Colombia during the period 1996-2005. Their results suggest that lower tariffs had a positive effect on the number of exported products but also on the probability of exporting a product. Finally, Debaere and Mostashari (2005) look at the imports from 148 countries to the U.S. between 1989 and 2000 and find that both tariffs and tariff preferences have a positive but small effect on the probability of a product to be exported.

The rest of the paper is organized as follows: the next section presents the data. Sections 3 and 4 describe respectively the patterns of aggregate exports and of the firm-level extensive margin of the Dominican Republic. Section 5 looks at tariffs and exporters' behavior, while section 6 presents the empirical exercise and the results. The last section concludes.

[3] A similar result is also predicted in Eckel et al. (2009).
[4] In our study, we do not classify Costa Rica as part of the group of countries signatories of the DR-CAFTA since this country ratified the agreement only in 2009.
[5] Episodes of structural change include China's accession to the World Trade Organization, as well as the structural transformation episodes in Chile (1970-80) and Korea (1970-80).

2. The data

Our study employs a unique, very detailed export firm-level dataset provided by the Dominican Republic Custom Agency. The data contain all transactions (i.e. amount and quantity) by product at the HS 12-digit level and by destination for all exporters[6] for the period 2002-2009. The sample includes 135,016 exporter-destination-product relationships. The firms' universe during this period consists of 8,706 firms, among which not all export in every year.[7] Table 1 reports the number of exporting firms, products and markets for selected years.

Table 1: Summary statistics

	2003	2005	2007	2009
exports by firm (10^6 US $):				
mean	1.4	1.5	1.4	1.5
standard deviation	9.4	9.9	9.0	9.8
products by firm:				
mean	6.3	5.2	6.5	6.2
standard deviation	10.7	8.9	13.1	13.1
markets by firm				
mean	2.1	2.1	2.1	2.2
standard deviation	2.7	2.9	2.9	3.1
number of firms	2,660	2,622	3,237	3,031
number of products	2,035	2,049	2,937	2,812
number of markets	133	131	147	147
total exports (10^6 US $):	3,742	3,969	4,474	4,563

The data show that the number of exporters, products and markets increased until 2007, before declining in the next years (except for the number of markets). The number of exporters went from 2,660 in 2003 to 3,237 in 2007, which is a 21.6% increase. In addition, the number of products rose by 44.3% for the same period. Their number went from 2,035 in 2003 to 2,937 in 2007. It is also worth mentioning that while the change in both the number products and firms was very modest between 2003 and 2005, their number expanded rapidly during the following years. Indeed, the number of firms for 2005-2007 period went from 2,622 to 3,237 and the number of products from 2,049 to 2,937. As for the export markets, their number rose by 10.5% between 2003 and 2007.

Looking at the exporters' profile, each year around 60% of firms are multi-product exporters (i.e. they export more than one product). Half of them export to a single market, while the other half exports to multiple markets (see Appendix 1). For the remaining firms, around 37% export only one product to one destination and 3% export one product to multiple destinations. In terms of exports, almost all exports

[6] Exporters are identified through their names.
[7] From this universe, only 459 export in every year.

come from multi-product firms. These findings are similar to those in Bernard, Redding and Schott (2009) and show that exports are concentrated within multi-product exporters.

Another important characteristic of our data set is that it distinguishes between exporters in Export Zones (EZ) and exporters in the National Territory (NT). This is an important feature as it allows us to control for the firms location in our empirical exercise. In terms of value EZ exporters are particularly important: their exports account for 74% (2009) to 84% (2002) of total exports. As for their number, around 20% (i.e. 545) of the total number of exporters operate in an EZ each year.

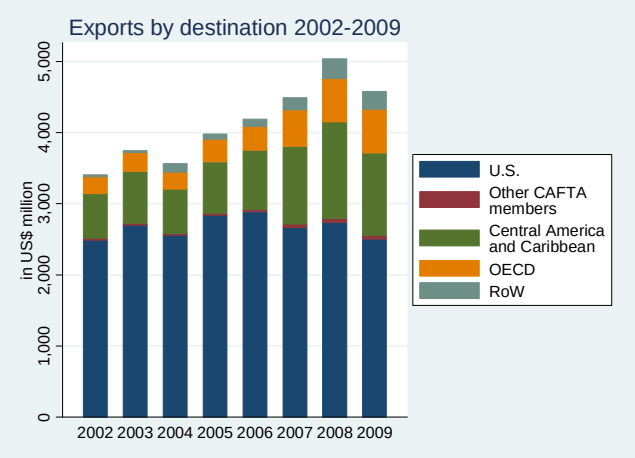
Finally, for accuracy purposes we exclude from our analysis, re-exports, ferronickel' exports[8], occasional exporters, couriers, as well as firms whose partners were not identified. These exclusions reduce our sample by 18% to 110,702 trade relationships.

3. Export trends

With the purpose of identifying any major change in the export patterns following the DR-CAFTA agreement, we briefly review in this section the evolution of the exports from Dominican firms to the U.S. and the other CAFTA members (i.e. El Salvador, Honduras, Guatemala and Nicaragua). [9]

Figure 1 reports the exports from the Dominican Republic by destination from 2002 to 2009 (in US$ millions). The United States is by far the largest partner of the DR with average exports amounting to US$ 2.6 billion each year. Other main destinations for DR exporters' shipments are Puerto Rico (10.2% in 2008), Haiti (9.9%), Belgium (2.1%), Spain (2%) and the Netherlands (1.9%). As for the exports to the other CAFTA members, they account for only 1% of DR total exports in 2008, and this share has been relatively stable since 2002.

Figure 1: Exports by destination



[8] We exclude ferronickel exports since they involve only one exporter and account on average for 13% of DR total exports. Moreover, its export value is heavily dependent on international price fluctuations which could also bias our results. In 2007 its exports accounted for 26% of total exports, while in 2008 the share was of only 9%, as consequence of a price decline.

[9] For the purpose of our study, we exclude Costa Rica from the CAFTA country group, as it only ratified the treaty in 2009.

Two main features of the DR trade with the U.S can be highlighted. First, the share of exports to the U.S. has declined since 2002 as a result of market diversification and a slowdown in the exports to this market.[10] Between 2002 and 2008 exports to other countries in the Caribbean (e.g. Haiti and Jamaica) as well as to other developed countries (e.g. Spain and Belgium) experienced a rapid expansion, and grew by some 150%, while exports to the U.S. expanded by a modest 10%. Second, exports to the U.S. are relatively volatile. They exhibit alternating periods of modest growth and decline. Figure 2 shows that following a decrease in 2004, exports picked up, before falling again in 2007 and in 2009. As a result the years post-DR-CAFTA have been characterized by a slow export growth. In 2009, the demand for DR exports fell across all regions (except for the exports to the OECD countries) and the exports to the U.S. were almost at the same level as in 2002. However, this does not necessarily reflect the effectiveness of the agreement but rather the difficult business conditions in the U.S. market during this period. In a recent study, Swiston (2010) shows that the U.S. 2008-recession reduced growth by 4 to 5 percent in Central America and that the transmission channels were mainly the financial conditions and the fluctuations in export demand.

Figure 2: Exports to the U.S.

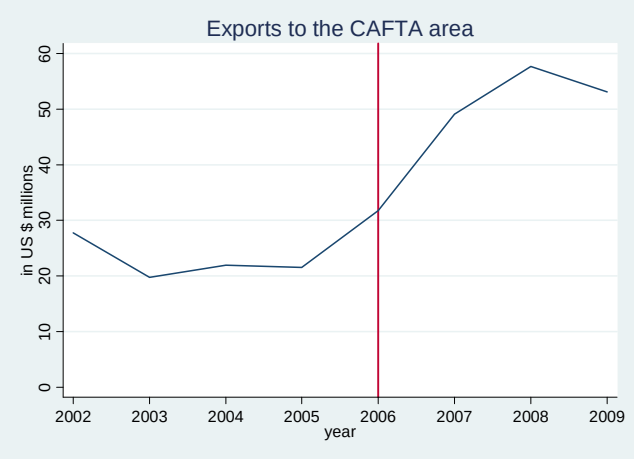
On the other hand, exports to the other CAFTA members (i.e. El Salvador, Honduras, Guatemala, and Nicaragua) not only significantly expanded since 2005, but accelerated in 2007 before declining in 2009. Figure 3a shows that exports to the CAFTA area went from US$ 21.5 million in 2005 to US$ 57.7 million in 2008. This remarkable performance is mainly due to the surge in exports to Guatemala and Honduras (Figure 3b). Between 2005 and 2008, the value of exports to Guatemala doubled to US$ 11.8 million, while exports to Honduras trebled from US$ 10.9 million to US$ 32.8 million (Appendix 2). Exports to El Salvador and Nicaragua also exhibited strong growth: the value of their exports more than doubled from 2005 to 2008.[11] This suggests that the tariff preferences were effective in boosting the exports to the CAFTA members. Moreover, Dominican exporters seem to have anticipated the agreement and start expanding their exports to the CAFTA area already in 2006.

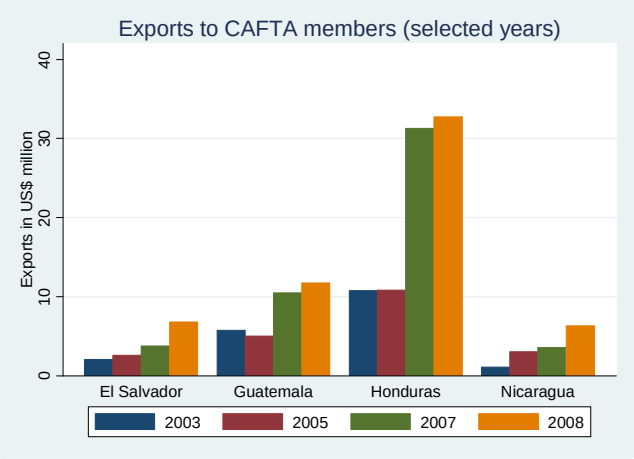
[10] In 2009, exports to the U.S. accounted for 54.6 % of the total exports, compared to 73% in 2002.

[11] It is worth mentioning that exports to Costa Rica also experienced an important expansion since 2005. They went from US$ 6 million to US$ 31 million. This could suggest that Costa Rican exporters may have anticipated the ratification of the DR-CAFTA.

As for DR export goods, the sectors (HS 2-digits) with the largest exports to the CAFTA members in 2008 were plastics (22%), cotton (20%) and tobacco (19%). These sectors combined, accounted for 61% of total exports to the CAFTA area. Particularly noteworthy is the textile sector, which went from US$ 1.1 in 2005 to US$ 18.3 million in 2008. This increase was mainly due to a surge in the exports of cotton (i.e. US$ 11.5 million). In the case of the U.S., the main export sectors were apparel (20%), medical and chirurgical instruments (16%), machinery and electrical appliances (14%) and jewelry (14%) (see Appendix 3). These sectors have increased their share in total exports since 2005, except for the clothing sector.

Figures 3a and 3b: Exports to CAFTA members





To summarize, following the DR-CAFTA agreement, exports to the U.S. stagnated in absolute terms while exports to the other CAFTA members exhibited strong growth, but their share represents only 1%. This highlights the potential for further trade expansion among Central American countries. However, in both cases, exports drop in 2009, probably as a consequence of the global economic crisis at that time.

4. Firm-level extensive margin patterns

Having analyzed the aggregate exports patterns, we now examine the exporters' dynamics that lied behind the aggregate exports movements. In particular, we look at firms' export extensive margin to the U.S. and to CAFTA area to assess whether there are significant changes in the exporters' behaviour subsequent to the agreement. The extensive margin refers to all new trade relationships[12] and can be decomposed into four components[13]:

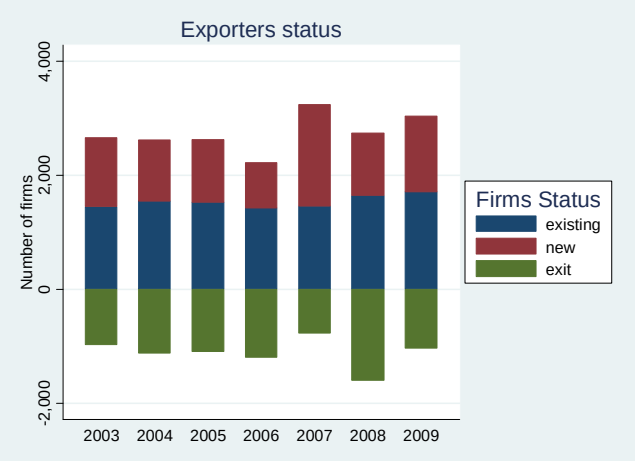
- Exports by existing firms of a new product to a new market;
- Exports by existing firms of a new product to an existing market;
- Exports by existing firms of an existing product to a new market; and
- Exports by new firms.

[12] A trade relationship is defined as the combination of a firm, a product and a destination. A new trade relationship can therefore be generated by the participation of new firms, the introduction of new products or/and the introduction of new markets.

[13] Our unique dataset contains information at the firm, product and destination level which allows for such decomposition.

Using this decomposition, we sketch exporters' behavior during this period and can determine whether they react as predicted in Melitz (2003) and Bernard, Redding and Schott (2009). In order to identify each of the components, we classify firms, products and markets according to three different statuses: new, existing and exit. A *new* firm is a firm that exports in *t,* but not in *t-1*. An *existing* firm is a firm that exports in *t* and in *t-1*. Finally, a firm that *exits* is a firm that exports in *t-1*, but not in *t*. The same definition applies to firm-product relationships and firm-destination relationships. For example, a new firm-product relationship refers to a product exported by firm *i* in *t*, but not in *t-1*. Figure 4 reports the number of firms by year according to their status.

Figure 4: Exporters by status (2003-2009)



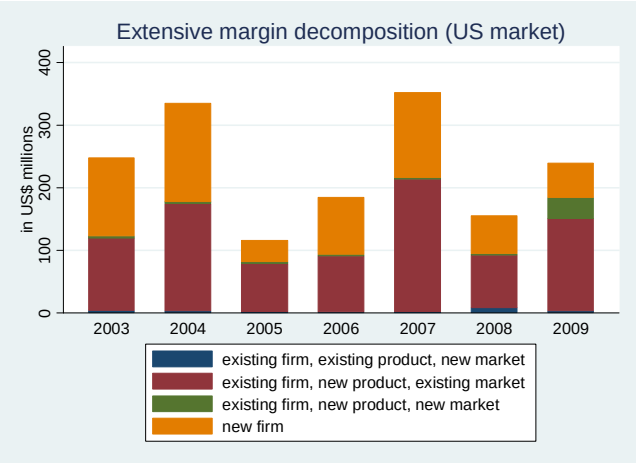
We observe that the number of newly-exporting firms surged in the year when DR-CAFTA took effect. As for exiting firms, about a thousand firms stop exporting in any given year during the 2002-2009 period, except in 2007 and 2008. From 2006 to 2007, the number of exits dropped significantly to 766, before reaching their high (i.e. 1595) in 2008. Two events may explain this result. First, the large number of entries during the DR-CAFTA year may have boosted the number of exits in 2008. Short survival among new exporters has been well documented in the literature (See *inter alia* Besedes and Prusa, 2006, 2007; Eaton et al., 2007 and Iacovone et al., 2010) and recently modeled in Albornoz et al. (2009). In their framework, firms discover their export profitability only once they become exporters. Experienced exporters entering a new market are therefore better informed than new exporters about their skills and their chances to succeed. As a consequence new exporters are more likely to exit than experienced ones. It could be that drawn by the more attractive conditions created by the agreement, many exporters entered the market in 2007, only to realize their true export performance, which forced them to exit in mass the next year. But in addition to the inherent low survival of exporters, the global economic crisis that started at the end of 2007 could have amplified this phenomenon, increasing even more the likelihood of existing of both experienced and new exporters.

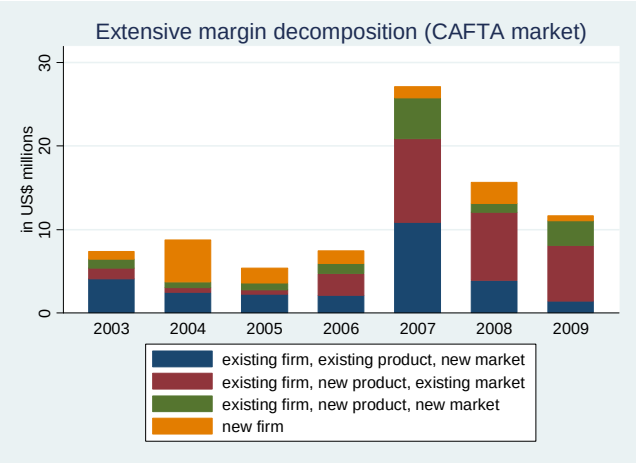
It is important to mention that the weight of the extensive margin in total exports varies across the U.S. and the CAFTA area (see Appendix 4). In the case of the exports to the U.S., the extensive margin accounts for a small share of the total trade to this country, around 5% to 13% of total exports. It has been characterized by periods of growth and decline. From 2005 to 2007 its value tripled but contracted the

following year. In 2009, it expanded again. As for the exports to the CAFTA area, the extensive margin has been growing since 2005, so has its share in total exports. In 2007, the extensive margin trebled and accounted for around 55% of total exports to the region. In both cases, the data suggest that the extensive margin expanded during the year the DR-CAFTA agreement came into force, but declined the following years.

In order to understand what drives the extensive margin, Figures 5a and 5b show the decomposition of the extensive margin for each market.

Figures 5a and 5b: The firm-level extensive margin decomposition 2003-2009





First, the data show that the composition of the extensive margin is very different in each market. In the case of the U.S. exports, the extensive margin is mainly driven by the exports generated by new entrants and by the introduction of new products by incumbents.

In the case of the other CAFTA members, the extensive margin has been mainly driven by the exports of incumbent exporters. In particular since 2007, when there is a clear jump in the extensive margin. In this year and in the next ones, the main actors were incumbent exporters who either introduce a new product in the CAFTA area or export for the first time to the CAFTA area. In 2007, around 40% of the exports were from incumbent firms, which for the first time served a CAFTA member with an existing product. Another 25% were exports generated by incumbents that were already exporting to CAFTA markets but decided to introduce a new product there. Finally exports from existing exporters serving a CAFTA market for the first time with a new product account for 19.5%. The remaining exports (7.5%) were generated by new exporters. With the marked decline in the extensive margin in 2008 and 2009, only exports generated by the introduction of a new product remained (approximately) at the level of 2007.

These figures suggest that new exporters played a more important role in the expansion of the extensive margin in the case of the U.S. than in the case of the other CAFTA markets. This could reflect the preferences of new exporters for the U.S., who see this destination as a market with more opportunities, given its size and wealth. Yet, this could also reflect the existence of non-tariff barriers to the entry into the CAFTA markets.

5. The relationship between tariff reductions and exporters' behavior: Preliminary evidence

In this section, we describe the tariff and the tariff reductions that followed the introduction of DR-CAFTA. We then examine the relationship between extensive margin and tariff cuts.

5.1. Tariffs and tariff cuts

The data on tariffs come from the tariff schedules that were negotiated in 2004 by each CAFTA member. Each country has its own tariff schedule in which goods are classified in eight to twelve different categories[14] according to the timeframe over which tariffs will be eliminated. While most of Dominican products could enter the U.S. market duty-free immediately after the agreement, between 15% (Guatemala) to 40% (El Salvador) of the total number of products in the other CAFTA markets were subject to a duty. Products whose tariffs were not zero immediately are being phased out progressively over a 5- to 20-year period.[15] Appendix 5 reports the number of product lines (HS 8-digit)[16] that received duty free treatment before and immediately after the implementation of the DR-CAFTA.

For the Dominican Republic-U.S. trade, the agreement consolidates the existing preferences and grants a duty free treatment to almost all products entering the US market[17], except for some agricultural products that are subject to quotas.[18] In the case of textile and apparel exports, the DR-CAFTA provisions are more flexible than the ones in the CBTPA, as they allow for cumulative rules of origin.[19] This allows apparel exporters in Central America and the Dominican Republic to use inputs from any country member, without losing their duty-free access to the US market (Hornbeck, 2008). For the Dominican-Central American trade[20], the DR-CAFTA extends the duty-free treatment to goods produced in export zones.

As for the tariff levels, the median tariff faced by Dominican exporters in the U.S. before the agreement was 3.2% and 5% in the other CAFTA members (see Appendix 6).[21] The tariffs before and after the agreement are shown in Appendix 7. In order to assess the size of the tariff preferences granted by the

[14] U.S. has 8 categories. El Salvador, Nicaragua and Honduras have 12 categories and Guatemala has 11 categories.
[15] There are also cases in which duty-free treatment is delayed and will not begin until 7 or 12 years after the agreement enters into force. But all tariffs will be eliminated in 20 years.
[16] All tariff schedules are at the HS 8-digit product, except in the case of Nicaragua (i.e. HS10-digit).
[17] According to USITC, before the agreement around 80% of exports from the Dominican Republic had preferential access in the U.S. market.
[18] Sugar in the case of the Dominican Republic.
[19] The provision was retroactive to January 1, 2004.
[20] The Central American (i.e. Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua) countries and the Dominican Republic signed a free trade agreement in 1998, which entered into force in all countries between 2001 and 2002. The agreement guaranteed duty free to almost all goods that complied with the rules of origins and transformation criteria, excluding goods from export zones.
[21] To compute the median tariff in the case of the Central American members, we first compute the median tariff by product across the five countries, and then we calculate the overall median tariff. The median tariff cut by product and overall median tariff cut are computed in the same way. These computations are possible using 8-digit data since countries in Central America share the same product classification at this level of disaggregation, namely the SAC (Sistema Arancelario Centroamericano).

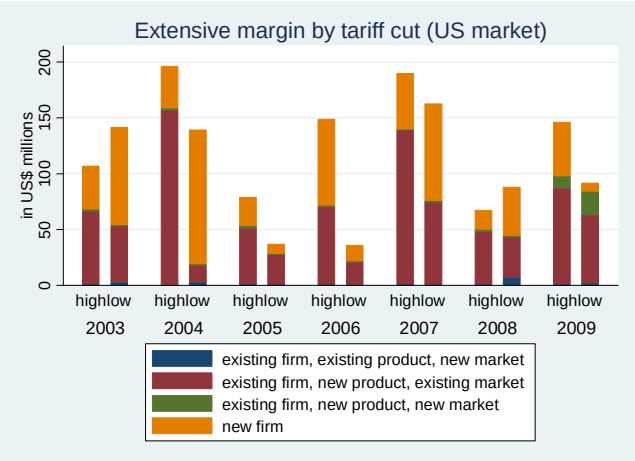
DR-CAFTA, we compute the tariff cuts by product for the U.S.[22] and the other CAFTA members. Appendix 8 reports the results. The median tariff cut in the case of the U.S. is 3.1% and 1% in the case of the CAFTA members. In the U.S. sectors that experienced high tariff cuts include agriculture, prepared foodstuff, footwear, textiles and clothing. In the case of the other CAFTA members, important tariff cuts took place also in agriculture, textiles and clothing, prepared foodstuff, as well as in machinery and appliances.

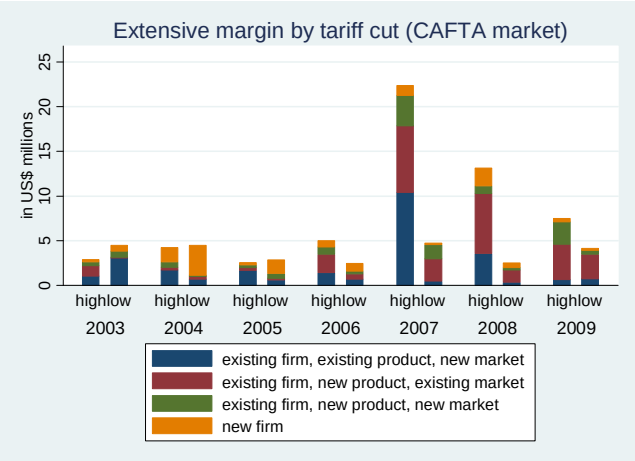
5.2. Did tariff reductions affect the extensive margin?

In order to explore the relationship between the extensive margin and the tariff reduction, we look at the extensive margin according to the size of the tariff cut. If the tariffs had an effect on the exporters' behavior, one expects the sectors with the larger tariff cuts to exhibit a relatively bigger increase in exports.

We first classify sectors (HS 2-digits) according to whether they had a low or a high tariff cut. A sector is a high cut sector if its median tariff cut is larger than the overall median tariff (i.e. 3.1% in the case of the U.S. and 1% in the case of the other CAFTA members). We use tariffs at sector level (HS 2-digits) rather than at product level, in order to have the largest product concordance between DR exports and its partners' product classifications. Exports by tariff cuts are reported in figures 6a and 6b.

Figures 6a and 6b: The extensive margin by tariff cut





In the case of the exports to the Central American countries, the extensive margin behaves as expected. The growth in the extensive margin between 2007 and 2009 is driven by the export growth in sectors that experience high tariff cuts. This suggests that the DR-CAFTA did promote new exports to the CAFTA members, and incumbent exporters seem to have benefited the most. These sectors include cotton, tobacco and apparel. However, the effect seems to vanish with time, as the extensive margin in both low and high sectors exhibit a progressive decline from 2008 onwards. This could reflect the effects of the 2008 economic crisis rather than a decline in the exporters' enthusiasm for the agreement.

[22] U.S. tariff figures excludes products whose tariff scheme depended on the good characteristics (weight, length, etc.), as well as some tobacco products whose tariffs were equal to 350%. In total, we exclude 963 products.

In the case of the U.S. market, the dynamics are less clear. From 2005 to 2007 exports in high cut sectors grew rapidly, thus suggesting that exporters may have anticipated the agreement and started exporting before the agreement entered into force. New exports in sectors with high tariff cut include apparel, footwear, plastic and tobacco. In the case of textiles and apparel, such anticipation effect is very likely, as textiles and apparel exports were subject to a retroactivity rule provided by the DR-CAFTA. Under this rule importers could apply for refunds of duties when DR-CAFTA's rules of origin were met. As a result this could have created a major incentive to start buying immediately from Dominican exporters.

In addition to the increase in the exports in high cut sectors, we also observe in 2007 an impressive expansion of the exports in low cut sectors. This is mainly driven by the sales from new exporters. This should not come as a surprise, as it could suggest that even if the tariff cut was low, it was big enough to modify the decision to export in that year. In 2008, the extensive margin in both low and high cut sectors dropped, but picked up again in 2009.

5.3. Did tariff reductions affect exporters' survival?

In this subsection we look at the exporters' survival probabilities before and after the DR-CAFTA agreement. A tariff reduction will raise the profits of incumbent exporters, thus improving firms' position in the export market and increasing their likelihood to stay in the market. We therefore expect the survival probabilities to be larger in high cut sectors.[23] To check whether this is the case, we compute the survival probabilities by cohort and by sector type (i.e. high tariff cut and low tariff cut) for firms exporting to the U.S., as well as for firms exporting to the other CAFTA members. Results are reported in Appendix 9.

First, the number of firms entering the U.S. market in any given year is considerably larger than the number of firms entering any other CAFTA market. This is not necessarily surprising considering the size of the U.S. market relative to the other markets. Second, the number of firms entering sectors with high tariff cuts between 2006 and 2009 is larger than in sectors with low tariff cuts. This is true for the U.S. market, except for 2008. Third, the survival probabilities in 2007 and 2008 for exporters in sectors with high tariff cuts are higher than the ones for exporters in sectors with low tariff cuts, for all markets, regardless of the year of entry. There were only very few cases, in both the U.S. and the other CAFTA members, where this was not observed. Finally, the survival probabilities before 2006 and in 2009 do not exhibit a particular pattern in both types of sectors, unlike in subsequent years.

This constitutes preliminary evidence that the tariffs did affect the pattern of firms in terms of survival, especially in sectors with high tariff cuts where survival seems to be higher in the first years of the DR-CAFTA.

[23] It is worth noting that the effect of tariffs on export survival could have an ambiguous lagged effect if we take into account the survival behavior of new entrants. Consider a decline in tariffs in *t*, according to the theoretical evidence this would increase unambiguously the survival of incumbent exporters in *t* and in subsequent years, but also increase the number of new exporters. Yet, the empirical evidence shows that most of new exporters only live for one year that is most of the new exporters will exit in *t+1*. If the number of new entrants is very large in t and so it is the number of exits in *t+1*, the export survival could be lower than in previous years, unless the survival of new exporters also improves.

6. Empirical strategy and results

In this section, we test formally the relationship between tariffs cuts and exporters' dynamics. We are particularly interested in examining whether the tariff reductions implemented by the DR-CAFTA promoted (i) firms' participation in the export market and (ii) the introduction of new product-market relationships. In the third part of this section, we also look at whether the tariff cuts (iii) improve DR exporters' survival by preventing firms from exiting the export market.

Before proceeding to the empirical exercise, a few caveats related to our dataset need to be mentioned. First the observations in our data set are likely to be subject to left and right censoring. In the case of left censoring we cannot determine whether a firm with a positive trade value in 2002 started exporting in 2002 or before (i.e. it is a new exporter or not). So for accuracy purposes we only consider firms that started exporting strictly after 2002 when estimating the effects of tariffs (i) on the number of new exporters and (ii) on the decision to exit the export market. Similarly for right censored observations, we cannot determine whether exporters reporting a positive trade in 2009, exit the next year or not. Only the exits that took place before 2009 can thus be assessed.

A second caveat concerns the period covered by our study. We observe only three years after the agreement, namely 2007, 2008 and 2009, and thus our empirical exercise considers only the short-term adjustments of the DR-CAFTA agreement.[24] Moreover this period coincides with the economic crisis that broke in the U.S., which could have undermined the effects of the agreement on Dominican exports.

Finally, given the nature of our data (i.e. customs data) we can only observe the firms that exported at least once during our period of observation, and not the total number of firms that could have potentially exported but that didn't. This selection problem could be a major handicap if one would like to estimate the probability of entering the export market (i.e. becoming an exporter). However, this is not the empirical strategy adopted in the present study.

6.1. New exporters

One of the main implications of the Melitz model is that lower trade costs will induce the entry of new firms into the export market. To test this, we estimate the effect of tariff cuts on the number of new exporters according to the following equation:

$$\text{NewExporters}_{\text{jpt}} = \beta_1 \Delta tariffs_{\text{jpt}} + \alpha Controls + \eta_k + \delta_j + \gamma_t + \epsilon_{jpt} \quad (1)$$

The dependent variable is the number of new entrants in the national territory and in export zones exporting product p (at the HS 8-digit level) to country j in time t. $\Delta tariffs_{\text{jpt}}$ is the duty reduction (in percentage points) in product p implemented in period t by country j.[25] The coefficient β_1 will be positive if the change in tariffs promoted the number of new entrants.

[24] However, we have seen in previous sections that exporters seemed to have reacted immediately to the agreement, thus ensuring some variation in our data.

[25] In order to have the largest product concordance between tariff data and exports, tariffs are averaged at the HS 6-digit level. In order to compute the tariff cuts we further assume that there were no changes in the trade policy of other countries vis-à-vis of the Dominican Republic during the period under consideration.

We also include two proxies for information spillovers: the number of firms that exported product *p* in *t-1* and the number of exporters serving market *j* with product *p* in *t-1*. Potential exporters may see the participation of other Dominican firms in foreign markets as a signal of profitability. We therefore expect these two covariates to have a positive effect on the decision to export of new entrants.[26]

Additionally, we control for the exporters location by adding a dummy *ez* that equals 1 for firms operating in an Export Zone (EZ), and zero otherwise.

In order to account for the benefits of a reduction in import costs due to the bilateral feature of the agreement, we introduce the cut of the import weighted tariff. This variable was calculated at the sector level (HS 2-digit) using as weights the coefficients observed in the 2005 input-output table of the Dominican Republic.[27] The rationale is that following the implementation of the DR-CAFTA, firms in the Dominican Republic could have access to cheaper inputs. If this is the case, this would reduce their costs, improve their competitiveness and therefore increase their propensity to export.

We also add a measure of comparative advantage, namely the normalized revealed comparative advantage index (NRCA) suggested by Laursen (1998) in order to assess whether or not new exporters start in sectors where the DR has already a comparative advantage. The NRCA is based on the RCA[28] and was computed for each year at the HS 4-digit level according to $NRCA_{kt}= (RCA_{kt}-1) / (RCA_{kt} +1)$. The main advantage of the NRCA is its symmetry: it ranges between -1 and 1. An $NRCA_{kt}$ between -1 and 0 suggests a comparative disadvantage in sector *k* in period *t*, while an $NRCA_{kt}$ between 0 and 1 indicates a comparative advantage. We also add an interaction term between the NRCA and the tariffs cuts in order to determine whether the tariffs preferences promoted the entry into DR comparative advantage sectors more than the entry into non-traditional sectors.

Finally, time(γ_t), country(δ_j) and sectors (η_k) (at the HS 2-digit) fixed effects are included. By their inclusion, we expect to control for any market, sector and year specific that could affect our results, such as the difficult business environment of 2008 and 2009. ϵ_{jpt} is the usual idiosyncratic error term.

We also estimate equation (1) using the actual applied tariffs enjoyed by Dominican exporters in foreign markets instead of the tariff cuts. By including the tariff levels, we can distinguish between the short-term effects (i.e. tariff reductions/adjustments) and the long-run effects (i.e. tariff levels) of tariffs. Tariff levels should negatively affect the number of new exporters. The data for applied tariffs (HS 6-digit) comes from TRAINS/WITS and is incomplete for the period 2002-2009, which reduces the number of observations for our empirical exercise.

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[26] It could also be the case that if the number of firms is too large with respect to the size of the market (i.e. the competition is too strong), potential exporters will decide not to enter that market.

[27] The input-output table comes from the Dominican Central Bank publications: http://www.bancentral.gov.do/publicaciones_economicas.asp.

[28] The revealed comparative advantage (RCA) index for a given year is given by $RCA_{ik} = (x_{ik}/X_i) / (x_{wk}/X_w)$, where x_{ik} and x_{wk} are the values of country *i*'s exports of product *k* and world exports of product *k* and where X_i and X_w refer to the country's total exports and world total exports. The RCA ranges between zero and infinity. A RCA lower than one suggests that the country has a revealed comparative disadvantage in the product. Similarly, if the index exceeds unity, this implies that the country has a revealed comparative advantage in the product. One should also keep in mind that the RCA is a static measure and is not comparable across time. One way to deal with this feature is to demean the RCA using the average RCA in each year. This is however not an issue in the present study as we have incorporated time fixed effects in the regression.

Table 2 presents the results. The three first columns contain the estimations using the tariff cuts, while columns 4 to 6 show the results using the tariff levels. In each case there are three specifications, the first one includes only the market access proxy. In the second specification, we control for the information spillovers and exporters location. In the last one, we add the weighted import tariff cut, the comparative advantage index and its interaction term.

Table 2: OLS estimates of the number of new exporters

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
variables	new exp.	new exp.	new exp.	new exp.	new exp.	new exp.
tariff cut	0.100**	0.097***	0.081***			
	(0.040)	(0.036)	(0.027)			
tariff				-0.017***	-0.018***	-0.016***
				(0.006)	(0.005)	(0.005)
nber of exporters, same product (t-1)		0.001	0.000		-0.000	-0.001
		(0.002)	(0.002)		(0.003)	(0.003)
nber of exporters, same prod. & mkt. (t-1)		0.126***	0.122***		0.126***	0.125***
		(0.012)	(0.011)		(0.013)	(0.013)
ez		-0.918***	-0.963***		-1.337***	-1.378***
		(0.177)	(0.189)		(0.302)	(0.310)
DR import weighted tariff cut			-0.149***			-0.123**
			(0.054)			(0.061)
comparative advantage			0.204***			0.464***
			(0.070)			(0.130)
comparative advantage *x* tariff cut			0.126***			
			(0.039)			
comparative advantage *x* tariffs						-0.009
						(0.006)
Observations	14,187	14,187	14,179	5,730	5,730	5,729
R-squared	0.301	0.437	0.452	0.281	0.402	0.403

Time, country and sectors fixed effects are used in all specifications, but are not reported. Errors are cluster by product. Robust standard errors in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1

As shown in Table 2, the coefficient of the tariff cuts is positive and statistically significant in all three specifications. Ten additional percentage points in the tariff cut will increase by one the number of new exporters of product p . This implies that sectors with large tariffs cuts attracted a larger number of new exporters, but the effect is very small. On the other hand, the effect of the tariff levels is significant and negative as expected. This suggests that sectors with relatively low tariffs attract more exporters. The effect is however almost negligible. As for the effect of the information spillovers, the fact that other firms export product p does not affect the behavior of potential exporters in the same sector. On the other hand, the number of new entrants selling product p in a given destination rises with the number of Dominican firms in the same market. The behavior of other exporters in a market seems therefore to affect the decision of new entrants. As for the exporters' location, there is a negative and statistically significant relationship between the number of new exporters and export zones. This suggests that the entry of new exporters takes mainly place in the national territory. This should not come as a surprise since the requirements needed to start a firm in an export zone are more demanding. The effect of the import tariff cuts is negative and statistically significant. Having access to cheaper inputs does not seem to benefit new exporters. One possible reason for this could be that sectors with large import tariff cuts were highly protected sectors in the past, and not necessarily competitive, thus explaining the lack of new

entries. Finally, our results suggest that the number of new exporters is larger in sectors where the DR has a comparative advantage. As for the interaction term, only the interaction between the NCRA and the tariff cut is significant. Its effect is positive, thus implying that the tariff cut have an additional and positive effect on the number of new exporters in a comparative advantage sector.

The results suggest that both tariff reductions (i.e. short-run adjustment) and lower tariffs levels (i.e. long-run equilibrium) do induce the entry of new exporters. Both effects are however very small. But the effect of tariffs seems to be larger in the short run than in the long run. This result could reflect the existence of other factors including but not limited to high transport costs, phytosanitary and standards requirements..

6.2. Introduction of new product-market relationships in the export mix

The second effect that we are interested in is whether a tariff decline encourages incumbent firms to export an additional product to the CAFTA area. For this exercise we consider only existing firms and test the effect of tariffs and tariff cuts on the number of exporters that introduce a new product in a given market (i.e. new product-market combination). The equation to be estimated is the following:

$$\text{Add}_{\text{jpt}} = \beta_1 \Delta tariffs_{\text{jpt}} + +\alpha Controls + \eta_k + \delta_j + \gamma_t + \epsilon_{jpt} \quad (2)$$

Where Add_{jpt} is the number of incumbent exporters in the national territory and in export zones that start shipping product p to market j in year t. $\Delta tariffs_{\text{jpt}}$ is the tariff cut (in percentage points) in product p implemented in period t. We expect that the number of firms adding product p to their export mix is the largest for products exhibiting large tariff reductions. Table 3 reports the results. The first three specifications use the tariff cuts (columns 1 to 3), while columns 4 to 6 show the results using the tariff levels. As for the control variables we include the same covariates than for equation (1), namely information covariates, exporters' location, import weighted tariff cuts and a comparative advantage measure. Time(γ_t), country(δ_j) and sectors (η_k) fixed effects are also included. ϵ_{jpt} is an idiosyncratic error term.

The effect of the tariff cut is positive and statistically significant but very small (i.e. 0.007 to 0.009). The effect of tariffs is negative and significant, but also small. This suggests that in the short and long run sectors with low tariffs can promote the participation of existing exporters by inducing them to add new product-market relationships in their export mix. The effect is, however, very small which could imply the existence of other non-tariff barriers.

Table 3: OLS estimates on the number of exporters adding new product-market relationships

variables	(1) nber. add	(2) nber. add	(3) nber. add	(4) nber. add	(5) nber. add	(6) nber. add
tariff cut	0.009*	0.009**	0.007*			
	(0.005)	(0.004)	(0.004)			
tariff				-0.007**	-0.007**	-0.005**
				(0.003)	(0.003)	(0.003)
nber of exporters, same product (t-1)		0.003***	0.002***		0.005***	0.004***
		(0.000)	(0.000)		(0.001)	(0.001)
nber of exporters, same prod. & mkt. (t-1)		0.111***	0.110***		0.097***	0.096***
		(0.007)	(0.007)		(0.006)	(0.006)
ez		-0.078	-0.093		0.117	0.094
		(0.076)	(0.077)		(0.141)	(0.142)
DR import weighted tariff cut			0.038***			0.076**
			(0.015)			(0.033)
comparative advantage			0.161***			0.359***
			(0.024)			(0.055)
comparative advantage *x* tariff cut			0.019***			
			(0.006)			
comparative advantage *x* tariffs						-0.009***
						(0.003)
Observations	37,486	37,486	37,435	13,629	13,629	13,621
R-squared	0.487	0.627	0.629	0.480	0.603	0.606

Time, country and sectors fixed effects are used in all specifications, but are not reported. Errors are cluster by product. Robust standard errors in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1

As for the information spillovers, both the number of exporters of a given product and the number of exporters of a given product in a given destination have a positive effect on the number of new trade relationships introduced by existing exporters. Also compared to the effect on new exporters, the effect of a cut on the import tariffs is positive for existing exporters. Exporter's location seems not to have an effect on the number of new product-market relationships. Finally, there are more new trade relationships that are created in comparative advantage sectors. The interaction term between NRCA and the tariff cuts is statistically significant and positive, which indicates that the effect of a larger tariff cut is amplified when the product belongs to a comparative advantage sector. Similarly, the interaction term between NRCA and the tariff levels is also statistically significant and negative, also suggesting that the effect of a lower tariff is magnified for sectors where the DR has a comparative advantage.

Another possibility for our estimations would have been to employ a poisson model with fixed effects. However, this model has a shortcoming: it does not allow us to evaluate the effect of time-invariant variables such as the firm location, *ez* (Cameron and Trivedi, 2005, chapter 23). Despite this and as a robustness check, we run equations (1) and (2) using the poisson estimator (ML and Quasi-ML) while excluding the variable *ez*. The results are very similar to those of the OLS model: effects of tariffs are very small (in terms of incidence ratios). We also estimate equation (1) and (2) using the negative

binomial model, but the latter is subject to stronger distributional assumptions and did not converge in all specifications. [29]

6.3. Exporter exit

According to Melitz (2003), we could expect that as tariffs go down the profits of incumbent exporters will rise, thus improving exporters chances to survive. This implies that lower tariffs could help incumbent exporters to consolidate their market position and prevent them from exiting foreign markets.

We examine this implication by estimating the effect of tariffs and tariff cuts on the probability of a firm to exit the export market. As mentioned at the beginning of this section, we consider only firms that start exporting and exit during the 2002-2009 period. The probability[30] for a firm *i* to stop exporting product *p* to country *j* in year *t* is given by:

$$\Pr\left(Exit_{ijpt} = 1\right) = \beta_1 \Delta tariffs_{\text{jpt}} + \alpha Controls + \eta_k + \delta_j + \gamma_t + \epsilon_{ijpt} \quad (3)$$

where the dependent variable $Exit_{ijpt}$ is a dummy that equals 1 if firm *i* stops exporting product *p* to market *j* in *t* and, zero otherwise. As before $\Delta tariffs_{\text{jpt}}$ refers to the tariff reductions in product *p* in time *t* applied by country *j*. We also include three different measures of export experience. Our first measure is the number of years a firm has been an exporter. Market experience is proxied by the number of products a firm *i* export to country *j* in *t-1*. Product experience is given by the number of markets a firm *i* served with product *p* in *t-1*. In order to account for the weight of product *p* in the exports of firm *i*, we also add the share of product *p* in the sales of firm *i* in *t-1*. We expect that as the share of a product increases the probability to stop exporting the product declines. We also introduce a dummy that takes one if the firm was a multi-product firm in *t-1*, zero otherwise. Finally, as for the previous estimations we control for the exporter location and add a measure of comparative advantage and an interaction term. We estimate three different specifications. The first one is the baseline regression which includes the tariff cuts and the share of product *p* in total sales. The second one includes measures of the exporter experience. In the last one we control for the exporter location as well as for the sector characteristics. We estimate each specification using the tariff cuts as well as the tariff levels. Results are reported in Table 4.

While the tariffs in levels do not seem to affect the probability to exit export markets, the coefficient of the tariff cuts is negative and statistically significant. However, its effect is very small (0.001).

The coefficients of the other covariates are very similar and statistically significant across all specifications. The size of previous sales has a negative effect on the probability to stop exporting product *p*. But the effect is very small (i.e. 0.001 to 0.002). Products with a low share in the export mix have a

[29] We also estimate equation 1 and 2 in their log-linear version (i.e. dependent variable in logs). The results remain very similar for tariffs and tariffs cuts, although not always significant.

[30] The main drawback of the LPM model is that the predicted probabilities can be negative and larger than one. But despite this, the LPM estimator remains a good indicator of the size of the effect. Moreover as a robustness check, we test the model using a logit estimator with fixed effects i.e. conditional logit (not shown here). In this type of model, only the signs of the coefficients can be interpreted (see Wooldridge chapter 15). The results on the signs of the coefficients were similar to those obtained with the LPM model.

higher probability of exit. This goes in line with Bernard, Redding and Schott model (2009), which predicts that firms will stop producing/selling products which are not in their core competencies.

Market and product experience decrease the probability to exit foreign markets. The more experienced a firm is the lower the probability to stop selling product *p* in market *j* will be. But product experience seems to matter more than market experience when it comes to exit. As for the years as an exporter, the probability to stop a product in given a market decreases by one percentage point with an additional year of export experience. Also being a multi-product exporter in *t-1* decreases the probability to drop a product-market combination in *t* by 18.7% to 23.2%. This is the covariate with the largest effect on the probability to stop selling a product in a given market.

Table 4: Estimates on the probability to exit

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
variables	exit	exit	exit	exit	exit	exit
tariff cut	-0.001***	-0.001***	-0.001***			
	(0.000)	(0.000)	(0.000)			
tariff				0.000	0.000	0.000
				(0.000)	(0.000)	(0.000)
share in sales (t-1)	-0.001***	-0.002***	-0.002***	-0.000***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
market experience (t-1)		-0.003***	-0.003***		-0.005***	-0.004***
		(0.000)	(0.000)		(0.000)	(0.000)
product experience (t-1)		-0.018***	-0.016***		-0.020***	-0.018***
		(0.001)	(0.001)		(0.001)	(0.001)
years as an exporter		-0.014***	-0.014***		-0.010***	-0.009***
		(0.001)	(0.001)		(0.002)	(0.002)
multi-product exporter (t-1)		-0.206***	-0.187***		-0.232***	-0.208***
		(0.010)	(0.009)		(0.015)	(0.014)
ez			-0.093***			-0.134***
			(0.006)			(0.009)
comparative advantage			-0.052***			-0.045***
			(0.004)			(0.006)
comparative advantage *x* tariff cut			-0.000			
			(0.000)			
comparative advantage *x* tariffs						0.000
						(0.000)
Observations	90,261	90,223	90,149	47,145	47,113	47,102
R-squared	0.720	0.736	0.738	0.693	0.711	0.715

Time, country and sectors fixed effects are used in all specifications, but not reported. Errors are cluster by product-country. Robust standard errors in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1

Firms located in an export zone show a lower probability to exit from market *j*. This is not surprising, as the requirements to be located in an EZ are more stringent than those required to be located in the national territory. Larger fixed costs in the EZ could therefore explain the better survival of EZ firms through a hysteresis mechanism (Baldwin and Krugman, 1989 and Dixit, 1989).[31] Another explanation could be that

[31] Hysteresis refers to the persistency of a firm' export participation as a consequence of the sunk costs associated with the entry into new markets. The entry into new markets is generally costly, so if a firm enters a market following a shock (i.e. exchange rate depreciation) it won't necessarily exit once the shock disappears.

the firms in export zones are the most productive ones (i.e. firms self-select into export zones) and therefore also exhibit higher survival rates.

Finally, exporters operating in a comparative advantage sector, have a lower probability of discontinuing the sale of a product in a given market. Yet, no significant effect is found for the interaction term between the comparative advantage measure and the tariffs cuts (*tariff levels*).

Recent studies have documented the low survival of trade relationships in their first years of activity. In Eaton et al. (2007), the authors show that during the 1996-2005 period most of Colombian exporters survive only one year. In another recent study, Iacovone et al. (2010) also document the short duration of the export activity for exporters in four African countries and look at its determinants. These firm-level analysis as well as other studies at the product-level (Besedes and Prusa 2006, 2007) highlight the importance of surviving in those first years. Dominican exporters are no exception. On average 63% of the new exporters last only for one year (i.e. exit after one year). We perform the same exercise as before, but this time we only consider new entrants and test whether the probability to stop exporting product *p* to market *j* in *t* given that firm *i* start exporting in *t-1* diminishes with a decline in tariffs. It is worth noting that if the number of years a firm exports is larger than one, it implies that the firm is a re-entrant (i.e. it was an exporter in the past, exit and re-enter in *t-1*). The equation to be estimated is the following:

$$\Pr\left(Exit_{ijpt} = 1 | Entry_{it-1} = 1\right) = \beta_1 \Delta tariffs_{\text{jpt}} + \alpha Controls + \eta_k + \delta_j + \gamma_t + \epsilon_{ijpt} \quad (4)$$

Table 5: Estimates on the probability to exit for new entrants

variables	(1) exit	(2) exit	(3) exit	(4) exit	(5) exit	(6) exit
tariff cut	-0.001***	-0.001***	-0.000			
	(0.000)	(0.000)	(0.001)			
tariff				-0.000	0.000	0.000
				(0.000)	(0.000)	(0.000)
share in sales (t-1)	0.000***	-0.001***	-0.001***	0.001***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
market experience (t-1)		-0.006***	-0.006***		-0.016***	-0.015***
		(0.000)	(0.000)		(0.001)	(0.001)
product experience (t-1)		-0.046***	-0.037***		-0.047***	-0.040***
		(0.002)	(0.002)		(0.003)	(0.003)
years as an exporter		0.026***	0.017***		0.030***	0.022***
		(0.003)	(0.003)		(0.004)	(0.004)
multi-product exporter (t-1)		-0.133***	-0.125***		-0.158***	-0.145***
		(0.012)	(0.011)		(0.016)	(0.015)
ez			-0.182***			-0.183***
			(0.010)			(0.013)
comparative advantage			-0.036***			-0.040***
			(0.005)			(0.008)
comparative advantage *x* tariff cut			-0.002***			
			(0.001)			
comparative advantage *x* tariffs						-0.000
						(0.001)
Observations	22,221	22,200	22,191	11,951	11,934	11,934
R-squared	0.804	0.820	0.825	0.787	0.814	0.819

Time, country and sectors fixed effects are used in all specifications, but not reported. Errors are cluster by product-country. Robust standard errors in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1

Table 5 presents the results. Tariff levels do not affect the probability to exit after one year, but a tariff reduction does. However its effect is very small (0.001) and it disappears once we control for the exporter' location and sectors characteristics. The coefficients of the remaining variables are similar to those from our previous exercise and are consistent across all three specifications, except for the product share and exporter experience. Results in the first and fourth specifications, suggest that the larger the share of a product in the export mix, the higher the probability to stop exporting this product. The effect becomes negative once we include the other controls. As for the effect of export experience, it increases the probability of exit. In other words, the probability to exit after one year is larger for re-entrants. This suggests that a previous experience does not necessarily improve export survival if that experience was not continuous.

As before, market and product experience decrease the probability to exit after one year. Product experience seems to improve the likelihood of exporting in the second year more than market experience. Finally, multi-product exporters, as well as exporters located in an EZ or in a comparative advantage sector show a higher probability to survive in the second year. Moreover the interaction term between the tariffs cuts and the NRCA is significant thus suggesting that the effect of tariff cuts is amplified in the sectors with a comparative advantage. The interaction term between the tariff levels and the NCRA does not exhibit any significant effect.

7. Conclusions

Thanks to the implementation of the DR-CAFTA in 2007, Dominican exporters face now better market access in the U.S., but also in El Salvador, Guatemala, Honduras and Nicaragua. Using an original firm-level dataset with exports by product and destination for the 2002-2009 period, this paper looks at the Dominican exporters' responses following the agreement and analyzes whether increased market access supported the expansion of the extensive margin and improved exporters survival. Based on the theoretical findings of Melitz (2003) and Bernard, Redding and Schott (2009), we test the effect of tariff reductions on (i) the number of new exporters, (ii) the number of existing exporters that added a new product-market relationship to their export mix and (iii) the probability to exit a given market.

Our results suggest that tariff reductions had a positive but very small effect on the number of new exporters. A similar result is found in the case of incumbent exporters. Tariff preferences seem to affect the behavior of existent exporters but the effect is also fairly small. Such effects could suggest that there may be other trade barriers such as standards, phytosanitary requirements, credit constraints and transport costs, among others that could be preventing exporters from taking full advantage of the agreement. This implies that beyond tariffs further efforts must be undertaken to identify the factors that are constraining exporters from benefitting from the agreement. This is also essential for the design of complementary policies aiming to stimulate export participation.

Finally we also look at the relationship between export survival and tariff preferences. Survival among Dominican exporters is very low six out of ten exporters exit the export market after one year. We test whether tariff cuts help exporters consolidate their position in a market and diminish their probability to exit. We find that tariff cuts do improve survival rates, especially among experienced exporters, although the effect is very small (0.001). Compared to experienced exporters, new entrants are smaller, and probably more sensitive to other factors, which could explain why tariff cuts does not necessarily affect the latter. This result also highlights the great challenge that export survival represents for young exporters, and therefore the need for policies that help them to develop and growth in foreign markets.

Other important results concern the exporters located in export zones. In general, these seem to perform better than their peers in the national territory when it comes to survive in export markets. Our results suggest that the probability of exiting the market for an EZ exporter is 9% to18% lower than for exporters located in the national territory; however, this may be due to self-selection, i.e. the fact that better firms chose to locate in EZs, rather than to the effectiveness of the EZ favorable fiscal regime.

Our findings provide some preliminary insight into the effects of the DR-CAFTA on Dominican exporters, in particular into the effects of improved market access on the extensive margin in the Dominican Republic. However, trade liberalization may also affect exporters' performance through other channels such as the access to cheaper inputs. Our future research will look at these effects, as well as those on the exporters from other CAFTA members. The purpose is to get a more complete assessment of the effects of the DR-CAFTA on exporters in the region.

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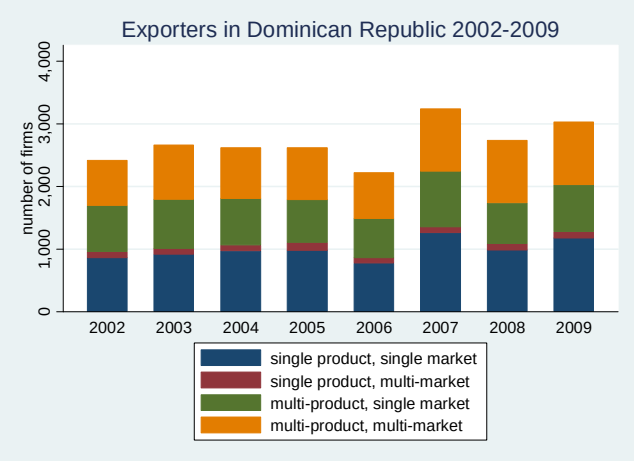
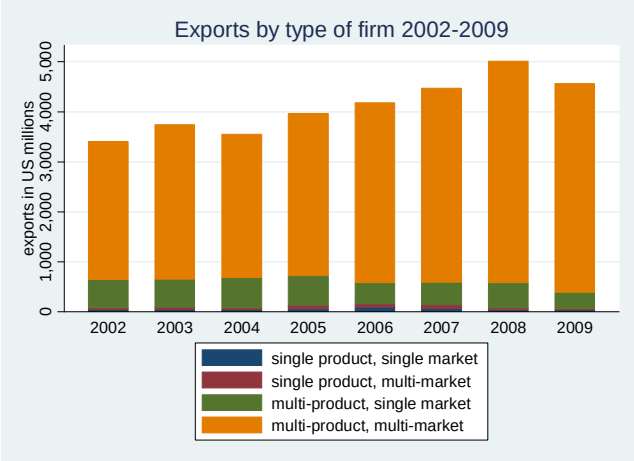
Appendix 1





Appendix 2

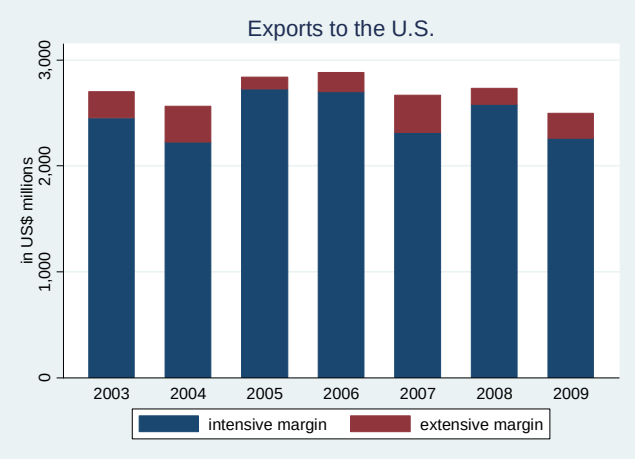
Table : Exports (in US$ million) to the CAFTA markets*					
year	El Salvador	Guatemala	Honduras	Nicaragua	CAFTA members
2002	1.18	1.81	23.14	1.65	27.77
2003	2.09	5.76	10.79	1.13	19.76
2004	1.48	3.68	15.05	1.76	21.98
2005	2.62	5.01	10.84	3.05	21.51
2006	2.86	8.97	15.52	4.4	31.75
2007	3.76	10.5	31.27	3.58	49.10
2008	6.82	11.77	32.73	6.34	57.66
2009	9.29	9.7	29.64	4.47	53.10
*excluding U.S. and Costa Rica					

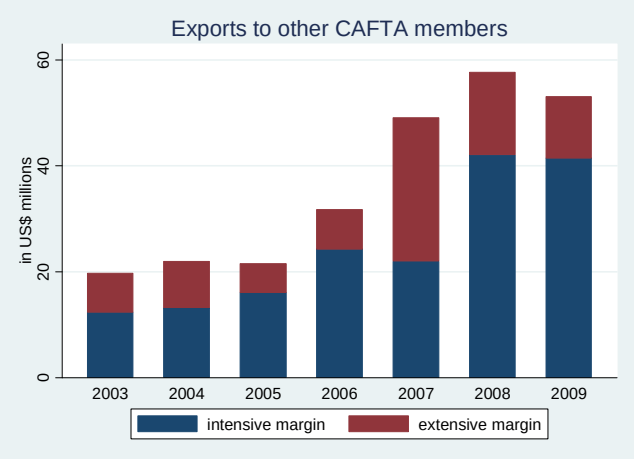
Appendix 3

Share of total exports to the CAFTA area				
top 10 sectors in 2008, HS-2 digit	values in 2005 (US$ million)	values in 2008 (US$ million)	share (%) in 2005	share (%) in 2008
Plastics and articles thereof.	5.43	12.6	25.3	21.85
Cotton.	0.27	11.58	1.3	20.08
Tobacco and manufactured tobacco	5.77	11.08	26.8	19.22
Albuminoidal subs; modified starche	1.15	3.84	5.4	6.66
apparel, not knitted or crocheted	0.16	3.03	0.7	5.25
Other made up textile articles; set	0.1	2.3	0.5	3.99
Products of the milling industry	1.08	2.05	5.0	3.56
Cocoa and cocoa preparations.	1.73	1.75	8.1	3.04
machinery and mechanical appliances/parts	0.23	1.62	1.1	2.81
Paper & paperboard	0.84	1.26	3.9	2.19

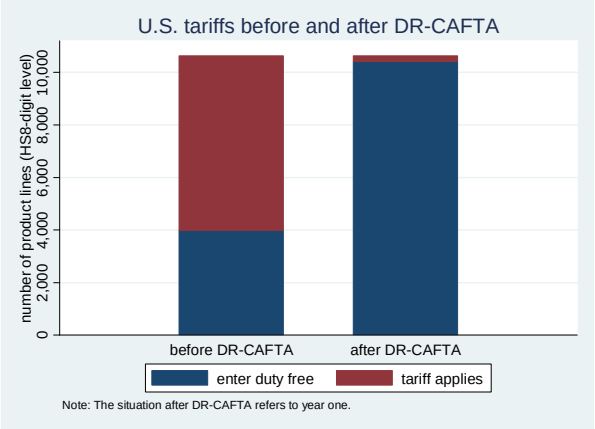
Share of total exports to the U.S.				
top 10 sectors in 2008, HS-2 digit	values in 2005 (US$ million)	values in 2008 (US$ million)	share (%) in 2005	share (%) in 2008
medical or surgical instruments /apparatus	353.73	430.56	12.5	15.74
apparel, not knitted or crocheted	834.65	407.19	29.4	14.89
Electrical mchy equip parts thereof	227.17	390.36	8.0	14.27
Natural/cultured pearls, prec stone	304.14	369.97	10.7	13.53
Tobacco and manufactured tobacco su	213.34	268.52	7.5	9.82
apparel, knitted or crocheted	143.85	144.19	5.1	5.27
Footwear, gaiters and the like; par	98.02	115.3	3.5	4.22
Paper & paperboard; art of paper pu	110.09	108.52	3.9	3.97
Plastics and articles thereof.	35.87	95.92	1.3	3.51
Sugars and sugar confectionery.	74.03	61.95	2.6	2.26

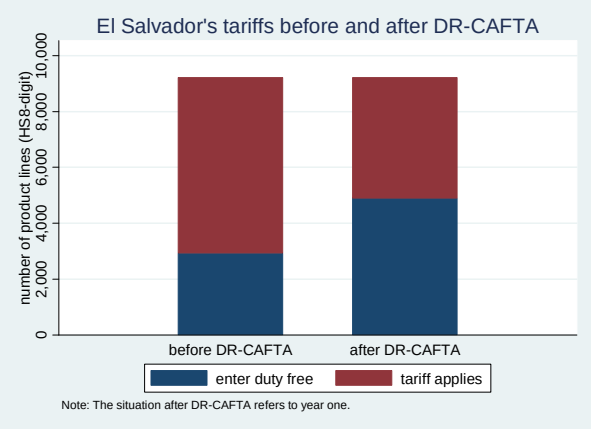
Appendix 4

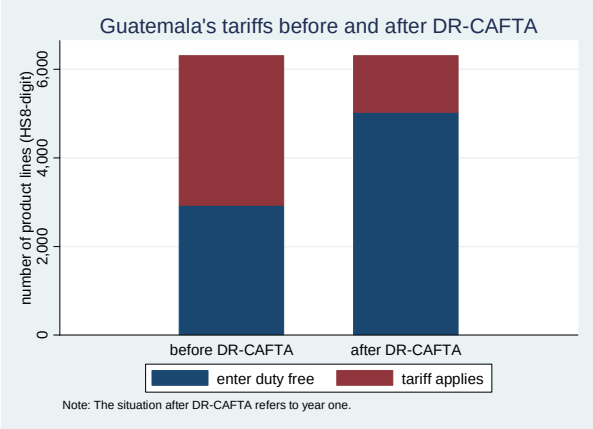

Exports to the U.S.
in US$ millions
0
1,000
2,000
3,000
2003
2004
2005
2006
2007
2008
2009
intensive margin
extensive margin

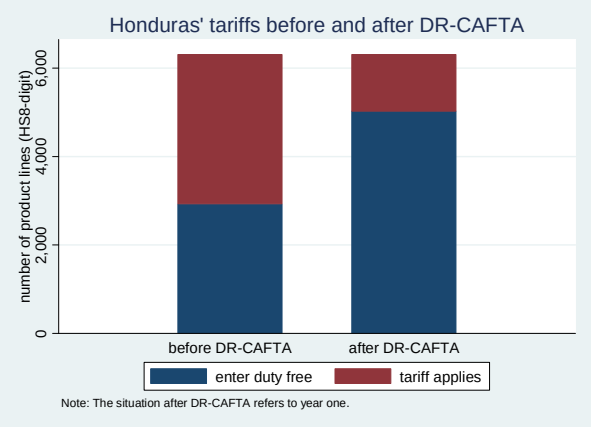

Exports to other CAFTA members
in US$ millions
0
20
40
60
2003
2004
2005
2006
2007
2008
2009
intensive margin
extensive margin

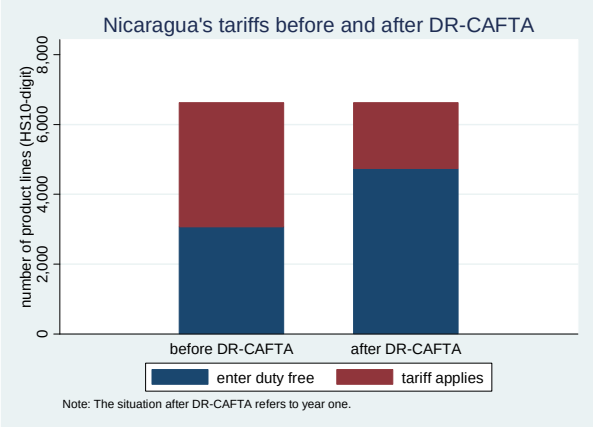
Appendix 5


U.S. tariffs before and after DR-CAFTA
number of product lines (HS8-digit level)
0
2,000
4,000
6,000
8,000
10,000
before DR-CAFTA
after DR-CAFTA
enter duty free
tariff applies
Note: The situation after DR-CAFTA refers to year one.


El Salvador's tariffs before and after DR-CAFTA
number of product lines (HS8-digit)
0
2,000
4,000
6,000
8,000
10,000
before DR-CAFTA
after DR-CAFTA
enter duty free
tariff applies
Note: The situation after DR-CAFTA refers to year one.


Guatemala's tariffs before and after DR-CAFTA
number of product lines (HS8-digit)
0
2,000
4,000
6,000
before DR-CAFTA
after DR-CAFTA
enter duty free
tariff applies
Note: The situation after DR-CAFTA refers to year one.

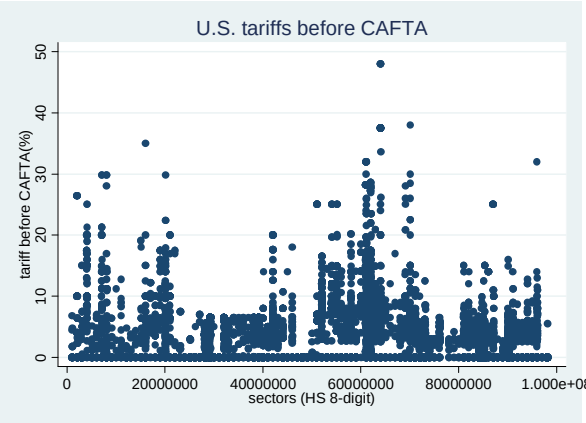

Honduras' tariffs before and after DR-CAFTA
number of product lines (HS8-digit)
0
2,000
4,000
6,000
before DR-CAFTA
after DR-CAFTA
enter duty free
tariff applies
Note: The situation after DR-CAFTA refers to year one.

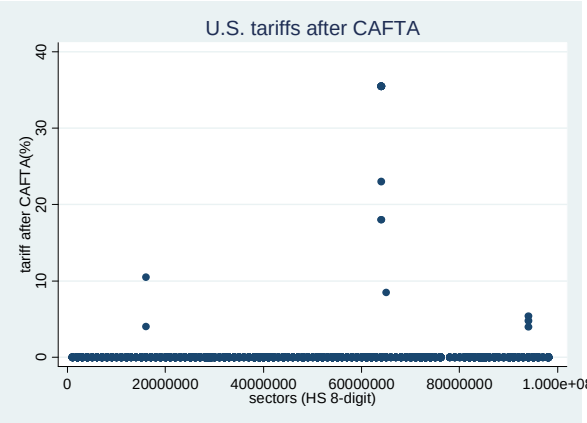

Nicaragua's tariffs before and after DR-CAFTA
number of product lines (HS10-digit)
0
2,000
4,000
6,000
8,000
before DR-CAFTA
after DR-CAFTA
enter duty free
tariff applies
Note: The situation after DR-CAFTA refers to year one.

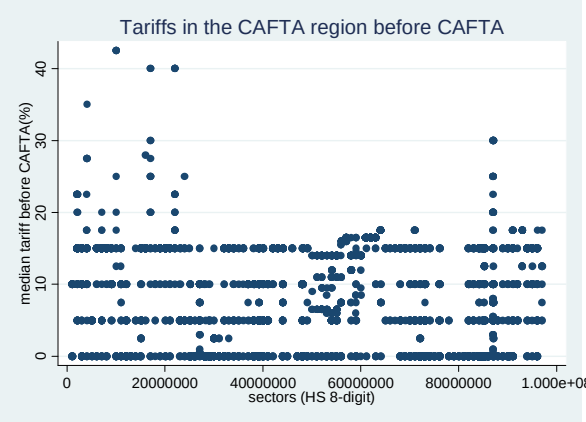
Appendix 6

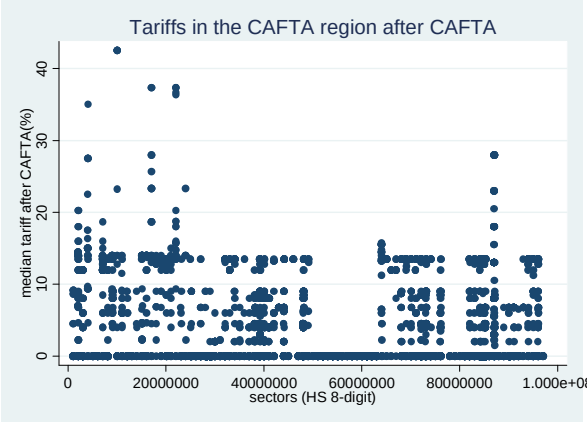
Tariffs before DR-CAFTA (%)		
El Salvador	median	5.00
	mean	7.46
	std	8.90
Guatemala	median	5.00
	mean	6.61
	std	7.69
Honduras	median	5.00
	mean	6.21
	std	7.61
Nicaragua	median	5.00
	mean	5.45
	std	7.65
U.S.	median	3.20
	mean	4.14
	std	10.75

Appendix 7


U.S. tariffs before CAFTA
tariff before CAFTA(%)
0
10
20
30
40
50
0
20000000
40000000
60000000
80000000
1.000e+08
sectors (HS 8-digit)


U.S. tariffs after CAFTA
tariff after CAFTA(%)
0
10
20
30
40
0
20000000
40000000
60000000
80000000
1.000e+08
sectors (HS 8-digit)


Tariffs in the CAFTA region before CAFTA
median tariff before CAFTA(%)
0
10
20
30
40
0
20000000
40000000
60000000
80000000
1.000e+08
sectors (HS 8-digit)


Tariffs in the CAFTA region after CAFTA
median tariff after CAFTA(%)
0
10
20
30
40
0
20000000
40000000
60000000
80000000
1.000e+08
sectors (HS 8-digit)

Appendix 8

Figure : US market

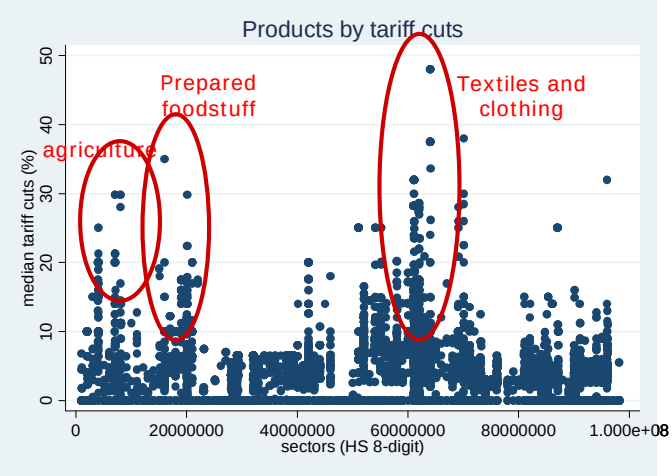
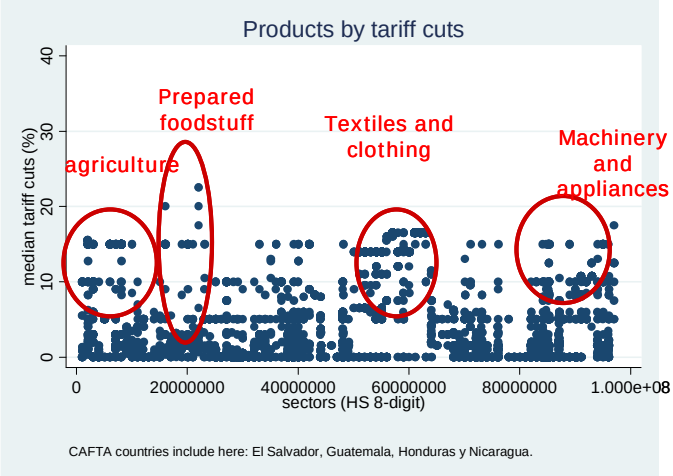


Figure : CAFTA markets



Appendix 9

Table A9a: survival probabilities for firms exporting to the others CAFTA members

High cut sectors

number of firms

	entry year						
year	2003	2004	2005	2006	2007	2008	2009
2003	49						
2004	20	50					
2005	14	17	53				
2006	5	9	13	47			
2007	4	6	9	22	49		
2008	4	5	6	13	20	46	
2009	2	3	4	9	10	22	43

Survival probability with respect to previous year

	entry year						
	2003	2004	2005	2006	2007	2008	
2003							
2004	0.41						
2005	0.70	0.34					
2006	0.36	0.53	0.25				
2007	0.80	0.67	0.69	0.47			
2008	1.00	0.83	0.67	0.59	0.41		
2009	0.50	0.60	0.67	0.69	0.50	0.48	

Low cut sectors

number of firms

	entry year						
year	2003	2004	2005	2006	2007	2008	2009
2003	44						
2004	9	37					
2005	5	12	48				
2006	3	6	13	40			
2007	3	2	7	9	50		
2008	3	2	4	4	25	47	
2009	2	2	3	4	9	21	46

Survival probability with respect to previous year

	entry year						
	2003	2004	2005	2006	2007	2008	
2003							
2004	0.20						
2005	0.56	0.32					
2006	0.60	0.50	0.27				
2007	1.00	0.33	0.54	0.23			
2008	1.00	1.00	0.57	0.44	0.50		
2009	0.67	1.00	0.75	1.00	0.36	0.45	

Table A9b: survival probabilities for firms exporting to the US market

High cut sectors

number of firms

	entry year						
year	2003	2004	2005	2006	2007	2008	2009
2003	510						
2004	142	493					
2005	75	148	415				
2006	43	73	105	283			
2007	39	52	63	126	774		
2008	30	38	47	69	145	337	
2009	24	26	37	47	96	127	582

Survival probability with respect to previous year

	entry year						
	2003	2004	2005	2006	2007	2008	
2003							
2004	0.28						
2005	0.53	0.30					
2006	0.57	0.49	0.25				
2007	0.91	0.71	0.60	0.45			
2008	0.77	0.73	0.75	0.55	0.19		
2009	0.80	0.68	0.79	0.68	0.66	0.38	

Low cut sectors

number of firms

	entry year						
year	2003	2004	2005	2006	2007	2008	2009
2003	432						
2004	129	365					
2005	66	100	329				
2006	43	47	81	270			
2007	34	28	51	107	681		
2008	22	22	35	58	174	389	
2009	18	18	28	32	113	140	480

Survival probability with respect to previous year

	entry year						
	2003	2004	2005	2006	2007	2008	
2003							
2004	0.30						
2005	0.51	0.27					
2006	0.65	0.47	0.25				
2007	0.79	0.60	0.63	0.40			
2008	0.65	0.79	0.69	0.54	0.26		
2009	0.82	0.82	0.80	0.55	0.65	0.36	