The impact of trade preferences on exports of developing countries: the case of the AGOA and CBI preferences of the USA

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Comments are Welcome

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Abstract

In this paper we study the impact of *AGOA* and *CBTPA* preferences on Sub-Saharan Africa and Caribbean Basin beneficiaries respectively. The identification of the impact consists of modelling the selection in exporting that occurs and accounting for the zero trade occurring at the HS-6 digit level of disaggregation used in the paper. The *AGOA* impact has in the literature been found to be driven mainly by apparel and textiles and oil and energy related products. We find evidence corroborating this, we do also find a strong impact of the *AGOA* and *CBTPA* preferences for the beneficiary countries in non apparel and textile products. Another result is that the strength of the estimated impact in several cases increases with the level of product aggregation. Finally, not controlling for zero trade flows and the choice of panel data estimator significantly biases the estimated impact. A large sample size as in our case in most cases attenuates this bias and increases consistency.

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Abbreviations Used

- ACP - African Caribbean and Pacific
- AGOA - African Growth and Opportunity Act
- AGOAA - African Growth and Opportunity Act Apparel waiver
- ATPA - Andean Trade Preference Act
- ATPDEA - Andean Trade Promotion and Drug Eradication Act
- CAFTA-DR - Dominican Republic–Central America Free Trade Area
- CBERA - Caribbean Basin Economic Recovery Act
- CBI - Caribbean Basin Initiative
- CEPII - Centre d'Etudes Prospectives et d'Informations Internationales
- CGE - Computable General Equilibrium
- CIF - Commission, Insurance and Freight
- CUTS - Consumer Unity and Trust Society
- EBA - Everything But Arms
- EPAs - Economic Partnership Agreements
- EU - European Union
- FTA - Free Trade Area
- GAO - Government Accountability Office
- GSP+ - Generalised System of Preferences Plus
- HS - Harmonised System
- ILO - International Labour Organisation
- LDCs - Least Developed Countries
- LSDV - Least Squares Dummy Variable
- MFN - Most Favoured Nation
- NRP - Non Reciprocal Preferences
- OECD - Organisation of Economic Cooperation and Development
- OLS - Ordinary Least Squares
- ROO - Rules of Origin
- SSA - Sub Saharan Africa
- UNCTAD - United Nations Conference on Trade and Development
- US - United States
- USITC - United States International Trade Centre
- USTR - United States Trade Representative
- TARIC - Integrated Tariff of the European Communities

1 Introduction and Background

The United States of America (USA) has signed several preferential trade agreements with developing countries. These include the *African Growth and Opportunity Act (AGOA)* offered to selected Sub-Saharan African countries (SSA) and the *Caribbean Basin Trade Protection Act (CBTPA)* which were provided to Caribbean Basin countries[1]. The *CBTPA* is part of the earlier *Caribbean Basin Initiative (CBI)* which was launched as the *Caribbean Basin Economic Recovery Act (CBERA)* provided to the Caribbean Basin countries in the early 1980s. Although, we focus on the *CBTPA* preferences which were provided in 2000 we do make references to the earlier *CBI* and *CBERA* preferences. There has been much debate in the literature about the impact of these preferences for developing countries. These studies include the impact of *AGOA* (for example, Brenton and Hoppe, 2006, Brenton and Ikezuki, 2004, Collier and Venables, 2007, Frazer and Van Biesebroeck, 2010, Gibbon, 2003, Mattoo et al., 2003, Páez et al., 2010, Tadesse and Fayissa, 2008) and studies on the *North American Free Trade Agreement (NAFTA)*, *Caribbean Basin Initiative (CBI)* and *Dominican Republic–Central America Free Trade Area (CAFTA-DR)* (Ames, 1993, Haar, 1990, Hornbeck, 2010, Hutchinson and Schumacher, 1994, Ozden and Sharma, 2006, Yeboah et al., 2009).

All these studies are mixed in terms of the impact of the preferences on developing countries. We believe that the mixed results can be attributed to the construction of the counter-factual by which the impact of the preferences are measured. Collier and Venables (2007), Di Rubbo and Canali (2008) and Nilsson (2005) tend to carry out their analysis by providing a means of measuring the performance of the preferential beneficiaries by comparing their exports to the USA to that of the European Union (EU). We envisage that this is important in isolating the impact of *AGOA* given that these countries also export to other regions and also receive preferential treatment from these regions. In this paper, we instead control for the exports of the developing countries to the rest of the world. This is done in order to also control for countries that in addition to benefiting from the preferences of the US and/or the EU are also members of *free trade areas* within their regions and hence have intra-regional trade which are exclusive of tariffs.

Frazer and Van Biesebroeck (2010) argue that the non-uniform preferences provided by *AGOA* and its selective choice of countries from within the continent satisfy the requirement for analysing the policy impact impact of *AGOA*. The *CBTPA* preference was also unilaterally applied to selected Caribbean and Latin American Countries[2]. The variation in countries selected and products covered is employed in the analysis to study the impact of the *AGOA* and *CBTPA* preferences on selected products at the 6 digit level of trade. Besides, Agostino et al. (2007) also notes that in the absence of these preference agreements the average level of trade becomes the counterfactual hence, adopting their idea—the introduction of the *CBI* and *AGOA* would lead to a departure from the normal level of trade. This departure from the normal level of trade can thus be interpreted as the effect of the policy.

In this paper the main question we ask is that, *"has there been an observed increase in the exports of AGOA recipients to the USA compared to their exports to the rest of the world?"* In addition we, (1) estimate the impact of the USA's preferences on exports of developing countries given their exports to the rest of the world (focussing on the *AGOA, CBI and GSP* preferences), (2) compare the impact at various levels of disaggregated trade (3) compare *AGOA* to the *CBTPA* preferences noting any significant differences (4)

[1] Caribbean and Central American Countries: Anguilla, Antigua and Barbuda, Aruba, Bahamas The, Barbados, Belize, British Virgin Islands, Cayman Islands, Costa Rica, Dominica, Dominican Republic, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Montserrat, Netherlands Antilles, Nicaragua, Panama, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, and Turks and Caicos Islands

[2] The introduction of preferences in textiles and apparel within the *CBTPA* preference is used to model this variation in preferences for Caribbean Basin countries

determine which products have been the export drivers while comparing the importance of apparel in the exports of the preference beneficiaries and (5) show that the results are robust to the choice of econometric technique and not sensitive to controls included in the regressions. In doing this, we contribute to the existing empirical literature on USA preferences by controlling for the exports of developing countries to the rest of the world. Secondly, we add to the few existing empirical work on the *CBTPA* preferences. In addition, we also find support for the importance of apparel and textiles in *AGOA* (and *CBTPA*) exports as has been underscored by for example Collier and Venables (2007) and Frazer and Van Biesebroeck (2010). Finally, we show that with large N panels the random effects estimator is inconsistent and inefficient. However, the Heckman two step procedure, fixed and Mundlak corrected random effects estimators provide similar estimates.

The rest of the paper is organised as follows. Section 2 provides a brief review of the empirical literature and some initial exploration of the data on preferential imports. Section 3 presents the data and methodology. Section 4 presents econometric modelling issues that need to be addressed and section 5 is a discussion of the results. The conclusion is provided in the final Section.

2 Review of the Empirical Literature

The *AGOA* and *CBI* preferences have undergone several amendments since their inception in 2000 (started in 2001) and 1983 respectively. We provide a summary of these important revisions in the *AGOA* and *CBI* preferences below. For the *AGOA* preferences the following revisions are noteworthy[3]:

- AGOA I - extended *GSP* product eligibility (4650 products); certain limitations (eg. *competitive needs legislation*) removed; inclusion of 1835 products not covered in the *GSP* as duty free products.
- AGOA II - (2002) further relaxation of rules of origin in apparel and selected textile articles (eg. towels & blankets, etc); knit-to-shape apparel included; rules of origin relaxed to include yarn; Botswana and Namibia given LDC status; volume cap limit doubled
- AGOA III - extended *AGOA* to 2015 and apparel provisions to 2007, ethnic printed fabrics added; use of foreign collars and cuffs in domestic garments allowed
- AGOA IV - (2006) Access given to LDC *AGOA* countries for HS 50 - 63; new rules of origin allowing inputs to be sourced from the *AGOA* LDC group. Third country fabric extended to 2012; increase in volume cap on garments.
- AGOA V - (Nov. 2009) single implementation of rules of origin; harmonisation and expansion of USA preferences and extension of trade benefits currently available.

The CBI has also undergone several phases and these include[4] :

- Launched in 1983 as the Caribbean Basin Economic Recovery Act (CBERA)
- 1984 - 20 countries received benefits (Includes El Salvador, Guatemala and Honduras. Nicaragua in 1990).
- 1990 - CBERA made permanent and amended.
  - 20 % tariff reduction on certain leather products

[3] www.agoa.info and *AGOA* reports to congress
[4] www.ustr.gov/trade-topics/preference-programs and USTR (2009)

  - Duty free treatment for products using 100% inputs from the US

- 1991 - 94 tariff categories added or expanded
- 1992 - 28 tariff categories added or expanded.
- 2000 - US Caribbean Basin Trade Partnership Act enacted.
  - Added apparel exports
  - This expires in 2010 (or if an FTA of the Americas comes into force)
- 2002 - CBERA amended
- 2006 - CAFTA-DR benefits begin for Dominican Republic, Honduras, Guatemala, El Salvador and Nicaragua. Costa Rica joins in 2009.
- The CBTPA has however, been extended for the remaining countries beyond 2010.

2.1 *AGOA* and Sub Saharan Africa

Tadesse and Fayissa (2008) use HS-2 digit disaggregated data to analyse the impact of *AGOA* on exports of eligible countries to the US. In doing this they adopt a gravity model and they also separate the *AGOA* impact into intensive and extensive margins [5]. In addition to the standard gravity variables they include the stock of immigrant population (per country) in the US, dummies for landlocked, *AGOA* eligibility, English language, an index of economic openness, years elapsed under *AGOA*, lagged imports and time and country effects. Using a tobit estimation technique they carry out regressions for each HS-2 digit product (that is chapters 00 - 99) and decompose the coefficient of the AGOA dummy into extensive and intensive margin effects.

Generally, the gravity coefficients had the expected signs—distance (-0.5) and economic size (0.495) for HS 03 products (that is fish and crustaceans). Moreover, US population and income levels had no significant impact on *AGOA* imports in several of the HS-2 categories. *AGOA* had approximately a 64% increase in HS 03 imports although it was insignificant. The lag of the dependent variable (0.65) was significant in most of their regressions. They reported both positive and negative immigrant stocks in several cases. The extensive and intensive margin effects reported by them for HS 01 products were 0.085 and 0.51 respectively and significant. In relation to the decomposition, only a few products recorded significant values for both effects—much less than the 24 significant extensive margin effects across products.

Collier and Venables (2007) estimate the impact of trade preferences on exports of developing countries to the USA relative to the EU using total apparel exports. Their total sample was 110 developing and middle income countries resulting from selecting countries with mean apparel exports of US$ 100,000 and above. They capture the *AGOA* impact through a dummy variable indicating when the country was given *AGOA* preferences. The main regressions are also estimated for a sub sample of 86 countries whose apparel exports were US$ 1 million and above during 1991 - 2005. The coefficients for *AGOAA (AGOA apparel dummy)* in their first three regressions were significant and varied from 2.00 to 2.21. The coefficients signify the strong impact of *AGOA* in increasing exports to the US relative to the EU in apparel products. The actual impact on exports to the US relative to the EU is given by the exponents of 2.00 and 2.21 which are 7.39 and 9.12

[5] They use the terms import initiation - creating new imports (extensive margin) and import intensification - the volume effect on US imports (intensive margin).

times the exports to the EU respectively. The result signifies an increase in *AGOA* country exports to the USA relative to the EU by a multiple of 7.39 and 9.12 respectively.

On the contrary, they had an another dummy capturing the effect of the EU *Everything but Arms (EBA)* preference on these countries. In order to identify the effect of the *EBA* they restricted their dummy to countries that were ineligible for the *European Union–African Caribbean and Pacific (ACP)* preferences. This variable was not significant and in most cases had the wrong sign. Similarly, using the *EBA* dummy in its place—it was also not significant and showed the wrong sign. Three subsequent regressions with 110 countries correct the sign for the *EBA* dummies and produces a marginal increase in the *AGOAA* coefficient. A quadruple difference in difference method to sort out the effects of having between country characteristics vary over time is also used. In the two regressions carried out with this method, the *AGOAA* effect recorded significant values (2.65 and 1.98 respectively). The first regression excluded the AGOA and EBANC terms. They therefore confirm that, *AGOA* had a large impact on its beneficiaries. We depart from Collier and Venables (2007) by expanding our product coverage[6] as well as working with highly disaggregated trade data. Secondly, we also consider preferences offered to the Caribbean Basin countries (*CBTPA*). And finally, we control not only for exports to the EU but also exports to the rest of the world.

Nilsson (2005) and Di Rubbo and Canali (2008) who instead employ a gravity model do not find such strong results for *AGOA* in their sample. It must however, be noted that these studies did not use the same product groups and level of aggregation. Nilsson (2005) explored the effects on total exports while Di Rubbo and Canali focussed on agri-products. Collier and Venables on the other hand, limited their analysis to apparel. In summary, Nilsson (2005) and Di Rubbo and Canali (2008) did not find significant trade creating effects for *AGOA*. EU trade policy was found to be more trade creating compared to *AGOA*.

Nilsson (2005) in a study of EU and USA trade policy for 158 developing countries apply a standard gravity model in estimating the trade effects of their trade policies. Their results confirm a stronger trade creating effect of EU policy compared to the USA trade policy. However, one drawback is that, the study did not account for the zero exports in the model estimated [7]. This is presented as a censoring problem in the econometrics literature and can create significant biases in coefficient estimates thus making them unreliable for inference (Cameron and Trivedi, 2005, Greene, 2003, Jensen et al., 2002, Wooldridge, 2002).

However, Nilsson's (2005) cross section estimation using the 2001 - 2003 annual average exports reduce the censoring problem. The coefficients of both sets of regressions are similar; however, the t-statistics estimated in the 2001 – 2003 panel are twice the cross-section estimates indicating the potential bias of ignoring the censoring of the dependent variable in his model. The reported trade creation values for the cross-section regression [8] include EU imports-35.6%; low income countries-50.3%; lower middle income countries-22.9% and upper middle income countries-46.2%. The percentages indicate the amount of trade generated by EU trade policy compared to USA policy. Thus the 50.3% reported for low income countries imply that EU policy created 50.3% more exports compared to USA policy for low income countries. All but lower middle income countries had significant coefficients in the cross-section regression. The coefficients for the panel regression are not discussed in this section due to the potential bias in the coefficients

[6]We go beyond apparel products to include all six–digit products within the following categories: live animals; meat and edible meat offal; salt, sulphur, earth and stone, plastering; ores, slag and ash; and textile products.

[7]Nilsson (2005) in Section 4, the last paragraph of the gravity model sub-section makes reference to the zero exports–"No particular attempt is made to deal with the zero-or missing value observations in the trade data" The countries with zero or missing trade data can be found in footnote 32.

[8]It is converted from actual EU imports from developing countries normalized by the transformed dummy coefficient of the relevant dummy for EU imports, and various income groupings.

identified above. Finally, the average estimate of gross creation by EU policy for the period 2001 – 2003 was 70.2%, 59.3% and 54.2% of total imports by the EU from developing countries for lower income, lower middle and upper middle income countries respectively (Nilsson, 2005). This is an indication of the size of the gross trade creation by the EU trade policy.

Di Rubbo and Canali (2008) in a study of 102 developing countries for the period 1996 - 2005 for agricultural products (food and fibre products) use a similar methodology to that of Nilsson (2005). They find EU trade policy to be more effective at creating trade than USA policy. They report gross trade creation coefficients of 75.9%, 62.2%, 90.4% and 69.1% for low income, lower-middle income, upper-middle income countries and EU imports respectively for the period 1996 - 2000. Higher percentages are recorded for the period 2000 - 2005 of 80.8%, 63.1%, 91.4% and 73% for low income, lower-middle income, upper-middle income countries and EU imports respectively. A similar interpretation to Nilsson's can be given to Di Rubbo and Canali–however, EU policy generates more exports of agri-products compared to the USA. They find the trade variation to be significant for the lower income group. Compared to Nilsson (2005) the trade creation effects are stronger for the upper-middle income countries rather than the low-income countries. We note that, these effects are confined to the agri-food sector not total exports as was the case in Nilsson. Also, the reported coefficients of Nilsson above, are for his cross-section regression and therefore exclude the time variation provided by Di Rubbo and Canali (2008).

In similar fashion, a recent paper by Frazer and Van Biesebroeck (2010) estimates the impact of *AGOA* at the HS 8 - digit level using standard difference-in-differences and triple difference-in-differences – controlling for baseline levels of imports, country and product specific import trends after the adoption of *AGOA*. They find an increase of 42% of imports on average as a result of the *AGOA* preference. However, they estimate the causal impact of *AGOA* to be lower at 28%—they argue that this controls for both the pre- and post-import differences for both *AGOA* and non *AGOA* countries—as well as control for product-specific trends common for both groups of countries. On the contrary, concentrating on only non-oil imports they find the increase to be 6.6%.

In summarising, Collier and Venables (2007), Frazer and Van Biesebroeck (2010), Gibbon (2003), Páez et al. (2010) generally find apparel and textiles as well as oil and energy products to be the main drivers of the gains by *AGOA* beneficiaries. We do observe this also in our analysis and it is further discussed in Section 5. Gibbon (2003) and Páez et al. (2010) discuss the proliferation of firms in the textile industry and the enormous impact on employment in that sector for Lesotho and other African countries. This according to them is not limited to apparel but also to oil and energy related exports where the example provided is the increase in investments in Nigeria's energy sector. Nonetheless, for Lesotho in spite of the record investments an impediment in having further investments was the constraints on land available (Gibbon, 2003). Had these constraints not existed a much stronger impact of *AGOA* might have ensued.

In an extended survey of previous empirical studies, Mold (2005) links the mild impact of *AGOA* to (1) the limited benefits and exclusion of sensitive products from the *AGOA* list, (2) the initial 8-year life span of *AGOA* with the subsequent extension in 2004 (of *AGOA*) to 2015 has not encouraged long-term investments for investors who have been given a short horizon to work with, (3) the fear that preferential access and new trade agreements under discussion if offered to the Middle East and Central America would dampen any benefits offered by *AGOA* and (4) Arbitrary use of *AGOA* ROOs in certain products. An example offered by Mold is the near-exclusion of Kenya due to its inability to meet ROOs in textiles. Mold (2005) brings to the fore the impact of the *AGOA* conditions on freedom of policy making and the uncertainty created by the periodic (annual) review of *AGOA* beneficiaries.

2.2 *CBI* and Caribbean Basin Countries

The *CBERA* preferences were less effective than the *CBTPA* preferences (Hornbeck, 2010) and this shows in the jump we observe in Figure (4(a)) in Appendix I. However, this is explained by Hutchinson and Schumacher (1994) to be as a result of (a) over-reliance on the market mechanism, (b) the exclusion of important Caribbean Basin products such as textile and apparel as well as tourism products hindered the reaping of its potential benefits, (c) the re-imposition and tightening of US sugar quotas and (d) the falling world prices of petroleum and petroleum products. This has led many authors to conclude that *CBERA* preferences failed to achieve their mandate of increasing economic growth in the region (for example, Ames, 1993, Hornbeck, 2010, Hutchinson and Schumacher, 1994). Nonetheless, the *CBTPA* preferences which had a large impact on the recipients also met with a decline as a result of the introduction of the *CAFTA-DR* (this is observed as the declining trend for our selected Caribbean countries in Figure (4(a))).

Hornbeck (2010) argues that CBI beneficiaries have suffered from erosion of their preferences as a result of the increasing move towards the adoption of *free trade agreements (FTA)* by the USA. *NAFTA* after its adoption, curtailed the trade advantage of the *CBI* countries over Mexico—thereby giving Mexico some advantages in apparel and other products Mexico was more competitive at producing than the Caribbean Basin countries (Hornbeck, 2010, Hutchinson and Schumacher, 1994). Hutchinson and Schumacher (1994) in calculating the revealed comparative advantage (RCA) of Mexico and the Caribbean countries in their top 30 export products did find the Caribbean countries to be competitive in 20 out of their top 30 industries and expected this to provide some buffer against *NAFTA*. The adoption of the *CAFTA-DR* has in particular adversely affected the remaining Caribbean countries within the *CBI* and again reduced their trade advantage in apparel and textiles and non-primary commodities (Hornbeck, 2010). The main reason provided by Hornbeck (2010) is due to the cummulation rules in apparel production among *NAFTA, CAFTA-DR* and Haiti which leave the remaining countries under the *CBI* with limited ability to adapt to the new competition from these regions. The percent of apparel imports in total US imports of apparel is even lower–this fell from 13.6% in 2005 to 1% in 2008 (Hornbeck, 2010). Hornbeck (2010) attributes this to the *CAFTA-DR* — *CAFTA-DR* countries excluding Costa Rica accounted for 90% of total apparel imports of all the Caribbean Basin countries (Hornbeck, 2010) and this accounts for the vast shortfall.

Hornbeck (2010) shows that only 7.5% of total imports from *CBI* recipient countries were eligible for preferential tariffs after excluding *CAFTA-DR* and energy exporting countries. This is what might be driving our negative coefficients discussed in section 4 of this paper. In addition, Hornbeck (2010) finds that the following additional factors contributed to the diminishing preferences (a) *CAFTA-DR* countries produced most of the apparel and textile products (b) the remaining *CBI* countries are not competitive in the apparel sector and have been unable to take advantage of the preferences and (c) The removal of the *multifibre agreement (MFA)* on textiles has furthered heightened their situation. It must however, be added that some of this might also be due to *AGOA* countries such as Lesotho and Kenya (and other smaller *AGOA* recipients) gaining a foothold in the US market.

2.3 Trends in Imports to the USA from Selected *AGOA* and *CBI* beneficiaries

The variation in the exports under the various programmes are shown in the graphs at the end of the paper in Appendix I. Figures (2) and (3) show the relationship between the preferential exports and mean aggregate exports (1997-1999) to the USA for *AGOA* and *GSP*. Figures (4) and (5) on the other hand, show the trends in the share of preferential exports in aggregate preferences and total exports to the USA respectively. For the *GSP* preference South Africa is the main outlier while Nigeria is the outlier for *AGOA* exports. Excluding these two countries in Figures (2(a)) and (3(c)) for those with exports greater than the mean total exports for the period 1997-1999 ($35.37 million) improves the fit and the line becomes steeper (Angola now becomes the outlier with exports close to $1 billion) to the USA.

There is no clear indication of the relationship for countries below the mean, however, rescaling the the graph would show a very steep line of fit as in (3(c)) for these countries. In Figure (4), the selected CBI countries within Latin America in (4(b)) do not show much difference between their shares. On the contrary, a clear jump in the share of exports for the selected *AGOA* countries in (5) is noticed in 2001 (countries begin to use their *AGOA* preferences). Similarly, noticeable differences exist in (4(a)) with the prominent case being the large jump in 2005 for Barbados but which gradually falls over time.

Figures (6) and (7) show the mean imports by applied and MFN tariffs for selected African and Caribbean Basin countries at the 6 digit level. Figures (8) and (9) show the maximum imports into the USA within each category. Ghana and Barbados are observed to export under each category. However, their mean imports into the USA are far below US$1 million and that of the remaining countries (with the exception of Angola that has mean imports into USA below US$ 20000). Kenya, Costa Rica and Jamaica have higher means, however, these are concentrated in two dominant categories—apparel and textiles, and salt/ore, slag and Ash exports. For the selected *AGOA* beneficiaries, their mean imports into the USA are dominated by free imports. The same can be said of Barbados and Jamaica. Although Ghana had low mean imports into the USA of apparel, the maximum imports into the USA from Ghana are concentrated in apparel and the imports are above US$ 6 million. For the remaining countries the pattern in the mean category is maintained.

Finally, Figure (10) shows the competitiveness of selected *AGOA* and *CBI* beneficiaries in four sectors, animals/meat, apparel, salt/ores and textiles. For both panels of the graph, the mean competitiveness prior to the adoption of *AGOA* (1996 - 2000) and post *AGOA* (2001 - 2009) are compared. In Panel (a), apart from South Africa the remaining countries—Ghana, Kenya and Nigeria show increased competitiveness in textiles in the post-*AGOA* period. South Africa on the other hand, has increased its competitiveness in salt/ores. This is similarly shown for selected *CBI* countries using the pre– and post–*AGOA* periods for comparative purposes. The selected *CBI* countries in Panel (b) show a decline in their competitiveness in the apparel and textiles sector post–*AGOA*. However, Honduras and Jamaica have seen an increase in their competitiveness within the salt/ore sector while Costa Rica has experienced a marginal improvement in the animals/meat sector.

3 Data and Methods

Data for the analysis is obtained from the World Integrated System[9] (WITS) which queries data from UN Comtrade for export (and import) data and UN TRAINS for the tariff data. Gross domestic product data is obtained from The World Bank's World Development Indicators[10] (WDI) and gravity type variables (*viz.*, landlocked, area, latitude, number of cities, official language, etc) are obtained from the CEPII distances database[11]. In addition, our political variables (military and religion) are obtained from the Database of Political Institutions[12] (DPI) and democracy time series dataset [13]. Finally, the preferential dummies are constructed based on information sourced from the WITS preferential database and USITC[14] The remaining variables constructed (*viz.*, RCA and market size) are based on the variables obtained from the sources above. Table (1) provides further information on the variables used as well as summary statistics.

We selected HS 2-digit categories 01:- Live Animals, 02:- Meat and edible meat offal; 25:- Salt, sulphur, earth & stone, plastering, etc; 26:- Ores, slag and ash; and 50–63:- Apparel and clothing and then used all the 6-digit categories within these 2-digit choices. The products were selected based on whether some of the 6-digit products were captured in the preference. Also, of interest were products that form a significant component of developing country exports. Apparel and Textiles are an important component of both *AGOA* and *CBTPA* preferences hence their inclusion. Arguably, agricultural produce and energy and energy related products are important in the exports of some of the beneficiary countries, however, we excluded these products from our analysis given that majority of the countries offered these preferences are net oil importers. Secondly, energy products form a significant component of *AGOA* exports to the USA—we therefore seek to carry out the analysis excluding these products to see if a positive impact is still observed.

We use annual data covering the period 1996 – 2009. There are 166 countries and 981 different products at the 6 digit level in the dataset. The products comprise of 808 apparel and textile and 173 non apparel and textile products at the 6-digits level. Fewer products are however, exported by several of the countries. For example, for the African countries fewer than 400 products are exported in any given year. Of these products there are some products that are not exported in all years. In Table (1), the probability of exporting a particular 6-digit product in our sample is 0.342, the average number of free lines per 6-digit category is 0.444, the average weighted MFN tariff is 9.03% and the average applied tariff is 8.09%. The probability of exporting under the *GSP, AGOA, CAFTA-DR* and *CBTPA* are 0.008, 0.004, 0.01 and 0.007 respectively. The tariff margins are constructed based on information provided at the 6-digit level on the MFN and applied tariff provided by WITS. In cases where missing values are encountered we checked the preferential status of the country and replaced the missing values with the average estimate based on the region, preference group and product. Exports not provided by UN Comtrade were assumed to be zero. This holds since for developing countries we use mirror exports (that is, the USA and World import values from these countries) in place of the actual export values. By doing this, we are able to observe whether they actually exported those products. Nonetheless, the mirror export values are better recorded than the export values from the developing countries (Piermartini and Teh, 2005).

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[9] http://wits.worldbank.org/wits/

[10] http://data.worldbank.org/

[11] Centre d'Etudes Prospectives et d'Informations Internationales: http://www.cepii.fr/anglaisgraph/bdd/distances.htm

[12] Thorsten Beck, George Clarke, Alberto Groff, Philip Keefer, and Patrick Walsh, 2001. "New tools in comparative political economy: The Database of Political Institutions." 15:1, 165-176 (September), World Bank Economic Review.

[13] Norris, 2009, http://www.hks.harvard.edu/fs/pnorris/Data/Democracy%20TimeSeries%20Data/

[14] http://dataweb.usitc.gov/

Table 1: Variable definitions and summary statistics: 1996 – 2009

Variable Name	Variable Description	Source	HS6-Mean	HS4-Mean	HS2-Mean	Time invariant (at HS6)-Mean
Probability of exporting	Dependent variable for 1st stage of Heckman. 1 if country exports to the USA	UN Comtrade	0.342	0.282	0.16	
US/World Import ratio (logs)	Dependent variable for all other regressions	UN Comtrade	0.323	0.293	0.202	
US/World Import ratio	Dependent variable for Poisson regressions	UN Comtrade	9824.379	92813.282	-2.82E+004	
Country's RCA (log)	RCA calculated by product for each country	UN Comtrade and World Bank	0.588	-1.974	-1.821	
Market size, USA.World (logs)	Market size of USA relative to world	UN Comtrade	0.895	0.881	0.724	
Margin (MFN and applied tariff)	Tariff margin calculated using MFN and applied tariff	UN TRAINS	-0.108	-0.126	-0.18	
AGOA country dummy	1 if country is an AGOA beneficiary	USITC/WITS Preferential database	0.061	0.083	0.106	
GSP country dummy	1 if country is a GSP beneficiary	USITC/WITS Preferential database	0.492	0.535	0.595	
GSP LDC country dummy	1 if country is a member of GSP LDC	USITC/WITS Preferential database	0.053	0.077	0.116	
CBI	1 if member of CBI	USITC/WITS Preferential database	0.043	0.059	0.089	
CAFTA-DR	1 if member of CAFTA-DR	USITC/WITS Preferential database	0.01	0.01	0.01	
AGOA product dummy	1 if product received AGOA preference	USITC/WITS Preferential database	0.004	0.003	0.002	
GSP product dummy	1 if product received GSP preference	USITC/WITS Preferential database	0.008	0.01	0.009	
CBTPA product dummy	1 if product received CBTPA preference	USITC/WITS Preferential database	0.007	0.005	0.002	
landlocked	1 if country is landlocked	CEPII	0.137	0.16	0.187	0.174
Area (log)	Log of Area in square km	CEPII	11.965	11.833	11.465	11.635
Number of cities	Number of Cities in a country	CEPII	23.542	23.317	22.684	23.043
latitude	Latitude in degrees	CEPII	25.734	23.638	20.786	22.15
English Speaking	1 if English speaking country	CEPII	0.196	0.212	0.239	0.224
Spanish speaking	1 if Spanish speaking country	CEPII	0.127	0.127	0.118	0.123
Africa	1 if African country (base category is Middle East, Asia, Europe & North America)	CEPII/Democracy time series dataset/ WDI	0.124	0.157	0.2	0.183
Latin America & Caribbean	1 if Latin America and Caribbean country	CEPII/Democracy time series dataset/ WDI	0.17	0.187	0.215	0.198
NAFTA	1 if member of North American Free Trade Area	USITC/WITS Preferential database	0.023	0.02	0.013	0.016
Majority Christian	1 if country has a Christian majority	Democracy time series dataset	0.61	0.593	0.567	0.579
Majority Muslim	1 if country has a Muslim majority	Democracy time series dataset	0.198	0.221	0.248	0.236
Other religion (base)	1 if other religion (viz, Jews, Hindu, Eastern, Traditional, etc)	Democracy time series dataset	0.192	0.187	0.185	0.185
Military	1 if chief executive is a serving military officer	Database of Political Institutions (DPI)	0.081	0.092	0.111	
Number of free lines	number of tariff free lines within each HS category	UN TRAINS	0.444	1.59	12.384	
Observations			1047124	292598	37567	121777

(a) The means above are for the sample of positive trade. There are cases where a country exports to the rest of the world but not to the USA hence the probability of exporting is less than 100%. After incorporating the zero trade scenarios the sample size for HS6, HS4 and HS2 becomes 2279844, 501984 and 41832 respectively.The probability of exporting then becomes 0.157, 0.107 and 0.145 for HS6, HS4 and HS2 respectively. (b) The preferential country dummies, religious dummies, military, regional and language dummies have marginally higher means for the larger sample. However, the preferential product dummies and constructed trade variables have marginally lower means for the larger sample

Finally, it is acknowledged that the tariff margin variable might be measured with some error given the paucity of tariff data available on UN TRAINS. We do, however, believe that this would not seriously affect our estimates presented in the results section. As a result, the tariff margin is not used in all regressions—in its place, we allow the country-product fixed effects to capture the tariff margin. Doing this makes it possible to check if the coefficients are biased in the absence of the tariff margin as an additional regressor.

The econometric formulation for investigating trade preferences at the macro level is adopted from Collier and Venables's (2007) paper. They estimate the impact of the USA's *AGOA* and EU trade preferences (given by dummies) on the log of exports from developing countries to the USA relative to the EU-15 countries. They control for market size and market demand shocks. We depart from Collier and Venables (2007) by looking at disaggregated 6 digit HS chapters 1, 2, 25, 26 and 50-63[15] and instead use the ratio of imports by the USA relative to imports by rest of the world for each country (see equation 4). Additional controls included here are each countries *RCA*, lagged values of applied preferential and MFN tariffs (or preference margins) at the 6-digit product level and lagged political controls such as democracy and political stability. In addition, imports under the GSP is controlled for by interacting our GSP dummy with the *CBI* and *AGOA* dummies.

At the 6 digit level of disaggregation, zero exports would be observed for some countries hence the Heckman two-stage panel estimator is more appropriate in modelling Equation (5). This is needed to correct for selectivity bias in the decision to export a particular HS 6 digit product in the case of the Heckman selection. Essentially, there is self-selection in the exports of products at highly disaggregated levels, whereby countries do not randomly choose to export a particular product. Our panel approach to estimation allows us to include fixed effects (exporter and product fixed effects) and time effects to control for some of the unobserved characteristics and market shocks respectively. The principal model is the Heckman selection — the Poisson pseudo maximum likelihood estimator (PPMLE), panel fixed effects, and Mundlak corrected random effects models are included for comparative purposes.

Equation (1) and (2) below model exports from country i (partner) to j (USA) and rest of the world as a function of exporter nation characteristics (E), USA and World characteristics - captured by market size (M), between country characteristics (d) and an error term (μ). The total imports by the USA relative to the World of product p from all countries is the proxy for market size–which additionally controls for market demand shocks in these importing regions. The between country characteristics (d) includes fixed elements-for example distance and constant trade preferences over time as well as time varying country-pair specific trade preferences (Collier and Venables, 2007, 1338-9). We proxy these using exporter and product fixed effects for the constant parts and dummies for trade preferences for the time varying parts. Equation (3) is then the ratio of the first two equations–this substitutes out the exporter characteristics leaving us with an estimable equation in the form of Equation (5). Equation (4) is our selection equation and the *Inverse Mills Ratio* calculated from (4) is incorporated into (5) to complete the Heckman two-step procedure.

The PPMLE is estimated using Equation (3) in its multiplicative form. The Poisson regression log linearises this equation and thus our results would be similar to the log linearised model in Equation (5) (for example, Herrera, 2010, Silva and Tenreyro, 2003). Our argument is that a country given a preference would then decide which products to produce. In this decision, rules of origin, cummulation rules, preference margins, competitiveness and other factors determine whether the country exports to the USA. In modelling the sec-

[15] 1–Live animals; 2–Meat and edible meat offal; 25–Salt, sulphur; earth & stone; plastering, etc; 26–Ores, slag and ash; 50-60–Textiles; and 61-63–Textile articles (apparel and clothing).

ond stage we do not believe that, the preference margin then plays a significant role since this is captured in the product exported under the preference. Hence our exclusion restriction includes the preference margin and this is discussed further in the next section.

$$X_{ip,j} = E_i(t) * M_j(t) * d_{ip,j}(t) * \mu_{ip,j}(t) \tag{1}$$
$$X_{ip,w} = E_i(t) * M_w(t) * d_{ip,w}(t) * \mu_{ip,w}(t) \tag{2}$$
$$x_{ipt} = M_t * d_{ipt} * \mu_{ipt} \tag{3}$$
$$exports_{ipt} = \alpha + \beta' TP_{it} + \gamma_1 lat + \gamma_2 RCA^{i,w}_{ipt} + \gamma_3 Mil_{ipt-1}$$
$$\gamma_4 tariff\ margin_{ipt-1} + \Gamma' Z^a + \eta_{ip} + \eta_t + \mu_{ipt} \tag{4}$$
$$exports_{ipt} = \begin{cases} 1 & \text{if} \quad positive\ exports \\ 0 & \quad otherwise \end{cases}$$
$$\ln x_{ipt} = a + \alpha' TP_{ipt} + \gamma_1 MSize_{pt} + \gamma_2 RCA^{i,w}_{ipt-1} +$$
$$+ \hat{\lambda}_{ipt} + \delta' Z^b + \eta_{ip} + \eta_t + \epsilon_{ipt}. \tag{5}$$

Where: $x_{ipt} = \frac{X_{ip,j}}{X_{ip,w}}; M_t = \frac{M_j}{M_w}; d_{ipt} = \frac{d_{ip,j}}{d_{ip,w}}$

$i,\ p,\ and\ t$ subscripts refer to country, product and time respectively, j refers to the USA while w refers to rest of the world, **"a"** in Equation (5) is the constant of the regression. The log of the dependent variable is taken as $\ln(1+X)$. Tariffs and political variables are lagged in order to avoid introducing any simultaneity or endogeneity into our model.

X_{ij}	is Imports from partner i
E_i	is exporter nation characteristics
M_j	is importer characteristics
d_{ij}	is between country characteristics - given by trade preferences offered by j to i
$\mu_{ipt};\ \epsilon_{ipt}$	is an error term
TP_{it}	is trade preferences offered by the USA. It takes the value 1 from the year in which a country first receives the preference and 0 before[16]. Includes, GSP, AGOA and CBI beneficiaries
TP_{ipt}	is trade preferences offered by the USA. It takes the value 1 for a product exported under a preference and 0 otherwise[17]. Includes, GSP, AGOA and CBTPA beneficiaries for each product
$MSize_{pt}$	is market size the ratio of total imports of our selected commodities into j excluding country i.
$tariff\ margin_{ipt}$	calculated as $\frac{MFN\ tariff - Applied\ HS\ tariff}{MFN\ tariff}$ for each country, year and product.
Mil	is Military - 1 if chief executive is a serving military officer
$\hat{\lambda}_{ipt}$	Is the inverse Mills ratio from the first stage regression, calculated as: $\frac{\phi(\cdot)}{\Phi(\cdot)}$, where $\phi(\cdot)$ is the standard normal probability density function and $\Phi(\cdot)$ is the standard normal density function of the Equation (4) when $E(exports = 1\|\ covariates)$.
η_t	Time effects
η_{ip}	exporter and product fixed effects in the fixed effects regression. Is the random effects in the panel random effect models
Z^a	vector of control variables – latitude, natural log of area, number of cities, Number of Free lines, dummies for Africa, Latin America & Caribbean, landlocked Christians, Muslims, English and Spanish speaking countries
Z^b	vector of control variables – latitude, natural log of area, number of cities, dummies for landlocked, Africa, Latin America & Caribbean, *NAFTA, CAFTA*, English and Spanish speaking countries
RCA	Based on Balassa (1967)[18]the revealed comparative advantage (RCA) is calculated as: $RCA^{i,w}_{ipt} = \left(\frac{X^w_{p,i}}{\sum_p X^w_{p,i}}\right) \div \left(\frac{X^w_{p,w}}{\sum_p X^w_{p,w}}\right)$ where: $X^w_{p,i}$ is exports of product p from country i to the World and $\sum_p X^w_{p,i}$ is total exports from country i to World, $X^w_{p,w}$ and $\sum_p X^w_{p,w}$ are the world exports of product p and total exports respectively

[16]Definition allows preferences to overlap for each country. Thus a country can be an *AGOA* and a *GSP* beneficiary. To control for these overlaps we include interaction terms for those cases where countries have two or more preferences

[17]Previous footnote applies here also

[18]Balassa, Bela 1967, Studies in Trade Liberalization, John Hopkins Press, Baltimore: Maryland

4 Econometric Modelling Issues

We attempt various econometric techniques *viz.*, the Heckman selection and the Poisson models. These are then compared to traditional estimates from the fixed effects and random effects models based on positive export flows. We employ the fixed effects regressions in most of our estimations as this approach allows for the existence of a correlation between the fixed effects and the regressors (Baltagi, 2001, Greene, 2003, Wooldridge, 2002). Secondly, the fixed effects approach minimises the omitted variable problem as the fixed effects capture variables omitted from the model leaving the coefficients unbiased to a large extent. A problem with the fixed effects is the inability to estimate time invariant variables. However, the time invariant variables can be recovered from a regression of the variables on the extracted fixed effects. The time invariant variables are not pivotal to our analysis so this is pursued only in a couple of regressions for comparison purposes—that is to compare the coefficients to those of the random effects, which allows for time invariant variables.

Unlike the fixed effects, the random effects approach does not allow for a correlation between the random effects and the explanatory variables. The model assumes this correlation to be zero. Hence, in the presence of a correlation, the random effects model becomes inconsistent and inefficient. Additionally, Mundlak (1978) argues that the random effects model in the presence of the correlation is misspecified. Mundlak (1978) argues that the random effects model is biased when there is a correlation between the random effects and the explanatory variables. To overcome this, Mundlak (1978) suggests adding the mean of the explanatory variables as additional regressors in the random effects model. Thus in our case the η_{ip} in Equation (4) and (5) (when estimated by random effects can be assumed to be capturing the random effects) can be specified as:

$$\eta_{ip} = \varphi' \bar{X}_{ip} + \vartheta_{ip} \tag{6}$$

where:

$\vartheta_{ip} \sim N(0, \sigma^2_\vartheta)$, $\bar{X}_{ip} = \frac{\sum_{t=1}^{T} X_{ipt}}{T}$ and X is the vector of explanatory variables in Equation (4) or (5)

This is pursued for all the random effects models presented in the results section. The *Hausman test* allows a choice to be made between the fixed effects and the random effects models. In addition, the *Breusch and Pagan test* provides a way of testing whether the random effects are significant. In Table (2) we report the *Breusch and Pagan test* and these are significant for all random effects models estimated (with and without Mundlak's correction). The *Hausman test* is not pursued since we employ the fixed effects model to capture country and product specific effects that are not captured by the variables included in our model. The fixed effects are significantly different from zero in all estimations as provided in the table's footnotes.

We now turn to specific econometric modelling issues found in the trade literature that requires our attention in this paper—as well as revisit some of the issues raised in the preceding paragraphs. The *Heckman selection* and *Poisson pseudo maximum likelihood (PPMLE)* have become dominant techniques in empirical trade studies (for example, Helpman et al., 2007, Herrera, 2010, Silva and Tenreyro, 2003, 2006, 2009, Silva et al., 2010). Given the presence of zeros in the trade data and the large literature on selection into exporting we pursue the Heckman selection as one of our models. In light of the zeros we also pursue the

PPMLE. The Heckman selection is motivated by the desire to model the self-selection into export markets (for example, Agostino et al., 2007, Cardamone, 2007).

It was earlier mentioned that, mirror exports are used to help reduce the missing or unrecorded exports of developing countries. The missing data problem is not entirely resolved as this is symptomatic of highly disaggregated trade data. However, we are reassured of the reliability of the import data since import data tend to be more accurately recorded compared to export data (for example, Piermartini and Teh, 2005). This is the case since tariffs have to be applied to imports at the border. Thus, in our case, imports into the USA would be more reliable since the USA has to decide which imports are allowed in duty free, under the various preferences, MFN or at normal tariff rates—this makes them more reliable. One can safely conclude that most of the remaining missing or unrecorded values in the dataset represent countries not exporting that particular product. This essentially motivates the Heckman's two stage panel estimator to control for self-selection into export markets and thus reduce the problem of selection bias that arises.

Import data includes cost insurance and freight charges. This is absent in export data that is reported free on board (Piermartini and Teh, 2005). In addition, this creates an estimation problem due to the correlation between imports and the error term as a result of transport costs (Piermartini and Teh, 2005). We do not expect this to pose any problems since we take the log ratio of mirror exports from developing countries to the rest of the world as the dependent variable. The use of this ratio cancels the transport costs and some constant characteristics of the exporters from the model.

An issue prevalent in pursuing Heckman's selection model is finding appropriate exclusion restrictions. The use of appropriate exclusion restrictions reduces the bias in standard errors calculated at the second stage and allows the model to be identified (Bushway et al., 2007). Nonetheless, the use of a probit in the first stage without the necessary exclusion restrictions holds as the non linear nature of the probit model provides identification (Zabel, 1992). In circumstances where both the first stage and the second stage are non linear (or linear if the first stage is based on a linear probability model) then the exclusion restrictions are important in identifying the second stage (Zabel, 1992). More importantly, failure to find adequate exclusion restrictions implies that the second stage cannot be identified in this case and estimates of the second stage would be inconsistent and inefficient (Zabel, 1992). To overcome these issues we adopt Jensen et al.'s (2002) approach of estimating a Mundlak corrected random effects probit model in the first stage and a fixed effects model in the second stage. This reduces the problem of having omitted variables in the first stage as well as mis-specifying the model. The challenge in carrying out the first stage probit model in our case is getting the model to converge—especially for the disaggregated product regressions. If faced with this problem we can safely adopt a linear fixed effects or a Mundlak corrected linear random effects estimator for the first stage. This, then requires us to include valid restrictions in our first stage to aid the identification of our second stage regressions.

Helpman et al. (2007) adopted religion as their exclusion restriction in modelling firm heterogeneity within the gravity framework. However, this has been criticised by some authors (for example, Silva and Tenreyro, 2009) who do not find a link between religion and the probability of exporting. We instead use the tariff margin, military and preference dummies created at the country level (not product level and irrespective of whether the country uses the preference). Our argument is that, a country given a preference would then decide which products to export. This decision would be influenced by rules of origin, cumulation rules, preference margins and competitiveness at the product level as well as other factors that determine whether the country exports to the USA (*viz.*, autocracy, number of free lines, landlocked among others). In the second stage, the tariff margin serves as an exclusion restriction. After a country has decided on exporting, the tariff margin then has a lesser emphasis in encouraging exports since other factors such as competitiveness and capacity of the country becme more important. In our analysis, the tariff margin would be captured by the product dummies[19] at the second stage and in the other regressions as well as the country-product fixed effects. The dummy-time interactions in later regressions capture annual variations and modifications occurring within the preference programmes.

The PPMLE has been shown to provide consistent results for gravity models and in our case it would also yield consistent estimates. The *zero inflated poisson (ZIP)* model can be an alternative to the PPMLE since it models excess zeros through a logit and hence solves any headaches with selection[20]. However, this is not pursued due to estimation problems encountered—due to the large number of parameters (mainly the fixed effects) the model is unable to converge. Another model within the *pseudo maximum likelihood* family, the *negative binomial regression (NBREG)* is also a useful alternative in the presence of over-dispersion in the dependent variable. However, the NBREG is sensitive to the scaling of the dependent variable and is restrictive. It does not do well in the presence of excess zeros, thus it is not pursued here. Bosquet and Boulhol (2010) show that the NBREG PMLE is not consistent and is sensitive to the scale of the dependent variable—thus not good for modelling trade flows. On the contrary, the PPMLE is consistent as long as the conditional mean function is correctly specified (Cameron and Trivedi, 1998). As a result the PPMLE can be applied to data generating processes for the dependent variable in cases where it is not poisson distributed (ibid.).

Finally, Piermartini and Teh (2005) argue that GDP is unreliable in estimations using disaggregated data and that the right controls in such cases is output data for the exporting industry or sectoral-country specific effects. In this paper, product-country effects are included in all fixed effects estimations and an additional variable, the revealed comparative advantage for each country is included to capture its competitiveness at the product level. This hopefully, solves the problem and reduces any omitted variables problem from not controlling explicitly for sectoral output.

5 Results and Discussion

The results in this section focus on the HS-6 digit level of disaggregation. All regressions apart from the regression of time invariant characteristics on the fixed effects in Table (4), include country-product and time fixed effects. All regressions with the exception of the random effects probit and the *Poisson PMLE* fixed effects estimates report robust standard errors clustered around the country-product groups. Table (2) reports three different estimators—the fixed, Mundlak corrected random effects and the ordinary panel random effects estimators. Table (3) reports the Heckman two-step estimator and the Poisson PMLE. This allows allows a comparison of the various estimators and also to show any indication of bias in our chosen Heckman model. Table (4) presents the time invariant variables regressed on the extracted fixed effects reported in the first four columns of Table (2) and the Heckman second stage estimations in Table (3). Finally, Table (5) allows us to check the sensitivity of our estimates to the exclusion of OECD and European countries as well as China and Hong Kong from our regressions. In Appendix II, more results are presented showing estimates of other levels of disaggregation (HS2 and HS4)—to show whether our estimates are sensitive to the level of disaggregation. Additionally, the tables in the appendix also compare estimates of non apparel and textiles to those of apparel and textiles to confirm whether the USA preferences are being

[19]The dummies are defined at the product and indicate products that are processed under the preference and exported as such.
[20]Thanks to Barry Reilly for pointing this out

driven by apparel and textiles.

We next discuss the results in the main paper. Columns (1) - (4) of Table (2) reports estimates from the fixed effects regression. The difference between columns (1) and (2) is the inclusion of the military variable in column (2). Columns (3) and (4) augment Columns (1) and (2) respectively with the interaction of *AGOA* and *CBTPA* preferences with year dummies respectively. The base year for the *AGOA*-year interaction is 2001 and that for the *CBTPA*-year interaction is 2000. Thus these two interaction terms are dropped from the regression and become the reference categories in interpreting the remaining preference-year interactions in the regression. Columns (5) - (8) reports the Mundlak corrected random effects—these follow the same pattern as columns (1) - (4). The main difference is the incorporation of time invariant variables. Thus in column (6) and (8) dummies for Christians and Muslims (base category is other religions) are included in addition to military. The inclusion of military and the religious dummies in these models allows us to test whether they can be omitted from the model and used as valid exclusion restrictions for the Heckman two-step estimator. We can reject the alternate hypothesis that the military coefficient is different from zero at the 5% level of significance in columns (2), (4), (6) and (8)—thereby indicating that it is not correlated with the dependent variable in the second stage. We cannot do the same for the religious dummies which are significantly different from zero at the 0.1% level and thus correlated with our dependent variable. Hence, if used in the Heckman first stage as an exclusion restriction, the residuals might be correlated with the second stage error. The Muslim dummy is however, not significant at conventional levels in columns (4) and (8) of Table (4) when regressed on the fixed effects. The final two columns of Table (2) reports the ordinary random effects estimator.

The *AGOA, CBTPA* and *GSP* preferences are significant in all eight columns of Table (2). Our controls *CAFTA-DR*, the lag of each country's RCA and market size of the USA are also significant in all columns. The interaction of *GSP* and *AGOA* is not significant in any of the columns of the table. The interaction of *CBTPA* and *GSP* is however, significant in our random effects type models. With the exception of the English speaking dummy all other time invariant controls included in the random effects type models are significantly different from zero. *NAFTA* has a coefficient of 1.7 in the Mundlak corrected random effects models indicating that *NAFTA* increases exports to the USA relative to the world by 447.39% compared to non *NAFTA* countries. Similarly, Latin American and Caribbean countries on average and holding all things constant significantly increase exports to the USA relative to the world. These are expected given the close proximity of *NAFTA* countries and to a large extent the Latin American and Caribbean countries to the USA. On the contrary, on average and holding all else constant, African exports to the USA are significantly lower relative to the rest of the world in the Mundlak regressions but positive in columns (9) and (10). In summarising, Table (2) indicates that *AGOA* and *GSP* preferences increase exports to the USA relative to the rest of the world holding all else constant. While *CAFTA-DR* decreases exports to the USA relative to the world.

For the *CBTPA* preferences, a positive coefficient is achieved only after controlling for annual variations in preferences through the inclusion of preferences and time interactions. In the case of *AGOA*, controlling for the annual variation in the preferences makes no difference to the sign or significance of the estimated coefficient. Also, the interaction of time and preferences is significantly lower in 2008 and 2009 compared to the base years of *AGOA* (2001) and *CBTPA* (2000). An indication of the harm caused to exports of developing countries and the ability of the USA to absorb additional imports from the world as a result of the financial crisis of that period. In spite of this, the *AGOA* and *CBTPA* preferences on average and holding all things constant have been able to increase exports of developing countries to the USA relative to their exports to the rest of the world.

Turning our attention to the next table (Table (3)) we find qualitatively similar results. *AGOA* is positive and significant in both the Heckman model and the *Poisson PMLE*. Similarly, the *CBTPA* preferences are only positive when the annual variation to the preference is controlled for. On the contrary, the *GSP* becomes negative in the *Poisson* models. They are however, significant in all models in which they appear within the table. In both tables the annual variation of the *AGOA* preferences indicates that the first few year of *AGOA* saw a rapid rise in exports to the USA relative to the rest of the world compared to the base year of 2001. Columns (1) and (4) report the first stage results for our Heckman model. All variables with the exception of the number of free lines have a significant impact on the probability of exporting to the USA. Apart from countries that qualify for the *CBI*, all the remaining preferences, that is, *GSP* and *AGOA* eligible countries significantly lower the probability of exporting to the USA. A country's competitiveness (RCA) in a product and the tariff margin significantly increases their probability of exporting to the USA. This is in line with our earlier assertion in the preceding section that, the larger the margin between the *MFN* tariff and the applied tariff (in this case the preferential tariff) the more likely a country would try to exploit the gains from exporting that particular product. Nonetheless to exploit these advantages a country with a competitive advantage in production of product p is more likely to benefit from the higher tariff margins by increasing its exports.

In column (4), latitude, English and Spanish speaking as well as land area significantly increase the probability of exporting to the USA holding all else constant. The remaining variables, number of cities, landlocked, Christianity and Muslim dummies (compared to the other religions) reduce the probability of exporting to the USA. The negative coefficients for the Muslim and Christian dummies might largely be due to the Chinese effect. However, for the Muslim dummy the composition of the exports of Muslim countries is also playing a role here. The military coefficient significantly lowers the probability of exporting to the USA. This is evidenced in the fact that, the USA normally imposes trade sanctions on countries it believes to be undemocratic or ruled by military leaders. The significance of military and the religious dummies indicate that they must be included in the first stage regression. They are thus highly correlated with the probability of exporting to the USA. In addition, all exclusion restrictions are jointly significantly different from zero. The case for military is however, much stronger than the religious dummies. The main difference between the two first stage regressions is that column (1) is based on a fixed effects regression, while column (4) is a Mundlak corrected random effects estimator—modified from that proposed by Jensen et al. (2002). Column (4) allows additional exclusion restrictions in the form of the religious dummies as well as additional controls provided by the time invariant variables.

In the second stage, we include the time and preference interactions in the immediate column after each first stage regression. The second column after the first stage estimates (columns (3) and (6)) exclude these interactions. The time-preference interactions only make a difference for the *CBTPA* in this table as previously shown in Table (2). The last two columns report the coefficients for the *Poisson PMLE* model. The coefficients for the Poisson model in most cases are larger than the previous models discussed. However, the Poisson model's standard errors are lowest among all the models reported above. In most cases it is less than half the standard error of the other models—thus indicating that it provides the lowest variance among the estimators presented in this section. The standard errors of the Heckman model are quite similar to those of the fixed effects model in Table (2). This in turn indicates that our exclusion restrictions are reasonable. The Heckman second stage standard errors reported in Table (3) have not been corrected as has been suggested by for example Wooldridge (2002). The similar standard errors reported by both model types reduces the pressure of correcting the second stage errors reported and also leads us to believe that the standard errors are unbiased. This result can be attributed to the large sample dimension of our data and given that our estimators have large N and small T sample properties we can overlook the correction at this stage.

Given these comparisons, all models presented with the exception of the ordinary random effects estimator are consistent to a large extent. The ordinary random effects model however, has presented us with relatively larger coefficients—at times twice the estimated coefficients in the other models. This points to its inconsistency and inefficiency, hence the other models perform better in reducing this bias. An argument which we do not find tenable here is whether the model is misspecified and that the random effects model is inappropriate. It does not seem so, since the Mundlak corrected random effects attenuates the bias of the ordinary random effects. The explanation could be the presence of a correlation between the random effects and some explanatory variables. Thus the inclusion of the averages of the explanatory variables as suggested by Mundlak (1978) has greatly reduced the misspecification and problems created by the assumption of no correlation. Nevertheless, the ρ reported by the random effects type models is significantly different from zero indicating that the random effects model is preferred to a pooled OLS regression. In addition, the Breusch and Pagan LM tests of random effects indicate the presence of the random effects and these are significantly different from zero. Finally, the goodness of fit measures of the Mundlak corrected random effects are larger than those of the ordinary random and fixed effects models. As a result, the Mundlak random effects model provides a better fit and is the more appropriate model to present.

Table (4) shows the median and OLS regression of the time invariant variables on the fixed effects. Apart from the *NAFTA* coefficient the median regressions report lower coefficients compared to the OLS regression. In almost all cases there are no sign reversals. Comparing the coefficients to that of the Mundlak corrected random effects model, it is observed that Spanish speaking, English speaking and African dummies are now positive in the fixed effects models. The *NAFTA* coefficient is smaller than that reported in Table (2). The first eight columns of Table (4) correspond to the first four columns of Table (2). The remaining four columns correspond to the Heckman second stage regression in Table (3). To sum up, the remaining coefficients have the same sign as the random effects models but are marginally larger in most cases.

The final table reports results for a sub-sample of countries. In columns (1), (3) and (4) we exclude OECD and European countries from our sample leaving us with 119 countries. In columns (2), (5) and (6) China and Hong Kong are also excluded in addition to the countries excluded earlier. These provide us with further sensitivity and robustness checks. In addition, we want to show whether in the absence of China (which is competitive in similar products) the *AGOA* and *CBTPA* preferences show larger and more significant coefficients. The results are qualitatively similar to the ones reported earlier. The only difference is in the first stage regression, the GSP eligible country dummy is now positive. Indicating that in the presence of the more competitive OECD countries and China, there is a marginally higher probability of exporting under the *GSP*.

In order to make the comparison across the models we summarise the coefficients and the exponentiated coefficients of the dummies of the models in Figure (1). The minimum and maximum coefficients are reported for each model and for the *AGOA, GSP, CBTPA* and *CAFTA-DR* preferences. The noticeable difference is the ordinary random effects and the Poisson model coefficients. The remaining models have quite similar coefficients. The graph on the right side (panel b) reports the exponentiated coefficients of the non Poisson models. We do this since our dependent variable is in logs and the explanatory variable is a dummy. We thus report the percentage impact of the preferences. The analysis above points towards the tendency of the USA preferences in increasing the exports of its preference beneficiaries relative to their exports to the rest of the world. Various attempts at testing the robustness and sensitivity of the estimates also lend support to the conclusion above. Thus, the maximum impact of *AGOA, GSP,* and *CBTPA* is 57.8%, 13.4%, and 48.4% respectively ignoring the results from the ordinary random effects model. Similarly, the minimum impact is 38.3%, 11.5% and -48.8% respectively. The *CAFTA-DR* impact is negative in all models—the magnitude of the impact is 40.3% in absolute terms. On the whole, these are much smaller than Collier and Venables (2007) but quite close to Frazer and Van Biesebroeck (2010). A comparison in this case is quite difficult since Collier and Venables (2007) uses more aggregated data while Frazer and Van Biesebroeck (2010) uses data at the HS-8 level but for all products.

Table 2: Fixed/Random effects regression without selection correction

	(1) FE1	(2) FE2	(3) FE3	(4) FE4	(5) Mundlak1	(6) Mundlak2	(7) Mundlak3	(8) Mundlak4	(9) RE1	(10) RE2
AGOA product dummy	0.324***	0.324***	0.384**	0.385**	0.456***	0.456***	0.417**	0.417**	0.818***	0.825***
	(0.076)	(0.076)	(0.135)	(0.135)	(0.076)	(0.076)	(0.136)	(0.136)	(0.140)	(0.140)
agoa × gsp product dummy	0.398	0.397	0.429	0.428	-0.013	-0.014	0.025	0.024	-0.074	-0.072
	(0.426)	(0.426)	(0.477)	(0.478)	(0.523)	(0.523)	(0.565)	(0.565)	(0.539)	(0.541)
CBTPA product dummy	-0.670***	-0.670***	0.367**	0.368**	-0.653***	-0.653***	0.394***	0.395***	1.218***	1.216***
	(0.075)	(0.075)	(0.113)	(0.113)	(0.075)	(0.075)	(0.113)	(0.113)	(0.111)	(0.111)
cbtpa × gsp product dummy	-1.098	-1.098	-1.115	-1.115	-1.548*	-1.548*	-1.559*	-1.559*	-1.219*	-1.218*
	(0.914)	(0.914)	(0.914)	(0.914)	(0.617)	(0.617)	(0.617)	(0.617)	(0.600)	(0.600)
GSP product dummy	0.113**	0.113**	0.113**	0.113**	0.125**	0.125**	0.126**	0.126**	0.180***	0.176***
	(0.040)	(0.040)	(0.040)	(0.040)	(0.040)	(0.040)	(0.040)	(0.040)	(0.034)	(0.034)
CAFTA-DR	-0.505***	-0.505***	-0.242***	-0.243***	-0.483***	-0.483***	-0.222***	-0.222***	-0.141***	-0.145***
	(0.036)	(0.036)	(0.038)	(0.038)	(0.035)	(0.035)	(0.037)	(0.037)	(0.033)	(0.033)
Country's RCA, lagged (log)	0.105***	0.105***	0.100***	0.100***	0.114***	0.114***	0.108***	0.109***	0.117***	0.116***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Market size, USA.World (logs)	0.007***	0.007***	0.008***	0.008***	0.009***	0.009***	0.010***	0.010***	0.029***	0.029***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Military		-0.018+		-0.020+		-0.018+		-0.020+		-0.047***
		(0.010)		(0.010)		(0.010)		(0.010)		(0.007)
agoa × year_2002			0.328+	0.327+			0.335+	0.334+	0.318+	0.315+
			(0.173)	(0.173)			(0.175)	(0.175)	(0.175)	(0.175)
agoa × year_2003			0.636***	0.635***			0.711***	0.710***	0.691***	0.688***
			(0.168)	(0.168)			(0.172)	(0.172)	(0.173)	(0.173)
agoa × year_2004			0.195	0.194			0.306+	0.305+	0.275	0.274
			(0.165)	(0.165)			(0.168)	(0.168)	(0.168)	(0.169)
agoa × year_2005			0.232	0.231			0.368*	0.367*	0.338+	0.336+
			(0.177)	(0.177)			(0.179)	(0.179)	(0.180)	(0.180)
agoa × year_2006			-0.270	-0.272			-0.140	-0.142	-0.177	-0.181
			(0.170)	(0.170)			(0.171)	(0.171)	(0.172)	(0.172)
agoa × year_2007			-0.282+	-0.283+			-0.141	-0.143	-0.170	-0.173
			(0.167)	(0.167)			(0.167)	(0.167)	(0.168)	(0.168)
agoa × year_2008			-0.579***	-0.580***			-0.450**	-0.452**	-0.472**	-0.475**
			(0.168)	(0.168)			(0.168)	(0.168)	(0.167)	(0.167)
agoa × year_2009			-0.727***	-0.728***			-0.616***	-0.618***	-0.636***	-0.639***
			(0.177)	(0.177)			(0.175)	(0.175)	(0.175)	(0.175)
cbtpa × year_2001			0.027	0.027			0.035	0.035	0.032	0.032
			(0.124)	(0.124)			(0.125)	(0.125)	(0.125)	(0.125)
cbtpa × year_2002			-0.398**	-0.399**			-0.391**	-0.391**	-0.404**	-0.404**
			(0.124)	(0.124)			(0.124)	(0.124)	(0.124)	(0.124)
cbtpa × year_2003			-0.756***	-0.756***			-0.744***	-0.744***	-0.754***	-0.754***
			(0.131)	(0.131)			(0.132)	(0.132)	(0.132)	(0.132)
cbtpa × year_2004			-1.107***	-1.107***			-1.110***	-1.110***	-1.102***	-1.102***
			(0.138)	(0.138)			(0.138)	(0.138)	(0.138)	(0.138)
cbtpa × year_2005			-1.503***	-1.504***			-1.505***	-1.505***	-1.498***	-1.498***
			(0.135)	(0.135)			(0.135)	(0.135)	(0.134)	(0.134)
cbtpa × year_2006			-1.657***	-1.658***			-1.676***	-1.676***	-1.736***	-1.734***
			(0.140)	(0.140)			(0.141)	(0.141)	(0.140)	(0.140)
cbtpa × year_2007			-1.841***	-1.841***			-1.861***	-1.861***	-1.920***	-1.918***
			(0.137)	(0.137)			(0.137)	(0.137)	(0.136)	(0.136)
cbtpa × year_2008			-1.941***	-1.941***			-1.982***	-1.982***	-2.021***	-2.019***
			(0.136)	(0.136)			(0.136)	(0.136)	(0.134)	(0.134)
cbtpa × year_2009			-2.071***	-2.072***			-2.115***	-2.115***	-2.164***	-2.162***
			(0.138)	(0.138)			(0.138)	(0.138)	(0.136)	(0.136)
landlocked					0.078***	0.078***	0.078***	0.078***	0.060***	0.064***
					(0.007)	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)
Area (log)					-0.018***	-0.018***	-0.018***	-0.018***	-0.033***	-0.036***
					(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Number of cities					-0.002**	-0.002**	-0.002**	-0.002**	0.001+	0.004***
					(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
latitude					-0.002***	-0.002***	-0.002***	-0.002***	-0.001***	-0.001***
					(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
English Speaking					-0.002	-0.002	-0.002	-0.002	-0.005	0.025**
					(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.010)
Spanish speaking					-0.126***	-0.126***	-0.125***	-0.125***	0.081***	0.112***

					(0.017)	(0.017)	(0.017)	(0.017)	(0.021)	(0.020)
Africa					-0.050***	-0.050***	-0.050***	-0.050***	0.068***	0.058***
					(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)
Latin America & Caribbean					0.317***	0.317***	0.315***	0.315***	0.437***	0.479***
					(0.018)	(0.018)	(0.018)	(0.018)	(0.019)	(0.020)
NAFTA					1.699***	1.699***	1.700***	1.700***	1.499***	1.487***
					(0.044)	(0.044)	(0.044)	(0.044)	(0.045)	(0.045)
Majority Christian						-0.071***		-0.071***		-0.099***
						(0.009)		(0.009)		(0.009)
Majority Muslim						0.032***		0.032***		0.022**
						(0.008)		(0.008)		(0.008)
Constant	0.189***	0.191***	0.196***	0.198***	0.400***	0.400***	0.407***	0.407***	0.418***	0.427***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.023)	(0.023)	(0.023)	(0.023)	(0.025)	(0.024)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mundlak average terms	No	No	No	No	Yes	Yes	Yes	Yes	No	No
Observations	1047124	1047124	1047124	1047124	1047124	1047124	1047124	1047124	1047124	1047124
R^2	0.010	0.010	0.015	0.015						
Adjusted R^2	0.010	0.010	0.015	0.015						
Clusters	1.22e+05	1.22e+05	1.22e+05	1.22e+05	1.22e+05	1.22e+05	1.22e+05	1.22e+05	1.22e+05	1.22e+05
rho	0.548	0.547	0.548	0.548	0.405	0.405	0.405	0.405	0.410	0.409
Panel F-Test	121.115	115.889	72.853	71.147						
Breusch and Pagan LM test for random effects				440362.91	440361.15	441431.46	441430.93	445807.58	439517.63	
Chi-squared					11178.176	11179.867	11264.086	11265.981	7676.957	8471.953
R-squared overall	0.000	0.000	0.001	0.001	0.154	0.154	0.156	0.156	0.090	0.092
R-squared between	0.001	0.001	0.000	0.000	0.182	0.182	0.183	0.183	0.107	0.108

Standard errors in parentheses, $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. (a) Dependent variable is the log of (imports into the US/into rest of world) (b) Estimation is done at 6 digits on positive flows. (d) F-tests of the Fixed effects are F-test(121776,925326) = 6.88 , F-test(121776,925325) = 6.88, F-test(121776,925308) = 6.88, F-test(121776,925308) = 6.88 for the first four columns respectively. (e) robust standard errors used

Table 3: Heckman two step estimator

	(1) 1st-stage	(2) 2nd-Stage A	(3) 2nd-Stage B	(4) 1st-stage	(5) 2nd-Stage A	(6) 2nd-Stage B	(7) Poisson	(8) Poisson
AGOA product dummy		0.407**	0.335***		0.405**	0.332***	0.508***	1.230***
		(0.134)	(0.075)		(0.134)	(0.075)	(0.004)	(0.008)
agoa × gsp product dummy		0.395	0.365		0.392	0.362	1.196***	2.139***
		(0.464)	(0.414)		(0.462)	(0.412)	(0.142)	(0.142)
CBTPA product dummy		0.353**	-0.644***		0.358**	-0.638***	-0.587***	0.247***
		(0.112)	(0.074)		(0.112)	(0.074)	(0.002)	(0.003)
cbtpa × gsp product dummy		-1.083	-1.066		-1.088	-1.071	-5.252***	-5.500***
		(0.888)	(0.887)		(0.886)	(0.885)	(0.415)	(0.415)
GSP product dummy		0.111**	0.110**		0.109**	0.109**	-0.943***	-0.873***
		(0.040)	(0.039)		(0.040)	(0.039)	(0.011)	(0.011)
CAFTA-DR		-0.265***	-0.514***		-0.266***	-0.516***	-1.598***	-1.147***
		(0.038)	(0.036)		(0.038)	(0.036)	(0.004)	(0.004)
Country's RCA, lagged (log)		0.000	0.002		0.003	0.006	0.303***	0.298***
		(0.005)	(0.005)		(0.005)	(0.005)	(0.000)	(0.000)
Market size, USA.World (logs)		0.009***	0.008***		0.009***	0.008***	0.260***	0.260***
		(0.001)	(0.001)		(0.001)	(0.001)	(0.000)	(0.000)
agoa × year_2002		0.321+			0.320+			0.290***
		(0.170)			(0.170)			(0.010)
agoa × year_2003		0.594***			0.591***			0.985***
		(0.166)			(0.166)			(0.008)
agoa × year_2004		0.159			0.156			0.169***
		(0.162)			(0.162)			(0.008)
agoa × year_2005		0.215			0.212			-1.548***
		(0.174)			(0.174)			(0.010)
agoa × year_2006		-0.278+			-0.279+			-0.891***
		(0.167)			(0.167)			(0.010)
agoa × year_2007		-0.299+			-0.299+			-2.763***
		(0.164)			(0.164)			(0.012)
agoa × year_2008		-0.560***			-0.558***			-1.455***
		(0.166)			(0.165)			(0.010)
agoa × year_2009		-0.730***			-0.728***			-0.968***
		(0.174)			(0.174)			(0.012)
cbtpa × year_2001		0.019			0.019			-0.198***
		(0.123)			(0.123)			(0.004)
cbtpa × year_2002		-0.389**			-0.387**			-0.279***
		(0.122)			(0.122)			(0.005)
cbtpa × year_2003		-0.728***			-0.726***			-0.801***
		(0.130)			(0.130)			(0.006)
cbtpa × year_2004		-1.071***			-1.069***			-0.938***
		(0.136)			(0.136)			(0.006)
cbtpa × year_2005		-1.455***			-1.452***			-2.182***
		(0.132)			(0.132)			(0.007)
cbtpa × year_2006		-1.594***			-1.592***			-0.761***
		(0.138)			(0.138)			(0.007)
cbtpa × year_2007		-1.776***			-1.777***			-3.759***
		(0.135)			(0.135)			(0.015)
cbtpa × year_2008		-1.854***			-1.858***			-4.189***
		(0.134)			(0.134)			(0.027)
cbtpa × year_2009		-1.951***			-1.959***			-2.207***
		(0.136)			(0.136)			(0.018)
1st stage Residuals		-5.545***	-5.696***		-5.966***	-6.121***		
		(0.152)	(0.154)		(0.162)	(0.165)		
GSP LDC country dummy	-0.013***			-0.013***				
	(0.001)			(0.001)				
GSP country dummy	-0.008***			-0.008***				
	(0.001)			(0.001)				
CBI	0.039***			0.039***				
	(0.008)			(0.008)				
AGOA country dummy	-0.006***			-0.006***				
	(0.001)			(0.001)				
Country's RCA (log)	0.070***			0.070***				
	(0.001)			(0.001)				
Military	-0.009***			-0.009***				
	(0.001)			(0.001)				
Number of free lines	0.001			0.001				
	(0.001)			(0.001)				
Margin (MFN and applied tariff)	0.014***			0.014***				
	(0.001)			(0.001)				
Area (log)				0.031***				
				(0.000)				
Number of cities				-0.002***				
				(0.000)				
latitude				0.001***				
				(0.000)				
landlocked				-0.075***				
				(0.001)				
English Speaking				0.059***				
				(0.002)				
Spanish speaking				0.064***				
				(0.003)				
Majority Christian				-0.039***				
				(0.002)				
Majority Muslim				-0.101***				
				(0.002)				
Constant	0.141***	4.078***	4.178***	-0.090***	4.064***	4.157***		
	(0.001)	(0.105)	(0.106)	(0.003)	(0.104)	(0.105)		
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mundlak average terms	No	No	No	Yes	No	No	No	No
Observations	2279844	1047124	1047124	2279844	1047124	1047124	1704878	1704878
R^2	0.020	0.022	0.017		0.022	0.018		
Adjusted R^2	0.020	0.022	0.017		0.022	0.018		
Clusters	1.63e+05	1.22e+05	1.22e+05	1.63e+05	1.22e+05	1.22e+05		
rho	0.678	0.549	0.549	0.588	0.605	0.608		
F-Test	483.580	84.726	139.692		85.054	140.306		
Chi-squared				59328.491			3.07e+06	3.54e+06
R-squared overall	0.139	0.006	0.004	0.266	0.003	0.002		
R-squared between	0.221	0.004	0.003	0.365	0.002	0.002		

Standard errors in parentheses, $^{+}\ p < 0.1$, $^{*}\ p < 0.05$, $^{**}\ p < 0.01$, $^{***}\ p < 0.001$. (a) Dependent variable is the log of (imports into the US/into rest of world) (b) Estimation is done at 6 digits on positive flows (c) F-test of exclusion restrictions: F(3,162845)=45.34 and Chi-squared test $\chi^2(5) = 3150.25$ for columns (1) and (4) respectively. Column 1 uses fixed effects and the exclusion restriction does not include religion. Column 4 has religion (christian and muslim) as additional exclusion restrictions. The F-test (Chi-squared test) is a joint significance test of military, number of free lines, tariff margin and religion dummies (where applicable) (d) robust standard errors used (except the Poisson case)

Table 4: Regression of Time Invariant variables

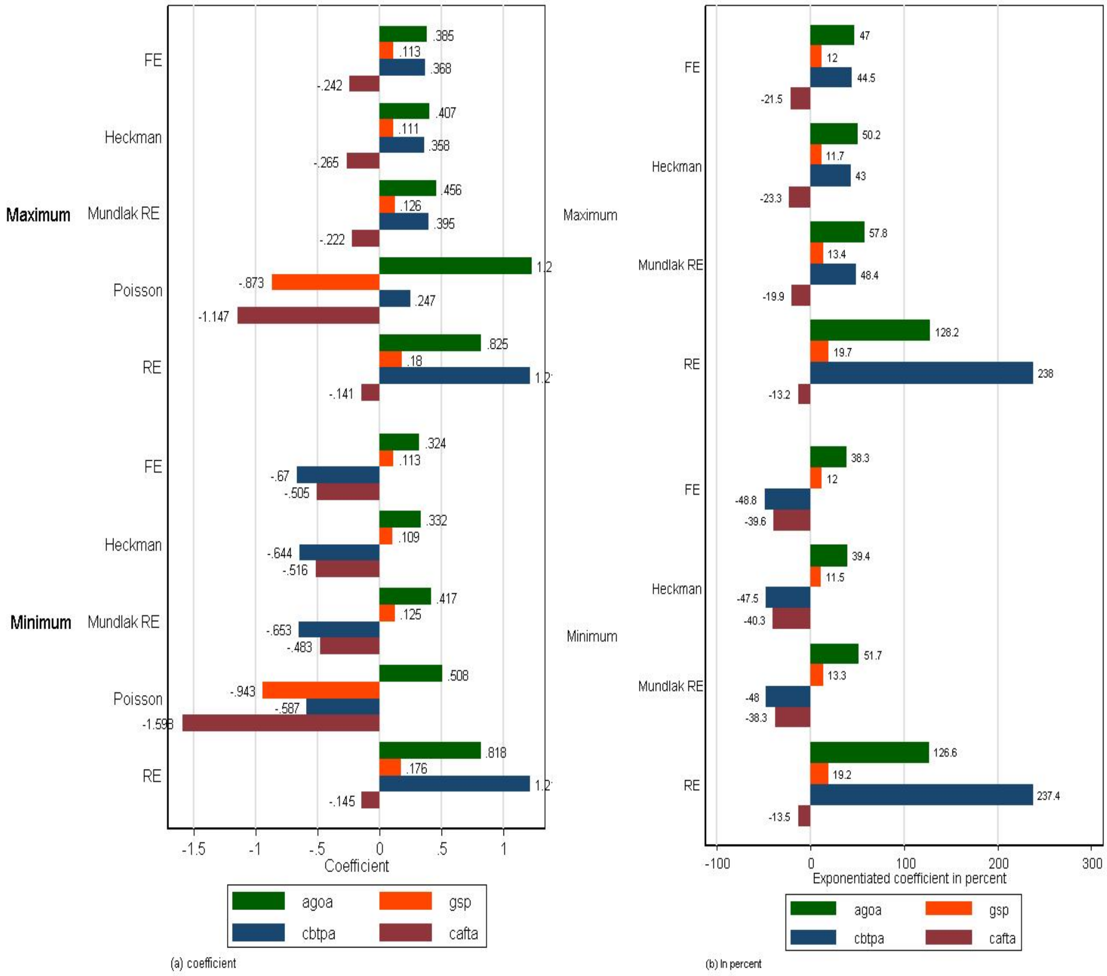
	(1) FE1-Median	(2) FE1-OLS	(3) FE2-Median	(4) FE2-OLS	(5) FE3-Median	(6) FE3-OLS	(7) FE4-Median	(8) FE4-OLS	(9) Heck1-Median	(10) Heck1-OLS	(11) Heck2-Median	(12) Heck2-OLS
landlocked	0.000	0.056***	-0.000	0.058***	-0.000	0.057***	-0.000	0.059***	0.003**	0.051***	0.324***	0.403***
	(0.001)	(0.008)	(0.001)	(0.008)	(0.001)	(0.008)	(0.001)	(0.008)	(0.001)	(0.008)	(0.003)	(0.009)
Area (log)	0.000	-0.036***	-0.000	-0.038***	0.000**	-0.035***	0.000	-0.037***	0.007***	-0.023***	-0.100***	-0.128***
	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)	(0.002)	(0.001)	(0.002)
Number of cities	-0.000**	0.002*	0.000*	0.004***	-0.000***	0.002*	0.000	0.004***	-0.001***	0.001	0.009***	0.010***
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
latitude	-0.000***	-0.001***	-0.000***	-0.001***	-0.000***	-0.001***	-0.000***	-0.001***	-0.001***	-0.002***	-0.005***	-0.006***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
English Speaking	0.002**	-0.010	0.003***	0.013	0.002**	-0.011	0.003***	0.011	-0.008***	-0.015	-0.304***	-0.295***
	(0.001)	(0.010)	(0.001)	(0.010)	(0.001)	(0.010)	(0.001)	(0.010)	(0.001)	(0.010)	(0.004)	(0.010)
Spanish speaking	0.019***	0.157***	0.022***	0.182***	0.011***	0.134***	0.014***	0.159***	0.086***	0.187***	-0.379***	-0.307***
	(0.001)	(0.021)	(0.001)	(0.021)	(0.001)	(0.021)	(0.001)	(0.021)	(0.002)	(0.021)	(0.006)	(0.021)
Africa	0.007***	0.074***	0.010***	0.063***	0.006***	0.069***	0.009***	0.059***	0.045***	0.104***	0.576***	0.592***
	(0.001)	(0.009)	(0.001)	(0.009)	(0.001)	(0.009)	(0.001)	(0.009)	(0.001)	(0.009)	(0.004)	(0.010)
Latin America & Caribbean	0.036***	0.410***	0.042***	0.442***	0.033***	0.403***	0.038***	0.434***	-0.027***	0.361***	0.547***	0.860***
	(0.001)	(0.019)	(0.001)	(0.020)	(0.001)	(0.019)	(0.001)	(0.020)	(0.001)	(0.019)	(0.005)	(0.019)
NAFTA	1.519***	1.508***	1.515***	1.503***	1.526***	1.522***	1.523***	1.517***	1.555***	1.559***	1.070***	1.187***
	(0.002)	(0.047)	(0.002)	(0.047)	(0.002)	(0.047)	(0.002)	(0.047)	(0.003)	(0.047)	(0.011)	(0.046)
Majority Christian			-0.013***	-0.082***			-0.014***	-0.081***				
			(0.001)	(0.009)			(0.001)	(0.009)				
Majority Muslim			-0.002*	0.011			-0.002**	0.010				
			(0.001)	(0.008)			(0.001)	(0.008)				
Constant	-0.267***	0.276***	-0.265***	0.291***	-0.268***	0.277***	-0.266***	0.291***	-0.267***	0.157***	0.967***	1.353***
	(0.001)	(0.028)	(0.001)	(0.027)	(0.001)	(0.028)	(0.001)	(0.027)	(0.002)	(0.027)	(0.007)	(0.028)
Observations	121777	121777	121777	121777	121777	121777	121777	121777	121777	121777	121777	121777
$PseudoR^2/R^2$	0.033	0.077	0.034	0.078	0.033	0.075	0.034	0.076	0.04	0.074	0.173	0.156
Adjusted R^2		0.077		0.078		0.075		0.076		0.074		0.156
F-Test		544.900		515.980		530.479		504.561		548.228		1959.238

Robust Standard errors in parentheses (excluding median regressions), $^{+}\ p < 0.1$, $^{*}\ p < 0.05$, $^{**}\ p < 0.01$, $^{***}\ p < 0.001$. (a) Dependent variable is the estimated fixed effects from the panel regression (b) Estimation is done at 6 digits on positive flows (c) Pseudo R^2 is Calculated as $1 - \frac{minimised\ sum\ of\ absolute\ deviations}{raw\ sum\ of\ absolute\ deviations}$ for median regressions. (d) FE*i* and Heck*i* are based on the fixed effects extracting from the models in the previous table with similar column headings.

Table 5: Random effects without selection correction and Heckman two step estimates for sub-sample of countries

	(1) Mundlak-RE[1]	(2) Mundlak-RE[2]	(3) LPM[1]	(4) 2nd Stage[1]	(5) LPM[2]	(6) 2nd Stage[2]
AGOA product dummy	0.409**	0.410**		0.395**		0.391**
	(0.136)	(0.136)		(0.133)		(0.133)
agoa × gsp product dummy	-0.079	-0.096		0.354		0.351
	(0.578)	(0.581)		(0.450)		(0.450)
CBTPA product dummy	0.397***	0.400***		0.350**		0.350**
	(0.113)	(0.113)		(0.111)		(0.111)
cbtpa × gsp product dummy	-1.616**	-1.623**		-1.046		-1.044
	(0.552)	(0.539)		(0.872)		(0.871)
GSP product dummy	0.147**	0.149**		0.122*		0.122*
	(0.048)	(0.048)		(0.048)		(0.048)
agoa × year_2002	0.342^{+}	0.343^{+}		0.323^{+}		0.325^{+}
	(0.175)	(0.176)		(0.169)		(0.169)
agoa × year_2003	0.725***	0.730***		0.574***		0.574***
	(0.174)	(0.174)		(0.165)		(0.165)
agoa × year_2004	0.347*	0.356*		0.155		0.159
	(0.169)	(0.169)		(0.161)		(0.161)
agoa × year_2005	0.429*	0.441*		0.231		0.237
	(0.181)	(0.181)		(0.173)		(0.173)
agoa × year_2006	-0.072	-0.058		-0.249		-0.243
	(0.172)	(0.172)		(0.166)		(0.166)
agoa × year_2007	-0.053	-0.038		-0.255		-0.247
	(0.168)	(0.168)		(0.163)		(0.163)
agoa × year_2008	-0.354*	-0.338*		-0.471**		-0.469**
	(0.168)	(0.168)		(0.164)		(0.164)
agoa × year_2009	-0.529**	-0.515**		-0.679***		-0.671***
	(0.175)	(0.175)		(0.173)		(0.173)
cbtpa × year_2001	0.040	0.040		0.015		0.015
	(0.125)	(0.125)		(0.123)		(0.123)
cbtpa × year_2002	-0.382**	-0.381**		-0.378**		-0.377**
	(0.125)	(0.125)		(0.122)		(0.122)
cbtpa × year_2003	-0.739***	-0.738***		-0.714***		-0.712***
	(0.132)	(0.132)		(0.129)		(0.129)
cbtpa × year_2004	-1.075***	-1.071***		-1.025***		-1.020***
	(0.138)	(0.138)		(0.135)		(0.135)
cbtpa × year_2005	-1.450***	-1.444***		-1.383***		-1.375***
	(0.135)	(0.135)		(0.131)		(0.131)
cbtpa × year_2006	-1.652***	-1.651***		-1.556***		-1.551***
	(0.141)	(0.141)		(0.138)		(0.138)
cbtpa × year_2007	-1.819***	-1.817***		-1.706***		-1.700***
	(0.137)	(0.137)		(0.135)		(0.135)
cbtpa × year_2008	-1.930***	-1.928***		-1.756***		-1.752***
	(0.136)	(0.136)		(0.134)		(0.133)
cbtpa × year_2009	-2.074***	-2.074***		-1.859***		-1.855***
	(0.137)	(0.137)		(0.135)		(0.135)
CAFTA-DR	-0.167***	-0.159***		-0.191***		-0.187***
	(0.037)	(0.037)		(0.037)		(0.037)
Country's RCA, lagged (log)	0.156***	0.159***		0.022***		0.022***
	(0.008)	(0.008)		(0.007)		(0.007)
Market size, USA.World (logs)	0.007***	0.007***		0.008***		0.007***
	(0.001)	(0.001)		(0.001)		(0.001)
Military			-0.009***		-0.009***	
			(0.001)		(0.001)	
landlocked	0.142***	0.138***	-0.085***		-0.078***	
	(0.011)	(0.011)	(0.001)		(0.001)	
Area (log)	-0.040***	-0.038***	0.020***		0.016***	
	(0.002)	(0.002)	(0.000)		(0.000)	
Number of cities	0.007***	0.005***	-0.002***		-0.002***	
	(0.001)	(0.001)	(0.000)		(0.000)	
latitude	0.001**	0.001***	-0.000^{+}		-0.000***	
	(0.000)	(0.000)	(0.000)		(0.000)	
English Speaking	-0.022^{+}	0.005	0.030***		0.021***	
	(0.011)	(0.012)	(0.002)		(0.001)	
Spanish speaking	-0.098***	-0.068**	0.048***		0.045***	
	(0.022)	(0.023)	(0.003)		(0.003)	
Africa	-0.094***	-0.103***				
	(0.009)	(0.009)				
Latin America & Caribbean	0.227***	0.202***				
	(0.020)	(0.020)				
GSP LDC country dummy			-0.011***		-0.010***	
			(0.001)		(0.001)	
GSP country dummy			0.003***		0.002**	
			(0.001)		(0.001)	
CBI			0.032***		0.032***	
			(0.008)		(0.008)	
AGOA country dummy			-0.007***		-0.006***	
			(0.001)		(0.001)	
Country's RCA (log)			0.074***		0.074***	
			(0.001)		(0.001)	
Number of free lines			0.000		0.001	
			(0.001)		(0.001)	
Margin (MFN and applied tariff)			0.018***		0.017***	
			(0.001)		(0.001)	
1st stage residuals				-7.542***		-7.596***
				(0.209)		(0.212)
Constant	0.398***	0.413***	-0.059***	5.383***	-0.049***	5.505***
	(0.027)	(0.028)	(0.003)	(0.140)	(0.003)	(0.144)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Mundlak terms (averages)	Yes	Yes	Yes	No	Yes	No
Observations	565077	538946	1634346	565077	1606878	538946
R^2				0.032		0.032
Adjusted R^2				0.032		0.032
Clusters	78716.000	76762.000	1.17e+05	78716.000	1.15e+05	76762.000
rho	0.338	0.326	0.544	0.560	0.536	0.544
F-Test				74.980		74.123
Chi-squared	7788.668	7700.262	27277.604		23693.851	
R-squared overall	0.143	0.143	0.260	0.010	0.241	0.013
R-squared between	0.160	0.160	0.371	0.010	0.349	0.013

Standard errors in parentheses, $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (a) Dependent variable is the log of (imports into the US/into rest of world) and for the 1st Stage it is the probability of exporting to the USA (b) Estimation is done at 6 digits on positive flows, (c) [1] Excludes 33 OECD countries and remaining European countries, [2] China and Hong Kong are also excluded in addition to the OECD and European countries. (d) Test of random effects is 226101.89 and 217337.84 for the first two columns respectively (e) Chi-squared test of exclusion restrictions are $\chi^2(3) = 227.92$ and $\chi^2(3) = 204.48$ for columns (3) and (5) respectively. (f)



Exponentiated coefficients calculated as $(\exp^{\beta} - 1) \times 100$

Figure 1: Summary of coefficients and impact of preference dummies

We now briefly discuss the results presented in Appendix II. The results presented here include HS-2 and HS-4 digit results. What is striking in Table (7) is the sign reversal for the HS-4 digit estimates of *AGOA* as well as similar sign reversals for *CBTPA* for HS-2 and HS-4 digit estimations. In terms of the *AGOA* coefficient this is insignificant in the HS-4 digit column. A possible explanation might be the difficulty in accurately determining the fraction of exports in that category exported under the preference. Nevertheless, we notice that the correlation among the regressors increase at more disaggregated levels and is more severe in the non apparel and textile regressions. Much of this correlation is due to the preference-time interactions and the *CBTPA* preference included in the regressions. The HS-6 results are repeated in the tables for comparative purposes. In Table (7), the impact of a country's previous competitiveness has a larger effect at the 6-digit level compared to the more aggregated 2- and 4-digit levels. Market size of the USA relative to the world becomes negative at the other levels of disaggregation and also becomes insignificant (except at the 2-digit level where it is marginally significant at 10%). the positive sign recorded for the 6-digit level of disaggregation is significant at the 0.1% but the effect is small. The negative coefficient for the 2- and 4-digit levels probably indicates that at higher levels of aggregation the rest of the world tends to provide a larger market relative to the USA. The *AGOA* preferences are negative and insignificant in the 4-digit columns. They are however, significant in the 2-digit regressions in columns (2) and (5). The coefficients are larger accounting for the aggregated nature of the data. The *GSP* dummy is insignificant in both the

2-digit and 4-digit regressions—this might be due to the fact that countries are graduated or de-graduated in products at the 6-digit level and not at higher levels of aggregation. On the contrary, the CBTPA dummy is negative and significant in the 4-digit regressions but insignificant in the 2-digit regressions.

The next two tables present results from looking at non apparel and textile and apparel and textile products separately. Table (8) reports the fixed effects estimates while Table (9) reports the Mundlak corrected random effects estimates. The two tables report similar estimates for our variables of interest. The *AGOA* coefficient is significant and positive in both tables at the 6-digit level for non apparel products. However, in Table (8) significance is at the 10% level and the coefficients of 0.017 and 0.036 (in Table (9) yield relatively small impacts of 1.71% and 3.71% respectively. This significance was obtained after including the time-preference interactions. The inclusion of the time-preference interactions also led to the exclusion of the *CBTPA* coefficients. The exclusion of the time-preference dummies leads to a negative coefficient for *AGOA* in the 6-digit level regressions. This compared to the apparel impact is relatively small in size. The inability to estimate a coefficient for the *CBTPA* preference does not allow us to make any comments about the impact of the preference. The 2- and 4-digit results are insignificant for the *GSP* and *AGOA* preferences. The evidence thus far points to *AGOA* being more favourable to apparel and textile products. In Table (9) all three regressions for the apparel and textile products yield coefficients for all three preferences. At the 6-digit level *AGOA, CBTPA* and *GSP* product dummies do lead to higher exports to the USA relative to the rest of the world and are significant. At the 2-digit level the signs became negative for the *GSP* and *CBTPA* preferences but remain positive and larger for AGOA. The 4-digit level estimates of *AGOA* are no longer significant. The estimates for CBTPA and GSP are significant and negative. These results so far show that care must be taken in choosing a level of disaggregation when analysing trade data. The 2-digit and 6-digit levels of disaggregation tend to provide coefficients with the same sign compared to the 4-digit level coefficients. In addition, the apparel and textile products seem to be the driving force behind the performance of the *AGOA* and *CBTPA* preferences in our regressions.

Tables (10) and (11) carry out the Heckman selection and *Poisson PMLE* regressions respectively. The results are qualitatively similar to those reported in Table (7). Table (12) summarises the impact of the preferences across all five tables. The large impact of *AGOA* at the 2-digit level is the most noticeable feature of the table. This large impact might be due to problems present in the regressions as result of the aggregation of the 6-digit trade data. However, the remaining preferences do not present such outliers in the impact of the preferences. The final set of tables, Tables (13) and (14) present the results from carrying out estimations on selected countries. Table (13) reports the Mundlak corrected random effects estimates while Table (14) does same for the Heckman second stage results. Among the *AGOA* countries (Ghana, Kenya, Nigeria and South Africa) Kenya posts a significant and positive coefficient. The remaining three countries report insignificant coefficients. In terms of the *CBTPA* dummy, Guatemala and Honduras report positive and significant coefficients in both tables. Costa Rica and Jamaica on the other hand, post insignificant coefficient estimates. For these countries with insignificant estimates a much closer look at the data and re-estimating the regressions to control for country specific shocks and controls might provide better estimates of the impact. However, at the moment given our general model which is applied to the individual countries, they seem not to have significantly increased their exports to the USA relative to the rest of the world. Nigeria and South Africa might not show the significance due to the composition of their exports and the fact that they do not benefit from the special textile preferences provided by the USA. Our choice of products for South Africa are mostly exported under the *GSP* hence we observe a significant coefficient for the *GSP* preference. On the contrary, for Ghana as shown in Figure (5) the share of *AGOA* exports in exports to the USA has declined over time since the initial jump in 2001.

We have presented results of various models to show the impact of USA's preferences on developing countries. In doing this, we have controlled for the exports of these countries to the rest of the world to isolate the impact of the preferences. The results after various robustness and sensitivity checks point to a positive impact of *AGOA* and the *CBTPA* preferences of the USA on the exports of its beneficiaries to the USA. Nonetheless, the USAs *GSP* preference is also increasing exports to the USA relative to the rest of the world. Most of these results pointing to a positive impact can be attributed to the ability of the USA to absorb imports from the world given its huge demand and consumption of its citizens. We do not however, attribute causation to these results but would like to point out that these are the relative impacts given our model and data.

6 Conclusion

In this paper we have attempted to estimate the impact of the USA's *AGOA* and *CBTPA* preferences on its beneficiary countries. Adopting Collier and Venables (2007) methodology and making the required changes to fit their methodology within our framework. We find a strong impact of the *AGOA* and *CBTPA* preferences. However, the *CBTPA* preferences is sensitive to the exclusion of the interaction of the preferences and time. *AGOA* on the other hand is not and is robust to the exclusion of the *AGOA* preference-time interaction as well as the exclusion of some variables. HS-6 and HS-2 levels of disaggregation tend to provide consistent estimates with the same signs and significance. The HS-4 disaggregation on the other hand, tends to be sensitive and the signs switch around a lot. However, at higher levels of aggregation (HS-2) the explanatory variables tend to be correlated with each other, especially the preference-time interactions and the *CBTPA* preferences. Also, with the non apparel and textile regression, correlation among the variables is higher and the concentration of exports in this cluster is less.

Using the ordinary random effects model leads to inconsistent estimates which in several cases are twice the estimates of the fixed effects, Mundlak corrected random effects and Heckman selection models. The Poisson PMLE estimates are also larger but they report much smaller standard errors affirming its popularity in the current trade literature as an applied model of choice. The inclusion of preference-time interactions increases the impact of the preferences . The increase is smaller in the other non Poisson models—but quite larger—more than twice for the Poisson model. The Mundlak corrected random effects and fixed effects estimates are quite similar to the Heckman model indicating that these models are good alternatives to the Heckman model. An implication, is that non exporting is distributed randomly in our dataset. Thus, the estimates not controlling for selection bias are not as severely biased as expected.

Studies based solely on the ordinary random effects model as shown by our analysis tend to overestimate the impact of preferences. Increasing the sample size and allowing N to increase infinitely does not resolve this inconsistency. However, the differences between the fixed effects, Mundlak corrected random effects and Heckman selection models are not so different in very large samples. This holds because our sample is relatively large and with fixed T—thus consistency holds for increasing N. Thus for fixed T but large N the differences in estimates are quite small as the benefits of the large sample tends to lead us towards the true parameters. In smaller N samples however, care needs to be taken in choosing the appropriate estimator to obtain consistent estimates.

In concluding, we note that further work needs to be done in identifying the causal impact of the preferences. Extensions to this paper to overcome the present short-coming includes exploring causality within a matching framework. Matching allows the countries to be compared, such that, countries that are similar before receiving the preferences are matched—to limit the differences in their exports to the USA to the preference received. As at now, the impacts can be considered as *intention to treat* (ITT) as described in the evaluation literature and not *average treatment effects* (ATE). Finally, a potential question for further research is whether the move by the EU towards *Economic Partnership Agreements* (EPAs) at the end of 2007 has transferred advantages enjoyed by the *European Union-African Caribbean and Pacific* (EU - ACP) beneficiaries to their current status in the American market.

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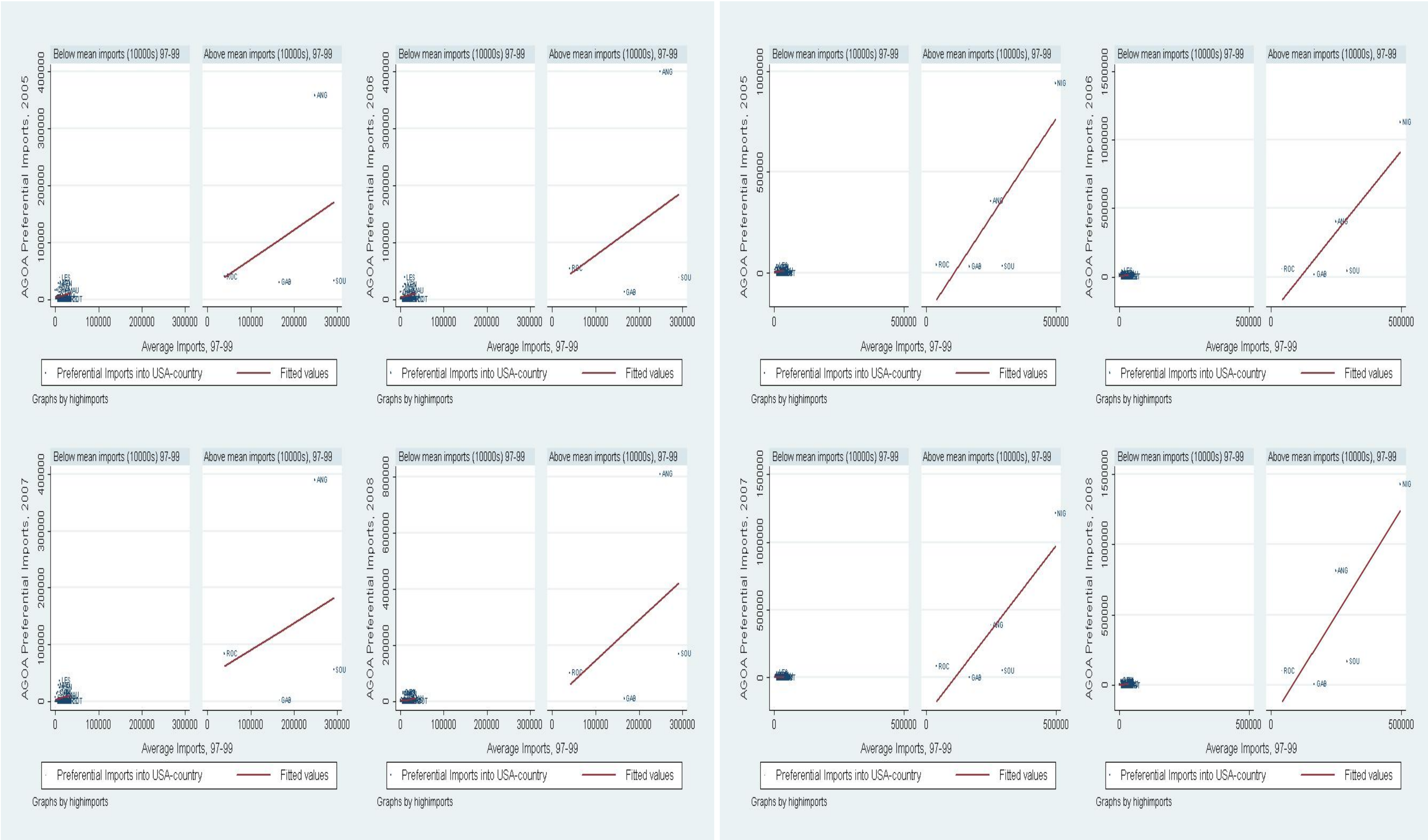
Appendix

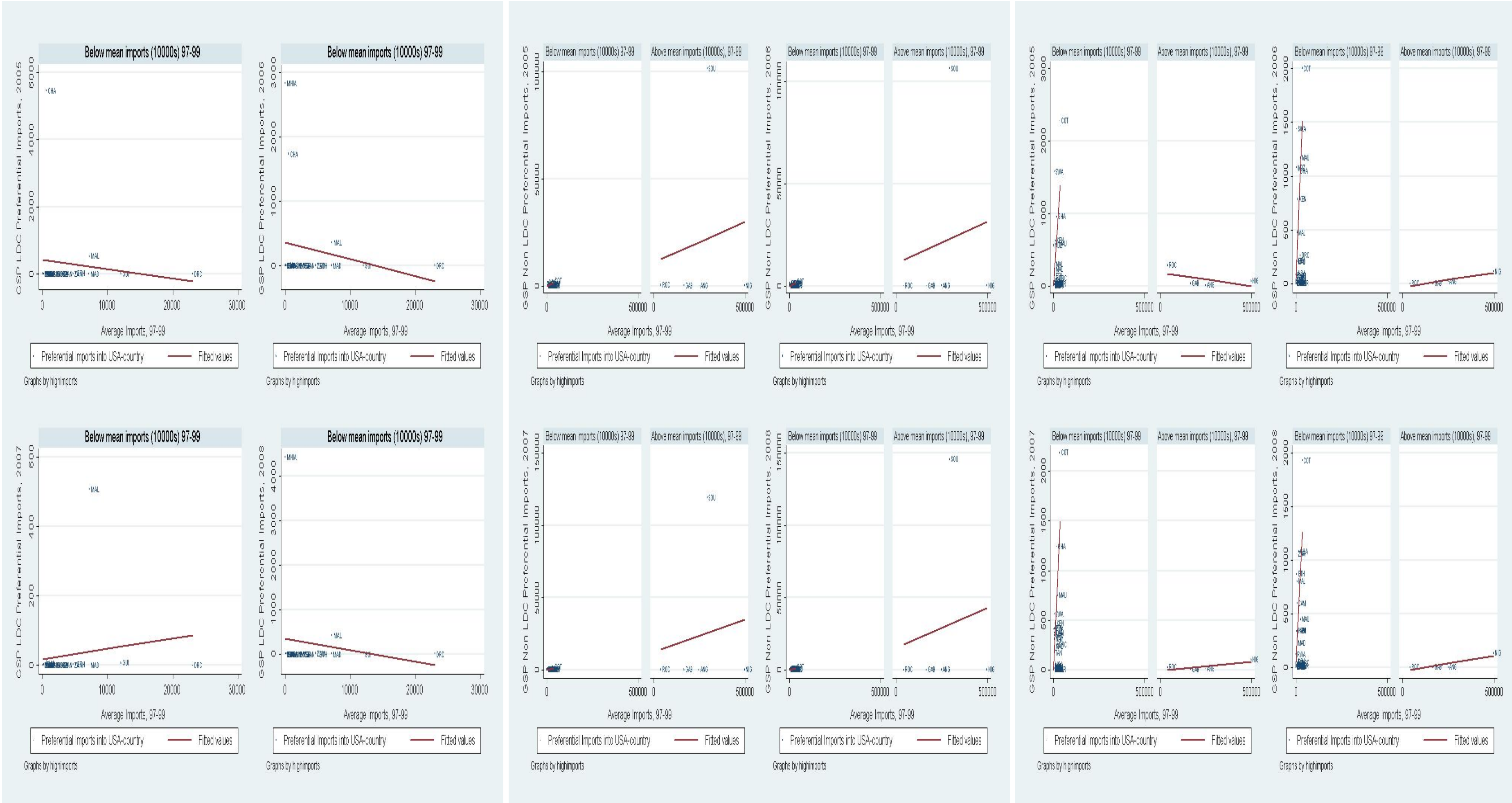
Appendix I



(a) AGOA excluding Nigeria

(b) AGOA Countries

Figure 2: Imports by the USA from SSA under *AGOA*

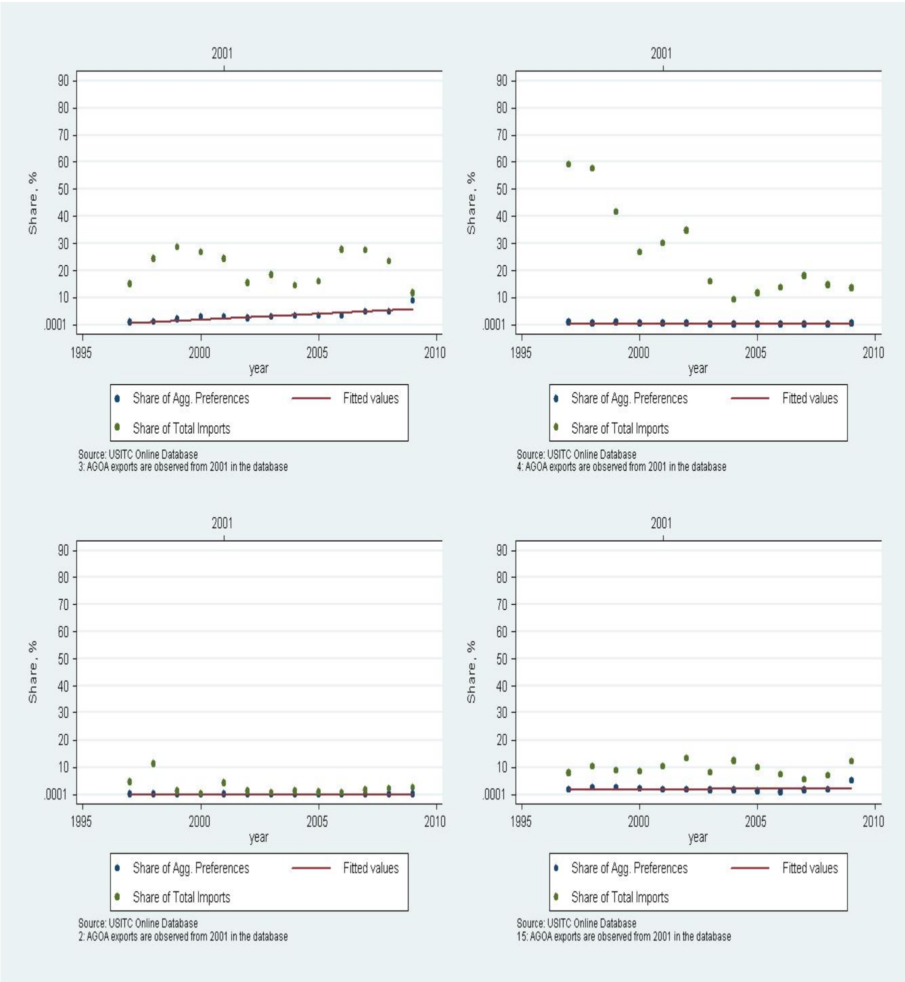


(a) GSP LDCs

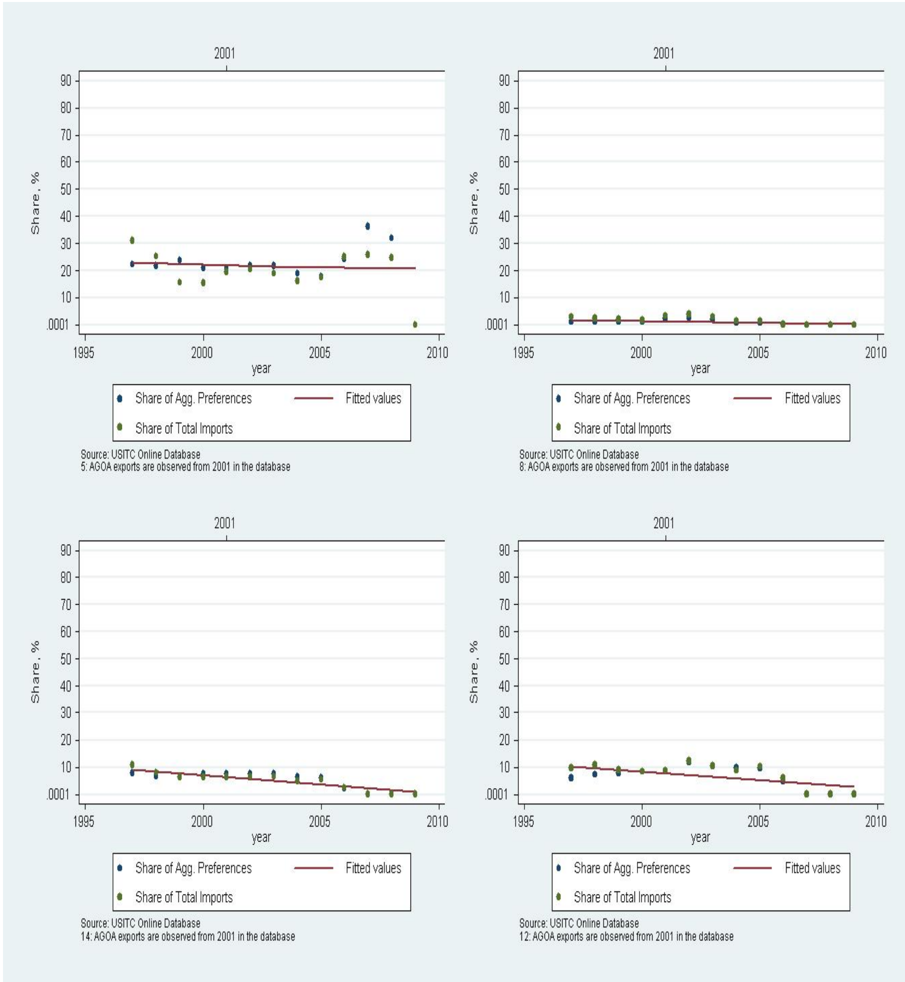
(b) GSP Non LDCs

(c) GSP Non LDC excluding South Africa

Figure 3: Imports by the USA from SSA under *GSP*



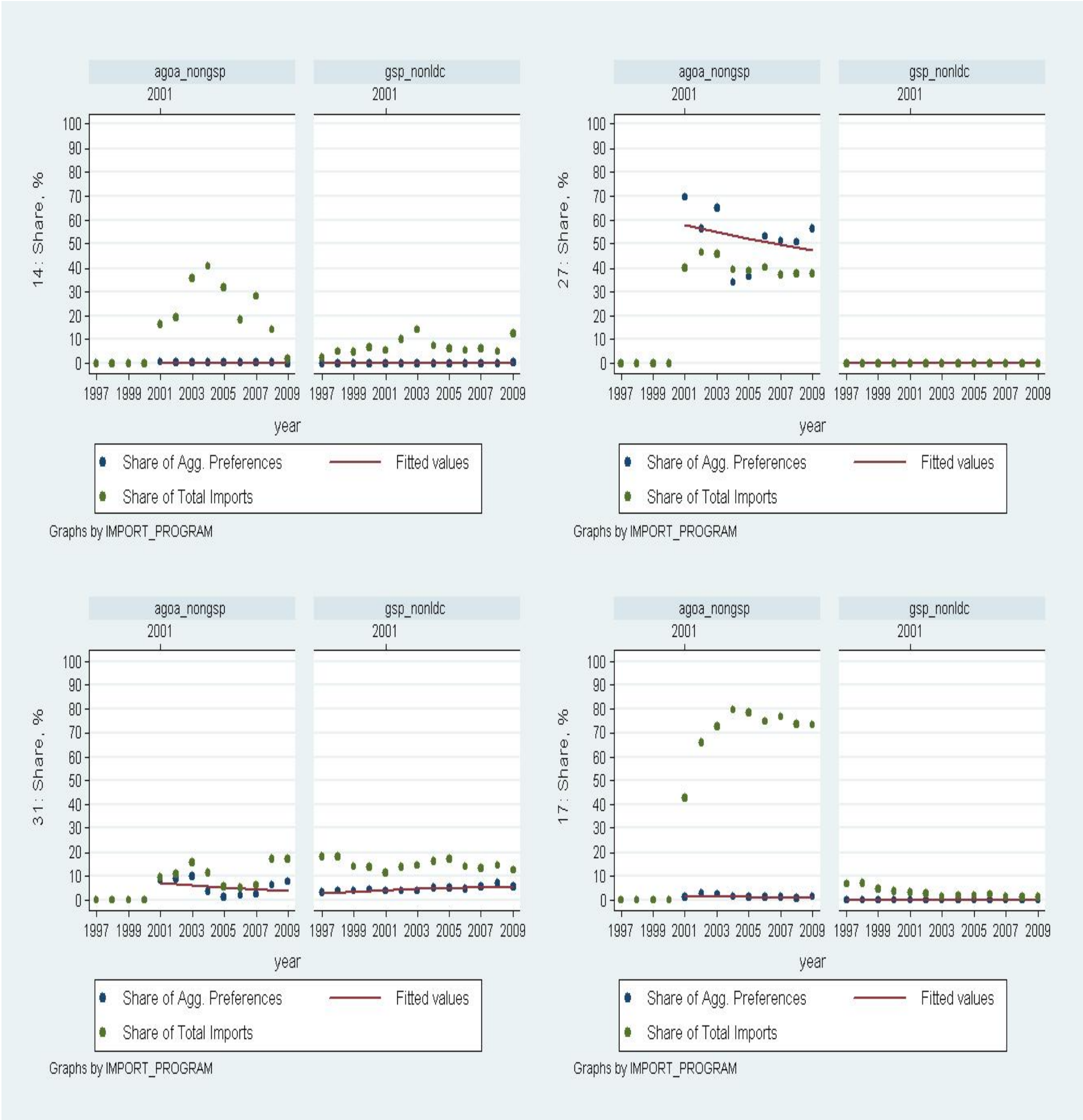
(a) Selected CBI countries in the Caribbean



(b) Selected CBI countries in Latin America

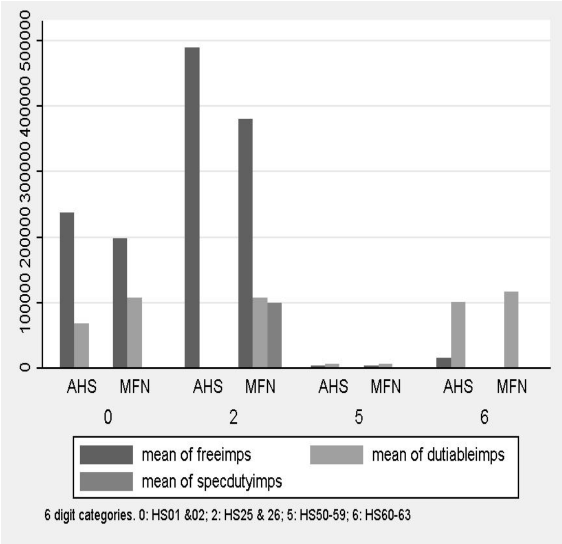
2: Antigua Barbuda, 3: Bahamas, 4: Barbados, 5: Costa Rica, 8: El Salvador, 12 Guatemala, 14: Honduras, 15: Jamaica

Figure 4: *CBI* Imports by the USA, by region

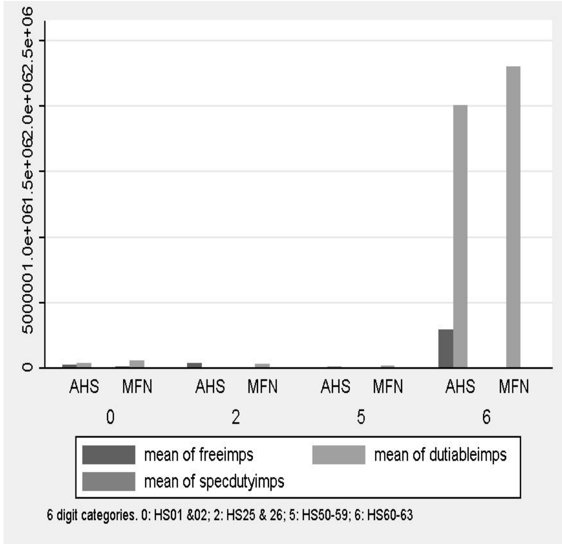


14: Ghana, 17: Kenya, 27: Nigeria, 31: South Africa

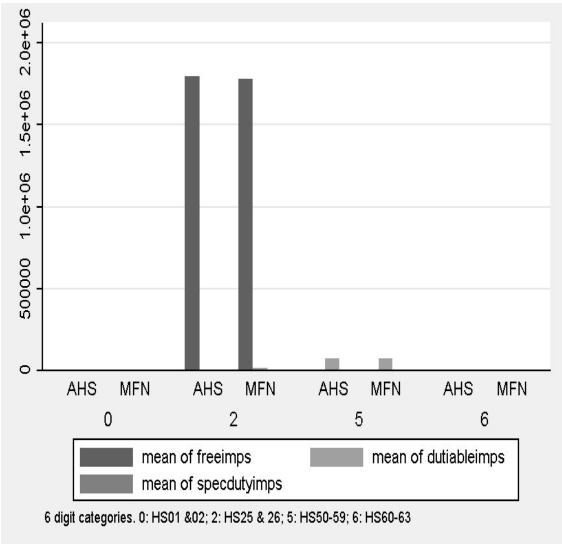
Figure 5: *AGOA* Imports by the USA, by region



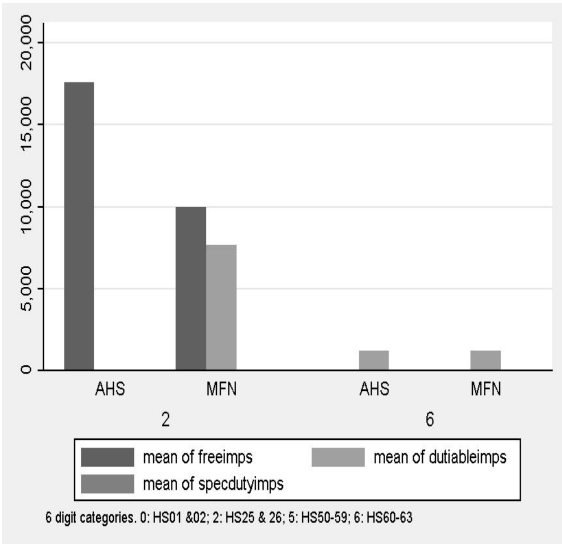
(a) Ghana



(b) Kenya



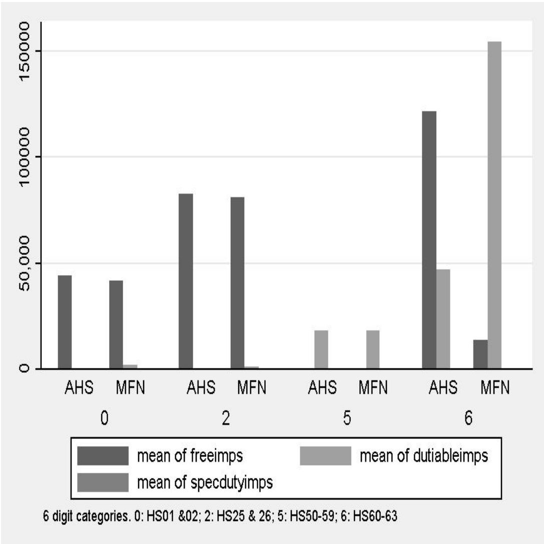
(c) Nigeria



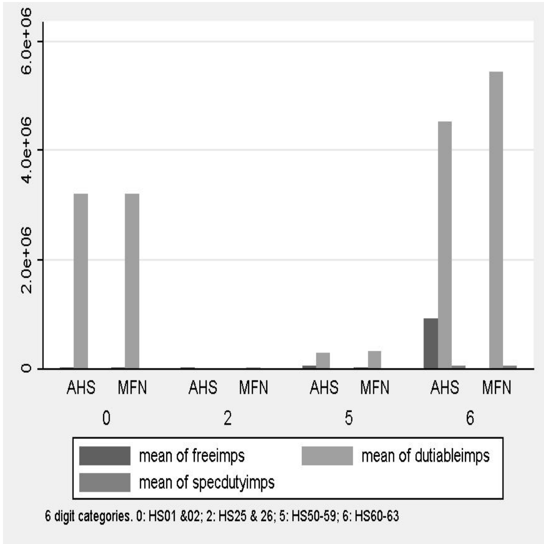
(d) Angola

Mean imports at the 6 digit level for free imports (zero tariffs), dutiable imports and specific duty imports respectively.
Source: TRAINS database

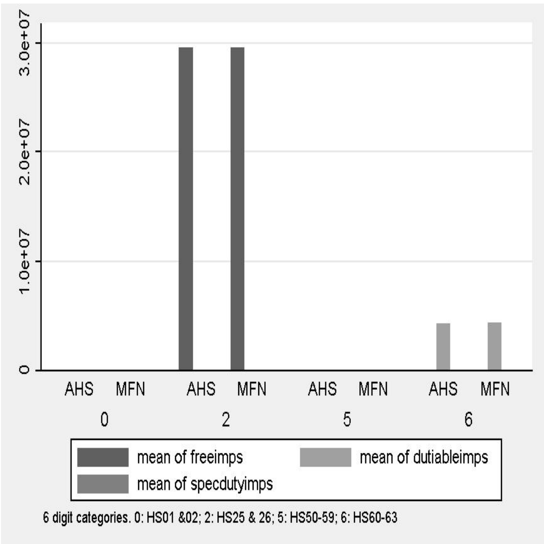
Figure 6: Mean Imports by Applied and MFN tariffs, Selected African Countries - 1996-2009



(a) Barbados



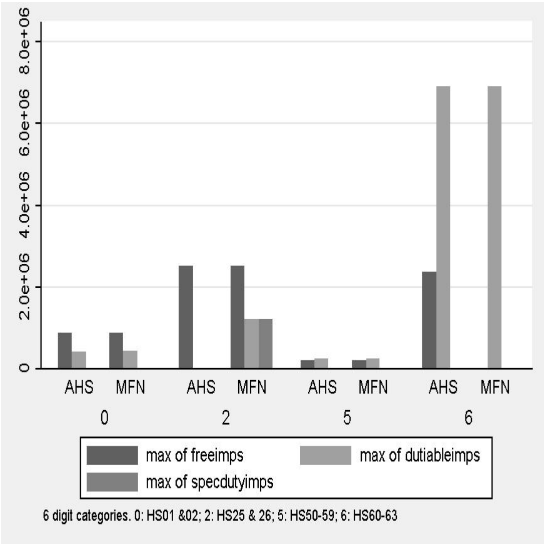
(b) Costa Rica



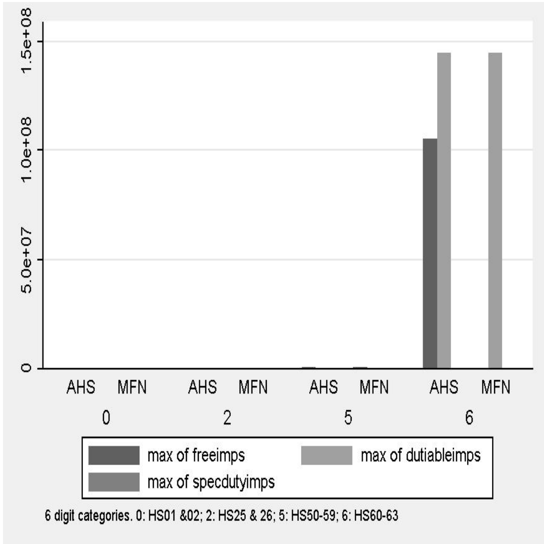
(c) Jamaica

Mean imports at the 6 digit level for free imports (zero tariffs), dutiable imports and specific duty imports respectively.
Source: TRAINS database

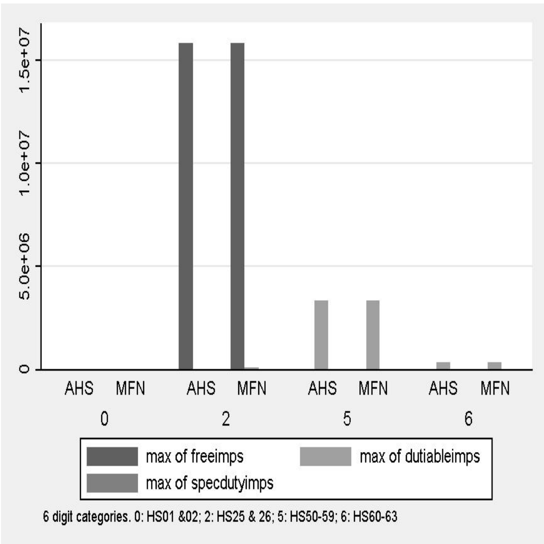
Figure 7: Mean Imports by Applied and MFN tariffs, Selected Caribbean Basin Countries - 1996-2009



(a) Ghana



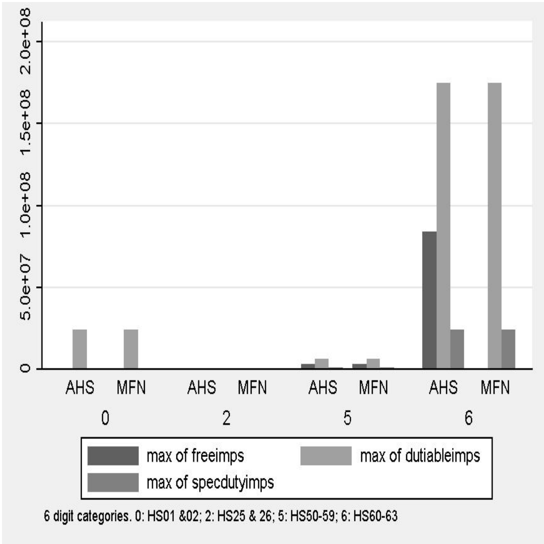
(b) Kenya



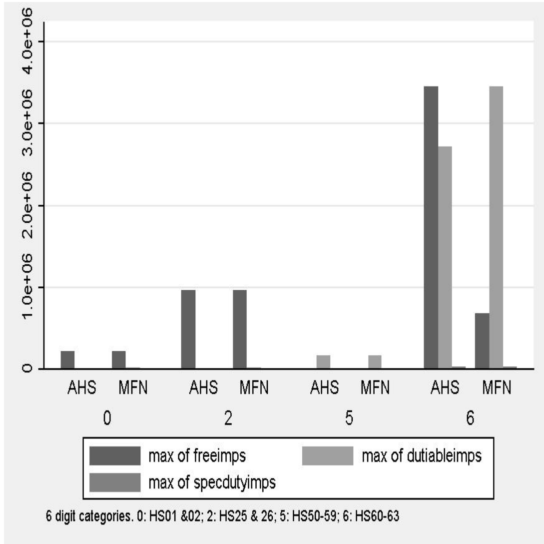
(c) Nigeria

Maximum imports at the 6 digit level for free imports (zero tariffs), dutiable imports and specific duty imports respectively. .
Source: TRAINS database

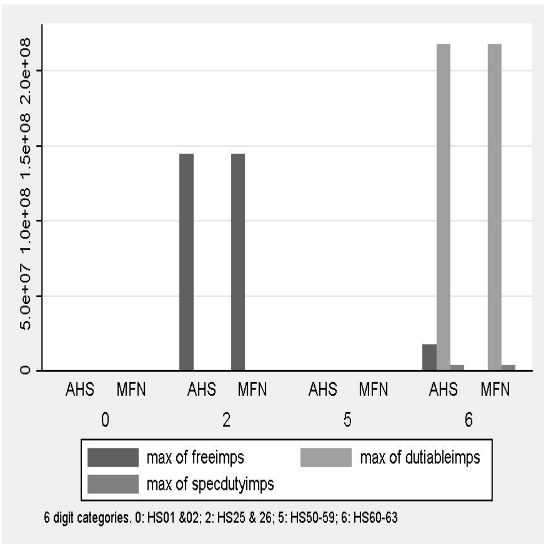
Figure 8: Maximum Imports by Applied and MFN tariffs, Selected African Countries - 1996-2009



(a) Costa Rica



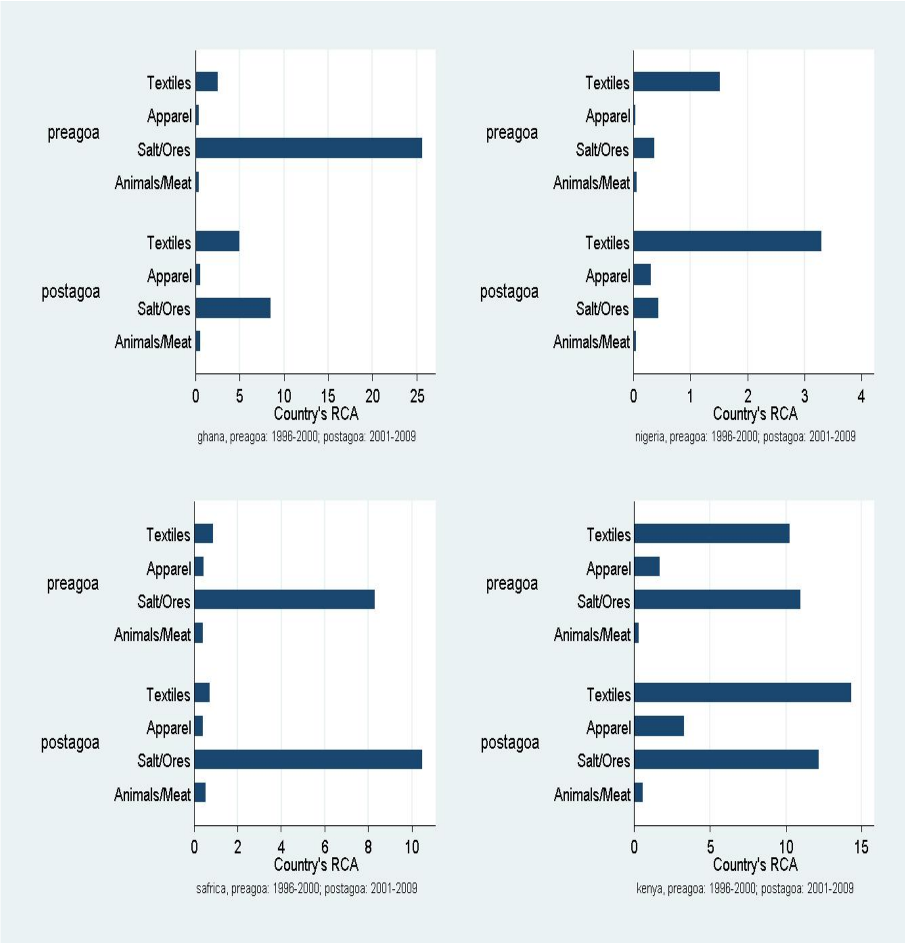
(b) Barbados



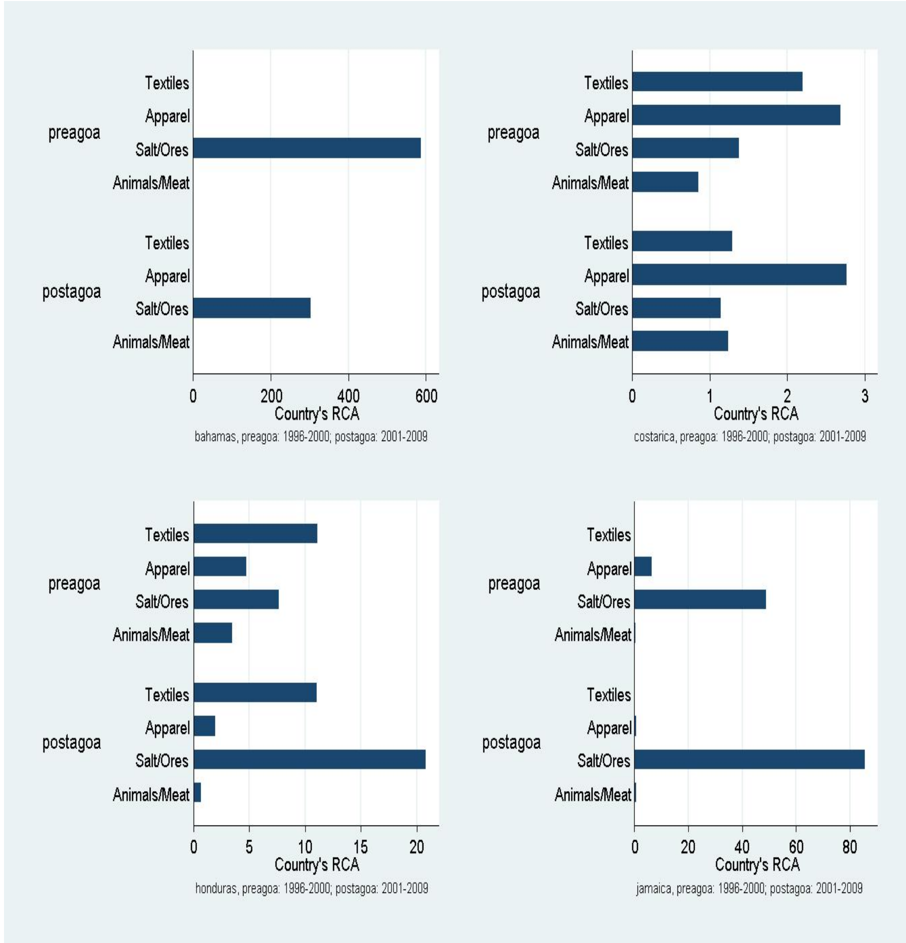
(c) Jamaica

Maximum imports at the 6 digit level for free imports (no tariffs), dutiable imports and specific duty imports respectively.
Source: TRAINS database

Figure 9: Maximum Imports by Applied and MFN tariffs, Selected Caribbean Basin Countries - 1996-2009



(a) Selected AGOA Countries



(b) Selected CBI Countries

AGOA countries (clockwise): Ghana, Nigeria, South Africa and Kenya. CBI countries (clockwise): The Bahamas, Costa Rica, Honduras and Jamaica.

Figure 10: Revealed Comparative Advantage for Selected AGOA and CBI Countries

Appendix II

Table 6: List of Countries

Afghanistan	Denmark	Lesotho	Russian Federation
Albania	Dominica	Liberia	San Marino
Antigua and Barbuda	Dominican Republic	Lithuania	Saudi Arabia
Argentina	Ecuador	Luxembourg	Senegal
Armenia	Egypt, Arab Rep.	Macao	Sierra Leone
Aruba	El Salvador	Macedonia, FYR	Singapore
Australia	Estonia	Madagascar	Slovak Republic
Austria	Ethiopia(excludes Eritrea)	Malawi	Slovenia
Azerbaijan	Fiji	Malaysia	South Africa
Bahamas, The	Finland	Maldives	Spain
Bahrain	France	Mali	Sri Lanka
Bangladesh	French Polynesia	Malta	St. Kitts and Nevis
Barbados	Gambia, The	Mauritania	St. Lucia
Belarus	Georgia	Mauritius	St. Vincent and the Grenadines
Belgium	Germany	Mexico	Suriname
Belize	Ghana	Micronesia, Fed. Sts.	Swaziland
Benin	Greece	Moldova	Sweden
Bermuda	Guatemala	Mongolia	Switzerland
Bhutan	Guinea	Morocco	Syrian Arab Republic
Bolivia	Guyana	Mozambique	Taiwan, China
Bosnia and Herzegovina	Haiti	Myanmar	Tajikistan
Botswana	Honduras	Namibia	Tanzania
Brazil	Hong Kong, China	Nepal	Thailand
British Virgin Islands	Hungary	Netherlands	Togo
Brunei	Iceland	Netherlands Antilles	Tokelau
Bulgaria	India	New Caledonia	Trinidad and Tobago
Burkina Faso	Indonesia	New Zealand	Tunisia
Cambodia	Iran, Islamic Rep.	Nicaragua	Turkey
Cameroon	Ireland	Niger	Turkmenistan
Canada	Israel	Nigeria	Uganda
Cape Verde	Italy	Norway	Ukraine
Cayman Islands	Jamaica	Oman	United Arab Emirates
Chile	Japan	Pakistan	United Kingdom
China	Jordan	Palau	Uruguay
Colombia	Kazakhstan	Panama	Uzbekistan
Congo, Dem. Rep.	Kenya	Paraguay	Venezuela
Cook Islands	Korea, Rep.	Peru	Vietnam
Costa Rica	Kuwait	Philippines	Yemen
Cote d'Ivoire	Kyrgyz Republic	Poland	Zambia
Croatia	Lao PDR	Portugal	Zimbabwe
Cyprus	Latvia	Qatar	
Czech Republic	Lebanon	Romania	

Table 7: Fixed/Random effects regression without selection correction

	All			Mundlack corrected RE		
	(1)	(2)	(3)	(4)	(5)	(6)
	FE-HS6	FE-HS2	FE-HS4	RE-HS6	RE-HS2	RE-HS4
AGOA product dummy	0.384**	3.224*	-0.105	0.416**	3.400*	-0.015
	(0.135)	(1.440)	(0.242)	(0.136)	(1.443)	(0.238)
agoa×gsp product dummy	0.429	-145.135*	0.730	0.022	-157.399**	0.571
	(0.477)	(56.855)	(0.632)	(0.564)	(57.505)	(0.607)
CBTPA product dummy	0.367**	-0.446	-1.048***	0.395***	-0.364	-1.027***
	(0.113)	(0.411)	(0.193)	(0.113)	(0.403)	(0.192)
cbtpa×gsp product dummy	-1.115	-5.249	-0.436	-1.561*	-16.603	-0.934
	(0.914)	(39.091)	(1.447)	(0.617)	(38.142)	(1.404)
GSP product dummy	0.113**	0.219	-0.122	0.126**	0.228	-0.098
	(0.040)	(0.470)	(0.143)	(0.040)	(0.470)	(0.143)
CAFTA-DR	-0.242***	-0.233**	-0.620***	-0.222***	-0.231**	-0.602***
	(0.038)	(0.077)	(0.075)	(0.037)	(0.077)	(0.075)
Country's RCA, lagged (log)	0.100***	0.082***	0.080***	0.108***	0.082***	0.079***
	(0.005)	(0.020)	(0.010)	(0.005)	(0.020)	(0.010)
Market size, USA.World (logs)	0.008***	-0.040^{+}	-0.004	0.010***	-0.039^{+}	-0.003
	(0.001)	(0.021)	(0.010)	(0.001)	(0.021)	(0.010)
agoa×year_2002	0.328^{+}	†	0.050	0.335^{+}	†	-0.035
	(0.173)		(0.256)	(0.175)		(0.254)
agoa×year_2003	0.636***	†	0.299	0.710***	†	0.204
	(0.168)		(0.313)	(0.172)		(0.304)
agoa×year_2004	0.195	†	-0.097	0.305^{+}	†	-0.180
	(0.165)		(0.463)	(0.167)		(0.440)
agoa×year_2005	0.232	†	-0.035	0.368*	†	-0.120
	(0.177)		(0.333)	(0.179)		(0.320)
agoa×year_2006	-0.270	†	0.138	-0.141	†	0.150
	(0.170)		(0.461)	(0.171)		(0.511)
agoa×year_2007	-0.282^{+}	†	-0.067	-0.142	†	-0.150
	(0.167)		(0.357)	(0.167)		(0.335)
agoa×year_2008	-0.579***	†	-0.025	-0.451**	†	-0.099
	(0.168)		(0.515)	(0.168)		(0.491)
agoa×year_2009	-0.727***	†	-0.653	-0.616***	†	-0.727
	(0.177)		(0.559)	(0.175)		(0.530)
cbtpa×year_2001	0.027	†	0.149	0.035	†	0.121
	(0.124)		(0.324)	(0.125)		(0.315)
cbtpa×year_2002	-0.398**	†	0.748*	-0.391**	†	0.722*
	(0.124)		(0.361)	(0.124)		(0.353)
cbtpa×year_2003	-0.756***	†	0.429	-0.744***	†	0.393
	(0.131)		(0.402)	(0.132)		(0.395)
cbtpa×year_2004	-1.107***	†	0.391	-1.110***	†	0.365
	(0.138)		(0.492)	(0.138)		(0.485)
cbtpa×year_2005	-1.503***	†	-0.047	-1.505***	†	-0.065
	(0.135)		(0.439)	(0.135)		(0.430)
cbtpa×year_2006	-1.657***	†	0.148	-1.676***	†	0.112
	(0.140)		(0.353)	(0.141)		(0.344)
cbtpa×year_2007	-1.841***	†	0.328	-1.861***	†	0.288
	(0.137)		(0.403)	(0.137)		(0.395)
cbtpa×year_2008	-1.941***	†	0.393	-1.982***	†	0.358
	(0.136)		(0.347)	(0.136)		(0.338)
cbtpa×year_2009	-2.071***	†	0.454	-2.114***	†	0.400
	(0.138)		(0.523)	(0.138)		(0.514)
landlocked	‡	‡	‡	0.076***	†	0.621***
				(0.007)		(0.056)
Area (log)	‡	‡	‡	-0.015***	†	-0.127***
				(0.002)		(0.011)
Number of cities	‡	‡	‡	-0.005***	†	-0.017**
				(0.001)		(0.006)
latitude	‡	‡	‡	-0.002***	†	-0.006***
				(0.000)		(0.001)
English Speaking	‡	‡	‡	-0.029***	†	0.025
				(0.009)		(0.052)
Spanish speaking	‡	‡	‡	-0.156***	†	-0.890***
				(0.017)		(0.084)
Africa	‡	‡	‡	-0.041***	†	0.825***
				(0.007)		(0.069)
Latin America & Caribbean	‡	‡	‡	0.282***	†	1.591***
				(0.017)		(0.097)
NAFTA	‡	‡	‡	1.713***	†	0.859***
				(0.044)		(0.119)
Constant	0.196***	0.450***	0.739***	0.406***	0.928***	2.363***
	(0.005)	(0.035)	(0.024)	(0.024)	(0.182)	(0.135)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Mundlak terms (averages)	No	No	No	Yes	Yes	Yes
Observations	1047124	20163	113997	1047124	20163	113997
R^2	0.015	0.021	0.023			
Adjusted R^2	0.015	0.020	0.022			
Clusters	1.22e+05	1872.000	14029.000	1.22e+05	1872.000	14029.000
rho	0.548	0.826	0.827	0.405	0.774	0.778
F-Test	72.853	5.004	18.316			
Chi-squared				10622.224	661.396	3156.275
R-squared overall	0.001	0.000	0.003	0.155	0.201	0.179
R-squared between	0.000	0.007	0.012	0.183	0.197	0.171

Robust Standard errors in parentheses, $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Dependent variable is the log of (imports into the US/into rest of world) Estimation is done at 6 digits, 4 digits and 2 digits on positive flows F test of fixed effects for columns 1, 2, and 3 respectively: F-test(121776,925309) = 6.89 , F-test(1871,18270) = 23.55, F-test(14028,99930) = 17.12. † indicates variable dropped in estimation ‡ indicates not applicable

Table 8: Fixed effects regression without selection correction-Non apparel and Apparel & Textiles

	Non Apparel			Apparel		
	(1)	(2)	(3)	(4)	(5)	(6)
	HS6	HS2	HS4	HS6	HS2	HS4
AGOA product dummy	0.017*	-0.079	-0.281	0.380**	3.287*	-0.128
	(0.008)	(1.042)	(0.266)	(0.136)	(1.456)	(0.242)
agoa×gsp product dummy	-0.118^{+}	†	†	0.510	-150.157*	1.897
	(0.068)			(0.507)	(60.564)	(1.282)
CBTPA product dummy	†	†	†	†	†	†
cbtpa×gsp product dummy	†	†	†	†	†	†
GSP product dummy	0.209^{+}	0.430	0.391	0.102*	0.202	-0.247^{+}
	(0.117)	(0.912)	(0.447)	(0.042)	(0.496)	(0.135)
CAFTA-DR	-0.139^{+}	-0.294*	-0.442	-0.258***	-0.219*	-0.637***
	(0.078)	(0.145)	(0.410)	(0.042)	(0.086)	(0.074)
Country's RCA, lagged (log)	0.001	-0.026	-0.059	0.116***	0.092***	0.093***
	(0.007)	(0.064)	(0.039)	(0.006)	(0.021)	(0.010)
Market size, USA.World (logs)	0.010***	0.148	0.109**	0.008***	-0.057**	-0.021*
	(0.002)	(0.098)	(0.039)	(0.001)	(0.018)	(0.009)
agoa×year_2002	-0.032**	†	-0.033	0.329^{+}	†	0.111
	(0.011)		(0.059)	(0.174)		(0.264)
agoa×year_2003	-0.013	†	†	0.633***	†	0.270
	(0.011)			(0.168)		(0.322)
cbtpa×year interactions	†	†	†	†	†	†
Constant	0.139***	0.304**	0.657***	0.206***	0.485***	0.783***
	(0.009)	(0.093)	(0.060)	(0.005)	(0.032)	(0.022)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	139290	2685	12335	907834	17478	101662
R^2	0.002	0.013	0.010	0.016	0.029	0.027
Adjusted R^2	0.002	0.007	0.009	0.016	0.028	0.027
Clusters	18551.000	225.000	1844.000	1.03e+05	1647.000	12185.000
F-Test	.	.	.	71.793	4.983	19.082
R-squared within	0.002	0.013	0.010	0.016	0.029	0.027
R-squared between	0.004	0.000	0.022	0.001	0.010	0.016

Robust standard errors in parentheses, $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Dependent variable is the log of (imports into the US/into rest of world). Estimation is done at 6 digits, 4 digits and 2 digits on positive flows Non apparel: HS 01, 02, 25 & 26 Apparel and Textiles: HS50 - 63 F test of fixed effects for columns 1-6 respectively: F-test(18550,120718) = 8.6 , F-test(224,2442) = 29.83, F-test(1843,10472) = 16.93, F-test(103225,804570) = 6.78 , F-test(1646,15810) = 22.32, F-test(12184,89439) = 16.84. † indicates variable dropped in estimation, ‡ indicates not applicable

Table 9: Random effects regression with Mundlak's correction-Non apparel and Apparel & Textiles

	Non Apparel			Apparel		
	(1)	(2)	(3)	(4)	(5)	(6)
	HS6	HS2	HS4	HS6	HS2	HS4
AGOA product dummy	0.036^{+}	-0.035	-0.288	0.409**	3.444*	-0.036
	(0.020)	(1.062)	(0.268)	(0.136)	(1.458)	(0.239)
agoa×gsp product dummy	-0.163*	†	†	0.090	-161.322**	1.587
	(0.076)			(0.597)	(61.106)	(1.253)
CBTPA product dummy	†	†	†	0.383***	-0.352	-1.008***
				(0.113)	(0.405)	(0.191)
cbtpa×gsp product dummy	†	†	†	-1.529*	-17.059	-0.896
				(0.618)	(38.388)	(1.391)
GSP product dummy	0.201^{+}	0.430	0.383	0.118**	0.211	-0.223^{+}
	(0.119)	(0.915)	(0.450)	(0.042)	(0.496)	(0.134)
CAFTA-DR	-0.105	-0.291*	-0.353	-0.240***	-0.218*	-0.622***
	(0.077)	(0.144)	(0.404)	(0.041)	(0.086)	(0.074)
Country's RCA, lagged (log)	0.002	-0.029	-0.049	0.126***	0.091***	0.091***
	(0.007)	(0.065)	(0.037)	(0.006)	(0.021)	(0.010)
Market size, USA.World (logs)	0.011***	0.149	0.111**	0.010***	-0.056**	-0.021*
	(0.001)	(0.099)	(0.038)	(0.001)	(0.018)	(0.009)
agoa×year_2002	-0.031**	†	-0.006	0.336^{+}	†	0.014
	(0.011)		(0.059)	(0.175)		(0.263)
agoa×year_2003	-0.012	†	†	0.707***	†	0.179
	(0.011)			(0.173)		(0.311)
agoa×year_2004	†	†	†	0.301^{+}	†	-0.200
				(0.168)		(0.450)
agoa×year_2005	†	†	†	0.366*	†	-0.131
				(0.180)		(0.327)
agoa×year_2006	†	†	†	-0.140	†	0.133
				(0.171)		(0.516)
agoa×year_2007	†	†	†	-0.138	†	-0.172
				(0.167)		(0.341)
agoa×year_2008	†	†	†	-0.443**	†	-0.128
				(0.168)		(0.486)
agoa×year_2009	†	†	†	-0.611***	†	-0.745
				(0.175)		(0.543)
cbtpa×year_2001	†	†	†	0.037	†	0.100
				(0.125)		(0.315)
cbtpa×year_2002	†	†	†	-0.390**	†	0.701*
				(0.125)		(0.352)
cbtpa×year_2003	†	†	†	-0.743***	†	0.369
				(0.132)		(0.395)
cbtpa×year_2004	†	†	†	-1.103***	†	0.347
				(0.138)		(0.485)
cbtpa×year_2005	†	†	†	-1.492***	†	-0.075
				(0.135)		(0.430)
cbtpa×year_2006	†	†	†	-1.647***	†	0.114
				(0.141)		(0.344)
cbtpa×year_2007	†	†	†	-1.828***	†	0.284
				(0.138)		(0.395)
cbtpa×year_2008	†	†	†	-1.943***	†	0.368
				(0.137)		(0.337)
cbtpa×year_2009	†	†	†	-2.075***	†	0.408
				(0.138)		(0.514)
landlocked	-0.031***	†	-0.040	0.094***	†	0.682***
	(0.009)		(0.226)	(0.008)		(0.058)
Area (log)	0.002	†	-0.162***	-0.017***	†	-0.128***
	(0.003)		(0.039)	(0.002)		(0.011)
Number of cities	0.005**	†	0.040^{+}	-0.006***	†	-0.021***
	(0.001)		(0.022)	(0.001)		(0.006)
latitude	0.001*	†	0.001	-0.003***	†	-0.007***
	(0.000)		(0.003)	(0.000)		(0.001)
English Speaking	0.070***	†	0.461**	-0.041***	†	-0.022
	(0.017)		(0.162)	(0.010)		(0.055)
Spanish speaking	-0.003	†	-0.149	-0.182***	†	-1.059***
	(0.045)		(0.243)	(0.018)		(0.087)
Africa	-0.036**	†	0.326	-0.042***	†	0.868***
	(0.012)		(0.199)	(0.008)		(0.072)
Latin America & Caribbean	0.262***	†	2.256***	0.287***	†	1.522***
	(0.044)		(0.326)	(0.018)		(0.099)
NAFTA	1.658***	†	-0.433	1.714***	†	1.083***
	(0.147)		(0.352)	(0.043)		(0.121)
Constant	-0.134**	0.637	1.154*	0.452***	0.963***	2.505***
	(0.041)	(0.544)	(0.526)	(0.026)	(0.189)	(0.138)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Mundlak terms (averages)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	139290	2685	12335	907834	17478	101662
Clusters	18551.000	225.000	1844.000	1.03e+05	1647.000	12185.000
rho	0.407	0.671	0.773	0.408	0.795	0.773
Chi-squared	.	.	.	10580.612	642.643	3017.242
R-squared overall	0.111	0.153	0.175	0.159	0.232	0.193
R-squared between	0.126	0.219	0.174	0.189	0.200	0.185

Robust Standard errors in parentheses, $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Dependent variable is the log of (imports into the US/into rest of world). Estimation is done at 6 digits, 4 digits and 2 digits on positive flows Non apparel: HS 01, 02, 25 & 26 Apparel and Textiles: HS50 - 63. † indicates variable dropped in estimation, ‡ indicates not applicable

Table 10: Heckman selection estimates

	LPM-FE/Probit-RE and Fixed Effects 2nd stage						Mundlak corrected first stage and Fixed effects 2nd stage					
	LPM-FE		LPM-FE		Probit		LPM-RE		LPM-RE		Probit	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	1st-HS6	2nd-HS6	1st-HS2	2nd-HS2	1st-HS4	2nd-HS4	1st-HS6	2nd-HS6	1st-HS2	2nd-HS2	1st-HS4	2nd-HS4
AGOA product dummy	‡	0.407**	‡	3.630*	‡	-0.069	‡	0.405**	‡	3.562*	‡	-0.060
		(0.134)		(1.473)		(0.241)		(0.134)		(1.470)		(0.246)
agoa × gsp product dummy	‡	0.395	‡	-146.076*	‡	0.691	‡	0.392	‡	-145.646*	‡	0.710
		(0.464)		(59.040)		(0.614)		(0.462)		(58.733)		(0.637)
CBTPA product dummy	‡	0.353**	‡	-0.325	‡	-1.017***	‡	0.359**	‡	-0.340	‡	-1.049***
		(0.112)		(0.404)		(0.193)		(0.112)		(0.405)		(0.193)
cbtpa × gsp product dummy	‡	-1.083	‡	-11.970	‡	-0.532	‡	-1.088	‡	-10.858	‡	-0.404
		(0.888)		(39.165)		(1.446)		(0.886)		(39.084)		(1.449)
GSP product dummy	‡	0.111**	‡	0.236	‡	-0.130	‡	0.109**	‡	0.222	‡	-0.115
		(0.040)		(0.468)		(0.143)		(0.040)		(0.469)		(0.142)
CAFTA-DR	‡	-0.265***	‡	-0.205**	‡	-0.700***	‡	-0.266***	‡	-0.211**	‡	-0.610***
		(0.038)		(0.077)		(0.078)		(0.038)		(0.077)		(0.076)
Country's RCA, lagged (log)	‡	0.000	‡	0.078***	‡	0.066***	‡	0.004	‡	0.079***	‡	0.084***
		(0.005)		(0.020)		(0.010)		(0.005)		(0.020)		(0.010)
Market size, USA.World (logs)	‡	0.009***	‡	-0.030	‡	-0.004	‡	0.009***	‡	-0.033	‡	-0.004
		(0.001)		(0.021)		(0.010)		(0.001)		(0.021)		(0.010)
agoa × year_2002	‡	0.321+	†	‡	‡	0.038	‡	0.320+	‡	†	‡	0.035
		(0.170)				(0.254)		(0.170)				(0.257)
agoa × year_2003	‡	0.594***	‡	†	‡	0.286	‡	0.591***	‡	†	‡	0.283
		(0.166)				(0.313)		(0.166)				(0.314)
agoa × year_2004	‡	0.159	‡	†	‡	-0.114	‡	0.155	‡	†	‡	-0.112
		(0.162)				(0.460)		(0.162)				(0.464)
agoa × year_2005	‡	0.215	‡	†	‡	-0.051	‡	0.212	‡	†	‡	-0.049
		(0.174)				(0.330)		(0.174)				(0.335)
agoa × year_2006	‡	-0.278+	‡	†	‡	0.120	‡	-0.279+	‡	†	‡	0.121
		(0.167)				(0.459)		(0.167)				(0.461)
agoa × year_2007	‡	-0.299+	‡	†	‡	-0.081	‡	-0.299+	‡	†	‡	-0.085
		(0.164)				(0.354)		(0.164)				(0.358)
agoa × year_2008	‡	-0.560***	‡	†	‡	0.013	‡	-0.558***	‡	†	‡	-0.053
		(0.166)				(0.509)		(0.165)				(0.517)
agoa × year_2009	‡	-0.730***	‡	†	‡	-0.644	‡	-0.728***	‡	†	‡	-0.679
		(0.174)				(0.554)		(0.174)				(0.562)
cbtpa × year_2001	‡	0.019	‡	†	‡	0.139	‡	0.019	‡	†	‡	0.148
		(0.123)				(0.321)		(0.123)				(0.325)
cbtpa × year_2002	‡	-0.389**	‡	†	‡	0.726*	‡	-0.387**	‡	†	‡	0.749*
		(0.122)				(0.359)		(0.122)				(0.361)
cbtpa × year_2003	‡	-0.728***	‡	†	‡	0.410	‡	-0.726***	‡	†	‡	0.429
		(0.130)				(0.402)		(0.130)				(0.402)
cbtpa × year_2004	‡	-1.071***	‡	†	‡	0.386	‡	-1.069***	‡	†	‡	0.389
		(0.136)				(0.492)		(0.136)				(0.492)
cbtpa × year_2005	‡	-1.455***	‡	†	‡	-0.064	‡	-1.452***	‡	†	‡	-0.047
		(0.132)				(0.436)		(0.132)				(0.440)
cbtpa × year_2006	‡	-1.594***	‡	†	‡	0.159	‡	-1.592***	‡	†	‡	0.145
		(0.138)				(0.353)		(0.138)				(0.354)
cbtpa × year_2007	‡	-1.776***	‡	†	‡	0.305	‡	-1.777***	‡	†	‡	0.329
		(0.135)				(0.402)		(0.135)				(0.403)
cbtpa × year_2008	‡	-1.854***	‡	†	‡	0.368	‡	-1.859***	‡	†	‡	0.397
		(0.134)				(0.347)		(0.134)				(0.347)
cbtpa × year_2009	‡	-1.951***	‡	†	‡	0.436	‡	-1.959***	‡	†	‡	0.446
		(0.136)				(0.521)		(0.136)				(0.523)
GSP LDC country dummy	-0.013***	‡	-0.014**	‡	-0.110**	‡	-0.013***	‡	-0.014**	‡	0.412***	‡
	(0.001)		(0.005)		(0.039)		(0.001)		(0.005)		(0.060)	
GSP country dummy	-0.008***	‡	0.000	‡	-0.442***	‡	-0.008***	‡	0.000	‡	-0.197***	‡
	(0.001)		(0.004)		(0.021)		(0.001)		(0.004)		(0.024)	
CBI	0.039***	‡	0.023	‡	-0.663***	‡	0.039***	‡	0.023	‡	0.701***	‡
	(0.008)		(0.028)		(0.063)		(0.008)		(0.028)		(0.209)	
AGOA country dummy	-0.006***	‡	-0.021***	‡	-0.111**	‡	-0.006***	‡	-0.021***	‡	0.195***	‡
	(0.001)		(0.003)		(0.034)		(0.001)		(0.003)		(0.043)	
Country's RCA (log)	0.070***	‡	0.001***	‡	0.141***	‡	0.070***	‡	0.001***	‡	0.113***	‡
	(0.001)		(0.000)		(0.004)		(0.001)		(0.000)		(0.004)	
Military	-0.009***	‡	-0.010	‡	-0.423***	‡	-0.009***	‡	-0.010	‡	-0.135***	‡

	(0.001)		(0.007)		(0.030)		(0.001)		(0.007)		(0.037)	
Number of free lines	0.001	‡	-0.000	‡	-0.016***	‡	0.001	‡	-0.000	‡	-0.005	‡
	(0.001)		(0.000)		(0.003)		(0.001)		(0.000)		(0.003)	
Margin (MFN and applied tariff)	0.014***	‡	0.047***	‡	0.138***	‡	0.014***	‡	0.047***	‡	0.062+	‡
	(0.001)		(0.014)		(0.033)		(0.001)		(0.014)		(0.038)	
1st stage Residuals/ *Inverse Mills ratio*	‡	-5.545***	‡	-8.705***	‡	-0.261***	‡	-5.964***	‡	-7.637***	‡	0.100
		(0.152)		(2.135)		(0.055)		(0.162)		(2.229)		(0.079)
Constant	0.141***	4.078***	0.126***	6.782***	-8.935***	1.697***	-0.133***	4.072***	-0.075**	5.662***	-8.573***	0.435+
	(0.001)	(0.105)	(0.005)	(1.554)	(0.116)	(0.206)	(0.003)	(0.104)	(0.024)	(1.523)	(0.210)	(0.245)
$\ln(\sigma_\nu^2)$												
Panel level variance (log)	‡	‡	‡	‡	2.462***	‡	‡	‡	‡	‡	2.279***	‡
					(0.014)						(0.020)	
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mundlak terms (averages)	No	No	No	No	No	No	Yes	No	Yes	No	Yes	No
Observations	2279844	1047124	41832	20163	501984	113997	2279844	1047124	41832	20163	501984	113997
R^2	0.020	0.022	0.017	0.024		0.024		0.022		0.023		0.023
Adjusted R^2	0.020	0.022	0.017	0.023		0.023		0.022		0.022		0.022
Clusters	1.63e+05	1.22e+05	2988.000	1872.000		14029.000	1.63e+05	1.22e+05	2988.000	1872.000		14029.000
rho $\left(\rho = \frac{\sigma_u^2}{1+\sigma_u^2}\right)$	0.678	0.549	0.850	0.830	0.921	0.842	0.592	0.602	0.807	0.881	0.907	0.819
F-Test	483.580	84.726	7.623	5.073		18.068		85.133		4.968		18.080
Chi-squared					8371.050		56930.645		663.322		5178.737	
R-squared overall	0.139	0.006	0.027	0.001		0.026	0.259	0.004	0.231	0.007		0.012
R-squared between	0.221	0.004	0.043	0.015		0.077	0.355	0.002	0.266	0.032		0.032

Standard errors in parentheses, $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors used for all non linear models. Dependent variable for 1st stage regressions is the probability of exporting to the USA. For the 2nd stage this is the log of (imports into the US/into rest of world). Columns (1), (3), & (9) use the linear probability model (LPM) for the 1st stage. Columns (5) & (11) are based on the panel probit random effects model. The second half of the table is augmented with the Mundlak averages and the LPM are based on the random effects model. Estimation in the second stage is done digits on positive flows. The error of the panel probit is decomposed into $\varepsilon_{it} = u_i + \nu_{it}$, where u_i is the random effect component and ν_{it} is the iid error. When $\rho = 0$, then the pooled effects probit is no longer different from the panel probit. † indicates variable dropped in estimation, ‡ indicates not applicable.

Table 11: Poisson FE Estimates

	(1) 1-HS6	(2) 2-HS6	(3) 3-HS6	(4) 3-HS2	(5) 1-HS4
US/World Import ratio					
AGOA product dummy	-0.263	0.972***	1.230***	28.248**	-0.163
	(9132.504)	(0.008)	(0.008)	(8.629)	(105.378)
agoa×gsp product dummy	0.448	2.889***	2.139***	-422.761	†
	(9132.032)	(0.142)	(0.142)	(993.389)	
GSP product dummy	1.176***	-1.601***	-0.873***	-81.923***	1.549***
	(0.023)	(0.015)	(0.011)	(8.359)	(0.025)
CAFTA-DR	-0.362***	-0.853***	-1.147***	4.190***	-0.127***
	(0.007)	(0.006)	(0.004)	(0.048)	(0.008)
Country's RCA, lagged (log)	-0.379***	0.411***	0.298***	-0.270***	-0.498***
	(0.001)	(0.001)	(0.000)	(0.003)	(0.001)
Market size, USA.World (logs)	0.256***	0.133***	0.260***	-1.374***	0.583***
	(0.000)	(0.001)	(0.000)	(0.021)	(0.001)
agoa×year_2002	-0.500	0.320***	0.290***	†	-0.050
	(167.738)	(0.010)	(0.010)		(167.738)
agoa×year_2003	-2.085	1.047***	0.985***	†	†
	(24768.914)	(0.008)	(0.008)		
agoa×year_2008	-5.911	-0.108***	-1.455***	†	†
	(2.03e+05)	(0.011)	(0.010)		
agoa×year_2009	-3.930	-0.778***	-0.968***	†	†
	(2.03e+05)	(0.012)	(0.012)		
-					
CBTPA product dummy	†	†	†	†	†
cbtpa×gsp product dummy	†	†	†	†	†
cbtpa×year interactions	†	†	†	†	†
Year effects	Yes	Yes	Yes	Yes	Yes
Observations	259714	1445164	1704878	26208	25830
log likelihood	-6.77e+06	-8.77e+06	-1.67e+07	-7.18e+04	-1.56e+06
Chi-squared	3.88e+06	1.68e+06	3.54e+06	1.35e+05	1.82e+06

Standard errors in parentheses, $^{+}\ p < 0.1$, $^{*}\ p < 0.05$, $^{**}\ p < 0.01$, $^{***}\ p < 0.001$. Estimation is done at 6 digits and 2 digits - 1=Non apparel: HS 01, 02, 25 & 26; 2=Apparel and Textiles: HS50 - 63 3=Full: combines all 6 (2) digit products for both apparel and non apparel in our sample. † indicates variable dropped in estimation, ‡ indicates not applicable

Table 12: Summary impact of preferences estimated in Tables 2 – 5 in percent

	GSP	AGOA	CBTPA	CAFTA-DR
Table 1				
2 digit (FE)	24.49	2411.77	-36.00	-20.78
4 digit (FE)	-11.44	-9.92	-64.94	-46.18
6 digit (FE)	12.00	46.84	44.38	-21.52
2 digit (Mundlak)	25.56	2895.24	-30.51	-20.60
4 digit (Mundlak)	-9.36	-1.50	-64.18	-45.21
6 digit (Mundlak)	13.39	51.57	48.37	-19.88
Table 2				
2 digit (Non Apparel)	53.76	-7.56	†	-25.51
4 digit (Non Apparel)	47.89	-24.53	†	-35.72
6 digit (Non Apparel)	23.29	1.71	†	-12.98
2 digit (Apparel)	22.40	2575.05	-34.99	-19.66
4 digit (Apparel)	-21.92	-12.04	-64.38	-47.11
6 digit (Apparel)	10.69	46.20	42.86	-22.72
Table 3				
2 digit (Non Apparel)	53.76	-3.48	†	-25.27
4 digit (Non Apparel)	46.66	-25.01	†	-29.73
6 digit (Non Apparel)	22.23	3.71	†	-9.95
2 digit (Apparel)	23.47	3030.98	-29.67	-19.55
4 digit (Apparel)	-20.00	-3.55	-63.50	-46.31
6 digit (Apparel)	12.49	50.58	46.62	-21.36
Table 4				
2 digit (Column 4)	26.59	3670.83	-27.75	-18.56
4 digit (Column 6)	-12.22	-6.66	-63.82	-50.34
6 digit (Column 2)	11.69	50.25	42.32	-23.30
2 digit (Column 10: Mundlak)	24.91	3424.60	-28.82	-19.02
4 digit (Column 12: Mundlak)	-10.87	-5.87	-64.95	-45.66
6 digit (Column 8: Mundlak)	11.55	49.94	43.17	-23.32

Calculated as $(\exp^{\beta} - 1) \times 100$. † implies coefficient was dropped by the software.

Table 13: Random effects regression without selection correction for selected countries–HS6 digits

	(1) Costa Rica	(2) Ghana	(3) Guatemala	(4) Honduras	(5) Jamaica	(6) Kenya	(7) Nigeria	(8) South Africa
AGOA product dummy		-0.816				1.195*	0.044	-0.019
		(0.540)				(0.586)	(0.157)	(0.075)
agoa×gsp product dummy								
CBTPA product dummy	0.406		0.429*	0.897*	0.213			
	(0.284)		(0.194)	(0.406)	(0.757)			
cbtpa×gsp product dummy								
GSP product dummy	-1.262*	0.043	0.207	-0.056	-0.151	0.089	0.298	0.130^{+}
	(0.513)	(0.809)	(0.747)	(0.345)	(0.167)	(0.099)	(0.339)	(0.071)
agoa×year_2002		0.706				0.387	-0.069	-0.013
		(0.823)				(0.790)	(0.044)	(0.066)
agoa×year_2003		1.457				0.454	-0.162**	-0.011
		(0.991)				(0.716)	(0.051)	(0.047)
agoa×year_2004		0.402				0.107		-0.204***
		(0.887)				(0.797)		(0.061)
agoa×year_2005		-0.155				0.163	-0.013	-0.346***
		(0.758)				(0.758)	(0.051)	(0.069)
agoa×year_2006		0.514				-0.329		-0.406***
		(0.759)				(0.755)		(0.074)
agoa×year_2007		0.813				-0.497	-0.070	-0.454***
		(0.625)				(0.798)	(0.055)	(0.075)
agoa×year_2008		-0.432				-0.315		-0.478***
		(0.552)				(0.865)		(0.076)
agoa×year_2009		-0.311				-0.162		-0.474***
		(0.597)				(0.850)		(0.075)
cbtpa×year_2001	0.118		-0.008	-0.044	0.181			
	(0.365)		(0.237)	(0.465)	(0.731)			
cbtpa×year_2002	0.013		-0.192	-0.357	0.353			
	(0.385)		(0.244)	(0.444)	(0.737)			
cbtpa×year_2003	-0.114		-0.596*	-0.774^{+}	0.069			
	(0.381)		(0.248)	(0.447)	(0.850)			
cbtpa×year_2004	-0.159		-0.772***	-0.707^{+}	0.499			
	(0.354)		(0.230)	(0.413)	(0.867)			
cbtpa×year_2005	-0.306		-1.135***	-1.185**	0.127			
	(0.349)		(0.234)	(0.423)	(0.943)			
cbtpa×year_2006	-0.234		-1.060***	-2.181***	0.701			
	(0.349)		(0.259)	(0.433)	(0.985)			
cbtpa×year_2007	-0.052		-1.403***	-1.879***	-1.606^{+}			
	(0.369)		(0.234)	(0.433)	(0.958)			
cbtpa×year_2008	-0.557		-1.403***	-1.876***	-0.888			
	(0.369)		(0.227)	(0.407)	(1.074)			
cbtpa×year_2009	-0.995**		-1.675***	-2.127***	-1.396			
	(0.344)		(0.247)	(0.412)	(0.864)			
CAFTA-DR	-0.050		0.018	-0.254^{+}				
	(0.081)		(0.091)	(0.132)				
Country's RCA, lagged (log)	1.126***	-0.008	0.355***	0.461***	1.661***	0.216***	-0.093**	0.056*
	(0.149)	(0.119)	(0.055)	(0.087)	(0.231)	(0.049)	(0.035)	(0.023)
Market size, USA.World (logs)	0.047	-0.030^{+}	0.030^{+}	-0.013	-0.006	0.019**	0.001	0.005^{+}
	(0.030)	(0.019)	(0.016)	(0.035)	(0.037)	(0.007)	(0.006)	(0.003)
Constant	0.172*	0.476***	0.241**	0.444***	-0.107	0.085^{+}	0.238***	0.028^{+}
	(0.083)	(0.108)	(0.078)	(0.099)	(0.137)	(0.045)	(0.056)	(0.016)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mundlak terms (averages)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5974	3748	8662	5896	2891	8384	6127	12778
Clusters	797.000	706.000	917.000	807.000	550.000	953.000	894.000	981.000
rho	0.184	0.053	0.350	0.244	0.081	0.125	0.000	0.154
Chi-squared	548.339	134.826	713.135	10895.267	196.873	612.368	.	144.190
R-squared overall	0.239	0.122	0.285	0.269	0.359	0.241	0.035	0.064
R-squared between	0.282	0.180	0.310	0.294	0.383	0.420	0.057	0.145

Standard errors in parentheses, $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 14: Heckman two step estimator for selected countries (second stage estimates)–HS6 digits

	(1) Costa Rica	(2) Ghana	(3) Guatemala	(4) Honduras	(5) Jamaica	(6) Kenya	(7) Nigeria	(8) South Africa
AGOA product dummy		-0.626				1.180*	0.052	-0.038
		(0.444)				(0.516)	(0.145)	(0.075)
agoa×gsp product dummy								
CBTPA product dummy	0.425		0.366^{+}	0.819*	0.263			
	(0.277)		(0.188)	(0.378)	(0.718)			
cbtpa×gsp product dummy								
GSP product dummy	-0.541***	-0.184	0.140	0.667	-0.023	0.068	0.270	0.101
	(0.131)	(0.714)	(0.730)	(0.610)	(0.142)	(0.071)	(0.309)	(0.072)
CAFTA-DR	-0.036		-0.409***	-1.059***				
	(0.132)		(0.112)	(0.201)				
Country's RCA, lagged (log)	0.332*	-0.125	-0.038	-0.110	0.820***	0.036	-0.102**	-0.007
	(0.139)	(0.132)	(0.050)	(0.091)	(0.205)	(0.037)	(0.038)	(0.039)
Market size, USA.World (logs)	0.068*	-0.037^{+}	0.047**	-0.006	0.033	0.027***	0.002	0.008*
	(0.031)	(0.020)	(0.017)	(0.037)	(0.045)	(0.008)	(0.007)	(0.004)
agoa×year_2002		0.896				0.189	-0.069	0.002
		(0.720)				(0.684)	(0.047)	(0.065)
agoa×year_2003		1.075				0.251	-0.118*	-0.005
		(0.833)				(0.619)	(0.054)	(0.047)
agoa×year_2004		-0.096				-0.263		-0.192**
		(0.686)				(0.711)		(0.060)
agoa×year_2005		-0.765				-0.162	0.028	-0.337***
		(0.656)				(0.664)	(0.054)	(0.068)
agoa×year_2006		-0.133				-0.467		-0.400***
		(0.678)				(0.676)		(0.073)
agoa×year_2007		0.146				-0.590	0.015	-0.450***
		(0.590)				(0.718)	(0.064)	(0.074)
agoa×year_2008		-0.598				-0.733		-0.340***
		(0.508)				(0.791)		(0.097)
agoa×year_2009		-0.535				-0.325		-0.453***
		(0.578)				(0.781)		(0.076)
cbtpa×year_2001	-0.005		0.005	-0.136	-0.014			
	(0.361)		(0.230)	(0.454)	(0.725)			
cbtpa×year_2002	0.075		-0.141	-0.349	0.118			
	(0.377)		(0.228)	(0.412)	(0.678)			
cbtpa×year_2003	0.185		-0.425^{+}	-0.814^{+}	0.007			
	(0.362)		(0.235)	(0.427)	(0.805)			
cbtpa×year_2004	0.075		-0.593**	-0.537	0.445			
	(0.336)		(0.224)	(0.396)	(0.822)			
cbtpa×year_2005	-0.170		-0.841***	-1.021*	0.233			
	(0.341)		(0.225)	(0.398)	(0.879)			
cbtpa×year_2006	-0.115		-0.835**	-1.847***	1.111			
	(0.350)		(0.254)	(0.405)	(0.894)			
cbtpa×year_2007	-0.008		-1.042***	-1.521***	-1.448			
	(0.363)		(0.225)	(0.417)	(0.967)			
cbtpa×year_2008	-0.368		-1.146***	-1.542***	-0.297			
	(0.368)		(0.221)	(0.390)	(1.103)			
cbtpa×year_2009	-0.753*		-1.344***	-1.724***	-0.415			
	(0.347)		(0.242)	(0.397)	(1.044)			
1st stage residuals	-13.491***	-7.494^{+}	-11.615***	-13.370***	-10.338***	-9.173***	-7.039*	-5.199*
	(1.569)	(4.215)	(1.216)	(1.416)	(1.733)	(1.280)	(3.103)	(2.540)
Constant	9.755***	6.479*	8.468***	10.570***	7.879***	7.028***	5.713*	3.523*
	(1.045)	(3.137)	(0.765)	(0.965)	(1.238)	(0.945)	(2.404)	(1.680)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5974	3748	8662	5896	2891	8384	6127	12778
R^2	0.136	0.027	0.090	0.135	0.242	0.062	0.017	0.041
Adjusted R^2	0.132	0.021	0.087	0.131	0.235	0.059	0.014	0.039
Clusters	797.000	706.000	917.000	807.000	550.000	953.000	894.000	981.000
rho	0.436	0.396	0.545	0.476	0.381	0.376	0.194	0.322
F-Test	10.604	1.920	9.906	.	5.885	.	.	4.650
R-squared overall	0.180	0.005	0.183	0.169	0.348	0.130	0.017	0.005
R-squared between	0.212	0.082	0.177	0.162	0.339	0.197	0.008	0.000

Standard errors in parentheses, $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. 1st stage results not reported here.