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THE COSTS OF RULES OF ORIGIN IN APPAREL:
African preferential exports to the United States and the European Union

by

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ABSTRACT

The European Union and the United States offer, simultaneously, preferential market access to exports of a group of African countries. Although similar regarding the extent of preferences for apparel, a key sector for least developed countries, these agreements differ as regards rules of origin (RoO). While the Everything But Arms initiative and the Cotonou Agreement require yarn to be woven into fabric and then made up into apparel in the same country or in a country qualifying for cumulation, the African Growth and Opportunity Act (AGOA) grants a special regime to "lesser developed countries", which allows them to use fabric of any origin and still meet the criteria for preferences, thus making a case for a natural experiment. This paper aims to assess econometrically the impact of different RoO on those African countries' exports. The main finding is that relaxing RoO by allowing the use of fabric of any origin increased exports of apparel by about 300 per cent for the top seven beneficiaries of AGOA's special regime, and broadened the range of apparel exported by those countries.

Key words: rules of origin, regional integration, African Growth and Opportunity Act, Everything But Arms, African, Caribbean and Pacific, African least developed countries.

JEL Classification: F12, F13, F15.

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CONTENTS

List of Figures

List of Tables

1. Introduction

A group of sub-Saharan African countries, mostly least developing countries (LDCs), has preferential market access to the United States under the African Growth Opportunity Act (AGOA) and to the European Union under either the Cotonou Agreement or the Everything But Arms (EBA) initiative. Those arrangements are examples of non-reciprocal preferential trade agreements (PTAs) in which Northern countries extend enhanced market access, at least temporarily, to developing countries in order to promote their integration into the world trade system and to contribute to their development.

Among sectors eligible for trade preferences under these agreements, the textile sector is a key one for many developing countries. Indeed, of all the stages in the production of clothing, apparel assembly is the one that is the most intensive in terms of low-skilled labour. Since the latter is relatively abundant in developing countries, they have a comparative advantage in engaging in low-wage-cost operations.

Although the extent of preferential access for apparel to the US market provided by AGOA is similar (measured by an average US most-favoured-nation tariff of 11.5 per cent in 2004) to the one provided by EU's preferential regimes (about 11.9 per cent in 2004), those agreements have different product-specific rules of origin (PSRO) that determine the criteria for entitlement of apparel to duty-free access under those preferences. RoO are economically justified in order to prevent trade deflection, or the re-export of foreign apparel purchased at a lower price while pretending it is produced in the country. At the same time, RoO are used as protectionist devices that increase the costs of production in the beneficiary country.

PSRO for apparel under EBA or under the Cotonou Agreement require a "double transformation" process in which yarn should be woven into fabric in the beneficiary country or in a country qualifying for cumulation under EU schemes, and then made-up into apparel in the beneficiary country (yarn→fabric→ apparel). In contrast, AGOA grants a Special

Rule (SR) for "lesser developed countries". It consents them to use third-country fabric and still meet the criteria for AGOA preferences; this means that African producers can purchase fabric from cheaper sources. Thus, under the SR, the PSRO for apparel consists of a "single transformation" requirement (fabric → apparel). As noted by Brenton and Özden (2005), a specific apparel product produced in a qualifying African country using third-country fabrics can gain preferential access to the US market but not to the EU market.

Compared with EBA and ACP provisions, the AGOA SR has altered the relative incentives of those sub-Saharan African (SSA) producers selling to the US and EU market by removing any restriction on the origin of fabric used to produce clothing. By the end of 2004, 22 African countries had qualified for the AGOA SR and at the same time benefited from EU preferential market access.

From an econometric point of view, this situation – where a group of African countries mainly export to two markets, enjoying a similar degree of preferential access, and are faced with different RoO regimes – characterizes an unusual natural experimental situation to isolate the effect of different RoO on the use of trade preferences.

By taking advantage of this natural experiment, this paper assesses econometrically the impact of the two different regimes of RoO on apparel exports by these African countries to the United States and to the European Union. To our knowledge, this paper is the first to do so. The main findings are that the relaxation of RoO by allowing the use of fabric of any origin increased apparel exports to the United States by about 300 per cent for the top seven African exporters of the group studied, and enlarged the range of exported apparel.

Section 2 of this paper describes the extent of the preferential market for African apparel exported to the EU market under EBA and the Cotonou Agreement, and to the US market under AGOA, as well as the respective RoO regimes. To facilitate our econometric estimates, section 3 develops a model in a monopolistic competition framework in which African producers sell to the United States and

to the European Union and abide by RoO when selling to the latter, thus causing a rise in production costs. Section 4 provides a brief description of the empirical methodology used, the data and the results. Section 5 sets out conclusions.

2. RoO, and EU and US preferential market access for African apparel

Since the empirical part of this paper covers the period from 1996 to 2004, this section will describe the evolution of market access and RoO for apparel under the EU and US schemes during that period.[1]

2.1. EU preferential agreements and apparel

GSP and EBA

In 1971, EU countries set up a preferential scheme for developing countries, known as the Generalized System of Preferences (GSP). Tariff reductions were granted under the GSP scheme for eligible goods, including apparel, from particular countries, subject to compliance with certain conditions stipulated by the EU, such as RoO, for benefiting from trade preferences.

RoO were defined in 1993 under the EU GSP scheme. They require that apparel be manufactured from yarn and sometimes wholly produced. Production from yarn entails a double transformation process in the beneficiary country, with the yarn being woven into fabric, which is then cut and made up into clothing.

In 1999, EU efforts to harmonize the RoO across the different PTAs were translated in a so-called single list of PSRO, which was applied in the EU's GSP scheme in July 2000.

The single list of PSRO provisions generalized the double transformation process to all apparel lines grouped under chapter 61 and 62 of the Harmonized System (HS) classification. For a few varieties of non-knitted apparel (CH-62), an alternative value content (VC) rule was applied, which allowed the use of non-originating fabric provided that its value did not exceed 40 per cent (or 47.5 per cent in a smaller number of lines) of the final product price. Thus, an exporter of non-knitted apparel designated for this alternative VC rule under preferences was able to choose between the double transformation rule or the less restrictive VC rule allowing a percentage of non-originating material that could be purchased from cheaper sources.

The EU GSP system also accepted bilateral cumulation[2] between the EU and a beneficiary country. Regional cumulation could also take place but only within three regional groupings – the Association of Southeast Asian Nations (ASEAN), the Central American Common Market (CACM) and the Andean Community – and not amongst African countries.[3]

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[1] RoO were defined in 1993 by Regulation (EEC) No. 2454/93. See appendix 3 for a synthesis of RoO for apparel under the different agreements described in this part and for an account of the legal texts defining them.

[2] Cumulation allows producers from a PTA to import non-originating materials from other member countries without the final product's originating status being affected. There are three types of cumulation rules: bilateral, diagonal and full cumulation. Bilateral cumulation applies to trade between two partners, allowing in country A to use inputs from country B without the final good's originating status being affected, provided that the inputs themselves originate in country B (i.e. they satisfy the area's RoOs). Under diagonal cumulation, producers can use materials originating in *any* member country of the PTA as if those materials originated in the country where the processing is undertaken. Finally, under full cumulation, all stages of processing or transformation of a product within the PTA can be counted as qualifying content regardless of whether the processing is sufficient to confer originating status on the materials themselves. For a description of the different EU cumulation schemes, see: ec.europa.eu/taxation_customs/customs/customs_duties/rules_origin/preferential/article_779_en.htm.

[3] In addition, regional cumulation was constrained by the requirement that the value added in the final stage of production exceeds the highest customs value of any of the inputs used from countries in the regional grouping.

As an extension of the EU GSP scheme, EBA was applicable from March 2001 to a group of 50 GSP-eligible countries, and provides duty-free access. It has the advantage of removing exceptions existing under the preceding GSP scheme and much of the resulting uncertainty in respect of market access. However, duty-free access for apparel to the EU market is based on similar criteria, with the same single list of PSRO and bilateral cumulation between beneficiary countries and the EU as in the previous GSP system.

Cotonou Agreement

The Cotonou agreement with African, Caribbean and Pacific (ACP) countries was signed on 23 June 2000. It is an extension to four previous agreements – the four Lomé Conventions – which lasted for 25 years. However, it is generally accepted that the ACP countries were unsuccessful in taking advantage of their preferential status. Indeed, the share of ACP non-oil exports in EU imports declined from 6.1 per cent to 2.9 per cent over the period 1975–1992.

Under the Cotonou Agreement, the provisions for PSRO for textiles and apparel (T&A) were also drawn from the "EU single list". However, while EBA or GSP limits cumulation to a bilateral basis involving a beneficiary country and the EU, the Cotonou Agreement authorizes full cumulation among African countries, so that regional fabrics can be used in the making of apparel without losing originating status. Therefore, countries eligible to ACP preferences that are also eligible for EBA, may, and indeed often do, prefer to continue exporting under the ACP regime, partly because of the more liberal cumulation scheme under the latter. Furthermore, the Cotonou Agreement attaches extensive conditions to potential cumulation with non-ACP countries, including South Africa.

2.2. US preferences for apparel: AGOA

On 18 May 2000, the African Growth and Opportunity Act was signed into law by the President of the United States as a means of contributing to development in Africa. It provided most developing countries with tariff-free access for important goods that were excluded by the standard US GSP programme, such as watches, footwear, handbags, luggage and work gloves, as well as apparel.[4] Currently, there are 37 countries eligible for trade preferences under AGOA.

RoO for apparel under AGOA were designed in the spirit of the triple transformation process for apparel prevailing under other US preferential trade agreements such as the North American Free Trade Agreement (NAFTA) and the Caribbean Basin Initiative (CBI). RoO require that all the intermediate stages take place either in a beneficiary country or in the United States. More precisely, AGOA provides quota-free and duty-free treatment for apparel assembled in one or more AGOA-eligible country from US fabrics, which in turn are made from US yarn. African apparel made from fabric produced in another beneficiary African country is tolerated provided that the fabric was made from US yarn and in an amount not exceeding an applicable percentage.[5]

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[4] The United States granted GSP treatment to some categories of handicraft textiles under the terms of an agreement guaranteeing certification that the items were handmade products of the exporting beneficiary. However, none of the textiles eligible to this "handicraft textiles arrangement" were classified under CH-61 or CH-62, which are the apparel articles examined in this paper.

[5] Initially, the applicable percentage was equal to 1.5 per cent of the aggregate square meter equivalents of all apparel articles imported into the United States in the preceding 12-month period for which data are available, beginning 1 October 2000, increased in each of the seven succeeding one-year periods by equal increments, so that for the period beginning 1 October 2007, the applicable percentage does not exceed 3.5 per cent. This applicable percentage has been "doubled" by an amendment to AGOA, known as AGOA II.

However, as mentioned in the introduction, a "Special Rule (SR) for Lesser Developed Countries" was set in order to relax standard RoO for apparel by granting duty-free access to the latter regardless of the origin of fabric used to produce it, and gave rise to a single-transformation requirement (fabric→ apparel).

The SR, which has been recently extended until 2015, was initially addressed to lesser developed countries, defined as having a gross domestic product (GDP) per capita lower than $1,500 in 1998, as measured by the World Bank. However, some countries with a higher level of GDP per capita were allowed to benefit from the SR, such as Botswana and Namibia, which were designated by an act amending some AGOA provisions in 2002 (known as AGOA II). After intensive efforts by its Government, Mauritius, another country with a higher GDP per capita, was granted the benefits of the SR in December 2004. As the period covered by this paper ends in 2004, Mauritius is not considered as a beneficiary of the SR since it was designated at the very end of that period and US apparel imports from it actually fell in 2004.

In order to benefit from the AGOA SR, countries must show that they "have in place an effective visa system to prevent illegal trans-shipment and use of counterfeit documentation, as well as effective enforcement and verification procedures" as defined by the US administration.

Apparel qualifying for the SR is also subject to the cap.[6] However, the cap is defined in terms of square metre equivalent, and not in monetary terms, a fact that may encourage the export of higher-quality apparel with more value. Furthermore, Olarreaga and Özden (2005) noted that the cap of 3 per cent of total US imports, increasing to 7 per cent over an eight-year period, is far from binding, since apparel exports under AGOA provisions are currently less than 1 per cent of total US imports in those sectors.

2.3. A natural experiment [7]

By the end of 2004, 22 countries benefited from the SR under AGOA. In addition, they benefited from preferential market access to the EU under the Cotonou Agreement, and 15 of them also qualified for EBA preferences. Since no additional preferences were granted for apparel from ACP countries under EBA, all of the 22 countries are on an equal footing for EU preferences on apparel.

While clothing assembled from fabric imported from outside the bloc or the EU is considered to originate under the AGOA SR and can be exported tariff-free to the United States, it is not recognized as originating under EU preferential schemes. This situation makes it possible to control for the impact of the RoO on preferences while controlling for other factors such as market access extent and importers' revenue. Figure 2.1 depicts the evolution of the average EU and US most-favoured-nation (MFN) tariffs during the period covered in this paper. Both average tariffs declined slowly and the initially small difference between them has been reduced.

Table 2.1 lists the 22 countries that are simultaneously eligible to the SR under AGOA as well as the Cotonou Agreement or EBA, ranked by decreasing order of total exports to the United States and European Union in 2004. The first columns show the volumes of their exports to the European Union and the United States, and the last column shows the starting date for special apparel provision, which varies from country to country.

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[6] The cap previously explained applies. In the case of Mauritius, it is limited to only 5 per cent of the SR cap, about 27 million square metre equivalents (SMEs).
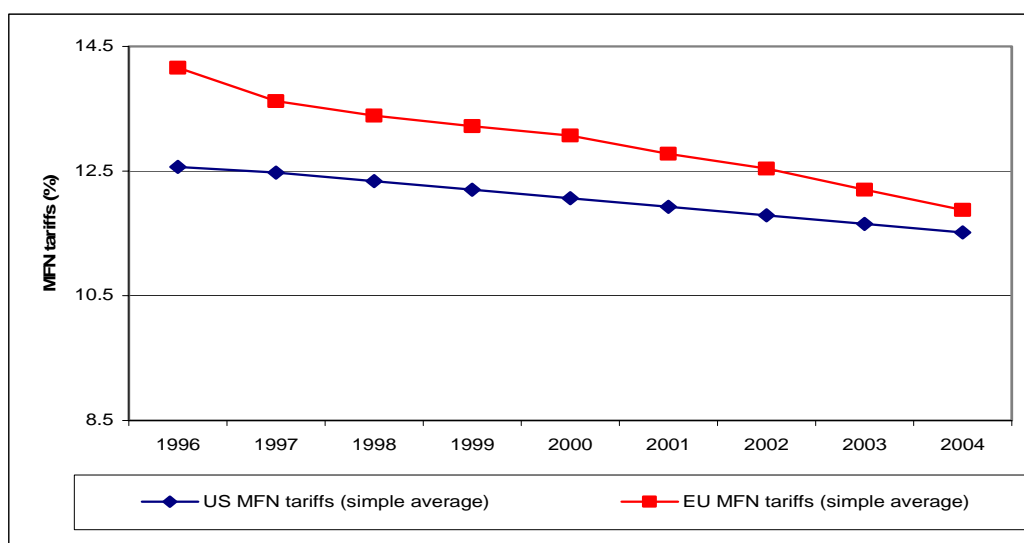
[7] For a discussion of natural and quasi-experiments in economics, see for instance, Meyer (1995).

Figure 2.1. US and EU MFN average tariffs

Source: Author's calculations based on data from the WTO Integrated Data Base.

Table 2.1. Countries benefiting from the AGOA SR in 2004

|		Exports to the EU in 2004 [000 $]		Exports to the US in 2004 [000 $]		AGOA Apparel provision date
		(1 000 $)	Share (%)	(1 000 $)	Share (%)	
1	Madagascar	179 732.01	85.77	323 323	23.34	Mar-01
2	Lesotho	1 049.13	0.50	455 935	32.92	Apr-01
3	Kenya	3 225.09	1.54	277 173	20.01	Jan-01
4	Swaziland	1 102.20	0.53	178 603	12.90	Jul-01
5	Namibia	97.39	0.05	78 654	5.68	Dec-01
6	Botswana	12 596.03	6.01	20 252	1.46	Aug-01
7	Malawi	122.66	0.06	26 775	1.93	Aug-01
8	Cape Verde	5 097.78	2.43	3 005	0.22	Aug-02
9	Ghana	139.43	0.07	7 368	0.53	Mar-02
10	United Republic of Tanzania	3 779.38	1.80	2 546	0.18	Feb-02
11	Ethiopia	708.86	0.34	3 335	0.24	Aug-01
12	Uganda	4.29	0.00	4 009	0.29	Oct-01
13	Mozambique	174.27	0.08	2 233	0.16	Feb-02
14	Sierra Leone	787.56	0.38	1 477	0.11	Apr-04
15	Cameroon	353.53	0.17	230	0.02	Mar-02
16	Senegal	356.48	0.17	11	0.00	Apr-02
17	Nigeria	87.12	0.04	76	0.01	Jul-04
18	Mali	55.24	0.03	12	0.00	Dec-03
19	Niger	58.69	0.03	6	0.00	Dec-03
20	Zambia	4.94	0.00	28	0.00	Dec-01
21	Benin	18.29	0.01	2	0.00	Jan-04
22	Rwanda	4.94	0.00	1	0.00	Mar-03
	TOTAL	209 555	100	1 385 053	100	

Note: Countries ranked by decreasing order of total apparel exports to the United States and the European Union.

Data on utilization rates show high rates of utilization of preferences when exporting to the European Union under EBA or Cotonou Agreement, and when importing to the United States under AGOA. Indeed, utilization rates of preferences for apparel imported by the 22 countries were 97.4 per cent for AGOA and 91.2 per cent for EBA or the Cotonou Agreement.[8] In spite of high utilization rates under EU and US schemes, export volumes evolved quite differently.

Figure 2.2 shows the evolution of volumes of exports to the United States and the European Union from the 22 countries benefiting from simple transformation rule under the AGOA SR. Prior to 2000, the pattern of African apparel exports to the United States and the European Union was the same. Thereafter, apparel exports to the United States increased substantially, with the change in the growth pattern coinciding with the entry into force of AGOA in 2000. By contrast, the value of exports to the EU of this same group of countries stayed relatively flat from 1996 until 2000 and then declined, mainly because of the political crises in Madagascar, the largest exporter to the EU, at the end of 2001, which

Figure 2.2. Apparel exports of 22 countries benefiting from the AGOA SR, as at 2004
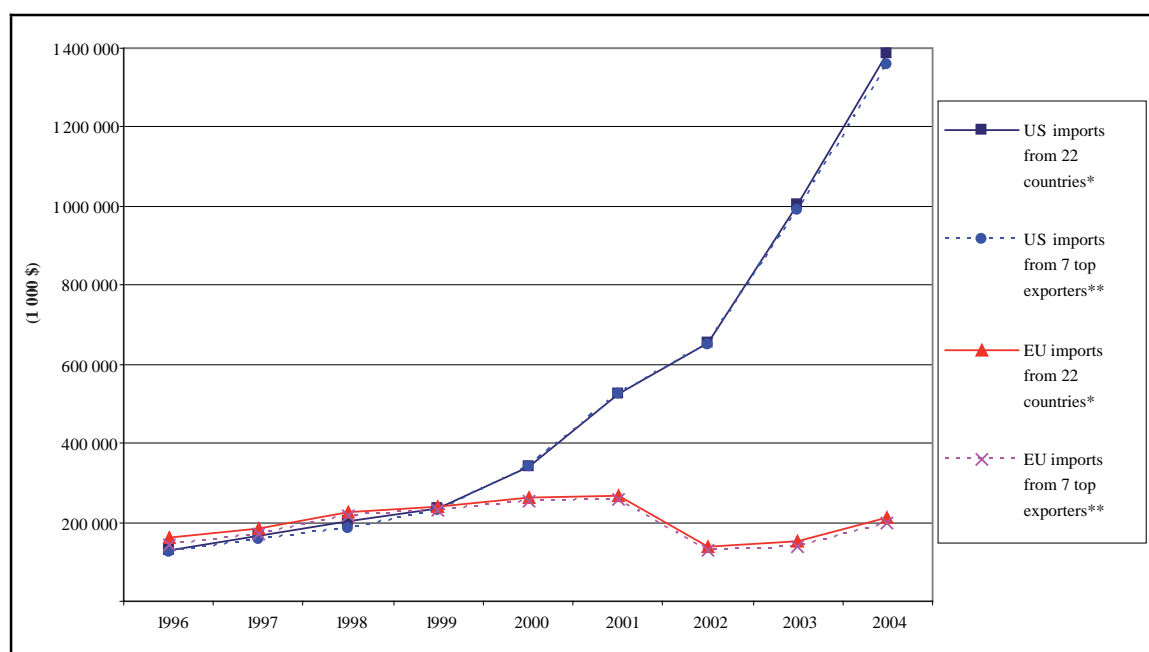
Source: Author's calculations based on data from the WTO Integrated Data Base.

* The 22 sub-Saharan countries benefiting from the AGOA SR as at 2004, as well as from the Cotonou Agreement, are Benin, Botswana, Cameroon, Cape Verde, Ethiopia, Ghana, Kenya, Lesotho, Madagascar, Malawi, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Swaziland, Uganda, the United Republic of Tanzania and Zambia.
** The top 7 exporters are Botswana, Kenya, Lesotho, Madagascar, Malawi, Namibia and Swaziland..

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[8] A utilization rate of preferences is defined as the percentage of imports entering a country on a preferential basis with respect to total imports. The figure for utilization rates for EU preferences in 2004 was obtained from Eurostat. Utilization rates for US preferential schemes can be more easily obtained since the United States International Trade Commission collects and makes available the programme under which imports enter the United States.

caused that country's exports to decrease. Madagascar's exports total 85 per cent of the group's apparel exports to the EU, as shown in the last column of table 2.1.

After elections in Madagascar in 2001, the incumbent president, Didier Ratsiraka, refused to hand over power to his rival, Marc Ravalomanana, even after an official recount had confirmed the latter as the winner of the

election. This resulted in a political deadlock that lasted for many months, after violent clashes between rival supporters and a blockade of the capital. The *Financial Times* reported that "the blockade led to severe petrol shortages and the collapse of the fast-growing textile industry with the loss of about 150,000 jobs. Textile companies warned that orders from European and US clothing retailers had dried up".[9]

Madagascar accounts for 27 per cent of the observations in the reduced sample, and the consequences in terms of export losses from 2002 can be seen in figure 2.3, which shows US apparel imports from Madagascar as well as from the other six main exporters. To take into account this negative shock in Madagascar's exports in our estimates, we define a dummy variable that controls for apparel exports reduction in 2002, as will be explained in section 4.

The differential pattern of exports to the United States and the European Union is striking, given that African apparel exports complying with ROO had duty-free access to the EU during the whole period under GSP or ACP agreements, whereas preferential access to the US market for apparel was granted only from 2000 under AGOA. The central role of RoO, which is easily seen when summing up exports, will later be assessed econometrically at a fairly disaggregated level.

Not all countries seem to have fully benefited from enhanced market access to the United States and the leniency of RoO granted by the SR. Among countries qualifying for the AGOA SR, seven accounted for the overwhelming majority of exports during the period in question, as seen in figure 2.2. They are Botswana, Kenya, Lesotho, Madagascar, Malawi, Namibia and Swaziland. Each exported apparel to the United States worth at least $10 million in 2004, and their exports accounted for 97.7 per cent of apparel exports to the United States and the European Union from the 22 countries benefiting from the SR in 2004. Even among the seven countries, the volume of exports to the US is different, as seen in figure 2.3.

Figure 2.3. US apparel imports from top seven exporters
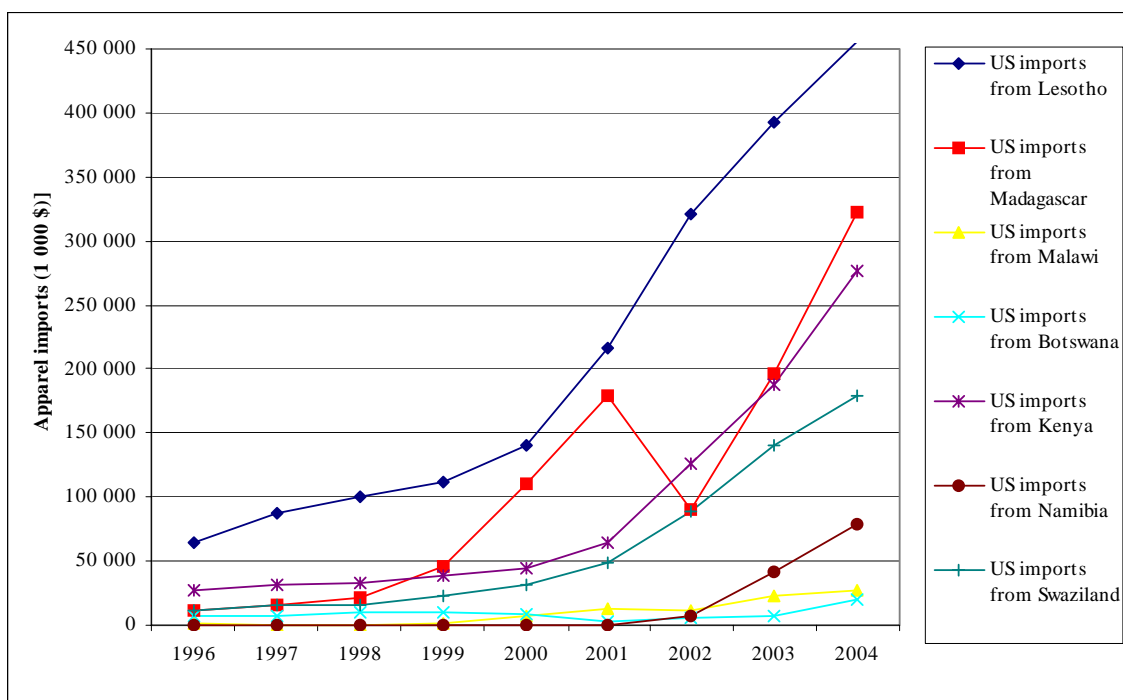
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[9] Madagascar set for national unity government, *Financial Times*, 17 June 2002.

Apparel products are divided into two main categories: knitted (CH-61) and non-knitted (CH-62).[10] The EU imports more knitted apparel than non-knitted. This pattern is in line with Brenton and Özden's (2005) claim that RoO are more costly for non-knitted apparel than for knitted apparel since they imply that fabric has to come from either the EU or from another beneficiary country, as happens with the double transformation rule under EU schemes, whereas for knitted items this rule is less costly to satisfy since there is typically no fabric involved.

After AGOA entered into force, exports of knitted apparel to the United States exceeded exports of non-knitted apparel. A possible explanation is that machines for the former are less expensive than machines for the latter.

3. Model

A simple model will now be sketched out to show the effects of a RoO on costs and to facilitate the econometric estimates.

On the supply side, African apparel (X) is assembled by combining value added with intermediate good (fabric or textiles) using Leontief technology with an input–output coefficient, a_V: $X = \min\left\{ f(K,L);\ \dfrac{V}{a_V} \right\}$. Two types of fabric are distinguished according to their source, with textiles from each source considered a perfect substitute with textiles from the other source. First, V^{EU} represents fabric produced either domestically or imported from countries qualifying for cumulation under EU schemes at price p_V^{EU}. Second, V^* designates inputs imported from the rest of the world at price p_V^*. Let V denote the total quantity of intermediate used in the production of apparel, that is $V = V^{EU} + V^*$, since textiles are assumed to be perfect substitutes.

Let $\varphi(X)$ be the value-added cost function dual to the value added production function, $f(\ )$, and $\varphi'(X) \equiv d\varphi(X)/dX$, the corresponding marginal cost function.

Perfect substitutability of intermediates implies that in the absence of an origin requirement, producers will choose the cheapest source, as is the case under the special regime for "lesser developed countries" under AGOA. The marginal cost of apparel exported to the United States is:

$$MC_X^{US}(\ ) = \varphi'(X) + a_V \min\left\{ p_V^{EU}, p_V^* \right\} \quad (1.1)$$

To qualify for EU preferences under EBA or the Cotonou Agreement, African exporters have to use fabric qualifying for cumulation at least in proportion r, with binding RoO specifying a minimum value content r (for simplicity expressed here as a proportion of total intermediate use). When $p_V^* > p_V^{EU}$, then $V = V^{EU}$ and expression (1.1) also describes the marginal cost of apparel exported to the EU. But, when $p_V^{EU} > p_V^*$, the RoO becomes binding and the marginal cost of apparel qualifying for preferences under EBA or the Cotonou Agreement is expressed by:

$$MC_X^{EU}(\ ) = \varphi'(X) + a_V \left[r p_V^{EU} + (1-r) p_V^* \right] \quad (1.2)$$

Bearing in mind the small size of African producers, assume that price of textiles $\left(p_V^{EU}, p_V^* \right)$ is fixed. Therefore, MC_X^{US} is also constant and $MC_X^{EU}(r)$ is an increasing function of the content requirement r under EBA and ACP ($dMC_X^{EU}(r)/dr > 0$).

Let p^k be the internal price of African apparel in country k, $k \in K = \{EU, US\}$. Then, $p^k = \left(1 + t^{k,pref}\right) q^k$, where $t^{k,pref}$ is the tariff applied to African apparel by country k, and q^k is the border price (excluding tariff) of African apparel sold in market k.

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[10] Figure A.2.1 in appendix 2 shows US and EU imports of knitted and non-kintted apparel from the 22 beneficiaries of the AGOA SR.

On the demand side, a representative consumer prizing variety maximizes his utility function. Then, the demand function for African apparel in country k, X_D^k, can be thought as:

$$X_D^k \left(p^k, Y^k, P_w^k \right), \quad \text{with} \quad \partial X_D^k / \partial p^k < 0,$$

$\partial X_D^k / \partial Y^k > 0$, and $\partial X_D^k / \partial P_w^k > 0$ (1.3)

where Y^k is the income of country k; P_w^k is a market price index of apparel substitute to African apparel that is imported under the MFN regime from other countries, such as Asian imports that were also subject to quotas. Then, $P_w^k = \overline{P^*} \left(1 + t^{k,MFN} \right)$ with $\overline{P^*}$ being the composite border price of apparel imported on a non-preferential basis and subject to an MFN tariff $\left(t^{k,MFN} \right)$.

Profit-maximizing pricing for sellers of African apparel implies:

$$p^k \left(\; \right) + \frac{\partial p^k \left(\; \right)}{\partial X^k} \; X^k = \left(1 + t^{k,pref} \right) \; \left(MC_X^k \right).$$

(1.4)

where $p^k \left(\; \right)$ is the inverse demand function of country k.

Totally differentiating expression (1.4) leads to:

$$\frac{dX^k}{dY^k} > 0, \frac{dX^k}{dt^{k,pref}} < 0, \frac{dX^k}{dt^{k,MFN}} > 0,$$

for $k \in K = \left\{ EU, US \right\}$, and $\frac{dX^{EU}}{dr} < 0$ (1.5)

which establishes that a binding RoO (such as the double transformation rule) reduces export sales of EBA/ACP beneficiaries (see appendix 1 for the derivation).

Figure 3.1 illustrates the intuition behind those four results. Figure 3.1.a shows the effect of increasing the value content (VC) requirement, which increases costs and reduces the volume of African imports.

A positive revenue shock boosts demand for African apparel as well as the marginal revenue (MR) of African apparel sellers, and increases apparel imports in country k, as shown in figure 3.1.b. Granting preferential access to African exports can be translated as a reduction of the preferential tariff, $t^{k,pref}$, at which African imports complying with the VC requirement are subject, as illustrated in figure 3.1.c. Lower costs support higher imports of African apparel. Finally, figure 3.1.d illustrates the consequence of preference erosions caused by a reduction of MFN tariffs. Since substitutes to African apparel become cheaper, demand for African apparel shifts back, cutting the MR of apparel sellers and thus causing African imports to shrink.

Figure 3.1. The effects of:

p^k

$X_D^k \left(p^k, Y_A^k, P_w^k \right)$

$\left(1 + t_A^{k,pref} \right) MC_X^k \left(r_1 \right)$

$\left(r_1 > r_0 \right)$

$r \uparrow$

$\left(1 + t_A^{k,pref} \right) MC_X^k \left(r_0 \right)$

MR_1

$X_1^k \quad X_0^k \qquad X^k$
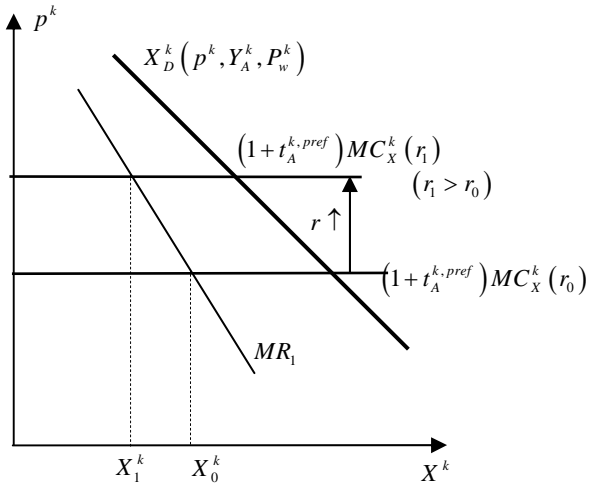
3.1.a) higher value content requirement

p^k

$X_D^k \left(p^k, Y_B^k, P_w^k \right)$

$\left(Y_B > Y_A \right)$

$Y^k \uparrow$

$Y^k \uparrow$

$\left(1 + t_A^{k,pref} \right) MC_X^k \left(r_0 \right)$

$MR_A \quad MR_B$

$X_D^k \left(p^k, Y_A^k, P_w^k \right)$

$X_A^k \quad X_B^k \qquad X^k$

3.1.b) positive revenue shock

p^k

$X_D^k \left(p^k, Y_A^k, P_w^k \right)$

$\left(1 + t_A^{k,pref} \right) MC_X^k \left(r_0 \right)$

$t^{k,pref} \downarrow$

$\left(1 + t_C^{k,pref} \right) MC_X^k \left(r_0 \right)$

$\left(t_C^{k,pref} < t_A^{k,pref} \right)$

MR_1
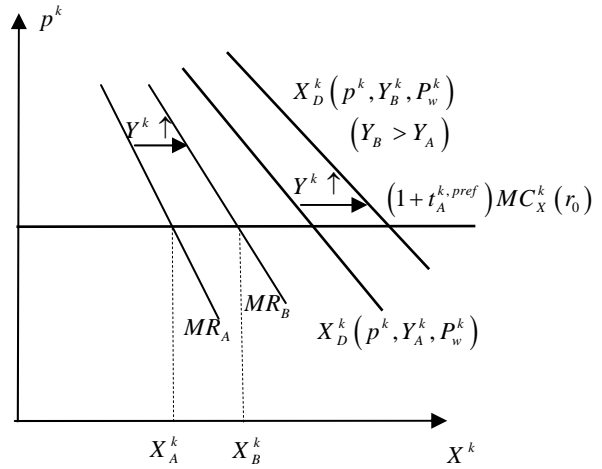
$X_A^k \quad X_C^k \qquad X^k$
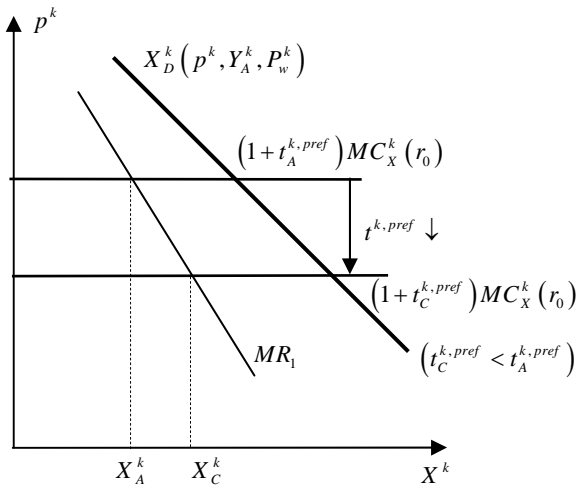
3.1.c) higher preferential margins

p^k

$t^{k,MFN} \downarrow$

$X_D^k \left(p^k, Y_A^k, \overline{P^*} \left(1 + t_A^{k,MFN} \right) \right)$

MR_D

$\left(1 + t_A^{k,pref} \right) MC_X^k \left(r_0 \right)$

MR_A

$t^{k,MFN} \downarrow$

$X_D^k \left(p^k, Y_A^k, \overline{P^*} \left(1 + t_D^{k,MFN} \right) \right)$

$\left(t_D^{k,MFN} < t_A^{k,MFN} \right)$

$X_D^k \quad X_A^k \qquad X^k$
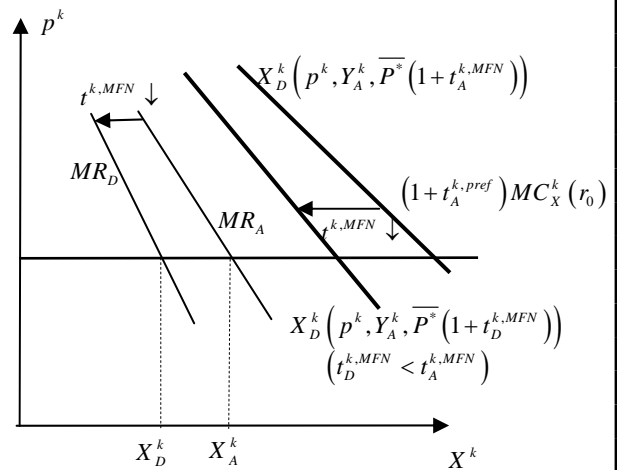
3.1.d) erosion of preferences due to
a reduction of the MFN tariff

4. Econometric evidence

On the basis of the results of the model above and assuming linear relationship, we estimate:

$$\ln\left(1 + X_{i,t}^{j,k}\right) = \beta_0 + \beta_1\left(R_{i,t}^{j,k}\right) + \beta_2\left(VC_{i,t}^{j,k}\right) + \beta_3\left(t_{i,t}^{k,mfn}\right) + \beta_4\left(t_{i,t}^{j,k,pref}\right)$$
$$+ \beta_5 \ln\left(Y_t^k\right) + \beta_6 D_i^{Madag-02} + \sum_{j\in J}\sum_{k\in K}\delta_{j,k}\left(D_i^j \times D_i^k\right) + \varepsilon_{i,t}^{j,k}$$

(1.6)

$j \in J = \{7(\text{or } 22) \text{ African exporters}\}$

$k \in K = \{EU, US\}\ t = 1996,...,2004$

$i \in (CH61\text{-}CH62)$

where :

- $X_{i,t}^{j,k}$ are exports of apparel variety i from African country j to country k (European Union or United States) in year t.

- $R_{i,t}^{j,k}$ is a dummy variable set equal to one if country j benefits from the AGOA SR, which allows textiles to be used from any source and still qualify for preferences $(k = US)$ in year $t(\geq 2000)$, and zero otherwise.

- $VC_{i,t}^{j,k}$ is a dummy variable taking the value one if non-knitted apparel (CH-62) of variety i is subject to an alternative (or optional) regional VC rule allowing apparel non-qualifying for cumulation, provided that its value does not exceed 40 per cent (or in some cases 47.5 per cent) of the product price in year $t(\geq 2000)$ when exporting on a preferential basis to the EU $(k = EU)$, and zero otherwise.

- $t_{i,t}^{k,mfn}$ is the MFN tariff applied on apparel product i by importer k in year t.

- $t_{i,t}^{j,k,pref}$ is the preferential tariff applied on apparel product i imported from j that benefits from country k's preferential regime when complying with RoO. Preferential tariffs are set equal to the MFN tariff prior to the implementation of a preferential agreement and set equal to zero once a

preferential regime is implemented.[11]

- Y_t^k is GDP of country k in year t.

- $D_i^j\left[D_i^k\right]$ is a dummy variable controlling for unobserved fixed effects by exporter j [importer k]

- $D_i^{Madag-02}$ is a dummy controlling for Madagascar's export loss in 2002 caused by its political crises, as explained before. It is equal to one when the exporter is Madagascar in t=2002, and zero otherwise.

- $\varepsilon_{i,t}^{j,k}$ is the error term.

We use a logarithmic transformation in the dependent variable equation (1.6) in order to avoid giving too much weight to apparel lines with large exports; however, the use of logarithms gives rise to a truncation problem for observations with zero-exports. To address this issue, we shift all export values by one dollar before applying the logarithmic transformation, which increases the mean of exports by one unit but does not affect its variance. In addition, tariff lines with zero exports are linked to zero values of the dependent variable $(\ln\left(1 + X_{i,t}^{j,k}\right))$ once the correction is made. Then, Tobit estimation appropriately accounts for the censorship of the dependent variable.

Notice that PSRO take the form of a regional value content in equation (1.4), whereas in specification (1.6) they are represented by two dummy variables. The first one, $R_{i,t}^{j,k}$, captures the presence of the "single transformation rule" under the SR introduced by AGOA. The second one, $VC_{i,t}^{j,k}$ is a dummy capturing the effect of an alternative VC requirement that is tolerated for some non-knitted apparel under EU preferential regimes that allow 40 per cent (or 47.5 per cent) of non-originating materials. This alternative rule adds

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[11] Since countries benefited from GSP preferences for apparel exports to the EU at the beginning of the period covered, preferential tariff for apparel exported to the EU is equal to zero for the whole period, whereas the United States grants preferential market access only to apparel exports under AGOA in 2000.

flexibility to the "double transformation rule" in EU preferential regimes, and was established under the GSP scheme in July 2000 and under the Cotonou Agreement in 2001.

Exporter and importer country-pair dummies $\left(D_i^j \times D_i^k \right)$ are added to the model to control for unobserved fixed effects specific to each pair of exporter-importer countries that potentially affect trade in apparel, such as the distance or a common language. Notice that export- or import-specific dummies cannot be added into the model because of multicollinearity.

According to (1.5), expected coefficient signs are: $\beta_1 > 0, \beta_2 > 0, \beta_3 > 0, \beta_4 < 0$ and $\beta_5 > 0$. For the dummy controlling Madagascar's export loss, we expect: $\beta_6 < 0$. To control for unobserved year-specific effects, time-dummies were added to the model. However, none of their coefficients were significant. Therefore, all time-dummies were taken away from all specifications.

Two other variables were not considered in the model as their coefficients were not statistically significant when included in the regressions: a dummy controlling for the difference between knitted (CH-61) and non-knitted apparel (CH-62) and an index of importer j's real exchage rate. For the former variable, figure A.2.1. shows that patterns of knitted and non-knitted apparel imports is similar.[12]

4.1. Data

Our panel covers 236 varieties of apparel exported to two destinations – the European Union and the United States – at the HS-6 data level in two samples: a full sample encompassing all 22 countries benefiting from the AGOA SR, and a reduced sample comprising only the seven larger exporters among them. We base our analysis mainly on the limited sample since the seven countries account for an overwhelming share of apparel exports. As robustness checks, estimates are also carried out on the full sample of 22 countries, most of which are reported in Appendix 3. For each African country, we include only apparel lines that have positive exports for at least one year to one of the destinations.

The estimation is carried out on a panel covering the period 1996–2004, which coincides with the removal of quotas upon the expiry of the Agreement on Textiles and Clothing (ATC) on 1 January 2005. Although the choice of the period was constrained by data availability, the episode is a convenient one since there is no need to control for the removal of quotas at the end of the ATC. In a post-ATC world, US and EU markets are expected to be flooded by apparel from larger exporters, such as China and India, that were previously bounded by quotas.[13]

Export data and tariff data were compiled from IDB-WTO and TRAINS/WITS at the HS-6 digit level of aggregation, the most disaggregated level for international comparison purposes. GDP is expressed in constant year 2000 dollars and was compiled from the World Development Indicators.

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[12] The latter variable was expected to capture the potential effect of the real exchange rate on African apparel imports demand, on the basis of the principle that a real exchange rate appreciation is expected to boost demand for imports. In that context, we did not find evidence that real exchange movements are related to the volume of African apparel imports. Moreover, one might have expected that an appreciation of the US dollar with respect of the euro could have contributed to the rise in exports to the United States compared with exports to the European Union, as shown in figure 2.2. In reality, however, the US dollar depreciated steadily during that period, passing from 0.94 (dollar/euro) at the end of 2000, to 1.05 at the end of 2002 and to 1.36 at the end of 2004.

[13] After 2004, the US and EU share of apparel imported from China did not increase as expected since the EU and the US managed to retain barriers to imports from China.

Table 4.1. Descriptive statistics

Variable	Top 7 exporters (reduced sample)			All 22 countries (full sample)		
	Obs.	Mean	Std. dev.	Obs.	Mean	Std. dev.
$\ln\left(1+X_{i,t}^{j,k}\right)$	13 590	3.158	5.203	33 408	2.063	4.181
$\ln\left(1+X_{i,t}^{j,k}\right)$	13 590	12.660	4.208	33 408	12.470	4.097
$\ln\left(1+X_{i,t}^{j,k}\right)$	13 590	3.044	6.300	33 408	2.958	6.118
$VC_{i,t}^{j,k}$	13 590	0.072	0.259	33 408	0.083	0.276
$R_{i,t}^{j,k}$	13 590	0.200	0.400	33 408	0.161	0.368
$\ln\left(Y_t^k\right)$	13 590	29.790	0.122	33 408	29.790	0.122

The starting date of effective eligibility for the special clothing provision, which varies from beneficiary to beneficiary, was not usually set on 1 January of a given year over the period 2001-2004, as shown previously in table 2.1. Given that trade data are collected on an annual basis, we set the dummy $R_{i,t}^{j,k}$ equal to one for the first year if country j has benefited from eligibility to benefits of the apparel provision for more than four months.[14] For instance, Botswana and Malawi were eligible from August 2001, then the dummy is set equal to one for t=2001 and evidently for successive years ($t \geq 2002$).

Descriptive statistics are shown in table 4.1 for the reduced sample and for the full sample.

4.2. Results

As the dependent variable involves either positive or zero numbers, the econometric specification is set up as a Tobit model, which takes into account its censored nature. In that context, the estimated coefficients of a Tobit model are not interpretable from a pure economic point of view, since they are merely the effect of the independent variables on the "latent" dependent variable underlying the Tobit model. We report two types of marginal effects. First, the marginal effect on the "unconditional expected value" (labelled *Uncond.*) is interpreted as the effect of a marginal change in an independent variable (or a one-unit change in a dummy) on the expected value of the dependent variable, taking into account the fact that some observations have zero exports. Since the dependent variable is $\ln\left(1+X_{i,t}^{j,k}\right)$, unconditional marginal effects (when small) can be approximated to a percentage change of exports due to a marginal change in an independent variable. Second, the effect on the "probability of uncensored variable" (labelled *Prob uncens.)* indicates how the probability of observing an uncensored dependent variable or (equivalently in this context) observing strictly positive exports is modified following a marginal change in an independent variable (or a one-unit change in a dummy). The overall fit for the models summarized in the likelihood-ratio values and the McKelvey and Zavoina pseudo-R^2 values (at the bottom of the table) is reasonable.[15]

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[14] Estimates do not vary substantially when choosing a different number of months to define $R_{i,t}^{j,k}$.

[15] There are many alternative pseudo-R^2 for Tobit models. The statistic reported is the McKelvey-Zavoina's pseudo-R^2, which according to Veall and

Table 4.2. Average effect of RoO

Dependent variable (Expected sign)	1 Coeff. 1a	1 Marginal effects Uncond.[a] 1b	1 Marginal effects Prob. uncens. 1c	2 Coeff. 2a	2 Marginal effects Uncond.[a] 2b	2 Marginal effects Prob. uncens. 2c	3 Coeff. 3a	3 Marginal effects Uncond. 3b	3 Marginal effects Prob. uncens. 3c
$R_{i,t}^{j,k}$ (>0)	4.75	1.39	0.13	6.69	1.6	0.14	3.18	0.67	0.07
	[0.56]***	[0.13]***	[0.01]***	[0.78]***	[0.13]***	[0.01]***	[0.39]***	[0.07]***	[0.01]***
$VC_{i,t}^{j,k}$ (>0)	1.78	0.45	0.05	0.84	0.15	0.02	2.18	0.44	0.05
	[0.57]***	[0.13]***	[0.01]***	[0.85]	[0.15]	[0.02]	[0.36]***	[0.06]***	[0.01]***
$t_{i,t}^{k,mfn}$ (>0)	0.24	0.06	0.01	0.32	0.05	0.01	0.09	0.02	0
	[0.04]***	[0.01]***	[0.00]***	[0.05]***	[0.01]***	[0.00]***	[0.03]***	[0.00]***	[0.00]***
$t_{i,t}^{j,k,pref}$ (<0)	-0.25	-0.06	-0.01	-0.19	-0.03	0	-0.15	-0.03	0
	[0.04]***	[0.01]***	[0.00]***	[0.05]***	[0.01]***	[0.00]***	[0.03]***	[0.00]***	[0.00]***
$\ln\left(Y_t^k\right)$ (>0)	13.43	3.09	0.33	13.85	2.37	0.25	13.57	2.38	0.28
	[2.79]***	[0.64]***	[0.07]***	[4.07]***	[0.70]***	[0.07]***	[1.93]***	[0.34]***	[0.04]***
$D_i^{Madag-02}$ (<0)	-1.67	-0.35	-0.04				-1.13	-0.19	-0.02
	[0.73]**	[0.17]**	[0.02]**				[0.73]	[0.13]	[0.02]
Observations	13 590			9 810			33 408		
Pseudo-R$^{2\,b}$	0.238			0.166			0.184		
Likelihood ratio[c]	2 490.54 (0)			1 060.26 (0)			4 149.17 (0)		
Sample	Top 7			Top 7 exc. Madagascar			All 22 AGOA SR		
Country-pair dummies	Yes			Yes			Yes		
$e^{\left(Uncond.R_{i,t}^{j,k}\right)}-1$	3.03			3.96			0.96		

Note:
[a] Unconditional marginal effects are evaluated at the sample mean value for t = 1999.
[b] McKelvey and Zavoina's pseudo-R^2.
[c] The reported likelihood ratio follows a chi-squared distribution with a number of degrees of freedom equal to the number of independent variables. The p-value of this statistic is reported in brackets.

Estimates include a constant that is not reported here.
Standard errors in brackets: ** significant at 5%; *** significant at 1%.

The last row of table 4.2 reports the value of ($e^{\left(Uncond\left(R_{i,t}^{j,k}\right)\right)}-1$) for each specification, which is a transformation that provides a better approximation of the

percentage change of exports due to the SR (a unit-change of $R_{i,t}^{j,k}$), when $Uncond.R_{i,t}^{j,k}$ is big.[16]

Zimmermann (1996) performs the best in Tobit models even compared with the widely used McFadden pseudo-R^2.

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[16] Both types of marginal effects (*Uncond.* and *Prob. uncens.*) can be expressed as the product of the estimated coefficient and a positive "correction term" specific to each type. In table 4.2, "a" columns report the estimated coefficient, and the

Columns 1a to 1c report estimates for equation (1.6) (specification 1). All coefficient signs are as expected. The same applies to other specifications in table 4.2. In specification 1, as shown at the bottom of column 1b, the elimination of the restriction on the origin of fabric by the SR is associated with an increase of exports by a factor of 3.03 (= 303 per cent) when correcting the unconditional marginal effect to provide a better approximation of the relative increase in exports.[17] [18]

Concerning tariff rates, since its unconditional marginal effects are small, a 1 per cent decrease in the MFN tariff, $t_{i,t}^{k,mfn}$, is associated with a decrease in African apparel exports of about 6 per cent, ceteris paribus. Symmetrically, a percentage point decrease in preferential tariffs $t_{i,t}^{k,pref}$ is related to a 6 per cent increase in exports. The high responsiveness of apparel imports to a change in tariffs can be attributed to the high protection prevalent in the apparel sector in the European Union and in the United States and to the huge rents involved.

The marginal effect of $\ln(Y)$ on the expected value of $\ln\left(1 + X_{i,t}^{j,k}\right)$ can be

interpreted as an income elasticity of the demand for African apparel imports. In specification 1, this elasticity is equal to 3,09.

The presence of an alternative VC requirement for some non-knitted apparel (CH62) is associated with an increase of more than 45 per cent in exports in those lines. Not surprisingly, easing-up the EU double transformation rule by allowing just a percentage of non-qualifying fabric is associated with an increase in exports smaller than that associated with simply removing restrictions on the origin of fabric, as under the AGOA SR. Madagascar's export loss in 2002 due to its political crises is about 35 per cent, as captured by the unconditional marginal effect of $D_i^{Madag-02}$.[19]

The theoretical model in section 4 describes the effect of different variables on the volume of exports, and not on the range of exports. To observe how export diversification occurs, data available at the firm level or the plant level is required. However, the change in the probability of having positive exports induced by a change in a regressor can be computed at the tariff line with the Tobit model without additional data. "C" columns in table 4.2 report those marginal effects (labelled *Prob. uncens.*)

As shown in column 1c, there is a 13 per cent greater probability of having positive exports on tariff lines benefiting from the SR induced by $R_{i,t}^{j,k}$. This can be interpreted as evidence of the role of the SR regarding export growth at the extensive margin (i.e. a greater probability of exporting varieties that would not be exported in the absence of the SR). Indeed, easing-up RoO cuts down exports costs under preferential arrangements, and this creates an incentive to export diversification.

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marginal effects are reported in columns b and c. Each type of "correction term" is a function of the values set for all independent variables (here evaluated at 1999, the year before the SR went into effect). Moreover, both types of "correction terms" are situated between zero and one, that fact implying that the estimated coefficient in column a is the upper bound of the marginal effects given at the bottom of the table (i.e. 475 per cent versus 303 per cent for specification 1).

[17]   When the natural experiment is restricted to US imports before and after AGOA by reducing the sample only to African exports to the United States, the marginal effect of the SR does not change significantly, increasing slightly to 323 per cent (not reported here).

[18]   To check whether $R_{i,t}^{j,k}$ is well-specified, we define two other SR dummies for all countries by supposing that the SR started one year after the baseline year at which the original $R_{i,t}^{j,k}$ was defined, as well as one year before it. When $R_{i,t}^{j,k}$ was replaced by these "misspecified" dummies, the estimated pseudo-R^2 were indeed smaller.

[19] Dummies controlling for additional Madagascar export loss in successive years are excluded, since their coefficients are not significant.

Figure 5.1. Variety of apparel exported by the six largest exporters to the United States
(vertical axis: number of tariff lines with positive exports)
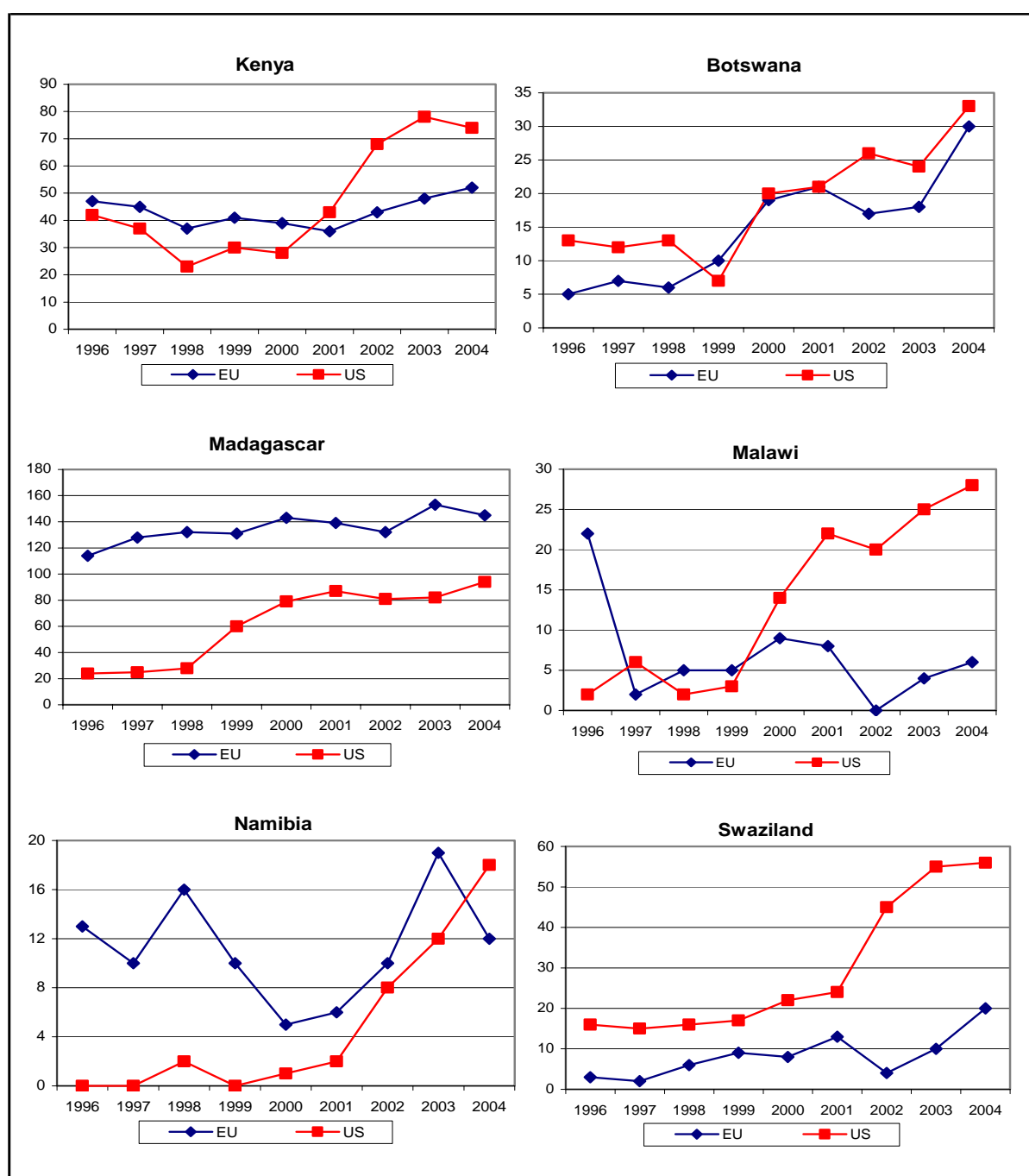
Source: Author's calculations based on data from the WTO Integrated Data Base.

These results are confirmed in figure 5.1, which shows the evolution of the number of tariff lines with positive exports from Kenya, Lesotho, Madagascar and Swaziland, which are the four major exporters in the bloc. With the exception of Madagascar, all countries export more varieties of apparel to the United States than to the European Union at the end of the period. The range of apparel exported to the United States increased faster than the range exported to the European Union after 2000, the year in which AGOA entered into force, even for Madagascar.[20]

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[20] Since data are used at the HS-6 level of aggregation, the most disaggregated level for the purpose of international comparison, new varieties exported are not detected at more disaggregated levels, say at the HS-8, when at least one variety from the same HS-6 category was already exported.

Compared with the exports of other African exporters, Madagascar's exports follow a different pattern due to its political crisis in 2002, as seen in figure 2.3. Since Madagascar is the largest exporter of apparel in our group and accounts for about a third of all observations in the reduced sample, we remove Madagascar from the sample to estimate specification 2, so as to compare those estimates with the previous ones. For subsequent estimates, the discussion is mainly focused on variables related to RoO and their unconditional marginal effects, as other estimates do not diverge substantially across specifications.

The effect of the SR on expected exports goes up to a 3.96 factor (= 396 per cent), as shown in last row of column 2b. Indeed, removal of Madagascar from the sample makes it appear that other exporters have benefited relatively more from AGOA SR. On the other hand, the effect of the alternative VC requirement on exports to the European Union decreases and is no longer significant. This result is consistent with the fact that Madagascar is by far the largest exporter to the European Union, and a main beneficiary of the flexibility provided by the alternative VC requirement under EU preferences.

In specification 3, we consider the whole sample of 22 countries eligible for the SR (columns 3a, 3b and 3c). Here, the export growth rate due to the SR decreases to 0.96 (= 96 per cent). As expected, this figure, which represents the "average" effect of the special provision on apparel is lower than in previous specifications, since countries not managing to increase exports significantly were included in the sample, even if they were made eligible for the AGOA SR.[21] The marginal effect of $\ln(Y)$ is now equal to 2.37, a more plausible value that do not vary greatly in next specifications.

To estimate how the effects of AGOA SR on exports evolve every year in which a beneficiary country benefits from the special programme, we include in specification (1.6) three additional dummy variables ($R2_{i,t}^{j,k}$, $R3_{i,t}^{j,k}$

and $R4_{i,t}^{j,k}$) that capture the supplementary or cumulative effects on exports of an additional year of benefiting from the SR. $R2_{i,t}^{j,k}$ is equal to one if country j is *at least* in the *second year* after being entitled to the SR programme (which includes the third and fourth years), and zero if not. Likewise, $R3_{i,t}^{j,k}$ is unit if country *j* is *at least* in the *third year* of the SR programme (including the fourth year), and zero otherwise. The same applies to $R4_{i,t}^{j,k}$. Then, the coefficient of $R_{i,t}^{j,k}$ no longer captures the average effect of the SR on exports, but only the effect on exports of being in the first year of the programme, so that the coefficient of $R2_{i,t}^{j,k}$ captures the additional or cumulative effect of the SR on exports in the second year of the programme, the coefficient of $R3_{i,t}^{j,k}$ captures the cumulative effect on exports after the third year, and the coefficient of $R4_{i,t}^{j,k}$ captures the cumulative effect after the fourth year.

Since the beginning of eligibility for clothing provisions is usually not set in January, we consider that a country is in its first year in the special regime for apparel if it has been designed as such at latest in August of a given year, as for the definition of $R_{i,t}^{j,k}$. Setting a different month for defining the first year of eligibility does not significantly change the results. It should be borne in mind that some countries did not reach the fourth year under the SR programme in 2004, the last year of our panel.

Columns 4a, 4b and 4c in table 4.3 show the estimates carried out on the reduced sample of the seven exporters. Instead of the marginal effect on the probability of being uncensored, column 5c reports the approximate export growth rates computed from the marginal effects of the dummies dealing with RoO.[22] Estimates show a positive change in the export growth rate during the first three years,

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[21] Estimates of subsequent specifications were made on the reduced sample of top seven exporters, as results do not change substantially when carried out on the full sample of 22 countries.

[22] In next estimates the "probabilities of uncensored variable" are no longer reported.

Table 4.3. Estimation results: Temporal effects of RoO

	4			5		
	Coeff.	**Marginal effects**		**Coeff.**	**Marginal effects**	
		Uncond.[a]	$e^{(Uncond.R)}-1$		**Uncond.[a]**	$e^{(Uncond.R)}-1$
	4a	**4b**	**4c**	**5a**	**5b**	**5c**
$R_{i,t}^{j,k}$	3.24	0.88	1.41	4.3	0.91	1.48
	[0.70]***	[0.16]***		[0.96]***	[0.16]***	
$R2_{i,t}^{j,k}$	1.91	0.48	0.62	2.78	0.54	0.72
	[0.78]**	[0.18]***		[1.03]***	[0.17]***	
$R3_{i,t}^{j,k}$	0.75	0.18	0.20	1.9	0.35	0.42
	[0.77]	[0.18]		[1.00]*	[0.17]**	
$R4_{i,t}^{j,k}$	-0.02	0	0	0.18	0.03	0.03
	[0.84]	[0.19]		[1.26]	[0.21]	
$VC_{i,t}^{j,k}$	1.99	0.51		1.27	0.23	
	[0.57]***	[0.13]***		[0.85]	[0.14]	
$t_{i,t}^{k,mfn}$	0.25	0.06		0.33	0.06	
	[0.04]***	[0.01]***		[0.05]***	[0.01]***	
$t_{i,t}^{j,k,pref}$	-0.27	-0.06		-0.22	-0.04	
	[0.04]***	[0.01]***		[0.05]***	[0.01]***	
$\ln\left(Y_t^{\,k}\right)$	10.26	2.35		7.26	1.23	
	[2.97]***	[0.68]***		[4.30]*	[0.73]*	
$D_i^{Madag-02}$	-1.71	-0.36				
	[0.77]**	[0.18]**				
Observations	13 590			9 810		
Pseudo R$^{2\,b}$	0.24			0.17		
Likelihood ratio^c	2 505.18 (0)			1 083.42 (0)		
Sample	Top 7			Top 7 exc. Madagascar		
Country-pair dummies	Yes			Yes		

Note:
[a] Unconditional marginal effects are evaluated at the sample mean value for t = 1999.
[b] McKelvey and Zavoina's pseudo-R^2.
[c] The reported likelihood ratio follows a chi-squared distribution with a number of degrees of freedom equal to the number of independent variables. The p-value of this statistic is reported in brackets.

Estimates include a constant that is not reported here.
Standard errors in brackets: *significant at 10%;   ** significant at 5%;   *** significant at 1%.

(although $R3_{i,t}^{j,k}$ is not significant), and a negative and non-significant change for the last year. The greatest change in export growth is registered during the first year. This is evidence that preferential exports increased immediately after the implementation of the SR. According to corrected unconditional marginal effects reported in column 4c, exports increase on average by 140 per cent after the first year, and by 200 per cent (= 140 per cent + 60 per cent) after the second year.

When Madagascar is removed from the reduced sample (specification 5), the marginal effects of all SR coefficients increase slightly. All of them are now positive and the cumulative effect for the third year becomes significant. According to estimates, exports increase on average by 147 per cent after the first year, by 220 per cent (= 148 per cent + 72 per cent) after the second year and by 262 per cent (= 220 per cent + 42 per cent) after the third year. There is evidence of "dynamic learning effects" as export growth rates for countries benefiting from the SR continue to increase for at least the first three years of the programme. Again, VC is no longer significant once Madagascar has been removed from the sample.

Finally, the last two specifications (7 and 8) in table 4.4 seek to estimate the differentiated effect of SR provisions on exports across countries. In the original specification, $R_{i,t}^{j,k}$ is replaced by interaction terms between country-specific dummies and $R_{i,t}^{j,k}$. Specification 6 is carried out on the reduced sample of seven countries and Madagascar is removed when specification 7 is being estimated.

Table 4.4 reports only the estimates for RoO dummies since other coefficients have values similar to those in previous specifications. To ensure comparability of marginal effects across countries, the dependent variables are set equal to their mean values in 1999 for each country separately when the unconditional marginal effects related to that country are being computed. Columns 6b and 7b report the marginal effects for each country, whereas marginal effects per country are corrected in columns 6c and 7c. As seen from

estimates for the seven larger exporters, the effect of AGOA SR on exports is positive and significant for all seven countries. The effect of the SR on exports from Malawi and Namibia is found to be the greatest in both specifications, even if those countries are not the largest exporters in the sample. The reason is that, compared with other countries in the sample, those countries exported a small volume of apparel in 1999, the baseline for computing the marginal effects (see figure 2.3), so that a small increase in exports after AGOA appears to be greater in relative terms, the lower the volume of exports in the base line.

When Madagascar is taken out of the sample in specification 7, the marginal effects for the remaining countries are magnified, although the ranking of the relative importance of marginal effects across countries remains unchanged.[23]

As robustness checks, similar estimates have been carried out for all seven specifications, with a random effects Tobit model providing similar estimates. The same applies for marginal effects that have been evaluated by setting independent variables at different values. We also computed standard errors for all coefficients using the robust Hubert-White sandwich estimator to account for potential heteroskedasticity, and found their values to be similar to the ones appearing in our tables.

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[23] Since the VC is no longer significant when Madagascar is removed from the sample, it is removed from the last specification. However, when a country-specific decomposition of VC on the sample of seven exporters is carried out (in a way similar to that for the decomposition for the SR dummy), only VC coefficients for Madagascar and sometimes Botswana are positive and significant.

Table 4.4. Estimation results: RoO effects, by exporters

	6			7		
	Coeff.	**Marginal effects**		**Coeff.**	**Marginal effects**	
		Uncond.	$e^{(Uncond)}-1$		**Uncond.**	$e^{(Uncond)}-1$
	6a	**6b**	**6c**	**7a**	**7b**	**7c**
$D_i^{Bot} \times R_{i,t}^{j,k}$	2.52	0.55 [a]	0.73	3.67	0.83	1.29
	[1.29]*	[0.24]**		[1.52]**	[0.28]***	
$D_i^{Ken} \times R_{i,t}^{j,k}$	3.15	0.98 [a]	1.66	4.47	1.41	3.10
	[0.86]***	[0.23]***		[1.04]***	[0.27]***	
$D_i^{Les} \times R_{i,t}^{j,k}$	5.89	1.54 [a]	3.66	7.32	1.95	6.03
	[0.94]***	[0.18]***		[1.13]***	[0.21]***	
$D_i^{Mad} \times R_{i,t}^{j,k}$	3.94	1.86 [a]	5.42			
	[0.84]***	[0.34]***				
$D_i^{Mala} \times R_{i,t}^{j,k}$	9.9	3.6 [a]	7.94	12.08	2.76	14.80
	[1.59]***	[0.36]***		[1.87]***	[0.22]***	
$D_i^{Nam} \times R_{i,t}^{j,k}$	15.41	6.92 [a]	14.03	18.06	3.3	26.11
	[2.42]***	[0.54]***		[2.82]***	[0.15]***	
$D_i^{Swa} \times R_{i,t}^{j,k}$	6.41	1.3 [a]	2.67	8.2	1.72	4.58
	[1.13]***	[0.15]***		[1.35]***	[0.18]***	
$VC_{i,t}^{j,k}$	1.78	0.44 [b]	0.55			
	[0.57]***	[0.13]***				
Observations	13 590			9 810		
Pseudo R[2] [b]	0.24			0.19		
Likelihood ratio[c]	2 495.17 (0)			1 067.32 (0)		
Sample	Top 7			Top 7 excl. Madagascar		
Country-pair dummies	Yes			Yes		

Note:
[a] Unconditional marginal effects are evaluated at the country mean value for t = 1999.
[b] McKelvey and Zavoina's pseudo-R[2].
[c] The reported likelihood ratio follows a chi-squared distribution with a number of degrees of freedom equal to the number of independent variables. The p-value of this statistic is reported in brackets.

Estimates include constants and other dependent variables that are not reported here.
Standard errors in brackets: *significant at 10%;   ** significant at 5%;   *** significant at 1%.

5. Conclusions

This paper has quantified the effect on exports of relaxing RoO for apparel produced in sub-Saharan African countries, which consisted in the removal of restrictions on the origin of intermediates granted by the SR of AGOA. It comes to several conclusions. First, taking advantage of this quasi-natural experiment setting whereby exports from those countries to the European Union and the United States benefited approximately from the same preferential margin of 10 per cent in both markets under EBA and AGOA, and controlling for other factors, we found that AGOA SR increased apparel exports from the seven main exporters by about 300 per cent. None of the time-dummy coefficients were significant, a fact that suggests that the model is appropriate. This large effect is particularly noteworthy since an analysis based solely on the high utilization rates of preferences might erroneously conclude that the special ("double transformation") requirements in T&A had little effect.

Second, the detailed analysis at the product level revealed that less restrictive RoO are associated with an expansion of the range of exported apparel. Indeed, under preferential market access, more lenient RoO reduce costs for exporters and may encourage export diversification or export growth at the extensive margin. To our knowledge, this is the first research that has looked at the relationship between RoO and export diversification.

Third, the results suggest learning effects. With respect to the dynamic effects of AGOA SR, we found evidence that the uptake of preferences is gradual over time, taking place in the first three years during which a country benefits from the SR.

The research also revealed that the impact of the AGOA SR on exports is different across countries. Since the SR was not introduced in the same year for all countries, these results strongly suggest that differences in RoO accounted for differences in performance. As to the uneven effects of the SR across the sample (e.g. the quality of infrastructure, political and social stability, governance, fiscal policies aimed at attracting foreign investment),

these could not be controlled for in this research.[24]

Two policy conclusions policy emerge from the study. First, since the uptake of preferences seems to be gradual over time, it may be too early to assess the performance of some countries under the SR. Furthermore, many analysts believe that the primary reason of Asian investment in apparel industries in the African countries was to circumvent US barriers to imports from Asian countries. But the removal of quotas at end of the ATC and of any other barriers will erode preferences for apparel exported by those countries in subsequent years, a fact that highlights the importance of lenient RoO.

Second, strict RoO have often been justified as a means of supporting more processing in developing countries by encouraging integrated production within a country, or within groups of countries through cumulation schemes, as in the case of T&A. However, at least in the case of T&A, RoO have a perverse effect as they discourage the developing of exports at the intensive margin, as well as at the extensive margin, through product diversification which contributes to reducing volatility. In sum, development-friendly policies would benefit from making RoO requirements less stringent.

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[24] For instance, Lesotho, one of the successful exporters, managed to attract foreign investment in the textiles industry by offering a low corporate tax and further tax concessions for locating factories in towns outside Maseru, the capital. Furthermore, the political and social environment was felt by foreign investors to be more stable after a period of political instability. The result was a sudden increase in foreign investment, mainly originating from Asia, and Lesotho became one of the largest exporters to the United States among countries eligible for the AGOA SR. For an early account of the case of Lesotho, see "Lesotho seen as gateway to US market: trade agreements have eased access for investors and helped diversify employment opportunities for locals", *Financial Times*, 23 August 2001.

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Appendix 1. Derivation of expression (1.5)

Profit- maximizing pricing for sellers of African apparel implies:

$$p^k\left(X^k,Y^k,P_w^k\right)+\frac{\partial p^k\left(X^k,Y^k,P_w^k\right)}{\partial X^k}\ X^k=\left(1+t^{k,pref}\right)\ \left(MC_X^k\right) \qquad (1.4)$$

where $p^k\left(\ \right)$ is the inverse demand function of country k and $P_w^k=\overline{P^*}\left(1+t^{k,MFN}\right)$.

Totally differentiating expression (1.4), we obtain:

$$\left\{\frac{\partial^2 p^k\left(\ \right)}{\partial\left(X^k\right)^2}X^k+2\frac{\partial p^k\left(\ \right)}{\partial X^k}-\left(1+t^{k,pref}\right)\frac{\partial MC_X^k\left(\ \right)}{\partial X^k}\right\}dX^k+\left\{\frac{\partial^2 p^k\left(\ \right)}{\partial X^k\partial Y^k}X^k+\frac{\partial p^k\left(\ \right)}{\partial Y^k}\right\}dY^k+$$

$$-\left\{MC_X^k\left(\ \right)\right\}dt^{k,pref}-\left\{\left(1+t^{k,pref}\right)\frac{\partial MC_X^k\left(\ \right)}{\partial r}\right\}dr+\left\{\frac{\partial^2 p^k\left(\ \right)}{\partial X^k\partial P_w^k}\overline{P^*}X^k+\frac{\partial p^k\left(\ \right)}{\partial P_w^k}\overline{P^*}\right\}dt^{k,MFN}=0$$

Since we assumed: $\dfrac{\partial MC_X^k\left(\ \right)}{\partial X^k}=0$, we have :

$$A\times dX^k+B\times dY^k+C\times dt^{k,pref}+D\times dr+E\times dt^{k,MFN}=0 \qquad (A1)$$

Where: $\quad A=\dfrac{\partial^2 p^k\left(\ \right)}{\partial\left(X^k\right)^2}X^k+2\dfrac{\partial p^k\left(\ \right)}{\partial X^k}$, $\quad B=\dfrac{\partial^2 p^k\left(\ \right)}{\partial X^k\partial Y^k}X^k+\dfrac{\partial p^k\left(\ \right)}{\partial Y^k}$, $\quad C=-MC_X^k\left(\ \right)$;

$D=-\left(1+t^{k,pref}\right)\dfrac{\partial MC_X^k\left(\ \right)}{\partial r}$, and $\quad E=\dfrac{\partial^2 p^k\left(\ \right)}{\partial X^k\partial P_w^k}\overline{P^*}X^k+\dfrac{\partial p^k\left(\ \right)}{\partial P_w^k}\overline{P^*}$.

Then from (A1) :

$A>0$ if and only if $-\dfrac{\partial^2 p^k\left(\ \right)}{\partial\left(X^k\right)^2}X^k>2\dfrac{\partial p^k\left(\ \right)}{\partial X^k}$, which is verified, for instance, if we assume a linear

demand function , so that $\dfrac{\partial^2 p^k\left(\ \right)}{\partial\left(X^k\right)^2}=0$.

$B>0$ if and only if $\dfrac{\partial^2 p^k\left(\ \right)}{\partial X^k\partial Y^k}X^k>\dfrac{\partial p^k\left(\ \right)}{\partial Y^k}$, which is verified, for instance, when we assume that

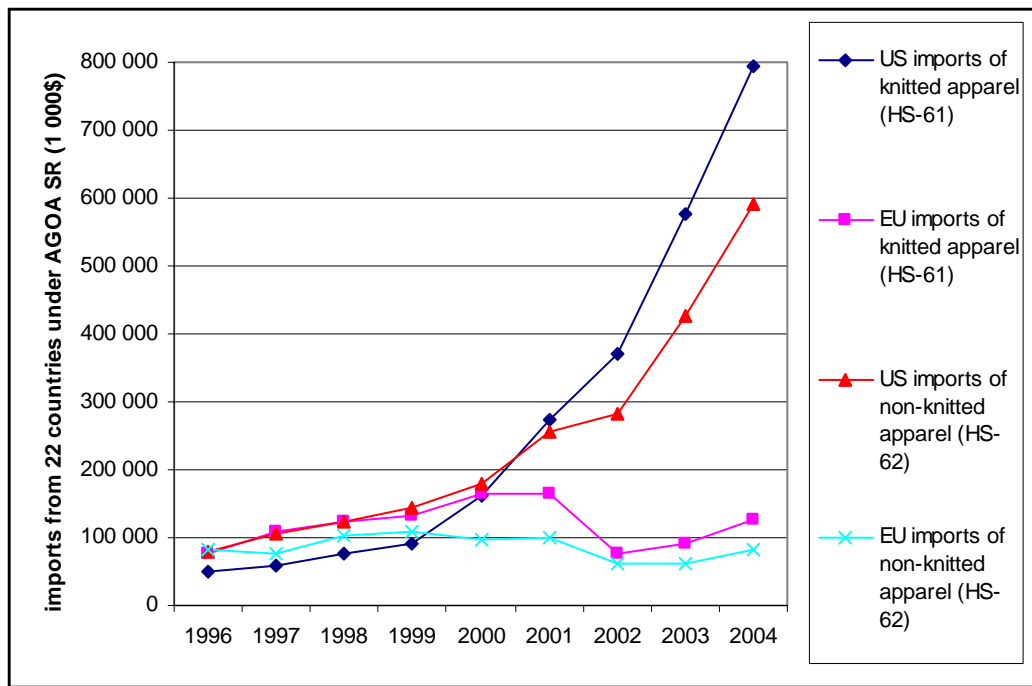$\dfrac{\partial^2 p^k\left(\ \right)}{\partial X^k\partial Y^k}>0.$

$C<0$ and $D<0$.

$E > 0$ if and only if $\dfrac{\partial^2 p^k\left(\ \right)}{\partial X^k \partial P_w^k} X^k > \dfrac{\partial p^k\left(\ \right)}{\partial P_w^k}$, which is verified, for instance, when we assume that

$\dfrac{\partial^2 p^k\left(\ \right)}{\partial X^k \partial P_w^k} > 0.$

Then,

$$\frac{dX^k}{dY^k} = -\frac{B}{A} > 0, \frac{dX^k}{dt^{k,pref}} = \frac{C}{A} < 0, \frac{dX^{EU}}{dr} = \frac{D}{A} < 0 \text{ and } \frac{dX^k}{dt^{k,MFN}} = -\frac{E}{A} > 0$$
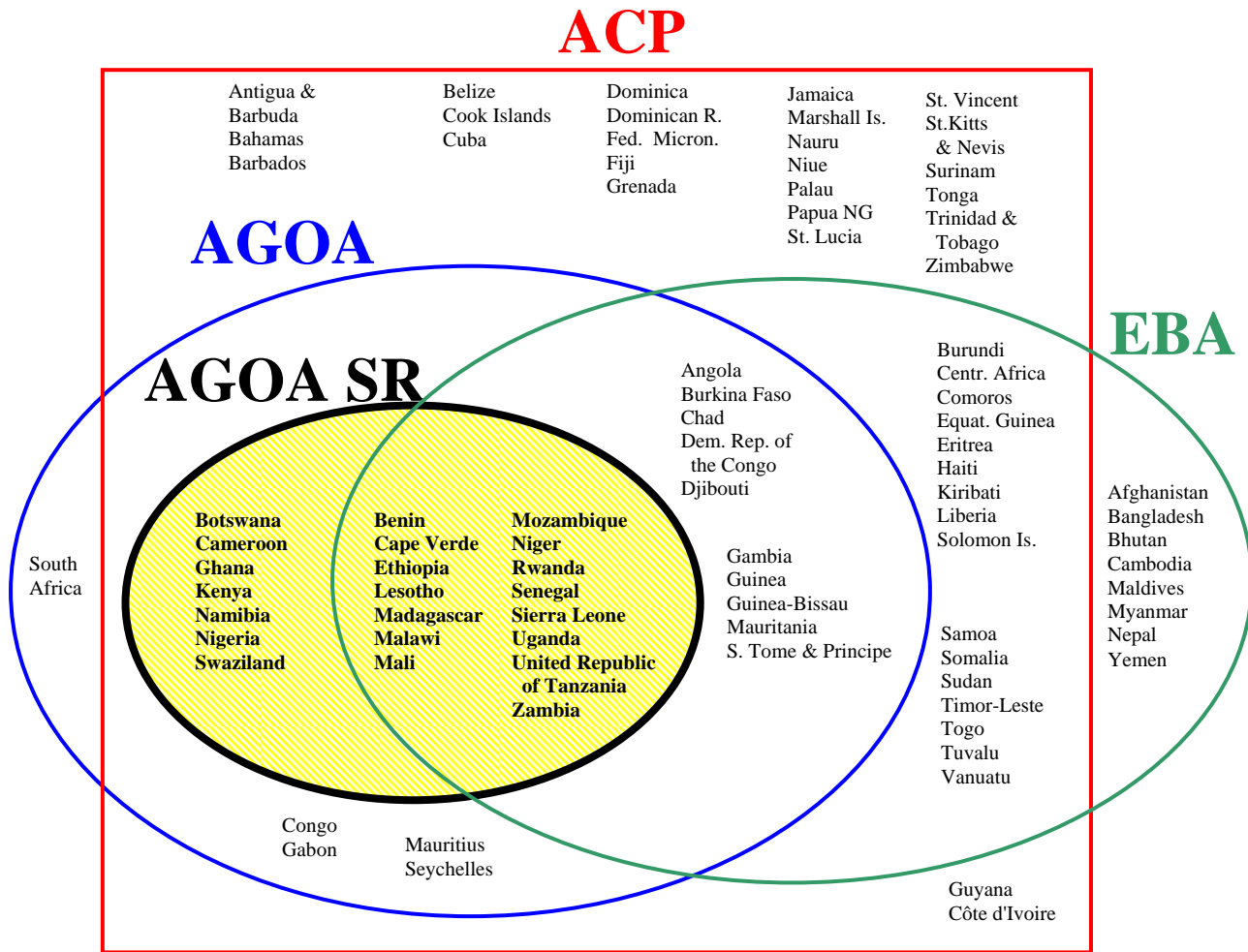
Appendix 2.   Additional figures

Figure A2.1. EU and US Imports of knitted (HS-61) and non-knitted (HS-62) apparel

Source: Author's calculations based on data from WTO Integrated Data Base.

Figure A2.2. Map of AGOA, ACP and EBA in 2004

Note: Mauritius was designated to benefit from AGOA SR in December 2004.

Appendix 3. Overview of rules of origin for T&A under some FTAs

PTA	Rules of origin	Legal texts
NAFTA	• Rules of origin for T&A are very complex. In order to be eligible for preferential access under NAFTA, most textiles and apparel must be produced – that is, cut and sewn – in the NAFTA area from yarn also made in a NAFTA country. This is called the *triple transformation process.* • In the case of cotton and man-made fibre spun yarn, the fibre must originate from North America, namely the NAFTA area.	The NAFTA agreement can be found at: http://www.nafta-secalena.org/DefaultSite/index_e.aspx?DetailID=78. Rules applying to trade in textiles and apparel goods between NAFTA countries are set out in annex 300-B. All specific rules of origin are detailed in annex 401.
AGOA general regime	• AGOA provides quota-free and duty-free treatment for apparel assembled (and/or cut) in one or more beneficiary sub-Saharan countries from US fabrics, which in turn are made out of US yarn. Apparel articles assembled from fabric produced in beneficiary sub-Saharan African countries from US yarn or originating in one or more beneficiary sub-Saharan African countries are allowed only in an amount not to exceed an applicable percentage[25] (sec 112). • AGOA allows for diagonal cumulation with respect to other SSA beneficiary countries (sec 112) • Apparel imports made with regional (African) fabric and yarn are subject to a cap of 1.5 per cent of the aggregate square metre equivalents of all apparel articles imported into the United States in the preceding 12-month period (section 111), growing proportionally to 3.5 per cent of overall imports over an eight-year period. The amendments to AGOA signed in 2002 (AGOA II) double the applicable percentages of the cap. • The AGOA Acceleration Act (AGOA III), signed in 2004, increases the de minimis rule from its current level of 7 per cent to 10 per cent. This rule states that apparel products assembled in Sub-Saharan Africa which would otherwise be considered eligible for AGOA benefits but for the presence of some fibres or yarns not wholly formed in the United States or the beneficiary sub-Saharan African country will still be eligible for benefits as long as the total weight of all such fibres and yarns is not more than a certain percentage of the total weight of the article.	The African Growth and Opportunity Act (AGOA) was signed into law on 18 May 2000 as Title 1 of the Trade and Development Act of 2000. President Bush signed amendments to AGOA (also known as AGOA II) on 6 August 2002 as section 3108 of the Trade Act of 2002. Finally, the AGOA Acceleration Act (AGOA III) was signed by the US President on 12 July 2004. The above-mentioned legal texts are downloadable at the following website: http://www.agoa.gov/agoa_legislation/agoa_legislation.html.

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[25] Initially, the applicable percentage is equal to 1.5 per cent for the one-year period beginning on 1 October 2000, increased in each of the seven succeeding one-year periods by equal increments, so that for the period beginning on 1 October 2007 the applicable percentage does not exceed 3.5 per cent. Since then this applicable percentage has been "doubled" by AGOA II.

PTA	Rules of origin	Legal texts
AGOA's special regime for lesser developed countries	• AGOA grants special RoO to "lesser developed countries". These countries are allowed to use third-country fabric and yarn and still qualify for AGOA preferences. In other words, making up fabric into clothing – the *simple transformation process* – is sufficient to confer origin. • The special regime for LDCs expires on 30 September 2007 but can be renewed by Congress, as has been done.	Sec 112 of the 8 AGOA legal text
EU's GSP/EBA and Cotonou Agreements	• EU rules of origin for apparel require production from yarn. This requires that a *double transformation process* take place in the beneficiary country, with the yarn being woven into fabric, which is then cut and made up into clothing. • Product-specific rules of origin for textiles and apparel under EBA and Cotonou Agreement are the same. • There are differences between the cumulation schemes of the EBA and the GSP and those of the Cotonou Agreement. Under the latter, there is full cumulation among African countries, so that regional fabrics can be used without loss of originating status. Under the GSP there is more limited partial or diagonal cumulation that can occur within four regional groupings – ASEAN, CACM, the Andean Community and the South Asian Association for Regional Cooperation – but not amongst ACP countries.[26] Therefore, LDC members of the Cotonou Agreement that are also eligible to export to the EU under the EBA may, and often do, prefer to continue exporting under the Agreement, partly because of the more liberal RoO under the latter. • The Cotonou Agreement attaches extensive conditions to cumulation with non-ACP countries as well as South Africa (see annexes IX-XI to protocol 1 of the Cotonou Agreement). However, diagonal cumulation under the GSP is constrained by the requirement that the value added in the final stage of production exceed the highest customs value of any of the inputs used from countries in the regional grouping (article 72a).	The Everything But Arms (EBA) initiative was incorporated as an amendment to the EU GSP system as Regulation EC 416/2001 and was adopted on 28 February 2001. It can be found at: http://trade.ec.europa.eu/doclib/docs/2004/october/tradoc_111459.pdf. RoO under the EU GSP schemes are defined by Articles 66 to 97 and annexes 14 to 18 and Annex 21 of Regulation (EEC) No. 2454/93[27], as amended by Regulations Nos. 12/97, 1602/2000 and 881/2003. The ACP Partnership Agreement was signed in Cotonou on 23 June 2000; the text can be found at: http://eurlex.europa.eu/LexUriServ/site/en/oj/2000/l_317/l_31720001215en00030286.pdf. RoO under the ACP Partnership Agreement are detailed in protocol 1, "Concerning the definition of the concept of origination products and methods of administrative cooperation, as well as its annexes.

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[26] Bilateral GSP cumulation applies between the European Community and the beneficiary country; diagonal cumulation applies between the European Community, Norway and Switzerland, and the beneficiary country; and regional cumulation applies between the beneficiary country belonging to one of the three GSP regional cumulation groups (Group I (Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Philippines, Singapore, Thailand, Viet Nam), Group II (Bolivia, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Peru, Venezuela) and Group III (Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka)). These types of cumulation may be combined for a single operation. Source: http://ec.europa.eu/taxation_customs/customs/customs_duties/rules_origin/preferential/article_779_en.htm.

[27] http://europa.eu.int/eur-lex/en/consleg/pdf/1993/en_1993R2454_do_001.pdf.

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