The Intended and Unintended Consequences of Special Fabric Provisions

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Abstract

The African Growth and Opportunity Act (AGOA) granted least developed countries special access to the US exports markets. The program has seemingly been a success with a rapid increase in exports. In this study we develop a theory of special trade preferences with a special focus on requirements on locally produced inputs. We test the theory using the introduction of AGOA and the expiration of the Multi-Fiber Agreement (MFA) and show that the design of the preferences has an important impact on the characteristics of exports. We argue that the increase in exports is a poor measure of the value of the program. By allowing for the use of third country inputs the design of AGOA and the expiration of the MFA, a quata system in place since 1974, pushed the benefiting countries into exporting low-priced, low-value added products with a high content of foreign inputs. We show, however, that forcing a higher content of domestic inputs is - through its negative impact on productivity - both an inefficient form of development aid and can be counter-productive for recipient welfare.

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1 Introduction

In 2000, the African Growth and Opportunities Act (AGOA) granted Lesotho and other least developed countries (LDC) special access to the U.S. markets for apparels and other products without the strict content requirements on locally produced inputs that usually accompany such programs. The response was a rapid increase in clothing exports to the U.S., but unfortunately this has not been accompanied by some of the more dynamic growth benefits that were originally envisioned. In this study we develop a theory of special trade preferences as a tool for development aid with a special focus on content requirements and test its predictions using the introduction of AGOA and the later expiration of the quotas of the Multi-Fiber Agreement (MFA). Leaving out any requirements on locally produced inputs encourages exports in sectors that are the most dependent on foreign inputs - which need not be those closest to being internationally competitive - such that a large part of the additional export revenue accrues to third parties. Imposing higher requirements on domestic content, however, is an inefficient way of transferring wealth and might be counter-productive as the forced use of more expensive inputs reduces efficiency, drives down export revenues and potentially harms the recipient of the special trade preferences. Whereas the welfare effects of content requirements are ambiguous, we demonstrate that some special trade preferences through reduced tariffs is efficient as a wealth transfer, even more so than a direct transfer.

We test the predictions and demonstrate that although exports surged, this was primarily in exports with low-value added. The expiration of MFA quotas shifted competing Asian exporters into low-priced low-value exports which harmed AGOA exporters.

Our starting point is a simple general equilibrium with perfect competition and three countries where the North seeks to transfer resources to the Southwest through trade instruments that favor it over the competing Southeast. The question is i) how the design of such trade preferences affect the characteristics of Southwest exports and ii) how to design it to transfer resources most effectively, in particular, the extent to which requirements should be put on the production of inputs in the Southwest. We consider two final good industries. Food is a homogenous good produced with labor and land and the manufacturing sector produces a set of varieties that require labor and an intermediate inputs with varying factor shares. Both Southwest and Southeast can produce these inputs, but Southwest cannot do so profitably without special preferences initiated by the North. Though special preferences without content requirements allow for production in sectors where labor-cost differentials are multiples of the the Southwest counter-party, granting special preferences through tariff reductions without requirements on locally produced inputs favors exports in low-value added goods which have a high content of foreign inputs. The export revenues that remain in the Southwest can therefore be much smaller than the rise of exports revenues. Accounting for the opportunity costs of newly employed resources in the exporting sector implies an even lower gain from an export increase.

Imposing a higher share of locally produced imports through content requirements, however, need not be a solution. A higher share of locally produced inputs increases the share of export revenues that remain in the Southwest, but reduces total exports by making production less efficient. The overall effect on demand for Southwest factors of production - and thereby welfare - is ambiguous and depends crucially on demand elasticity and the relative inefficiency of Southwest production. This suggests that content requirements are better applied to better developed countries as has in fact been the case.

We discuss the efficiency of special trade preferences as a mean of indirect transfers. If tariffs are originally set as a solution to an objective function of Northern policy makers a small tariff reduction will have second order effects and some use of trade preferences will always be desirable even if efficient dollar-for-dollar transfers are possible. Such a result does not exist for content requirements which will in general reduce economic efficiency and might even harm Southwest welfare.

We test the predictions of the model using the introduction of AGOA and exploit the fact that although a large set of countries were granted lower tariffs only a subset where granted a waiver of content requirements.[1] Though our model is intended to be more general the introduction of AGOA and the removal of the Multi-fiber agreements provides a nice possibility of testing the theory. We exploit two changes in US trade policy for apparels. The introduction of the African Growth and Opportunity Act (AGOA) in 2000 granted a set of 37 countries access to export apparels to the US without tariffs.[2] Furthermore, a subset of these countries, 22, defined as "lesser-developed" were allowed to export to the US without restrictions on domestic production of inputs. Whereas AGOA boosted exports of the eligible countries the expiration of the Multi-Fiber Agreement on January 1. 2005 meant that previously quota-restricted exporters (mostly from Asia) could now export, although, still subject to a tariff hurting exports of the AGOA eligible countries. These two events provide us with natural breaks with which to test our theory and the differential treatment of some countries under AGOA further allows us to test the differential impact on requirements on domestic content. Using both data on the value of imports and detailed pricing data we find that the predictions of our model are met out in the data. After the introduction of AGOA, exports surged from the set of countries that did not have to adhere to rules on local production of inputs compared with those that did, and this increase was more pronounced in sectors with higher fabric content. When the MFA was removed, constrained countries such as China moved strongly into precisely the markets in which AGOA countries had specialized. Although AGOA helped the least developed countries withstand this shock, they were nonetheless adversely affected.

Even after more than a decade of special trade preferences, there is a consensus that a remaining productivity disadvantage makes the industry's survival totally dependent on its preferences. Each time the expiration of the special rule has drawn near, studies have issued credible and dire warnings about the industry's ability to survive without them (Salm, 2002 and Bennett, 2006). Why this disappointment? Both Lall (2005) and Collier and Venables (2007) suggest it may be that these AGOA countries are simply too underdeveloped for the exports to ignite the process. Collier and Venables argue it reflects a lack of complementary inputs that are required to exploit scale economies. They suggest that preferences are only likely to work if countries already have "the skills and infrastructure to be near the threshold of global manufacturing competitiveness" (P1328). Lall also suggests that part of the explanation could lie with having foreign factory owners – most of whom are Taiwanese, – that are not closely integrated into the local community. Ironically, this might suggest that these kinds of preferences should

[1] In May 2000, the US congress passed AGOA. The Act granted duty free access for 4600 GSP tariff-line items plus another 1800 tariff line –items not on the original GSP. This meant that, aside from some apparel and agricultural products, AGOA beneficiaries could export almost any product to the US duty free. The AGOA preferences for garments required that that they are made of 85% US made yarn and fabric or from fabrics and yarns made in other AGOA beneficiary countries.

[2] AGOA allows for the exports of certain manufactures without tariffs as well, but the empirical focus here will be on the apparel industry.

be given to the more advanced developing countries like South Africa rather than the least developed countries that have received them. Our goal here is to present a theory that predicts the impact of the design of the special trade preferences on the characteristics of exports. An important area for future research is to determine if and how exporting some products is better for development. We discuss some initial considerations and argue that current preferences are not designed to favor those inputs that are closest to being internationally competitive. On the contrary, Collier and Venables (2007) argue that content requirements are destructive: allowing for imports allows a country to develop a special comparative advantage in a much smaller area of expertise which could allow the country to establish itself as competitive even without the preferences further suggesting that imposing content requirements need not be desirable.

This paper is related to several strands of literature. First, the formalization of content requirements relates to the models of Grossman (1981) and Dixit and Grossman (1982), who both demonstrate the possible counter-productive consequences from content requirements by reducing productive efficiency. Dixit and Grossman (1982)'s model is formally closer to ours, but whereas they (among other things) consider content requirements as a protective tool that an imposing country can use to exploit monopoly power, our focus here is on the use by an importer who seeks to aid the exporting country viz a viz a third party. This difference further implies that although a small increase in content requirements is welfare enhancing for the imposing country in their model, such a result does not exist here. In fact content requirements can often be harmful. We further consider the empirical predictions on goods with heterogeneous use of inputs and test these implications.

The emphasis on the use of tariffs as implicit transfers relates to an existing formal literature initiated by McCulloch and Pinera (1977) who consider the efficiency of the transfers. They are mainly interested in the cost both to the initiating country and to third party countries as a function of the market structure. Trade preferences can be "cheap" as implicit transfers as the differential use of tariffs can improve an importing countries ability to exploit monopoly at cost to a third party. By construction we rule out costs to third parties and demonstrate that from a starting point of an optimally set tariff, it is always "cheap" for an importer to reduce tariffs to support an exporter, even more so than a direct transfer.

Although, our main emphasis will be on a neo-classical model of perfect competition abstracting from externalities, an implicit or explicit argument often made in favor of trade preferences is the possible dynamic effects through spill-overs, learning-by-doing and agglomeration effects. If they can "learn by doing" by using trade preferences, it is hoped that firms that start by exporting a few simple products can upgrade their product sophistication, and diversify into other products and markets and ultimately become come competitors that no longer need preferential treatment. In addition, it is hoped that there are benefits to the rest of the economy. Other domestic firms could gain too through backward and forward linkages as exporters demand inputs and services and become increasingly embedded in the local economy. Such has been formally recognized in the literature as the importance of increasing returns to scale both external and internal.

Ethier (1979) was the first to show formally that holding the assumption of constant returns of scale at the firm level, but allowing for increasing returns to scale at the industry level introduces the possibility of multiple equilibria: if a country already produces a good it will gain a comparative advantage supporting its production. Welfare can therefore depend crucially on sufficiently large interventions. Later theories demonstrate that increasing returns

to scale at the firm level with the necessary consequence of imperfect competition likewise can lead to multiple equilibria, in the case of Murphy, Shleifer and Vishny (1989) in terms of the adoptation of a more efficient technology in the case of Krugman (1991) in terms of the geographical location of production. Although, our model does not allow us to address these issues we discuss them in an extension and the conclusion.

We initially provide an overview over the AGOA and MFA schemes in section 2, before we proceed to describe the manufacturing sector and the determinants of comparative advantage in section 3.1. We then embed this partial equilibrium in a general equilibrium model in section 3.3. We use this general equilibrium model to derive empirical predictions of AGOA and the expiration of MFA in section 4 and welfare implications in section 5. We briefly discuss an extension to heterogeneous productivity differences in section 6 before we test the empirical predictions in section 7. We conclude and discuss possible further research in section 8.

2 The African Growth and Opportunity Act (AGOA) and the Multi-fiber Agreement (MFA).

The use of trade policy as a development tool is partly inspired by the success of dynamic Asian countries such as Japan, South Korea and Hong Kong, that all cut their teeth as exports of clothing, continuously upgrading and diversifying (Gereffi, 1999). Motivated in part by such considerations the EU and the US both implemented multilateral Generalized Special Preferences Programs in the 1970s. The success of these programs, however, has been limited as rules of origins provisions often require more local production than the targeted countries can provide (Ahmad, 2007).

2.1 AGOA

The rules of the US AGOA program are however an important exception. AGOA not only gave all Sub-Saharan countries extensive duty - quota-free access to the US (Table 8 in the appendix). Its rules of origin also contained an unusual a waiver for wearing apparel that was granted to "Lesser Developed Beneficiary Countries" (LDBCs). Subject to a fairly generous market-share caps that have not been binding, the waiver allowed these LDBC countries to use third-country fabrics or yarn and still export clothing under the AGOA preferences. There is, however, near universal agreement that the beneficiaries would not be internationally competitive without the special treatment.

Countries not defined as "lesser-developed" such as South Africa and Mauritius did receive AGOA preferences, but they were required to meet GSP rules of origin that for clothing required the use of US or regional yarns or fabric. The experience demonstrates how important they can be: US imports of clothing from AGOA countries (SITC 84- Apparel and Clothing Accessories) increased from $730 million in 2000 to $1755 million in 2004. This growth was dominated by US imports of clothing from the least developed African countries which increased by four hundred percent, almost all of which took advantage of the lesser developed country provision (See Figure 1a, showing m^2 equivalent). The largest increase in exports came from Lesotho which increased its export by more than $300 million to $456 million.[3] Notably, the two largest

[3]Other countries experienced comparatively impressive growth in exports. Kenya's increased from $43 million to $270 million, Madagascar from $110 million to $323 million Swaziland from $32 million to $179 million and

exporters of apparels in 2000, South Africa and Mauritius, who were not granted a waiver from the content requirements[4] saw there combined exports in apparel drop by $18 million in the same time period.

Did AGOA stimulate entry into new clothing markets? Table 1 reports the number of HTS ten-digit apparel products produced by AGOA countries. Overall AGOA countries export limited ranges of apparel products. South Africa, Mauritius and Madagascar had the widest range of products (over 130 each) prior to the implementation of AGOA in 2000 (see footnote 4). AGOA preferences increased product penetration. Many countries experienced exceptional increases in the total number of lines from 2000 to 2004 (Kenya from 45 to 155, Swaziland from 47 to 139, Lesotho from 60 to 118). In most countries however these trends reversed after 2005 when the MFA expired.

Several research papers have confirmed what is obvious to the naked eye – that the lesser developed country provisions have played a key role in the outcomes. Using a variety of methodologies, empirical estimates confirm that preferences under AGOA are a significant determinant of Apparel exports: Mattoo, Devesh, and Subramanian (2003) stressed the role of rules of origin in limiting the overall benefits from AGOA to all recipients. Collier & Venables (2007) find that the AGOA apparel provision had a positive and significant effect on exports. Frazer and Van Biesebroeck (2010) find that the AGOA had a "large and robust effect that grew over time" and estimate that overall AGOA apparel exports increased by 53 percent with stronger impacts on products with high initial levels of protection. Portugal-Perez (2008) report an impact of 96 percent for 22 countries eligible for the third-country fabric provision, and 303 percent for the top 7 beneficiaries In addition to higher export volumes there is also evidence that AGOA exporters enjoyed higher prices and captured some of the tariff rents created by the preferences (Olarreaga and Özden, 2005). Apparently, whatever Africa's handicaps, they have not prevented substantial responses: Interestingly, there is no evidence of differential effects in taking advantage of AGOA based on measures of corruption or institutional quality (Frazer and Van Biesebroeck, 2010).

2.2 The Expiration of MFA

Clothing exports to the United States were subject to tariffs but were also constrained by country specific quota restrictions under the MFA which had been in place since 1974. As these became increasingly binding on others, exports started from unconstrained countries to take advantage of its unfilled quotas. One of the largest beneficiaries, Lesotho's concentration of exports in products where quota constraints on Chinese exports were binding is clearly revealed in Figure 2. Thus even prior to the passage of AGOA, firms based in Lesotho, most of which were subsidiaries of Asian multinationals were exporting to the US. Indeed, after 1999, 99 percent of all Lesotho's apparel exports went to the US with only 0.8% going to South Africa and just 0.2% to the EU.

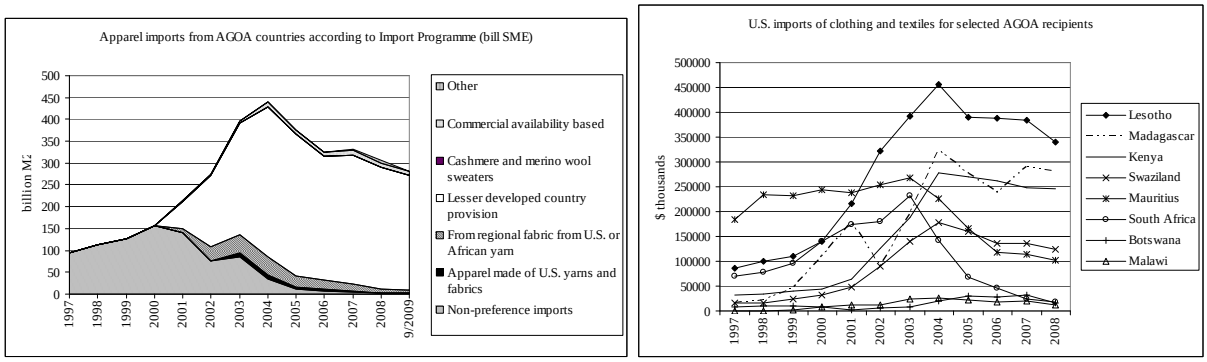
Namibia which increased from 0 to $79 million.

[4]Most of the countries that were eligible for the waiver are classified as Least Developed by the United Nations. Botswana and Namibia did not meet the requirements for the Special Rule as their GDP per capita exceed the maximum of US$ 1 500 in 1998. However, they were designated as LDC countries under amendments to the AGOA act in 2002 (AGOA II) and 2004 (AGOA IV). Mauritius was temporarily granted the third-country fabric derogation from October 2004-September 2005 under the Miscellaneous Tariff Bill of 2004 (known as AGOA III). More recently Mauritius qualified for the third-country fabric derogation in November 2008 for a period of 4 years.

Table 1: Products traded (out of approx 1,500 possible products), sorted by 2004

Eligibility	Country	1996	2000	2004	2008
Apparel eligible	Mauritius	165	139	135	139
	South Africa	136	267	318	177
Apparel eligible, LDC special rule	Benin	2	2	4	0
	Botswana	14	24	57	18
	Burkina	8	9	9	4
	Cameroon	10	7	14	18
	Cape Verde	2	4	14	5
	Chad	0	0	1	0
	Ethiopia	9	4	41	79
	Ghana	38	52	63	48
	Kenya	55	45	155	117
	Lesotho	41	60	118	84
	Madagascar	38	175	236	259
	Malawi	2	22	45	25
	Mali	10	10	12	11
	Mozambique	3	0	7	0
	Namibia	0	1	40	2
	Niger	4	4	7	5
	Nigeria	61	47	39	33
	Rwanda	0	0	2	5
	Senegal	31	20	10	16
	Sierra Leone	2	28	45	54
	Swaziland	21	47	139	86
	Tanzania	4	6	24	16
	Uganda	0	0	9	4
	Zambia	1	1	4	4
non-apparel eligible	Angola	0	0	0	0
	Burundi	1	1	0	0
	Comoros	1	0	1	0
	Congo (Brazzaville)	0	0	3	0
	Congo (Kinshasa)	3	4	1	3
	Djibouti	0	0	0	0
	Gabon	1	1	3	0
	Gambia	6	11	7	9
	Guinea	5	12	13	12
	Guinea-Bissau	0	0	0	3
	Liberia	2	3	2	3
	Sao Tome and Principe	1	1	0	0
	Seychelles	0	2	3	6
	Togo	13	4	3	4
	All AGOA countries	323	439	537	465
Possible products		1,548	1,533	1,525	1,515

Figure 1: US Apparel imports from AGOA countries. a) according to import program, b) from individual countries



Source: USITC

The expiration of the MFA on January 1. 2005 was a setback for the AGOA countries as the constraints on their (mainly Asian) competitors were lifted. As a result, U.S. imports declined, although for the least developed AGOA countries still remained three times as large as in 2000. By contrast, despite AGOA, imports from South Africa and Mauritius combined were decimated and in 2008 were only a third of their 2000 levels. We exploit the changes in quotas in the empirical section.

Table 2 provides some preliminary evidence on the change along the extensive margin. Decompositions of output growth reveal that the export of new product lines (the extensive margin) contributed 30 percent of total AGOA import growth from LDC special rule countries between 2000 and 2004, and 42 percent of the decline from 2004-08. Strikingly only 8 percent of the growth in Lesotho's apparel exports took the form of new products. The share of product lines accounted for by the top four and top ten HS 10-digit products is around sixty and eighty percent and has remained fairly constant throughout the period.

3 The Model

The following sections describe the theory. We consider a world with two final good sectors. One produces a homogenous good, food, with land and labor and one produces a variety of manufactures which have heterogeneous dependence on labor and intermediate inputs. All sectors are competitive. The world consists of three countries. The North produces only food and is the only consumer of manufactures, the Southwest which produces food and potentially manufactures and intermediate inputs and the Southeast which, in the absence of special trade preferences, would out-compete the Southwest in the production of both manufactures and intermediate inputs. The North seeks to favor the Southwest through such special preferences. We initially take a partial equilibrium view of the manufacturing sector in the Southeast and derive the crucial determinants of scope and size of exports. Then we proceed to embed the partial equilibrium into a full general equilibrium model to consider welfare effects and efficiency of the trade instruments.[5]

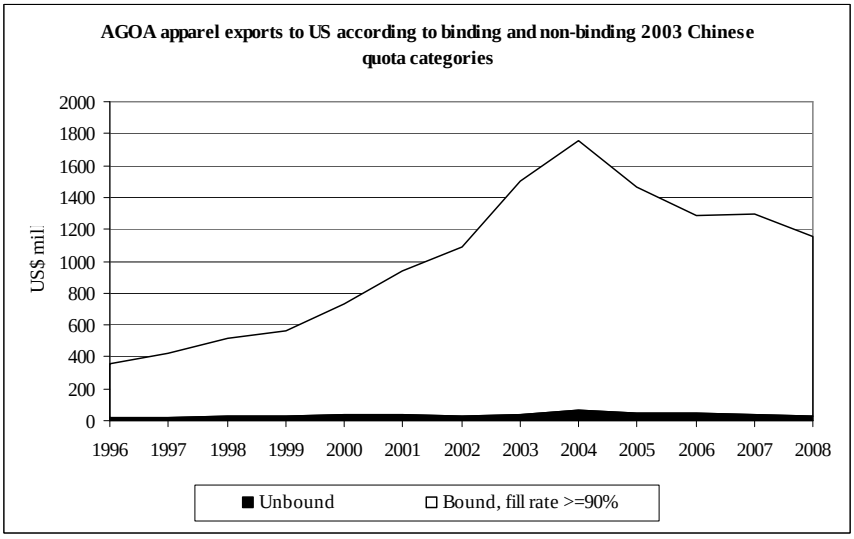
[5]The Southwest is considered "small", so although general equilibrium effects will be of crucial importance within the economy of the Southwest we abstract from these in the North and Southeast by assuming linear

Table 2: Decomposition of growth in US apparel imports: Extensive and Intensive growth

		Contribution Intensive growth	Contribution Extensive growth	Average annual Growth (US$)	Contribution Intensive growth	Contribution Extensive growth	Average annual Growth (US$)	Cumulative imports 2004
		2000-04			2004-08			
Apparel eligible, LDC special rule	Benin	0.00	1.00	0.33	0.00	1.00	-1.00	0.00
	Botswana	0.24	0.76	0.27	-1.56	2.56	-0.06	0.01
	Burkina Faso	-0.02	1.02	0.28	0.00	1.00	-0.49	0.01
	Cameroon	0.00	1.00	0.22	-0.27	1.27	0.21	0.01
	Cape Verde	0.33	0.67	0.36	0.00	1.00	-0.73	0.01
	Chad	0.00	1.00		0.00	1.00	-1.00	0.01
	Ethiopia	0.00	1.00	4.00	0.52	0.48	0.30	0.02
	Ghana	0.02	0.98	1.18	0.95	0.05	-0.41	0.02
	Kenya	0.68	0.32	0.59	0.81	0.19	-0.03	0.18
	Lesotho	0.92	0.08	0.34	0.87	0.13	-0.07	0.44
	Madagascar	0.78	0.22	0.31	0.91	0.09	-0.04	0.62
	Malawi	0.51	0.49	0.38	0.32	0.68	-0.17	0.64
	Mali	1.19	-0.19	-0.17	0.90	0.10	0.37	0.64
	Mozambique	0.00	1.00		0.00	1.00	-1.00	0.64
	Namibia	0.00	1.00	3.69	0.07	0.93	-0.94	0.68
	Niger	-0.82	1.82	0.11	0.44	0.56	0.18	0.68
	Nigeria	1.90	-0.90	-0.07	-0.10	1.10	-0.08	0.68
	Rwanda	0.00	1.00		0.00	1.00	0.92	0.68
	Senegal	0.73	0.27	-0.30	0.65	0.35	0.16	0.68
	Sierra Leone	0.40	0.60	0.59	0.19	0.81	-0.39	0.68
	Swaziland	0.57	0.43	0.54	0.63	0.37	-0.09	0.79
	Tanzania	0.24	0.76	1.80	-0.25	1.25	-0.12	0.79
	Uganda	0.00	1.00		-0.04	1.04	-0.44	0.79
	Zambia	0.00	1.00	-0.42	0.00	1.00	-0.52	0.79
	Mauritius	0.67	0.33	-0.02	0.94	0.06	-0.18	0.92
Apparel eligible	South Africa	-17.67	18.67	0.00	0.80	0.20	-0.40	1.00
non-apparel eligible	Burundi	0.00	1.00	-1.00				1.00
	Comoros	0.00	1.00		0.00	1.00	-1.00	1.00
	Congo (DROC)	0.00	1.00	-0.19	0.00	1.00	1.45	1.00
	Congo (ROC)	0.00	1.00		0.00	1.00	-1.00	1.00
	Gabon	0.00	1.00	2.56	0.00	1.00	-1.00	1.00
	Gambia	-0.32	1.32	-0.14	0.90	0.10	0.32	1.00
	Guinea	-0.02	1.02	-0.42	1.01	-0.01	0.11	1.00
	Guinea-Bissau				0.00	1.00		1.00
	Liberia	0.00	1.00	-0.34	0.00	1.00	0.12	1.00
	Sao Tome & Principe	0.00	1.00	-1.00				1.00
	Seychelles	0.95	0.05	-0.64	0.00	1.00	0.97	1.00
	Togo	0.00	1.00	-0.18	0.00	1.00	0.47	1.00
All AGOA		0.68	0.32	0.25	0.70	0.30	-0.10	
LDC special rule eligible		0.69	0.31	0.42	0.58	0.42	-0.07	
Other apparel eligible		1.05	-0.05	-0.01	0.87	0.13	-0.25	
Other AGOA		-2.03	3.03	0.04	-0.18	1.18	-0.21	

Notes: Mauritius is treated as not eligible to export under LDC special rule, despite being granted temporary LDC status from October 2004-September 2005 under the Miscellaneous Tariff Bill of 2004 (known as AGOA III).

Figure 2: Lesotho apparel exports to US according to Chinese quota fill rates



Notes: Quota fill rates are obtained from OTEXA ((http://otexa.ita.doc.gov/). Quotas on product lines are assumed binding if the 2003 Chinese fill rate is greater than or equal to 90%.

3.1 The Manufacturing Sector

The manufacturing sector in the Southwest produces a set of differentiated goods. These are denoted x_z, $z \in [0,1]$ and are each produced competitively using intermediate inputs and labor priced at r and w, respectively.[6] The production technology can be described by standard constant returns to scale production functions, but it will be convenient to work with the corresponding unit cost functions:

$$c\left(w,r,z\right),\ z\in\left[0,1\right] \tag{1}$$

where $c(w,r,z)$ is homogenous of degree 1 in (w,r). Define $\theta_L(w,r,z)$ as the factor content of labor in variety z, and use Shepard's lemma to get: $\theta_L(w,r,z) = c_w(w,r,z)w/c(w,r,z)$, where throughout c_x will denote the derivative of the cost function wrt. argument x. We assume sufficient regularity of the cost functions for us to order varieties such that varieties with higher z has a larger factor content of labor:

$$\partial\theta_L(w,r,z)/\partial z > 0, \quad \text{for all } (w,r) \tag{2}$$

Demand for manufactures comes exclusively from the North and is described by the following demand functions:[7]

$$D(p_z,z),\ z\in\left[0,1\right],$$

production technologies.

[6] r will denote the effective price of inputs domestically. That is the price for a domestic producer of manufactures. Below it will be an average of the price of domestically produced inputs, priced at s and inputs produced abroad which are priced at r^*

[7] The assumption that the small open economy does not consume the differentiated goods is not essential, but somewhat simplifies the results and is in accordance with the empirical application.

where p_z is the price faced by consumers in the North and we assume a constant price elasticity of $\eta > 1$.

The Southeast uses identical technology to produce apparels. A comment on this assumption is in order. Lall (2005) argues that Lesotho in particular suffers from low-skilled and unproductive workers. He writes: "Despite a decade and a half of experience in CMT (Cut, Make and Trim) operations, productivity in Lesotho is below that of major competitors. Since wages are comparable, its competitiveness cannot outlast trade privileges". In terms of the present model, what matters for the Southwest's ability to export naturally is its comparative advantage in manufacturing and allowing for a uniform lower productivity of the manufacturing sector would - up until a rescaling of the unit of labor - be isomorphic to the present model: It would imply a lower level of welfare, but would not alter any of the conclusions presented here.

A different question concerns heterogeneous productivity differences across varieties. In section 6 below we expand the model to allow for this and demonstrate that trade preferences without content requirements will stimulate sectors with low factor share of labor, θ_L, which are not necessarily those that are closest to being able to compete without special preferences. Even if trade preferences stimulates local productivity growth the initial disadvantage might be too big leaving the export sector permanently relying on special preferences.

We maintain the assumption of perfect competition throughout the paper. Since Murphy, Shleifer and Vishny (1989) and Krugman (1991) it has been recognized that deviating from this assumption and introducing increasing returns to scale at the firm level can have important consequences for both the allocation of industries and the choice of technology. Venables (1996) show that the combination of imperfect competition and transportation costs create forward and backward linkages and that there are multiple equilibria for the allocation of industries. In such a world policy can conceivably impact the allocation and thereby welfare by encouraging production that can be self-sustainable at a sufficient scale, but does not arise independently. Such considerations are doubtless crucial for a lot of the support for trade preferences. The present paper, however, focuses primarily on the empirical predictions and welfare consequences of a neo-classical, although we will discuss some extensions along these lines in the conclusion.

Let a particular set of factor prices domestically be (w', r') and foreign prices (w^*, r^*). If there are no impediments to trade and there exists a z^* such that the following *cut-off condition* is met

$$c(w', r', z^*) = c(w^*, r^*, z^*), \tag{3}$$

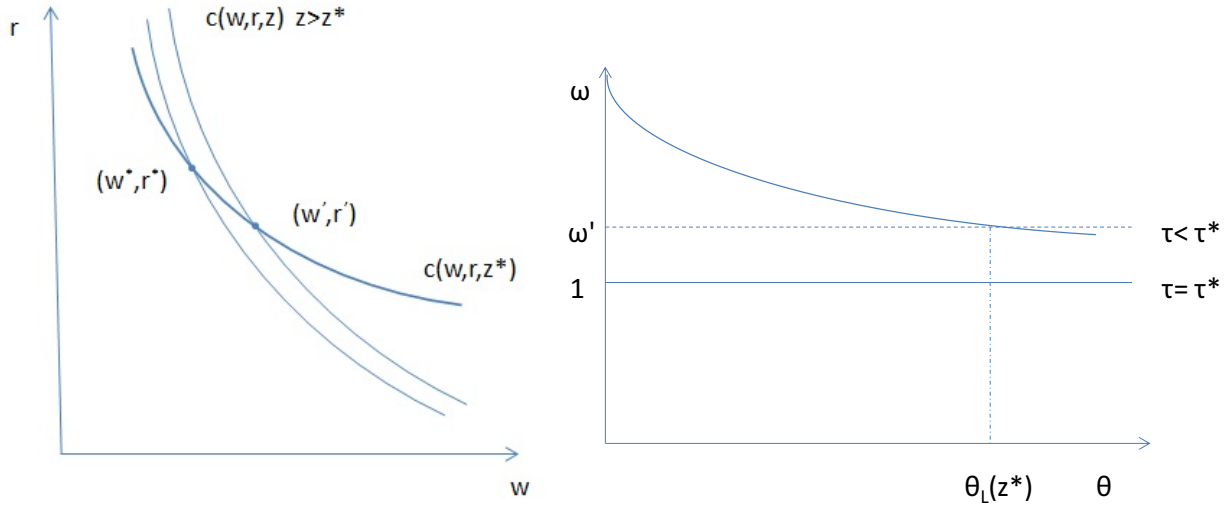
both countries will be active in exports. If $w' > w^*$ and $r' < r^*$ then the assumption of condition (2) implies that all varieties with low factor content of labor, $z \leq z^*$, are produced in the Southwest and all varieties $z > z^*$ are produced in the Southeast. This is illustrated in figure 3.a below which plots Iso-cost curves in (w, r) space. As drawn, there exists a $z = z^*$ for which the unit costs are the same in the two countries. For higher z - which are more labor intensive - the slope of the indifference curve is steeper and such products will be cheaper to produce for the Southeast. The Southwest on the other hand will be able to produce the goods that are less labor intensive cheaper than the Southwest.

Our interest will primarily lie with differential ad-valorem tariffs imposed on the Southwest, τ and the Southeast, τ^*. We will discuss quotas in section 4.5 below. This results in a cut-off equation of:

$$(1 + \tau)\, c(w', r', z^*) = (1 + \tau^*)\, c(w^*, r^*, z^*), \tag{4}$$

where the properties of the cost function implies:

Figure 3: a) The cut-off condition, b) ω for two trade regimes



Note: Panel a) shows the cut-off condition. Southwest produces all varieties with $z \leq z^*$. Panel b) shows the highest possible differential in wages. Preferential treatment without content requirements implies that only varieties with low θ_L can export profitably.

$c(w'(1+\tau), r'(1+\tau), z^*) = c(w^*(1+\tau^*), r^*(1+\tau^*), z^*)$, such that the condition for the Southwest to be an exporter of the least labor-intensive goods is that $(1+\tau)w' > (1+\tau^*)w^*$ and $(1+\tau)r' < (1+\tau^*)r^*$, that is the tariff-corrected factor prices will determine the comparative advantage across varieties. A special case to consider is when there is free trade in inputs such that $r' = r^*$, in which case $\tau < \tau^*$ and $(1+\tau)w' > (1+\tau^*)w^*$ are necessary conditions for the Southwest to specialize in varieties with low labor inputs. That is wage costs in the Southwest must be relatively higher than the tariff differential to allow for production in the Southeast. If this is met and there is a z^* figure 3 above still describes the pattern of production.

Let the price faced by exporters be q_z. Perfect competition then implies:

$$\begin{aligned} q_z &= c(w, r, z), \quad z \leq z^*, \\ q_z &= c(w^*, r^*, z), \quad z > z^*, \end{aligned} \tag{5}$$

where $p_z = (1+\tau)q_z$ for $z \leq z^*$and $p_z = (1+\tau^*)q_z$ otherwise. Equations 4 and 5 along with the def of p_z are central for predicting, respectively, export changes along the extensive and intensive margin as a consequence of trade preferences. Although, a straightforward application of Shepard's lemma, it will be important for the consequences of content requirements and total production of variety z in the Southwest that the elasticity of costs wrt to r is given by $(\partial q_z/\partial r)(r/q_z) = (1-\theta_L(w,r,z))$ which is decreasing in the factor share of labor; a given increase in input prices - say from higher content requirements - will therefore disproportionately increase the price of varieties of high intermediate input content. Total production of variety z in the Southwest is given by:

$$x_z = D(p_z, z), \quad z \leq z^*$$

For the purpose of the general equilibrium analysis we note that the direct demand of labor from the production of manufactures in the Southwest is given by:

$$L_X = \frac{1}{w}\int_0^{z^*} \theta_L(w,r,z) q_z D(p_z,z) dz. \tag{6}$$

Before we proceed to the general equilibrium analysis we discuss the implications of this for the Southwest's ability to produce under a special preference program

3.2 Productivity differentials

As emphasized in the introduction actual US trade policy has made use of four policy instruments: tariffs for AGOA and non-AGOA members, quotas under the MFA agreement and finally content requirements for some AGOA members. For the sake of clarity we will in this section discuss only tariffs on the Southwest products, τ, tariffs on Southeast products, τ^* and finally the possible content requirement of k on the use of intermediate inputs in the Southwest. As the expiration of the MFA constituted a reduction of tariffs we will extend the model in such a manner in subsection 4.5 below.

We will consider equilibria in which exports of intermediates from Southwest are uncompetitive such that demand can only arise domestically, and that only if content requirements create the sufficient incentive. As in Grosmann (1981) we allow for a continuum of content requirements, such that in order to produce and export manufactures without tariffs, a share k of inputs must be purchased domestically. This implies an (average) price of inputs of

$$r = ks + (1-k)\, r^*, \tag{7}$$

With these instruments we can use the cut-off condition of (3) to define $\omega(z,\tau,k)$ as the highest relative wage in the Southwest that will allow production of variety z under trade regime (τ,k,μ). Using the homogeneity of degree 1 of the cost function it is defined as:

$$(1+\tau)\, c(\omega(z,\tau,k), \alpha k \omega(z,\tau,k) + (1-k)\,\alpha^*, z) = (1+\tau^*)\, c(1,\alpha,z), \tag{8}$$

where $\alpha \equiv s/w$ and $\alpha^* \equiv r^*/w^*$ are the input/wage relative price in Southwest and Southeast, respectively. It is clear that $\omega(z,\tau^*,0) = 1$. If the Southwest receives no special treatment, the assumption of identical technology implies that it can compete only if wages are no higher than in the Southeast. Consider a change in the tariffs on the Southwest:

$$\frac{\partial \omega}{\partial \tau}\frac{1+\tau}{\omega} = 1/\tilde{\theta}_L(w,r,z,k),$$

Let $\beta \equiv \alpha w k/\left(\alpha w k + (1-k)\, r^*\right)$ be the fraction of intermediate inputs expenditure that goes to foreign production, such that $\tilde{\theta}_L(w,r,z,k) \equiv \beta\left(1-\theta_L(w,r,z)\right) + \theta_L(w,r,z)$ is labor's total factor share, including the indirect spending on domestically produced intermediates. A given decrease in the tariff will allow for a higher local wage for products with low labor use (low $\tilde{\theta}_L$). The use of labor is a function of the inherent labor intensity of a given variety z *and* the content requirements. If $k=0$, $\tilde{\theta}_L(w,r,z,0) = \theta_L(w,r^*,z)$ the inherent labor intensity of variety z is crucial. Take for example, two manufactures products each priced at US$ 10, but differing in terms of use of intermediate inputs. Intermediate inputs costs make up 90 percent of the cost

of product A and 1 percent of the cost of product B. Assume further that the specific tariff on goods from Southeast is 1 dollar. The largest permitted wage difference is just over 10 per cent percent for product B, but is 100 percent for product A. The implication is that Southwest will be easier for the Southwest to break through exporting varieties with low labor share, a feature of crucial importance for the analysis to continue.

We collect these results in the following lemma

Lemma 1. *Consider the highest possible relative wage difference between Southwest and Southeast, $\omega(z,\tau,k,\mu)$, as defined in equation 8.*

i) With no trade impediments the highest relative wage is 1 for all varieties ($\omega(z,\tau^*,0,0)=1$ for all z)

ii) The elasticity of ω wrt. to $(1+\tau)$ is decreasing in the labor share ($\partial\omega/\partial\tau\,(1+\tau)\,/\omega = 1/\tilde{\theta}_L(w,r,z,k)$)

The lemma is illustrated in figure 3.b, which plots ω for two different trade regimes. In one, there are no content requirement, but no preferential treatment and Southwest can export manufactures only if $\omega = 1$ that is if there is no wage difference. For a trade regime that imposes no content requirement but favors the Southwest a positive wage difference is allowed and this can difference is decreasing in $\theta_L(z)$. If $\omega = \omega' > 1$ then nothing can be produced if $k = 1$, but all varieties with $\theta_L(z) < \theta_L(z^*)$ can be produced if $k = 0$.

3.3 General Equilibrium

We now embed the manufacturing sector into a general equilibrium model of trade with three sectors and two factors of production: labor and land. Besides manufacturing the Southwest produces intermediate inputs (needed only in manufacturing), M, and and an additional product, y, which we label food. The North produces only food and does so with linear technology at a price which we normalize to 1. The Southeast does not consume manufactures, but is active in the production of all goods as described below. Both final and intermediate goods are tradeable and there are no natural or man-made restrictions on the trade of food.

The Southwest is capable of producing all three types of goods. The production of intermediates is simple, competitive and only uses labor as input. It takes α units of labor to produce a unit of intermediate input so the price of domestically produced units, s, is:

$$s = \alpha w, \tag{9}$$

and the demand for labor from this sector, $L_{X,M}$, is given:

$$L_M = \alpha M. \tag{10}$$

Food is produced competitively with labor and land using a well-behaved CRS production function with corresponding cost function of $c^F(w,t)$, where t is the rental rate of land. Competitive pricing implies:

$$1 = c^F(w,t). \tag{11}$$

Factor demand from the food producing sector implies:

$$T = y c_t^F(w,t), \tag{12}$$

$$L_F = yc_w^F(w,t), \tag{13}$$

where, as land is only used in the production of food, we have imposed equality with the total stock of land, T. The total demand for labor from the food sector is given by L_F. With a stock of labor of L the corresponding market clearing condition for labor is given by:

$$L_X + L_M + L_F = L, \tag{14}$$

where for later purposes we define total employment in the manufacturing sector $L_{X,M}$ as the sum of direct employment, L_X, and indirect employment, L_M.

To close the model we need to specify the demand for domestic input, which is given by:

$$M = \frac{k}{r}\int_0^{z^*} \left(1-\theta_L(w,r,z)\right) q_z D(p_z,z)dz. \tag{15}$$

With no impediments to trade, the equilibrium of $(r,w,t,s,p_z,q_z,L_M,L_X,L_y,M,y,z^*)$ is then pinned down by the equations 4 to 15, excluding 8, and the definition of p_z.

4 Comparative Static under different trade regimes

Having described the equilibrium in a world of free trade we move on to comparative statics under different regimes. It turns out that both for empirical predictions and welfare assessments that comparative statics on Southwest wages, w, is a crucial summary static for the effects of policy interventions. A natural restriction for the discussion of content requirements is $r > r^*$, and we consider only equilibria that satisfy this.

4.1 Comparative static on wages.

The interpretation is the easiest if we rewrite the labor market clearing condition (14) as the total income of workers, wL, and note that the change in total wage bill is given by $d(wL) = Ldw = d(wL_F) + d(wL_{X,M})$. This implies that we can find the wage effect by focusing on the sum of the changes in labor factor reward across sectors. Total factor reward to domestic workers employed directly or indirectly in the manufacturing sector is:

$$wL_{X,M} \equiv w\left(L_X + L_M\right) = \int_0^{z^*} \left[\beta\left(1-\theta_L\left(w,s,z\right)\right) + \theta_L(w,s,z)\right] p_z D(p_z,z)dz.$$

The comparative static on w of changes in (k,τ) are given in the proposition below (for ease of exposition we assume that the elasticity of substitution, σ is identical across :

Proposition 2. *The comparative statics on Southwest wages, w, and the cut-off value of z^* of changes in Southwest tariffs, τ, and content requirements, k, can be reduced to a 2x2 system in dw and dz^*. The comparative statics on w are given by:*

$$\frac{\partial w}{\partial k}\frac{1}{w} = \frac{\frac{(M+M^*)^{\alpha}}{L}(1-\Delta k)}{determinant}$$

$$-\frac{\left[\left(\eta-1\right)\lambda_{X,M}\left(1-\tilde{\Theta}_L\right) + \left(1-\beta\right)\left(1-\sigma\right)\left(1-\Theta_L\right)\lambda_X + \epsilon_{z^*}\theta_L(z^*)\gamma^*_{X,M}\lambda_{X,M}/z^*\right]\Delta}{determinant},$$

$$\frac{\partial w}{\partial \tau}\frac{1+\tau}{w} = -\frac{\eta\lambda_{X+M} + \gamma^*_{X,M}\lambda_{X,M}/z^*\epsilon_{z^*}}{determinant} < 0,$$

where 'determinant' is the (positive) determinant the system, λ_g and is the labor share in sector $g = X, X, M$, $\gamma^*_{X,M}$ is the total use of labor in the production of the marginal unit relative to the use of labor in the average unit, $\Delta \equiv (\alpha w - r^*)/(\alpha w k + (1-k) r^*)$ is a measure of the relative costliness of domestic intermediates and
$\epsilon_{z^*} \equiv -c(w, r, z^*)/((1+\tau^*) c^*_{z^*} - (1+\tau) c_{z^*})$ is defined as the absolute change in z^* when costs domestically increase by 1. The parameters, Θ_M and $\hat{\Theta}_M$ are the weighted average of inputs in manufactures where the weights are the total use of labor in manufactures production and just with domestic labor respectively:,[8]

Proof. Omitted in this version. □

The finiteness of the determinant - and thereby the non-zero effect on wages - depends on the elasticity of labor demand in the food sector. If we let labor be the only factor in the food sector and keep the assumption of constant returns to scale a supply function of labor from the food sector will be infinite as long as there is positive production in the food sector. This will keep the wage constant and as demonstrated in sector 5 below will leave welfare in the Southwest independent of trade policy. The importance of the elasticity of labor supply in development policy has long been recognized (Rosenstein-Rodan, 1943 and Lewis, 1954).

The effect from a drop in the tariff on Southwest exports, τ, is straightforward and intuitive: A decrease in τ will affect wages positively through two channels: An increase in export along the intensive margin and an increase along the extensive margin as the marginal variety, z^*, increases. Both drive up demand for labor and thereby the wages. The extent of the intensive margin depends crucially on η and the extensive margin from the change in z^* from changes in costs, ϵ_{z^*}.

The effect on wages from changes in the content requirements are more complicated. The expression is the combination of 4 effects. First, there is the *i) direct effect* of an increase in k which increases the share of domestic inputs thereby driving up demand for labor and correspondingly the price. However, there is an adjustment in total export revenue for the Southwest through both an *ii) intensive margin* effect and an *iii) extensive margin* effect as the use of more expensive inputs increases prices which reduces both demand and competitiveness. These effects depend in an intuitive way crucially on the elasticity of demand, $\eta > 1$ and ϵ_{z^*}. The fourth, the *iv) substitution effect,* is the result of a substitution away from intermediates (which are only partially produced domestically) and towards labor (which is wholly domestic) as a result of a change in relative prices. This effect will naturally be diminished if the requirement on domestically produced intermediates is already high (k and thereby β is close to 1). If production is Cobb-Douglass, $\sigma = 1$, the factor shares are constant and this result is not present. The combined effect is in general ambiguous.

From the expression it can be seen that there are four extreme cases in which content requirements can be deemed to have an unambiguous (positive or negative) effect on wages. If prices of domestic inputs are only marginally higher, ($\Delta \simeq 0$) then the efficiency loss from using more expensive is minimal and the increased use of domestic factors will drive up the wage. It is possibly fruitful to relate this to the result in Grossman and Dixit (1982), who find that a

[8] These are defined as: $\Theta_M \equiv \frac{\left(\int_0^{z^*}(1-\theta_L(w,r,z))L_{X,M}(z)dz\right)}{L_{X,M}}$ $\hat{\Theta}_M \equiv \frac{\left(\int_0^{z^*}(1-\theta_L(w,r,z))L_X(z)dz\right)}{L_X}$.

small increase in k is always welfare improving as the distortion from small changes is of second order. Here it is assumed to be first order. However, as the gain in both models come at the gain from the trading partner, it is - as we will show below - not clear that content requirements should be included in trade preferences, regardless of whether the initial distortion is of second order or not.

AGOA imposed content requirements on countries not deemed least developed which is consistent with this result. As $\eta > 1$ any increase in costs from the use of more expensive domestic units will reduce export revenues, and if demand is sufficiently elastic (η sufficiently high) an increase in content requirement will always be decremental to Southwest wages. If on the other hand the existing production of manufactures is low ($z^* \simeq 0$) it can be demonstrated that all but the final term will tend to zero, such that with a small existing production the forced use of domestic inputs will have little impact on labor demand, but risk driving out the (only marginally competitive) manufacturing industry. Alternatively, if there is existing production, but the labor share of this production is low ($\lambda_{X,M}$ and λ_X near zero) then the reduced competitiveness resulting from the forced use of more expensive domestic will have little impact on existing low production, but will still have the direct effect of increasing demand for manufactured inputs and driving up wages.

4.2 The production of manufactures

It is clear from above that a content requirement impacts overall occupation in the manufacturing industry both through a higher labor demand per unit (the direct effect and possibly the substitution effect) and a overall drop in production from a less competitive industry (the effects along the intensive and extensive margin). *Total exports in the manufacturing sector will therefore always suffer from such a policy*, but the size of the labor force employed in manufacturing (both directly and indirectly in the production of intermediate goods) might increase. Note from the labor market clearing condition, (14), that the total size of the workforce directly and indirectly employed in manufacturing ($L_M + L_X$) increases if and only if the labor force in food, L_y, shrinks. Combining equations (11) and (12) we find that the marginal effect on food production from changes in wages is given by:

$$\frac{\partial y}{\partial w}\frac{w}{y} = -\frac{\theta_{L,F}}{\theta_{F,T}}\sigma_F < 0,$$

implying that food production increases if and only if wages drop, such that the sign of $\partial w/\partial k$ is also a sufficient condition for the change in the labor force directly or indirectly employed in manufacturing. If it is positive then an increase in content requirements will increase such employment. We collect this in the following lemma

Lemma 3. *Consider an increase in the content requirement, k, as described in proposition 2. It holds that*

i) Total exports falls,

ii) Total labor demand, directly and indirectly, from the production of manufactures increases if and only if $\partial w/\partial k > 0$.

Proof. Follows from the discussion above. □

With these comparative statics in hand we can move on to discuss the predictions of the model from changes in the trade regimes. We will phrase the discussion in terms of the impact of AGOA and the expiration of the MFA.

4.3 AGOA

Initially we consider a decrease in τ keeping the content requirement constant at $k = 0$. Before proceeding we note that the pre-tariff export value of variety z exported by the Southwest is given by $V_z \equiv q_z D(p_z, z)$ such that: $dV_z/V_z = -d\tau/(1+\tau) + (1-\eta)\,\hat{p}_z$, where $\hat{p}_z (\equiv dp_z/p_z)$ is the proportional change in the price of variety z. Relative changes in tariffs and prices are therefore sufficient statistic for (relative) changes in export value. We use this in the following proposition:

Proposition 4. *AGOA with LDBC privilege. Consider a decrease in τ keeping the content requirement constant at $k = 0$. The effect on export value and the extensive margin is given by:*

$$\frac{\partial V_z}{\partial \tau}\frac{1+\tau}{V_z} = -\eta - (\eta - 1)\,\theta_L(w, rz)\frac{\partial w}{\partial \tau}\frac{1+\tau}{w}, \tag{16}$$

$$\frac{\partial z^*}{\partial \tau}(1+\tau) = -\epsilon_{z^*}\left[1 + \theta_L(z^*)\frac{\partial w}{\partial \tau}\frac{1+\tau}{w}\right],$$

Proof. Follows from differentiating equations (4) and (5). □

Equation (16) makes clear that the change in prices for varieties already exported is the sum of two effects. The direct effect from a lowering of tariffs which enables SW exporters to deliver goods more cheaply. Note that this effect is independent of the labor content of the variety. Second, as demonstrated there is a general equilibrium effect driving up wages w, and thereby driving down exports. This effect is stronger for labor intensive goods.

For the extensive margin there are likewise two effects: On the one hand, tariffs drop which makes the marginal variety z^* more competitive, with a countervailing effect of the general increase in labor driving up wages. This implies that if a country is initially only marginally competitive and special trade preferences are granted it will start its exports in sectors that are highly dependent on inputs with low labor factor share.

In principle both effects could be negative for some configurations of parameters, but for reasonable parameters the direct effect will dominate (For a 10 per cent drop in tariffs, and a labor share of the marginal product of, say, 50 per cent, wages would have to increase by 20 per cent to reduce production).

4.4 AGOA with content requirements

For the purpose of the empirical section we briefly discuss the effects of AGOA for countries which were not granted exemption from rules of origins requirements. Since firms can choose between the old regime of lower tariffs but content requirements or the new regime of tariffs but no content requirement the cost function becomes:

$$p_z = min\left\{(1+\tau)\,c(w, r^*, z), c(w, \alpha w, z)\right\},$$

where we have used that competitive pricing implies $r = \alpha w$, it is clear that if any firms will opt out of AGOA it will be those with the highest factor content. As AGOA included a discrete change in k the differential approach taken above might be misleading. Instead take a first order approximation from $(\tau = \tau^*, k = 0)$ to $(\tau = 0, k = 1)$ and use this to derive the change in the export value:

$$\frac{dV_z}{V_z}(1+\tau) = -\eta\tau^* - (\eta-1)\Delta + (\eta-1)\theta_L(w,r,z)\left(\Delta - \frac{dw}{w}\right)(1+\tau), \tag{17}$$

where compared with equation 16 there is an additional term in Δ which is the increased cost of domestic inputs. Again wage changes are likely to be smaller than the direct effects the change in the trade regime. If we ignore this effect it is clear that although exports will (weakly) increase for the AGOA implementation both with and without content requirements, it will increase more for $k = 0$ and this difference is higher for varieties with lower labor share.

The empirical prediction is therefore that a drop in τ will increase exports in particular when the initial tariff rates were high, and AGOA countries that are granted a waiver from content requirements will export relatively more in sectors of high input content. Note that the price itself is not included in equation (17). This is different for the reductions of quota requirements following the expiration of the MFA. We now turn to this.

4.5 The expiration of MFA

On January 1. 2005 MFA expired and along with it quotas on in particular Asian apparel exports to the US. As shown in Farley (1979), a quota has the effect of imposing a specific duty on exports (The Lagrangian multiplier of a corresponding quota-constrained maximization problem) which under very general circumstances will lead to a shift in exports towards higher quality. This was empirically confirmed for the case of Japanese auto exports to the US by Feenstra (1998). Though the policy instrument is properly considered the quota constraint with μ an endogenous variable, we let μ be the policy choice. The cut-off condition then becomes:[9]

$$(1+\tau)\,c(w', r', z^*) = (1+\tau^*)\,c(w^*, r^*, z^*) + \mu,$$

and consumer prices for Southeast export are:

$$p_z = (1+\tau^*)\,c(w^*, r^*, z) + \mu, \;\; z > z^*$$

In an extension of lemma 1 and proposition 2 we can derive the following proposition:

Proposition 5. *Define $\hat{\omega}(z, \tau, k, \mu)$ analogously too ω, as the highest wage level in Southwest that will allow production for variety z under trade regime (τ, k, μ). It holds:*

i) With no trade impediments the highest relative wage is 1 for all varieties ($\hat{\omega}(z, \tau^*, 0, 0) = 1$ for all z)

[9] Technically, now the condition $\partial\theta_L(w,r,z)/\partial z > 0$ is no longer sufficient to guarantee a well-behaved cut-off z^*, that is to ensure that the Southwest exports only $z \leq z^*$. Note that we can write: $c(w,r,z^*) = c(w^*(1+\varsigma), r^*(1+\varsigma), z^*)$, where $(1+\varsigma)\frac{\left(1+\tau^* + \frac{\mu}{c(w^*,r^*,z^*)}\right)}{1+\tau}$, such that the condition is that the unit value of varieties does not fluctuate sufficiently to reverse the Southeast advantage in labor-intensive industries. Naturally, a sufficient condition is that more labor-intensive varieties have higher unit values, which is a reasonable assumption. Although, the math is considerably simplified by this cut-off condition it is not essential. We could define a (non-convex) set of varieties $\xi \in [0,1]$ that the Southwest can produce and gain the same intuition.

ii) The semi-elasticity of ω wrt. to μ is decreasing in the labor share and the price:

$$\partial\hat{\omega}/\partial\tau\,(1+\tau)\,/\omega = 1/p_z\tilde{\theta}_L(w,r,z,k),$$

iii) an increase in the specific tariff μ on Southeast imports will increase wages in the Southwest:

$$\frac{\partial w}{\partial \mu}\frac{1}{w} = \frac{\lambda^*_{X,M}/p_{z^*}}{determinant} > 0,$$

Proof. Analogous to lemma 1 and proposition 2. □

Whereas in the results of proposition 2 prices did not matter, the results in proposition 5 do. Whereas the previous quotas forced Asian exporters into higher priced as argued by Falvey the removal of the quotas lead to an increase in exports and crucially made production relatively more difficult in lower priced items. We test this in the empirical section as well.

5 Efficiency of transfer

A final question concerns the aggregate welfare effects, keeping in mind that many of the dynamic effects argued as central for preferential treatment have been shut off by assumption (we return to the case of no quotas, $\mu = 0$).

We proceed in two steps in the following: First, we address the consequences of changes in trade policy on Southwest welfare and then we proceed to discuss the costs to the North of these implicit transfers. By construction we avoid the question of welfare consequences for the Southeast as the assumption of linear production technology and no consumption of manufactures keeps welfare there constant. The efficiency of the implicit transfer from the North to the Southwest depends on the implied three distortions arising from trade policy: Between the production of food and manufactures, between manufactures production in Southwest and Southeast and finally in the production of intermediate inputs between the Southwest and Southeast.

If we value aggregate welfare with a Bergson-Samuelson social welfare function we can write the change in total utility in the Southwest as:

$$\frac{dU^{SW}}{\gamma^{SW}} = dI^{SW} = Tdt + (L_F + L_M + L_X)\,dw = L_{X,M}dw, \tag{18}$$

where U^{SW} is total utility in the Southwest, dI^{SW} is the change in income in the south, γ^{SW} is the pure income derivative and the second equality follows from equation (11). Note that:

$$d\left(\int_0^{z^*} D(p_z,z)q_z dz\right) > d\,(wL_{X,M}) > L_{X,M}dw.$$

The total increase in export revenues is higher than the increase in the amount that is paid to domestic factors. Furthermore, as the welfare impact is $L_{X,M}dw$ and not total change in wage payments $d(wL_{X,M})$ the expression makes explicit the opportunity cost of raising production in the manufacturing sector as the cost of (labor) resources being pulled out of the food sector. Only the direct impact on wages can have a positive impact on aggregate welfare. Should the

interest lie with the welfare of workers then naturally Ldw is the appropriate measure of welfare change. Importantly, in both cases a sufficient statistic for the welfare gains of trade policy is whether it raises wages and proposition 2 can straightforwardly be rephrased to concern either aggregate welfare or the welfare of Southwest workers.

With this in hand, it is natural to ask what the welfare costs to the North are of changes in trade policy. As the stated objective of trade preferences is to aid the Southwest, we loosely follow McCulloch and Pinera (1977) in letting the objective function of the North be

$$W = U^N + \varphi U^{SW} - \varphi^P \left(\vartheta V + V^*\right),$$

where U^N is a "standard" (Bergson-Samuelson) measure of welfare, $\varphi^P \left(\vartheta V + V^*\right)$ is a political cost of imports with differential weight on Southwest and Southeast exports and $\varphi^P < 1$.[10] It is important that $\vartheta < 1$, that is for the political cost of exports from the Southwest to be higher than those from the Southeast for there to be positive production in the Southwest if the North is not concerned with welfare there. With identical tariffs and no content requirements production is completely determined by w/w^* and only in the case of $w = w^*$ can there be positive production in both countries in which case the labor-content of production is undetermined.

The parameter φ measures the extent to which the North incorporates Southwest welfare in its maximization problem. By appropriate normalization of U^N and U^{SW} we let $\varphi = 1$ be the special case with equal weights, such that for any $\varphi < 1$ a pure wealth transfer is not desirable. We can find:

$$\frac{dU^N}{\gamma^N} = d\left(\tau V + \tau^* V^*\right) - \int_0^1 D(p_z, z) dp_z dz,$$

where $dU^N, \gamma^N (= \gamma^{SW}$ by normalization) and $dI^N = d(\tau V + \tau V^*)$ have the analogous interpretations as for the Southwest above. As the North produces only food the change in income is equal to the change in tariff income, where V and V^* is the value of imports from Southwest and Southeast, respectively. The first order conditions of the problem $max_{\tau,\tau^*,k} W$ are:

$$\tau: \; -\frac{(\tau - \varphi^P \vartheta)\eta}{1+\tau} V + \left[\pi\left(1+\varphi^P\right) + (1-\vartheta)\varphi^P\right] V_{z^*} \frac{\partial z^*}{\partial \tau} - \left[\chi(\tau) - \varphi\right] L_{X,M} \frac{\partial w}{\partial \tau} = 0, \tag{19}$$

$$\tau^*: \; -\frac{(\tau^* - \varphi^P)\eta}{1+\tau^*} V^* + \left[\pi\left(1+\varphi^P\right) + (1-\vartheta)\varphi^P\right] V_{z^*} \frac{\partial z^*}{\partial \tau^*} = 0, \tag{20}$$

$$k: \; -\left[\chi(\tau)\right](M + M^*)(\alpha w - r^*) - \left[\chi(\tau) - \varphi\right] L_{X,M} \frac{\partial w}{\partial k} + \left[\pi\left(1+\varphi^P\right) + (1-\vartheta)\varphi^P\right] V \frac{\partial z^*}{\partial k} \leq 0, \tag{21}$$

where $\pi \equiv \left[c(w^*, r^*, z^*) - c(w, r, z^*)\right] / c(w, r, z^*)$, is a measure of the relative inefficiency of misallocation of Southwest/Southeast production of the final manufactures. If $\pi < 0$ "too much" production takes place in the Southwest from the stand point of economic efficiency. As $w > w^*$ this must be the case in any equilibrium with positive exports from the Southwest.

The first order equations weigh economic efficiencies with political considerations. Consider first the first order condition for the use of a tariff on the Southeast: An increase in τ^* will

[10] Though the present model does not feature production of manufactures in the North, such an extension would be natural and a political objective could be the direct protection of domestic production (McCulloch and Pinera, 1977) or contributions as in the protection-for-sale literature (Grossman and Helpman, 1994). Here we choose total imports as an intuitive measure of protection, but any measure, Ξ, with $\Xi_\tau, \Xi_{\tau^*} > 0$ would lead to similar conclusions.

have the usual effect of distorting food/manufactures production, an effect that is of second order at $\tau^* = 0$ from familiar reasoning. Furthermore, an increase in τ^* will push production towards the Southeast ($\partial z^*/\partial \tau^* > 0$) and alter the geographic local of manufactures. If $\pi > 0$ this will increase efficiency as - from an economic point of view - too much production was taking place in the Southwest. These considerations must be weighted against the political desirability of lower imports, in particular from the Southwest. Without political considerations only importing from the Southeast would have been optimal, and $\tau^* = 0$ would have been the optimal tariff.

Whereas the North is unable to manipulate prices in the Southeast it can do so in the Southwest which is captured in the additional term in the first order condition for τ: The cost to the North for a one dollar increase in production costs in the Southwest is given by: $\chi(\tau) \equiv 1 + \tau\eta - \varphi^P \vartheta(\eta - 1) > 0$ It is the combination of three terms: First, the direct effect of the price increase, second an additional distortion as the increase in prices reduces demand and thereby tariff revenue, and finally a positive term resulting from lower political costs of imports. As $\partial w/\partial \tau < 0$ this term captures the North's ability to exploit its monopoly power. However, if $\varphi > 0$ this has to be weighted against the cost to Southwest welfare captured by equation 18. However, with $\chi(\tau) \geq 1 \geq \varphi$ there is always some cost of using tariffs.

Finally, consider the first order condition for the content requirements, k, which introduces an additional distortion, in the production of intermediate inputs as it shifts production from the economically efficient Southeast to the Southwest. The expression is proportional to the cost difference, $\alpha w - r^*$and the total use of intermediates: $M + M^*$. The second term is analogous to the wage effect of a change in tariffs, except that from proposition 2 the sign of $\partial w/\partial k$ is ambiguous. Finally, note that as $dz^*/dk < 0$ an increase in content requirement will push production towards the Southeast which will increase economic efficiency ($\pi < 0$ in equilibrium) - and thereby tariff income - but which will also increase undesirable imports from the Southwest. We can demonstrate that for ϑ not too far from 1, $\left[\pi\left(1 + \varphi^P\right) + (1 - \vartheta)\varphi^P\right] > 0$ implying that an increase in k is moves production back to the Southeast in a manner that is undesirable to the North. The first order condition for k is written with a slack equality, $\leq$, as an interior solution for k will in general not be optimal.

Using this we can derive the following proposition:

Proposition 6. *Consider the maximization problem $max_{\tau,\tau^*,k}W$. The first order conditions are given by equations (19), (20) and (21). Call the optimal $\tau^{opt}, \tau^{*,opt}, k^{opt}$. It holds that*

- A solution with positive exports from both countries will feature an interior solution: $0 < \tau^{opt} < \tau^{*,opt}$.

- Any positive weight on Southwest welfare, $\varphi > 0$, will feature some trade preferences:

$$\frac{\partial \tau^{opt}}{\partial \varphi} < 0,$$

- In general the solution of k is not interior and $\partial k^{opt}/\partial \varphi > 0$ is not guaranteed.

Proof. Omitted in this version. □

Though an explicit solution for τ^{opt}, $\tau^{*,opt}$ and k^{opt} are difficult to obtain the first order conditions above help us characterize the optimum. First, consider an initial interior solution for $\varphi = 0$, that is for the setting where the North does not weigh the welfare of the Southwest. We

think of this as the situation before special trade preferences. As the North has no monopoly power over the Southeast $\varphi^P > 0$ and $\vartheta < 0$ are necessary for $\tau < \tau^*$ such that there is positive exports from both countries. Now consider an increase in φ implying a positive weight on Southwest utility in the utility function. As tariffs were optimally set before the cost to reducing tariffs are second order, but if and only if the North can affect Southwest wages, there is a first order gain to be had from lowering tariffs. This holds even if $\varphi < 1$ such that direct transfers are not optimal: Even compared with efficient direct transfers some amount of tariff concession is optimal.

In contrast, consider the first order condition of k. As the discussion above made clear there is no guarantee of an interior solution, $k \in (0,1)$. In fact, if $\left[\pi\left(1+\varphi^P\right)+(1-\vartheta)\,\varphi^P\right] > 0$ then $k > 0$ can be optimal only if $\partial w/\partial k < 0$, that is only if, the North can exploit its market power through content requirements by lowering Southwest wages and thereby welfare, a situation contrary to the idea that content requirements are good for the Southwest. Finally, as $k = 0$ might be optimal there is no guarantee that an increase in the weight of Southwest utility in the North will necessitate a use of content requirements.

Naturally, these conclusions are obtained in a neo-classical model which does not feature any of the dynamic effects that are often argued as consequences of trade preferences. In the following we initially consider varying labor productivity across varieties and show that the lack of content requirements still pushes production towards varieties with low labor content, which need not be those that are closest to the technological frontier. And furthermore we briefly discuss the implications of increasing returns to scale at the industry level.

6 Heterogeneous productivity

Having discussed the positive and normative implications of a neo-classical model of trade preferences we briefly address some of the dynamic arguments often made in favor of special trade preferences. First, we allow for varying productivity across varieties and demonstrate that trade preferences still favor production in input-intensive production, which need not be those that are closest to being able to compete without special preferences. Second, we briefly discuss a possible extension of the model to allow for external increasing returns to scale, but separately for the production of inputs and manufactures.

In the following we allow for heterogeneous productivity across inputs and that such special trade preferences continue to allow for dispersions in labor costs proportional to the inverse of the labor intensity. These preferences will therefore favor production in input-intensive industries, which need not be those where productivity is closest to capabilities in the Southwest. Even with spill-overs trade preferences therefore risk favoring production that cannot reasonably become competitive without special preferences.

Allow for labor productivity of $1/\gamma_z$ for variety z. Let $\tilde{\omega}\left(z,\tau,k,\gamma_z\right)$ be the relative wage that is possible when labor productivity is $1/\gamma_z$. $\tilde{\omega}$ is given by:

$$(1+\tau)\,c(\gamma_z\tilde{\omega},\alpha k\tilde{\omega}+(1-k)\,\alpha^*,z)=(1+\tau^*)\,c(1,\alpha,z),$$

and again we find:

$$\frac{\partial\tilde{\omega}}{\partial\tau}\frac{(1+\tau)}{\tilde{\omega}}=1/\tilde{\theta}_L(\gamma_z w,r,z),$$

such that the ability of an industry to engage in production is still determined by (the inverse) of its labor share. The ability to compete internationally without special preferences, $\tau = \tau^*$ and $k = 0$, however, is given by $\tilde{\omega} = 1/\gamma_z$.

Though preliminary this analysis suggests that there is an important different between the varieties that are closest to being able to compete internationally, that is those with the lowest γ_z, and those that are best able to compete under special trade preferences, which are the least labor productive. The design of AGOA without special trade preferences thereby push production into sectors that require substantial productivity improvements to succeed without such special treatment.

7 Econometric Evidence

Our background review identified three distinct trade regimes facing AGOA recipients from the mid-1990s: (a) Quotas under the MFA, (b) AGOA preferences with a distinction between countries with third country fabric provisions and those without, and (c) the expiration of the MFA. The following describes the two approaches we use to test our theory. In the first approach we identify changes in export composition and characteristics (value-addition, and fabric intensity) associated with the MFA and AGOA preferences using difference-in-difference estimation. In the second approach, we exploit the very detailed pricing data available for US imports of apparels. We infer from these estimates changes in the fabric and valued-added content of clothing exports in response to the AGOA preferences and MFA quotas. These two approaches are complimentary and both support the importance of fabric content in the effects of special trade preferences, as well as our theoretical predictions about shifts in fabric content.

We find support for our theoretical predictions. AGOA resulted in a strong export response by firms in beneficiary countries. The effects were strongest in products with high tariff preferences and from countries eligible for the third-country fabric provision, whereas the export response by other AGOA members was poor. The composition of apparel exports by designated 'lesser-developed' AGOA countries also shifted towards low-value added products. The price-analysis, which captures within-product shifts in the composition of U.S. imports, provides some corroborating evidence. AGOA recipients are found to be specialized in fabric-intensive clothing products with low value addition relative to quota-constrained (and other) countries. This approach suggests, however, that the implementation of AGOA, however, led to no further increases in the overall fabric intensity of these exports. Lesser-developed beneficiaries predominantly expanded the output of the products they were already exporting as a result of their MFA preferences i.e. growth was primarily along the intensive margin. We find that that the expiration of the MFA, adversely affected exports from AGOA recipients, but the effect was mitigated for the least developed AGOA countries by the third-party fabric preferences provided under AGOA. Other non-quota constrained emerging economies experienced larger declines in exports to the U.S. than AGOA recipients. The price analysis reveals China and other previously quota-constrained countries raised the fabric content of their exports after 2005 relative to other emerging economies, as predicted by our theory. The fabric-content of lesser-developed AGOA apparel exports also rose relative to the emerging country control group.

7.1 Export value and composition of exports

We commence with the specification of the export value. The two trade regimes (MFA and AGOA) are predicted to influence the value, volume and range of apparel products exported by AGOA recipients and other affected countries. We derive an empirical specification from our model similar to the difference in differences (DD) approach used by Frazer and Van Biesebroeck (2010).

7.1.1 Specification

The first hypothesis concerns the differential impact of AGOA on countries eligible for fabric provisions and those that are not. Consider a producer in country c, exporting variety z at time t and facing tariffs, wages and input costs of $\tau_{z,c,t}, w_{c,t}$ and $r_{c,t}$, respectively. In the spirit of proposition 4, we can take a first order approximation of the log of total imports around $(\tau_{c,z,0}, w_{c,0}, r_{c,0})$ to get:

$$\ln V_{c,z,t} = \ln V_{c,z,0} - \frac{\sigma}{1+\tau_0}\left(\tau_{c,z,t} - \tau_{c,z,0}\right) + (1-\sigma)\left[\theta_L^0(z)\left(w_{c,t} - w_{c,0}\right) + \left(1-\theta_L^0\left(z\right)\right)\left(r_{c,t} - r_0^*\right)\right], \tag{22}$$

where $\theta_L^0(z)$ is short hand for the initial labor-intensity of this sector and we use that initially all countries where able to use inputs at the world price of r_t^* which we for simplicity keep constant at r^*, without loss for the empirical specification due to fixed effects. For the sake of simplicity we will in the following exploit that changes in wages are a general equilibrium effect and keep wages constant.[11]

Now consider a country $c = c_1$ which is eligible for special fabric provision and one $c = c_2$ that is not. For the country that is not a producer of a given product can either use AGOA which implies $\tau_{c_2,z,t} = 0$ but $r_{c_2,t} = \alpha w_{c_2,t}$ or not which implies $\tau_{c,z,t} = \tau_{c,z,0}$ but $r_{c,t} = r_0^*$. We write the empirical specification as:

$$\begin{aligned} \ln V_{c,z,t} = \alpha_{c,z} + \beta_1 D2001 \cdot Dldc_c \cdot DAg_c \\ + \beta_2 D2001 \cdot DAg_c + \beta_3 D2001 \cdot Dldc_c \cdot DAg_c \cdot \theta_L^0(z) \\ \beta_4 D2001 \cdot DAg_c \cdot \theta_L^0(z) + \delta_{c,z} + \delta_{z,t} + \varepsilon_{c,z,t}, \end{aligned} \tag{23}$$

where $DAg_c = 1$ for all AGOA eligible countries, $Dldc_c = 1$ only for those who are eligible to use third party fabric and $D2001 = 1$ for those years following the implementation of AGOA in 2001.[12] Using equation 22 we get: $\beta_1 > 0$, $\beta_3 > 0$, that is countries eligible for the special fabric provision will benefits more than those not eligible and in particular in sectors with high fabric intensity (low $\theta_L\left(z\right)$).

[11] All that is required is that wages change by less than the changes in tariffs and input prices as a consequence of content requirement.

[12] An important consideration relating to the basic specification is that not all countries became eligible for the third-country fabric provision at the same time. We therefore replace D2001 with time- and country-varying dummy variables DAg_startct and Dldc_startct which equal 1 for each country from the time they became eligible for AGOA preferences and LDC Special Rule preferences, respectively.

7.1.2 Data

The empirical analysis draws on a panel of time-consistent 10-digit HTS import data for the U.S. from 1996-2008.[13] The raw data contains approximately 1202 product lines for Clothing (HS61, 62 and various sub-codes of HS 64 & 65) covering 224 countries.

For the import value equations (17 and 18), the dependent variable is the logarithmic transformation of import values. We follow Frazer and Van Biesebroeck (2010) and add a constant of value 1 dollar to all import values to address the problem of zero imports.[14] Across product shifts in the composition of imports are evaluated using initial MFN tariffs as a proxy for the tariff preference and the share of value added in total shipments as an inverse measure of the fabric-intensity. These are calculated at the NAICS 6-digit level using data from the 2000 U.S. Manufacturing Census.[15]

7.1.3 Results

In table 3 and Figure 4 below we run the regression first without fabric intensity and then with (using bins) including the original tariff level.

We similarly use the result for the extensive margin to derive an equation analogous to equation (23) for the extensive margin. These results are likewise shown in table 3

Our expectation is that AGOA preferences stimulated US imports from beneficiary countries, with relatively high growth in imports of fabric-intensive and low value-added products. In addition, we expect import growth to be positively correlated with tariff preference margins. The effects are predicted to be particularly pronounced in LDC recipients eligible to use third country fabric. Impact on value and range of products We first ascertain the impact of AGOA apparel preferences on the value and range of U.S. imports from recipient countries. The results of the difference-in-difference estimation over the period 1996 through 2004 are presented in Table 3. The first set of columns, reveal that the AGOA preferences resulted in a 16.8 percent increase in U.S. imports from LDC beneficiary countries relative to other AGOA countries over the period 2001 through 2004. Imports from other AGOA countries actually fell by 8.4 percent from 2001 to 2004 relative to all other countries (the control group). We attribute the difference in import performance to the third-country fabric provision.

The estimated size of the impact is substantially smaller than other studies where the estimates range from 38.4 percent (Frazer and Van Biesebroeck 2010, table 2) to 303 percent for the top 7 beneficiaries (Portugal-Perez 2008). One reason is that our data are at a far more disaggregated level than their studies and our sample therefore contains far more product lines for which there was no trade in both periods. When we delete country specific product lines in

[13] The HTS classification changed frequently throughout the period as new product lines were introduced and old product lines were aggregated. We use the Pierce and Schott (2009) concordance program to construct a time-consistent classification for the full period.

[14] This increases the mean of exports by one dollar, but does not affect the variance. See Frazer and Van Biesebroeck (2010) who show that the positive impact is insensitive to different choices of constant value, although the size of the impact is influenced. One concern with applying OLS to this estimate is that the transformed dependent variable is left-censored at zero. Portugal-Perez (2008) therefore uses a Tobit model in his estimates. This was not feasible in our case given the large number of fixed effects included.

[15] We also used estimates of share of fabric in costs at the 4-digit HS level obtained from estimates of price equation 21. The results suggest that U.S. apparel imports from LDC recipients shifted towards mid- and high-fabric intensive products, but the effects were not significantly differences across fabric categories once the effect of tariff preferences were accounted for.

Table 3: Impact of AGOA apparel preferences on US import volumes from beneficiary countries

Dependent variable	ln IMP	ln IMP	Import dummy
		Positive value	
Sample	All	product lines	All
Years	1996-04	1996-04	1996-04
	(1)	(2)	(3)
Marginal impact LDC preference relative to Other AGOA	16.8%	281.5%	1.2%
Marginal impact Other AGOA relative to non-AGOA	-8.4%	17.6%	-0.9%
Regression coefficients			
$Dldc\_start_{ct}*Dldc_c*DAg_c$	15.5%	133.9%	1.2%
	(26.20)	(19.66)	(20.18)
$DAg\_start_{ct}*DAg_c$	-8.8%	16.2%	-0.9%
	(23.61)	(3.46)	(21.56)
N	3114506	732050	3114506
Fixed effects	product/year country/product	product/year country/product	product/year country/product

Notes: Robust t-statistics presented in parentheses. Estimates are robust to heteroskedasticity. South Africa, which is not eligible for the third country fabric provision, is excluded from the apparel eligible group. Mauritius is also excluded, as it was only eligible for the LDC special rule from October 2004 – September 2005 and more recently from November 2008. Percentage change in the value results is calculated as exp(coefficient)-1

which no trade occurs (as in Portugal-Perez (2008)) increases in imports of over 280 percent are estimated for LDC recipients relative to other AGOA beneficiaries (column 2). Other AGOA countries now experience a rise in exports relative to the control group (all other countries). The final column of the table isolates the extensive margin response to AGOA. The estimates reveal that the third-country fabric provision raised the probability of exporting each product line by 1.2 percent relative to the rest of AGOA. These results, therefore, corroborate existing empirical evidence that AGOA preferences and the third country fabric provision led to substantial increases in U.S. apparel imports from recipient countries. Table 4 presents estimates where we interact the AGOA dummy variable with various categories of tariff preferences (based on the initial MFN tariff rate). The results reveal a substantially larger growth in imports from AGOA recipients in products facing high tariff preference. For example, US imports from lesser-developed AGOA countries grew by 78 percent (relative to rest of AGOA) in products facing a 20 percent or upwards tariff preference, compared to 1 percent in products facing tariff preferences of less than 10 percent. The extensive margin response was also much larger in relatively protected sectors: 4.7 percent for tariff $\geq$ 20 percent and 0 percent for tariff $<$ 10 percent.

To evaluate shifts in the composition of US imports towards low value added, fabric-intensive products we estimate equation 23 where we interact the various difference terms with the NAICS 6-digit level based measures of the share of value-added in cost in U.S. manufacturing. To condition on the tariff preference effect, we also include the interactions with tariff preferences as presented in Table 4.

The results presented in Figure 8 reveal strong evidence of structural shifts in the composition of U.S. apparel imports from LDC AGOA recipients towards low value added products. Lesser-developed countries experienced import growth in excess of 66 percent in low value-added apparel products (value added share less than 38 percent) and only 15-25 percent growth in higher value-added products compared to other AGOA recipients. Growth in the extensive margin was also relatively strong in low value added sectors (see Appendix Table 10). In sum, our estimates present considerable evidence of the positive impact of AGOA preferences on imports from recipients, particularly those eligible to use third country fabric. As predicted, the growth in import value and range of new products imported rise according to the preference margin. In addition, we find that the third country fabric provision of AGOA resulted in a shift in the composition of US imports from lesser-developed recipients towards relatively low value added products.

A limitation of the difference-in-difference analysis base on import values is that import value data hide substantial price heterogeneity within each product line.

Take for example, Figure 5 that plots U.S. import unit values on exporter per capita GDP (both in logarithmic form) for Women's and girls' cotton pullovers (Lesotho's top apparel export) in 2004. The price of imports of this highly disaggregated HS10-digit product ranges from under 10 dollars to over 1000 dollars per square meter equivalent with higher income economies producing the more expensive (higher quality) varieties (as in Hummels and Klenow (2002) and Schott (2004)). The lesser-developed AGOA recipients predominantly situate at the low-quality, low-income per capita end of the spectrum.

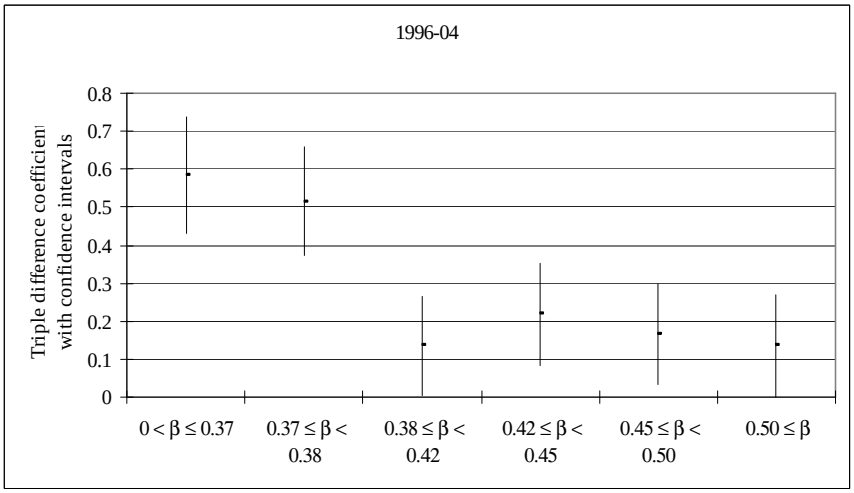
Therefore, even HS 10-digit data is too aggregated to fully capture the variation in product quality. By only looking at changes in the value or range of HS10-digit products exported by each country, we may miss important changes occurring within each product line. Accordingly,

Table 4: Marginal impact of AGOA on imports from recipient countries by MFN tariff preference

Dependent variable	ln IMP	Import dummy
Sample	All	All
Years	1996-04	1996-04
Marginal impact LDC preference relative to Other AGOA		
t < 10%	1.0%	0.0%
	(1.57)	(0.49)
10% ≤ t < 17%	13.5%	0.9%
	(12.10)	(8.83)
17% ≤ t < 18%	22.5%	0.8%
	(3.00)	(1.29)
18% ≤ t < 20%	68.2%	4.2%
	(11.02)	(9.61)
20% ≤ t	78.1%	4.7%
	(26.10)	(23.11)
Marginal impact Other AGOA relative to non-AGOA		
t < 10%	-6.9%	-0.8%
	-(15.05)	-(14.02)
10% ≤ t < 17%	-7.6%	-0.8%
	-(11.87)	-(11.02)
17% ≤ t < 18%	-8.8%	-0.5%
	-(2.15)	-(1.13)
18% ≤ t < 20%	-14.5%	-1.4%
	-(6.16)	-(5.53)
20% ≤ t	-13.1%	-1.3%
	-(12.29)	-(11.00)
N	3114506	3114506
Fixed Effects	product/year country/product	product/year country/product

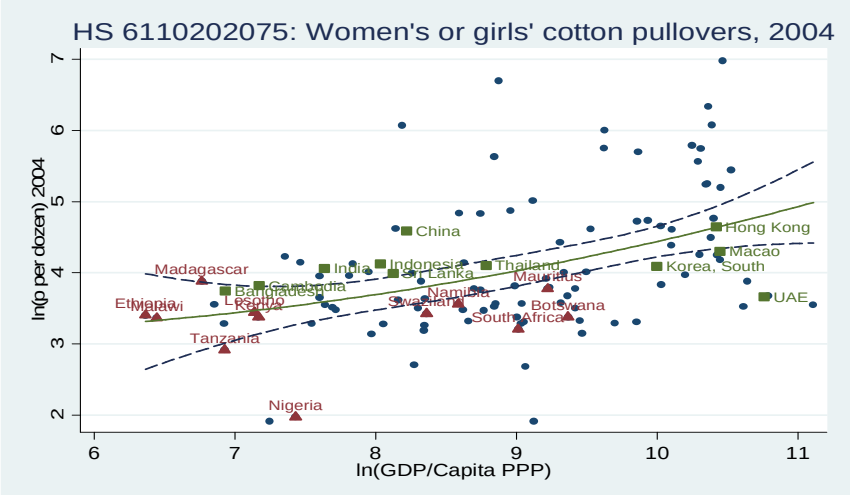
Notes: Robust t-statistics presented in parentheses. Estimates are robust to heteroskedasticity. South Africa, which is not eligible for the third country fabric provision, is excluded from the apparel eligible group. Mauritius is also excluded, as it was only eligible for the LDC special rule from October 2004 – September 2005 and more recently from November 2008. Percentage change in the value estimates is calculated as exp(coefficient)-1. The tariff cut-off points are set so that total US apparel imports are equally distributed across categories.

Figure 4: Marginal impact of third-country fabric provision on U.S: imports by value added category, conditional on import response to tariff preferences



Notes: The cut-off points are set so that total US apparel imports are equally distributed across categories.

Figure 5: Unit values and level of development: Top Apparel product exported by Lesotho in 2004 (Women's or girls' other pullovers of cotton, knitted)



Notes: Triangles are AGOA countries eligible to export apparel. Square blocks reflect the top quota restricted countries from 1984-2004 as identified by Brambilla et al. (2010)

our second empirical method is based on the analysis of highly disaggregated import unit value data. More specifically, we use difference-in-difference estimation to exploit the distinct breaks arising from the implementation of AGOA and the ending of the MFA and identify whether prices changes and changes in the fabric-intensity of apparel products are consistent with those predicted by our theory.

7.2 Pricing equation

A limitation of the difference-in-difference analysis base on import values is that import value data hide substantial price heterogeneity within each product line. Take for example, Figure 5 that plots U.S. import unit values on exporter per capita GDP (both in logarithmic form) for Women's and girls' cotton pullovers (Lesotho's top apparel export) in 2004. The price of imports of this highly disaggregated HS10-digit product ranges from under 10 dollars to over 1000 dollars per square meter equivalent with higher income economies producing the more expensive (higher quality) varieties (as in Hummels and Klenow (2002) and Schott (2004)). The lesser-developed AGOA recipients predominantly situate at the low-quality, low-income per capita end of the spectrum.

Consider a producer of variety z producing in country c with factor prices $w_{c,t}$ and $r_{c,t}$. Use equation (5) to take a first order approximation in $\ln w_{c,t}$ and $\ln r_{c,t}$ around $(\ln w_{c,0}, \ln r_{c,0})$:

$$\ln(c(w_{c,t}, r_{c,t}, z)) \simeq A_{c,z} + \theta_L(w_{c,0}, r_{c,0}, z)\ln w_{c,t} + [1 - \theta_L(w_{c,0}, r_{c,0}, z)]\ln r_{c,t} \tag{24}$$

There are essentially two changes in response to the MFA and AGOA that we wish to identify: (i) changes in the price level and (ii) changes in the fabric-intensity of U.S. apparel imports. Changes in the price level would be revealed by shifts in the intercept, whereas changes in fabric-intensity brought about by across and within-product (at 10-digit level) shifts in the composition of imports would be revealed by changes in the coefficients on fabric and value added prices. For example, a shift by AGOA recipients to more fabric intensive varieties within each 10-digit product line should be revealed by a rise in the coefficient on fabric prices and a decline in the coefficient on value added prices.

As in the analysis of import values, difference-in-difference estimation is used. To identify changes in the level of import prices from a region in response to a shock, say AGOA countries after the expiration of the MFA, the above equation is modified to include an interaction between an AGOA dummy variable (DAg) and a dummy variable for the new period (D05). The basic price equation in this example is then specified as:

$$\begin{aligned} \ln p_{z,c,t} &= \gamma D05 \times DAg_c \\ &+\delta_1 \ln pf_{z,t} + \delta_2 \ln pva_{z,c,t} \\ &+\beta_2 \ln e_{c,t} + \beta_3 \ln q_{z,c,t} + \beta_4 \ln(1 + \tau_{z,c,t}) \\ &+\lambda_{z,c} + \lambda_t + \epsilon_{z,c,t}, \end{aligned} \tag{25}$$

where - unlike the theoretical treatment - we allow fabric prices (pf) to vary with type of product and pva is the value added price (made up labor and capital costs). The coefficientβ measures the marginal effect of the end of the MFA (D05) on unit values of U.S. imports from AGOA countries (DAgc) relative to all other countries in the sample (the control group). Country by product (cntry/prod) fixed effects are included, so the regression uses the within-country by

product variation of prices and the other variables over time to estimate the coefficients.[16] Year fixed effects λ_t are also included to account for common shocks across all product varieties. A more comprehensive specification that also allows for changes in the relative fabric-content of apparel imports from AGOA beneficiaries in response to the change in the trade regime is as follows:

$$\begin{aligned}\ln p_{z,c,t} = \gamma D05 \times DAg_c + \delta_1 \ln pf_{z,t} + \delta_2 \ln pva_{z,c,t} \\ + (\alpha_1 + \gamma_1 D2005) \times DAg_c \times \ln pf_{z,t} \\ + (\alpha_2 + \gamma_2 D2005) \times DAg_c \times \ln pva_{c,z,t} \\ + (\delta_1 + \gamma_3 D2005) \times \ln pf_{z,t} \\ + (\delta_2 + \gamma_4 D2005) \times \ln pva_{c,z,t} \\ + \beta_2 \ln e_{c,t} + \beta_3 \ln q_{z,c,t} + \beta_4 \ln(1 + \tau_{z,c,t}) \\ + \lambda_{z,c} + \lambda_t + \epsilon_{z,c,t}.\end{aligned} \tag{26}$$

We are most interested in the additional rows 2 and 3 which capture the effect of the post-MFA period on fabric-intensity in AGOA countries (first difference) relative to the effect of the post-MFA period on fabric-intensity in the control group (second difference). Assuming the control group in this estimate is quota-constrained countries, we would expect a decline in fabric-intensity of AGOA exports. Support for our hypothesis would be revealed by a negative coefficient on the AGOA by post-MFA interaction with the fabric price (γ_1) in row 2 combined with a positive coefficient on the AGOA by post-MFA interaction with the value added price (γ_2) in row 3. Note that these coefficients reflect the post MFA impact on fabric-intensity in AGOA countries relative to the post-MFA impact on fabric-intensity in the control group which is captured by the coefficients γ_3 in row 4 and γ_4 in row 5.

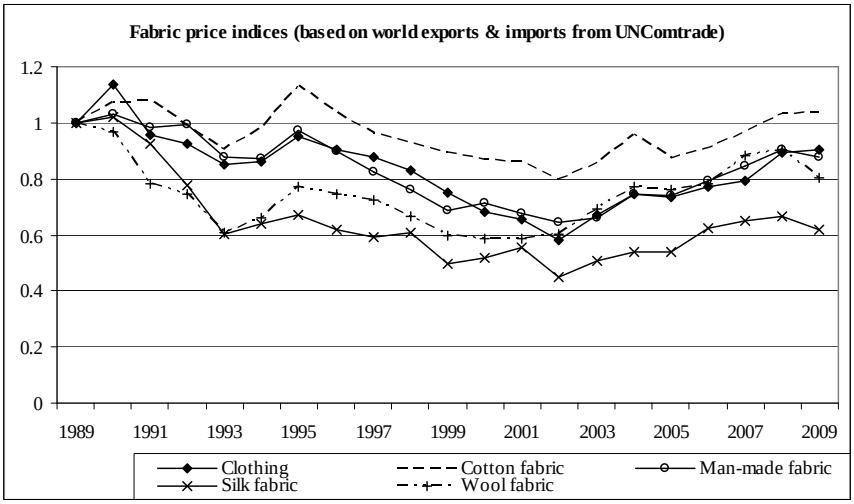
7.2.1 Data

In the price equations (25) and (26), the log import price of clothing exclusive of tariffs, insurance and freight costs is used as the dependent variable. This does not affect the estimates, except that the pass-through of tariffs to US domestic prices of imports is calculated as $1 - \beta_4$. Looking at the independent variables, we use the foreign industry value added deflator (in foreign currency) for pva, the US dollar to foreign currency exchange rate for e and US Producer Prices (at 6-digit NAICS level) (usppi) and competitor clothing unit values (at 10-digit level) (Pcompete) for substitute products q. Applied tariff rates are defined at the 4-digit HS level.[17]

[16] The standard most restrictive difference specification includes a dummy variable for AGOA countries (DAgc), but in equation 22 these have been replaced with country by product fixed effects (cntry/prod) to allow for country and product level heterogeneity in the base-level of import prices.

[17] We use the average tariff at the HS 4-digit level to avoid erroneous correlations arising from the construction of the variables (tariff rate = duty/import value and price = import value/import quantity). Using the average may also reduce biases associated with the potential endogeneity of product level tariff rates. The trade data are obtained from Peter Schott who constructed the database using US Customs Service data. US producer prices are obtained from the Bureau of Labor Statistics, fabric prices are constructed using UNcomtrade data and the exchange rates are obtained from the World Bank World Development Indicator database. Country specific tariff rates at the 4-digit HS level are constructed as the sum of duties collected over value of imports. Competitor clothing prices are calculated as the geometric average price of all other countries (using import values as weights).

Figure 6: Fabric price indices



Notes: Based on Tornqvist price index constructed using hs 6-digit unit values obtained from UnComtrade trade data. Hs 6-digit product lines for fabric (HS (50 - silk, 51-wool, fine animal hair, 52-cotton, 54-man made fiber, 55 - man-made staple).

In addition to these variables, real GDP per capita measured in PPP prices is included to capture the impact on prices of general productivity improvements in the economy and relative technological advantage in producing higher-quality goods (Hummels and Klenow 2005).[18]

For fabric prices, we calculate Tornqvist price indices for silk (HS50), wool and fine animal hair (HS51), cotton (HS 52) and man made fiber and staple (HS 54 & HS55) using unit values derived from world trade data obtained from UNComtrade.[19] The calculated fabric indices are presented in Figure 6.[20] Of interest, is the relatively close association between the average U.S. import unit value of wearing apparel (HS 61 and HS 62) and fabric prices, particularly man-made fabrics.

The relevant fabric price (silk, cotton, man-made, wool, or weighted average of these) is allocated to each 10-digit HTS clothing product based on the dominant fabric used in producing the good.[21] Unfortunately, we are unable to construct weighted average fabric price indices for apparel products produced using different combinations of fabric types.[22] We now separately apply the various equations to the AGOA and MFA trade regimes.

[18] Although the industry value added price is the net effect of productivity and nominal factor prices, the real GDP per capita also embodies productivity improvements in the services sector.

[19] The following HS codes for synthetic fibres are also included in man-made products: 550110, 550120, 550130, 550190, 550200, 550310, 550320, 550330, 550340, 550390, 550410, 550490, 550610, 550620, 550630, 550690. The average of the fabric prices calculated using world exports and world imports are used.

[20] The fabric prices correspond closely with the dominant agricultural commodity used to produce the fabric. For example, there is a close fit between cotton-based fabric and raw cotton prices, and wool-based fabric and wool prices.

[21] The allocation was done manually on the basis of the product description.

[22] See Goldberg and Knetter (1997) on how aggregate production cost indices can bias the exchange-rate pass-through downwards. The value added deflator is also more aggregated than is desired

7.2.2 Results

As noted earlier, changes in import values within and across products hide substantial variation of product quality within each product category. In this section, we use the estimates of the price equations (25) and (26) to identify changes in fabric-intensity of imports from AGOA recipients that may occur within the HS 10-digit product lines.

Table 7 presents the regression results. The first column presents the benchmark price equation over the period 1996-2004 used to evaluate the consistency of the price equation with our theoretical priors. Overall, the price model produces results that are consistent with theory and other empirical evidence (See Feenstra 1989.

The dollar price of US clothing imports rise with increases in foreign and US competitor's prices. Import unit values rise with foreign GDP per capita reflecting a positive association between income and quality of exports as explained by Hummels and Klenow (2005). Applied tariffs reduce the fob price of apparel products with a coefficient of -0.60, which is very close to the effect of an equivalent depreciation of the dollar.[23] Foreigners therefore absorb 60 percent of tariff increase or depreciation either through lower mark-ups (in case of imperfect competition) and/or reduced marginal costs (from upward sloping supply curve). Further, rising foreign production costs result in higher U.S. import prices. US import prices are equally affected by increases in foreign fabric costs and value added costs, implying a fabric share coefficient of approximately 50 percent.[24]

Various diagnostic tests reveal that the aggregate model fails the homogeneity test and the hypothesis of symmetric pass-through of the tariff and exchange rate. However, far fewer instances of rejection are found in the disaggregated HS4–digit level estimates. The disaggregated results and hypotheses tests are presented in Table 9 in the appendix. We are therefore reasonably satisfied with our basic price equation and proceed with our objective of identifying differences in the fabric-content of AGOA apparel exports.

The second column of results extends the base regression by including interactions between an AGOA dummy (DAg) and fabric costs and value added prices (see rows 9 & 10). The objective of this estimate is to identify the average fabric-intensity of U.S. imports from AGOA beneficiaries throughout the 1996 to 2004 period.[25]

> The results indicate that AGOA countries produce relatively fabric-intensive clothing products with low value addition.

The coefficient on the fabric price (DAg x ln(pf)) is positive and significant (0.323), while the coefficient on value added prices (DAg x ln(pva)) is significant and negative (-0.389). Therefore, U.S unit values of apparel imports from AGOA beneficiaries are far more sensitive to fluctuations in fabric prices than apparel imports from the rest of the world. We infer from this result that AGOA beneficiary exports are relatively fabric-intensive. This outcome is consistent with both the effect of the AGOA preferences and the MFA.

[23] The estimated exchange rate pass-through coefficient of 0.6 falls between Feenstra's (1989) estimates for Trucks (0.63) and Cars (0.71) and more general estimates based on aggregate import data (Marazzi et al. 2005, Gopinath and Rigobon 2008).

[24] The coefficients on value added and fabric prices are insignificantly different from each other.

[25] Not all countries became eligible to export apparel in 2001. D2001 therefore varies by country and time and equals 1 for all years from the time the country becomes eligible to export apparel products. The dummy variable is set equal to 1 for the initial year if eligibility occurred within the first 6 months of the year.

Table 5: Marginal Impact of AGOA preferences on fabric intensity in beneficiary countries

	Country sample	All	All	All	All
			AGOA fabric-		Marginal LDC
		Base	intensity	AGOA	AGOA
		(1)	(2)	(3)	(4)
	Marginal impact of AGOA on fabric-intensity				
	LDC AGOA countries relative to other AGOA				
1	D01 x Dldc x ln(pf)				0.067
2	D01 x Dldc x ln(pva)				-0.083
	AGOA countries relative to control				
3	D01 x DAg x ln(pf)			-0.114	-0.175
4	D01 x DAg x ln(pva)			0.113	0.186
	Other coefficients				
5	ln(pf)	0.272***	0.268***	0.316***	0.315***
6	ln(pva)	0.237***	0.252***	0.213***	0.213***
7	Dldc x ln(pf)				-0.049
8	Dldc x ln(pva)				0.144
9	DAg x ln(pf)		0.323***	0.405***	0.446**
10	DAg x ln(pva)		-0.389***	-0.423***	-0.537**
11	D01 x ln(pf)			0.099***	0.099***
12	D01 x ln(pva)			-0.104***	-0.104***
13	D01 x Dldc				0.034
14	D01 x DAg			-0.063	-0.092
15	ln(GDP/capita), PPP	0.126***	0.115***	0.124***	0.122***
16	ln(e)	-0.538***	-0.548***	-0.547***	-0.546***
17	ln(Pcompete)	0.037***	0.037***	0.037***	0.037***
18	ln(US ppi)	0.135	0.131***	0.109	0.11
19	ln(1+t)	-0.600***	-0.637***	-0.684***	-0.689***
	N	255231	255231	255231	255231
	F	90.9	81.61	67.2	54.8
	Fixed effects	country/product year	country/product year	country/product year	country/product year

Notes: Estimates are robust to heteroskedasticity. * p<.1; ** p<.05; *** p<.01

To identify the effect of AGOA preferences on beneficiary exports, we use a specification similar to that of equation 21, except that the time period dummy variable in the interactions now refers to the 2001 to 2004 period. The relevant results are presented in rows 3 & 4 in column 3 of Table 7. These are the coefficients on the difference-in-difference terms that measure the change in fabric-intensity of U.S. imports from AGOA beneficiaries after 2001 relative to the change in fabric-intensity of imports from the rest of the world. Our expectations are that AGOA preferences raised the fabric-intensity of imports from beneficiary countries.

However, contrary to our theoretical predictions,

> we find no increase in the fabric-intensity of apparel exports from 2001 to 2004 in response to the AGOA preferences. The coefficients on the interaction terms (D01 x DAg x ln(pf)) in row 3 and (D01 x DAg x ln(pva)) in row 4 are insignificantly different from zero.

One reason may be that the above estimates are an average for both LDC AGOA and other AGOA countries. Our theory suggests that the effect of AGOA preferences on fabric-intensity is particularly pronounced amongst LDC AGOA countries who are eligible for the third country fabric provision. To isolate the marginal impact of the third country fabric provision on fabric-content, we include additional interactions of ln(pva) and ln(pf) on dummy variables for LDC AGOA countries (Dldc) over the full period and over the 2001-04 period. Estimates of this relationship are presented in column 4. The coefficients on the LDC interaction terms in rows 2 & 3 are interpreted as the marginal impact of AGOA on fabric intensity in LDC special rule countries relative to the rest of AGOA beneficiaries.

> We still find no increases in the fabric content of apparel exports by lesser-developed AGOA countries relative to other AGOA countries or the rest of the world from 2001 to 2004.

None of the marginal effects for LDC Special Rule countries are significantly different from zero. Overall, the results suggest that the preferences under AGOA had very little impact on the within-product fabric content of apparel exports to the US by recipient countries. AGOA beneficiaries, including lesser-developed Special Rule countries, were already specialized in fabric intensive products prior to receiving AGOA preferences. The impact of AGOA was to make production of these products more attractive and they responded by increasing exports of these products, rather then of new fabric-intensive products. This is consistent with the decomposition of growth analysis in Table 2 which showed that the expansion of exports was overwhelmingly along the intensive margin.

7.3 The expiration of MFA

The ending of the MFA presents an additional policy 'experiment' to test our theory as applied to AGOA beneficiaries. As noted, quotas under the MFA were removed on the 1st January 2005, although some quotas were re-imposed in industrialized countries in response to the rapid growth in imports from China. In this section, we exploit this break to identify whether import values, import unit values and the fabric-intensity of U.S. apparel imports moved in accordance with our predictions.

Theory predicts that firms in previously quota restricted countries respond to the ending of quotas by downgrading the quality of their apparel exports (exporting cheaper goods). In our

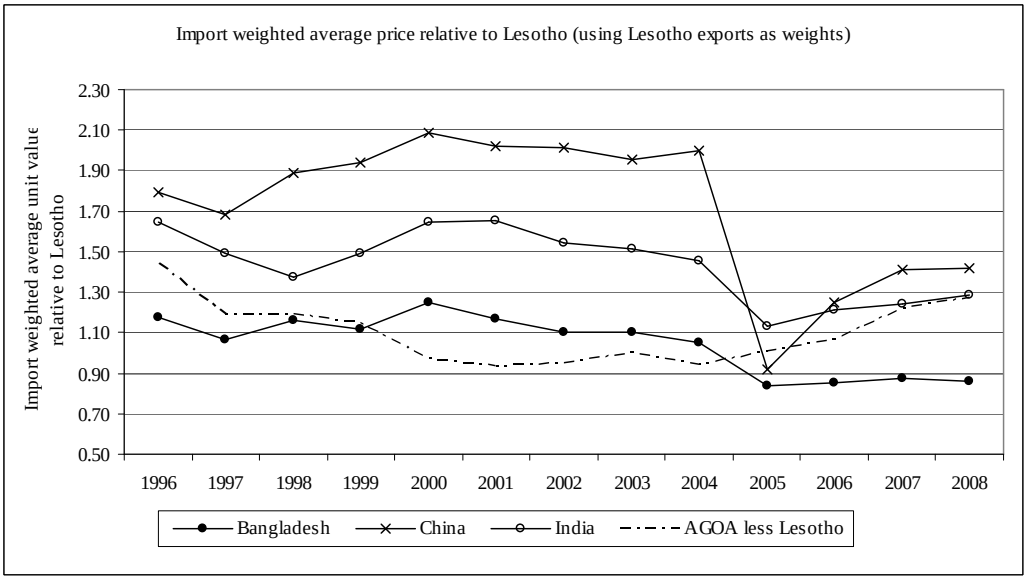


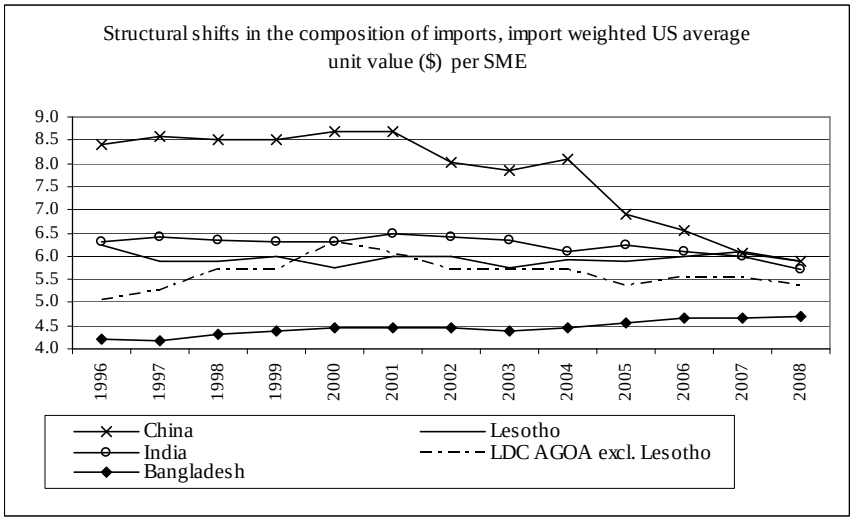
Figure 7: Import weighted average price relative to Lesotho

Notes: The import weighted average price for country c is calculated as $\bar{p}_{c,t} = \Pi \left(p_{zct}/p_{zLt}\right)^{\nu_{zLt}}$ where ν_{zLT} is the share of product z in Lesotho's apparel exports to the US, p_{zLt} is the price of Lesotho exports and p_{zct} is the price of the comparator country apparel exports.

model, this would be revealed by relatively strong growth in imports of low priced varieties from previously quota restricted countries that include AGOA beneficiaries. Evidence in support of quality downgrading is found by Brambilla et al. (2010) and Harrigan and Barrows (2009). A second hypothesis derived from our theory, is that, conditional on price, quota restricted countries responded to the ending of the MFA by increasing exports of fabric-intensive apparel products. In this section, we test these two hypotheses focusing on the response by quota restricted countries relative to AGOA beneficiaries. Preliminary support for the effect of the MFA on product quality is provided in Figure 7 that presents a measure within-product price differences for selected countries relative to Lesotho. These are calculated by aggregating up the log ratio of export prices relative to Lesotho using Lesotho export values as weights. Higher values reflect the export of more expensive apparel varieties than Lesotho within each product line. During the MFA period, quota-constrained countries such as China, Bangladesh and India exported varieties within each HS 10 digit line that were up to twice as expensive as those from Lesotho. The expiration of the MFA, however, saw a dramatic decline in the relative price as these countries downgraded the quality of their apparel exports: see the relative price of Chinese apparel that fell from 1.95 times to 90 percent of those from Lesotho in one year. There was a slight rebound from 2006 as new quotas on Chinese apparel exports were imposed, but by 2008 relative prices had still fallen by over 55 percentage points from 2004.

The composition of imports from quota constrained countries also shifted towards the low priced products exported by Lesotho. Figure 8 presents import weighted prices (per square meter equivalent) of apparel imports from each country calculated using the product-level median prices for the entire sample and period and time varying import values by country as weights. Reductions in the average price, reflects across-product shifts in the composition of

Figure 8: Structural shifts in the composition of US apparel imports



Notes: The import weighted average price for country c is calculated as $psme_{ct} = \sum m_{zct}\bar{p}_z$where $\bar{p}_z$is the median price of product z over the entire period and m_{zct} is the share of z in country c's apparel exports to the US.

apparel exports to the U.S. towards lower priced products. The shift in composition is most noticeable for China, whose apparel exports were initially concentrated in relatively expensive 10-digit apparel products, but then fell in 2002 as quotas imposed under Phase I, II and III of the MFA were eliminated in response to China's entry into the WTO. A further shift towards low priced products occurred in 2005 after the ending of Phase IV of MFA and by 2008 the import weighted median price of Chinese apparel exports was very similar to those of Lesotho.

The trends in these diagrams provide some support for our hypotheses regarding the effect of quotas on product prices. We now apply the difference-in-difference estimation to test for significant changes in the value, price and fabric-content of apparel exports by AGOA recipients Import values and product range Our first objective in this section is to estimate the impact of the ending of the MFA on AGOA recipients relative to other countries. It is clear from the previous diagrams and discussion that the expiration of the MFA in 2005 adversely affected exports from AGOA recipients. The impact relative to other emerging economies, however, is not obvious, as the AGOA preferences may have insulated the African beneficiaries from the full extent of the increased competitiveness of China and other previously quota constrained countries. To identify the relative impact of the expiration of the MFA on AGOA recipients, we estimate the difference-in-difference specification similar to that of 17, except that we replace the post 2001 dummy variable with one for the post-MFA period (D05). We also add an additional variable consisting of the interaction between a dummy variable Dquotacntry that equals 1 (otherwise zero) for quota constrained countries and the post-2005 dummy variable (D05). The control group in the estimates is therefore non-AGOA, non-quota constrained emerging economies. The results of the estimates over the period 2001 to 2008 are presented in Table 6.[26] The sample of countries is restricted to low- and middle-income economies as the

[26]We focus on the period from 2001 to 2008 to eliminate possible biases arising from differences in the fabric-

Table 6: Marginal impact of end of MFA on LDC AGOA, other AGOA and quota constrained countries

Dependent variable	Ln IMP		Import dummy	
Control	Emerging	Emerging	Emerging	Emerging
sample	Bound	Unbound	Bound	Unbound
	(1)	(2)	(3)	(4)
Marginal impacts				
LDC AGOA relative to Other AGOA	20.9%	2.1%	1.5%	0.2%
Other AGOA relative to Control	-4.2%	-11.4%	-0.8%	-1.6%
Quota countries relative to Control	163.0%	133.7%	5.2%	8.3%
Coefficients				
D05 x *Dquotacntry*	0.967	0.849	0.051	0.08
	(27.71)	(24.71)	(14.83)	(22.05)
D05 x *DAg*	-0.043	-0.121	-0.008	-0.016
	(4.97)	(22.83)	(9.02)	(25.11)
D05 x *Dldc*	0.19	0.021	0.015	0.002
	(19.49)	(4.21)	(15.38)	(3.73)
N	792545	876663	792545	876663
Fixed effects	product/year country/product	product/year country/product	product/year country/product	product/year country/product

Notes: Robust t-statistics presented in parentheses. Percentage change is calculated as exp(coefficient)-1. Quotas on product lines are assumed binding if the Chinese fill rate was greater than or equal to 90 percent in 2003. Quota fill rates are obtained from OTEXA ((http://otexa.ita.doc.gov/).

allocation decision in the theoretical model is more likely to apply between AGOA recipients and other emerging economies than between AGOA recipients and high-income countries. In the estimates that we present here, Dquotacntry refers to the top 4 (Bangladesh, India, China and Indonesia) most constrained countries identified by Brambilla et al. (2010).[27] These countries faced fill rates of over 79 percent in more than 70 percent of their restricted lines.[28] Finally, separate estimates are presented for products facing binding quota restrictions and non-binding quota restrictions. Quota restricted products are defined as those with Chinese fill rates equal to or exceeding 90 percent in 2003. These products make up approximately 80 percent of all imports prior to 2005.

There are three main insights from the estimates. Firstly, U.S. imports from quota constrained countries rose dramatically relative to imports from other emerging economies in response to the expiration of the MFA. Imports grew strongly in both bound and unbound product

content of AGOA countries before and after the implementation of AGOA.

[27] These four countries account for 31 percent of total apparel imports from emerging economies and 35 percent of imports from the top 30 most quota restricted countries prior to 2005.

[28] An enlargement of this group to the top 30 alters the magnitude of the impact, but has no effect on the direction of the results.

lines, but as expected import growth was relatively strong in the former. Imports of previously bound products from the quota constrained group grew by 163 percent and the probability of exporting a product by 5.2 percent. The second observation is that imports from non-LDC AGOA countries, however, declined relative to the emerging economy control group. These countries therefore experienced relatively poor export growth despite the preferences provided under AGOA.

The final observation is that LDC AGOA countries experienced smaller declines in exports (value and product range) relative to other AGOA and relative to the emerging economy control group. The effect was much stronger in bound product lines than unbound product lines. For example, U.S. imports from LDC AGOA recipients in the post-2005 period rose by 20.9 percent relative to other AGOA recipients (and 16.7 percent relative to the control group) in previously bound product lines, but only 2.1 percent in unbound product lines (-9.3 percent relative to the control group). The implication is that AGOA's third country fabric provision helped the least developed recipients to withstand the intense competition after the expiration of the MFA. Overall imports from LDC AGOA recipients fell, but by far less than other non-quota constrained emerging economies. One explanation drawn from our theory is that the third country fabric provision provided additional export incentives to the very same products that these countries were induced to export under the MFA. The remaining price-based estimates in this section suggest that these were low priced, fabric-intensive apparel products. Quotas and price levels The second objective of this section is to estimate if the expiration of the MFA reduced average U.S. import unit values from quota-constrained countries as these countries shift apparel production towards lower priced products. The equation used to identify these price effects is the difference-in-difference specification of equation (25), except that we replace DAg with a dummy variable Dquotacntry for quota constrained countries. Table 7 presents the results. In line with theoretical predictions (and the price trends in Figure 7 and Figure 8), quota constrained countries responded to the end of the MFA by reducing the quality of their apparel exports by shifting towards lower priced varieties and products. The average unit value of U.S. apparel imports from the top 4 most quota constrained countries declined by 31.9 log points relative to other countries after 2005 (see row 1 of column 1 of Table 7) (see also Brambilla et al. (2010) and Harrigan and Barrows (2009)).[29] This arises from a combination of across-product shifts of imports towards lower price products and within-product shifts towards lower priced varieties. The expiration of the MFA therefore adversely affected the competitiveness of non-quota constrained countries such as Lesotho that produced low priced products in response to the MFA.

7.4 Quotas and fabric-intensity

We now test for changes in the fabric-intensity of apparel imports in response to the expiration of the MFA. Our theory predicts a rise in the fabric-content of exports by previously quota constrained countries relative to AGOA beneficiaries and other non-quota constrained exporters. We commence with the simplest difference-in-difference specification to identify changes in the fabric-intensity of quota-constrained countries in response to the end of the MFA. The specification is similar to that of equation 21 and entails the inclusion of various interactions between Dquotacntry and value added and fabric prices covering the pre and post

[29] The decline for the top 30 quota constrained countries is lower at 13.9 percent.

Table 7: Marginal impact of the ending of the MFA on import unit values and fabric-intensity in apparel eligible AGOA beneficiaries

		Base price	Base fabric	AGOA	LDC Agoa
	Country sample	Emerging	Emerging	Emerging	Emerging
		(1)	(2)	(3)	(4)
	Impact of ending of MFA on U.S. import prices				
1	Quota constrained relative to control (*D05* x *Dquotacntry*)	-0.319***	-0.580***	-0.567***	-0.573***
2	AGOA relative to control (*D05* x *DAg*)			0.422***	
3	LDC AGOA relative to other AGOA (*D05* x *Dldc*)				0.111
	Marginal impact of ending of MFA on fabric-intensity				
	Control group				
4	*D05* x ln(*pf*)		-0.107***	-0.087***	-0.098***
5	*D05* x ln(*pva*)		0.093***	0.073**	0.084***
	Quota-constrained group relative to control group				
6	*D05* x *Dquotacntry* x ln(*pf*)		0.217***	0.219***	0.209***
7	*D05* x *Dquotacntry* x ln(*pva*)		-0.112	-0.112	-0.104
	AGOA countries relative to control group				
8	*D05* x *DAg* x ln(*pf*)			0.294***	
9	*D05* x *DAg* x ln(*pva*)			-0.317***	
	LDC AGOA countries relative to other AGOA				
10	*D05* x *Dldc* x ln(*pf*)				0.273**
11	*D05* x *Dldc* x ln(*pva*)				-0.260**
	Other variables				
12	ln(*pf*)	0.619***	0.443***	0.468***	0.430***
13	ln(*pva*)	0.381***	0.288***	0.332***	0.320***
14	*Dquotacntry* x ln(*pf*)		0.599***	0.631***	0.628***
15	*Dquotacntry* x ln(*pva*)		-0.898***	-0.938***	-0.917***
16	*DAg* x ln(*pf*)			0.432***	
17	*DAg* x ln(*pva*)			-0.324***	
18	*Dldc* x ln(*pf*)				0.373***
19	*Dldc* x ln(*pva*)				-0.297***
20	ln(*GDP/capita*), PPP	0.152***	0.578***	0.580***	0.534***
21	ln(*e*)	-1.141***	-0.886***	-0.980***	-0.918***
22	ln(*Pcompete*)	0.028**	0.038***	0.037***	0.038***
23	ln(*US ppi*)	0.216*	0.230*	0.234*	0.220*
24	ln(1+*t*)	-0.637***	-0.681***	-0.661***	-0.701***
	N	102208	102208	102208	102208
	F	168	131	108	106
	Fixed effects	country/prod uct year	country/prod uct year	country/prod uct year	country/prod uct year

Notes: Estimates are robust to heteroskedasticity. * p<.1; ** p<.05; *** p<.01

MFA period. We are interested in two effects: (i) the change in fabric-intensity of exports of the control group (non-quota constrained emerging economies) after January 2005, and (ii) the change in fabric-intensity of exports of the quota-constrained group relative to the control group. The first effect is given by the interactions between the post-MFA dummy (D05) and fabric and value added prices in rows 4 & 5 of Table 7. The second effect is given by the triple interaction between D05, Dquotacntry and fabric and value added prices in rows 6 & 7. The results in rows 4 & 5 in column 2 indicate a decline in the fabric-intensity of apparel exports to the U.S from emerging economies after 2005. The coefficient on log fabric prices declines by 10.9 log points, while the coefficient on log value added prices rises by 9.3 log points. This change is consistent with our theory that predicts shifts out of fabric-intensive products by non-quota constrained countries in response to the removal of quotas. Our estimates also reveal significant increases in the fabric-intensity of U.S. apparel imports from the most quota-restricted countries.[30] This is revealed by the significant positive coefficient of 0.217 on the interaction term (D05×Dquotacntry×ln(pf)) in rows 6 & 7 of column 3. Apparel exports from Bangladesh, India, China and Indonesia therefore became more responsive to fabric price fluctuations after 2005 relative to all other emerging economies. We infer from this result that the fabric-intensity of apparel exports to the U.S. from these previously quota constrained countries has risen. The next three estimates focus on identifying the MFA effect on prices and fabric-intensity for AGOA beneficiaries relative to other non-quota constrained emerging economies. We do this by including additional triple interactions for the AGOA group (see rows 8 & 9 column 3) and the LDC AGOA group (see rows 10 & 11 column 4). The estimates produce interesting results. The data suggest that the expiration of the MFA led to a rise in the fabric-intensity of AGOA exports relative to other emerging economies. This is revealed by the rising responsiveness of U.S. import prices from AGOA recipients to changes in fabric prices relative to the control group. If we focus on LDC AGOA countries (column 5), we get a similar result. Clearly AGOA countries have responded differently to other non-quota constrained emerging economies. This is precisely what our theory predicts would happen under AGOA preferences. We found earlier that AGOA resulted in no changes in fabric-intensity of exports by beneficiary countries. Our explanation was that these countries were already specialized in fabric-intensive low value-added apparel products as a result of the incentives introduced by the MFA quotas. With the end of the MFA, China and other quota-constrained countries moved into the fabric-intensive products they were previously discouraged from exporting under the quotas. This led to increased competition in fabric-intensive products that non-quota constrained countries specialized in under the MFA. The response by these countries was to reduce the fabric-intensity of their apparel exports. AGOA recipients, however, are an exception. Why? An explanation based on our theory is that AGOA preferences insulated the recipients in the most fabric-intensive products as the effective preferences in these products are the greatest. The effect of AGOA on fabric-intensity is only revealed in our estimates once MFA is removed as prior to this we had an identification problem as both AGOA and MFA encouraged specialization in fabric-intensive products. In conclusion, the MFA induced AGOA countries to specialize in low value added, high fabric-content apparel products. AGOA preferences and particularly the third-country fabric provision were expected, according to our theory, to compound this specialization in low value-added, fabric-intensive varieties and products. We do not find evidence of significant changes in the fabric-content of apparel exports in

[30] There is no significant difference from the control group for the top 30 most quota-restricted countries.

response to the AGOA preferences. Rather, the AGOA preferences primarily led to substantial increases in exports of existing products. The dependence of these exports on the tariff preferences and quota restrictions in competing countries made AGOA recipients and other non-constrained emerging economies very vulnerable to the ending of the MFA. The elimination of quotas (quotas were re-introduced on Chinese exports in later 2005) induced China and other previously quota restricted countries to downgrade product quality and increase exports of those products and varieties that AGOA countries were specialized in. However, the effect on fabric-content of AGOA recipient exports was insulated relative to other countries by the AGOA preferences that grant the greatest effective preferences in fabric-intensive products. The AGOA preferences helped mitigate the effects of the expiration of the MFA.

8 Conclusions

This paper presents a formal model of trade preferences as aid with a special focus on the efficiency of the implied transfers, the use of content requirements and in particular how the characteristics of exports depend crucially on the design of the preferences. By construction the model is neo-classical and though it provides a framework for predicting the empirical outcomes. It demonstrates how the lack of content requirements encourages production in low-value added goods implying that a large fraction of export revenue go to third party. On the other hand, a higher content requirement is unlikely to be an efficient way of transferring resources and may in fact not help the recipient country. As these results are derived in a model that by construction disregards dynamic impacts they should not be taking as a final conclusion. It is important to understand how the characteristics of products affects a beneficiary country's ability to develop.

A possible and natural extension is to allow for increasing returns to scale at the industry level as originally modeled by Ethier (1979). Collier and Venables (2007)discuss the possibility that content requirements prevent a country from specializing in particular industries thereby achieving sufficient scale to exploit such spill-overs. Replace the following alteration of equations (9) and the cost function, 1 by

$$M = \alpha(L_M)L_M,$$
$$c\left(\frac{w}{\gamma(L_X)}, r, z\right),$$

where $\alpha'(L_M), \gamma'(L_X) > 0$, where α and γ are measures of external increasing returns, keeping the assumption of constant returns to scale at the firm level. It is important to note that the spill-overs are assumed to be isolated in industries. Since content requirements reduce total exports it will reduce L_X and thereby make assembly less effective. But if there is little returns to scale in the labor part (α is practically constant) then it might be worthwhile to push a lot of production over on manufactures, that is impose content requirements. The question of the extent of spill-overs and the implications for the design of content requirements seem a fruitful venue for future research.

The positive response to AGOAs special rule highlights the importance of providing exporters with access to inputs at world prices. Requiring exporters to use expensive inputs can seriously impede their competitiveness. This is clearly seen in the contrast between Lesotho's prowess in the United States where it is allowed to use fabrics that are priced at world prices, with its weak performance in the EU and SACU where it is not.

The experience also shows, however, that trade preferences are not a panacea. The outcomes associated with the special rule conform to those suggested by theory. The special rule has a very strong impact on the value-added and fabric use of exports. On the one hand, the incentives are most powerful in lower quality products that require less value-addition. It is important to understand whether this has limiting effects on potential dynamic effects from the trade preferences. Potentially the lower value added discourages skills development and other forms of quality upgrading and the use of foreign inputs can prevent backward and forward linkages from arising.

The experience analyzed in this paper is a case study of the links between trade and growth – a topic that has been the subject of considerable empirical investigation. This example highlights the obvious, but often ignored consideration, that both trade and growth are quintessentially endogenous variables rather than policy instruments and suggests that the reasons for trade are likely to be important in the impact on growth. Even if on average trade and growth are associated, and even if on average trade may cause growth, the widely used proposition that trade leads to growth should not be used as an unconditional forecast. The precise reasons for trade and the other domestic conditions and policies that are associated with it, are likely to play key roles in the growth impact. In the case of Lesotho and other AGOA countries utilizing preferences may lead to more trade but are not a substitute for the more difficult challenges of developing more comprehensive development strategies. In sum, the slogan of "trade not aid" can be misleading. Trade preferences may be help create the conditions for growth, but they are not sufficient

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Table 8: Summary of Apparel Rules of Origin under AGOA

Description of the rules of origin requirements	**Conditions of Access**
1. Apparel made from U.S. yarns or fabric	Unrestricted
2. Apparel assembled from regional fabric from U.S. or African yarn	Subject to tariff rate quota cap (currently 6.43675 percent to 2015)
3. Apparel assembled in a Lesser Developed Country using foreign fabric or yarn	Unrestricted for four years, but extended to 2012 (cap of 3.5 percent of US imports)
4. Certain cashmere and merino wool sweaters;	Unrestricted for selected products
5. Apparel made of yarns and fabrics not produced in commercial quantities in the US	Unrestricted
6. Eligible handloomed, handmade, or folklore articles and ethnic printed fabrics; and	Unrestricted for selected products from Dec 2006 under AGOA IV

Notes: Unrestricted implies duty-free and quota-free treatment.

A Tables

Table 9: Price equations estimates by 4-digit HS level

Hs4 code	Description	Coefficients ln(GDP worker)	ln(pf)	ln(pva)	ln(Pcomp ete)	ln(e)	ln(US ppi)	ln(1+t)	N	F	r2	Hypothesis tests (p-value) HOD 1	$\delta_1+\delta_2=\beta_2$	Erate= tariff
6101	men's or boys' overcoats etc, knit or crochet	-0.186	0.329**	0.217***	-0.660***	0.062	-0.439	0.873**	2890	7.19	0.024	0.169	0.072	0.003
6102	women's or girls' overcoats etc, knit or crochet	-0.530***	0.199	0.420***	-0.704***	0.107**	-0.546	0.047	3833	14.3	0.035	0.719	0.048	0.397
6103	men's or boys' suits, ensembles etc, knit or croch	-0.282***	0.358***	0.326***	-0.672***	0.062**	0.774***	-1.265***	8136	17.6	0.024	0.122	0.714	0.002
6104	women's or girls' suits, ensemb etc, knit or croch	-0.319***	0.406***	0.358***	-0.812***	0.070***	1.444***	-0.244	24243	76.2	0.030	0.001	0.011	0.772
6105	men's or boys' shirts, knitted or crocheted	0.071	0.469***	0.331***	-0.678***	0.150**	0.649*	-0.293	4272	14.8	0.035	0.118	0.001	0.928
6106	women's or girls' blouses & shirts, knit or croch	-0.149	0.231**	0.255***	-0.555***	0.161***	0.539	-0.557*	5332	15.1	0.027	0.651	0.114	0.731
6107	men's or boys' underpants, pjs, etc, knit or croch	-0.384	0.752**	-0.13	-1.377***	0.262**	0.274	1.029	2321	3.96	0.018	0.902	0.008	0.658
6108	women's or girls' slips, pjs, etc, knit or crochet	-0.454***	0.439***	0.370***	-0.912***	0.064*	0.238	-1.884***	10262	33.7	0.033	0.794	0.003	0.000
6109	t-shirts, singlets, tank tops etc, knit or crochet	-0.105*	0.225***	0.273***	-0.632***	0.023	0.780***	0.042	14877	39.1	0.025	0.067	0.000	0.027
6110	sweaters, pullovers, vests etc, knit or crocheted	-0.179***	0.574***	0.298***	-0.819***	0.056***	0.406**	-0.423***	29316	98.4	0.031	0.041	0.003	0.100
6111	babies' garments & accessories, knit or crocheted	-0.299	0.241	0.381***	-0.829***	0.229***	1.329**	1.139	5254	20.8	0.048	0.054	0.101	0.082
6112	track suits, ski-suits & swimwear, knit or crochet	-0.442***	0.736***	0.286***	-1.101***	0.079**	1.894***	-0.367	6478	24.4	0.033	0.004	0.067	0.239
6113	garments, knit etc, coated etc rubber, plastic etc	0.037	1.015***	-0.034	-1.180***	0.076	0.989	4.128*	2653	8.76	0.030	0.162	0.036	0.099
6114	garments nesoi, knitted or crocheted	-0.375***	0.647***	0.279***	-1.028***	0.016	-0.181	-0.43	9940	33.5	0.031	0.484	0.004	0.114
6115	pantyhose, socks & other hosiery, knit or crochet	-0.348**	0.151*	0.609***	-0.718***	0.047	1.775**	-0.564	5535	18	0.030	0.036	0.379	0.728
6116	gloves, mittens and mitts, knitted or crocheted	-0.677***	0.689***	0.441***	-1.108***	-0.054	0.725	-1.525***	5314	21.5	0.032	0.132	0.779	0.005
6117	made-up clothing access nesoi. parts etc knit etc	-0.561***	0.367**	0.392***	-0.678***	0.096***	3.312***	-0.866	5824	15.7	0.023	0.000	0.304	0.435
6201	men's or boys' overcoats, cloaks etc, not knit etc	0.032	0.343***	0.351***	-0.638***	0.068**	-0.403	-0.225	12265	34.8	0.026	0.089	0.050	0.556
6202	women's or girls' overcoats etc, not knit or croch	-0.043	0.410***	0.354***	-0.788***	0.013	-0.509	-0.438**	14450	57	0.035	0.294	0.183	0.296
6203	men's or boys' suits, ensembles etc, not knit etc	0.057	0.238***	0.358***	-0.573***	0.100***	0.698***	-0.579***	22945	72.3	0.030	0.026	0.199	0.398
6204	women's or girls' suits, ensemb etc, not knit etc	-0.009	0.447***	0.368***	-0.822***	0.044***	0.797***	-0.504***	50694	245	0.044	0.019	0.510	0.043
6205	men's or boys' shirts, not knitted or crocheted	0.113	0.368***	0.319***	-0.641***	-0.035	0.924***	-0.718***	6467	19.2	0.029	0.087	0.168	0.198
6206	women's or girls' blouses, shirts etc not knit etc	0.028	0.453***	0.205***	-0.704***	0.052*	0.989***	-0.687***	7965	38.3	0.042	0.037	0.085	0.119
6207	men's or boys' undershirts etc, not knit or croch	-0.068	0.352	0.263	-0.987***	-0.071	0.628	-2.315	2337	4.27	0.024	0.893	0.105	0.249
6208	women's or girls' slips etc, not knit or crochet	-0.095	0.306***	0.195***	-0.577***	0.116***	-0.463	-1.424***	7748	15.5	0.021	0.064	0.077	0.001
6209	babies' garments & accessories, not knit or croch	-0.358**	0.602***	0.238**	-1.258***	-0.084	0.923	-0.923	3786	19.9	0.054	0.329	0.002	0.118
6210	garments, of felt etc, or fabric impregnated etc	-0.299***	0.429***	0.149**	-0.577***	-0.052	-0.093	-0.137	7067	5.03	0.007	0.315	0.978	0.561
6211	track suits, ski-suits & swimwear, not knit etc	-0.046	0.386***	0.289***	-0.674***	0.079***	0.582***	0.555***	28191	54.1	0.018	0.144	0.937	0.001
6212	bras, girdles, garters etc., knitted etc or not	-0.117	0.509***	0.390***	-0.854***	-0.049	1.165*	-1.159**	5872	21.8	0.032	0.101	0.382	0.072
6213	handkerchiefs	-0.758**	0.147	0.053	-1.064***	-0.044	11.178***	1.781	1049	4.38	0.046	0.001	0.001	0.428
6214	shawls, scarves, mufflers, mantillas, veils etc.	-0.097	-0.04	0.208*	-0.099	0.156*	2.429	-0.055	3625	2.66	0.007	0.246	0.448	0.162
6215	ties, bow ties & cravats, not knitted or crocheted	-0.817***	-0.157	0.733***	-0.472***	0.126**	0.823	0.318	1974	6.86	0.031	0.519	0.247	0.284
6216	gloves, mittens and mitts, not knit or crocheted	-0.027	0.897***	0.232*	-0.945***	-0.033	-1.059	-0.737	2991	3.62	0.013	0.305	0.110	0.366
6217	made-up clothing access nesoi, garment etc parts nesoi	-0.571**	0.102	0.323**	-0.627***	-0.006	8.474***	-0.019	4782	9.05	0.020	0.000	0.034	0.652
6406	parts of footwear: insoles etc: gaitors etc, parts	-1.000**	-0.699	0.713**	-0.06	-0.012	4.351**	1.158	691	2.79	0.045	0.045	0.900	0.558
6501	hat forms/bodies, hoods, plateaux & manchons of felt	0.359	1.500*	-0.629	-0.838	-0.054	1.703	-2.434	381	0.885	0.027	0.401	0.893	0.528
6502	hat shapes, plaited or assembled strips any material	-0.243	0.656	-0.117	-0.75	0.136*	3.266*	-0.79	671	3.31	0.043	0.074	0.382	0.657
6503	felt hats & other felt headgear from heading 6501	0.498	2.189	-0.012	-2.288**	-0.046	1.255	-81.49***	243	9.51	0.347	0.535	0.657	0.000
6504	hats & other headgear, plaitd/assmbld strips any material	-0.099	0.126	0.214	-0.595**	0.228**	0.754	-0.658*	1653	4.05	0.019	0.683	0.062	0.557
6505	hats & headgear, knit etc, lace, etc in pc, hr net	-0.300***	0.545***	0.278***	-0.817***	0.151***	0.554**	-1.285**	9802	24.2	0.027	0.044	0.867	0.039

Note: Year fixed effects are not included as the fabric costs do not vary across products for some of the HS 4-digit groups. Estimates are robust to heteroskedasticity.

Table 10: Marginal Impact on import volumes and probability of exporting a product by Value Added (va) category (percentage change).

Dependent variable	ln IMP	Import dummy
Sample	All	All
Years	1996-04	1996-04
Marginal impact LDC preference relative to Other AGOA		
0 < va ≤ 0.37	79.3%	4.1%
	(7.52)	(5.47)
0.37 ≤ va < 0.38	67.5%	3.6%
	(7.08)	(5.01)
0.38 ≤ va < 0.42	14.6%	0.4%
	(2.04)	(0.56)
0.42 ≤ va < 0.45	24.5%	1.1%
	(3.16)	(1.69)
0.45 ≤ va < 0.50	18.2%	0.6%
	(2.44)	(0.86)
0.50 ≤ va	14.6%	0.4%
	(1.97)	(0.67)
Marginal impact Other AGOA relative to non-AGOA		
0 < va ≤ 0.37	-18.9%	-1.9%
	-(6.43)	-(5.87)
0.37 ≤ va < 0.38	-22.6%	-2.1%
	-(8.47)	-(6.99)
0.38 ≤ va < 0.42	-12.2%	-1.2%
	-(5.17)	-(4.65)
0.42 ≤ va < 0.45	-15.3%	-1.5%
	-(6.30)	-(5.89)
0.45 ≤ va < 0.50	-16.2%	-1.5%
	-(6.81)	-(5.80)
0.50 ≤ va	-15.4%	-1.6%
	-(6.46)	-(6.09)
N	3114506	3114506
Fixed Effects	product/year	product/year
	country/product	country/product

Note: Estimates conditional on import response to initial tariffs. Robust t-statistics presented in parentheses. Estimates are robust to heteroskedasticity. Percentage change is calculated as exp(coefficient)-1.