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AGOA Rules
The Intended and Unintended Consequences of Special Fabric Provisions

Lawrence Edwards and Robert Z. Lawrence

9.1 Introduction

The export performance of the small, landlocked nation of Lesotho is an African success story that demonstrates both the power and limitations of trade preferences. In 2004, just three years after Lesotho became eligible for preferences under the Africa Growth and Opportunities Act (AGOA), the clothing exports to the United States from one of Africa's poorest landlocked nations had trebled to reach \$460 million and provide employment for over 50,000 workers (Bennet 2006). The performance of Lesotho and several other preference recipients was particularly striking because it seemed to contradict the pessimistic verdict many had reached about Africa's capacity to become a globally competitive exporter of manufactured products even when granted preferential market access.[1]

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1. Several studies have been devoted to explaining this poor performance, and most conclude that the problems lie with the African countries themselves, rather than on the access given their products in foreign markets. A host of inhibiting factors have been identified (Ng and Yeats 1996; Wang and Winters 1998).

On May 12, 2010, a ceremony was held on Capitol Hill in Washington, DC, to celebrate the tenth anniversary of AGOA. In his remarks at the gathering, United States Trade Representative Ron Kirk credited AGOA with "a substantial increase in two-way US-Africa trade since 2000, with African countries now exporting to the United States a more diverse range of value-added products." Kirk also asserted that the trade program "powerfully demonstrates the link between trade and economic development."[2] In this chapter we will provide some evidence that supports Kirk's positive verdict: AGOA has stimulated exports of manufactured products, especially clothing, but we will also suggest that the ultimate impact on economic development has been quite disappointing. We will argue that both the success and limitations are the predictable consequences of the manner in which the preferences have been constructed. We will show that although these preferences encourage exports, they simultaneously create disincentives for local value addition that may limit the program's development benefits.

9.2 Background

As indicated by Mr. Kirk's remarks, trade preferences are of interest not only because they might provide one-time benefits in the form of higher incomes and increased employment, but also because trade is associated with more dynamic benefits that lead to faster growth. Economic growth is an ever-expanding process in which actors not only replicate what they were doing on a greater scale, but continuously develop new capabilities that allow them to produce increasingly sophisticated goods and services (Hausmann, Hwang, and Rodrik 2007). More developed countries typically produce higher unit-value products and wider ranges of products than their less developed counterparts (Schott 2004). These products often face less elastic demands and provide higher profit margins than more standardized, commodity-like products. 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 competitors that no longer need preferential treatment.[3] 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.

During the industrial revolution this form of development was evident in the textile industry, which was an important driver of industrialization.

2. http://www.america.gov/st/business-english/2010/May/20100513122443SztiwomoD0.8958856.html.

3. According to Hwang (2007) there is unconditional convergence at the six-digit level. If countries start to produce low-unit-value goods within a product category, they will eventually experience significant increases in their unit values. The claim is that this will happen more or less automatically, without any special supportive policies in place.

Japan, and later Korea, Hong Kong, and other dynamic Asians also all cut their teeth as exporters of clothing, continuously upgrading and diversifying (Gereffi 1999). Motivated in part by such considerations, the European Union (EU) and the United States both implemented multilateral generalized special preferences (GSP) programs in the 1970s. In addition, they both have regionally focused preferential programs.[4]

Yet, the notion that developed country markets are open to manufactured exports from least developed economies as a result of these concessions can be challenged. It is difficult for underdeveloped countries to produce complete complex products, but they are often quite capable of providing simple assembly operations. Some of the preferences given through programs are thus a sham because they include rules of origin that require more local production than these poor countries can provide. These rules are generally justified as necessary to prevent the trade deflection that could occur if products are imported from third countries and then, with little additional value added, claimed as originating from preference recipients—a practice sometimes known as "screwdriver plants." This is a legitimate concern, but the rules are more constraining than strictly necessary, and they inhibit poor countries from specializing in the narrow slices of global production chains in which their comparative advantage is likely to lie.

In the case of preference programs in apparel, these rules are particularly stringent, generally requiring at least two (in the case of the EU) or even (in the case of the United States) three transformation processes (e.g., yarn, fabric, assembly) in the preference-receiving or granting countries to qualify for duty-free entry. (For an excellent account, see Ahmad [2007]) These rules are especially problematic because fabric production is a highly capital- and technology-intensive activity that is beyond the capabilities of most very poor countries.

The rules of the US AGOA program are, however, an important exception, indeed perhaps the exception that proves the rule. The AGOA not only gave all sub-Saharan countries extensive duty-free, quota-free access to the United States (table 9.1),[5] but its rules of origin also contained an

4. The EU granted African, Caribbean, and Pacific (ACP) countries special preferences, first under the Lomé Conventions (starting in 1976) and later through the Contonou Agreement (2000). More recently the EU has concluded Economic Partnership Agreements (EPAs) with groups of ACP countries. The US has granted special preferences under the Caribbean Basin Initiative (CBI), the Andean Promotion Act, and AGOA. Preferences for least developed countries (LDCs) have received special attention. In 2001, the European Union introduced an "Everything but Arms" (EBA) program that provides LDC exports duty-free, quota-free access. In the Doha Round negotiations, the United States agreed to give duty-free access to LDCs in 97 percent of its tariff lines.

5. In May 2000, the US Congress passed AGOA. The Act granted duty-free access for 4,600 GSP tariff-line items plus another 1,800 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 United States duty free. The AGOA preferences for garments required that they are made of 85 percent US-made yarn and fabric or from fabrics and yarns made in other AGOA beneficiary countries.

Table 9.1 Summary of apparel rules of origin under AGOA

Description of the rules of origin requirements	Conditions of access
1. Apparel made from US yarns or fabric	Unrestricted
2. Apparel assembled from regional fabric from United States 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 United States	Unrestricted
6. Eligible hand loomed, handmade, or folklore articles and ethnic printed fabrics	Unrestricted for selected products from Dec. 2006 under AGOA IV

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

unusual waiver for wearing apparel that was granted to "lesser developed beneficiary countries" (LDBCs). Subject to 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.[6] Instead of requiring individual items to meet specific transformation rules, such as minimum value-added requirements or the use of domestic fabric, the United States set up a simple inspection program that verified that genuine production activities were taking place.[7] Although the special LDBC rule was originally scheduled to expire after three years, it was extended in 2004 for another three years and in 2007 for a further five.

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. Because the different treatment for higher-income countries provides a useful control group, AGOA provides an ideal opportunity to explore the role of different types of rules of origin in preferential arrangements, and 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

6. 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 minimum 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 four years.

7. The AGOA privileges also require protecting US intellectual property rights, observing labor rights, proving access to US trade and investment, and implementing rule of law. Apparel exports require adopting an effective visa system to prevent transshipment.

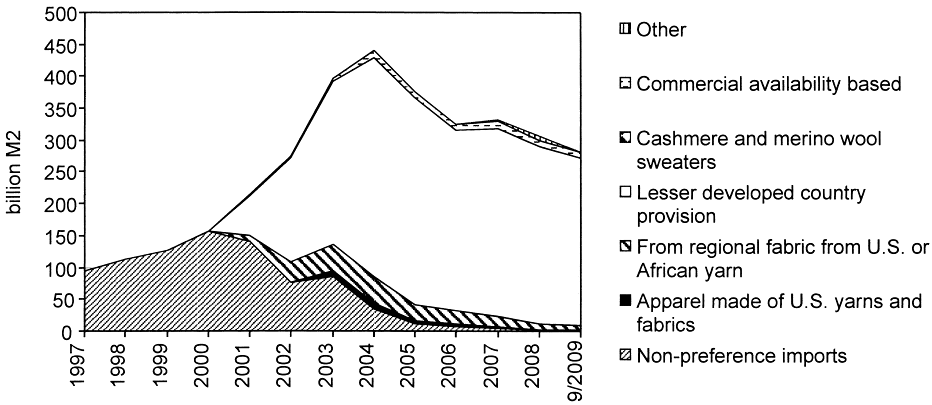

Fig. 9.1 US apparel imports from AGOA countries according to import program
Source: USITC.

African countries, which increased by 400 percent, almost all of which took advantage of the lesser-developed country provision (see figure 9.1). The largest growth in exports between 2000 and 2004 came from Lesotho (up from \$140 million to \$456 million), and over the same period very significant increases also occurred in Kenya (up from \$43 million to \$270 million), Madagascar (\$110 million to \$323 million), Swaziland (\$32 million to \$179 million), and Namibia (0 to \$79 million) (figure 9.2). By contrast, in 2004 US imports of clothing from South Africa and Mauritius, the two largest African clothing exporters when AGOA was passed, were actually 18 million dollars lower than they had been in 2000 (figure 9.2).

The AGOA also stimulated entry into new clothing markets. Table 9.2 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. The AGOA preferences increased product penetration. Many countries experienced exceptional increases in the total number of lines from 2000 to 2004 (see Kenya from 45 to 155, Swaziland from 47 to 139, and Lesotho from 60 to 118).[8] In most countries, however, these trends reversed after 2005, but still remained above 2000 levels.

The AGOA countries have experienced setbacks, however, first when the constraints on their (mainly Asian) competitors were lifted with the expiration of the Multi-Fiber Arrangement (MFA) in 2005, and second with the slump in the United States because of the global financial crisis.[9] As a result,

8. The largest contractions in Lesotho occurred in firms producing knitted garments; those producing woven garments (e.g., denim) did better. (See Bennet 2006.)

9. In July 2007 Lesotho Clothing and Applied Workers Union estimated employment at 44,000 compared to 55,000 in 2004.

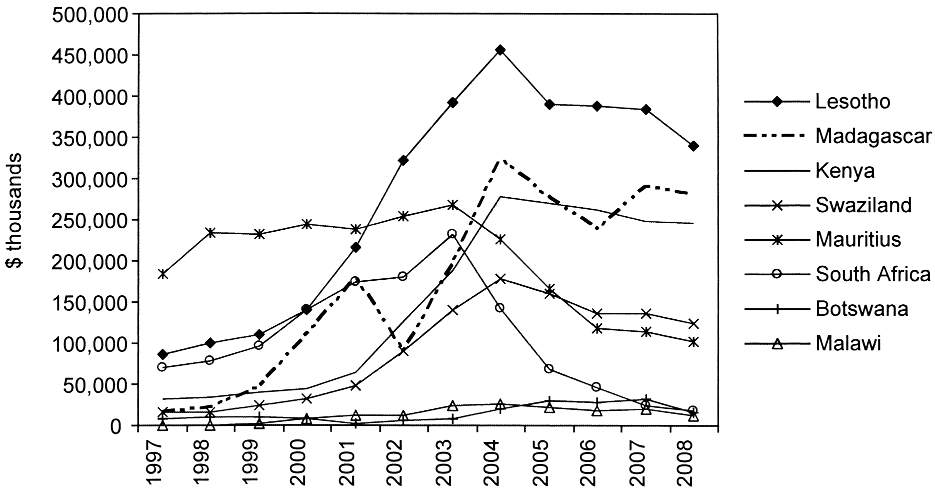

Fig. 9.2 US imports of clothing and textiles for selected AGOA recipients
Source: USITC.

US 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.

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, Roy, and Subramanian (2003) stressed the role of rules of origin in limiting the overall benefits from AGOA to all recipients. Collier and Venables (2007) find that the AGOA apparel provision had a positive and significant effect. 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) reports an impact of 96 percent for twenty-two countries eligible for the third-country fabric provision, and 303 percent for the top seven beneficiaries.[10] 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:

10. Other studies include Brenton and Ikezuki (2005), Gibbon (2003), Seyoum (2007), Nouve (2005), Rolfe and Woodward (2005), and FIAS (2006).

Table 9.2 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
Nonapparel 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

Notes: We use the Pierce and Schott (2009) concordance program to construct a HS ten-digit, time-consistent classification for the full period.

indeed, 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).

Despite the impressive growth in volumes, there is also some disquieting evidence in AGOA's performance that relates to the issue of dynamic benefits. Decompositions of output growth reported in table 9.3 reveal that the export of new product lines (the extensive margin) contributed only 30 percent of total AGOA import growth from LDC special rule countries between 2000 and 2004, and 42 percent of the decline from 2004–2008. *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 ten-digit products is around 60 and 80 percent and has remained fairly constant throughout the period. In addition, production is predominantly CMT (cut-make-trim) with little value addition and there is little evidence of dynamic spillovers to other sectors of the economies (Lall 2005). These trends are exemplified by the development of Lesotho's clothing industry in response to the AGOA preferences. Therefore, before presenting and testing a theory that can explain these outcomes, we describe briefly the history of Lesotho's clothing industry.

9.2.1 Lesotho

As the largest apparel exporter to the United States, Lesotho is of particular interest. Whereas some countries such as Namibia, Malawi, and Botswana became clothing exporters for the first time after AGOA, the response of Lesotho actually built on a longer historical experience in which trade preferences and policies also played an important part. The industry was launched in the 1980s when Taiwanese manufacturers, originally based in South Africa, moved to Lesotho in order to avoid trade sanctions imposed by the United States and Europe on what was then the apartheid regime. More investors were attracted in the late 1980s, after the European Union signed the Lomé Convention, which granted special preferences to the African, Caribbean, and Pacific (ACP) countries that had formerly been colonies. While the clothing preferences in Lomé had a double transformation rule, Lesotho was granted a temporary derogation from the requirement allowing it to use third-country fabrics that the investors took advantage of.

When the derogation expired in the mid-1990s, exports to Europe plunged and they have never recovered (figure 9.3). This experience provided the first demonstration of the importance of the role of these special preferences in the viability of Lesotho's exports of clothing. Clothing exports to the United States were subject to tariffs but were also constrained by quota restrictions under the MFA. As these became increasingly binding on others, Lesotho's foreign-owned firms shifted to exporting to the United States to take advantage of its unfilled quotas. AGOA countries' concentration of exports in

Table 9.3 Decomposition of growth in US apparel imports: Extensive and intensive growth

		2000–2004			2004–2008			
		Contribution intensive growth	Contribution extensive growth	Average annual growth (US$)	Contribution intensive growth	Contribution extensive growth	Average annual growth (US$)	Cumulative imports 2004
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

(*continued*)

Table 9.3 (continued)

		2000–2004			2004–2008			
		Contribution intensive growth	Contribution extensive growth	Average annual growth (US$)	Contribution intensive growth	Contribution extensive growth	Average annual growth (US$)	Cumulative imports 2004
Apparel eligible	Mauritius	0.67	0.33	–0.02	0.94	0.06	–0.18	0.92
	South Africa	–17.67	18.67	0.00	0.80	0.20	–0.40	1.00
Nonapparel 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	

Note: 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).

products where quota constraints on Chinese exports were binding is clearly revealed in figure 9.4. Thus, even prior to the passage of AGOA, firms based in Lesotho, most of which were subsidiaries of Asian multinationals, were exporting to the United States. Indeed, after 1999, 99 percent of all Lesotho's apparel exports went to the United States with only 0.8 percent going to South Africa and just 0.2 percent to the EU.

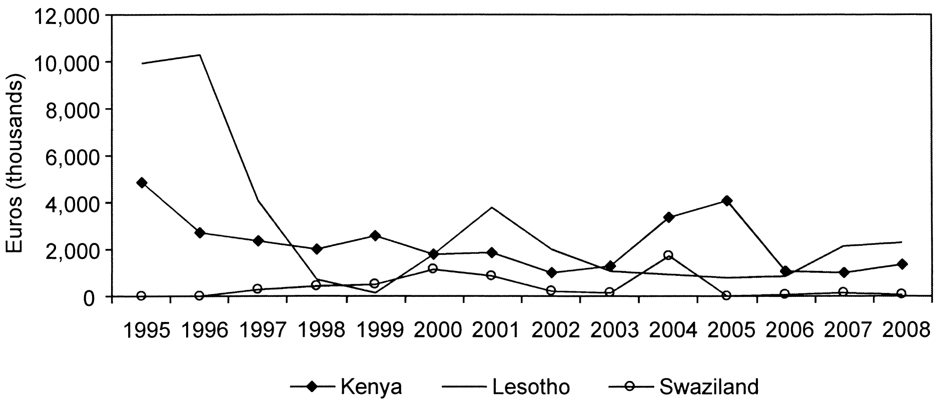

Fig. 9.3 Apparel exports to the EU 15, selected AGOA countries

Notes: Own calculations using data from Eurostat (http://epp.eurostat.ec.europa.eu/newxtweb).

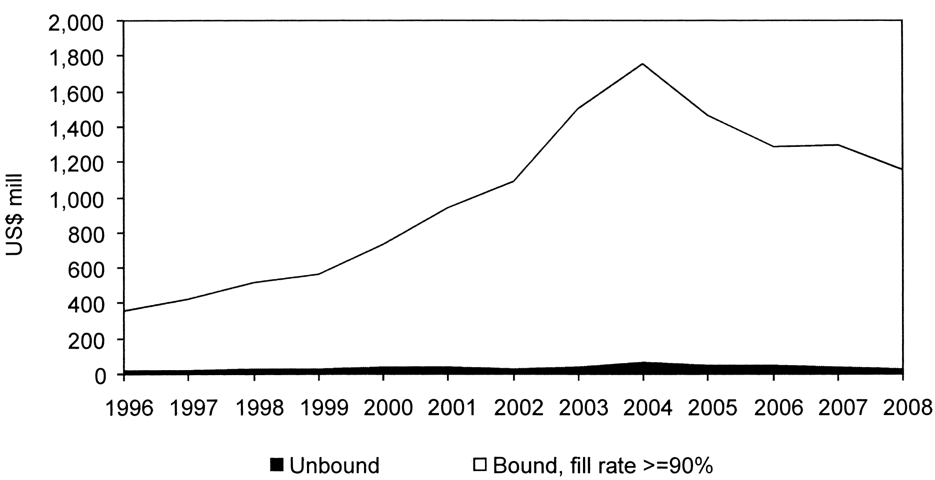

Fig. 9.4 AGOA apparel exports to United States according to Chinese quota fill rates

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 percent.

The small share of Lesotho's exports going to South Africa also indicates the important role played by fabric rules of origin. The US most favored nation (MFN) tariff on clothing is around 17 percent, while the Southern African Customs Union (SACU) tariff is about 40 percent. Thus, garments exported to South Africa from Lesotho (which is within the customs union) have a much larger margin of preference. *Yet Lesotho is far more competitive in the United States than in SACU.*[11] The reason is that to sell in South Africa, Lesotho has to pay SACU tariffs or SACU prices for fabric. By contrast, under AGOA it obtains these duty free.[12]

The AGOA has been in effect for a decade, but there is little evidence that much of Lesotho's industry could survive without preferences or that it has diversified horizontally into new products and markets or vertically into greater domestic value addition. Factories in Lesotho continue to concentrate on just a narrow range of garments: the most basic low-unit-value categories of knitted tee-shorts, slacks, blouses, and blue jeans. The slice of the production chain they participate in is narrow and does not seem to be expanding. Most apparel manufacturing in Lesotho is CMT (cut-make-trim). The firms, almost entirely foreign owned, typically provide assembly, packaging, and shipping services and depend on their Asian headquarters to generate orders, design the clothes, and send them the fabric they need. This can be seen by comparing the industry wage bill for 50,000 workers (approximately $1,000 per worker), that is, $50 million in 2004 with total US exports valued at $456 million. Most of the value is thus added to other parts of the chain. Almost none of the managers are locals and the buyers of fabric and the marketers of the garments and the key strategic corporate decisions are all made thousands of miles away in Asia.

The local production process is characterized by highly routine steps used to produce very large volumes. Just one buyer—US retailer The GAP—accounts for almost 40 percent of overall output. The combination of the large scale on which they operate and the large orders by concentrated buyers makes it difficult for small firms to enter the market. In addition, to move up the value chain and to produce differentiated products in smaller batches

11. Indeed, according to Sandrey et al. (2005), Lesotho cannot even compete in Lesotho! "Examination of the local clothing retail outlets reveals a predominance of both Chinese and South African garments."

12. To be sure, factors besides favorable rules of origin have contributed to Lesotho's performance (Maloney 2006). These include fluctuations in the Rand to which its currency is tied (favorable between 2000 and 2002) and other policies to assist exporters by the Lesotho government. In addition, Lesotho has benefited from a favorable international image as a non-sweatshop producer (Seidman 2009). It has also been promoted by Bono in his campaign against AIDS. The Lesotho National Development Corporation (LNDC) has played an active role, offering favorable rents for factory shells. The government also provided generous tax treatment—reduced from 15 to 0 in 2006—and sought to maintain industrial peace with a Directorate of Dispute Prevention and Resolution. The government has used the Duty-Credit-Certificate Scheme of the South African Customs Union that gives apparel firms between 10 and 25 percent of the free on board (FOB) value of their exports in certificates that allow them to import textiles or apparel duty free.

requires more skilled workers. This is part of the explanation for Lesotho's inability to do well in the relatively small South African market in which demand is more varied.

One firm in Lesotho has built a denim plant.[13] But with this exception, all fabrics are imported. Lesotho and other AGOA countries, even South Africa, therefore, lack the domestic textile industry that would allow them to meet the regular clothing rules of origin in US preference programs.

Lesotho's workers have relatively low productivity levels and their skills do not appear to have increased over time.[14] Lall ascribes the lack of improvement in part to the Labor Code Rule that prohibits the use of piece rate. He noted "Despite over a decade of clothing assembly, productivity in Lesotho still lags way behind major competitors. With similar wages, therefore, its competitiveness cannot outlast trade privileges unless productivity improves sufficiently to match competitors" (Lall 2005, 1016).

The relatively low quality of Lesotho's (and other AGOA) apparel exports is also revealed in the comparative price of its exports. Table 9.4 presents the average unit values of the top fifteen apparel products at HS ten-digit level exported by Lesotho to the United States in 2004. These unit values are compared against the average unit value of other lesser-developed AGOA countries and the 10th, 25th, median, 75th, and 90th percentile unit values of the 226 countries in the sample. In all but one case, when it is just below the 25th percentile, the unit values of Lesotho's apparel exports fall between the 25th and 50th percentile range.

What is also striking is the range of unit values even within these highly disaggregated product lines (see Schott 2004). For example, the 90th percentile unit value of a dozen women's or girls' cotton pullovers (Lesotho's top apparel export) in 2004 was 280 dollars versus 31 dollars for Lesotho exports.

The combination of a productivity disadvantage and almost no domestic textile industry makes the industry's survival totally dependent on its preferences. Each time the expiration of the special rule has drawn near, therefore, studies have issued credible and dire warnings about the industry's ability to survive without them (Salm et al. 2002; Bennet 2006).

This experience makes it clear that trade need not automatically lead to growth and the manner in which trade is stimulated could well prove consequential for the amount and nature of the growth it stimulates. In particular it suggests that trade that is stimulated by preferences might well have different effects than trade that occurs for other reasons.

Why this disappointment? Both Lall (2005) and Collier and Venables

13. In 2004, the industry faced a major challenge with the potential expiration of the special rule. Partly anticipating the expiration of the special rule in 2004, the Nien Hsing Group of Taiwan invested over $100 million to build the Formosa Mill, a state-of-the-art denim fabric mill.

14. Lall (2005) estimated that while Lesotho's wages were similar to Asian levels, its productivity was typically only 50 percent of East Asian levels. According to Morris and Sedowski (2006), worker productivity has not increased over a ten-year period. (See also Morris 2006.)

Table 9.4 Price (US$ per dozen) of top fifteen Lesotho products in terms of export value, ranked largest to smallest, 2004

HS	Description	Lesotho	Other lesser-developed AGOA	Percentiles: 10th	25th	Median	75th	90th	Cumulative trade share Lesotho (%)
6110202075	Women's/Girl's other pullovers of cotton	31	27	26	32	46	99	280	14
6110202065	Men's/Boys' other pullovers of cotton	36	36	24	34	60	110	222	26
6203424010	Men's trouser breeches, cotton, blue denim	90	73	48	63	100	191	465	32
6203424035	Boys' trouser/breeches, cotton, blue denim	68	66	42	54	68	98	269	37
6204624010	Women's trousers/breeches, cotton, blue denim	87	71	52	76	92	199	449	42
6204624020	Women's trousers/breeches other cotton, not knit	71	58	39	65	93	232	384	45
6110303055	Women's/girl's other sweaters, man-made fibers	36	46	34	43	57	120	406	49
6204624040	Girls' trousers, cotton, blue denim not imp. playsuit parts, not knit	70	66	43	59	73	100	470	52
6110303050	Men's/boys' other sweaters, man-made fibers, knit	35	52	30	41	68	163	287	56
6110202040	Men's/boys' sweatshirts of cotton	60	56	41	60	77	170	306	58
6104632011	Women's trousers and breeches, synthetic fibers	50	46	28	43	60	198	409	61
6203424045	Boys' trouser, etc., not cotton	70	49	26	47	67	93	243	63
6203424060	Boys' shorts, cotton not playsuit parts, not knit	52	53	25	39	55	84	207	65
6203424050	Men's shorts of cotton	69	53	27	48	74	148	288	67
6204624055	Women's shorts of cotton	63	49	34	52	67	113	337	69
	All products exported by Lesotho	37	59	22	33	60	122	299	

Notes: The mean price for other AGOA is the exponent of the mean log price.

(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" (1328). 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 be given to the more advanced developing countries like South Africa rather than the least developed countries that have received them.

In this chapter, however, we will explore a different explanation that has been overlooked in the literature. We will argue that both the positive and negative responses to AGOA are no accident. Indeed, they are the consequences that economic theory would lead us to expect, given the form in which the preferences have been granted.

As we will show using the theory of effective protection, preferences combined with the third-country fabric rule can have powerful financial effects. They could easily be the equivalent of a subsidy to production that is two or three times higher than the 17 percent preference margin granted by AGOA through MFN tariff relief on clothing. This allows AGOA producers to offset cost disadvantages due to the lower productivity of their workers and greater distance from suppliers and markets and helps explain why the initial responses to AGOA (and the availability of unused MFA quotas) were so powerful.

On the other hand, in theory the preferences also have two deleterious effects. First, they steer firms mainly toward the simplest products in which clothing producers add little value. Thus the preferences tax skills acquisition and discourage firms from moving up the value chain. Second, the preferences (and the MFA) discourage backward linkages because they induce exporters to use relatively expensive fabrics rather than the cheaper fabrics that are more likely to be produced in poor countries.

In sum, trade preferences "work." They can stimulate trade, raise incomes in developing countries, and boost employment. But whether they actually lead to development conceived of as a cumulative growth process is much less certain.

In addition, changes in other trade policies at first helped and then hindered AGOA's performance. On the one hand, the MFA initially provided an especially favorable environment for AGOA countries to produce low-unit-value products because it not only constrained their Asian competitors, but also induced these exporters to shift toward higher-quality products. On the other hand, 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 African countries withstand this shock, they were nonetheless adversely affected.

This chapter proceeds now in three sections. In the first we discuss the economic theory of the effects these regimes are likely to have. In the second, we conduct several empirical tests of the theory, and in the final section we present our conclusions.

9.3 Theory

The overview of Lesotho's export performance identified the influence of two trade policies: (a) the effect of MFA quotas and their removal, and (b) the effect of AGOA tariff preferences and rules of origin. In this section we draw on economic theory to investigate the impact of these policies. The focus is on incentives they create for the production and export of particular types of clothing products. We are particularly interested in the impact on product characteristics such as quality, fabric use, and value addition in recipient countries.

We will show that the regime governing clothing trade can be expected to have a profound impact on clothing production choices in countries like Lesotho. In particular, we will demonstrate that the MFA not only provided a subsidy to Lesotho's clothing exports but also created incentives for it to specialize in low-quality and low-valued-added products. The AGOA program provided an even more powerful incentive to expand exports of low-value-added clothing products, but it had an additional effect. The third-country fabric provision encouraged further specialization in clothing products with high fabric-cost shares.

Some of the arguments we will use are not new. The body of literature on how trade policies influence product characteristics is well established in the case of quotas (Falvey 1979; Krishna 1987; Feenstra 1988) and transport costs (Alchian and Allen 1964; Hummels and Skiba 2004). The central result in this literature is that quotas and unit transport costs lead to quality upgrading, while tariffs do not. However, the literature generally assumes integrated production, and less studied are the effects of quotas and tariffs on the quality and value addition when products contain imported intermediate inputs. This analysis therefore explores how tariff preferences and their associated rules of origin lead to changes in the quality of goods produced and exported. We focus on clothing and fabric inputs, although some of the results would be applicable to other products that are manufactured with imported intermediate inputs.

Most apparel firms located in Lesotho sell products to the United States through "full-package" intermediaries located in East Asia. These full-package suppliers compete with others for orders in the United States and Europe (Lall 2005). They then contract these out to their associated apparel producers, either through competitive bidding or through some allocation rule. Lesotho, for example, will export all products for which its production costs are lower than its competitor suppliers.

We are therefore going to develop a simple model that captures this intrafirm allocation and thus the relative shares of two countries, think Lesotho and China, in the US apparel imports. We model clothing as an array of products containing varying quantities of labor and fabric inputs. We determine patterns of value addition and specialization in a Ricardian framework that captures the effects of differences in fabric intensity. We then explore the effects of changes in market-access policies on production choices in both countries. In particular, we highlight how these policy changes affect both the volumes (intensive margin) and the types of products (the extensive margin) each of the countries will export.

9.3.1 Model

We assume apparel products are differentiated by type of product and the content of fabric.[15] Each apparel product z is associated with a point on an interval $[0,1]$ and is assembled using labor and fabric according to a constant returns to scale Leontief production function:[16]

$$y(z) = \min[L(z)/a(z), F(z)/\theta(z)]$$

$a(z)$ is the labor used per unit output, $L(z)$ is the quantity of labor, $F(z)$ is the quantity of fabric, and $\theta(z)$ is the unit fabric requirement in square meters (the input-output coefficient).

Using the cost function dual to the production function, the unit cost $c(z)$ of clothing (assuming no transport costs) is given as:

$$c(z) = a(z)w + \theta(z)PF(z) \tag{1}$$

where w is the wage and $PF(z)$ is the price per square meter of fabric associated with product z. We also assume firms are competitive, so equilibrium profits are zero and the free on board price equals costs, that is,

$$p(z) = c(z) = a(z)w + \theta(z)PF(z). \tag{2}$$

Products are therefore differentiated according to their unit labor requirements, as well as unit fabric costs, which are affected by the quantity and price of fabric used. For example, we would expect more complex apparel products (e.g., suits) to require more labor than simple products (e.g., T-shirts). Although we do not model quality specifically, we would also

15. Mattoo, Roy, and Subramanian (2003) develop an alternative model with decreasing returns and infinite demand to show how both tariff preferences and waivers of rules of origin increase exports of existing products. They do not deal with the impact on product quality, nor export of new varieties.

16. Portugal-Perez (2008) assumes a similar production function. A clear limitation of this model is that it does not take into account capital (sewing machines, fabric cutters, irons, washing and drying machines) used in the production of apparel. However, in a world where this type of capital is internationally mobile, it is the nontraded factors that become the primary determinant of a country's comparative advantage (Wood and Mayer 2001).

expect higher-quality apparel to require more labor services and higher-priced fabric than lower-quality products.

9.3.2 The Allocation Decision

The allocation process depends on the relative cost of production across different locations. Lesotho will export all products for which its costs are less than or equal to those from China. This allocation condition can be specified as:

$$a(z)w + \theta(z)PF(z) \leq a^*(z)w^* + \theta(z)PF^*(z), \tag{3}$$

where transport costs are assumed to be zero and * denotes foreign competitor (China). Under free trade where fabric is internationally traded and there are no differences in unit fabric costs ($PF(z) = PF^*(z)$), we can respecify the relationship in terms of Lesotho's relative unit labor cost (RULC):

$$RULC(z) = \frac{wa(z)}{w^*a^*(z)} \leq 1. \tag{4}$$

Here, home (Lesotho) exports all apparel products for which its unit labor costs are lower than its foreign competitors. Alternatively, China exports all apparel products for which its relative wages are less than or equal to its relative productivity.

This result implies that comparative advantage when intermediate inputs can be obtained at world prices is entirely dependent on the relative effective price of the *nontraded* factor. This outcome is equivalent to that of the Dornbusch, Fischer, and Samuelson (DFS) (1977) Ricardian model with a continuum of goods. **The fabric content of apparel, therefore, has no influence on what is produced by the home country.** We will see later that this no longer holds once we introduce quotas and preferential trade barriers.

9.3.3 Consumption and Equilibrium

To close the model, we assume that there is no US apparel production, that countries only export apparel to the United States, and that US consumers have identical and homothetic preferences. Utility is Cobb-Douglas for a numeraire good (nonclothing products), but is a constant elasticity of substitution (CES) function in the quantities of the differentiated clothing products. The utility function is specified as:[17]

$$u = \left(\int_0^1 C^\rho(z)dz\right)^{\alpha/\rho} C_0^{1-\alpha} \qquad 0 < \rho < 1, \tag{5}$$

where $C(z)$ denotes total US consumption of apparel products z and C_0 is consumption of all other goods. The US consumers spend a constant frac-

17. See Dixit and Norman (1980, 282).

tion α of their income on apparel products with the remainder spent on the numeraire good. In addition, the differentiated apparel products are substitutes with a constant elasticity of substitution given by $\sigma = 1/(1 - \rho) > 1$.[18]

Since u is a separable utility function, the optimal choice of apparel products can be obtained by maximizing the CES component of the utility function subject to expenditure being less than or equal to αI where I is US income. Optimal demand by US consumers for each product z is given by

$$C(z) = \left(\frac{p(z)}{P}\right)^{-\sigma} \frac{\alpha I}{P}, \tag{6}$$

where the price index of the CES quantity index is given by $P = \left(\int_0^1 p(z)^{1-\sigma} dz\right)^{1/(1-\sigma)}$. A rise in the relative price of a particular product will therefore result in a disproportionate reduction (as $\sigma > 1$) in the relative consumption of that product.[19] Assuming a sufficiently large number of products, the elasticity of demand for each product will be given by σ.

The model so far differs importantly from the Dixit and Stiglitz (1977) and Krugman (1979, 1980) monopolistic competition models in that we assume perfect competition and constant returns to scale. The full range of apparel products will therefore be produced and prices will equal marginal cost in equilibrium.[20] In addition, the value of exports of any product decline in response to a rise in relative prices, with a greater change the more substitutable are the differentiated products:

$$p(z)C(z) = \left(\frac{p(z)}{P}\right)^{1-\sigma} \alpha I.$$

The final condition for equilibrium is that labor demand equals labor supply (L), or alternatively that labor income equals the wage bill in the clothing sector. Assume that apparel products are indexed according to diminishing Chinese relative unit-labor requirements, $(a^*(z)/a(z))$. With $\bar{z}$ denoting a hypothetical dividing line between Chinese exports $(0,\bar{z})$ and Lesotho exports $(\bar{z},1)$, the home and foreign labor market clearing condition are respectively represented as:

$$wL = \int_0^{\bar{z}} wa(z)C(z)\,dz \tag{7}$$

18. Note that this ensures that the differentiated goods are closer substitutes among themselves than are the differentiated goods and the numeraire good. We do not modify the CES function to allow for quality as in Hummels and Klenow (2005). A quality index acts as a demand shifter, leading to higher consumption at every given price.

19. To see this take the ratio of (6) for product 1 to product 2 to obtain:

$$C(z_1)/C(z_2) = (p(z_1)/p(z_2))^{-\sigma}.$$

20. While we could follow DFS (1977) and use a Cobb-Douglas utility function for US consumers, this has the disadvantageous outcome that the value of US imports of each variety does not change. Growth in foreign exports to the United States can only be achieved through growth along the extensive margin. This outcome is inconsistent with the empirical evidence.

and

(8) $$w^*L^* = \int_{\bar{z}}^{1} w^* a^*(z) C(z)\, dz.$$

Taking the ratio of these two conditions gives:

(9) $$\frac{w}{w^*} = \left(\frac{\int_0^{\bar{z}} wa(z)C(z)\, dz}{\int_{\bar{z}}^{1} w^* a^*(z) C(z)\, dz} \right) \left(\frac{L^*}{L} \right).$$

This schedule is upward sloping on z. A rise in the range of products exported by Lesotho at constant relative wages increases the demand for labor in Lesotho and reduces the demand for labor in the competitor country. This raises the relative wage in Lesotho required to equate demand and supply of labor. Equilibrium is achieved through reductions in relative US consumption of Lesotho exports in response to higher prices.

If relative wages are fixed, as may be expected in Lesotho where unemployment is very high, then the adjustment to equilibrium will be through changes in the relative employment of labor in the apparel sector (L^*/L falls). In what follows, we impose the fixed-wage assumption to avoid unnecessary complexity associated with the marginal effect of relative wage changes on the range of products exported. Together, equations (2), (3), (6), (7), (8), and the price index solve for Chinese and Lesotho wages, the geographic specialization of apparel exports, the price index P, and US consumption and prices across the full spectrum of products.

9.3.4 Quotas and Product Choice for Exporting Firms

The MFA was important in the markets in which Lesotho and other clothing producers operated, and its application and elimination had major effects (Harrigan and Barrows 2009). Quotas on clothing imports into developed economies were widely applied under the MFA, with imports from China particularly constrained (Brambilla, Khandelwal, and Schott 2010). The MFA, therefore, led to a geographical dispersion of clothing production as producers relocated to countries where there were unused quotas. Lesotho (and other AGOA countries) was a beneficiary of this relocation of production as its US quotas were not filled,[21] but the effects on clothing products were not all the same. As we will argue, *quotas under the MFA induced the export of low value-added, fabric-intensive, and low-priced (low-quality) clothing products in developing countries such as Lesotho.*

It is well established in the literature that under competitive conditions a quota is equivalent to a specific tariff (Falvey 1979). The result also holds

21. For data on quota fill rates see the US Office for Textiles and Apparel (OTEXA) (http://otexa.ita.doc.gov/). Brambilla, Khandelwal, and Schott (2010) provide a review of the fill rates for various countries since the 1980s.

in cases of imperfect competition (Feenstra 1988, 2004).[22] While the quota restricts the total volume of sales, its effect differs across products produced by the firm. Firms adjust exports of different products to ensure that they earn the same quota premium from each good exported (Feenstra 2004). The effect is that exports of low-priced (low-quality) products are the most adversely affected.

We find similar effects in our model. Assume apparel quotas are imposed on imports from China. The specific tariff effect of the quota (denoted as s) alters the allocation condition (equation [3]) that determines the range of apparel products exported by Lesotho. The condition becomes:

$$(10) \qquad a(z)w + \theta(z)PF(z) \leq a^*(z)w^* + \theta(z)PF^*(z) + s.$$

Assuming, for exposition purposes, that both Lesotho and China have access to fabric at world prices ($PF^*(z) = PF(z)$), this equation can be respecified in terms of Lesotho's relative unit labor cost (RULC):[23]

$$(11) \qquad \frac{wa(z)}{w^*a^*(z)} \leq 1 + \frac{s}{a^*(z)w^*}.$$

Further, if we let $\lambda^*(z)$ denote the share of fabric in foreign costs ($\lambda^*(z) = \theta(z)PF^*(z)/c^*(z)$), and therefore $1–\lambda^*(z)$ as unit labor costs as a share of total costs ($= w^*a^*(z)/c^*(z)$), we can simplify the allocation condition even more to:

$$(12) \qquad \frac{wa(z)}{w^*a^*(z)} \leq 1 + \frac{s}{(1 - \lambda^*(z))c^*(z)}.$$

The effect of the quota is a modified allocation condition in which the right-hand side of the DFS equation (4) is raised by the term $s/(1 - \lambda^*)c^*$. This term is positive and *rises* if, ceterus paribus, s increases, costs fall, or the share of fabric in production rises.

We can consider four implications of quotas under the MFA for apparel exports from Lesotho using this relationship.[24] First, the effect of a quota is equivalent to a specific subsidy on exports from non-quota-constrained countries such as Lesotho. This enables Lesotho's producers to export

22. See Krishna (1987) for an imperfect competition model where firms jointly select the quantity and the quality of the products they export in response to a quota. Feenstra (1988, 2004) also show how quotas lead to an upgrading of the characteristics within each variety produced.

23. In Lesotho, for example, import duties were rebated on imported fabric used in the production of apparel exports. We ignore the effects that transport cost differentials have on the relationship. Specific transport costs on output can be modeled in an equivalent way to the effect of specific tariffs and quotas. For example, relatively high specific transport costs on output for the competitor country have the equivalent effect on quality as our example for quotas. See Falvey (1979) and Hummels and Skiba (2004).

24. There are two additional considerations. Missing from this story is the fact that within-quota tariffs were also imposed under the MFA. As shown by Hummels and Skiba (2004), ad valorem tariffs lower the relative demand for high-quality goods in the presence of per unit

apparel products even if they do not have a comparative advantage in the production of that product, that is, where their RULC exceeds 1 by up to $s/(1 - \lambda^*(z))c^*(z)$. The implicit subsidy conferred by the tariff compensates the relatively inefficient apparel producers for their high relative unit-labor costs and helps explain why countries such as Lesotho exported apparel under the MFA despite productivity levels that were lower and wage levels that were comparable to those of Asian levels (Lall 2005).

The second consideration is that the implicit subsidy of the quota for Lesotho (and other non-quota-constrained countries) is a greater percent of the overall value the lower is the price ($c^*(z)$) of the product exported by China. This is the standard result for quotas obtained by Falvey (1979). Quota-constrained countries upgrade quality of exports by shifting to higher-priced varieties. What we show here is that the gap in the market is filled by non-quota-constrained countries that may not have been able to compete prior to the quotas, that is, where their RULC exceeded 1.

The third consideration is novel to our model. Holding costs constant, the *effective* subsidy, that is, the subsidy as a proportion of value added, rises exponentially with the share of costs (of the efficient producer) attributed to fabric. Alternatively, the effective subsidy is greater the smaller the value added of the product.

Take, for example, two apparel products each priced at US$10, but differing in terms of fabric intensity: Fabric 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 equivalent of a quota on imports from China is one dollar. The resulting effective export subsidy for Lesotho is just over 1 percent for product B, but is 100 percent for product A. In fact, the effective subsidy is 100 percent for any product in which China's labor costs are equal to one dollar. The implication is that firms in Lesotho will be able to compete in exporting product B, even if their unit labor costs are 100 percent higher than those of the competitive quota constrained supplier (China). These considerations explain how the quotas enable an expansion in the range of products exported by Lesotho and other non-quota-constrained countries, that is, growth along the extensive margin.

The impact of the quota is to shift the Chinese out of low-priced products. This implies that relative price increase of Chinese exports will be strongest in low-priced products. This leads to the fourth effect: Lesotho will also experience growth in the volume and value of existing exports (intensive margin)

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transport costs (or equivalently quotas). As tariffs rise, the shadow price of the quota constraint falls and dampens the effect (but not direction) of the quota on relative demand for high-quality products. The final consideration is that import quotas administered by the Office of Textiles and Apparels (OTEXA) are specified in terms of yardage of fabric equivalents and not quantity of goods. In this case, the quota is equivalent to a specific tariff on the price per square meter of fabric equivalence, that is, the allocation condition is: $c(z)/\theta \leq c^*(z)/\theta + s$. *The implication for Lesotho is that relative demand and relative prices shift in favor of exporting low-priced clothing varieties that are intensive in the use of cheap fabric.*

as the relative price of their existing exports falls relative to the exports from quota-constrained countries (their export price falls relative to the average price index; see equation [6]). Therefore, in Lesotho we expect the strongest intensive margin growth in exports in existing low-priced products. In contrast, quota-constrained countries experience a decline in the range, value, and volume of their exports, particularly in low-priced products.

In conclusion, we expect four effects of the MFA on Lesotho and other AGOA countries (and other non-quota-constrained countries): a rise in the export of both (a) existing and (b) new apparel products combined with specialization in (c) cheap low-quality products with (d) very little value addition. The removal of the MFA would have had the opposite effects. Previously, quota-constrained countries would shift production toward cheaper products with lower labor-value added. Unconstrained countries would thus be especially adversely affected in these shifts, both in terms of the range and value of their apparel exports.

9.3.5 Tariff Preferences and Product Choice

We now turn to an analysis of the effect of the tariff preferences granted under AGOA. Generally, theory suggests that in a competitive market ad valorem tariffs have no impact on value addition as they preserve relative prices faced by the firm and the consumer (Falvey 1979; Feenstra 1988).[25] This changes once we introduce tariffs and tariff preferences in a model where products contain internationally traded intermediate inputs such as fabric.

Once tariffs are introduced, what determines whether Lesotho exports product $y(z)$ is whether the tariff-inclusive price of its good in the US market is less than or equal to its foreign competitor, China:[26]

$$c(z)(1+t) \leq c^{*}(z)\left(1+t^{*}\right). \tag{13}$$

Letting $\phi(z)$ denote the Lesotho fabric price relative to the Chinese fabric price, $(PF(z) = PF^{*}(z))$, we can express the allocation condition (13) in terms of relative unit labor costs (RULC) and fabric-cost shares (λ) as follows:

$$\frac{wa(z)}{w^{*}a^{*}(z)} \leq \frac{\left(1+t^{*}\right)}{(1+t)} + \frac{\lambda(z)}{1-\lambda(z)}\left[\frac{(1+t^{*})}{(1+t)} - \varphi(z)\right]. \tag{14}$$

The cut-off point defining what products will be exported by Lesotho is now a function of relative tariff rates faced, fabric intensity, and relative

25. Krishna (1987) presents an imperfect competition model where the firm's choice of output and quality is influenced by ad valorem tariff rates.

26. To simplify the model we have assumed that the ad valorem tariff does not vary by variety. Apparel tariffs actually vary enormously according to the type of fabric used, and in some cases according to the quantity and amount of fabric used in production. Extending the model to allow for variation in tariffs across z does not alter the main insights of the theory.

fabric prices. To explore the implications for product choice under AGOA, three different scenarios are compared:
(a) Case 1: Pre-AGOA with MFN tariffs and competitive input supplies;
(b) Case 2: AGOA tariff preferences for LDC special rule beneficiaries; and
(c) Case 3: AGOA tariff preferences for non-LDC special rule beneficiaries.

Case 1: No preferences, MFN tariff rates ($t = t^*$), and access to competitively priced inputs. In the first scenario, the United States imposes common MFN tariffs on apparel imports from Lesotho and China. For MFN trade there are no rules of origin requirements or restrictions on access to internationally priced fabric, so barring domestic restrictions on use of inputs, all countries have access to internationally priced fabric, that is, ($\phi(z) = 1$).

In this scenario, the product allocation condition (14) reduces to the standard RULC condition of the DFS model (equation [4]). Tariffs affect both countries equivalently and the unit fabric-cost components cancel each other out. The geographic location of production is determined entirely by relative unit-labor costs, with specialization according to comparative advantage. Fabric intensity has no bearing on what a country exports. Tariff protection in this scenario introduces no fabric-use bias.

Case 2: Preferential access granted to home ($t = 0$, $t^* > 0$) and no rules of origin. The second scenario is set up to reflect the AGOA preferences granted to Lesotho and other LDBCs. These countries are granted a tariff preference into the United States ($t = 0$, $t^* > 0$), but under the LDC special rule are also able to use internationally competitive third-country fabric in the production of apparel exports. Given our assumption of no-transport costs, fabric prices are therefore equal in Lesotho and China (($\phi(z) = 1$).

The allocation condition in this case simplifies to:

$$\frac{wa(z)}{w^*a^*(z)} \leq \left(1+t^*\right) + \frac{\lambda^*(z)}{1-\lambda^*(z)}\left(t^*\right). \tag{15}$$

What can be observed from the relationship is that the *effective* preference is a function of both the tariff preference as well as the ratio of fabric cost shares to value-added costs shares ($\lambda^*/(1 - \lambda^*)$). We explore the implications of this in more detail.

Take a scenario where apparel products contain no fabric, that is $\lambda^* = 0$, and the term on the far right of equation [15] falls away. The tariff preference has a uniform impact on all apparel products and allows Lesotho to export products in which it is up to $1 + t^*$ times less efficient at producing than China. For example, a tariff preference of 20 percent enables the home country to export new apparel products where its unit labor costs are up to 20 percent greater than their foreign competitors.

In addition to the export of new products (i.e., growth along extensive margin), the tariff reductions under AGOA also raise US consumption of existing products exported by Lesotho (i.e., the intensive margin) through reductions in the relative US consumer price of these goods. The effect on the volume and value of exports could be very large if products are highly substitutable. We would therefore expect to see growth in exports along both the intensive and extensive margin.

Once fabric is introduced, the AGOA preferences alter relative incentives to export products of different unit-fabric contents. In particular, the tariff preference is greater for products with higher fabric-cost shares. This is revealed by the second term on the right-hand side, which is positive and increasing (exponentially) in λ^*. As the fabric-cost share approaches 1, the effective preference granted to Lesotho converges on positive infinity.

Diagrammatically, this relationship is represented in figure 9.5. Assume for simplicity's sake, that Lesotho's relative unit-labor costs are fixed at $(aw/a^*w^*)_1$ on the vertical axes for all apparel products. We have also assumed that Lesotho's RULC exceeds 1. On the horizontal access, apparel products are ordered according to rising fabric-cost shares (or diminishing labor-cost shares). In a competitive environment where Lesotho and China face the same US tariffs (see Case 1 in figure 9.5), Lesotho would not export any products as its RULC exceeds 1. With tariff preferences plus waivers from the rules of origin granted to Lesotho, the relevant comparison is between RULC and the solid line (equals the right-hand side of equation [15]) identified as Case 2 in the figure. Lesotho is still unable to export products with low fabric-cost shares. However, because the effective tariff preference rises with fabric-cost share, Lesotho is able to export all products in which the fabric-cost share exceeds λ_1, despite having no comparative advantage in these products.

In sum, the tariff preference affects Lesotho's exports in three ways. First, it raises the relative unit-labor-cost threshold by $(1 + t^*)$, which is equivalent to what we would expect in a tariff-adjusted DFS model. Second, the threshold defining the cut-off-point is higher for fabric-intensive products. This arises because tariffs not only tax foreign unit-labor costs, but also tax the fabric content of the product. *The total tariff equivalent preference per unit-labor cost is therefore an increasing function of the unit-fabric-cost share*.[27] Finally, by reducing the relative price of exports, the preferences increase the volume and value of existing imports from beneficiary countries.

The implication for LDC AGOA beneficiaries is that they enter and specialize in the export of the most fabric-intensive apparel products. *The AGOA preferences to LDC beneficiaries therefore compound the existing incentives to produce low value-added or fabric-intensive products brought about by the MFA.* There is one important difference. The AGOA incentives are unre-

27. In a small country price-taking model, the tariff effects are greatest for fabric intensive products *even among those goods where it has a comparative advantage* (the intensive margin). The tariff preferences therefore create incentives for firms to expand production most in the low-value-added, fabric-intensive varieties of products they are already exporting. In addition, the preferences would encourage entry of the least efficient firms into the most fabric-intensive apparel products.

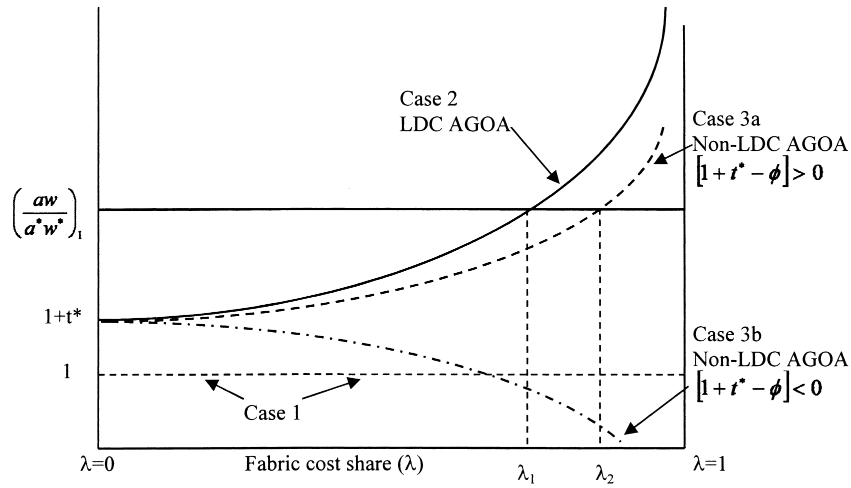

Fig. 9.5 The effect of tariff preferences on incentive to export fabric-intensive products

lated to the price of the product, only fabric intensity, whereas the implicit subsidy for non-quota-constrained countries under the MFA is greatest for low-priced, fabric-intensive products.

Case 3: Preferential access granted to home ($t = 0$, $t^* > 0$), but rules of origin constraints on fabric inputs.

This scenario reflects the situation for non-LDC special rule AGOA countries such as South Africa (and Mauritius for most of the post 2001 period). Apparel exports from these countries have preferential access into the US market, but production is subject to a two-stage transformation requirement. Apparel producers from these countries are therefore required to use domestic (or US)-produced fabric in the production of exports to the United States under AGOA preferences. If these countries produce fabric at internationally competitive prices, $\phi(z) = 1$, then the outcome will be equivalent to Case 2. However, if local fabric is more expensive than foreign fabric, $\phi(z) > 1$, the allocation condition is given by:

$$\text{(16)} \qquad \frac{wa(z)}{w^*a^*(z)} \leq \left(1+t^*\right) + \frac{\lambda^*(z)}{1-\lambda^*(z)}\left(1+t^* - \varphi(z)\right).$$

The relationship differs from equation [15] in that while the home country is granted a tariff preference, it has to utilize more expensive domestic fabric.

The impact on clothing production relative to the pre-AGOA period is ambiguous and depends on the fabric-price disadvantage relative to the tariff preference. Take for instance a scenario (Case 3a) where the home relative fabric-price disadvantage is less than the tariff preference such that

$(1 + t^* - \phi(z)) > 0$. In this scenario, the effective preference rises with fabric intensity, but less so than in Case 2. In figure 9.5 this is depicted by the dashed line identified as Case 3a. The home country will export all products in which the fabric-cost share exceeds λ_2.

An alternative scenario (3b) is one where the fabric-price disadvantage is greater than the tariff preference such that $(1 + t^* - \phi(z)) < 0$. Here the effective preference declines as the fabric intensity of the product rises. At some level of fabric intensity, the fabric-price disadvantage will dominate the tariff preference effect and reduce the right-hand side of equation (15) to below 1. At this point, there is a disadvantage associated with exporting under the preferential access scheme as opposed to exporting under MFN rates (Case 1). Firms that are competitive in these products, that is RULC < 1, will then export under MFN rates. In figure 9.5, Case 3b depicts the declining effective preference (Case 3b), although in this example, the non-LDC AGOA beneficiaries will not export at all as the allocation condition [15] is not met for any product.

Bar the case of competitive domestic fabric producers, our model predicts that LDC AGOA beneficiaries such as Lesotho will experience higher growth in export volumes (along both the extensive and intensive margin) to the United States than other AGOA beneficiaries. The effect will be particularly pronounced in fabric-intensive apparel products.

9.3.6 Other Effects

Other considerations relate to the development of a comparative advantage in the nascent industry. Our model raises a number of concerns in relation to this. First, the incentives steer firms to producing products with the lowest value addition conditional on price, rather than up the value chain. If these products are characterized by low positive-growth externalities, then the preference may trap firms into a lower-growth path than alternative preferences that incentive greater value addition.

Second, our model does not deal with the opportunity cost of resources used in the production of apparel. If labor supply is not infinite, then the growth in the apparel industry will raise wages, which may actually drive out export firms in other sectors where the home country has a comparative advantage. This also holds for other scarce resources such as infrastructure, land, and water.

Third, the specialization by firms in fabric-intensive products makes these exporters highly vulnerable to international price volatility (either through exchange rates or international prices), preference erosion through lower MFN tariff rates, and the ending of the waiver of the rules of origin. Changes in these variables result in an amplified impact on the effective subsidy provided by the AGOA preferences and the MFA quotas. Preference erosion could therefore provide an additional blow that would be seriously underestimated if models fail to capture the contribution of the rule of origin preference.

Finally, the preferences restrict backward linkages by discouraging the addition of value-added services from other sectors and inducing exporters to use expensive fabric that is less likely to be produced in poor countries.

9.4 Empirical Application: Testing Methods and Data

Our background review identified three distinct trade regimes facing AGOA recipients from the mid-1990s: (a) quotas under the MFA; (b) AGOA preferences, including the third-country fabric provision; and (c) the expiration of the MFA. Theory suggests that each of these trade regimes had different impacts on the incentives facing AGOA and non-AGOA countries

In what follows we describe the testing approach we use and then apply this to highly disaggregated US import data. Our specific focus is on changes in the characteristics (value addition and fabric intensity) of AGOA apparel exports associated with the MFA and AGOA preferences. We ignore the effects on the value and range of imports, as this is already covered by existing empirical research.[28] The empirical method we use is difference-in-difference estimation applied to price equations. In essence, we identify changes in the fabric intensity of US apparel imports from AGOA recipients by analyzing changes in the relationship between apparel import prices and fabric input prices.

We find support for our theoretical predictions. Under the MFA, AGOA recipients are found to be specialized in fabric-intensive clothing products with low value addition relative to quota-constrained (and other) countries. Our estimates suggest, however, that the implementation of AGOA 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; that is, growth was primarily along the intensive margin.

However, support for our hypothesis of rising fabric content in response to the AGOA preferences is found after the expiration of the MFA. 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. More important for this study is that we also find a rise in the fabric content of lesser-developed AGOA apparel exports relative to the

28. We have estimated triple difference-in-difference equations similar to those of Frazer and Van Biesebroeck (2010) and do find a surge in apparel imports from lesser-developed beneficiaries relative to other AGOA recipients (and the rest of the world) in response to the third-country fabric provision. The average growth in imports from 2001 through 2004 associated with the fabric provision is estimated to be up to 282 percent, with stronger effects in products facing high preference margins. We also find 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.

emerging country control group. The AGOA preferences therefore helped insulate recipients in those fabric-intensive products that China and other quota-constrained countries increasingly entered into after 2005.

9.4.1 Empirical Specification of the Price Equation

An important limitation of existing empirical studies on the effect of AGOA on import values (Collier and Venables 2007; Portugal-Perez 2008; Frazer and Van Biesebroeck 2010) is that import value data, even at the HS ten-digit level, is too aggregated to fully capture changes in product characteristics. By only looking at the value or range of HS ten-digit products exported by each country, existing studies may miss important changes occurring within each product line.

Take, for example, figure 9.6 that plots US 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 HS ten-digit product ranges from under ten dollars to over one thousand dollars per square meter, equivalent with higher-income economies producing the more expensive (higher quality) varieties (as in Hummels and Klenow [2005] and Schott [2004]). The lesser-developed

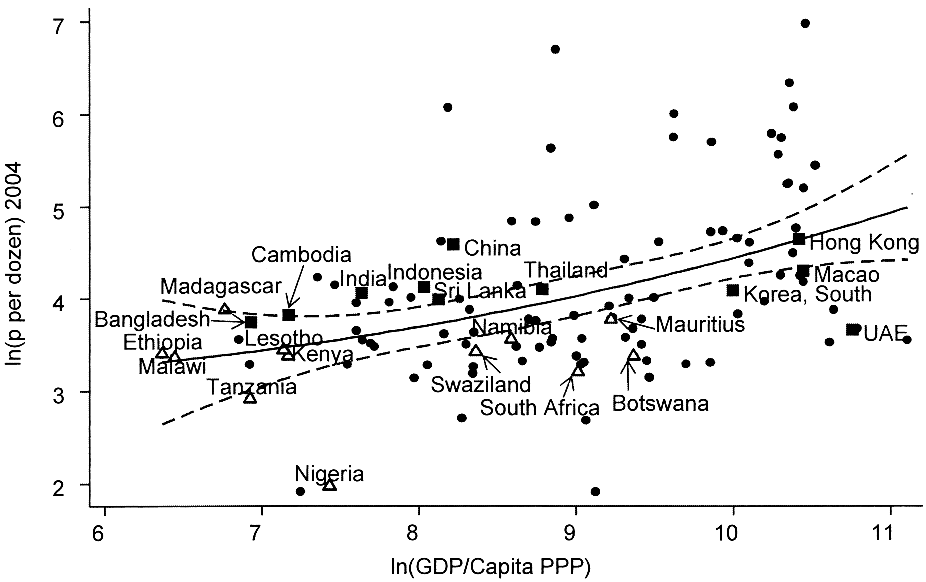

Fig. 9.6 Unit values and level of development: Top apparel product exported by Lesotho in 2004 (women's or girls' other pullovers of cotton, knitted)

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

AGOA recipients predominantly situate at the low-price, low-income per capita end of the spectrum.[29]

Our particular focus is on product prices. 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 to identify whether price changes and changes in the fabric-intensity of apparel products are consistent with those predicted by our theory.

Following Feenstra (2004), the US domestic price of an imported good i from country c is specified as a function of marginal costs (c^*), the exchange rate (e), import tariffs (tar), aggregate domestic expenditure (I), and the price of substitute goods (q) as follows:

$$\begin{aligned} \ln p_{ict} &= \alpha + \beta_1 \ln c^*_{ict} + \beta_2 \ln e_{ct} + \beta_3 \ln q_{ict} \\ &\quad + \beta_4 \ln(1 + tar_{ict}) + \beta_5 I_t + \varepsilon_t \end{aligned}. \tag{17}$$

This is an unrestricted version of a price equation that imposes symmetric pass-through of the exchange rate and foreign costs (where $\beta_1 = \beta_2$), symmetric pass-through of the tariff and exchange rate (where $\beta_2 = \beta_4$), and homogeneity of degree 1 in its arguments (β_1 (= $\beta_2 = \beta_4$) + $\beta_3 + \beta_5 = 1$).

We are particularly interested in isolating changes in the fabric content of US apparel imports using this equation. This requires a more precise specification of the influence of fabric costs on unit costs c^*. To simplify the analysis, we impose a unit-cost function derived from a constant return to scale Cobb-Douglas production function:

$$c^*_{ict} = A_t \, pf^{\alpha}_{it} \, pva^{1-\alpha}_{ict}, \tag{18}$$

pf is the price of the fabric used in the production of good i, pva is the value-added price (made up labor and capital costs), and A_t measures total factor productivity. This specification imposes the restriction that the proportion of expenditure spent by the firm on fabric is constant and is given by α. Substituting (18) into (17) gives the following equation:

$$\begin{aligned} \ln p_{it} &= \alpha + \delta_1 \ln pf_{it} + \delta_2 \ln pva_{it} + \beta_2 \ln e_t + \beta_3 \ln q_{it} \\ &\quad + \beta_4 \ln(1 + tar_{it}) + \beta_5 I_t + \varepsilon_t \end{aligned} \tag{19}$$

where $\delta_1 = \beta_1\alpha$ and $\delta_2 = \beta_1(1-\alpha)$. Given the assumptions imposed, the fabric content of the clothing product can be calculated as $\delta_1/(\delta_1 + \delta_2) = \beta_1\alpha/(\beta_1\alpha + \beta_1(1 - \alpha)) = \alpha$. Fabric-intensive products would therefore be characterized by large coefficients on the fabric price (δ_1) relative to the coefficient on the value-added price (δ_2).

There are two changes in response to the MFA and AGOA that we wish to identify: (a) changes in the price level, and (b) changes in the fabric intensity of US apparel imports.

29. There are exceptions. Apparel unit values of China, India, and Indonesia, who were among the top four quota-restricted countries under the MFA (Brambilla, Khandelwal, and Schott 2010) are higher than predicted. This is consistent with theoretical predictions of quality upgrading in response to quota restrictions.

To identify changes in the level of import prices from a region in response to a shock, say AGOA recipients after 2001, the above equation is modified to include an interaction between an AGOA dummy variable (*DAg*) and a dummy variable for the post-AGOA period (*D01*). The basic price equation in this example is then specified as:

$$\begin{aligned}\ln p_{ict} &= \theta_1 D01 \times DAg_c \\ &\quad + \delta_1 \ln pf_{it} + \delta_2 \ln pva_{ict} \\ &\quad + \beta_2 \ln e_{ct} + \beta_3 \ln q_{ict} + \beta_4 \ln(1 + tar_{ict}) \\ &\quad + cntry/prod_{ct} + \lambda_t + \varepsilon_{ict}\end{aligned} \tag{20}$$

where θ_1 measures the marginal effect of the AGOA preferences (*D01*) on unit values of US imports from AGOA countries (DAg_c) 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.[30] Year fixed effects λ_t are also included to account for common shocks across all product varieties.

To identify changes in the fabric intensity associated with the various trade regimes, we focus on changes in the coefficients on the fabric and value-added prices. For example, we would expect a shift by AGOA recipients to more fabric-intensive varieties within each ten-digit product line to be revealed by a rise in the coefficient on fabric prices and a decline in the coefficient on value-added prices.

We use difference-in-difference estimation to identify changes in the *relative* fabric content of apparel imports from AGOA beneficiaries. The specification in the case of AGOA preferences is as follows:

$$\begin{aligned}r1:&\ \ln p_{ict} = \theta_1 D01 \times DAg_c \\ r2:&\quad + (\alpha_1 + \theta_2 D01) \times DAg_c \times \ln pf_{it} \\ r3:&\quad + (\alpha_2 + \theta_3 D01) \times DAg_c \times \ln pva_{ict} \\ r4:&\quad + (\delta_1 + \theta_4 D01) \times \ln pf_{it} \\ r5:&\quad + (\delta_2 + \theta_5 D01) \times \ln pva_{ict} \\ r6:&\quad + \beta_2 \ln e_{ct} + \beta_3 \ln q_{ict} + \beta_4 \ln(1 + tar_{ict}) \\ r7:&\quad + cntry/prod_{ic} + \lambda_t + \varepsilon_{ict}\end{aligned} \tag{21}$$

The first row tells us the effect of AGOA on US import unit values of apparel products imported from AGOA recipients. Rows 2 and 3, however, are of most interest to us. The coefficients on the triple interaction terms (θ_2 and θ_3)

30. The standard most restrictive difference specification includes a dummy variable for AGOA countries (DAg_c), 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.

measure the marginal impact of AGOA preferences on the fabric intensity of US imports from AGOA recipients (first difference) *relative to changes in the fabric intensity of US imports from the control group* (second difference). The latter effect is captured by the coefficients θ_4 and θ_5 in rows 4 and 5.

For example, support for our hypothesis that AGOA preferences raise the fabric intensity of imports from recipient countries would be revealed by a positive coefficient on the AGOA country by post-2001 interaction with the fabric price (θ_2) in row 2 and a negative coefficient on the AGOA country by post-2001 interaction with the value-added price (θ_2) in row 3. Note that these coefficients reflect the post-2001 impact on fabric intensity in AGOA countries *relative* to the post-2001 impact on fabric intensity in the control group, which is captured by the coefficients θ_4 in row 4 and θ_5 in row 5.[31]

Equations (20) and (21) summarize the main approaches used in the following analysis. Further refinements to isolate the marginal effects of the MFA and AGOA preferences on lesser-developed AGOA beneficiary countries will be explained in the relevant empirical sections.

9.4.2 Data

The empirical analysis draws on a panel of time-consistent ten-digit HTS import data for the United States from 1996 to 2008.[32] The raw data contains approximately 1,202 product lines for clothing (HS 61, 62, and various subcodes of HS 64 and 65) covering 224 countries.

Unlike the price equations specified above, the dependent variable is the log import price of clothing *exclusive* of tariffs, insurance, and freight costs. This does not affect the estimates, except that the pass-through of tariffs to US domestic prices of imports is calculated as $1 - \delta_7$. 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 six-digit NAICS level) (*usppi*), and competitor clothing unit values (at ten-digit level) (*Pcompete*) for substitute products *q*. Applied tariff rates are defined at the four-digit HS level.[33] In addition to these variables, real GDP per capita measured in purchasing power parity

31. We could also include product by year fixed effects and country by year fixed effects. In this case, only variables defined over product, country, and time will be retained.

32. 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.

33. We use the average tariff at the HS four-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. The 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 four-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).

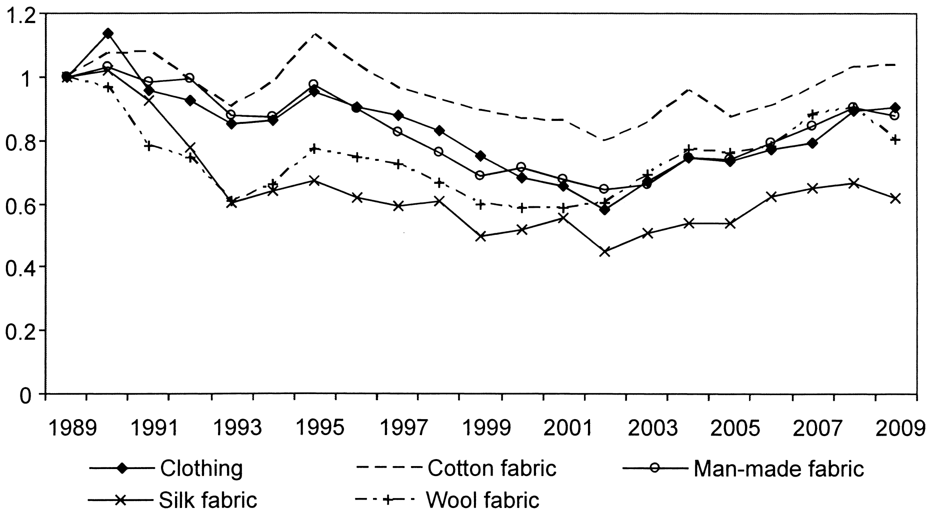

Fig. 9.7 Fabric price indices (based on world exports and imports from UNComtrade)

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

[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).[34]

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 and HS55) using unit values derived from world trade data obtained from UNComtrade.[35] The calculated fabric indices are presented in figure 9.7.[36] Of interest is the relatively close association between the average US 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 ten-digit HTS clothing product based on the dominant fabric used in producing the good.[37] Unfortunately, we are

34. 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.

35. 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, and 550690. The average of the fabric prices were calculated using world exports and world imports.

36. 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.

37. The allocation was done manually on the basis of the product description.

unable to construct weighted average fabric price indices for apparel products produced using different combinations of fabric types.[38]

We now separately apply the various equations to the AGOA and MFA trade regimes.

9.5 African Growth and Opportunity Act

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. The effects are predicted to be particularly pronounced in LDC recipients eligible to use third-country fabric.

Table 9.5 presents regression results for various specifications of the price equation. The first column presents benchmark estimates of the price relationship over the period 1996–2004 and is 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 2004).

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.[39] Foreigners therefore absorb 60 percent of tariff increases 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 US import prices. The 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.[40]

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 HS four-digit-level estimates. The disaggregated results and hypotheses tests are presented in table 9A.1 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

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

39. The estimated exchange rate pass-through coefficient of 0.6 falls between Feenstra's (1988) 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).

40. The coefficients on value added and fabric prices are insignificantly different from each other.

Table 9.5 **Marginal impact of AGOA preferences on fabric intensity in beneficiary countries**

	Country sample	All base (1)	All AGOA fabric intensity (2)	All AGOA (3)	All marginal LDC AGOA (4)
	Marginal impact of AGOA on fabric intensity				
	LDC AGOA countries relative to other AGOA				
1	D01 × Dldc × ln(pf)				0.067
2	D01 × Dldc × ln(pva)				–0.083
	AGOA countries relative to control				
3	D01 × DAg × ln(pf)			–0.114	–0.175
4	D01 × DAg × 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 × ln(pf)				–0.049
8	Dldc × ln(pva)				0.144
9	DAg × ln(pf)		0.323***	0.405***	0.446**
10	DAg × ln(pva)		–0.389***	–0.423***	–0.537**
11	D01 × ln(pf)			0.099***	0.099***
12	D01 × ln(pva)			–0.104***	–0.104***
13	D01 × Dldc				0.034
14	D01 × 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	255,231	255,231	255,231	255,231
	F	90.9	81.61	67.2	54.8
	Fixed effects	country/product year	country/product year	country/product year	country/product year

Estimates are robust to heteroskedasticity.
***Significant at the 1 percent level.
**Significant at the 5 percent level.
*Significant at the 10 percent level.

interactions between an AGOA dummy (*DAg*) and fabric costs and value-added prices (see rows 9 and 10). The objective of this estimate is to identify the average fabric intensity of US imports from AGOA beneficiaries throughout the 1996 to 2004 period.

The results indicate that AGOA countries produce relatively fabric-intensive clothing products with low value addition. The coefficient on the fabric price ($DAg \times \ln(pf)$) is positive and significant (0.323), while the coefficient on value-added prices ($DAg \times \ln(pva)$) is significant and negative (–0.389). Therefore, US 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.

To identify the effect of AGOA preferences on beneficiary exports, we use the specification in equation (21) where the time period dummy variable in the interactions refers to the 2001 to 2004 period.[41] The relevant results are presented in rows 3 and 4 in column (3) of table 9.5. These are the coefficients on the difference-in-difference terms that measure the change in fabric intensity of US 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* ($\mathrm{D01} \times \mathrm{DAg} \times \ln(\mathrm{pf})$) *in row 3 and* ($\mathrm{D01} \times \mathrm{DAg} \times \ln(\mathrm{pva})$) *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 among 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 2001–2004 period. Estimates of this relationship are presented in column (4). The coefficients on the LDC interaction terms in rows 2 and 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

41. 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 six months of the year.

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 United States by recipient countries. The 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 than of new fabric-intensive products. This is consistent with the decomposition of growth analysis in table 9.3, which showed that the expansion of exports was overwhelmingly along the intensive margin.

9.6 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 January 1, 2005, although some quotas were reimposed in industrialized countries in response to the rapid growth in imports from China.[42] In this section, we exploit this break to indentify whether import values, import unit values, and the fabric intensity of US 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. In our 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, Khandelwal, and Schott (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 9.8 that presents a measure of *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,

42. We do not take into account the reimposition of quotas on selected Chinese apparel products from late 2005. As shown by Harrigan and Barrows (2009) these contained, but did not reverse, the import response to the end of the MFA.

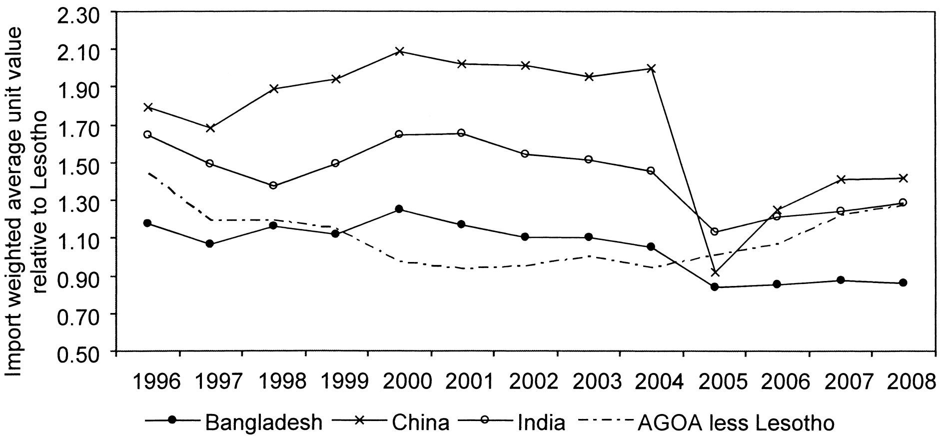

Fig. 9.8 Import weighted average price relative to Lesotho (using Lesotho exports as weights)

Note: The import weighted average price for country c is calculated as ADD EQUATION where w_{iLt} is the share of product i in Lesotho's apparel exports to the United States, P_{iLT} is the price of Lesotho exports, and P_{ict} is the price of the comparator country apparel exports.

Bangladesh, and India exported varieties within each HS ten-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 toward the low-priced products exported by Lesotho. Figure 9.9 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 reflect *across-product* shifts in the composition of apparel exports to the United States toward lower-priced products.

The shift in composition is most noticeable for China, whose apparel exports were initially concentrated in relatively expensive ten-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 World Trade Organization (WTO). A further shift toward 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.

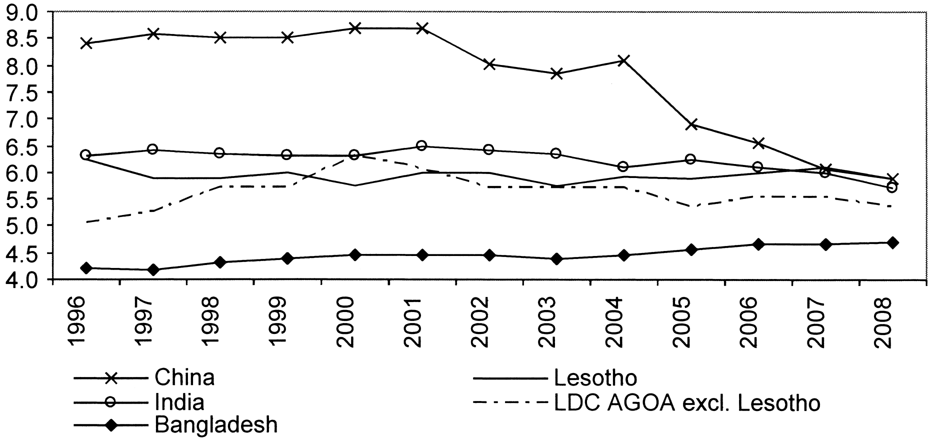

Fig. 9.9 Structural shifts in the composition of US apparel imports, import weighted US average, unit value ($) per SME

Note: The import weighted average price for country c is calculated as ADD EQUATION where ADD EQUATION is the median price of product i over the entire period and m_{ict} is the share of i in country c's apparel exports to the United States.

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 price and fabric content of apparel exports by AGOA recipients.

9.6.1 Quotas and Price Levels

The first objective of this section is to estimate if the expiration of the MFA reduced average US import unit values from quota-constrained countries who are predicted to have shifted apparel production toward lower-priced products. The equation used to identify these price effects is the difference-in-difference specification of equation (20), except that we replace *DAg* with a dummy variable *Dquotacntry* for quota-constrained countries and *D01* with a post-2005 dummy variable (*D05*). Table 9.6 presents the results.

In line with theoretical predictions (and the price trends in figure 9.8 and figure 9.9), quota-constrained countries responded to the end of the MFA by reducing the quality of their apparel exports by shifting toward lower-priced varieties and products. The average unit value of US apparel imports from the top four most quota-constrained countries declined by 31.9 log points relative to other countries after 2005 (see row 1 of column [1] of table 9.6; see also Brambilla, Khandelwal, and Schott [2010]; Harrigan and Barrows [2009]).[43] This arises from a combination of across-product shifts of imports toward lower-price products and within-product shifts toward lower-priced

43. The decline for the top thirty quota-constrained countries is lower at 13.9 percent.

Table 9.6 **Marginal impact of the ending of the MFA on import unit values and fabric intensity in apparel-eligible AGOA beneficiaries**

	Country sample	Base price emerging (1)	Base fabric emerging (2)	AGOA emerging (3)	LDC AGOA emerging (4)
	Impact of ending of MFA on US import prices				
1	Quota constrained relative to control (*D*05 × *Dquotacntry*)	–0.319***	–0.580***	–0.567***	–0.573***
2	AGOA relative to control (*D05* × *DAg*)			0.422***	
3	LDC AGOA relative to other AGOA (*D05* × *Dldc*)				0.111
	Marginal impact of ending of MFA on fabric intensity				
	Control group				
4	*D05* × ln(*pf*)		–0.107***	–0.087***	–0.098***
5	*D05* × ln(*pva*)		0.093***	0.073**	0.084***
	Quota-constrained group relative to control group				
6	*D05* × *Dquotacntry* x ln(*pf*)		0.217***	0.219***	0.209***
7	*D05* × *Dquotacntry* x ln(*pva*)		–0.112	–0.112	–0.104
	AGOA countries relative to control group				
8	*D05* × *DAg* × ln(*pf*)			0.294***	
9	*D05* × *DAg* × ln(*pva*)			–0.317***	
	LDC AGOA countries relative to other AGOA				
10	*D05* × *Dldc* × ln(*pf*)				0.273**
11	*D05* × *Dldc* × 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* × ln(*pf*)		0.599***	0.631***	0.628***
15	*Dquotacntry* × ln(*pva*)		–0.898***	–0.938***	–0.917***
16	*DAg* × ln(*pf*)			0.432***	
17	*DAg* × ln(*pva*)			–0.324***	
18	*Dldc* × ln(*pf*)				0.373***
19	*Dldc* × 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	102,208	102,208	102,208	102,208
	F	168	131	108	106
	Fixed effects	country/product year	country/product year	country/product year	country/product year

Notes: Estimates are robust to heteroskedasticity.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

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.

9.6.2 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), except, as above, a post-2005 dummy variable is used and we also include various interactions between *Dquotacntry* and value added and fabric prices covering the pre- and post-MFA period.

We are interested in two effects: (a) the change in fabric intensity of exports of the control group (non-quota-constrained emerging economies) after January 2005, and (b) 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 and 5 of table 9.6. The second effect is given by the triple interaction between *D05*, *Dquotacntry*, and fabric- and value-added prices in rows 6 and 7.

The results in rows 4 and 5 in column (2) indicate a decline in the fabric intensity of apparel exports to the United States 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 US apparel imports from the most quota-restricted countries.[44] This is revealed by the significant positive coefficient of 0.217 on the interaction term ($D05 \times Dquotacntry \times \ln(pf)$) in rows 6 and 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 United States from these previously quota-constrained countries has risen.

The next two 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 separately including addi-

44. There is no significant difference from the control group for the top thirty most quota-restricted countries.

tional triple interactions for the AGOA group (see rows 8 and 9, column [3]) and the LDC AGOA group (see rows 10 and 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 US import prices from AGOA recipients to changes in fabric prices relative to the control group. If we focus on lesser-developed beneficiary countries (column [4]), 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. The 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 sum, the MFA induced AGOA countries to specialize in low-value-added, high-fabric-content apparel products. The 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 response to the AGOA preferences. Rather, the apparel producers in AGOA recipient countries responded by increasing 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 reintroduced 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.*

9.7 Conclusions

Lesotho and other lesser-developed beneficiary countries enjoyed rapid growth in their clothing exports to the United States as a result of the third-country fabric provision of AGOA. Although adversely impacted by the expiration of the MFA and the recession in the United States, the clothing industries of these least developed African countries have clearly benefited from the provisions. But these economies have not enjoyed the more dynamic upgrading and spill-over benefits that might have been hoped for. Most of the export growth has come in the products that these countries were already producing. Success in the US clothing market has also not translated into success in other clothing markets or in success in exporting other labor-intensive products. The LDBCs have generally remained specialized in a small number of garment categories that are particularly favored by the preferences. These typically embody low value added in sewing and are relatively intensive in fabric. Although the AGOA program has operated for a decade, it is unlikely that most of the industry in these poor sub-Saharan countries could survive without the special rule.

This experience provides important lessons. Trade preferences can have important effects on export success. First, they can offer powerful inducements to beneficiary exporters that are financed through foregone tariff revenues by developed countries rather than taxpayers in developing countries. Second, by providing a form of infant industry protection in export rather than domestic markets, they ensure that products have to meet the requirements of consumers in advanced economies. And third, since they are externally imposed, they do not give rise to domestic rent seeking.

The positive response to AGOA's 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 positive response to AGOA highlights the restrictive nature of other rules of origin that have been imposed on least developed country exports. Allowing LDBCs to use imported fabrics provided powerful effective subsidies for clothing exports. This served to compensate producers in poor countries for the lower productivity of domestic workers and other institutional and infrastructural deficiencies.

The fact that the program has operated smoothly without problems relating to trade deflection demonstrates the potential gains from modifying the restrictive rules that continue to limit the benefits to poor countries from programs such as the EBA program of the European Union. Such changes would create more realistic possibilities that the least developed countries could participate in global production chains. It would be particularly welcome given the problems faced by these countries as a result of the expiration of the MFA.

In the Doha Round, it is recognized that lower MFN tariffs will result in preference erosion. But typically studies have suggested that the effects would not be large.[45] However, if the models that are used to estimate the impact of erosion fail to take the third-country fabric provision into account, they could seriously underestimate the impact on the effective protection provided to the lesser-developed AGOA recipients.

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 distorts decisions on value addition and fabric use in opposite directions. On the one hand, the incentives are most powerful in lower-quality products that require less value addition. This may limit the dynamic benefits that are hoped for from these preferences by discouraging skills development and other forms of quality upgrading. On the other hand, it encourages the use of more expensive fabrics. This makes it less likely that there will be backward linkages into domestic textile industries that are still at rudimentary stages of development.

Preferences are thus an opportunity, but not a substitute for, more comprehensive industrial strategies that involve complementary domestic policies to improve private and governmental capabilities. This does not mean that these preferences are unimportant, but suggests they are unlikely to be sufficient. In addition, problems arise when most of the entrepreneurs taking advantage of the preferences are foreign, with many other crucial parts of the value chain being provided thousands of miles away. The experience analyzed in this chapter 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 help create the conditions for growth, but they are not sufficient.

45. For estimates of the impact of preference erosion, see IMF (2003), Olarreaga and Özden (2005), Hoekman and Prowse (2005), and Grynberg and Silva (2004).

Appendix

Table 9A.1 **Price equation estimates by four-digit HS level**

HS4 code	Description	Coefficients ln(GDP worker)	ln(pf)	ln(pva)	ln(e)	ln(Pcompete)	ln(US ppi)	ln(1 + *t*)	*N*	F	r^2	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**	2,890	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	3,833	14.3	0.035	0.719	0.048	0.397
6103	Men's or boys' suits, ensembles, etc., knit or crochet	–0.282***	0.358***	0.326***	–0.672***	0.062**	0.774***	–1.265***	8,136	17.6	0.024	0.122	0.714	0.002
6104	Women's or girls' suits, ensembles, etc., knit or crochet	–0.319***	0.406***	0.358***	–0.812***	0.070***	1.444***	–0.244	24,243	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	4,272	14.8	0.035	0.118	0.001	0.928
6106	Women's or girls' blouses & shirts, knit or crochet	–0.149	0.231**	0.255***	–0.555***	0.161***	0.539	–0.557*	5,332	15.1	0.027	0.651	0.114	0.731
6107	Men's or boys' underpants, pjs, etc., knit or crochet	–0.384	0.752**	–0.13	–1.377***	0.262**	0.274	1.029	2,321	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***	10,262	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	14,877	39.1	0.025	0.067	0.000	0.027
6110	Sweaters, pullovers, vests, etc., knitted or crocheted	–0.179***	0.574***	0.298***	–0.819***	0.056***	0.406**	–0.423***	29,316	98.4	0.031	0.041	0.003	0.100
6111	Babies' garments & accessories, knitted or crocheted	–0.299	0.241	0.381***	–0.829***	0.229***	1.329**	1.139	5,254	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	6,478	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*	2,653	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	9,940	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	5,535	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***	5,314	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	5,824	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	12,265	34.8	0.026	0.089	0.050	0.556
6202	Women's or girls' overcoats, etc., not knit or crochet	–0.043	0.410***	0.354***	–0.788***	0.013	–0.509	–0.438**	14,450	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***	22,945	72.3	0.030	0.026	0.199	0.398
6204	Women's or girls' suits, ensembles, etc., not knit, etc.	–0.009	0.447***	0.368***	–0.822***	0.044***	0.797***	–0.504***	50,694	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***	6,467	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***	7,965	38.3	0.042	0.037	0.085	0.119
6207	Men's or boys' undershirts, etc., not knit or crochet	–0.068	0.352	0.263	–0.987***	–0.071	0.628	–2.315	2,337	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***	7,748	15.5	0.021	0.064	0.077	0.001
6209	Babies' garments & accessories, not knit or crochet	–0.358**	0.602***	0.238**	–1.258***	–0.084	0.923	–0.923	3,786	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	7,067	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**	28,191	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**	5,872	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	1,049	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	3,625	2.66	0.007	0.246	0.448	0.162

(*continued*)

Table 9A.1 (continued)

HS4 code	Description	Coefficients ln(GDP worker)	ln(pf)	ln(pva)	ln(e)	ln(Pcompete)	ln(US ppi)	ln(1 + *t*)	*N*	F	r^2	Hypothesis tests (*p*-value) HOD 1	$\delta_1 + \delta_2 = \beta_2$	Erate = tariff
6215	Ties, bow ties & cravats, not knitted or crocheted	–0.817***	–0.157	0.733***	–0.472***	0.126**	0.823	0.318	1,974	6.86	0.031	0.519	0.247	0.284
6216	Gloves, mittens and mitts, not knitted or crocheted	–0.027	0.897***	0.232*	–0.945***	–0.033	–1.059	–0.737	2,991	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	4,782	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, plaited/ assembled strips any material	–0.099	0.126	0.214	–0.595**	0.228**	0.754	–0.658*	1,653	4.05	0.019	0.683	0.062	0.557
6505	Hats & headgear, knit, etc., lace, etc., in pc, hair net	–0.300***	0.545***	0.278***	–0.817***	0.151***	0.554**	–1.285**	9,802	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 four-digit groups. Estimates are robust to heteroskedasticity. Overall, the coefficients are broadly consistent with expectations. In most sectors the coefficient on fabric prices is positive and ranges from 0.23 to just over 1. Similarly, the coefficients on value-added prices and the exchange rate are mostly of the correct sign. The estimates for headgear (HS 64) and footwear (HS 65) products are poor, but is likely that the fabric costs indices do not adequately reflect the inputs used in the production of these products. For example, HS 6406 covers parts of footwear; removable insoles, heel cushions, and similar articles; gaiters, leggings, and so forth. HS65 covers headgear products often comprising of felt, strips of any material, lace, and the like. These products also make up a very small proportion of AGAO country exports. Most estimates fail to reject the homogeneity and symmetric pass-through (both the tariffs and exchange rate and exchange rate and production costs) hypotheses. Each hypothesis is rejected at most twelve times (out of forty).

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

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