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AGOA Rules: The Intended and Unintended Consequences of Special Fabric Provisions

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Abstract

While exports of clothing from Africa to the United States responded impressively to the preferences they were granted under the African Growth and Opportunity Act (AGOA), this performance was not accompanied by some of the more dynamic benefits that might have been hoped for. Beneficiary countries still do not have viable internationally competitive industries that could survive without the preferences, or that have diversified horizontally into new products and markets or vertically into greater domestic value addition. In this paper we demonstrate that this outcome is a predictable consequence of incentives under the Multi-Fiber Arrangement (MFA) quotas and the AGOA trade preferences. The paper first extends standard trade models and predicts that, in equilibrium, the MFA encouraged exports of low quality and low value added products by AGOA countries and higher quality and higher value added products by quota-constrained countries. AGOA preferences further encourage specialization in clothing products with high fabric cost shares in the least developed countries receiving the preference. The paper then tests these theoretical predictions using difference-in-differences estimations by looking at changes in the value-added and fabric intensity of AGOA apparel exports in response to the ending of the MFA in January 2005 and the granting of AGOA preferences from 2001. The results show that MFA quotas and AGOA preferences caused least developed AGOA recipients to specialize in fabric-intensive products with low value added as well as rising fabric content.

JEL Codes: African Growth and Opportunity Act, AGOA, Multi-Fiber Arrangement, trade preferences, exports, apparel, industrial development, value chains, rules of origin

Keywords: F13, F14, F63, O14, O24

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INTRODUCTION

The export performance of the small land-locked 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 African Growth and Opportunity Act (AGOA) clothing exports to the United States from one of Africa's poorest land-locked nations had tripled to reach $460 million and provide employment for over 50,000 workers (Bennett 2006). Clothing exports from other African countries such as Kenya, Madagascar, Malawi, and Swaziland also increased dramatically in response to the preferences.

This performance 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. The growth was also accompanied by foreign direct investment primarily from Taiwanese investors that used their global positioning to connect into global value chains (GVCs) feeding into US retail chains (Morris, Staritz, and Barnes 2011).

Despite the impressive growth in export volumes, there is disquieting evidence in AGOA's performance that relates to the issue of dynamic benefits. After 12 years of AGOA support, beneficiary countries still do not have viable internationally competitive industries that could survive without the preferences, or that have diversified horizontally into new products and markets or vertically into greater domestic value addition (Salm et al. 2002, Bennett 2006). Despite their success in accessing and connecting to global value chains, the domestic firms have failed to move into higher value activities in the value chain (Staritz 2013). In recent years, several AGOA countries have also experienced declining exports.

Several studies have been devoted to explaining these outcomes, and most conclude that the problems lie with the African countries themselves, rather than on the access given their products in foreign markets.[1] One explanation is that these countries are too far from the threshold of global competitiveness for exports to ignite the industrialization process (Collier and Venables 2007). Another is the weak integration of the foreign factory owners into the local community (Lall 2005; Morris, Staritz, and Barnes 2011; Staritz 2013). The expiration of the Multi-fiber Arrangement in January 2005 also led to much stronger competition from China and other previously quota-constrained countries in those products exported by AGOA beneficiaries. Yet, no studies have explored how the preferences themselves may have shaped the outcome.

In this paper we demonstrate that the lack of dynamic benefits is a predictable consequence of incentives under the Multi-Fiber Arrangement (MFA) quotas and the AGOA trade preferences. Although

1. For earlier research on this topic in Africa, see Ng et al. (1996) and Wang and Winters (1998).

these preferences encourage exports, they simultaneously create disincentives for local value-addition that may limit the program's development benefits.

The paper first extends standard trade models and predicts that, in equilibrium, the MFA should encourage exports of low quality and low value added products by AGOA countries and higher quality and higher value added products by quota-constrained countries. The AGOA preferences would further encourage specialization in clothing products with high fabric cost shares in the least developed countries receiving the preference. This outcome under AGOA is driven by the waiver on rules of origin requirements that allowed lesser developed countries to use third-country fabrics or yarn and still export clothing under the AGOA preferences.

The paper then tests these theoretical predictions using difference-in-differences estimations by looking at changes in the value-added and fabric intensity of AGOA apparel exports in response to the ending of the MFA in January 2005 and the granting of AGOA preferences from 2001. The results show that MFA quotas and AGOA preferences caused least developed AGOA recipients to specialize in fabric-intensive products with low value added as well as rising fabric content.

The MFA quotas and the AGOA preferences allowed 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 MFA quotas and AGOA preferences also have two deleterious effects. First, they steer firms mainly toward the simplest low priced products in which clothing producers add little value. Thus the trade preferences tax-skills acquisition and discourages firms from moving up the value chain. Second, the AGOA preferences 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.

Our results show that trade preferences can stimulate trade, raise incomes in developing countries, and boost employment. But whether they actually lead to viable diversified and competitive industries is much less certain.

This paper proceeds now in five sections. In the first we describe the AGOA program. In the second we discuss the economic theory of the effects these regimes are likely to have. In the third we conduct several empirical tests of the theory. In the fourth we discuss various policy implications arising from our results, and in the final section we present our conclusions.

BACKGROUND

A centerpiece of US trade relations with sub-Saharan Africa is the African Growth and Opportunity Act (AGOA). First implemented in 2000, AGOA grants qualifying countries duty-free, quota-free access to the US market. The program, which has been renewed several times, is scheduled to expire in 2015.

Unlike earlier extensions that were made at the last minute, this time the Obama administration has pledged to renew AGOA in a "seamless process" that assures implementation in a timely manner.

Since US officials view AGOA as a success, the administration's position is not surprising. On May 12 2010, for example, a ceremony was held on Capitol Hill in Washington, DC to celebrate the 10th 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."

Trade preferences can be powerful stimulants for trade. There is a view that because of their preferential access into developed economy markets, poor countries will "learn by doing." That is, over time they will upgrade their product sophistication, diversify into other products and markets and ultimately become competitors that no longer need the preferential treatment. In addition, it is hoped that there are benefits to the rest of the economy. Other domestic firms could gain too through backward and forward linkages as exporters demand inputs and services and become increasingly embedded in the local economy. Motivated in part by such considerations, the European Union and the United States both implemented multilateral Generalized System of Preferences (GSP) programs in the 1970s. In addition, they both have regionally focused preferential programs.[2]

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. Yet opportunities to export under preferences while only contributing a small slice of the value chain is often restricted by rules of origin requirements (Collier and Venables 2007). 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."

In the case of preference programs in apparel, these rules are particularly stringent, generally requiring that at least two (in the case of the European Union) or even three (in the case of the United States) transformation processes (e.g., yarn, fabric, assembly) in the preference-receiving or granting

2. The European Union 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 European Union has concluded Economic Partnership Agreements (EPAs) with groups of ACP countries. The United States 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 which 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.

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. AGOA not only gave all sub-Saharan countries extensive duty-free quota-free access to the United States.[3] Its rules of origin (see table 1) also contained an 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 LDBCs to use third-country fabrics or yarn and still export clothing under the AGOA preferences.[4] 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.

Although the special LDBC rule was originally scheduled to expire after three years, it was extended in 2004 for another three years, in 2007 for a further five and in August 2012 just one month prior to its anticipated expiration, for a further three years.

Impact of AGOA on Clothing Exports

The experience demonstrates how important preferences and different rules of origin treatments can be: US imports of clothing from AGOA countries (SITC 84-Apparel and Clothing Accessories) increased from $730 million in 2000 to $1,755 million in 2004. This growth was dominated by US imports of clothing from the least developed African countries, which increased by 400 percent, almost all of which took advantage of the lesser developed country provision (see figure 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 2). By contrast, in 2004 US imports of clothing from

3. 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 that they are made of 85 percent US-made yarn and fabric or from fabrics and yarns made in other AGOA beneficiary countries.

4. Most of the countries that were eligible for the waiver are classified as least developed by the United Nations. Botswana and Namibia did not meet the requirements for the special rule as their GDP per capita exceed the 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).

South Africa and Mauritius, the two largest African clothing exporters that were not eligible for the rules of origin waiver, were actually $18 million lower than they had been in 2000 (figure 2).[5]

AGOA also stimulated entry into new clothing products. Table 2 reports the number of apparel products at the 10-digit level of the Harmonized Tariff Schedule (HTS) produced by AGOA countries. South Africa, Mauritius, and Madagascar had the widest range of products (over 130 each) prior to the implementation of AGOA in 2000. With the implementation of AGOA many countries experienced sharp increases in the total number of lines from 2000 to 2004 (see Kenya from 45 to 155, Swaziland from 47 to 139, Lesotho from 60 to 118), although the range remained low relative to all possible product lines. In most countries however these trends reversed after 2005, but still remained above 2000 levels.

AGOA countries have experienced setbacks. First when the quota constraints on their (mainly Asian) competitors were lifted with the expiration of the Multi-Fiber Arrangement in January 2005. US apparel imports from China and other quota-constrained countries rose dramatically, but fell from other countries, including AGOA recipients (Brambilla, Khandelwal, and Schott 2010). The second setback was the slump in US imports because of the global financial crisis.[6] As a result, US imports declined, although for the least developed AGOA countries values 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 confirm that the lesser developed country provisions played a key role in the growth of exports (Mattoo, Roy, and Subramanian 2003; Collier and Venables 2007; Portugal-Perez 2008).[7] Collier and Venables (2007), using difference-in-differences estimations with exports to the European Union as a control, find that the AGOA apparel provision increased apparel exports to the

5. Mauritius qualified for the third-country fabric derogation in November 2008 for a period of four years.

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

7. Other studies include Brenton and Ikezuki (2004), Gibbon (2003), Seyoum (2007), Nouve (2005), Rolfe and Woodward (2005), and FIAS (2006). Factors besides favorable rules of origin have also contributed to the export growth. In the case of Lesotho, 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 (Maloney 2006). In addition, Lesotho has benefited from a favorable international image as a non-sweatshop producer (Seidman 2009). It has also been promoted by the musician 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 from the government—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 which allow them to import textiles or apparel duty free.

United States by a factor of 7.4.[8] Frazer and Van Biesebroeck (2010) use product level (at the six-digit level) import data for the United States and estimate an increase in overall AGOA apparel exports of 53 percent with stronger impacts on products with high initial levels of protection. Portugal-Perez (2008) follows an approach similar to that of Collier and Venables (2007), but with product level data, and reports an impact of 96 percent for 22 countries eligible for the third-country fabric provision, and 303 percent for the top seven beneficiaries. In addition to higher export volumes there is also evidence that AGOA exporters enjoyed higher prices and captured some of the tariff rents created by the preferences (Olarreaga and Özden 2005).

Dynamic Benefits

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 3 reveal that the export of new product lines (the extensive margin) contributed only 30 percent of total AGOA import growth from lesser-developed special rule countries between 2000 and 2004, and 42 percent of the decline from 2004–08.

The share of product lines accounted for by the top four and top 10 HTS 10-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, Staritz 2013).

These trends are exemplified by the development of Lesotho's clothing industry in response to the AGOA preferences. Factories in Lesotho concentrate on just a narrow range of garments: the most basic low unit value categories are knitted tee-shirts, slacks, blouses, and blue-jeans. The slice of the production chain they participate in is narrow and does not seem to be expanding. Productivity levels remain low and workers' skills have not increased over time (Lall 2005).[9] A domestic fabric industry has not emerged and fabrics are still almost entirely imported.[10]

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8. No studies appear to have investigated whether AGOA beneficiaries have increased apparel exports to other markets to which they were not given preferential access. Increased exports to these countries could be a sign of improved international competitiveness and thus another positive impact of preferential access. Exports to other countries could also be diverted towards the United States.

9. 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 10-year period. See also Morris (2006).

10. In 2004 the industry faced a major challenge which 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.

Firms have also failed to extend into the higher value functions (including input sourcing, product development and design, merchandising, buyer relationships) of the value chain (Staritz 2013). The firms in Lesotho, 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. Almost none of the managers are locals, and the buying of fabric and marketing of the garments, together with making the key strategic corporate decisions, are all done in Asia.

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 studies have issued credible and dire warnings about the industry's ability to survive without them (Salm et al. 2002, Bennett 2006).

Why this disappointment? Both Lall (2005) and Collier and Venables (2007) suggest it may be that these AGOA countries are simply too underdeveloped for the exports to ignite the industrialization process. Collier and Venables (2007, 1328) argue it reflects a lack of complementary inputs that are required to exploit scale economies and 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." Lall (2005) also suggests that part of the explanation could lie with having foreign factory owners—most of whom are Taiwanese—who are not closely integrated into the local community. Morris et al. (2011) argue that the lack of integration arises from the distinctive nature of the value chain in which Taiwanese-owned firms operate. These firms' global exporting strategy is based on CMT activities producing large volumes of basic products which limits the potential for moving into the higher value activities of the Global Value Chain (through process upgrading, product upgrading, and functional upgrading) and reduces spillovers into the local economy (Morris et al. 2011, Staritz 2013). [11]

In this paper, 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.

THEORY

The overview of AGOA beneficiaries' export performance identified the influence of two trade policies: (1) the effect of MFA quotas and their removal and (2) the effect of AGOA tariff preferences and rules of origin. In this section we draw on economic theory to investigate the incentives these policies create for

11. Morris, Staritz, and Barnes (2011) contrast upgrading in Taiwanese and South African owned firms in Swaziland and Lesotho.

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 demonstrate that the MFA not only provided a subsidy to non-quota-constrained countries (including AGOA beneficiaries) for clothing exports but also created incentives for them 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.

Model

We assume apparel products are differentiated by type of product and the content of fabric.[12] 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:[13]

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

$a(z)$ 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 fabric associated with product z. We also assume firms are competitive, so equilibrium profits are zero and the free on board price equals costs, i.e.,

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

12. 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.

13. 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). Further, given the constant returns to scale assumption, the model is unable to account for learning by doing and returns to scale effects.

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., tee-shirts). Although we do not model quality specifically, we would also expect higher quality apparel to require more labor services and higher priced fabric than lower quality products.

The Allocation Decision

Most apparel firms located in AGOA countries 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.

We model this process assuming that the exports are allocated to the least cost producer. The Home country (assume to be Lesotho) will, therefore, export all products for which its costs are less than or equal to its competitors (assume 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 re-specify 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 *non-traded* 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.

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:[14]

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

where $C(z)$ denotes total US consumption of apparel products z and C_0 is consumption of all other goods. US consumers spend a constant fraction 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 $\sigma = 1/(1 - \rho) > 1$.[15]

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.[16] 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) 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.[17] 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:

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

15. Note that this is 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.

16. To see this take the ratio of (6) for product 1 to product 2 to obtain: $C(z_1)/C(z_2) = \left(p(z_1)/p(z_2) \right)^{-\sigma}$.

17. 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

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

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:

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

and

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

Taking the ratio of these two conditions gives:

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

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.

States can only be achieved through growth along the extensive margin. This outcome is inconsistent with the empirical evidence.

MFA 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, but the effects on clothing products were not all the same.[18] 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 in cases of imperfect competition (Feenstra 1988, 2004).[19] 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:

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

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):[20]

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

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

19. 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.

20. 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).

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:

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

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.[21] Firstly, the effect of the MFA quota is equivalent to a specific subsidy on exports from non-quota constrained countries such as Lesotho. This enables Lesotho's producers to export apparel products even if they do not have a comparative advantage in the production of that product, i.e., 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 countries (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.

The third consideration is novel to our model. Holding costs constant, the *effective* subsidy, i.e., the subsidy as a proportion of value added, rises exponentially with the share of costs (of the efficient producer) attributed to fabric. As λ^* tends to 1, the effective subsidy tends to infinity. Alternatively, the effective subsidy is greater the smaller the value added of the product.

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21. 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 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, i.e., the allocation condition is: $c(z)/\theta \leq c^*(z)/\theta + s$. The implication for AGOA LDBCs 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.

These considerations explain how the quotas enable an expansion in the range of products exported by Lesotho and other non-quota-constrained countries, i.e., growth along the extensive margin.

Lesotho will also experience growth in the volume and value of existing exports (intensive margin). The MFA quota on Chinese exports raises the price of Chinese exports relative to exports from quota constrained countries (their export price falls relative to the average price index, see equation 6). The increase in relative price is strongest for low priced products. Therefore in Lesotho we expect the strongest intensive margin growth in exports in existing 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 (i) existing and (ii) new apparel products combined with specialization in (iii) cheap low quality products with (iv) very little value addition. The removal of the MFA would have had the opposite effects. Previously quota constrained countries would shift production towards 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.

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).[22] 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:[23]

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

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:

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

23. 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.

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

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 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,

(c) Case 2: AGOA tariff preferences for LDC special rule beneficiaries,

(d) 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 US 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, i.e., (ϕ(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 Rules of Origin Waiver on Fabric*

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 ((ϕ(z)=1).

The allocation condition in this case simplifies to:

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

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, i.e., $\lambda^* = 0$, 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.

In sum, the tariff preference affects Lesotho's exports in three ways. Firstly, 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. Secondly, 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*.[24] 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 fabric-intensive products brought about by the MFA.* There is one important difference. The AGOA incentives are unrelated 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.

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24. In a small-country price taking model, the tariff effects are greatest for fabric intensive products *even amongst 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.

Case 3: Preferential Access Granted to Home (t=0, t>0), but Rules of Origin Constraints Apply 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 is equivalent to Case 2. However, if local fabric is more expensive than foreign fabric, $\phi(z)>1$, the allocation condition is given by:

$$\frac{wa(z)}{w^*a^*(z)} \leq \left(1+t^*\right)+\frac{\lambda^*(z)}{1-\lambda^*(z)}\left(t^*+1-\phi(z)\right) \tag{16}$$

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 $\left(t^*+1-\phi(z)\right)>0$. In this scenario, the effective preference rises with fabric-intensity, but less so than in Case 2.

An alternative scenario (Case 3b) is one where the fabric price disadvantage is greater than the tariff preference such that $\left(t^*+1-\phi(z)\right)<0$. 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, i.e., RULC < 1, will then export under MFN rates.

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.

Other Effects

Other considerations relate to the development of a comparative advantage in the nascent industry. Our model adopts a Constant Returns to Scale production function and therefore does not allow us to evaluate the impact of trade preferences on learning by doing, infant industry development, and returns to scale. Nevertheless, our model raises a number of concerns in relation to these dynamic gains. Firstly, 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 provide incentives for greater value addition.

Secondly, 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.

Thirdly, 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.

EMPIRICAL APPLICATION: TESTING METHODS AND DATA

Three distinct trade regimes have faced 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. The theory presented suggests that each of these trade regimes will have had different impacts on the type of clothing products exported by AGOA recipients.

In what follows we describe the approach used to test this theory. 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.[25] The empirical method we use is difference-in-differences

25. We have estimated triple difference-in-differences 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

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, i.e., 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 importantly for this study is that we also find a rise in the fabric content of lesser-developed AGOA apparel exports relative to the emerging country control group. AGOA preferences therefore helped insulate recipients in those fabric-intensive products that China and other quota-constrained countries increasingly entered into after 2005.

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 HTS 10-digit level, is too aggregated to fully capture changes in product characteristics. By only looking at the value or range of HTS 10-digit products exported by each country, existing studies may miss important changes occurring within each product line.

Take for example, figure 3 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 HTS 10-digit product ranges from under 10 dollars to over 1000 dollars per square meter equivalent with higher income economies producing the more expensive (higher quality) varieties (as in Hummels and Klenow (2005) and Schott (2004)). The lesser-developed AGOA recipients predominantly situate at the low-price, low-income per capita end of the spectrum.[26]

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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 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.

26. There are exceptions. Apparel unit values of China, India, and Indonesia, who were amongst the top 4 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.

Our particular focus is on these product prices. More specifically, we use difference-in-differences estimation to exploit the distinct breaks arising from the implementation of AGOA and the ending of the MFA and 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:

$$\ln p_{ict} = \eta + \beta_1 \ln c^*_{ict} + \beta_2 \ln e_{ct} + \beta_3 \ln q_{ict} + \beta_4 \ln(1+tar_{ict}) + \beta_5 I_t + \varepsilon_t \quad (17)$$

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 ($=\beta_2=\beta_4$) + β_3 + β_5 =1).

We wish to isolate 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:

$$c^*_{ict} = A_t \, pf_{it}^{\alpha} \, pva_{ict}^{1-\alpha} \quad (18)$$

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:

$$\ln p_{it} = \eta + \delta_1 \ln pf_{it} + \delta_2 \ln pva_{it} + \beta_2 \ln e_t + \beta_3 \ln q_{it} + \beta_4 \ln(1+tar_{it}) + \beta_5 I_t + \varepsilon_t \quad (19)$$

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: (i) changes in the price level and (ii) changes in the fabric-intensity of US apparel imports. 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:

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

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.[27] 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 10-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-differences 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:

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

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) 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*

27. The standard most restrictive difference specification includes a dummy variable for AGOA countries (DAg_c), but in equation 20 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.

from the control group (second difference). The latter effect is captured by the coefficients θ_4 and θ_5 in rows 4 and 5.

Support for our hypothesis that AGOA preferences raise the fabric intensity of imports from recipient countries, is 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. 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.

Data

The empirical analysis draws on a panel of time-consistent 10-digit HTS import data for the US from 1996–2008.[28] The raw data contains approximately 1202 product lines for clothing (HTS 61, 62, and various sub-codes of HTS 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 $1–\beta_4$. Looking at the independent variables, we use the foreign industry value added deflator (in foreign currency) for *pva*, the US dollar to foreign currency exchange rate for *e* and US producer prices (at six-digit NAICS level) (*usppi*) and competitor clothing unit values (at 10-digit level) (*Pcompete*) for substitute products *q*. Applied tariff rates are defined at the four-digit HTS level.[29] In addition to these variables, real GDP per capita measured in PPP prices is included to capture the impact on prices of general productivity improvements in the economy and relative technological advantage in producing higher-quality goods (Hummels and Klenow 2005).[30]

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28. 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.

29. We use the average tariff at the HTS 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. 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 HTS four-digit 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).

30. 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.

For fabric prices, we calculate Tornqvist price indices for silk (HTS 50), wool and fine animal hair (HTS 51), cotton (HTS 52), and man-made fiber and staple (HTS 54 and HTS 55) using unit values derived from world trade data obtained from UNComtrade.[31] The calculated fabric indices are presented in figure 4.[32] Of interest, is the relatively close association between the average US import unit value of wearing apparel (HTS 61 and HTS 62) and fabric prices, particularly man-made fabrics.

The relevant fabric price (silk, cotton, man-made, wool, or weighted average of these) is allocated to each 10-digit HTS clothing product based on the dominant fabric used in producing the good.[33] Unfortunately, we are unable to construct weighted average fabric price indices for apparel products produced using different combinations of fabric types.[34]

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

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 4 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 1988).

The dollar price of US clothing imports rises 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.[35] 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

31. The following HTS codes for synthetic fibers 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 calculated using world exports and world imports are used.

32. 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.

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

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

35. 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).

supply curve). Further, rising foreign production costs result in higher US import prices. US import prices are equally affected by increases in foreign fabric costs and value added costs, implying a fabric share coefficient of approximately 50 percent.

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 HTS four–digit level estimates. The disaggregated results and hypotheses tests are presented in table A1 in the appendix. We are therefore reasonably satisfied with our basic price equation and proceed with our objective of identifying differences in the fabric-content of AGOA apparel exports.

The second column of results extends the base regression by including interactions between an AGOA dummy (*DAg*) and fabric costs and value added prices (see rows 9 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* x ln(*pf*)) is positive and significant (0.323), while the coefficient on value added prices (*DAg* x ln(*pva*)) is significant and negative (–0.389). Therefore, 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.[36] The relevant results are presented in rows 3 and 4 in column 3 of table 4. These are the coefficients on the difference-in-differences 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 (*D01* x *DAg* x ln(*pf*)) in row 3 and (*D01* x *DAg* x ln(*pva*)) in row 4 are insignificantly different from zero.

36. 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.

One reason may be that the above estimates are an average for both AGOA LDBCs and other AGOA countries. Our theory suggests that the effect of AGOA preferences on fabric intensity is particularly pronounced amongst AGOA LDBCs that 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 AGOA LDBCs (*Dldc*) over the full period and over the 2001–04 period. Estimates of this relationship are presented in column 4. The coefficients on the LDC interaction terms in rows 2 and 3 are interpreted as the *marginal* impact of AGOA on fabric intensity in lesser-developed special rule countries relative to the rest of AGOA beneficiaries.

We still find no increases in the fabric content of apparel exports by lesser-developed AGOA countries relative to other AGOA countries or the rest of the world from 2001 to 2004. None of the marginal effects for lesser-developed 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. 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 3 which showed that the expansion of exports was overwhelmingly along the intensive margin.

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 January 1, 2005, although some quotas were reimposed in industrialized countries in response to the rapid growth in imports from China.[37] In this section, we exploit this break to identify 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).

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

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 varieties. 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 5, which presents a measure of *within-product* price differences for selected countries relative to AGOA LDBCs. These are calculated by aggregating up the log ratio of export prices relative to AGOA LDBCs using the LDBCs export values as weights. Higher values reflect the export of more expensive apparel varieties than AGOA LDBCs within each product line.

During the MFA period, quota-constrained countries such as China, Bangladesh, and India exported varieties within each HTS 10-digit line that were up to twice as expensive as those from AGOA beneficiaries. 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 93 percent of those from AGOA LDBCs in one year. There was a slight rebound from 2006 as new quotas on Chinese apparel exports were imposed, but by 2008 relative prices had still fallen by over 55 percentage points from 2004.

The composition of imports from quota-constrained countries also shifted towards the low-priced products exported by AGOA recipients. Figure 6 presents import weighted prices (per square meter equivalent) of apparel imports from each country calculated using the product-level median prices for the entire sample and period and time varying import values by country as weights. Reductions in the average price, reflects *across-product* shifts in the composition of apparel exports to the United States towards lower priced products.

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

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-differences estimation to test for significant changes in the price and fabric content of apparel exports by AGOA recipients

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 that are predicted to have shifted apparel production towards lower priced products. The equation used to identify these price effects is the difference-in-differences 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 5 presents the results.

In line with theoretical predictions (and the price trends in figure 5 and figure 6), quota-constrained countries responded to the end of the MFA by reducing the quality of their apparel exports by shifting towards lower priced varieties and products. The average unit value of US apparel imports from the top 4 most quota-constrained countries declined by 31.9 log points relative to other countries after 2005 (see row 1 of column 1 of table 5 as well as Brambilla, Khandelwal, and Schott 2010 and Harrigan and Barrows 2009).[38] This arises from a combination of across-product shifts of imports towards lower price products and within-product shifts towards lower priced varieties. The expiration of the MFA therefore adversely affected the competitiveness of non-quota-constrained countries such as Lesotho that produced low priced products in response to the MFA.

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-differences 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 of various interactions between *Dquotacntry* and value added and fabric prices covering the pre- and post-MFA period.

We are interested in two effects: (i) the change in fabric intensity of exports of the control group (non-quota-constrained emerging economies) after January 2005, and (ii) the change in fabric intensity of exports of the quota-constrained group relative to the control group. The first effect is given by the interactions between the post-MFA dummy (*D05*) and fabric and value added prices in rows 4 and 5 of table 5. The second effect is given by the triple interaction between *D05*, *Dquotacntry* and fabric and value added prices in rows 6 and 7.

38. The top 4 quota-constrained countries include Bangladesh, India, China, and Indonesia. The decline for the top 30 quota-constrained countries is lower at 13.9 percent.

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.[39] This is revealed by the significant positive coefficient of 0.217 on the interaction term (*D05* x *Dquotacntry* x 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 additional triple interactions for the AGOA group (see rows 8 and 9 in column 3) and the LDC AGOA group (see rows 10 and 11 of 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 positive and statistically significantly (at 1 percent level) coefficient on the interaction term (*D05* x *DAg* x ln(*pf*)) in column 3. This coefficient indicates a 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 find a similar result.

Clearly AGOA countries have responded differently to other non-quota constrained emerging economies. This is precisely what our theory predicts would happen under AGOA preferences. We found earlier that AGOA resulted in no changes in fabric intensity of exports by beneficiary countries. Our explanation was that these countries were already specialized in fabric-intensive low value-added apparel products as a result of the incentives introduced by the MFA quotas.

With the end of the MFA, China and other quota-constrained countries moved into the fabric-intensive products they were previously discouraged from exporting under the quotas. This led to increased competition in fabric-intensive products that non-quota constrained countries specialized in under the MFA. The response by these countries was to reduce the fabric intensity of their apparel exports. AGOA recipients, however, are an exception. The fabric intensity of AGOA clothing exports rose relative to non-quota-constrained countries.

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

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.

POLICY IMPLICATIONS

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 spillover benefits that might have been hoped for. They have not moved up into higher value activities in the GVC.

Most of the export growth has also come in the products that these countries were already producing. 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 do have major advantages. 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 also 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, and with its weak performance in the European Union and SACU, where it is was not (Collier and Venables 2007). 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 giving rise to large problems relating to trade deflection demonstrates the scope for improving the restrictive rules that continue to limit

the benefits to poor countries from programs such as the EBA program of the European Union. Such improvements 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.[40] 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, both of which are undesirable. 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.

CONCLUSION

The experience analyzed in this paper is a case study of the links between trade preferences and export growth. We demonstrate using theory and empirical estimation, how trade preferences may give rise to unintended consequences that inhibit some of the more dynamic benefits that might have been hoped for. In particular, we reveal how the MFA encouraged exports of low quality and low value added products by AGOA countries. The AGOA preferences further encouraged specialization in clothing products with high fabric cost shares in the least developed countries that were eligible to use third country fabrics. These consequences help explain why AGOA beneficiary countries still do not have viable internationally competitive industries that could survive without the preferences, or that have diversified horizontally into new products and markets or vertically into greater domestic value addition.

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 that by themselves they are unlikely to be sufficient to initiate viable competitive industries and some of the dynamic benefits that their proponents sometimes claim have occurred.

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

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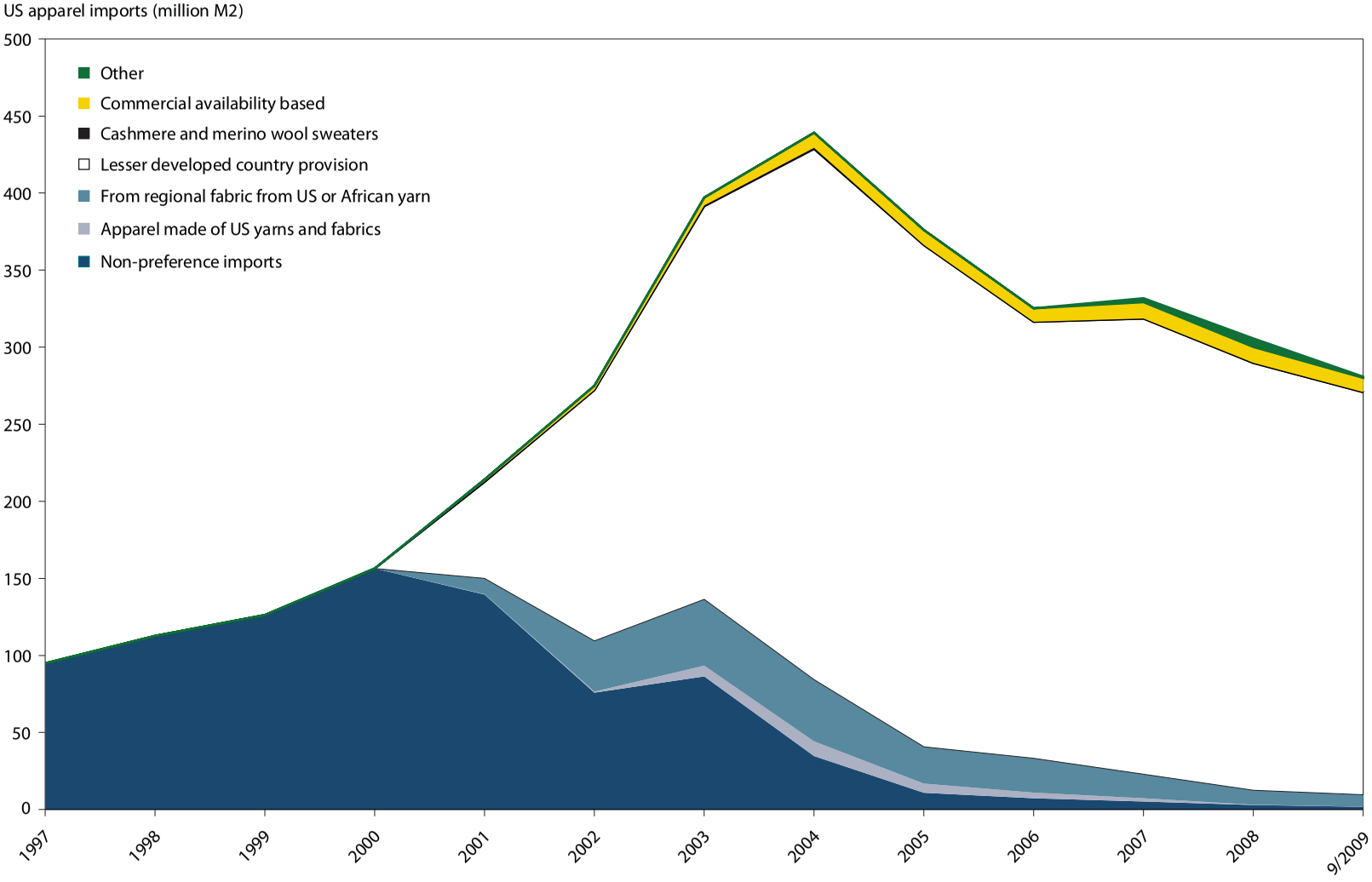
Table 1 Summary of apparel rules of origin under the African Growth and Opportunity Act (AGOA)

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 US 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 handloomed, 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.

Source: United States International Trade Administration.

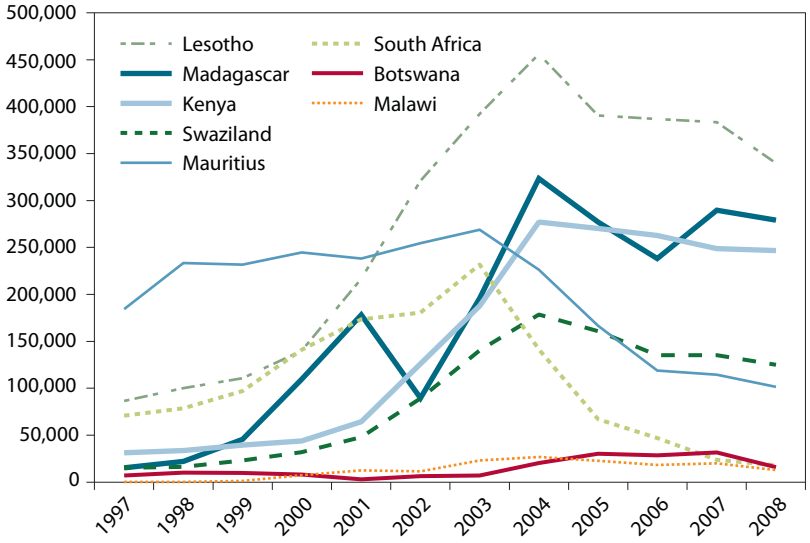
Figure 1 Apparel imports from AGOA countries according to import program



Source: Data obtained from the United States International Trade Commission.

Figure 2 US imports of clothing and textiles for selected AGOA recipients, 1997–2008

US apparel imports (US dollars, thousands)



Source: Data obtained from the United States International Trade Commission.

Table 2 Products traded (out of approximately 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

AGOA = African Growth and Opportunity Act; LDC = least developed countries

Notes: We use the Pierce and Schott (2009) concordance program to construct a HTS 10-digit time-consistent classification for the full period.

Source: Authors' calculations based on data obtained from United States International Trade Commission.

Table 3 Decomposition of growth in US apparel imports: Extensive and intensive growth

Eligibility	Country	Contribution of intensive growth	Contribution of extensive growth	Average annual growth (US dollars)	Contribution of intensive growth	Contribution of extensive growth	Average annual growth (US dollars)	Cumulative imports, 2004
		2000–04			2004–08			
Apparel eligible, LDC special rule	Benin	0.00	1.00	0.33	0.00	1.00	–1.00	0.00
	Botswana	0.24	0.76	0.27	–1.56	2.56	–0.06	0.01
	Burkina Faso	–0.02	1.02	0.28	0.00	1.00	–0.49	0.01
	Cameroon	0.00	1.00	0.22	–0.27	1.27	0.21	0.01
	Cape Verde	0.33	0.67	0.36	0.00	1.00	–0.73	0.01
	Chad	0.00	1.00		0.00	1.00	–1.00	0.01
	Ethiopia	0.00	1.00	4.00	0.52	0.48	0.30	0.02
	Ghana	0.02	0.98	1.18	0.95	0.05	–0.41	0.02
	Kenya	0.68	0.32	0.59	0.81	0.19	–0.03	0.18
	Lesotho	0.92	0.08	0.34	0.87	0.13	–0.07	0.44
	Madagascar	0.78	0.22	0.31	0.91	0.09	–0.04	0.62
	Malawi	0.51	0.49	0.38	0.32	0.68	–0.17	0.64
	Mali	1.19	–0.19	–0.17	0.90	0.10	0.37	0.64
	Mozambique	0.00	1.00		0.00	1.00	–1.00	0.64
	Namibia	0.00	1.00	3.69	0.07	0.93	–0.94	0.68
	Niger	–0.82	1.82	0.11	0.44	0.56	0.18	0.68
	Nigeria	1.90	–0.90	–0.07	–0.10	1.10	–0.08	0.68
	Rwanda	0.00	1.00		0.00	1.00	0.92	0.68
	Senegal	0.73	0.27	–0.30	0.65	0.35	0.16	0.68
	Sierra Leone	0.40	0.60	0.59	0.19	0.81	–0.39	0.68
	Swaziland	0.57	0.43	0.54	0.63	0.37	–0.09	0.79
	Tanzania	0.24	0.76	1.80	–0.25	1.25	–0.12	0.79
	Uganda	0.00	1.00		–0.04	1.04	–0.44	0.79
	Zambia	0.00	1.00	–0.42	0.00	1.00	–0.52	0.79
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	

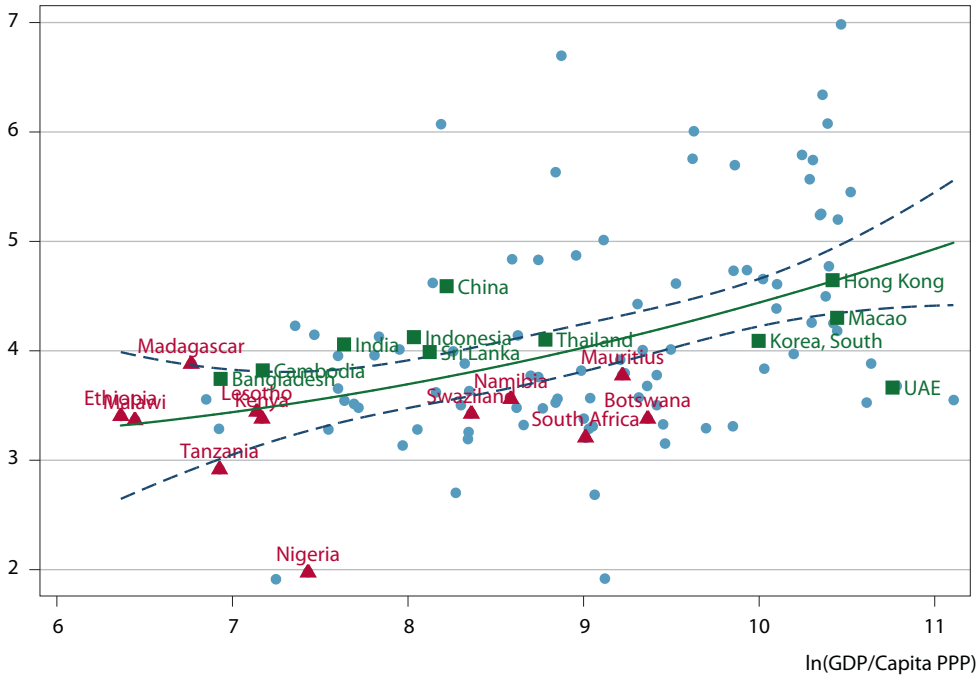
AGOA = African Growth and Opportunity Act; LDC = least developed countries

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

Source: Authors' calculations based on data obtained from United States International Trade Commission.

Figure 3 Unit values and level of development: Top apparel products exported by Lesotho in 2004 (women's or girls' other pullovers of cotton, knitted)

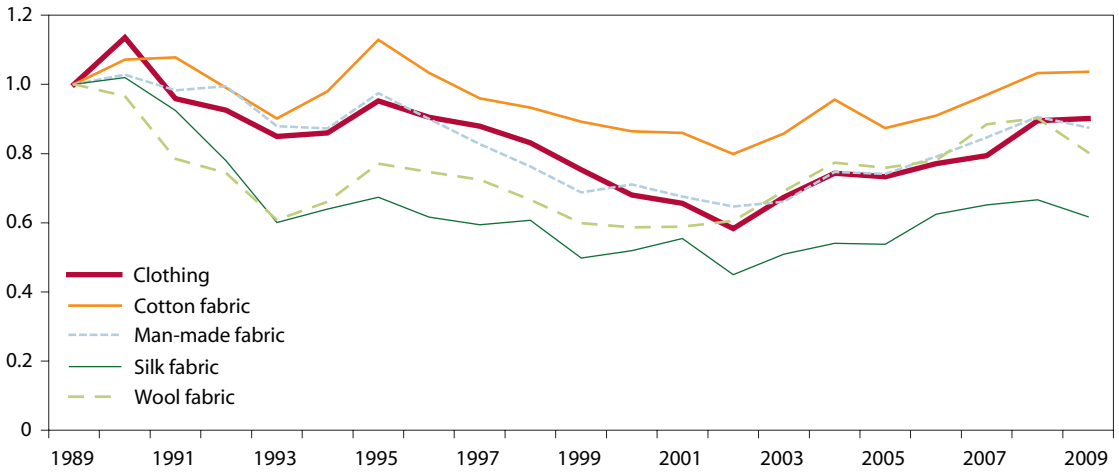
US import unit value per dozen (dollars, in natural logarithm)



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

Source: Author's calculations based on trade data obtained from the United States International Trade Commission and GDP per capita data obtained from World Bank, *World Development Indicators* database.

Figure 4 Fabric price indices



Source: Author's calculations based on trade data obtained from UN Comtrade database.

Table 4 Marginal impact of AGOA preferences on fabric intensity in beneficiary countries

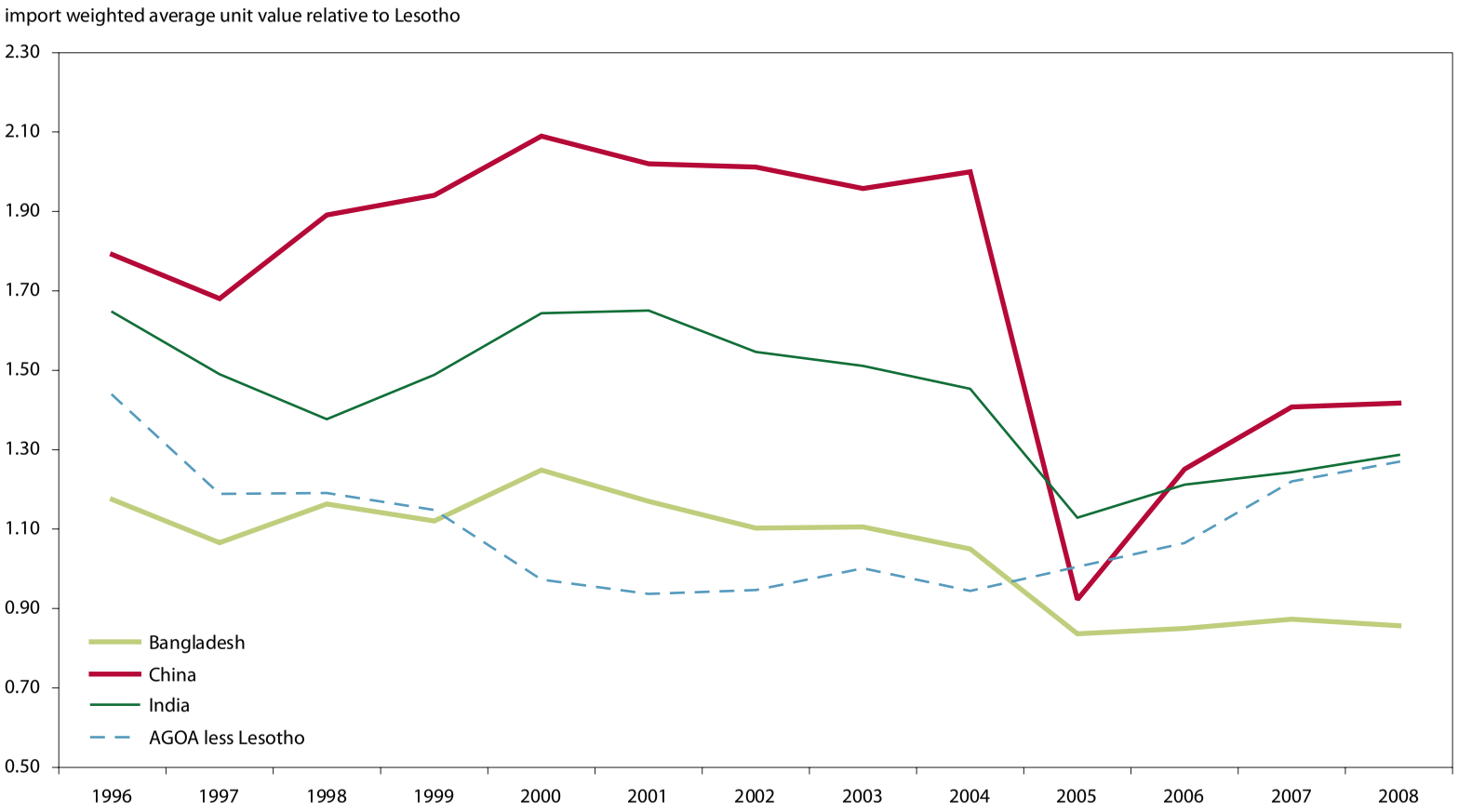
	Country sample	All base (1)	All AGOA fabric intensity (2)	All AGOA (3)	All marginal LDC AGOA (4)
	Marginal impact of AGOA on fabric intensity				
	LDC AGOA countries relative to other AGOA				
1	D01 x Dldc x ln(pf)				0.067
2	D01 x Dldc x ln(pva)				–0.083
	AGOA countries relative to control				
3	D01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

AGOA = African Growth and Opportunity Act; LDC = least developed countries

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

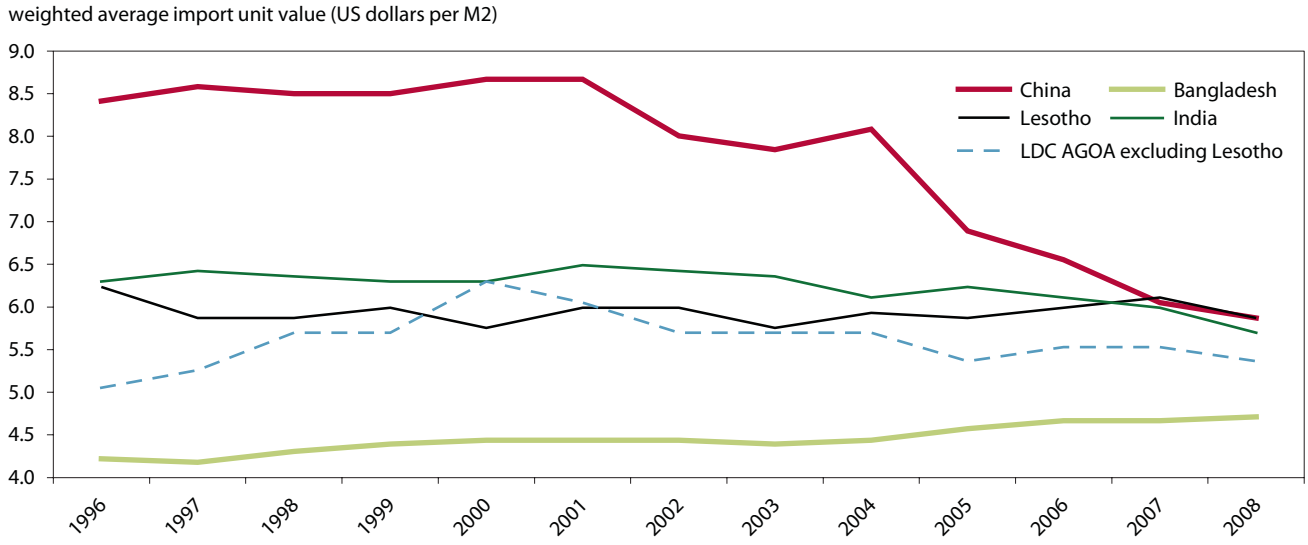
Source: Authors' estimates.

Figure 5 Import weighted average price relative to Lesotho (using Lesotho exports as weights)



Source: Author's calculations based on data obtained from the United States International Trade Commission.

Figure 6 Structural shifts in the composition of imports, import weighted US average unit value (dollars) per SME



Source: Author's calculations based on data obtained from the United States International Trade Commission.

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

AGOA = African Growth and Opportunity Act; MFA = Multi-Fiber Arrangement; LDC = least developed countries

Notes: Estimates are robust to heteroskedasticity.

a. The control group in this specification includes non-lesser developed AGOA recipients. * p<.1; ** p<.05; *** p<.01

Source: Authors' estimates.

Table A.1 Price equation estimates by four-digit HTS level

HTS4 code	Description	Coefficients ln (GDP worker)	ln(pf)	ln(pva)	ln(e)	ln (Pcompete)	ln(US ppi)	ln(1+t)	N	F	r2	Hypothesis tests (p-value) HOD 1	$\delta_1+\delta_2=\beta_2$	Erate=tariff
6101	men's or boys' overcoats etc., knitted or crocheted	−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., knitted or crocheted	−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., knitted or crocheted	−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, ensembled etc., knitted or crocheted	−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, knitted or crocheted	−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., knitted or crocheted	−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., knitted or crocheted	−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., knitted or crocheted	−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, knitted or crocheted	−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, knitted 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, knitted or crocheted	−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 accessories nesoi, parts etc. knitted 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 knitted 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 knitted or crocheted	−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 knitted 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 knitted 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 knitted 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 knitted or crocheted	−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 knitted or crocheted	−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 knitted or crocheted	−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 knitted 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
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 accessories 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., gaiters 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, knitted etc., lace, etc., in the piece; hair nets	−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

HTS = Harmonized Tariff Schedule

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

Source: Authors' estimates.