

Are Trade Preferences a Panacea? AGOA and African Exports*

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Abstract

Preferential access to foreign markets has been used as a mechanism to stimulate export growth in Africa. But there is little evidence on whether preferential access *durably* boosts export performance. To address this question, we exploit significant policy changes in the US around the turn of the 21st century: the GSP product expansion for LDCs of 1997 and the AGOA implementation of 2001, to assess whether preferential access increases exports of all eligible products and of apparel specifically; and the MFA phase-out in 2005, to assess whether any expansion in apparel exports survived the erosion of preferences. To find a causal impact of these changes on exports to the US by a given African country, we use a triple-differences regression and 26 years of newly constructed data on exports to the US at country-HS 6-digit-year level (1992-2017). We find that the biggest boost from AGOA to African countries' exports was for apparel products but there was also a significant increase in other exports thanks to US GSP LDC and AGOA. However, while the marginal impacts on African apparel exports grew sharply in the first years of AGOA, they leveled off after 2005, when the end of the MFA quotas unleashed competition from Asian countries. Furthermore, the impact of AGOA on apparel varied across regions. Some countries, mostly in Central and West Africa, never took meaningful advantage of AGOA. Countries in Southern Africa displayed a boom-bust pattern with strong growth in the first years followed by a decline in the post-MFA years. East Africa countries saw, in some cases late, but eventually sustained growth in exports. Understanding the heterogeneous response to preferences remains a challenge. However, preliminary evidence suggests that preferential access per se was not sufficient but needed to be complemented by three types of domestic reforms: improved access to imported inputs through reduction of tariffs; lightened regulatory burden and enhanced access to infrastructure through creation of effective SEZs; and competitive exchange rates through adoption of flexible exchange rate regimes.

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1. Introduction

Economists do not agree on whether preferential access to foreign markets can help African countries. Some see it as a means “to transport a bit of the economic miracle from China to Africa.”¹ Unlike conventional infant industry protection, the benefits of preferential access are conditional on competing successfully in foreign markets. Moreover, protracted privileged access cannot be taken for granted, creating stronger incentives to improve performance. Others are skeptical about the benefits of trade preferences, because they can dilute the case for reform at home and lure beneficiaries into sectors where they do not have a comparative advantage (Hoekman and Ozden, 2005). In support of the former view is evidence that privileged access to the US market under the Africa Growth and Opportunity Act (AGOA) spurred growth in African exports (e.g. Frazer and Van Biesebroeck, 2010). The latter view finds support in the experience of African countries with the Generalized System of Preferences (GSP) (e.g. Herz and Wagner, 2011).

Surprisingly, there is little evidence on the most important and interesting economic question: has preferential access *durably* boosted African export performance? The true measure of success for infant industry assistance is not whether performance improves while it is in place but whether the improvement survives the reduction in assistance. We address this question taking advantage of trade policy changes in the US at the turn of the Century and of the passage of time relying on 26 years of trade data.

To place the policy changes in context, note that well before the entry into force of AGOA in 2001, nearly 30 percent of the HS 8-digit tariff lines in the US had zero MFN tariffs and another 35 percent were duty-free for LDCs under the 1970s GSP regime. The GSP product expansion for LDCs in 1997 freed another 16 percent of US tariff lines from duties. The coming of AGOA was unprecedented because for the first time the US allowed duty-free entry of apparel, as part of a further 6 percent of tariff lines becoming duty-free. That provided eligible African apparel exporters privileged access to the US market, not only because other countries continued paying tariffs but also because the main exporters were subject to quotas under the Multi-Fiber Arrangement (MFA).² These quotas were entirely phased out by 2005, unleashing competition from China and other Asian countries and eroding the preferences African countries enjoyed in the US market.

The GSP product expansion of 1997 and the AGOA implementation of 2001 allow us to assess, as others have done, whether preferential access leads to an expansion of exports, for products in general and apparel specifically. The MFA phase-out allows us to assess, in a way that has not been done before, whether any expansion in apparel exports persisted in levels or growth beyond the reduction in preferences.

¹ See interview available at <https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1752-5209.2008.00017.x> and Collier (2007).

² THE MFA governed world trade in textiles and apparel from 1974 through 2004, imposing quotas on the totals that certain developing countries could export to developed countries.

The paper utilizes a highly detailed trade and tariff database that we constructed, by combining US import data from the US Census Bureau with US tariff data published by the US International Trade Commission (USITC) at the eight-digit Harmonized Tariff Schedule of the United States. While the descriptive analysis relies on product-level data at eight-digit level, US import and tariff data are aggregated from the HS eight-digit level to the six-digit level for the econometric estimation. The sample includes product-level data for 208 exporting countries over the period 1992-2017, resulting in a total of 27 million observations.

The raw data reveal that oil accounted for the bulk of African exports to the US under AGOA but we focus on manufacturing exports – since boosting manufacturing was a key goal of AGOA. African manufacturing exports to the US grew steadily in the first post-AGOA years and then flattened at about the time of the Great Recession. A more interesting pattern is seen in African apparel exports to the US that first boomed, then declined after the end of the MFA quotas and stagnated in recent years. Delving deeper into apparel, we find that the aggregate picture for African exports is in fact a result of four different country-level stories: countries, mostly in Central and West Africa, which never took meaningful advantage of AGOA; countries, mostly in Southern Africa, which experienced a boom right after AGOA followed by a bust; countries like Lesotho and Mauritius, which experienced a period of growth and then stagnation; and a few countries in East Africa which saw, in some cases a late, sustained success.

How far are these patterns attributable to GSP LDC, AGOA and the end of MFA? To identify a causal impact on African countries exports, we take a treatment and control group approach. This approach relies on several variants of the unrestrictive triple-differences specification with a stringent set of fixed effects, proposed by Frazer and Van Biesebroeck (2010). The estimators identify the impact of GSP LDC or of AGOA from the growth in exports to the US for eligible countries of eligible products post- versus pre-AGOA/GSP LDC, relative to the growth in exports to the US for the control group which includes: non-eligible products in treated countries; non-eligible products in control countries; and eligible products in control countries. The specification controls for country-product fixed effects, so impacts are identified relative to average pre-AGOA exports to the US of that country-product; country-year fixed effects, so impacts are netted out of shocks to overall exports to US from a country (supply shocks) and net of macroeconomic shocks (such as the Great Recession); and product-year fixed effects, so impacts are netted out of shocks to overall US imports of a product (due to changes in US preferences or global technological/supply shocks).

As an alternative to a specification with indicators for eligibility of countries and products for duty-free treatment, we estimate directly the impact of preferential margins. These margins are defined either as the difference between the MFN tariff and the preferential tariff for each country-product in the US, or a measure that also takes into consideration tariff preferences granted to non-beneficiary countries. One

limitation of the tariff information is that it does not cover quantitative restrictions, such as quotas on imports of apparel and textile products under the MFA. To account for the possible effects of the end of the MFA in our analysis, we complement the tariff data using US quota information for years 1992-2004 from Brambilla, Khandelwal, and Schott (2010).

Our main findings are the following. Focusing on the average impacts over the entire period following the US trade policy changes – that is the average long-term impacts – we find that the biggest boost from AGOA to African countries' exports was for apparel products, which benefitted from the largest tariff preferences. But there were also positive and significant boosts to African exports provided by US GSP LDC and AGOA for non-apparel products.

Focusing on apparel products, we estimate a separate impact of AGOA for each year from 2001 onwards. The marginal impacts on African apparel exports exploded in the first years post-AGOA but then levelled off after the end of the MFA quotas on apparel in 2005. This flattening could be a consequence of the erosion of preferences for African countries leading to fiercer competition from the Asian giants. The econometric estimates confirm that the impact on AGOA apparel impacts varied across the sub-regions in Africa. We see clearly the boom-bust pattern for Southern Africa – with a stronger marginal benefit to exports in the first years. And we see the significant late success with large marginal impacts on exports of East African countries from 2005 onwards.

Although we have not yet been able to identify the causes of differential impacts of AGOA across African countries, a preliminary exploration of those causes hints at some reasons. First, low tariffs on own imports may help explain the initial success of Southern African countries, because such regimes allowed easy access to imported inputs – even compared to that in other countries where duty-drawback and other schemes involved higher transactions costs. Second, the establishment of effective special economic zones (SEZs) may be a reason for the success of Mauritius but also the recent success of Ethiopia. Third, exchange rate regimes, and overvalued exchange rates in particular, may help rationalize the lost opportunity for West Africa.

The remainder of the paper proceeds as follows. Section 2 reviews the literature while Section 3 describes the data. Section 4 describes the trade preference regimes and Section 5 provides descriptive evidence on African trade patterns. Section 6 presents the econometric specification and Section 7 discusses the main results. Section 8 focuses on heterogeneity results. Section 9 concludes.

2. Literature review

An extensive literature examines the impact of nonreciprocal trade preferences on developing countries' trade flows. With one exception, the existing research does not address the dynamic question we have

identified as crucial, whether benefits are sustained in a post-preference environment.³ In what follows we briefly discuss a few key empirical studies which examine the impact of preferences using rigorous identification strategies drawing upon time-series and cross-sectional trade data.⁴ The less pertinent literature that uses computable general equilibrium and other models to conduct ex ante simulations is not discussed here.

Most studies rely on a gravity model - the standard tool in the literature to assess the effects of preferential trade agreements on trade flows (Head and Mayer, 2014) – to assess the impact of different non-reciprocal trade preferences on bilateral trade flows. This literature typically uses a variable indicating whether preferences are in effect for a given country in a given year and generally finds a positive impact of preferences. Rose (2004) finds a strong positive and significant effect of GSP programs in fostering trade growth of developing countries over the 1948-1999 period (based on a sample of 178 countries). Shifting the period by a decade and considering all nonreciprocal preference agreements, Gil-Pareja, Llorca-Vivero and Martinez-Serrano (2014) show that those agreements, and GSP programs specifically, had a significant positive effect on exports of developing countries over the 1960-2008 period (based on a sample of 177 countries). Cirera and Cooke (2015) conclude in their review of the literature that most gravity model-based studies find a positive impact of trade preferences on exports, though they differ in the magnitude of the impact and on the impact of specific nonreciprocal regimes. Using the quasi-experimental Synthetic Control Methods approach, Kassa and Coulibaly (2018) estimate the impacts of AGOA on each African country's total exports to the US over the 1993-2015 period. They show that most African countries exhibit gains in exports but the effects are heterogeneous – the largest gains are registered for Angola, South Africa, Gabon, Ivory Coast, Kenya, Namibia, Ethiopia, Botswana and Tanzania.

One study reaches a less positive conclusion. Focusing on GSP programs and emphasizing dynamic impacts, Herz and Wagner (2011) show positive short-run and negative long-run impact on exports of GSP beneficiary countries, using bilateral trade data for 184 countries over the period 1953-2006. They argue that the negative long-run impact may be due to GSP program-induced distortions in the economic structure GSP beneficiary countries, namely related to administrative costs associated with technical compliance with GSP rules of origin. They conclude that GSP-type trade preferences are not an appropriate instrument to promote the economic development of low-income countries and may distort their economic structure.⁵ However, their “short run” involves estimating their gravity regression using data for every year (thus

³ This literature fits under the broader umbrella of the impact of preferential trade agreements on trade flows.

⁴ For a thorough review of the literature see Cirera and Cooke (2015). A detailed review of studies focusing on the impacts of AGOA is provided in USITC (2014).

⁵ Gil-Pareja et al. (2014) and Herz and Wagner (2011) obtain their robust findings using state-of-the-art gravity equation estimation that accounts for multilateral resistance terms, time-invariant and time-variant unobserved bilateral heterogeneity, as well as zero trade flows.

exploiting year-to-year variation) and the “long run” estimating using only data every 5 years or every 10 years. They do not consider a post-preference scenario.

While yielding valuable insights on the broad impacts of nonreciprocal trade agreements, the studies mentioned above are subject to certain limitations. The work at a high level of aggregation, relying on total bilateral export flows between countries and capturing trade preferences as dichotomous variables, and thus rely on country-year variation that masks significant heterogeneity across products. Not all products are eligible for preferential treatment under nonreciprocal trade agreements – a detailed discussion of this issue for GSP and AGOA will be provided in Section 4 – and products that are eligible to preferential treatment may differ based on the extent of the tariff cuts, the rules of origin, and the preference margin, all of which influence the degree of preference utilization. Given the difficulty of estimating the causal impact of nonreciprocal preferences on trade based on aggregate data, it is difficult to attribute the positive trade outcome to preferential access.

Methodologically, our paper is closely related to a small strand of the literature that attempts to estimate causal effects of nonreciprocal preferences using highly-disaggregated data and quasi-experimental difference-in-difference-types of econometric specifications. In particular, our study follows closely the work by Frazer and Van Biesebroeck (2010) who provide an early evaluation of the trade impact of AGOA over the 1998-2006 period. They use highly disaggregated trade data at country-product-year level and triple-differences econometric specifications with treatment indicators identifying the countries and products benefitting from AGOA in each year (which we will describe in detail in Section 6 since our approach is a variant of their approach). They show that AGOA caused an increase in African countries’ exports to the US: on average a 28 percent increase in exports across treated country-products when the sample includes oil exports but a more moderate impact of 6.6 percent when the sample excludes oil exports.⁶ They also show that the impact of AGOA grew over time over the 2001-2006 period. However, as the sample period ends in 2006, the paper assessed only the impact of AGOA over a relatively short time horizon and is not in a position to assess whether the benefits survived the erosion of preferences.

A handful of studies have assessed the impact of the special provisions in AGOA for textile and apparel articles, but to our knowledge all focusing on early impacts up to 2008 at the latest. Nevertheless, two studies anticipate some of the concerns we raise. Edwards and Lawrence (2010) build a theoretical model to assess whether the apparel provisions under AGOA led to a dynamic effect. They find that MFA quotas on China helped AGOA countries, Lesotho in particular, to increase exports of low value-added apparel products to the US. But this was not associated with dynamic benefits since the provisions did not

⁶ USITC (2014) documents the importance of oil exports as beneficiaries of AGOA, a fact that was probably not anticipated nor desired by US policy-makers extending special treatment to African countries to help them grow and develop their industrial sectors.

encourage significant local value-addition Using product-level data for the 1996-2008 period, Rotunno, Vézina and Wang (2013) study the role of the MFA quota regime still in place in the first years post-AGOA in explaining exports of apparel products from AGOA countries.⁷ They find that the least developed AGOA countries that benefitted from the simplified rules of origin (single transformation) enjoyed rapid growth in their apparel exports in the years after AGOA and substantial declines following the end of the MFA quota system in 2005. They find a significant correlation between these countries' exports of apparel to the US and these countries' imports from China of apparel products subject to quotas in the US imposed on China. They conclude that the absence of restrictive rules of origin for the least developed AGOA countries allowed those countries to directly import apparels from China and transship them to the US without any value addition benefiting from AGOA duty-free treatment. Our paper differs from theirs in at least two dimensions. First, while their paper considers the effect on eligible apparel product across AGOA-eligible countries, our sample includes all HS 6-digit products and countries exporting to the US. In particular, we estimate a triple difference-in-differences model that compares all products that are eligible and ineligible products (first difference) before and after the implementation of the nonreciprocal preferences (second difference) and across exporting countries – eligible and non-eligible (third difference). In addition, our sample extends beyond 2008; we can study whether the effect of the end of MFA has a long-term impact.

Finally, there are some studies that have compared the impact of AGOA with that of the European Union's Everything But Arms (EBA) preferential access initiative for least developed countries. Collier and Venables (2007) estimate the equivalent to a triple-differences specification for the period 1991-2005 where they compare middle-income and developing countries' exports of apparel to the US versus the EU to estimate the impact of AGOA relative to the EBA. They show that AGOA textiles and apparel provisions have a large significant impact on African exports of apparel to the US whereas EBA's impact is insignificant. De Melo and Portugal-Perez (2013) exploit the difference in rules of origin for apparel in AGOA relative to EBA – i.e., the fact that under AGOA 22 African countries could use fabric of any origin (single transformation) and meet the criterion for preferential access in the US (the so-called Special Rule that we discuss in Section 4) whereas the EU required yarn to be woven into fabric and then made into apparel in the same country (double transformation). Their panel estimates for the 1996-2004 period show that the simplification in rules of origin under AGOA taking place around 2002 contributed to a substantial increase in exports of apparel to the US (by approximately 168 percent for the top seven beneficiary countries) that was four times as large as the growth effect from the initial preferential access under the AGOA without single transformation. We conjecture that the restrictiveness of rules of origin may have implications not just for the impact of preferences but also for whether the impact is sustained when

⁷ Brambilla, Khandelwal, and Schott (2009) describe the MFA quota regime and exploit the constraints of China under the regime and its export surge when the regime ended.

preferences decline. For example, restrictive rules of origin may limit preference utilization but, by inducing greater local value added, lead to greater learning-by-doing and more sustainable results. Unfortunately, it is not possible to test this conjecture in the AGOA context because almost all African countries were allowed access under identical liberal rules of origin.

3. Data

The analysis in this paper is based on a new, highly detailed database that we constructed by combining US trade data from the US Census Bureau with tariff data published by the US International Trade Commission (USITC). This section provides a brief description of this database (the US Trade and Market Access Database, USTMAD) and we direct the reader to the companion note for all details.⁸

The database provides detailed tariff and information on product-eligibility for trade preferences in the US, including the applied most favored nation (MFN) tariff the country-product-year faces in the US, the unilateral preferences the country-product can benefit from in the US in that year (e.g., GSP, AGOA), and the best preferential tariffs that the country-product can benefit from in the US in that year. Our tariff measures are all expressed as ad-valorem as we compute ad-valorem equivalents for duty variables expressed in the USITC tariff database as specific tariffs or combined tariffs (with an ad-valorem component and a specific component).⁹ The database also includes the value and quantity of US imports from any country of any HS 8-digit product in each year during the period 1997-1997.

The new US trade and market access database offers important advantages relative to the widely used trade and tariff datasets from the World Trade Integration Solution (WITS). First, it provides information at a more disaggregated level, the 8-digit level. Second, it provides much better coverage in terms of years for all types of tariffs, be it the most favored nation or preferential tariffs (under a large number of programs and regimes) whereas the WITS data on tariffs has many MFN and preferential tariffs missing. Imputation techniques used in the literature to correct those missing tariff data may yield inaccurate tariff rates. Third, preferential tariff rates are constructed based on updated preferential trade agreements, whereas in the WITS data they are often not updated when the preferential rates are phased in and phased out. Finally, it includes information on the actual imports which have entered under different trade regimes (for example GSP and AGOA) such that preference utilization rates can be computed. However, note that in Section 5 we will provide some broad patterns on African export performance to the world (not just the US) using WITS data.

⁸ The companion note (and the database) is available at: <http://www.worldbank.org/en/region/afr/brief/afrce-office-of-chief-economist-in-the-africa-region>.

⁹ The ad-valorem equivalents are obtained by dividing the specific tariff (or specific component) by the import unit price, itself computed as the median of the unit values of all US imports of a given HS 8-digit product in a given year across partner countries, from the US Census trade data.

For the econometric analysis, we make the following adjustments to the database. First, in order to capture trade flows before the GSP product coverage is expanded for LDCs in 1997, we augment the import data include years from 1992 onwards. Second, for computational feasibility, trade, preference eligibility, and tariff data are aggregated from 8-digit level to the 6-digit level for most of the estimation. Third, in order to account for zero trade flows in our estimation, we expand the database such that it is a balanced panel where all countries exporting to the US have observations for all products in all years, many recording zero trade flows. Fourth, we exclude from the estimating sample in all regressions, oil products (HS chapter 27), although they account for a large share of AGOA-eligible exports by African countries to the US, as our study focuses on the impacts of US trade preferences on African manufacturing and apparel products. Our long sample period presents a challenge regarding the product classification as HS product codes underwent several revisions between 1992 and 2017. To harmonize product codes across years, we convert all HS 6-digit level codes into HS 1996 revision 6-digit codes using the concordance tables provided by WITS.

The detailed tariff information allows us to examine how the trade effects of preferences under AGOA or GSP LDC vary with the magnitude of the preference margin offered to these beneficiary countries and how this effect changes over time. The database also provides detailed tariff information to examine how the trade effects of AGOA or GSP LDC change in response to the reciprocal and non-reciprocal preferential tariff rates granted to other countries.

One limitation of the tariff information is that it does not capture the ad-valorem equivalents of quotas such as those on apparel exports implemented under the Multi-Fiber Agreement (MFA). To account for the effects of the end of the MFA in our analysis, we complement the tariff data using quota information for years 1992-2004 from Brambilla, Khandelwal, and Schott (2010). They construct quota fill rates in the US by exporting country and year for 3-digit MFA categories defined by OTEXA that are mapped to 10-digit US HTS codes using a concordance.¹⁰

4. Trade preferences in the US: GSP and AGOA

Over the last half century, developed countries have aimed to support the integration of developing countries into the world economy by providing them with ‘special and differential treatment’, consisting in non-reciprocal preferential access to their markets. A key instrument for such trade preferences has been the Generalized System of Preferences (GSP).¹¹ GSP programs were established under the assumption that preferential market access to developed country markets – in the form of duty-free status or lower tariff rates for a wide range of products – could spur export-driven growth in developing countries. The argument

¹⁰ The quota information is available at http://faculty.som.yale.edu/peterschott/sub_international.htm.

¹¹ See Ornelas (2016) for an extensive discussion on ‘special and differential treatment’ and GSP preferences.

was that the markets of developed countries were sufficiently large to provide economic motivation and space for developing countries to achieve those goals. The European Union was the first to establish a GSP program for developing countries since the early 1970s and other developed countries followed, with the US beginning its GSP program for beneficiary developing countries (BDCs) in 1975.¹² In 1997, the scope of the US GSP benefits was expanded for least-developed beneficiary developing countries (LDBDCs) by allowing duty-free entry in the US for a larger number of products. Product eligibility under US GSP is discussed later in the section. To be eligible for GSP, countries must *not* be classified as “high income” by the World Bank.¹³ Eligibility for GSP LDC is determined by the United Nations based on three criteria: per capita gross national income (GNI), human assets, and economic vulnerability to external shocks.¹⁴ In addition to GSP programs, the EU and the US signed other non-reciprocal preferential trade agreements with developing countries, such as, respectively, the Everything but Arms (EBA) and the African Growth and Opportunity Act (AGOA).

AGOA was signed into law on May 2000 as part of the Trade and Development Act of 2000 under the broad US “trade not aid” economic doctrine towards Sub-Saharan Africa.¹⁵ AGOA defines Sub-Saharan Africa to include 49 countries (South Sudan was added in 2012) and authorizes the US President to designate an SSA country as beneficiary if it meets the eligibility requirements set forth by the authorizing legislation. AGOA grants certain unilateral trade preferences to the eligible countries: an extension of benefits under the US GSP program (whether the countries are LDCs according to GSP’s definition or not) and duty-free treatment for certain textile and apparel articles excluded from duty-free treatment under GSP through two provisions (the general AGOA textile and apparel provisions (section 112) and the ‘special rule’ for less-developed countries, also known as ‘third-country fabric provision’). These unilateral trade preferences are described in further detail below. There is an annual review (and a report to US Congress) of the current and potential eligibility of each of the 49 SSA countries to be designated as AGOA beneficiaries. The number of SSA countries eligible for AGOA preferences has changed over time, starting at 34 in 2001 and increasing to 49 in 2017. Appendix Table 1 shows AGOA eligibility for each SSA country and year. Over the 2001-2017 period some countries lost AGOA eligibility (with some later regaining it) due to violations in eligibility conditions related to political violence, problems with the rule of law, and human rights abuses.¹⁶

¹² Under GSP, each preference-granting country establishes specific criteria and conditions for defining and identifying developing countries’ beneficiaries.

¹³ GSP beneficiary countries lose their beneficiary status after the US President determines they have become “high-income” countries.

¹⁴ See <http://unohrlls.org/about-lids/criteria-for-lids/>.

¹⁵ The description of AGOA rules draws heavily on Chapter 1 in USITC (2014).

¹⁶ See USITC (2014) for further details on countries’ eligibility criteria.

But SSA countries eligible for AGOA preferences do not automatically qualify as eligible for preferences under the general textile and apparel provisions. USITC (2014) indicates that to be eligible for preferences under the general textile and apparel provisions (section 112), AGOA beneficiary countries need to be certified to have in place an effective visa system, enforcement and verification procedures (to ensure that the goods on which AGOA benefits are claimed are in fact produced in an eligible SSA country meeting the rules of origin required to claim those benefits). As of 2017, 26 AGOA beneficiary countries also qualify for the general AGOA textile and apparel provisions, as seen in Appendix Table 1. Burundi, Togo, and South Sudan, among others, did not qualify.

AGOA-eligible countries designated as lesser developed beneficiary countries (LDBCs) – defined as those with a per capita gross national product (GNP) lower than \$1,500 in 1998 – qualify for additional preferential treatment under the AGOA ‘special rule’ which implies that the yarn, thread or fabric used in manufacturing of textile and apparel articles can be sourced in any country in the world, and those articles can be eligible for duty-free access in the US, under quantitative restrictions.¹⁷ Although Botswana, Namibia, and Mauritius are not LDBCs according to the per capita GNP definition, amendments to AGOA designated them as LDBCs from 2004 onwards.¹⁸ Appendix Table 1 shows that 24 AGOA beneficiary countries also qualify for the AGOA ‘special rule’ as of 2017.

South Africa is the only SSA country eligible for preferences under the general textile and apparel provisions but not eligible for the ‘special rule’ since it is not designated as a LDBC. For this country the rules of origin for apparel and textile articles require either the use of US yarn, thread or fabric (bilateral cumulation) for duty-free quota-free access, or the use of AGOA-originated yarn, thread or fabric for duty-free access but with quantitative restrictions.¹⁹

Rules of origin are different for non-apparel products from those applied to textile and apparel articles and are similar for all AGOA-eligible countries, and are in fact resemble those of the GSP program. Duty-free treatment for imports to the US is allowed if the product is the “growth, product, or manufacturing” of an AGOA beneficiary country and if the percentage of local content in the appraised import value of the good when it enters the US exceeds 35 percent, which can include the cost of materials and parts sourced from other AGOA-eligible countries, as well the cost of materials and parts sourced from the US (that can account for up to 15 percentage points of that 35 percent).

¹⁷ In practice, USITC (2014) reports that these quantitative restrictions were never binding since the onset of AGOA. The ‘special rule’ implies that rules of origin for eligible countries are a single transformation requirement, that is, the only requirement is that the transformation from fabric to garment is undertaken in the eligible country.

¹⁸ Mauritius treatment as LDBC was temporary between 2004 and 2005 and was not renovated in 2006, but was granted again in 2008 without a fixed term.

¹⁹ Additional rules govern the inclusion of interlinings, findings and trimmings of foreign origin (up to 25% in value is allowed) and other minimal fabrics (up to 10% in weight).

Over the 1997-2017 period, there was some degree of uncertainty about the continuity of both US GSP and AGOA due to periodic expirations, and in the case of AGOA there were also amendments and changes (including those mentioned above of adding to the list of LDBC benefitting from the ‘special rule’ three countries that do not fit the LDBC per capita GNP definition in 2006 and 2008).²⁰ In 2004, AGOA benefits were extended until 2015 but the ‘special rule’ was extended only until 2007. Then, the ‘special rule’ was renewed under a series of waivers in 2006 and extended until 2012, and in 2012 it was extended until 2015. In 2015, AGOA (including the ‘special rule’) was re-authorized to be in place until 2025.

Next, we discuss product eligibility under GSP and the changes brought by AGOA, drawing on the US database on trade and market access. Table 1 presents the numbers separately for African LDCs and non-LDCs. For both LDCs and non-LDCs, before AGOA was enacted, from the universe of 10,184 tariff lines (HS 8-digit) on US imports, 3,131 faced a non-preferential (MFN) zero rate of duty in the US while 3,507 faced a zero rate of duty in the US for GSP eligible countries.²¹ For LDCs, 1,670 tariff lines were added to the duty-free group under the expansion of the GSP LDC program in 1997 and from 2001 onwards 780 new product lines become eligible for duty-free entry under AGOA, divided into 555 apparel tariff lines, which had never been duty-free under any other non-reciprocal trade preference regime before AGOA, and 225 non-apparel tariff lines that faced positive MFN tariffs prior to AGOA. For non-LDCs, from 2001 onwards 1,610 tariff lines that were already duty-free under GSP LDC since 1997 become duty-free under AGOA and, similarly to LDCs, 780 new product lines – 555 apparel and 225 non-apparel – become eligible for duty-free entry under AGOA. The significance of AGOA seems larger when accounting for the value of SSA exports in eligible tariff lines. For SSA LDCs, AGOA covers 11 percent of exports in 2001, mostly accounted for by apparel products. For SSA Non-LDCs, AGOA covers 67 percent of exports of which 3 percent are of AGOA-exclusive products, mostly apparel, and 64 percent are due to the extension of GSP LDC to all SSA countries. For LDCs 1,096 tariff lines remain dutiable in the US post-AGO, while for non-LDCs 1,156 tariff lines remain dutiable in the US.²²

²⁰ Hakobyan (2015) finds that the temporary expiration of GSP preferences in 2011 had a negative impact on exports despite the tariffs being refunded after reauthorization.

²¹ To be more precise, the MFN zero rate of duty was applicable to any country with normal trade relations with the US. Some exclusions to this rule were Vietnam until 2001. Currently only Cuba and North Korea do not have normal trade relations with US.

²² The difference is explained by 60 tariff lines of the 1,670 that become duty-free under the GSP LDC program in 1997 and are not extended to non-LDC SSA countries after AGOA.

Table 1. US Tariff Schedule, GSP and AGOA for African countries

	Number of US tariff lines (HTS 8-digit)		% of Exports to US	
	LDC	Non-LDC	LDC	Non-LDC
MFN Zero	3,131	3,131	9%	28%
GSP duty-free	3,507	3,507	1%	4%
GSP LDC duty-free	1,670		79%	
AGOA Apparel	555	555	11%	3%
AGOA Non-LDC		1,610		64%
AGOA Only	225	225	0%	0%
No Preference (MFN>0)	1,096	1,156	0%	1%
Total	10,184	10,184	100%	100%

Note: the number of tariff lines and total exports are for 2001. The LDC and Non-LDC African country exports include only the exports of the 46 countries that are AGOA-eligible between 2001 and 2017 (therefore they do not account for country-year specific eligibility and they also do not account for preference utilization).

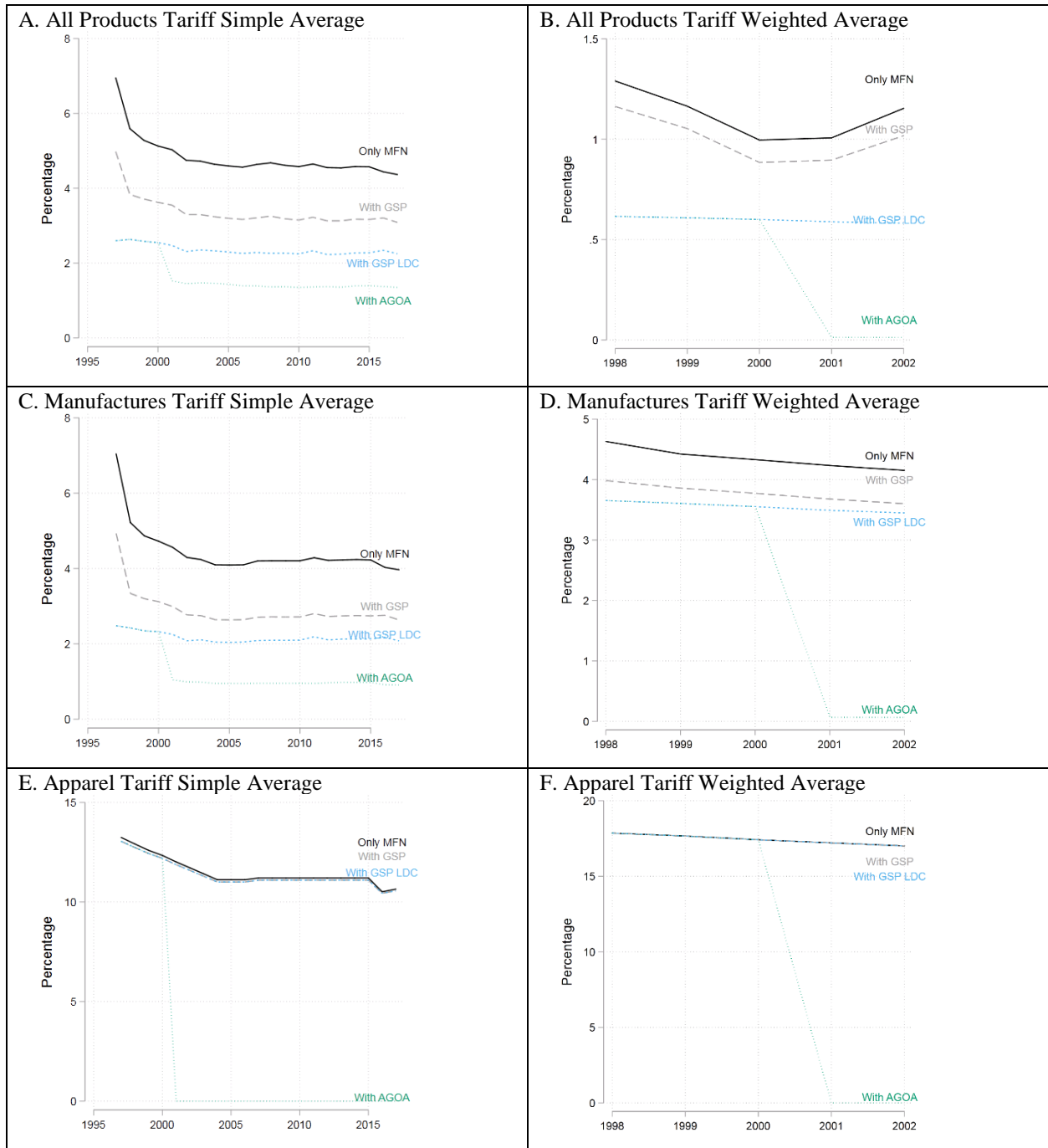
The tariff structure presented in Table 1 shows that for AGOA-eligible countries in the US market, the bulk of tariff lines are duty-free. Focusing on LDCs, of the 1,096 tariff lines that have no preference and positive MFN tariffs, textiles (HS 50-60) account for 753, textile-products other than apparel for 85, and the other most important categories are dairy produce, bird eggs, etc. (81 tariff lines), sugars and confectionary (24 tariff lines), cocoa and preparations (38 tariff lines), miscellaneous edible preparations (29 tariff lines), and travel goods (15 tariff lines).

In addition to product eligibility under AGOA, it is important also to document the actual tariff preference that regime awarded to African exports to the US. Considering averages across all products, Panel A of Figure 1 shows that the average tariff had already been reduced from the average MFN tariff of 5 percent to less than 4 percent for GSP-eligible countries and to less than 3 percent for GSP LDC-eligible countries. AGOA brought the simple average tariff down to between 1 and 2 percent from 2001 onwards for all eligible countries. This impact was particularly large for non-LDC SSA countries for which the AGOA non-LDC product list (almost all GSP-LDC) and the AGOA-only products were liberalized simultaneously in 2001. The trade-weighted average tariff, which accounts for the actual export capacity of African countries, was much lower than the simple average even prior to AGOA, but declined further with AGOA, more sharply than as a result of GSP and GSP LDC programs. GSP covered products with small exports while GSP LDC covered important products such as oil exported by several African countries (e.g., Angola) but AGOA was the reason for the reduction of the average to zero, due to its expansion to all SSA countries (e.g., Nigeria) and to its coverage of apparel products. Panel B shows that the impact of AGOA on the simple average tariff on manufacturing products was similar in magnitude to that across all products but was much higher on the trade-weighted average tariff on manufacturing products because the corresponding trade-weighted average MFN tariff was much higher (above 4.5 percent) than across all products combined, and because GSP and GSP LDC duty-free treatment covered products with seemingly little export capacity in SSA. AGOA slashed the trade-weighted average tariff on manufacturing products

to almost zero, because it covered manufacturing products in which African countries had the greatest export capacity. But the most crucial tariff cuts induced by AGOA were on apparel products, as shown in Panel C, because these were the products most protected by US MFN tariffs of about 12 percent and because AGOA duty-free treatment was extended to every single apparel product in HS chapters 61-62. GSP and GSP LDC had almost no effect on average tariffs because those preference programs do not cover apparel (other than a few accessories). The impact of AGOA is magnified for the trade-weighted average that is brought to zero, relative to a trade-weighted MFN rate of 17 percent.

Appendix Figures C1 and C2 show the impact of AGOA on the average tariffs on agricultural products and on mining products. AGOA added few agricultural products to those already duty-free under GSP LDC. As such AGOA duty-free treatment was important only in reducing tariffs for non-LDC African countries that export agricultural products, like Cote d' Ivoire and Kenya. Average tariffs for mining were small due to low MFN tariffs and to GSP preferences. The most important African mining exports to the US already faced MFN tariffs close to zero prior to AGOA. AGOA duty-free treatment became important for non-LDC mining-intensive countries such as Botswana, Namibia, Nigeria, and South Africa.

Figure 1. Impact of AGOA on US average tariffs on all products for Africa



Source: US database on trade and market access.

Note: simple average tariffs include all 8-digit tariff lines of the US Trade Schedule (HTSUS) for each year. Ad-valorem equivalents are calculated for tariffs with specific components (149 tariff lines with complex tariffs are not included). Trade-weighted average tariffs use total SSA exports to the US in 2000 as weights. Number of products per sector in 2001 HTSUS. Apparel includes HS sections 61 and 62.

Due to the proliferation of preferential trade agreements over the last two decades between the US and non-African trading partners, the MFN tariff rates used in Figure 1 are an imperfect benchmark against

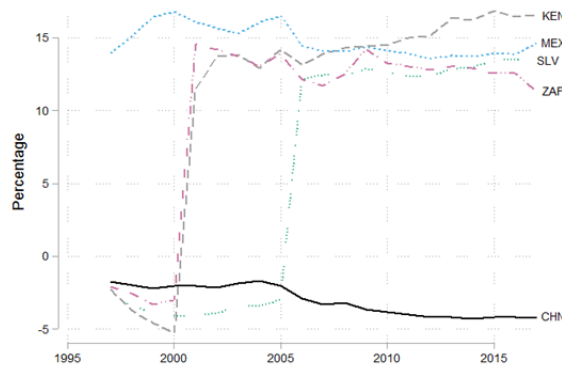
which to measure the tariff advantage that a preference program like AGOA provided in the US market. It is therefore useful to consider an alternative measure that captures the benefits of duty-free treatment provided by AGOA to African countries relative to the preferential treatment provided by the US to other exporting countries. We construct a competition-adjusted relative preference margin (RPM) simplifying the formula used by Nicita (2011) as:²³

$$RPM_j^{US} = \frac{\sum_{hts} X_{j,hts}^{US} \left(\frac{\sum_v X_{v,hts}^{US} t_{US,hts}^v}{\sum_v X_{v,hts}^{USA}} - t_{US,hts}^j \right)}{\sum_{hts} X_{j,hts}^{US}} \quad (1)$$

where j is the country exporting to the US, X is export value, v are other exporting countries competing with country j , t is the tariff paid in the US, hts is an HTS 8-digit product. For a given country, the RPM measures the difference between the trade-weighted average tariff paid by all other competing countries and the trade-weighted average tariff it pays, with a higher RPM indicating that it benefits from a higher preference.

To illustrate this, we construct RPMs for apparel (HTS 8-digit products within chapters 61-62) for China, Mexico (capturing NAFTA), El Salvador (capturing CAFTA), and Kenya and South Africa (capturing AGOA) and show them in Figure 2. AGOA resulted in a large (competition-adjusted) preferential margin in apparel for SSA countries. In fact, AGOA gave African countries the same preferential margins as NAFTA gave Mexico. The RPM received by Kenya and South Africa from AGOA is robust to the Central American preferential treatment that started in 2005. Ideally, to calculate the true preference margin, we would also include the tariff-equivalent of the quotas of the MFA and the impact of its end on the preference margins, but this exercise is beyond of scope of this study.

Figure 2. Relative preferential margins in apparel – selected countries



Source: US database on trade and market access.

²³ The simplification we implement relative to Nicita (2011) is that we do not consider trade elasticities in the calculation, thus assuming that all countries' export flows react similarly to a reduction in tariffs.

5. Descriptive evidence: African export performance and the role of AGOA

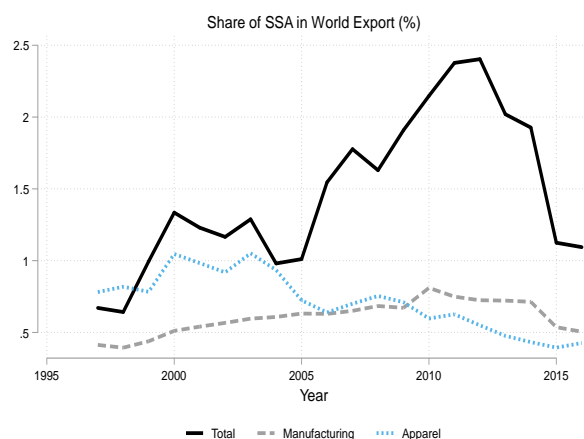
In this section, we first describe some broad patterns of Africa's export performance and then link it to AGOA.

5.1 African export performance

In describing Africa's export performance over the last two decades, we focus on African countries' share in world trade, the sectoral composition emphasizing manufacturing and apparel, and the share of different destination countries, using data from WITS.²⁴

The low share of Africa in world exports (the solid line in Figure 3), increased from about 0.6 percent in 1997 to almost 2.5 percent in 2011 then declined abruptly, mostly due to lower commodity prices, to 1 percent by 2017. Since African exports are intensive in commodities, the value of African exports is sensitive to commodity prices, and growth of African total exports follows closely growth of commodity prices (Appendix Figure B.1). The share of SSA in world exports of manufacturing is much less sensitive to swings in commodity prices, and has remained mostly unchanged over the last two decades, at a low 0.5 percent, whereas the share of SSA exports of apparel in world exports of apparel was cut in half from about 1 percent in 2000 to less than 0.5 percent in 2017.

Figure 3. Sub-Saharan Africa share of exports



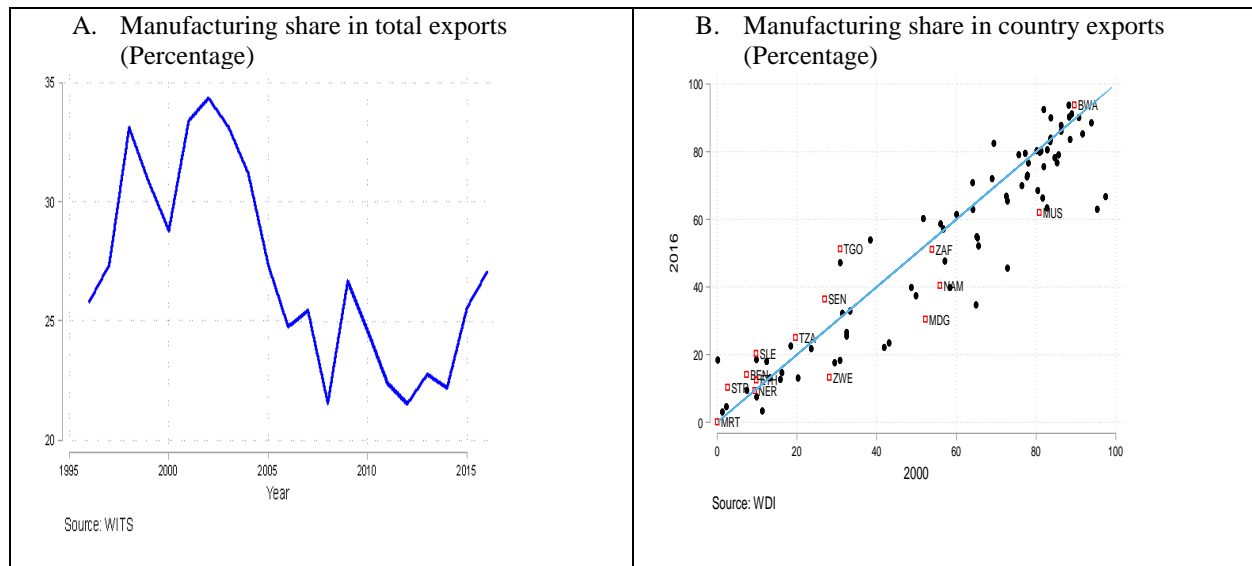
Source: WITS.

The share of manufacturing in *total African exports* was close to 30 percent at the beginning of the twenty-first century, but decreased importantly thereafter due to the boom in commodity prices until the global financial crisis in 2008, and then increased from 2012 onwards reaching 27 percent by 2016 (Figure

²⁴ The definition of manufacturing used in our analysis is provided in Appendix B which also provides some information on the availability (or lack thereof) of WITS data for SSA countries.

4.A). Individual countries exhibit diverse patterns, with manufacturing accounting for a high share of total exports for Botswana, South Africa, Madagascar and Namibia (Figure 4.B). Importantly, except Senegal and Togo, none of the other African countries exhibits a meaningful increase in the share that manufacturing represents in their total exports between 2000 and 2016.

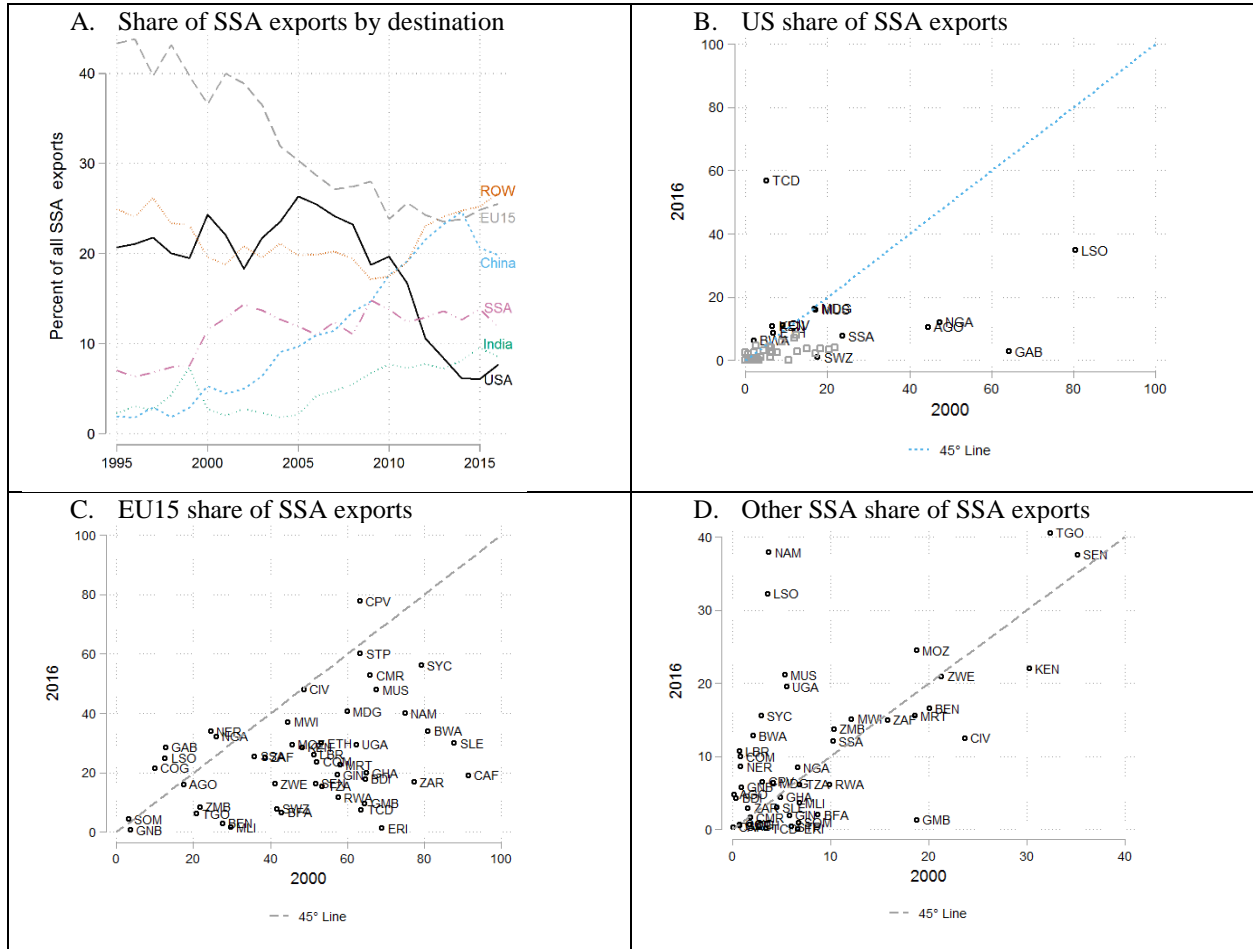
Figure 4. Manufacturing as a share of SSA total exports and SSA countries' total exports



Africa is shifting away from its traditional trading partners, the US and the EU15, and increasing its exports to China and India (Figure 5.A). For most SSA countries, the US is a relatively small destination for exports and that its share has declined between 2000 and 2016 (Figure 5.B).²⁵ Similarly, for almost all SSA countries, the share of their total exports going to the EU15 declined over the period: for most it was higher than 40 percent in 2000 and for most it was less than 40 percent in 2016 (Figure 5.C). The share of other SSA countries as a destination for SSA countries' exports remained relatively stable for most countries, but increased substantially over the 2000-2016 period for countries like Namibia and Lesotho (Figure 5.D).

²⁵ The US was an important destination as of 2000 for total exports of less than a handful of countries: Lesotho, Angola, Gabon, and Nigeria.

Figure 5. SSA total exports and SSA countries' total exports by destination

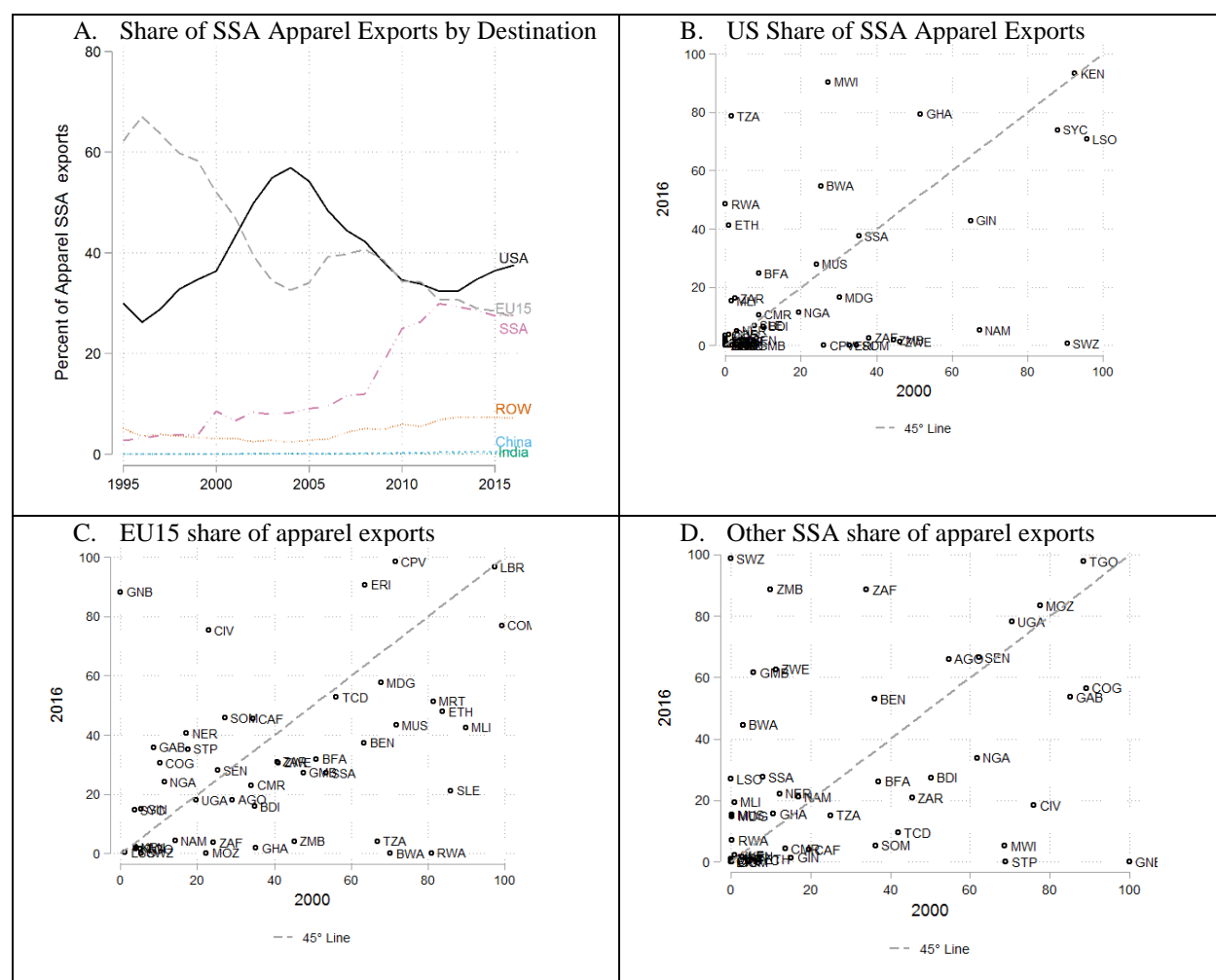


Source: WITS.

Like aggregate exports, *Africa's manufacturing exports* too have shifted away from the EU15, whose share declined from 50 percent in 1995 to 25 percent in 2015. In contrast, the share of SSA manufacturing exports going to the US remained stable at around 10 percent. The shares of SSA manufacturing exports going to China and India are substantially lower than for the share of SSA total exports, indicative of the recent pattern of Africa being a supplier of raw materials to those fast-growing destinations. The share of SSA manufacturing exports to other SSA countries increased substantially from 10 percent in 1996 to 40 percent in 2010, and but the decline to 30 percent in 2016 (Figure 6.A). The shares of manufacturing exports going to the US are lower than 30 percent for most SSA countries. Between 2000 and 2016, the changes in those shares were heterogeneous, with the US gaining importance for Kenya, Tanzania and Rwanda but losing importance for Seychelles and Swaziland (Figure 6.B). The changes in shares of manufacturing exports going to the EU15 were much more homogeneous, decreasing in almost all countries between 2000 and 2016 (Figure 6.C). Increases in the shares of manufacturing exports going

(Figure 7.C). The share of apparel exports to other SSA countries increased substantially for Swaziland (shifting away from the US) and for South Africa, the main exporter to other SSA countries shipping 90 percent of its apparel exports to those markets by 2016 (Figure 7.D).

Figure 7. SSA apparel exports and SSA countries' apparel exports by destination



Source: WITS.

5.2 The role of AGOA for African export performance

Next, we examine in detail the exports of African countries to the US based on the US database on trade and market access. We start by depicting the value of total exports and then decompose it into three components: AGOA-eligible exports, other duty-free eligible exports (MFN, GSP and GSP LDC), and dutiable exports. Total African exports to the US increased rapidly after the start of AGOA in 2001, reaching a peak of 82 billion USD in 2008, but then declined with the global financial crisis in 2009 and fell even more substantially with the decline in commodity prices from 2012 onwards, reaching a nominal

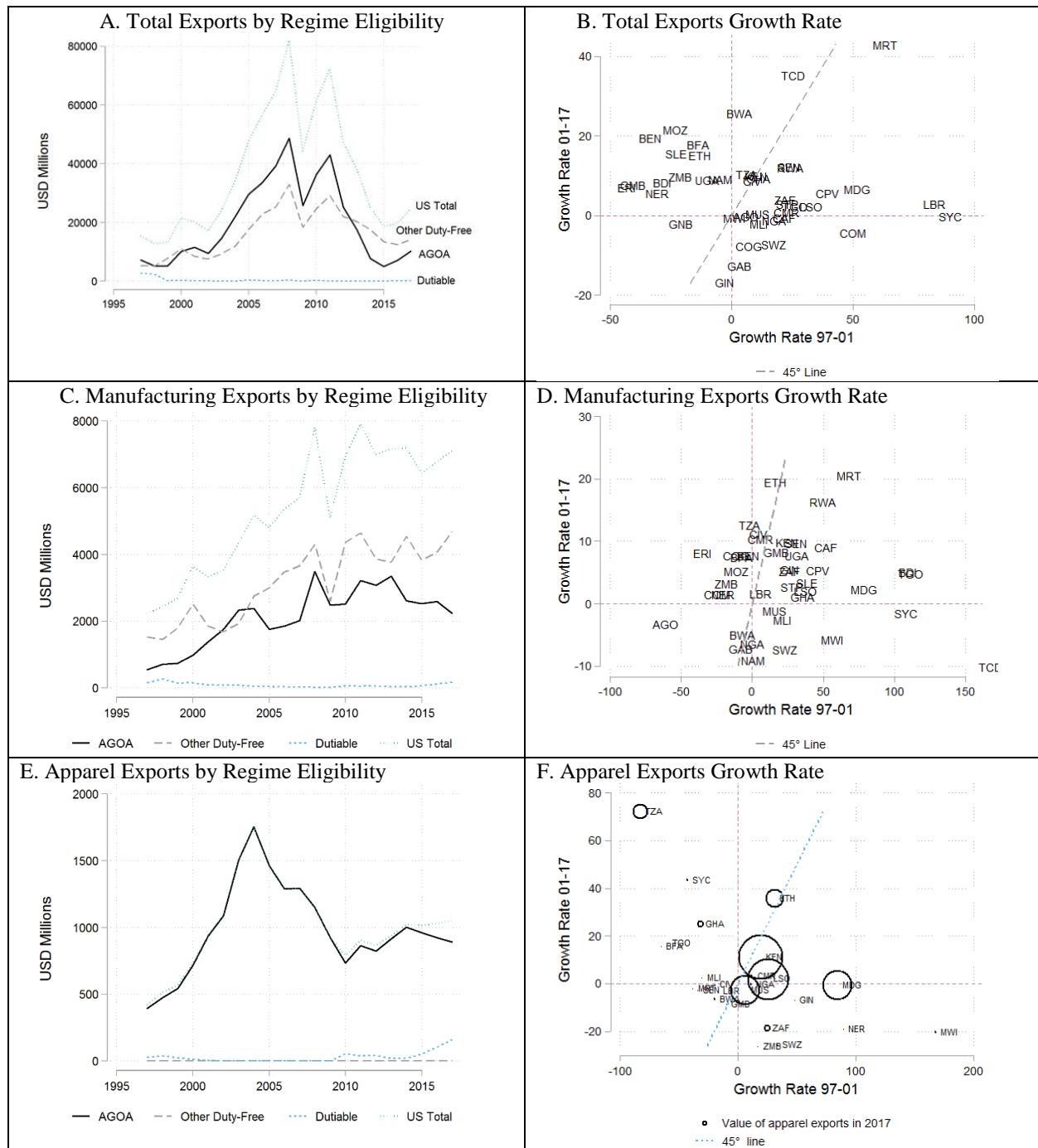
value in 2016 only slightly higher than that in 1995 (Figure 8-A). Exports of AGOA-eligible products account for a high share of total exports and exhibit a similar inverted-U-shape pattern that follows the swings in commodity prices (since many AGOA-eligible products are commodities). Due to GSP and AGOA preferences, almost all SSA exports enter duty-free in the US. African manufacturing exports, whose prices are less volatile than non-manufacturing exports, grew steadily from 1997 to 2007, after which they fell due to the global financial crisis and then stabilized afterwards (Figure 8-C). African apparel exports to the US grew rapidly after 1997, accelerating in 2000 and peaking in 2004 at 1.75 billion USD. From 2005 onwards, apparel exports declined steadily until 2010 bottoming out at 0.78 billion USD and then picked up slightly and stabilized at about 1 billion of USD (Figure 8-E). Almost all SSA apparel exports are eligible for duty-free treatment by the US under AGOA, except for countries that do not have an approved visa system or countries that lose the AGOA eligibility at some point over the 2001-2017 period.

To gain more insights into the role of AGOA, we examine the patterns of export growth for individual SSA countries before AGOA (1997-2001) and post-AGO (2001-2017). We compute for each country in each of these periods average export growth as a compound growth rate in nominal exports, for total, manufacturing, or apparel.²⁶ For total exports to the US, all but three of the fourteen countries with average negative export growth prior to AGOA, see positive export growth thereafter (Figure 8-B).²⁷ But eight countries actually switch from positive export growth pre-AGO to negative export growth post-AGO. Hence, the pattern of overall export growth to the US across periods is quite heterogeneous across SSA countries. For manufacturing exports to the US, most countries had positive growth rates prior to AGOA which increase in magnitude post-AGO, with the top-growers post-AGO being Ethiopia, Mauritania, and Rwanda (Figure 8-D). Cameroon, Cote d'Ivoire, and Tanzania which had close to zero growth rates pre-AGO see fast increases to averages of more than 10% per annum post-AGO. In contrast, Ghana, Lesotho, and especially Madagascar see a dramatic decline in their positive growth rates pre-AGO of more than 20 percent per annum to less than 5 percent per annum post-AGO. For apparel exports to the US, most countries had small negative or small positive export growth rates prior to AGOA and maintain those rates post-AGO (Figure 8-E). A few countries with negative apparel export growth switch to positive export growth post-AGO, of which Tanzania exhibits the most dramatic increase to more than 60 percent average per annum growth post-AGO. Only a couple of countries – Ethiopia and Kenya – exhibit strong positive export growth in both periods whereas several countries, including South Africa, Swaziland, and Zambia exhibit substantial negative export growth in both periods. We discuss in more detail the performance of apparel exports of SSA countries in the next sub-section.

²⁶ For each country and sub-period, the compound growth rate r in nominal exports E between year t_0 and year T is obtained as the solution to the equation $E_T = E_{t_0}(1 + r)^{T-t_0}$.

²⁷ The 3 countries with negative export growth in both periods are Guinea-Bissau, Guinea and Gabon.

Figure 8 SSA total, manufacturing and apparel exports to the US and SSA countries' export growth



Source: US database on trade and market access.

Note: Exports are classified by tariff regime eligibility by product-country-year and do not account for preference utilization. Eligibility for AGOA is extended before 2001 in the graphs for easier comparison. Growth Rates are calculated as compound growth rates between the first and last year nominal value of exports.

Finally, it is important to assess to what extent beneficiary African countries utilize the preferences granted under AGOA and GSP LDCs, since restrictive rules of origin or administrative burdens could be

an obstacle for imports to qualify for duty-free treatment. The utilization rate of AGOA, defined as the share of preference-eligible imports that enter using the preferential regime, was lower than 70 percent during the first years, but increased rapidly to close to 90 percent (see Appendix Figure C.3).²⁸ Non-utilized preferences in recent years are mostly accounted for by oil-related products for which the US MFN duty is very low (less than 1 percent).

5.3 Apparel exports to the US after AGOA: Four stories

We identify four groups of countries with different patterns of growth in apparel exports to the US after AGOA. First, we identify a group of countries that are eligible for apparel preferences, engage in some exports of apparel to the US but with no clear pattern, never taking full advantage of AGOA. We designate these as the ‘missed opportunities’ group of which Cameroon is a typical example (Figure 9.A).²⁹ Second, we identify a group of countries exhibiting a large boom in apparel exports to the US immediately after AGOA, followed by a dramatic bust soon after the end of the MFA quotas in 2005 and settling at low levels of exports to the US subsequently. We designate these as the ‘boom-bust’ group of which Swaziland is a typical example (Figure 9.B).³⁰ Third, we identify a group of countries with substantial growth in apparel exports after AGOA, which is negatively affected by the end of the MFA quotas in 2005. However, their exports do not disappear but remain stagnant afterwards. We designate these as the ‘growth and stagnation’ group of which Lesotho is a typical example (Figure 9.C).³¹ Finally, we identify a small set of countries that experience limited growth in apparel exports to the US immediately after AGOA but have subsequently shown steady growth that accelerated in the post-2010 period. We designate these as the ‘late and sustained success’ group of which Ethiopia is a typical example (Figure 9.D).³² Appendix Figures C3-C5 show the patterns in apparel exports to the US for each SSA country (other than the four shown in Figure 9), and their allocation to each of the four groups.

²⁸ The low utilization rate observed in the first few years of AGOA is likely due to an imprecision in our definition of eligibility to AGOA for a given country by year whereas AGOA entered into force for different countries in different months of the year.

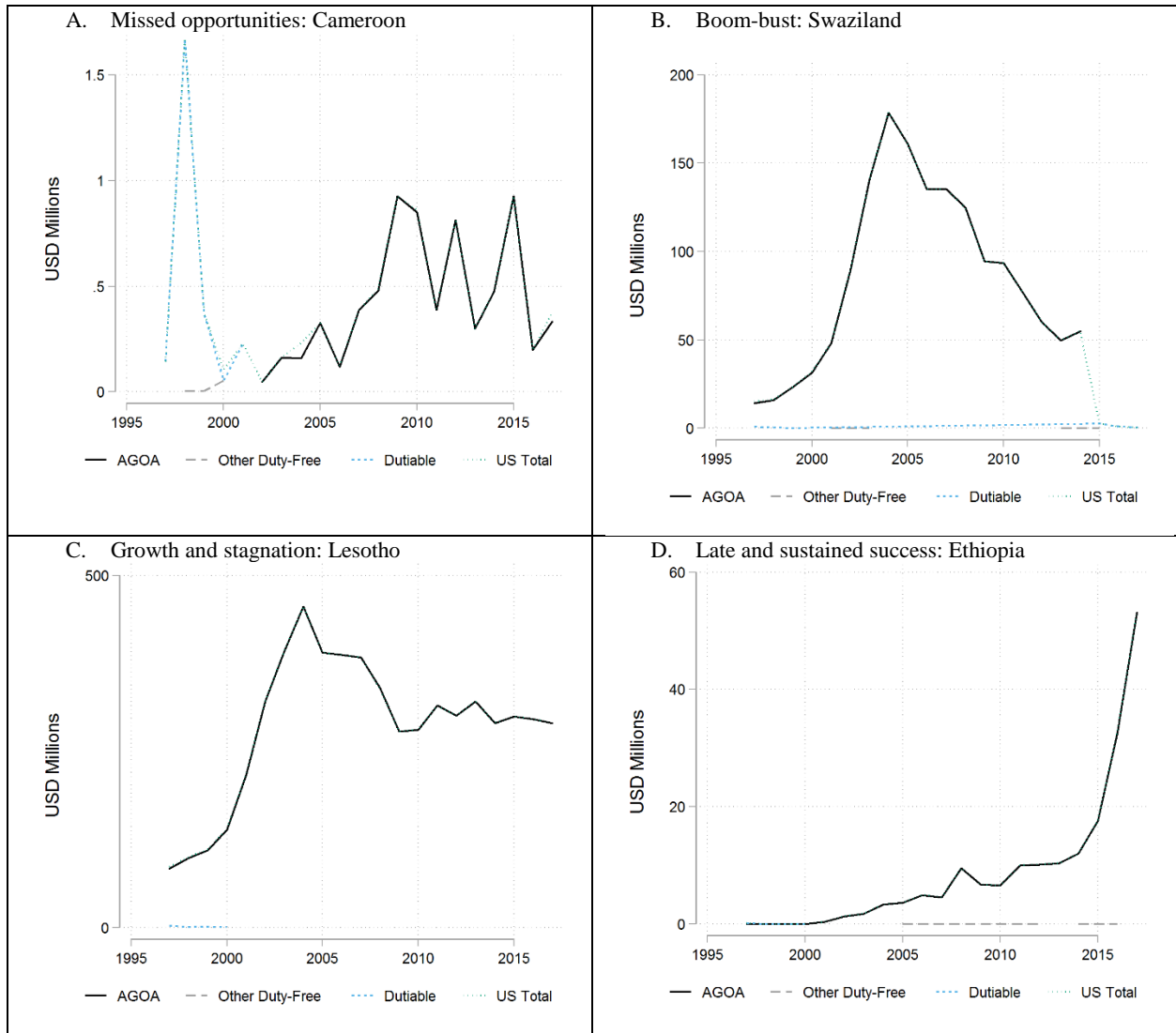
²⁹ Other countries in this group are Cote d’Ivoire, Ghana, Sierra Leone, Seychelles, and Zambia.

³⁰ Other countries in this group are Botswana, Cape Verde, Madagascar, Malawi, Mozambique, Namibia, South Africa, Swaziland, and Uganda.

³¹ The other country in this group is Mauritius.

³² Other countries in this group are Kenya, Rwanda, and Tanzania.

Figure 9. Four stories of AGOA apparel exports



Source: US database on trade and market access.

Notes: Exports are classified by tariff regime eligibility by product-country-year and do not account for preference utilization. Eligibility for AGOA is extended before 2001 in the graphs for easier comparison.

6. Econometric specification

How far are the changes discussed in Section 5 attributable to trade preferences and, for apparel, their erosion after the end of the MFA quotas? To identify a causal impact of AGOA and GSP LDC on African countries exports to the US over the long 1992-2017 period, we take a treatment and control group approach. This approach relies on several variants of the unrestrictive triple-differences specification with a stringent and rich set of fixed effects proposed by Frazer and Van Biesebroeck (2010). Our benchmark specification is given by:

$$\begin{aligned}
\ln(Imp_{cpt}) = & \sum_{r \in (s, ns)} \beta_{1r} \times GSP_p \times GSP_c \times PostGSP_{ct} \times 1\{c \in r\} \\
& + \sum_{j \in (n, e)} \beta_{2j} \times ANonApp_p \times ANonApp_c \times PostANonApp_{ct} \times 1\{c \in j\} \\
& + \beta_3 \times AApp_p \times AApp_c \times PostAApp_{ct} + \delta_{cp} + \delta_{ct} + \delta_{pt} + \epsilon_{cpt}
\end{aligned} \tag{2}$$

where c is an exporting country, p is an HS 6-digit product, t is a year, and Imp are US imports, and ϵ is an independently and identically distributed (i.i.d.) error term. Our specification estimates a separate impact of five different categories of ‘treated’ products and treated countries. The first interaction term on the right-hand side captures the impact of the GSP policy change in 1997 that increased the number of duty-free products for GSP LDC eligible countries and territories (designated as GSP for short). It is defined as the product between GSP_c which is an indicator for countries eligible for GSP LDC, GSP_p which is an HS 6-digit indicator for the 810 products (see Table 2) eligible for duty-free treatment under GSP LDC, and $PostGSP_{ct}$ which is an indicator for the period from 1998 onwards when GSP LDC is enacted, that is country-varying since there is variation in country eligibility for GSP LDC.³³ We allow the interaction term to enter separately for African LDC countries (identified by the indicator for c equal to s) and non-African LDC countries (identified by the indicator for c equal to ns) to be able to accurately capture the impact of nonreciprocal preferential treatment provided by the US to African countries, which is the focus of our study.

The second and third interaction terms on the right-hand side of Equation (2) capture the impact of the AGOA policy change. The second term captures the effects of AGOA on non-apparel products and it is the product between $ANonApp_c$ which is an indicator for AGOA-eligible countries, $ANonApp_p$ which is an indicator for the non-apparel HS 6-digit products that become eligible for duty-free treatment under AGOA and $PostANonApp_{ct}$ which is an indicator for the period 2001 onwards when the AGOA general provision is enacted, that is country-varying as discussed in Section 4. Most non-apparel products added under AGOA were already eligible for duty-free treatment for LDC countries under the GSP LDC scheme. In order to allow for differential effects, the non-apparel interaction coefficients are estimated separately for products that become eligible for duty-free treatment under AGOA for both LDC and Non-LDC African countries (the 91 AGOA Only products in Table 2, new product identified by the indicator for j equal to n) and products that become eligible for Non-LDC African countries (the 769 AGOA Non-LDC products in

³³ Even though the presence of $PostGSP_{ct}$ makes the presence of GSP_c unnecessary (and similarly that of $PostANonApp_{ct}$ makes $ANonApp_c$ unnecessary and that of $PostAApp_{ct}$ makes $AApp_c$ unnecessary) we follow Frazer and Van Biesebroeck (2010) in including those variables to make the triple-differences specification explicit.

Table 2, existing product, identified by the indicator for j equal to e).³⁴ The last interaction term is the product between $AApp_c$ which is an indicator for countries eligible to the AGOA apparel provision (designated in what follows as AGOA apparel-eligible countries), $AApp_p$ which is an indicator for the set of 239 apparel HS 6-digit products (see Table 2) eligible for duty-free treatment under AGOA and $PostAApp_{ct}$ which is an indicator for the period 2001 onwards when the AGOA apparel provision is enacted, that is country-varying as discussed in Section 4.

Equation (2) includes controls for country-product fixed effects δ_{cp} – the panel dimension of the data – which imply that all coefficients are estimated based on *within* variation over time for a given country-product and controls for country-year fixed effects δ_{ct} and for product-year fixed effects δ_{pt} .³⁵ Country-year fixed effects are a way to flexibly account for overall demand and supply and general macroeconomic shocks in the exporting countries, thus eliminating a potential concern of omitted variable biases. In particular, these fixed effects account for the fact that our sample period encompasses the global financial crisis initiated in 2008.

The interpretation of the estimated coefficients on the interaction terms is as follows. For example, the coefficient β_3 measures the increase in exports to the US by an AGOA apparel-eligible country of an AGOA-eligible apparel product after the AGOA apparel provision is enacted, relative to the overall increase in exports to the US by that country, to the overall global increase in exports to the US of that product, and to the base level of exports to the US by the country-product before AGOA. This base level is an average of exports by the country-product prior to the country becoming eligible for AGOA (typically this would be over the period 1992-2001).

In practice, the dependent variable used in Equation (2) is defined as the log of US imports at the country-HS 6-digit-year level plus 1, to allow us to keep in the estimating sample all zero trade flows (thus addressing selection biases). Hence, Equation (2) captures the impact of preferential US market access under AGOA or GSP LDC on African countries' exports at the intensive and extensive margin. In order to capture separately an impact on the probability of exporting, the extensive margin, we follow Frazer and Van Biesebroeck (2010) and estimate a version of Equation (2) where the dependent variable is an indicator variable for positive trade flows. The use of OLS estimation for this version of Equation (2) implies the use of a linear probability model which has the shortcoming that the predicted probabilities may not be meaningful since they can lie outside of the [0,1] interval. However, as suggested by Frazer and Van Biesebroeck (2010), this is unlikely to be a binding shortcoming since the impact of AGOA and GSP LDC

³⁴ These 769 products were already eligible for duty-free entry for SSA LDC countries under US GSP LDC before AGOA was enacted.

³⁵ The inclusion of this rich and stringent set of fixed effects implies that Equation (2) is a more general specification than a pure triple-differences specification would be, essentially it controls for the 'levels' variables that would be required for such specification via the fixed effects.

on the probability of an African country exporting a product to the US is likely to be small, given the set of fixed effects that are controlled for.

Our consideration of a longer period in the 1990s starting in 1992, allows us to estimate the impacts of the change in GSP LDC policy in 1997 with the addition of products eligible for duty-free treatment for LDC countries (see Section 4) as separate from those of AGOA. This is an improvement relative to the approach of Frazer and Van Biesebroeck (2010) whose sample period started in 1998 which implied that they measured as an impact of AGOA on non-apparel products what was in fact an impact of GSP LDC on products that were already duty-free since 1997, rather than from 2001 onwards as they consider in their specifications.

The coefficients estimated in Equation (2) provide the average impact of GSP LDC and AGOA over the entire period following the enactment of these policy changes. But there is great interest in understanding the dynamics of the impacts. In order to understand how quickly African countries increase their exports to the US after the AGOA and GSP LDC policy changes, and whether the impacts accelerate, stabilize, or mean-revert, we estimate a variant of Equation (2) where each interaction term is interacted further with year fixed effects, such that each interaction term is allowed to have a different coefficient in each year (for the first two interaction terms this implies separate coefficients for years from 1998 onwards and for the other interaction terms this implies separate coefficients for years from 2001 onwards).

As an alternative to Equation (2), we use detailed data on the tariffs that the US applied to all HS 6-digit products and all countries over the period 1997-2017 to estimate the trade effects of tariff preferences granted by the US under different schemes, including AGOA, using the following specification:

$$\begin{aligned} \ln(Imp_{cpt}) = & \gamma(\tau_{cpt}^{MFN} - \tau_{cpt}^{Pref}) \times 1[c \in AFR] + \gamma(\tau_{cpt}^{MFN} - \tau_{cpt}^{Pref}) \times 1[c \in NonAFR] \\ & + \delta_{cp} + \delta_{ct} + \delta_{pt} + \epsilon_{cpt} \end{aligned} \quad (3)$$

where $\tau_{cpt}^{MFN} - \tau_{cpt}^{Pref}$ is the difference between the MFN tariff rate and the best available US preferential tariff rate. As in Equation (2), we control for a stringent set of fixed effects: country-product, country-year, and product-year. The coefficient of interest γ captures the trade effects of the tariff preferences given to a country-product pair relative to the average export of that country-product pair. To capture the trade effect of the tariff cuts provided to African countries, we include the tariff preference variable twice: once for African countries and once for non-African countries.³⁶

³⁶ This specification is closely related to that used for an evaluation of the impact of EU GSP in EU (2015).

7. Estimated impacts of AGOA and GSP LDC

We begin with a baseline specification and then delve deeper into the impact on apparel and the issue of export diversion from other destinations.

7.1 Baseline estimates

Before turning to the econometric estimates, Table 2 provides some statistics based on the sample that is used for the regressions, focusing on characteristics prior to AGOA. Note also that the estimating sample includes 27,420,560 observations, of which 87% have zero imports. Table 2 shows that AGOA-eligible countries export to the US typically substantially fewer HS 6-digit products and smaller values, whether they are AGOA-eligible or not, than control countries. On average, a country that has ever been declared AGOA-eligible has positive exports in only 97 HS 6-digit products. However, there is enormous variation across the eligible countries.

Table 2. Summary statistics based on estimating sample

Panel A. Number of HS 6-digit Products and US Import Values

	AGOA Countries (44)		Control Countries (164)	
	Average	Standard Deviation	Average	Standard Deviation
Total number of products	5,070		5,070	
Number of products per country (imports>0)	97	240	734	1,068
Number of AGOA-eligible products per country (imports>0)	28	57	188	226
Log imports per country-HS 6-digit product (all products)	0.24	0.57	1.91	2.59
Log imports per country-HS 6-digit product (imports>0)	9.84	1.05	10.71	1.25

Panel B. Number of HS 6-digit Products GSP LDC-eligible or AGOA-eligible and US MFN tariff rates

			AGOA/GSP Countries Only			
			Only LDCs	Only Non-LDCs	Both LDCs and Non-LDCs	
			GSP LDC	AGOA Non-LDC	AGOA Only (Non-apparel)	AGOA Apparel
Number of HS 6-digit products	All products		810	769	91	239
	Imports >0	Average per country	4	26	5	23
		Maximum per country	11	195	34	120
US MFN tariff rate	All products		4.8%	4.8%	9.0%	12.3%
	Imports >0	Average per country	5.0%	4.3%	7.3%	11.2%
		Maximum per country	21.9%	10.0%	13.3%	15.6%

The baseline results from estimating Equation (2) are shown in Table 3. The results are based on data at the exporting country HS 6-digit product-year level, including positive as well as zero import flows

to the US. All specifications are the triple-differences regressions that control for country-product, country-year, and product-year fixed effects. Inference is based on standard errors robust to heteroscedasticity with the Huber-White approach, clustered at the product level.³⁷

The estimates in column (1) show a positive and significant impact of the expansion of duty-free products for GSP LDC from 1998 onwards for beneficiary countries in Africa (β_{1s}).³⁸ African countries increase on average their exports to the US of the GSP LDC additional products eligible for duty-free treatment from 1998 onwards, relative to their pre-1997 levels by 24 percent.³⁹ Regarding the impacts of AGOA, column (1) shows they are positive and significant on non-apparel as well as on apparel products. Exports to the US of non-apparel products that become eligible for duty-free treatment under AGOA for all African countries (β_{2n}) increase on average by 11.1 percent, while those of non-apparel products whose duty-free treatment is extended to non-LDC African countries under AGOA increase on average by 23.4 percent, relative to their pre-2001 levels. Finally, the largest boost to exports provided by AGOA is estimated for apparel products that increase by close to 28.9 percent for AGOA-eligible countries from 2001 onwards, relative to their pre-AGOA levels.

Two crucial remarks need to be made about these estimates. First, recall that they are obtained controlling for time-varying country and product changes in US imports, and therefore account for any overall surge or drop in US imports from AGOA countries for eligible and non-eligible products as well any overall surge or drop in US imports of AGOA- products or GSP-eligible products globally. Second, they are estimates of a response by African countries to AGOA and GSP LDC at both the intensive and extensive margin of exports to the US, since zeros are included in the estimating sample. Column (2) shows the estimates of the impact of AGOA and GSP LDC on the extensive margin of African exports to the US. We find significant increases in a range close to 1 percent in the probability of an eligible country exporting an HS 6-digit product to the US, whether that is a GSP LDC product, an AGOA non-apparel product, or an AGOA apparel product.⁴⁰

³⁷ Due to the presence of a very large set of fixed effects, we estimate our equations using the *reghdfe* Stata command drawing on Guimaraes and Portugal (2010) and Correia (2015). The current version of the command eliminates from the number of observations singleton groups and adjusts standard errors for their exclusion. A singleton group is a group with only one observation: e.g., for country-HS 6-digit fixed effects, a singleton group is a country-HS 6-digit cell that is imported by the US a single year.

³⁸ The impact of GSP LDC on exports of LDC countries outside Africa (β_{1ns}) is insignificant.

³⁹ This marginal effect corresponding to the coefficient of 0.215 in Table 3 is obtained as $(e^{(0.215)} - 1) \cdot 100$.

⁴⁰ In Appendix Table D.1 we unbundle non-apparel products into three groups - agriculture, manufacturing, and mining - and re-estimate Equation (2) allowing each of the interaction terms to differ across the three groups. The results show that African LDC countries increase exports to the US of their agriculture and manufacturing products eligible for GSP LDC duty-free treatment from 1998 onwards, relative to their pre-1997 levels. Agriculture and manufacturing products whose duty-free treatment is extended to non-LDC African countries under AGOA also increase significantly, relative to their pre-2001 levels. The strongest impacts are experienced by agriculture products that become eligible for duty-free treatment under AGOA for all African countries whose exports increase on average by 25.6 percent, while those of manufacturing products increase by 15.7 percent. Positive and significant impacts on the extensive margin are also found for agriculture and manufacturing products, the largest being for agriculture products that become eligible for duty-free treatment under AGOA for all African countries. Regardless of preference eligibility, impacts of GSP LDC or AGOA on mining products are insignificant.

Table 3. Baseline impacts of AGOA and GSP and some robustness checks

Data at country-HS 6-digit-year level (including zeros) is used						
Dependent variable is:						
	Log (imports + 1)	Dummy for positive imports	Log (imports + 1) Excluding OECD	Log (imports + 1) Excluding China	Log (imports + 1) Controlling for competition	Log (imports + 1) 1998-2006
	(1)	(2)	(3)	(4)	(5)	(6)
GSP LDC * Africa	0.215*** (11.49)	0.0185*** (12.39)	0.120*** (10.27)	0.216*** (11.74)	0.016 (1.89)	0.078*** (7.57)
GSP LDC * Non-Africa	0.0038 (0.22)	0.0012 (0.90)	-0.080*** (-5.56)	0.005 (0.29)	-0.133*** (-5.14)	-0.067** (-2.64)
AGOA Non-LDC	0.105*** (6.49)	0.008*** (5.68)	0.027* (2.18)	0.104*** (6.51)	0.024 (1.77)	0.014 (1.07)
AGOA Non-apparel	0.210*** (4.66)	0.014*** (3.71)	0.094** (2.74)	0.195*** (4.36)	0.075 (1.51)	0.087*** (3.54)
AGOA apparel	0.254*** (5.40)	0.009* (2.41)	0.223*** (4.86)	0.245*** (5.22)	0.237*** (5.10)	0.349*** (7.54)
Competition-adjusted relative preference margin					0.530*** (4.73)	
Average MFA quotas on competitors					0.570 (1.04)	
Indicator for MFA quota					0.800*** (11.42)	
Country-product fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Product-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	27,420,560	27,420,560	22,944,154	27,288,901	21,904,250	9,491,040

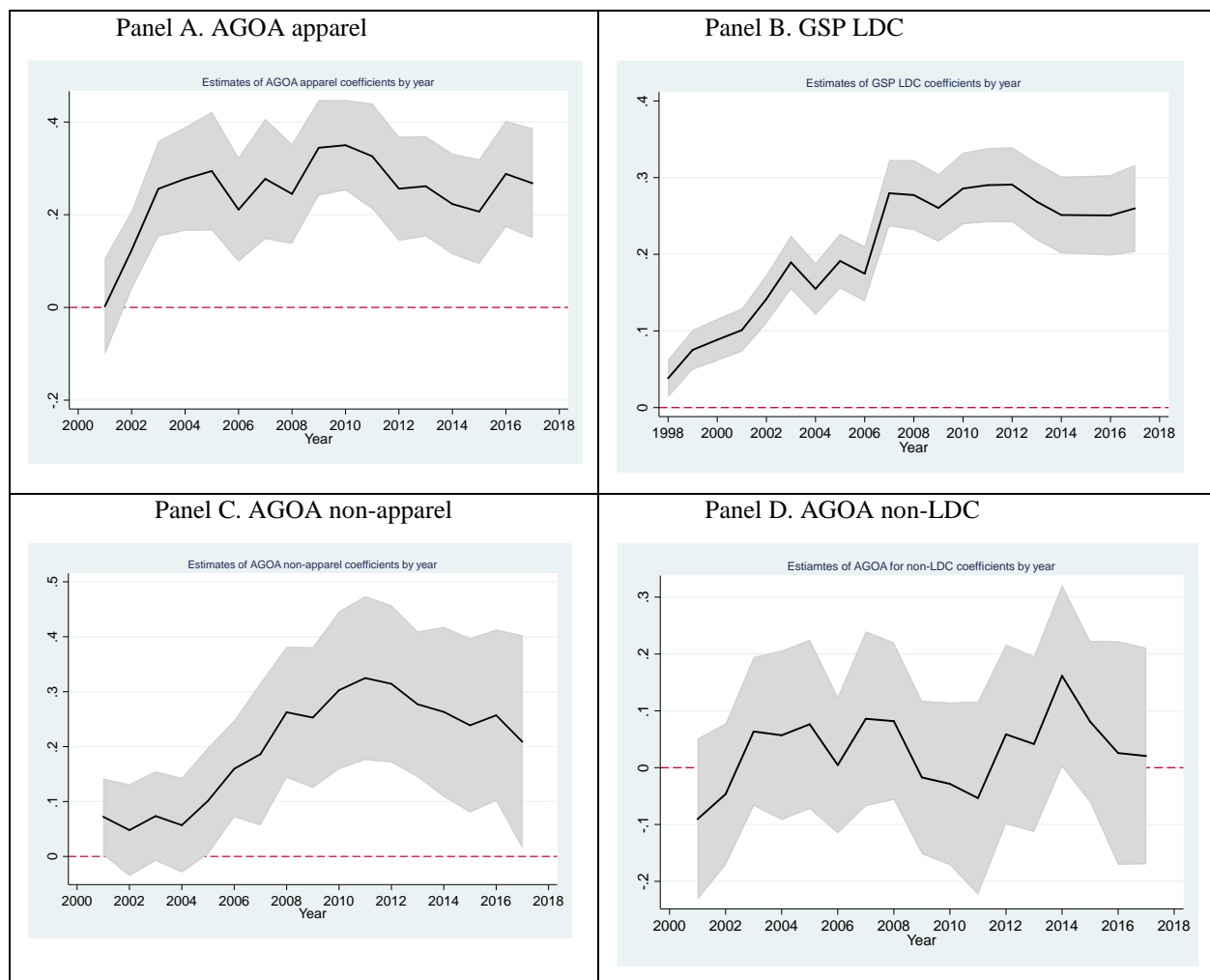
Notes: Robust t-statistics in parentheses, clustered by HS 6-digit product. ***, **, and * indicate significance at 1%, 5%, and 10% confidence levels, respectively.

The estimates in Table 3 show the average impacts of GSP for LDC and AGOA over the entire post-implementation period, but one of our key objectives is to understand the timing and durability of the effects of trade preferences offered by the US. To examine how quickly and persistently African countries respond to policy changes under AGOA and GSP LDC, we allow each interaction term in Equation (2) to have a different coefficient in each year post-implementation and show the corresponding coefficients and 95 percent confidence intervals for each year in Figure 10. Panel A shows that the effect of AGOA on exports to the US of apparel products by AGOA-eligible countries starts low but then explodes over the first four years after its enactment. After the phasing out of the MFA quotas, it fluctuates slightly but in broad terms, levels off (if anything the impact decreases between 2011 and 2015). Specifically, the estimate of the impact of AGOA on apparel is zero in 2001 and increases fast thereafter reaching 29 percent in 2004. This increase in the impact of AGOA on apparel products over the 2002-2005 period may reflect the time taken by beneficiary countries to learn and build capacity to respond to the expanded market opportunities in the US or it may reflect the increase in transshipment of Chinese exports, as shown by Rotunno, Vezina, and Wang (2013). The levelling of marginal impacts of AGOA on African exports of apparel could be a

consequence of the erosion of preferences for African countries after the end of the MFA quotas, which led to fiercer competition from Asian giants.

Panel B and C display the effects AGOA on non-apparel products. Panel B shows the impact of GSP LDC on eligible products for African LDC countries increasing over the first 10 years starting in 1998 then levelling off. Panel C shows the impact of AGOA on exports of non-apparel products that become eligible for duty-free treatment under AGOA for all African countries increasing steadily and strongly from 2001 until 2011, then declining. Finally, Panel D shows that the impact of AGOA on non-apparel products whose duty-free treatment under GSP LDC is extended to non-LDC African countries fluctuates, is not significantly different from 0 in several years, and is highest in 2014.

Figure 10. Impact of AGOA and GSP across years



Notes: figures show coefficients and 95 percent confidence intervals based on robust standard errors, clustered by HS 6-digit product.

Table 3 presents not only our baseline results but also some robustness checks to those results. Columns (3) and (4) provide impact estimates using two alternative estimating samples. We exclude from the estimating sample OECD countries in column (3) with the objective of estimating Equation (2) using a potentially better (more similar) control group for the African countries. We exclude China from the control group in column (4) given its explosion of exports to the US over the sample period (particularly of apparel products). The results in both columns are qualitatively similar to those in column (1), and the magnitudes of the coefficients on AGOA apparel are almost unchanged, whereas those on other products decline in magnitude when OECD countries are dropped.

Given our long sample period, the trade effect of nonreciprocal trade preference granted under AGOA and GSP LDC may have been eroded as the US signed multiple preferential trade agreements with non-African countries. In order to capture this effect, we add to our specification in column (5), the relative preference margin. As defined in Section 5, that variable measures for each HS 6-digit product in a year the difference between the weighted average tariff paid by competitor countries and the weighted average tariff paid by the country. Higher RPMs, which indicate a higher preference, are shown to be significantly linked to higher export growth to the US. Since RPM does not accurately capture the degree of protection in the US for apparel products under MFA quotas, we also include in this specification an indicator variable of whether the country-HS 6-digit product faced an MFA quota in the US (prior to 2005) as well as a weighted average of the presence of MFA quotas on competitor countries exporting that HS 6-digit product to the US. We find no significant effect of the average MFA quota imposed on the rest of the world. Surprisingly, we find a positive and significant effects on the own country-product quota dummy. This may simply reflect the fact that MFA quota is endogenous to the export flows in a sense that MFA quota was imposed on a country-product when it had experienced significant export growth to the US. More importantly, accounting for competition from other countries with preferential access to the US market does not change the estimated impacts of AGOA on apparel products, but the impact of GSP LDC and AGOA on non-apparel products become insignificant.

It is useful to compare our estimates to those in Frazer and Van Biesebroeck (2010). We estimate a smaller average impact of AGOA on apparel products over the 2001-2017 period than they do over the 2001-2006 period, which is not surprising given our pattern of yearly effects in Panel A of Figure 10. Our separate impacts of GSP LDC and AGOA on non-apparel products show a higher average response of exports of GSP LDC duty-free products or products that become duty-free under AGOA for all African countries than of GSP LDC duty-free products extended to African non-LDC countries by AGOA. In column (6) of Table 3 we explicitly use the Frazer and Van Biesebroeck (2010) sample period of 1998-2006 and find a significantly higher response for apparel products and a significantly smaller response for

non-apparel products relative to our baseline results. The differences may be due to the fact that we consider a longer pre-AGOA period during which there is evidence of a pre-existing trend, discussed below.

As discussed in Section 6, we consider an alternative to our baseline specification given by Equation (3), where instead of treated countries and eligible products, we estimate the impact of tariff preferences granted by the US under different schemes using data on US tariffs on HS 6-digit products and all countries over the period 1997-2017. The corresponding results are shown in Table 4 and indicate in column (1) that, on average across all countries, US import tariff liberalization does not significantly increase export growth at the country-product level. However, when the effect is allowed to differ across African and non-African countries in column (2), US tariff preferences increase significantly export growth for African countries. Some interesting differences are also identified when the effect of US tariff preferences is allowed to differ across groups of products: US tariff preferences have a significant positive impact on growth of apparel exports as well as on growth of manufacturing exports for African countries. We view these results as consistent with those we obtain with our baseline triple-differences specification.

Table 4. Impacts of US preference margins

	Data at country-HS 6-digit-year level (including zeros) is used		
	Dependent variable is:		
	Log (imports + 1)	Log (imports + 1)	Log (imports + 1)
	(1)	(2)	(3)
Preference margin	0.007 (1.01)		
Preference margin * Africa		1.650*** (8.90)	
Preference margin * Non-Africa		-0.0003 (-0.39)	
Preference margin * Africa * Agriculture			0.370*** (3.44)
Preference margin * Africa * Apparel			3.360*** (8.23)
Preference margin * Africa * Manufacturing			1.567*** (9.40)
Preference margin * Africa * Mining			-1.257 (-0.74)
Preference margin * Non-Africa * Agriculture			0.358 (1.95)
Preference margin * Non-Africa * Apparel			-2.423*** (-3.95)
Preference margin * Non-Africa * Manufacturing			0.0002 (0.37)
Preference margin * Non-Africa * Mining			6.317*** (5.58)
Country-product fixed effects	Yes	Yes	Yes
Country-year fixed effects	Yes	Yes	Yes
Product-year fixed effects	Yes	Yes	Yes
Observations	21,931,483	21,931,483	21,931,483

Notes: Robust t-statistics in parentheses, clustered by HS 6-digit product. ***, **, and * indicate significance at 1%, 5%, and 10% confidence levels, respectively.

For the significant increase in exports of eligible products from beneficiary African countries estimated in our triple-differences regression would be more credibly attributable to AGOA and GSP LDC, if AGOA and non-AGOA countries faced similar trends in their exports to the US of potentially preference-eligible products before the implementation of GSP LDC and AGOA. As a simple way to address this concern of different pre-treatment dynamics for treated and control country-products, we re-estimate Equation (2) including a time trend for the different groups of AGOA-eligible or GSP-eligible countries and products, following the approach proposed by Mora and Reggio (2017).⁴¹ Those time trends can account for any existing differences in the dynamics of exports to the US for treated countries and products that existed prior to the enactment of the US trade preferences and may have persisted thereafter. The results shown in Appendix Table C.2 suggest that the control for eligible country-product trends does not significantly change our findings for apparel, and moreover the trend for those products is insignificantly different from zero. For GSP LDC products, the impact is also still positive and significant even though the coefficient on the corresponding time trend is also positive and significant. For the non-apparel products eligible for AGOA, the control for a differential time trend leads to an insignificant impact of AGOA on African exports of those products to the US. In what follows, we will focus mostly on the estimated impacts of AGOA on apparel, even though all specifications to be estimated also include all other interaction terms.

7.2 Delving into the AGOA impact on apparel exports

The results presented above show that the estimated impact on apparel increases over time and then becomes flat after 2005, which coincides with the end of the MFA quotas. We now turn to a more detailed investigation of the impact of AGOA on apparel products. We begin by examining whether the end of the MFA in 2005, which unleashed the exports of apparel by China and other emerging Asian countries, mitigates or eliminates the positive impacts of AGOA on apparel exports for African countries.

We re-estimate Equation (2) allowing the apparel interaction term to be sub-divided into two terms, one where the variable $PostAApp_{ct}$ is an indicator for years 2001-2004 and one where that variable is an indicator for years 2005-2017. The corresponding results are shown in column (1) of

Table 5. The average impact of AGOA on apparel products is higher in the period following the end of the MFA quotas than in the initial years post-AGOA. The difference in these two coefficients is significant at 5 percent level. Again, this combines the impact of starting to export new products to the US and expanding exports of existing products to the US. The somewhat unexpected pattern of a stronger positive impact of AGOA post end of the MFA quotas can be understood by revisiting the evidence in Panel

⁴¹ Specifically, we follow their Equation (13).

A of Figure 10, which shows a small initial impact of AGOA in 2001, which then increases substantially and results in a smaller average impact in 2001-2004 than the average impact of AGOA from 2005 onwards.

Table 5. Impacts of AGOA on apparel across periods and sub-regions in Africa

	Data at country-HS 6-digit-year level (including zeros) is used Dependent variable is: Log (imports + 1) (1)
GSP LDC * Africa	0.215*** (11.50)
GSP LDC * Non-Africa	0.00372 (0.22)
AGOA Non-LDC	0.105*** (6.48)
AGOA Non-apparel	0.210*** (4.66)
AGOA apparel * 2001-2004	0.194*** (4.69)
AGOA apparel * 2005-2017	0.269*** (5.32)
Country-product fixed effects	Yes
Country-year fixed effects	Yes
Product-year fixed effects	Yes
Observations	27,420,560

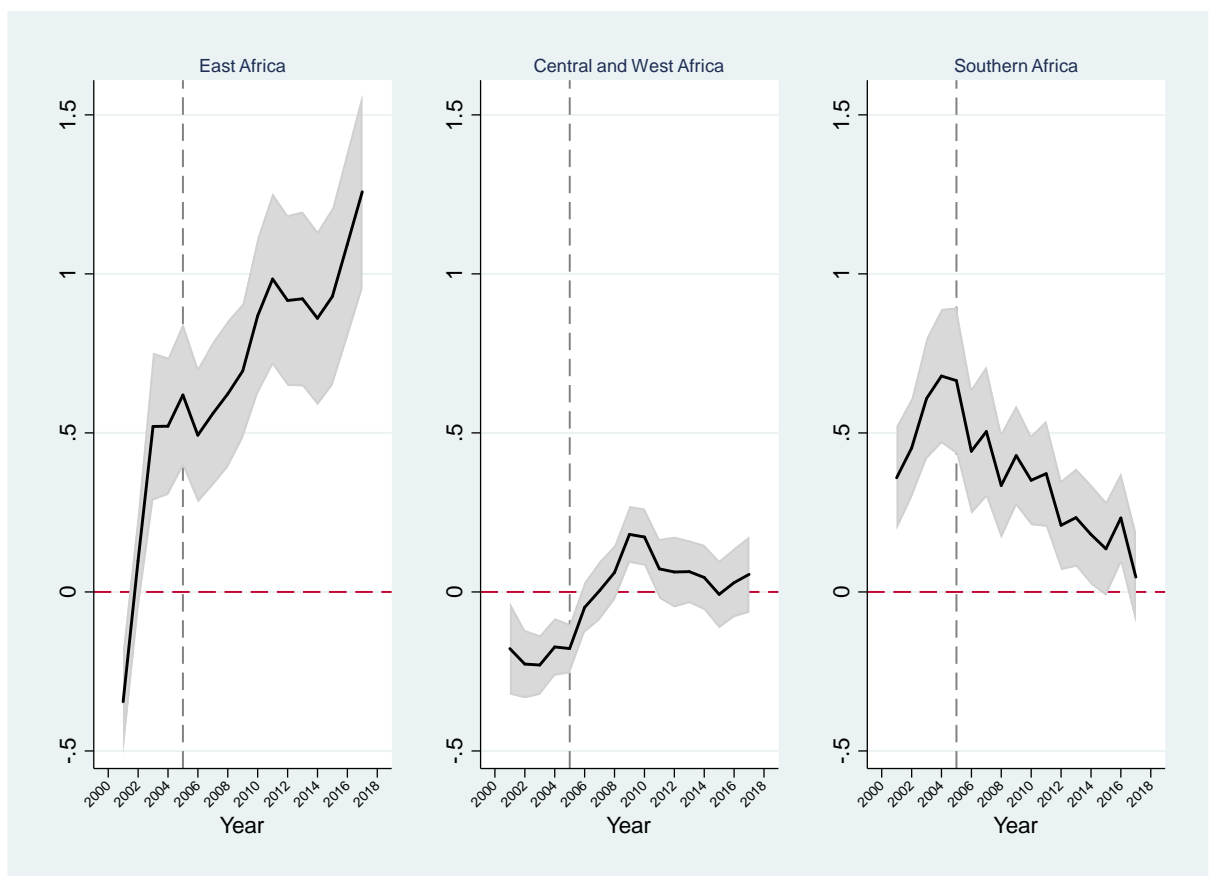
Notes: Robust t-statistics in parentheses, clustered by HS 6-digit product. ***, **, and * indicate significance at 1%, 5%, and 10% confidence levels, respectively.

We next investigate whether there is country or sub-regional heterogeneity in the impact of AGOA on apparel. First, considering country heterogeneity and returning to an average impact of AGOA over the entire 2001-2017 period, we plot in Appendix Figure D.1 the coefficient on the apparel interaction term obtained by re-estimating Equation (2) allowing the impact of each interaction term to be different for each country. The countries exhibiting the largest significant positive impacts of AGOA on apparel exports are Kenya, Swaziland, Madagascar, Ethiopia, and Lesotho. In contrast, South Africa, Senegal, Nigeria, and Cote d'Ivoire experience an average negative impact of AGOA on their apparel exports.

Second, in order to assess whether and to what extent AGOA had differential impacts on exports of apparel across African sub-regions before versus after the liberalization of the MFA quotas, we re-estimate Equation (2) allowing the apparel interaction term to vary across years and its coefficient to be separately estimated for three sub-regions: East Africa, Central and West Africa, and Southern Africa. We plot the corresponding coefficient estimates with the 95 percent confidence intervals in Figure 11. The figure shows a clear differential response to AGOA and MFA liberalization across sub-regions. For Central and

West Africa, the impacts of AGOA on apparel exports are insignificant (and actually negative in the 2001-2004 period). AGOA has a growing positive impact on apparel exports from East Africa - the impact is significantly lower in the early post-AGO period than in the years following the end of the MFA quotas. In contrast, for Southern Africa the average impact of AGOA on apparel exports is significantly higher in the early post-AGO period and it decreases substantially after 2005 with the end of the MFA quotas. While the Southern African countries took initially advantage of the opportunities created by AGOA, they suffered more after the end of the MFA quotas. The decline in the impact of AGOA in the face of increased competition from previously quota-constrained countries such as China after 2005 suggests that the US trade preferences did not help the Southern African countries to build a durable comparative advantage in apparel exports. The results show patterns that are largely consistent with the four apparel stories emerging from the raw export data that were discussed in Section 5.

Figure 11. Impacts of AGOA on apparel across years and sub-regions in Africa



Notes: figures show coefficients and 95 percent confidence intervals based on robust standard errors, clustered by HS 6-digit product.

7.3 AGOA and trade redirection

Our findings suggest that the nonreciprocal trade preferences provided by the US under AGOA and GSP LDC led to a significant increase in US imports from beneficiary African countries, of apparel exports in particular. This increase could be the result of completely new export creation or, to at least some extent, of the redirection of African exports from other trading partners to the US in response to the trade preferences. We examine the potential trade redirection by examining how African exports to the European Union change in response to the AGOA preferences. We re-estimate our baseline specifications using as dependent variable EU imports at the country-HS 6-digit-year level and show the results in Table 6. We choose the EU for two reasons. First, as we discussed in Section 4, the EU is a major trading partner for most African countries. Second, Eurostat's COMEXT provides disaggregated EU import data for a long period overlapping with that used for our main analysis on the impact of GSP LDC and AGOA (1992-2016).

Table 6 reports in column (1) the baseline results on the impacts of GSP LDC and AGOA on US imports but restricting the sample to be similar to that which will be used in subsequent columns using EU imports (this implies dropping year 2017 and excluding all 28 EU countries from the control group). Column (2) reports the results from estimating our baseline specification using as dependent variable the logarithm of EU imports plus one (to account for zeros). The estimates suggest that the AGOA trade shock reduced significantly the exports of apparel by African countries to the EU. Although the EU provides generous tariff preference to LDC African exporters, the EU's rules of origin requirements are relatively stringent, as described in De Melo and Portugal-Perez (2013). Our finding of a negative effect on apparel exports to the EU is in contrast with the finding by Frazer and Van Biesebroek (2010) of no trade redirection from the EU. The likely reason for the difference in results is their consideration of a relatively short period of time before and after the implementation of AGOA (1999, 2000, 2002, and 2003). Column (3) allows the impact on apparel to differ in 2001-2004 and 2005-2016 and shows a similar pattern of declines in both periods in exports by African countries to the EU of apparel products. Column (3) also shows that African exports to the EU15 increase for non-apparel products that became eligible for duty-free treatment by the US under GSP LDC. A potential reason for this finding can be that the rapid growth of exports to the US helped African countries to increase their exports to other destinations via economies of scale or by a learning-by-doing or learning-by-exporting mechanism. Column (4) shows the results from estimating our baseline specification using as dependent variable the sum of exports to the EU and the US at the country-HS 6-digit-year level. These results confirm that aggregate exports to the two destinations increase, suggesting that AGOA did lead to export growth in the aggregate.

Table 6. AGOA and Trade Redirection of African exports

	Data at country-HS 6-digit-year level (including zeros) is used			
	Dependent variable is:			
	Log (US imports + 1)	Log (EU imports + 1)	Log (EU imports + 1)	Log (US & EU imports + 1)
	(1)	(2)	(3)	(4)
GSP LDC * Africa	0.148*** (9.59)	0.049*** (5.24)	0.049*** (5.24)	0.129*** (7.83)
GSP LDC * Non-Africa	-0.0564*** (-3.50)	-0.002 (-0.20)	-0.002 (-0.20)	-0.0654*** (-3.96)
AGOA Non-LDC	0.047** (3.21)	0.009 (0.97)	0.009 (0.97)	0.0284 (1.93)
AGOA Non-apparel	0.183*** (4.78)	0.048* (2.11)	0.048* (2.11)	0.186*** (5.04)
AGOA apparel	0.298*** (6.37)	-0.051*** (-4.97)		0.308*** (6.95)
AGOA apparel * 2001-2004			-0.036*** (-3.45)	
AGOA apparel * 2005-2017			-0.055*** (-4.66)	
Country-product fixed effects	Yes	Yes	Yes	Yes
Country-year fixed effects	Yes	Yes	Yes	Yes
Product-year fixed effects	Yes	Yes	Yes	Yes
Observations	21,044,192	21,044,192	21,044,192	21,044,192

Notes: Robust t-statistics in parentheses, clustered by HS 6-digit product. ***, **, and * indicate significance at 1%, 5%, and 10% confidence levels, respectively. The estimating sample covers years 1992-2016 and excludes EU countries from the control group in all columns.

7.4 Correlates of Country and Sub-Region Heterogeneity in the Impact of AGOA

Our analysis shows that AGOA had a differential impact on apparel exports across African countries and sub-regions (and over sub-periods). While some African countries took advantage of the opportunities created by the trade preferences offered by the US, others failed to do so, and the durability of the AGOA impact varied across sub-regions. It is therefore interesting to explore potential factors that may have contributed to such differential impacts. In their estimation of the early impacts of AGOA, Frazer and Van Biesebroeck (2010) found differential impacts of AGOA on apparel and non-apparel across African countries, but no meaningful correlations of those with measures of corruption, the rule of law or import tariffs imposed by African countries.⁴² We too conducted an exploratory exercise, re-estimating our baseline specification but allowing the impacts of AGOA to differ across countries and 2-year sub-periods.⁴³ Then we correlated those country-2-year sub-period impacts of AGOA on apparel with a variety

⁴² Coulibaly and Kassa (2018) show that higher trade creation impacts of AGOA can be explained by countries' ICT infrastructure, sound legal institutions and property rights protection and steady macroeconomic environment including stable exchange rates and low inflation but they focus on explaining country-year varying impacts of AGOA on aggregate exports to the US, which is very different from the impacts of AGOA on apparel and non-apparel groups of products that we estimate.

⁴³ We used country-2-year sub-periods since the estimation of country-year impacts proved to be computationally unfeasible.

of country-year variables, including many used in previous studies. None of the correlations proved to be significant and some were counter-intuitive.

A particular set of variables we explored in depth were those relating to exchange regimes and exchange rate overvaluation but the results based on time-varying information were either weak or counter-intuitive. However, a simple correlation between the country-specific AGOA coefficients (not time-varying) and the exchange rate regime shown in Appendix Figure D2 may help explain the dismal performance of Central and West Africa in response to AGOA. Given the reliance of African countries on imported inputs and capital goods, the trade policy of African countries can play an important role in explaining the success of AGOA in promoting their apparel exports. We explore this possibility in Table 7, which presents results from re-estimating Equation (2), allowing the interaction terms for the impact of GSP LDC and AGOA to enter also interacted with average tariffs imposed by African countries on their own imports (that vary over time).⁴⁴ The results show intuitively that countries with lower import tariffs benefit significantly more from AGOA.

Table 7. Impacts of AGOA on apparel and the role of import tariffs

	Data at country-HS 6-digit-year level (including zeros) is used Dependent variable is: Log (imports + 1)
	(1)
GSP LDC * Africa	0.250*** (11.58)
GSP LDC * Africa * Avg. import tariff	-0.003*** (-6.89)
GSP LDC * Non-Africa	0.00372 (0.22)
AGOA Non-LDC	0.0459 (1.87)
AGOA Non-LDC * Avg. import tariff	0.005*** (4.35)
AGOA Non-apparel	0.238*** (3.41)
AGOA Non-apparel * Avg. import tariff	-0.003 (-0.74)
AGOA apparel	0.438*** (5.85)
AGOA apparel * Avg. import tariff	-0.017*** (-4.37)
Country-product fixed effects	Yes
Country-year fixed effects	Yes
Product-year fixed effects	Yes
Observations	27,420,560

Notes: Robust t-statistics in parentheses, clustered by HS 6-digit product. ***, **, and * indicate significance at 1%, 5%, and 10% confidence levels, respectively.

Of the other unmeasured factors that may have contributed to the differential impacts, of particular relevance may be the role of export processing zones (EPZs). The number of EPZs in Africa has been

⁴⁴ The tariff data used is taken from Teti, Felbermayr, and Yalcin (2017) as explained in Appendix B.

growing over the last two decades. While there is no comprehensive source of information on EPZs in Africa, Newman and Page (2017) identify 79 active Special Economic Zones (SEZs) as of 2016 – of which EPZs are the majority – in 46 African countries (52 of them in Kenya alone and 6 focused exclusively on apparel manufacturing). They argue that many of those SEZs began operations in the late 1990s or early 2000s, often precisely in response to AGOA and the MFA. Many of the SEZs have been established by Chinese firms as part of their policy of “going global”. In particular, from 2006 the Chinese government supported investments in SEZs in Nigeria, Ethiopia, Mauritius and Ghana (Zeng, 2015). But a large body of evidence reviewed in Farole (2011) suggests SEZs in Africa have largely under-performed. Some argue that this is largely due to the lack of an appropriate legal, infrastructural, and institutional frameworks required to attract potential investors (UNDP, 2015).

Farole (2011) argues that fully successful SEZ performance in Africa was witnessed only by Mauritius and to a smaller extent Kenya and Lesotho before 2005. His new data and case study evidence, shows strong export performance of SEZs in Kenya and Lesotho that benefited enormously from AGOA preferences in the US market in the period 2000–2004 (while competition from Asian producers was limited). But his analysis also suggests that the presence of SEZs in Kenya and Lesotho did not help to counteract these countries’ declining export competitiveness in the US apparel market after the end of the MFA. Those SEZs experienced export stagnation and employment losses from 2005 to 2008 (when his analysis ends) although some in Kenya were able to subsequently and successfully diversify away from apparel.

The success of SEZs in Mauritius, Kenya, and Lesotho in the early post-AGOA years can help rationalize the boom-bust and boom-stagnation patterns observed in the raw export data and in the time profile of the estimated impacts of AGOA for those countries. Outside of these success cases, the pessimistic view on SEZs in Africa is counteracted only by the recent SEZ growth in Ethiopia which has been concurrent with the late sustained success pattern observed in its raw export data and in the yearly impacts of AGOA for East Africa. The Growth and Transformation Plan guiding Ethiopia's recent development policy identifies EPZs as one of the means for industrialization (UNDP, 2015). The Government of Ethiopia introduced comprehensive laws and regulations on the establishment and management of EPZs. Moreover, the government has successfully engaged different partners in its EPZ agenda - obtaining financial and technical support from the World Bank and Chinese partners. Anecdotal evidence suggests that AGOA was a key factor for the recent investment by foreign companies in Ethiopian EPZs (UNDP, 2015).

Understanding the heterogeneous response to preferences remains a challenge. However, this brief discussion suggests preferential access per se is not sufficient to deliver even temporary export success. The few instances of export growth seem to have combined market access with domestic reforms that

improved access to imported inputs through low domestic tariffs, lightened the regulatory burden and enhanced access to infrastructure through the creation of effective SEZs, and maintained competitive exchange rates through the choice of flexible exchange rate regimes. Further research is needed in this area.

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APPENDIX

Appendix A: AGOA and GSP eligibility

Appendix Table A1. AGOA eligibility across countries and over time

Country	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Angola				X	X	X	X	X	X	X	X	X	X	X	X	X	X
Benin	X	X	X	X	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
Botswana	X ¹	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
Burkina Faso					X	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
Burundi						X	X	X	X	X	X	X	X	X	X		
Cameroon	X	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
Cape Verde	X	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
Cen African Rep	X ¹²	X ¹²	X ¹²														X ¹²
Chad	X	X	X	X	X	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
Comoros								X	X	X	X	X	X	X	X	X	X
Congo (DROC)			X	X	X	X	X	X	X	X							
Congo (ROC)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Cote d'Ivoire		X	X ¹²	X ¹²							X	X	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
Djibouti	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Eritrea	X	X	X														
Ethiopia	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
Gabon	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Gambia			X	X	X	X	X	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²			
Ghana	X	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
Guinea	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Guinea-Bissau	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X
Kenya	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
Lesotho	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
Liberia							X	X	X	X	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
Madagascar	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²					X	X	X	X
Malawi	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
Mali	X	X	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²		X	X	X	X
Mauritania	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X
Mauritius	X ¹	X ¹	X ¹	X ¹²	X ¹²	X ¹	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
Mozambique	X	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
Namibia	X	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
Niger	X	X	X	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²		X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
Nigeria	X	X	X	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
Rwanda	X	X	X	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
Sao Tome & Prin	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Senegal	X	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
Seychelles	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Sierra Leone	X	X	X	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
South Africa	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
South Sudan													X	X			
Swaziland	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²			
Tanzania	X	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
Togo								X	X	X	X	X	X	X	X	X	X
Uganda	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²
Zambia	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²	X ¹²

Note: X eligible for AGOA, ¹ eligible for apparel provisions, ² eligible for LDBC special rule.

Equatorial Guinea, Somalia, Sudan, and Zimbabwe have never been eligible for AGOA.

Appendix Table A2. GSP and GSP-LDC eligibility across countries and over time

Country	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
Angola	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Benin	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Botswana	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Br Indian O Ter	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Burkina Faso	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Burundi	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Cameroon		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Cape Verde	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X	X	X	X	X	X	X	X
Cen African Rep	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Chad	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Comoros	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Congo (DROC)	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Congo (ROC)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Cote d'Ivoire	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Djibouti	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Eq Guinea	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹							
Eritrea						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Ethiopia		X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Gabon					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Gambia	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Ghana	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Guinea	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Guinea-Bissau	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Kenya	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Lesotho	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Liberia												X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Madagascar	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Malawi	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Mali	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Mauritania					X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Mauritius	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mozambique	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Namibia	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Niger	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Nigeria						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Rwanda	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Sao Tome & Prin	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Senegal	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Seychelles	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sierra Leone	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Somalia	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
South Africa	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
South Sudan																		X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Sudan																							
Swaziland	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tanzania	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Togo	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Uganda	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Zambia	X	X	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
Zimbabwe	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Note: X eligible for GSP, ¹ eligible for GSP-LDC

Appendix B: WITS sectoral definition, SSA data and commodity prices

For the descriptive analysis in Sections 4 and 5, and the regression analysis in Section 7 we define three sectors following the WTO:

- Agriculture: SITC sections 0, 1, 4 and divisions 22,23,24,25,26, and 27;
- Mining: SITC section 3 and divisions 27, 28, and 68, as defined by the WTO. In addition, we also include division 97 (non-monetary gold) in Mining.
- Manufacturing: Sections 5, 6, 7, 8 minus division 68.

We drop from our data monetary gold (HS 710820) and other non-gold money and coins (HS 711810 and 711890).

In the descriptive analysis in Section 4, we use WITS world import data as mirror data for SSA exports to lessen concerns of quality and consistency of Africa's export data. Within Africa, the value of imports can be affected due to missing import data in some years. Appendix Table B1 shows the first year that each African country reports in WITS and the years in which each country has missing export data. Reassuringly, for the two key years of our charts in Section 4, 2000 and 2016, there is a large number of countries with data in WITS including the two largest importers: Nigeria and South Africa.

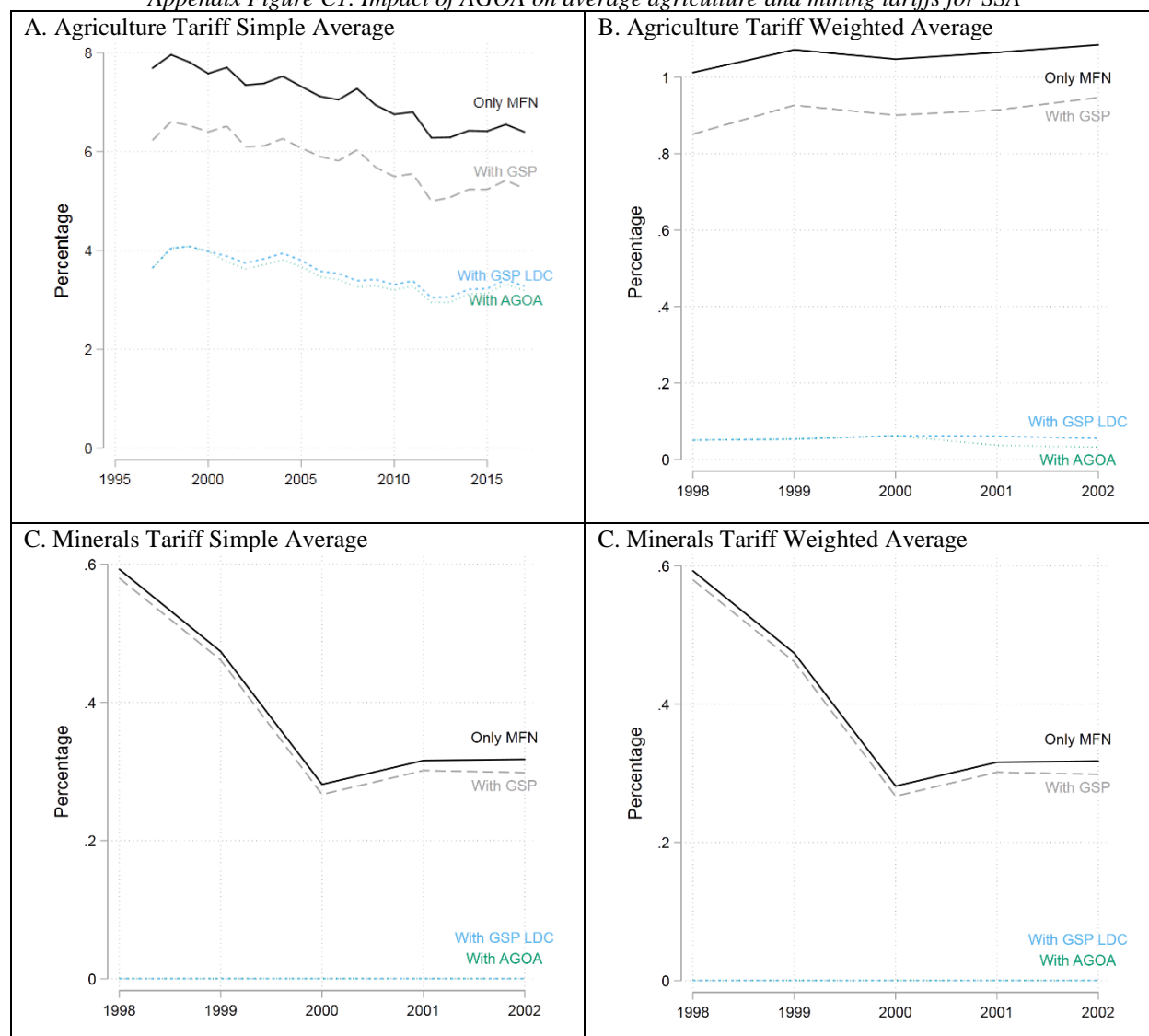
Appendix Table B1. Countries with Missing Import Data in WITS

Country	First Year	Last Year	Missing Years
Angola	2007	2015	2008
Burkina Faso	1995	2016	2006
Congo (ROC)	1993	2014	1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006
Ethiopia	1995	2016	1996
Gabon	1993	2009	1995
Ghana	1996	2016	2014, 2015
Guinea	1995	2015	2003, 2009, 2010, 2011, 2012
Gambia	1995	2016	2015
Kenya	1992	2013	1993, 1994, 1995, 1996, 2011, 2012
Lesotho	2000	2012	2005, 2006, 2007
Mali	1996	2016	2009, 2013, 2014, 2015
Mauritania	2000	2016	2015
Malawi	1990	2015	1992, 1993, 1996, 1997, 1998
Nigeria	1996	2016	2004, 2005, 2015
Rwanda	1996	2016	2000
Sierra Leone	2000	2016	2001, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013
Seychelles	1994	2016	2009
Togo	1994	2016	2006
Zimbabwe	1995	2016	1996, 1997, 1998, 1999, 2000, 2003

In the regression analysis in Section 7, we use the average MFN import tariff imposed by each AGOA country. The tariffs are taken from a newly constructed database by Teti, Felbermayr, and Yalcin (2017), which is based on the TRAINS and IDB databases. The database addresses the missing MFN tariffs by setting equal to the nearest preceding observation and the nearest succeeding observation when there is no preceding observation. However, for some countries, the MFN tariffs are still missing after these procedures. For these countries, we replace the missing MFN tariff by linearly interpolating observations based on the World Bank's WITS database.

Appendix C: Agriculture and mining tariff declines, preference utilization under AGOA, and additional countries in the four stories of apparel exports

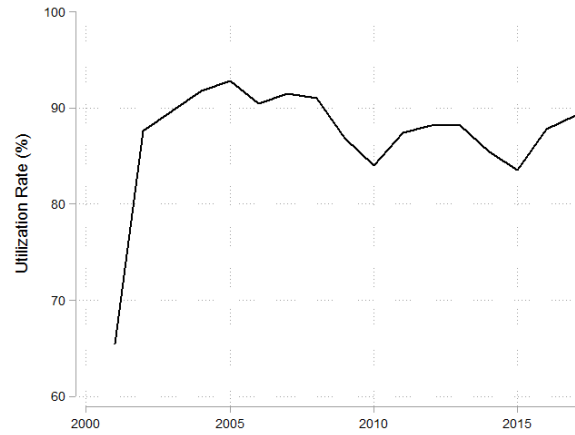
Appendix Figure C1. Impact of AGOA on average agriculture and mining tariffs for SSA



Source: US database on trade and market access.

Note: simple average tariffs include all 8-digit tariff lines of the US Trade Schedule (HTSUS) for each year. Ad-valorem equivalents are calculated for tariffs with specific components (tariff lines with complex tariffs are not included). Trade-weighted average tariffs use total SSA exports to the US in 2000 as weights. Number of products per sector in 2001 HTSUS.

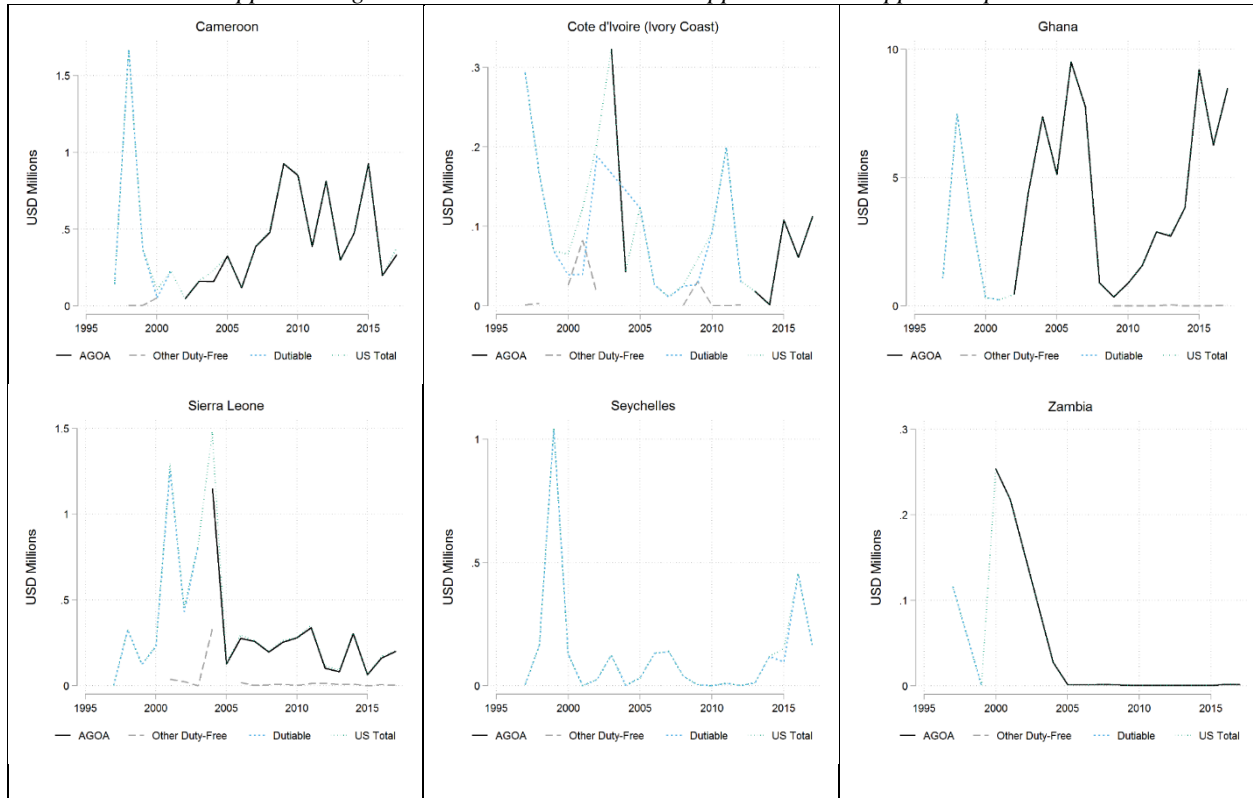
Appendix Figure C2. AGOA Preference Utilization



Source: US database on trade and market access.

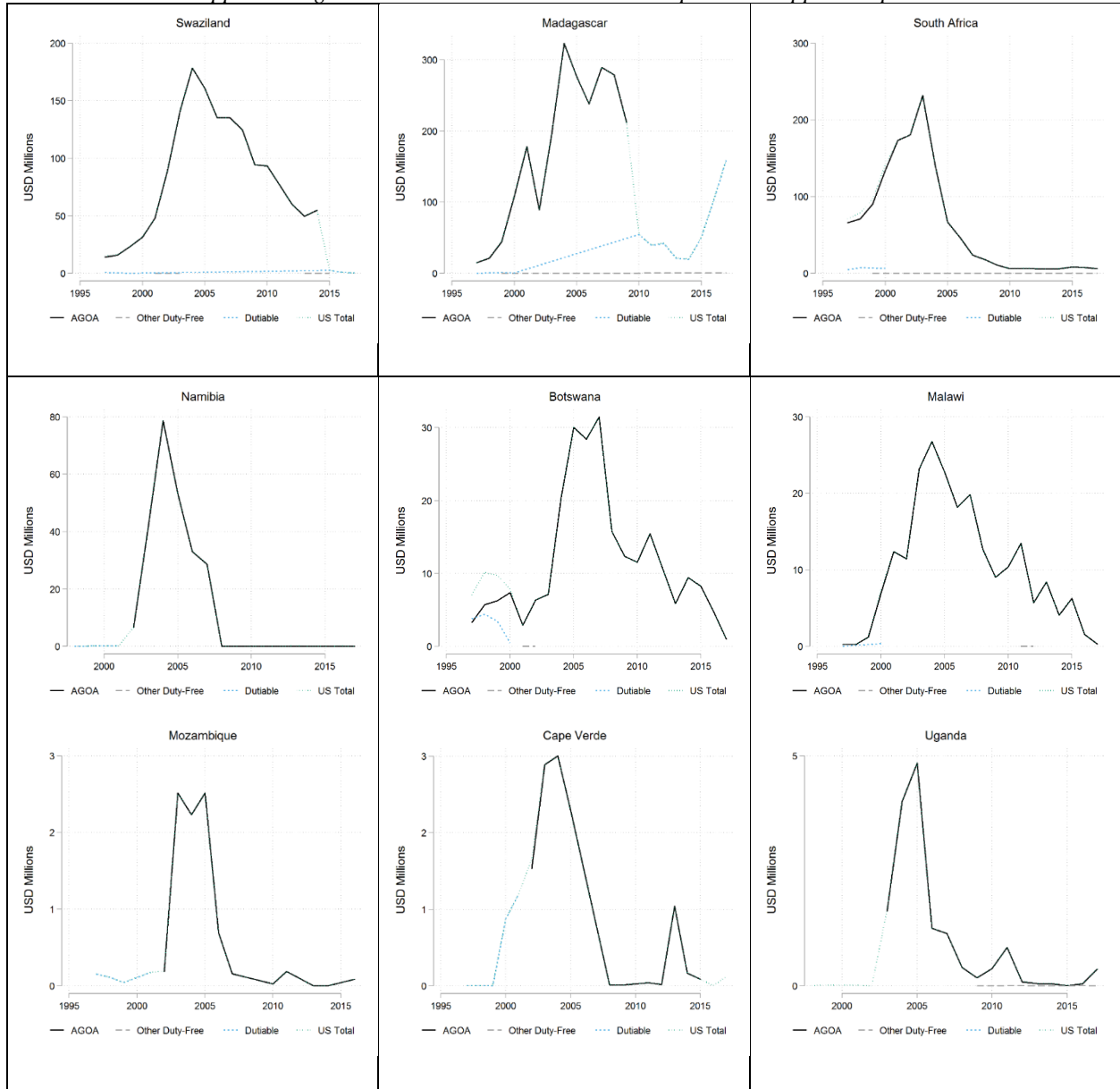
Notes: the utilization rate is defined as the share of dutiable preference-eligible imports that enter the US (originating in SSA countries) using AGOA. Imports entering under different duty-free eligible programs are excluded from the calculation.

Appendix Figure C3. Countries with missed opportunities in apparel exports



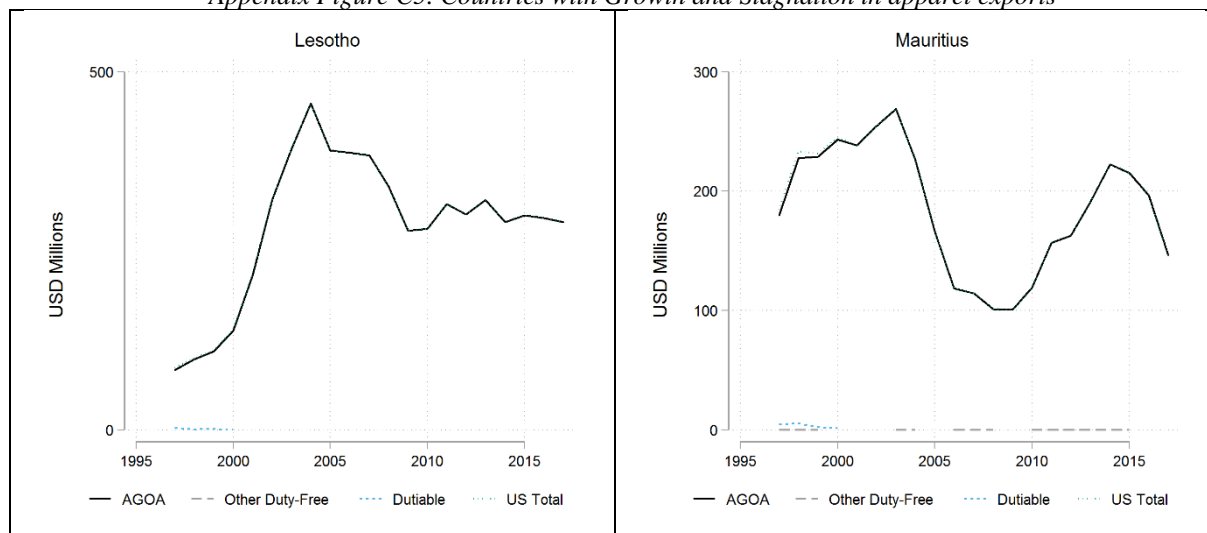
Source: US database on trade and market access.

Appendix Figure C4. Countries with a Boom-Bust pattern in apparel exports



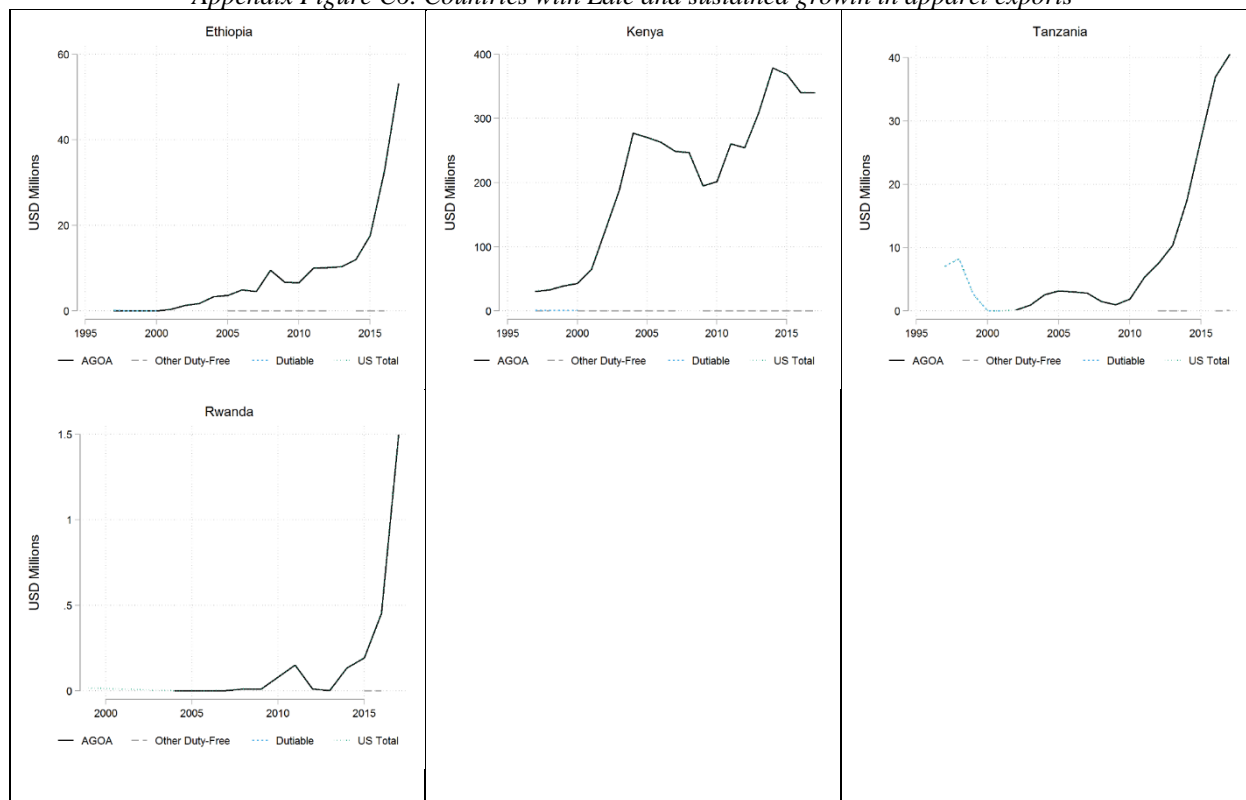
Source: US database on trade and market access.

Appendix Figure C5. Countries with Growth and Stagnation in apparel exports



Source: US database on trade and market access.

Appendix Figure C6. Countries with Late and sustained growth in apparel exports



Source: US database on trade and market access.

Appendix D: Additional regression results

Appendix Table D1. *Baseline impacts of AGOA and GSP allowing for sub-groups in non-apparel*

Data at country-HS 6-digit-year level		
Dependent variable is:		
	Log (imports + 1)	Log (imports + 1)
	(1)	(2)
GSP LDC * Africa * Agriculture	0.161*** (5.63)	0.014*** (5.71)
GSP LDC * Africa * Manufacturing	0.247*** (10.92)	0.021*** (11.98)
GSP LDC * Africa * Mining	-0.009 (-0.05)	0.002 (0.16)
GSP LDC * Non-Africa * Agriculture	-0.026 (-1.01)	-0.001 (-0.54)
GSP LDC * Non-Africa * Manufacturing	0.021 (0.96)	0.003 (1.53)
GSP LDC * Non-Africa * Mining	-0.082 (-1.06)	-0.004 (-0.76)
AGOA Non-LDC * Agriculture	0.084*** (3.47)	0.006** (2.85)
AGOA Non-LDC * Manufacturing	0.126*** (6.45)	0.009*** (5.77)
AGOA Non-LDC * Mining	-0.209 (-1.10)	-0.015 (-1.09)
AGOA Non-apparel * Agriculture	0.292*** (5.45)	0.024*** (5.61)
AGOA Non-apparel * Manufacturing	0.187*** (3.39)	0.012* (2.47)
AGOA apparel	0.254*** (5.40)	0.009* (2.41)
Country-product fixed effects	Yes	Yes
Country-year fixed effects	Yes	Yes
Product-year fixed effects	Yes	Yes
Observations	27,420,560	27,420,560

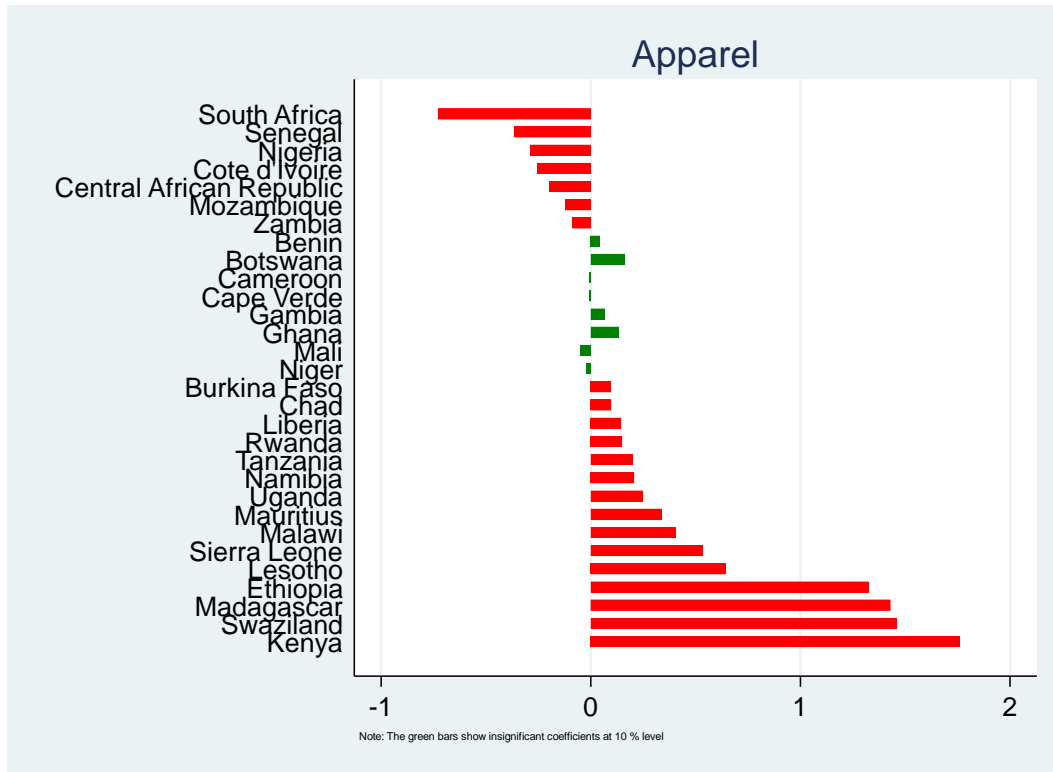
Notes: Robust t-statistics in parentheses, clustered by HS 6-digit product. ***, **, and * indicate significance at 1%, 5%, and 10% confidence levels, respectively.

Appendix Table D2. Baseline impacts of AGOA and GSP controlling for time trends

	Data at country- HS 6-digit-year level (including zeros) is used Dependent variable is: Log (imports + 1) (1)
GSP LDC * Africa	0.113*** (6.68)
GSP LDC * Non-Africa	-0.046* (-2.43)
AGOA Non-LDC	0.0270 (1.84)
AGOA Non-apparel	0.0631 (1.73)
AGOA apparel * 2001-2004	0.174*** (4.20)
AGOA apparel * 2005-2017	0.223*** (4.77)
GSP LDC * Africa * time trend	0.009*** (6.13)
GSP LDC * Non-Africa * time trend	0.005*** (3.32)
AGOA Non-LDC * time trend	0.007*** (5.61)
AGOA Non-apparel * time trend	0.014*** (3.54)
AGOA apparel * time trend	0.004 (1.70)
Country-product fixed effects	Yes
Country-year fixed effects	Yes
Product-year fixed effects	Yes
Observations	27,420,560

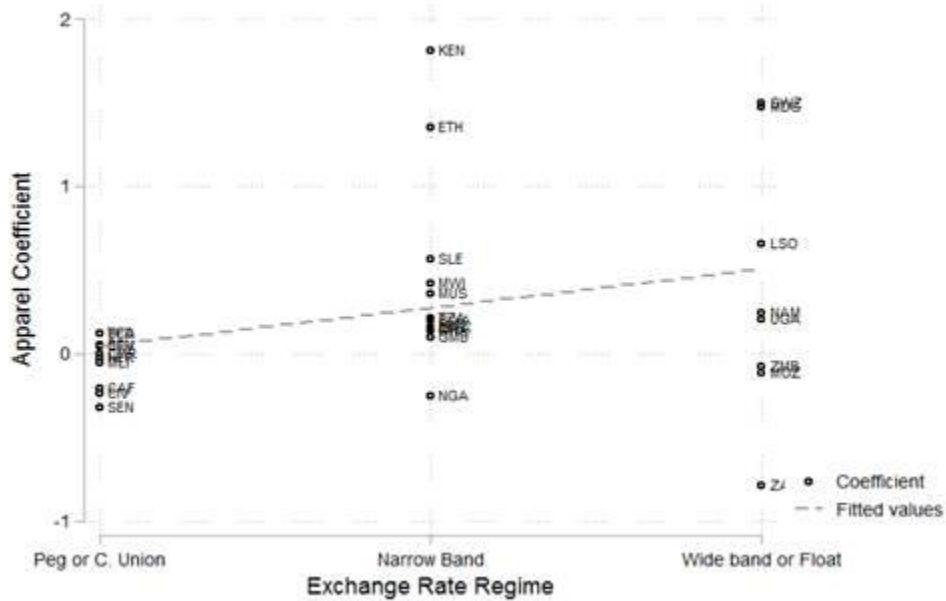
Notes: Robust t-statistics in parentheses, clustered by HS 6-digit product. ***, **, and * indicate significance at 1%, 5%, and 10% confidence levels, respectively.

Appendix Figure D1. Baseline impacts of AGOA on apparel by country



Notes: figures shown coefficients and 95 percent confidence intervals based on robust standard errors, clustered by HS 6-digit product.

Appendix Figure D2. Baseline impacts of AGOA on apparel by country and exchange rate regime



Notes: figure shows coefficients on AGOA apparel separately estimated for each country.