THE IMPACT OF AFRICAN GROWTH AND OPPORTUNITY ACT (AGOA) ON U.S. IMPORTS FROM SUB-SAHARAN AFRICA (SSA)

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Abstract: We evaluate the impact of the unilateral trade policy concession known as African Growth and Opportunity Act (AGOA) on U.S. imports from eligible Sub-Saharan African (SSA) countries. Using U.S.–SSA countries' trade data that span the years 1991–2006, we find that AGOA has contributed to the initiation of new and the intensification of existing U.S. imports in both manufactured and non-manufactured goods and several product categories. However, compared to its import initiation impact, the import intensification effect of the Act has been marginal. Our results have important policy implication for further intensification of African exports to the U.S. markets. Copyright © 2008 John Wiley & Sons, Ltd.

1 INTRODUCTION

This paper empirically examines whether or not the recent unilateral trade policy change granted by the U.S. to selected Sub-Saharan African (SSA) countries under the rubric of 'African Growth and Opportunity Act (AGOA)' has contributed to increased U.S. imports from the eligible SSA countries. Signed into the U.S. laws on 18 May 2000, AGOA provides the eligible countries duty-and quota-free export access to the U.S. markets so that they continue to open their economies and build free markets. As of June 2007, thirty eight of the forty eight SSA countries are declared eligible for benefits under the programme.

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Since its implementation, several agencies from both AGOA stakeholders and international financial institutions have invested substantial amount of resources to help eligible African countries to effectively utilise the benefits of the programme.[1]

Free trade agreements, whether unilateral or bilateral, are historically expected to raise trade flows among the partners to the agreement, thereby contributing to enhanced long-run economic growth of the parties involved. Carrere (2004), Romalis (2003), and Gould (1998) document that the removal of tariffs on imports of several items into the U.S., Japan, Europe, and Canada increased trade flows in the order of 11 percent. Proponents of AGOA thus argue that by expanding preferential export access to the U.S. markets in more than 2000 different products, AGOA has the potential to increase trade flows between the U.S. and SSA countries and thereby spur long-term economic growth of the eligible countries. To this end, Ianchovichaina *et al.* (2001) speculate a roughly 14 percent increase in SSA exports, if granted a preferential market access to the European Union, Japan, U.S. and Canada.

Critics of trade policy changes in general and AGOA in particular, however, question the potential benefits of such a unilateral policy initiative by arguing that (i) African exports to U.S. are dominated by petroleum products that have relatively low value added and (ii) the existing U.S.–Africa trade is dominated by imports from a few African countries (Nouve and Staatz, 2003). Collier and Gunning (1999) attribute the chief factors explaining Africa's poor economic performance to: distorted product and credit markets, high risk, inadequate social capital and infrastructure and poor public service. While Lindsey (2002) maintains that U.S. and OECD countries' trade policy initiatives in general have mixed signals, citing transport costs as major constraint to African trade, Blackman and Mutume (1998), Mutume (1998) and Raghavan (2000) also stipulate that AGOA's benefits for most African countries would remain illusory.

A cursory review of the available reports and data on U.S. trade with SSA countries after the implementation of AGOA, on the other hand, seems to indicate the contrary. According to USTR (2006), for example, between 2004 and 2005 alone, there has been a 40 percent increase in the total volume of U.S. imports from SSA countries. Analysis of U.S.–SSA trade data that extend from 1989 to 2004 also reveals a 46.3 percent increase in U.S. imports of non-manufactured goods and a 130.4 percent increase in U.S. imports of manufactured goods from SSA countries pre- to post-AGOA periods. Although these figures appear to indicate a rise in the post AGOA U.S. imports from SSA, whether the changes are the result of the unilateral trade policy concession, or the inertia in the eligible SSA countries' global trade pattern, or adjustments in other economic policies of the SSA countries, or a combination of these factors is not clear cut.

In this study, we use aggregate and disaggregated (at 2-digit Harmonized System -HS) U.S. imports from each AGOA eligible SSA country for the years 1991–2006, control for country and time-specific determinants of bilateral trade flow, and investigate if the increase in the volume of aggregate and HS-2 level disaggregated U.S. imports from AGOA eligible SSA countries can be attributed to the implementation of the Act. Further expanding the available literature, we also evaluate the effect of the policy change in terms of: (i) its contribution to the initiation of imports (i.e. changing imports from 0 or some unobservable level to a positive or observable threshold) which we call trade-initiation

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[1]As a result, in addition to the ongoing trade capacity building (TCB) works conducted by regional trade competitiveness hubs in Ghana, Botswana and Kenya, a fourth hub was opened in Dakar, Senegal in October 2005 to help eligible African countries increase their exports under AGOA.

effect and (ii) subject to the existence of positive import flows prior to the policy change, its effect on the volume of U.S. imports. We call this latter effect a trade-intensification effect. Our work thus contributes to the literature in several ways. First, we help differentiate facts from descriptive reports often prepared to sway critics on the policy initiative by empirically examining whether the increase in the trade flow between the U.S. and eligible SSA countries can be attributed to the implementation of the policy initiative. Second, we highlight areas where emphasis should be placed to further enhance the success of the initiative by identifying factors that determine the initiation as well as the intensification of the existing level of U.S. imports from the eligible SSA countries.

The remainder of this paper proceeds as follows. Section 2 discusses the relevant literature. Section 3 presents the analytical framework, explanatory variables, data and the empirical model. Results and conclusions are presented in Sections 4 and 5, respectively.

2   RELATED LITERATURE

Although AGOA was designed with the standard economic benefits of trade policies (creation of employment and specialisation which leads to productivity improvements and per capita income growth) in mind, the realisation of the potential of the Act in improving Africa's exports to the U.S. has been a subject of series of debates. Critics vary from those who assert that the removal of trade barriers on textiles and apparels originating from Africa would result only in a massive loss of U.S. jobs (Friedman, 2000a,b; Cooper, 2002) to those who question the potential benefits of the Act for most of SSA countries (Raghavan, 2000; Nouve and Staatz, 2003) by arguing that SSA countries' exports to U.S. are dominated by petroleum products and are concentrated in a few countries (such as Nigeria and South Africa). Rodrik (1998), Wang and Winters (1998), Collier and Gunning (1999) and Limao and Venables (2001) attribute the causes of poor African export performance to low per capita income, small country size, geography, lack of infrastructure and domestic trade policies rather than high tariff. Morrissey and Rudahernawa (1998) indicate that the removal of export duties, the liberalization of foreign exchanges markets and trade may not increase export earnings, while Milner *et al.* (2000) based on Uganda's data observe that transport costs constrain African trade. Direct observations and inferences from these studies make the impact of a unilateral trade policy initiative such as AGOA, an open empirical question.

The literature on SSA trade in general and the U.S.–SSA countries' trade in particular is limited. Using information on pre-AGOA tariffs and assumptions on supply response and the rules of origin on yarn, Mattoo *et al.* (2003) predict that African textile exports to the U.S. will rise by 5 percent. Ianchovichaina *et al.* (2001) speculate African exports to increase roughly by 14 percent if granted a preferential market access to the European Union, Japan, the U.S. and Canada.

Given a few years have elapsed since AGOA was enacted into the U.S. laws, only very few studies have attempted to empirically assess the impact of the Act. Among the available studies, using panel data of U.S. agricultural trade with 46 SSA countries, Nouve and Staatz (2003) find that AGOA induced gains in increasing agricultural exports were not significantly different from zero although the response of African exports to the U.S. was positive as stipulated in the legislation. Employing the triple difference-in-difference method of controlling for the 'endogeneity of policy', Frazer and Van Biesebroeck (2007) conduct an in-depth study of important policy implication with greater data coverage. The

authors find that AGOA has had large and robust impact on U.S. apparel imports from SSA countries. Citing positive achievements under AGOA, Collier and Venables (2007) also indicate that trade preferences such as AGOA serve as a catalyst for trade in manufactured goods leading to a rapid growth in exports and employment. Their study thus stresses the need for designing trade preferences that are consistent with international trade in fragmented 'tasks' (as opposed to complete products) and making them open to countries with sufficient levels of complementary inputs such as skills and infrastructure. While very similar in data coverage and objective to the works of Frazer and Van Biesebroeck (2007) and Collier and Venables (2007), our study employs HS-2 level disaggregated trade data and a more comprehensive analytical approach that allows us to separate the trade (imports) initiation impact of the implementation of the Act from its trade (import) intensification effect.

3 THE THEORETICAL FRAMEWORK AND EMPIRICAL MODEL

3.1 The Theoretical Framework

To examine the effect of AGOA on the eligible SSA countries' exports to the U.S., we use the gravity model. Tinbergen (1962) first applied the gravity specification to study trade flows. Since then, the model has been extensively used in international trade applications because of its traceable empirical appeal and robustness. The model specifies bilateral trade flows between countries as a function of their respective incomes and geographic distance. The lack of a theoretical underpinning has been initially cited as a major problem for the gravity model. However, more recently, researchers have established theoretical foundations for the model (Anderson, 1979; Bergstrand, 1985; Helpman and Krugman, 1985; Davis, 1995; Deardorff, 1998; Feenstra *et al.*, 2001; Eaton and Kortum, 2002; Anderson and van Wincoop, 2003). In its basic form, the model posits that country 'i' export to, or import M_{ijt} from nation 'j' during a given year t increases with the trading partners' combined economic mass, given as the product of gross domestic product of the exporting (GDP_{it}) and the importing countries' (GDP_{jt}) and decreases with the geographical distance (D_{ij}) between the trading partners, a proxy for transportation cost. Taking as the constant of proportionality, Equation (1) below illustrates the theoretical relationship.

$$M_{ijt} = \left(\frac{GDP_{it} GDP_{jt}}{D_{ij}} \right) \qquad (1)$$

The theoretical model suggests that higher GDP_{jt} values in importing country imply greater potential for imports while higher GDP_{it} values in the exporting country imply increased capacities for export. D_{ij} represents the distance between U.S. (New York) 'j' and the capital city of each AGOA eligible SSA country 'i' (measured in kilometers using the great circle method), a proxy for transportation costs.

3.2 The Empirical Model and Data

To control for additional factors that influence trade flows, we augment the basic gravity specification with sets of trade-inhibiting and trade-facilitating variables such as the stock

of immigrant population from each African nation residing in the U.S., whether English is the official language in the beneficiary SSA country, a dummy variable that indicates if each SSA country has access to the sea, and an index of economic openness. We also include a dummy variable (AGOA) which takes a value of 1 if the country has been declared eligible for the benefits described in the unilateral trade initiative (i.e. can export to the U.S. free of any quota) as of a given year t or 0, otherwise. Although a country is declared eligible for benefits under the Act, it may not start exporting eligible products right away for various reasons (including but not limited to bureaucratic arrangements and lack of adequate information). However, once exporters start benefiting from utilisation of benefits under the Act, we consider that their experience stimulate other exporters and/or exports in other products. To capture this effect, we augment the gravity model with a variable that measures the number of years elapsed since each SSA country has started exporting its first product under AGOA. To account for the country specific and year-to-year fluctuations in macroeconomic factors that affect a country's export performance, we also add country- and year-specific dummy variables to the model. Taking the natural logarithm of the continuous variables and adding an assumed independently and identically distributed error term (ε_{ijt}), our empirical model is given as follows:

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\begin{aligned}
\ln M_{ijt}^{k} = {} & \beta_0 + \beta_1 \ln \mathrm{DIST}_{ij} + \beta_2 \ln \mathrm{GDP}_{jt} + \beta_3 \ln \mathrm{GDP}_{it} + \beta_4 \ln \mathrm{POP}_{it} + \beta_5 \ln \mathrm{POP}_{jt} \\
& + \beta_6 \ln \mathrm{IMM}_{ijt} + \beta_7 \ln \mathrm{GDEF}_{it} + \beta_8 \ln \mathrm{GDEF}_{jt} + \beta_9 \ln \mathrm{EXRT}_{ijt} + \beta_{10} \mathrm{ENG}_i \\
& + \beta_{11} \mathrm{LLCK}_i + \beta_{12} \mathrm{AGOA}_i + \beta_{13} \mathrm{YREXP}_i + \beta_{14} \ln \mathrm{OPEN}_i + \beta_{15} M_{ijt-1}^{k} \\
& + {}'\mathrm{SSA}_i + {}'\mathrm{YRD}_t + \xi_{ijt}
\end{aligned}
\tag{2}
$$

where *ln* is the natural logarithm, 'i' is the exporter (SSA country), 'j' is the importer country (U.S.), t is the year, and M_{ijt}^{k} is the real value of U.S. imports of products at SITC-1 digit level industry classification k(0–9), or a more HS-2 digit level disaggregated product classification $k = 00, 01, 02, \ldots, 99$ from each SSA nation i at time t, DIST_{ij} is the distance from the capital of each SSA country i to New York j (measured in kilometers using the great circle method). GDP and POP refer to the real gross domestic product and the population size of each SSA country. Following Gould (1994), we control for the relative domestic price levels using each SSA country's GDP deflator, GDEF_{it} and that of the U.S., GDEF_{jt}. To capture the potential effects of each country's terms of trade with the U.S., we include EXRT_{ijt}, the annual change in each SSA country's exchange rate against the U.S. dollar. Expressed as each of the SSA country's currency units per U.S. dollar, an increase in the value of this index indicates depreciation of country i's currency against the U.S. dollar and is thus expected to increase U.S. imports from each country. Following Eichengreen and Irwin (1996), we include a 1-year lag of the dependent variable, M_{ijt-1}^{k} to capture the inertia effect of the previous levels of U.S. imports from each country.

Prior studies have established that immigrants exert positive influences on trade in three broad and related channels: via preferences for home country goods, by supplying otherwise unavailable information to individuals involved in trade, and through informal mechanisms that help to enforce contracts (See, Dunlevy and Hutchinson, 1999; Gould, 1994; Head and Ries, 1998; Globerman, 2001; White, 2007). Thus we augment the model with IMM_{ijt}, the stock of immigrants from each SSA country i residing in the U.S. in a given year t adjusted for the annual in- and out-flows of immigrant population from the corresponding SSA country. The immigrant stock variable is constructed following White (2007) and White and Tadesse (2007). In line with the extant of the literature (Globerman, 2001; Rauch and

Watson, 2002; Rauch and Trindade, 2002) on immigrant-trade link, we expect that SSA immigrants to increase U.S. imports from their respective countries as they might arrive with preferences for home country goods and fail to find desired products and acceptable substitutes. In addition, SSA immigrants could increase U.S. trade with their respective home countries as they might have connections to business, or social networks, or possess knowledge of political or social obligations required to conduct business in their home countries, which in turn, convey otherwise unknown information regarding trading opportunities, reduce transaction costs and lax in contract enforcement and deter opportunistic behaviour.

Common language among trading partners has been identified as an important determinant of trade flows in gravity specifications (Hutchinson, 2002; Dunlevy, 2006). Thus, we include a dummy variable (ENG_i) equal to 1 if English is the official language, or in common use in each SSA country i (CIA, 2006), 0 otherwise. Using data from the IMF, Radelet and Sachs (1998) estimate that transport and insurance costs are twice as high for landlocked countries as coastal countries. Thus, we include a dummy variable ($LLCK_i$) equal to 1 if country i is landlocked to capture the effects of related geographic location of a SSA country j on its bilateral trade with the U.S., 0 otherwise.

The variable $YRXP_{ijt}$ measures the number of years elapsed since each country started exporting its first product under the Act, and its coefficient is expected to reflect the effect of experience gained in utilising benefits from the Act. The dummy variable AGOA takes a value of 1 if the given country has been declared eligible for benefits under the Act in the given year t, and 0 otherwise. As all other the variables included in our model account for factors thought to affect trade flows between the U.S. and each SSA country, the coefficient of the AGOA dummy variable is thus expected to capture the effect of implementation of the Act on U.S. imports from each SSA country by comparing the post- versus pre-AGOA U.S. import flows from each eligible SSA country.

Information for identifying each SSA country's AGOA status which varies from country to country, product to product, and data on the number of years elapsed since each country has started exporting under the Act are taken from the foreign trade statistics data base. Trade data are taken from the U.S. International Trade Commission (USITC) and U.S. Department of Commerce. Unbalanced panel data covering 37 AGOA eligible SSA countries spanning the years 1991–2006 are employed.[2] The GDP and population data for each country are from the World Bank Development Indicators CD (2006). Wherever applicable, values for all financial variables have been normalised to the 1995 U.S. constant prices.

Lastly, following White (2007), we include $OPEN_{it}$ as a measure of the economic openness of each SSA country and a set of country- (SSA_i) and year (YRD_t)-specific variables to account for country and time heterogeneities in the SSA countries' economic and trade policies not accounted by the other variables included in the model.

3.3 Estimation of the Empirical Model

First, we estimate the model in Equation (2) using aggregate, manufactured and non-manufactured trade measures of U.S. imports from SSA, and each of the five non-manufactured (SITC0-SITC4) and manufactured goods (SITC5-SITC9) sub-categories. Concessions under AGOA are, however, product-specific. Hence the use of

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[2]For some countries, information on one or more of the explanatory variables are missing for certain years, making the data unbalanced panel.

aggregate imports or SITC-1 digit level product classification might not be sufficient to disentangle the effects of the Act on product level U.S. imports. Thus, we employ HS-2 digit level disaggregated U.S. import measures to analyse the effect of the implementation of the Act on each of the 99 different HS-2 level product classifications. As the main purpose of our study is to examine the impact of the implementation of the Act on U.S. imports by discerning its trade initiation from its intensification effects, we employ the error component structure in estimating our empirical model.[3]

We derive the coefficients of the variables included in our model by employing a Tobit specification which is justified on both theoretical and empirical grounds: the data generation process (DGP), the conduciveness of the method in addressing our objective (separating the trade initiation from the trade intensification effect of the Act) and empirical considerations. First, the theoretical gravity model in Equation (1) strictly predicts positive realisations of trade (imports). However, trade data often contain cases wherein the values are equal to zero.[4] To permit a realisation of zero trade values, Eaton and Tamura (1994) modify the gravity model by subtracting an amount from the level predicted by the theoretical gravity model making the latent trade values to assume any value while allowing the observed imports and/or exports to be set to zero. The Tobit model allows such a realisation (Woodridge, 2002). Second, decomposition of the coefficient estimates through which we separate the trade initiation and intensification effects of our variable of interest is possible only with Tobit specification. The Tobit model is also used widely in gravity-based trade studies (See, for example, Eaton and Tamura, 1994; Head and Ries, 1998; Tadesse and White, 2007).

Finally, we use the McDonald and Moffitt (1980) method to decompose the coefficient estimate of our variable of interest, the AGOA dummy, to obtain two separate marginal effects: the likelihood that the dependent variable (import) changes from zero to above zero, and subject to positive values of trade, the amount by which the trade measure changes used as dependent variable changes from its average value. This allows us to separate the impact of the implementation of the Act into trade-initiation (the likelihood of U.S. imports to be above 0, or some observable threshold) and trade-intensification (i.e. the increase in the average value of U.S. imports) effects.

4   RESULTS

4.1 Comparing Pre- and Post-AGOA U.S. Imports From Eligible SSA Countries

Table 1 provides average annual values (pre- and post-AGOA) of aggregate U.S. imports from each AGOA eligible SSA country and brief descriptive statistics of the variables included in the empirical model.

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[3]Although the model we estimate by including country- and time-specific dummy variables can be considered as fixed effects model, we do not employ the standard Maximum Likelihood approach to estimate the error component model as we want to explore the cross-sectional dimension of the data while controlling for the standard gravity model based on time invariant and country-specific variables such as *Distance* and *Language*. Head and Ries (1998) also employ similar approach. The time- and country-specific dummy variables allow the error to take on a different mean in each year as well as separate means for observations corresponding to different SSA countries.

[4]Zero and even negative realisation of trade flows are possible when considering the 'iceberg model' where a portion of the product (ice) being traded is expected to melt in the process of transaction (i.e. as a payment for transaction and/or transportation costs).

Table 1.   Pre- and Post-AGOA average annual US imports from eligible SSA countries

Country	Pre-AGOA			Post-AGOA		
	N	Mean (St. Dev.)	% (Total)	N	Mean (St. Dev.)	% (Total)
Angola	13	8708.51 (2315.14)	0.02	3	45 206.51 (16 691.56)***	0.11
Benin	10	3608.82 (4977.85)	0.15	6	827 (404.39)	0.01
Botswana	10	17 938.57 (6456.25)	0.30	6	87 608.24 (85 338.39)***	0.35
Burkina Faso	14	1739.53 (1614.42)	0.04	2	1161.94 (644.55)	0.01
Burundi	15	6728.5 (5244.43)	0.28	1	1310.23 (785.72)***	0.03
Cameroon	10	21 654.99 (8357.95)	0.90	6	41 352.71 (14 813.98)***	0.86
Cape Verde	10	204.99 (161.79)	0.01	6	2367.92 (1585.27)***	0.05
Chad	10	3758.61 (3028.15)	0.15	6	10 389.67 (8688.93)	0.18
Republic of Congo	10	2574.64 (2865.73)	0.08	6	1243.67 (0)	0.01
Democratic Republic of Congo	12	18 430.52 (8380.26)	0.32	4	18 277.64 (6863.97)	0.16
Djibouti	10	96.57 (178.96)	0.00	6	1465.83 (993.76)***	0.01
Equatoria Guinea	10	110 000 (11 934.24)	4.34	6	72 858.38 (19 250.28)***	1.38
Ethiopia	10	32 923.53 (21 905.01)	1.41	6	42 034.41 (1973.15)	0.85
Gabon	10	6543.87 (1234.98)	0.27	6	7458.34 (1546.78)	0.30
Gambia	12	3629.64 (2076.06)	0.13	4	3512.53 (2049.74)	0.05
Ghana	10	160 000 (38 059.37)	2.51	6	99 859.87 (38 934.3)**	1.99
Guinea-Bissau	10	77.45 (75.06)	0.00	6	204.94 (214.84)	0.00
Kenya	10	98 092.29 (14 471.88)	3.98	6	230 000 (110 000)***	5.14
Lesotho	10	74 573.98 (21 714.02)	3.28	6	320 000 (120 000)***	7.10
Madagascar	10	69 804.44 (35 007.35)	3.03	6	300 000 (110 000)***	6.77
Malawi	10	62 884.25 (12 807.26)	2.77	6	68 858.5 (23 389.33)	1.56
Mali	10	4174.88 (2499.7)	0.11	6	4799.66 (2871.46)	0.05
Mauritius	10	220 000 (41 844.62)	9.39	6	240 000 (68 073.81)	5.20
Mozambique	10	6453.21 (2341)	0.31	6	7689.40 (2345.00)	0.30
Namibia	10	30 637.21 (16 242.5)	1.24	6	110 000 (64 563.86)	2.36
Niger	10	5863.78 (9746.05)	0.23	6	4871.68 (3793.31)	0.05
Nigeria	10	49 218.39 (19 510.24)	1.90	6	48 858.19 (27 240.12)	0.73
Rwanda	10	4110.58 (2186.09)	0.18	6	5499.85 (2044.57)	0.12
Sao Tome and Principe	10	224.74 (484.12)	0.01	6	2.87 (7)	0.00
Senegal	10	6628.47 (1725.96)	0.20	6	19 176.92 (34 683.01)	0.16
Seychelles	10	2904.97 (1300.72)	0.06	6	11 548.68 (8514.66)***	0.23
Sierra Leone	12	17 882.91 (14 773.58)	0.57	4	72 386.42 (31 552.91)***	1.63
South Africa	10	2 300 000 (530 000)	56.37	6	5 100 000 (1 200 000)***	57.66
Swaziland	10	31 372.27 (7956.99)	1.35	6	130 000 (60 138.42)***	2.88
Tanzania	10	21 488.72 (9159.89)	0.66	6	28 113.04 (4686.95)	0.38
Uganda	10	19 867.62 (10 627.1)	0.86	6	22 980.11 (7284.31)	0.50
Zambia	10	51 561.02 (13 856.9)	2.18	6	20 987.9 (9160.72)***	0.43
ALL AGOA Eligible Countries	388	92 938.73 (380 000)	100.00	204	220 000 (900 000)	100.00

***, ** and * denote significant differences between the Pre- and Post-AGOA average annual exports of the specific country at $p < 0.01$, $p < 0.05$ and $p < 0.10$, respectively; trade values reported here exclude exports of Commodities in HS-27 (petroleum products) and HS-71 (pearls and natural stone); The mean (St. Dev.) of the variables for all countries included in the analysis are as follows: RGDP (in billions): 8.5 (220.66); Population (in millions): 14.03 (22 000); Distance from NY (in KM):6892.69 (2316); GDP Deflator: 92.9 (21.6); Stock of Immigrants (per country in 1000s): 77.754 (1669.7); Usage of English as common language: 0.26 (0.44); Landlocked: 0.37 (0.48); Index of openness: 31.38 (21.35); Average number of years since exporting first product under AGOA: 3.09 (1.37).

As it can be observed from the table, we find a significant post-AGOA increase in the volume of U.S. imports from 17 countries (namely, Angola, Botswana, Burundi, Cameroon, Cape Verde, Djibouti, Equatorial Guinea, Ghana, Kenya, Lesotho, Liberia, Madagascar, Namibia, Seychelles, South Africa, Swaziland and Zambia). However, the number of years elapsed since each SSA country has been declared eligible for benefits

under AGOA varies from country to country. There is also a substantial difference in the socio-economic characteristics of these nations and their respective share in the aggregate U.S. imports from Africa. As observed from previous studies and by sceptics of the success of AGOA, both in the pre-and post-AGOA periods, U.S. trade with SSA is limited to a few countries. South Africa alone accounts for more than half of U.S. imports from the AGOA eligible SSA countries.[5] Although Madagascar, Mauritius, Lesotho, Kenya and Ghana account for a tangible share of SSA countries' exports to the U.S., the magnitude is substantially small.

It is also very interesting to note that the post-AGOA statistically significant increase in U.S. imports from some of these nations do not necessarily follow their relative export share. While accounting for only a very small proportion of SSA countries' exports to the U.S., for example, compared to pre-AGOA periods, there has been a significant increase in the exports of countries such as Burundi, Cameroon and Botswana, a trend that if allowed to continue could enable some of these nations to be important players in the U.S.–SSA trade. Yet, as the post-AGOA statistically significant increase in SSA's exports to the U.S. could be driven by a rise in exports of products that do not necessarily qualify for benefits under the Act, or by changes in other macro-economic variables and/or trade policies of these nations, or combinations of these and several other factors, crediting AGOA based on results from such descriptive analysis without accounting for the potential influence of other determinants of trade is impossible. We thus, resort to our empirical model in which we account for all other determinants of trade flows to determine whether or not AGOA had a role in changing the volume of U.S. imports from eligible SSA countries.

4.2 Econometric Results

We first estimate Equation (2) using U.S. imports of aggregate and its sub-classification of non-manufactured goods (together with the corresponding SITC: 0–4 sub-classifications) and manufactured goods (and their subsequent SITC: 5–9 sub-categories) as dependent variables.[6] Just as every SSA country is not eligible for benefits under the Act, AGOA does not exempt all products from tariff and quota limitations. Disentangling the effect of the implementation of the Act thus requires conducting the analysis at higher level of product disaggregation, the natural extension of which is to use SITC-2 or higher levels of product classification. We use HS-2 digit level product sub-classification that results in 99 different product categories due to lack of trade data at the corresponding higher digit SITC disaggregation. Table 2 presents coefficient estimates of the variables included in our model for selected HS-2 level product categories.

Higher log-likelihood and significant Chi-square values reported at bottom of each column corresponding to each HS-2 product indicate that the estimated model fits the data very well. Using results for commodities in HS-09 (coffee, tea, mat and spices), HS-61

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[5]The share of South Africa in total U.S imports from SSA countries rises to 71 percent when considering African exports of all products to the U.S. Note, however, that the data in Table 2 exclude African exports of goods in HS-27 (fuel and oil) and HS-71 (natural pearls and/or stones) categories.
[6]Results obtained from using aggregate U.S. imports (manufactured and non-manufactured goods and their corresponding SITC-1 digit level product classification), while less detailed and different from one-another, do not contradict the observation from HS-2 level disaggregation reported and discussed here. Corresponding results for aggregate and SITC-1 digit level classification and all other HS-2 level product not reported here can be obtained from the authors.

Table 2a. Determinants of selected U.S. imports from AGOA eligible SSA countries by HS-2 product classification, tobit estimates (undecomposed marginal effects)

Dep. Var. ==>	HS-03	HS-04	HS-05	HS-07	HS-09	HS-10	HS-11	HS-15	HS-19	HS-21	HS-22	HS-30	HS-31	HS-33	HS-37	HS-38
ln DIST$_{ij}$	−0.500 (2.74)***	0.063 (0.32)	−0.829 (2.25)**	−0.322 (2.56)***	−0.427 (4.42)***	−0.036 (0.28)	−0.443 (1.56)	0.954 (1.48)	−0.489 (2.67)***	−0.591 (2.08)**	−1.058 (1.96)*	−0.540 (2.67)***	−0.231 (1.55)	0.735 (1.17)	−0.236 (1.08)	0.352 (0.87)
AGOA$_{it}$	0.495 (0.52)	−0.170 (1.87)*	−0.111 (2.28)**	0.524 (1.88)*	1.622 (3.66)***	0.054 (0.49)	0.296 (1.04)	1.504 (2.72)***	0.275 (1.46)	2.105 (2.40)**	1.202 (1.99)**	0.019 (0.11)	−2.120 (0.98)	0.546 (1.76)*	3.263 (1.11)	2.783 (1.57)
ln GDP$_{it}$	0.027 (2.89)***	0.101 (1.48)	0.603 (4.26)***	0.058 (0.28)	1.067 (1.20)	0.087 (2.22)**	−0.195 (2.14)**	−0.584 (2.56)**	0.227 (3.65)***	0.194 (2.00)**	0.666 (3.29)***	0.211 (3.26)***	0.125 (2.50)**	0.097 (0.43)	0.214 (2.75)***	0.318 (2.15)**
ln POP$_{it}$	−0.353 (1.18)	−0.050 (0.73)	−0.055 (0.48)	0.325 (1.62)	1.574 (4.52)***	−0.034 (0.87)	0.251 (2.81)***	0.584 (2.58)***	−0.108 (2.01)**	0.231 (2.44)**	−0.455 (2.57)**	0.016 (0.30)	−0.064 (1.55)	0.421 (1.93)*	−0.018 (0.29)	−0.078 (0.63)
ln GDEF$_{jt}$	−1.297 (1.16)	−0.171 (0.86)	−1.187 (2.81)***	0.038 (0.06)	−0.583 (0.54)	−0.178 (1.47)	−0.394 (2.46)**	−1.347 (1.95)*	−0.125 (0.78)	−0.162 (0.59)	−0.193 (2.32)**	0.067 (0.39)	0.027 (0.16)	0.938 (1.31)	−0.065 (0.26)	−0.373 (0.81)
EXRT$_{ij}$	0.343 (3.13)***	0.021 (0.94)	−0.020 (0.49)	0.012 (0.18)	0.293 (2.65)***	0.012 (0.89)	0.016 (0.57)	0.097 (1.35)	0.006 (0.32)	0.003 (0.11)	0.087 (1.34)	0.026 (1.38)	−0.030 (1.81)*	0.137 (1.85)*	−0.060 (2.39)**	−0.017 (0.37)
ln GDP$_{jt}$	0.511 (0.10)	−0.011 (0.90)	−0.986 (0.87)	1.760 (2.36)**	−0.732 (0.87)	−0.489 (0.93)	0.845 (0.67)	−0.391 (0.53)	−0.885 (1.75)*	−0.536 (0.75)	−1.368 (0.87)	−0.182 (0.63)	0.103 (1.19)	−0.987 (1.59)	1.335 (0.25)	−1.267 (2.94)***
ln POP$_{jt}$	−1.067 (0.22)	2.058 (1.62)	0.153 (1.00)	1.114 (1.57)	1.852 (1.25)	7.771 (0.51)	−1.817 (0.53)	1.602 (0.18)	3.712 (2.10)**	2.935 (0.94)	2.541 (0.39)	0.317 (1.01)	−0.610 (0.99)	1.846 (1.40)	−0.623 (1.67)*	1.272 (2.91)***
ln GDEF$_{jt}$	7.987 (0.19)	−1.851 (2.12)**	−1.045 (1.19)	−3.130 (1.56)	−4.049 (1.58)	−0.696 (0.16)	1.808 (0.18)	1.552 (0.06)	−1.355 (2.20)**	−9.950 (0.95)	−3.024 (0.14)	−7.084 (1.17)	4.293 (0.73)	−1.340 (1.19)	6.934 (0.79)	−3.334 (2.69)***
ln IMM$_{ij}$	0.056 (0.31)	0.065 (1.66)*	0.029 (0.36)	0.316 (2.56)**	0.615 (3.01)***	0.034 (1.65)*	0.127 (2.45)**	0.557 (3.85)***	0.049 (1.57)	−0.026 (0.45)	0.220 (2.12)**	0.073 (1.85)*	0.015 (0.61)	0.260 (1.94)*	−0.048 (1.17)	−0.020 (0.24)
ENG$_i$	1.806 (2.69)***	0.132 (1.04)	0.563 (2.21)**	−0.178 (0.48)	1.052 (1.67)*	0.095 (1.54)	0.268 (1.80)*	0.491 (1.23)	0.089 (0.83)	0.239 (1.19)	0.406 (1.19)	0.104 (0.83)	0.090 (0.94)	−0.312 (2.80)***	0.043 (0.33)	0.031 (0.12)
LLOCKED$_i$	−2.699 (4.67)***	0.180 (1.44)	−0.447 (2.25)**	−0.098 (0.27)	−0.205 (0.35)	−0.021 (0.29)	−0.303 (2.01)**	−1.114 (2.88)***	−0.086 (0.92)	−0.434 (2.85)***	−0.013 (0.04)	−0.095 (1.02)	−0.093 (1.15)	−0.375 (1.02)	−0.089 (0.76)	−0.295 (1.31)
ln OPEN$_{it}$	−0.020 (1.46)	0.001 (0.17)	−0.006 (1.16)	0.015 (1.52)	0.020 (1.64)*	0.000 (0.13)	0.015 (3.30)***	0.028 (2.62)***	0.003 (1.37)	0.011 (2.47)**	0.004 (0.61)	0.003 (1.22)	−0.002 (0.91)	0.029 (3.01)***	−0.001 (0.22)	0.000 (0.05)
YREXP$_{it}$	−1.245 (1.35)	0.419 (1.60)	0.307 (0.75)	0.899 (1.43)	1.577 (2.55)**	−0.036 (0.32)	1.041 (2.82)***	1.682 (2.27)**	0.395 (1.84)*	1.345 (3.73)***	1.382 (2.00)**	0.719 (2.86)***	0.101 (0.67)	2.504 (3.14)***	0.523 (1.82)*	1.315 (2.44)**

a

LAGDEP$_{it}$	0.650	0.047	0.080	0.267	0.703	0.019	0.092	0.349	0.032	0.063	0.195	0.027	0.028	0.233	0.040	0.099
	(13.71)***	(4.57)***	(3.92)***	(8.98)***	(16.25)***	(2.85)***	(6.68)***	(10.88)***	(3.56)***	(4.33)***	(7.26)***	(3.27)***	(4.19)***	(7.52)***	(3.21)***	(4.76)***
Constant	512.59	−698.35	−873.44	−2179.14	−2928.08	−119.06	293.24	−254.6	−643.35	−543.9	−423.71	−334.92	336.37	−2044.45	353.41	−2703.19
	(0.22)	(1.64)	(1.00)	(1.58)	(1.28)	(0.48)	(0.53)	(0.17)	(2.09)**	(0.94)	(0.34)	(1.02)	(0.98)	(1.39)	(0.70)	(2.88)***
Observations	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560
McFadden R^2	0.17	0.19	0.22	0.17	0.23	0.23	0.23	0.20	0.27	0.26	0.18	0.21	0.25	0.16	0.19	0.15
Chi-square	1166***	1179***	1182***	979***	979***	981***	400***	439***	462***	228***	237***	242***	282***	284***	297***	1320***
Log-likelihood ratio	−2254.1	−2247.5	−2245.9	−2265.6	−2265.6	−2264.8	−2400.8	−2381.3	−2370.0	−2716.2	−2711.8	−2709.0	−2576.3	−2575.4	−2569.0	−2170.5
Country-fixed effects	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Time-fixed effects	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included

Table 2b. Determinants of selected U.S. imports from AGOA eligible SSA countries by HS-2 product classification, tobit estimates (undecomposed marginal effects)

Dep. Var. ===>	HS-39	HS-40	HS-44	HS-52	HS-57	HS-60	HS-61	HS-62	HS-76	HS-83	HS-85	HS-86	HS-87	HS-95	HS-97	HS-98
b																
ln DIST$_{ijt}$	0.417	−2.289	−0.490	−3.243	−0.437	−0.621	−0.435	−0.948	−0.270	−1.617	−2.733	−0.009	−1.199	−0.015	−2.011	−1.352
	(0.54)	(3.07)***	(0.61)	(4.14)***	(0.99)	(2.20)**	(1.83)*	(1.65)*	(0.70)	(2.65)***	(2.91)***	(0.23)	(2.09)**	(0.02)	(2.52)**	(2.04)**
AGOA$_{it}$	2.035	1.659	0.435	2.570	−0.155	3.457	2.774	0.342	2.519	−0.491	1.916	0.168	2.241	0.164	−0.131	0.533
	(2.21)**	(1.96)*	(2.48)**	(0.70)	(3.34)***	(1.83)*	(3.78)***	(2.38)**	(1.21)	(0.82)	(1.90)*	(2.20)**	(0.39)	(0.20)	(0.15)	(0.73)
ln GDP$_{it}$	0.470	0.219	0.192	0.387	0.484	0.174	0.564	0.266	0.172	0.476	1.686	0.052	0.459	0.842	0.644	1.275
	(1.54)	(0.83)	(0.63)	(1.34)	(2.87)***	(1.83)*	(1.65)*	(1.84)*	(1.29)	(2.18)**	(4.57)***	(3.56)***	(2.16)**	(2.90)***	(2.13)**	(4.71)***
ln POP$_{it}$	0.091	0.334	0.796	0.675	0.046	0.074	−0.139	0.080	−0.016	−0.103	−0.570	−0.008	−0.165	−0.029	0.811	−0.065
	(0.35)	(1.35)	(2.89)***	(2.55)**	(0.30)	(0.85)	(0.43)	(0.28)	(0.13)	(0.52)	(1.77)*	(0.64)	(0.95)	(0.12)	(2.93)***	(0.28)
ln GDEF$_{it}$	0.741	−0.541	0.318	0.563	−0.776	−0.656	−0.937	−0.063	−0.601	−0.405	−0.712	0.035	0.207	−0.251	−2.019	0.237
	(0.79)	(1.63)*	(0.32)	(0.63)	(1.52)	(2.16)**	(1.83)*	(0.06)	(1.38)	(0.64)	(0.61)	(0.88)	(0.34)	(0.28)	(2.03)**	(0.28)
EXRT$_{ijt}$	−0.144	−0.139	0.029	−0.018	−0.101	−0.045	−0.104	0.110	−0.061	−0.042	−0.267	−0.002	−0.043	0.089	−0.124	−0.168
	(1.50)	(1.61)	(0.30)	(2.20)**	(1.86)*	(1.56)	(0.88)	(1.93)*	(1.42)	(0.60)	(2.26)**	(0.46)	(0.67)	(0.99)	(1.26)	(1.97)**
ln GDP$_{jt}$	−1.826	−3.916	0.494	0.876	0.276	0.214	1.291	0.377	−0.738	0.398	−1.386	−1.952	0.307	1.341	1.844	0.006
	(0.63)	(2.11)**	(0.44)	(1.19)	(0.21)	(0.67)	(1.02)	(0.24)	(0.49)	(1.59)	(0.70)	(2.26)**	(0.02)	(0.59)	(0.55)	(0.38)
ln POP$_{jt}$	−4.511	1.368	−1.384	1.515	−1.241	1.366	−1.308	−0.785	0.304	1.518	−2.721	9.075	6.711	4.832	−0.923	0.342

(Continues)

Table 2a. (Continued)

Dep. Var. ==>	HS-39	HS-40	HS-44	HS-52	HS-57	HS-60	HS-61	HS-62	HS-76	HS-83	HS-85	HS-86	HS-87	HS-95	HS-97	HS-98
	(0.41)	(1.33)	(0.56)	(2.48)**	(0.18)	(0.40)	(1.13)	(1.72)*	(2.01)**	(1.83)*	(0.19)	(1.98)**	(0.09)	(2.57)**	(1.70)*	(0.00)
ln GDEF$_{jr}$	4.560	−1.422	1.340	−1.639	1.965	−2.091	0.008	24.833	3.029	−2.294	4.282	−2.243	−3.514	−1.861	0.104	−0.836
	(1.29)	(0.68)	(0.47)	(1.83)*	(0.11)	(0.19)	(1.86)*	(0.64)	(0.19)	(1.76)*	(1.04)	(1.77)*	(0.16)	(0.57)	(0.81)	(2.31)**
ln IMM$_{ijr}$	0.192	0.057	−0.106	−0.184	0.223	0.006	0.355	0.141	0.061	0.205	−0.171	−0.004	0.035	0.160	−0.308	0.042
	(1.16)	(0.39)	(0.63)	(1.19)	(2.54)**	(0.11)	(1.76)*	(0.81)	(0.82)	(1.72)*	(0.89)	(0.45)	(0.32)	(1.00)	(1.85)*	(0.30)
ENG$_i$	−0.768	0.121	1.086	−0.091	0.555	0.163	1.034	0.109	0.209	−0.071	0.519	−0.007	−0.215	−0.294	1.411	0.824
	(1.47)	(2.25)**	(1.91)*	(0.17)	(1.83)*	(0.86)	(2.59)***	(2.18)**	(0.83)	(0.18)	(0.77)	(0.33)	(0.62)	(0.59)	(2.47)**	(1.67)*
LLOCKED$_i$	0.094	−0.721	−1.505	−1.304	0.064	−0.182	0.563	−0.557	−0.174	0.416	−1.346	−0.019	−0.288	−0.307	−2.035	−0.814
	(0.19)	(1.66)*	(2.93)***	(2.87)***	(0.26)	(1.19)	(0.94)	(1.85)*	(0.79)	(1.13)	(2.28)**	(0.86)	(0.90)	(0.68)	(4.01)***	(1.88)*
ln OPEN$_{ir}$	0.007	0.036	−0.002	0.014	0.006	0.002	0.028	0.016	0.004	0.015	0.024	0.000	0.003	−0.007	0.006	0.035
	(0.61)	(3.14)***	(0.20)	(1.18)	(0.95)	(0.50)	(1.95)*	(2.23)**	(0.63)	(1.63)	(1.66)*	(0.42)	(0.41)	(0.63)	(0.49)	(3.23)***
YREXP$_{it}$	4.497	2.477	4.855	3.075	1.084	0.388	2.063	2.440	0.938	2.626	0.191	0.068	2.356	3.899	4.402	1.185
	(4.32)***	(2.82)***	(4.91)***	(3.66)***	(2.12)**	(1.35)	(2.00)**	(2.66)***	(2.06)**	(3.46)***	(0.19)	(1.31)	(3.23)***	(4.25)***	(4.84)***	(1.63)
LAGDEP$_{ir}$	0.401	0.414	0.692	0.424	0.229	0.068	0.687	0.853	0.115	0.206	0.406	0.002	0.186	0.449	0.509	0.318
	(9.42)***	(11.94)***	(14.66)***	(10.30)***	(8.58)***	(3.99)***	(16.25)***	(20.93)***	(6.21)***	(6.49)***	(7.97)***	(1.24)	(7.07)***	(10.31)***	(10.32)***	(6.90)***
Constant	864.11	−2249.4	1181.12	−2765.83	186.09	−223.24	2625.68	1179.06	33.66	−2465.59	550.37	−144.33	−112.8	−1053.38	1442.42	37.05
	(0.44)	(1.27)	(0.57)	(1.46)	(0.18)	(0.38)	(1.11)	(0.54)	(0.04)	(1.83)*	(0.23)	(1.94)*	(0.09)	(0.57)	(0.70)	(0.02)
Observations	560	560	560	560	560	560	560	560	560	560	560	560	560	524	524	524
McFadden R^2	0.14	0.18	0.19	0.17	0.17	0.18	0.16	0.17	0.19	0.14	0.09	0.31	0.15	0.16	0.15	0.11
Chi-square	1323***	1325***	601***	611***	642***	534***	539***	564***	387***	387***	389***	273***	274***	288***	929***	654***
Log-likelihood ratio	−2168.8	−2167.8	−2280.6	−2275.7	−2260.3	−2169.5	−2167.0	−2154.8	−2539.5	−2539.5	−2538.6	−2793.2	−2793.0	−2786.0	−1197.0	−1017.0
Country-fixed effects	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Time-fixed effects	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included

Absolute value of z statistics in parentheses.
*Significant at 10%.
**Significant at 5%.
***Significant at 1%.
See Table 3 for the description of each of the HS-2 product categories used as dependent variables.

(apparel articles and accessories, knit or crochet) and HS-62 (apparel articles and accessories, not knit etc.) categories, for example, we observe that most of the coefficients bear the expected signs.[7] Accordingly, for coffee, tea and spices and apparel articles, a 1 percent increase in the geographic distance results in a comparable 0.43 percent fall in U.S. imports of both product categories from each SSA country, while the same would reduce U.S. imports of not knit Apparel articles by 0.95 percent, plausibly as a result of differences in bulkiness of the products under consideration. Depreciation of a SSA country's currency vis-à-vis the U.S. dollar by 1 percent corresponds to increases in U.S. imports of coffee, tea and spices by 0.29 percent, no impact on U.S. imports of knit apparel articles while resulting in a 0.11 percent increase in U.S. imports of non-knit apparel articles.

With increases in the average income of each SSA country, we observe increases in U.S. imports by 0.56 percent and 0.26 percent for knit and non-knit apparel articles, respectively; both of the coefficients are less than unity as predicted by the theoretical gravity model and empirical studies that employ gravity model in examining determinants of bilateral trade flows (See, for example, Combes *et al.*, 2005; White, 2007).

We also observe significantly higher U.S. imports of products in each of the HS-09, HS-61, HS-62 categories, and several other products reported in Table 2 from SSA countries where English is commonly used. Intuitively, this implies that common language facilitates transactions. While we observe that U.S. imports from SSA countries that are landlocked are significantly lower than those that have coastal access, we also find a rise in the volume of U.S. imports from the specific SSA country with a rise in the economic openness of each country, indicative of the impact of the natural infrastructure and trade policy.

As hypothesised, the coefficient estimate of the stock of immigrant population is positive and significant for some products (e.g. both for coffee, tea and spices and knit apparel articles (products with inelastic demand for which immigrants often fail to find desirable substitutes) conforming to the pro-trade effects of immigrants, often reported in the trade-immigration literature. We also observe negative coefficient estimates of the stock of immigrants in few instances. Intuitively, this could result either from the availability of desirable substitutes for the specific goods under consideration, or changes in U.S. economic policies against often unfriendly regimes and politically unstable governments during certain years which may end up sending significantly larger immigrant population to the U.S. as refugees.

Results of two other variables (namely, $YREXP_{ijt}$, years elapsed since exporting the first product(s) from each SSA country took place, and M_{ijt-1}^{K}, the lag of the dependent variable) attract attention warranting further discussion. In the three product categories we selected for sample discussion (coffee, tea and spices, and knit and non-knit apparel articles) and almost all other products as well, the coefficients of both variables are significant and positive, their magnitudes exceeding that of most other variables in the model (e.g. for coffee, tea and spices, 1.57 and 0.70; for knit apparel articles, 2.06 and 0. 69, and for non-knit apparel articles, 2.44 and 0.85, respectively). While the significance of the lag of the dependent variable is indicative of the persistence of SSA country's trade inertia with

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[7]Given that we employ Tobit specification for our estimations, the resulting coefficients are not true elasticities. However, as the corresponding proportionality coefficient estimates for each product are small relative to the median export levels of each SSA country, we heuristically interpret the coefficients as elasticity estimates following Tadesse and White (2007) and Head and Ries (1998).

the U.S., that of YREXP informs us that an additional year of exporting experience under AGOA enhances exports from the particular country by a magnitude ranging from 1.6 percent for coffee, tea and spices to 2.44 percent for non-knit apparel articles. The straightforward implication is that, over time, experience gained from trading eligible product(s) tends to increase each country's utilisation of the benefits stipulated by the Act.

Increases in population size of an AGOA eligible SSA country positively relate, in some instances, with greater U.S. imports from each country. However, each of the SSA country's exports of many of the HS-2 products does not appear to be sensitive to changes in the U.S. GDP, or population levels. We can, thus, assert that U.S. income, population size or wealth effect does not appear to exert discernable impact on U.S. imports from AGOA eligible SSA countries, although larger (in terms of population as well as GDP) AGOA eligible SSA economies tend to trade more with the United States.

Lastly, turning to our variable of interest and focusing on the marginal effect of the AGOA dummy variable, we find that the coefficient is positive and significant across many of the product classifications considered even after controlling for standard factors that are theoretically thought to affect bilateral trade flows, implying that the implementation of the Act has enhanced U.S. imports from SSA countries. Again, using the three products we have selected above as an example, we can say that, on average 5.2 percent of each SSA country's exports of coffee, tea and spices, 43.5 percent and 16.02 percent of the increase in the knit and non-knit apparel articles, respectively, can be attributed to the implementation of AGOA. Our results, specifically for apparel articles, are comparable with the findings in Frazer and Van Biesebroeck (2007) who use the triple difference-in-difference method for evaluating the impact of AGOA on U.S. imports from SSA countries.[8]

4.3 The Trade Initiation and Intensification Effects of AGOA

Taken collectively, the results from both the aggregate (total non-manufactured and manufactured) U.S. imports, the corresponding SITC-1 digit level product classifications (all not reported here for brevity) and the HS-2 level product disaggregation reported in Table 3 indicate that while AGOA did not bring statistically significant changes in aggregate as well as non-manufactured goods imports from SSA countries, it has resulted in a significant increase in U.S. imports of manufactured goods imports from the countries eligible for benefit under the Act.[9] This is also consistent with the fact that under the Act, different products (for example, apparel and non-apparel items) have separate details of implementation.

Our inability to observe a significant coefficient for the AGOA dummy variable for some products, however, doesn't necessarily imply that the implementation of the Act had no effect on U.S. imports of the particular product(s) under consideration. Differences in the details of implementation of the Act across products, for example, may force some

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[8]To check the sensitivity of our results, we drop South Africa from the data and run our estimations. Despite the significance of South Africa's exports in total SSA exports to the U.S., the effect of AGOA did not appear to differ from those reported here.

[9]Note that while we do not observe statistically significant increase in the aggregate non-manufactured goods U.S. imports from SSA countries, we find significant increase in the initiation of some level of imports for aggregate as well as non-manufactured goods. Regression results indicating these findings are available from the authors.

Table 3. The import initiation and intensification effects of AGOA on U.S. imports from eligible SSA countries by HS-2 commodity classification

HS-2 commodity classification	Pre-AGOA U.S. imports from SSA countries (N = 304)		Post-AGOAUS imports from SSA countries (N = 256)		Import initiation effect	Import intensification effect
	Mean (St. Dev)	% (Total)	Mean (St. Dev.)	% (Total)		
01. Live animals	147.41 (367.36)	0.24	335.52 (1545.67)	0.24	0.08455 (1.85)*	0.514 (1.85)*
02. Meat and edible meat offal	1.72 (20.25)	0.00	0 (0)	0.00	−0.03565 (0.52)	−0.351 (0.52)
03. Fish, crustaceans and aquatic invertebrates	1656.29 (6076.83)	2.69	1855.66 (6116.93)	1.35	−0.02904 (0.87)	−0.627 (0.87)
04. Dairy products; birds eggs; honey; Ed Animal Pr Nesoi	71.68 (478.08)	0.11	0.55 (2.61)***	0.00	0.02137 (1.08)	−0.144 (2.28)**
05. Products of animal origin, Nesoi	66.1 (359.43)	0.10	60.18 (307.53)**	0.04	−0.10555 (2.45)**	−0.730 (2.45)**
06. Live trees, plants, bulbs etc.; cut flowers etc.	102.62 (491.21)	0.16	192.29 (733.79)	0.13	−0.07621 (0.88)	−0.500 (0.78)
07. Edible vegetables and certain roots and tubers	41.63 (189.21)	0.07	110.97 (417.55)**	0.08	1.06394 (2.33)**	2.426 (2.33)**
08. Edible fruit and nuts; citrus fruit or melon peel	735.54 (4175.93)	1.17	1993.98 (10132.04)	1.42	0.04791 (0.56)	1.440 (2.66)***
09. Coffee, tea, mate and spices	3477.16 (8779.38)	5.53	4735.03 (7472.15)**	3.33	0.011 (0.49)	1.309 (3.49)***
10. Cereals	0.89 (6.74)	0.00	4.71 (26.81)**	0.00	0.059 (1.84)*	0.563 (1.04)
11. Milling products; malt; starch; insulin; wht gluten	9.31 (43.92)	0.01	32.6 (116.4)***	0.02	0.262 (2.84)***	1.525 (2.74)***
12. Oil seeds etc.; misc grain, seed, fruit, plant etc.	251.36 (1069.36)	0.39	548.25 (2168.15)	0.39	0.055 (0.54)	−0.373 (0.64)
13. Lac; gums, resins and other vegetable sap and extract	599.24 (2652.87)	0.95	555.23 (2075.62)	0.40	0.008 (0.49)	0.200 (0.49)
14. Vegetable plaiting materials and products Nesoi	32.73 (176.18)	0.05	20.72 (81.47)	0.01	−0.071 (0.70)	0.419 (0.72)
15. Animal or vegetable fats, oils etc. and waxes	47.23 (165.5)	0.07	163.23 (999.89)*	0.11	0.026 (0.72)	0.475 (0.72)
16. Edible preparations of meat, fish, crustaceans etc.	55.92 (446.12)	0.09	195.21 (2267.7)	0.14	0.001 (0.05)	0.025 (0.05)
17. Sugars and sugar confectionary	1163.18 (4059.75)	1.90	1007.6 (3361.38)	0.71	−0.093 (1.92)*	−0.836 (1.92)*
18. Cocoa and cocoa preparations	1148.5 (5921.19)	1.74	1887.57 (8555.82)	1.35	0.066 (1.46)	0.723 (1.46)
19. Prep cereal, flour, starch or milk; bakers wares	2.69 (12.22)	0.00	14.06 (49.55)***	0.01	0.210 (2.74)***	1.401 (2.74)***
20. Prep vegetables, fruit, nuts or other plant parts	546.13 (3311.4)	0.87	746.61 (4199.88)	0.53	−0.027 (0.40)	−0.182 (0.40)
21. Miscellaneous edible preparations	58.99 (358.43)	0.09	220.6 (957.11)**	0.16	0.176 (1.99)**	1.219 (1.99)**
22. Beverages, spirits and vinegar	153.91 (981.49)	0.24	1340.36 (8113.67)**	0.92	0.035 (0.58)	2.306 (2.58)***
23. Food industry residues and waste; prep animal feed	108.3 (469.13)	0.17	212.1 (865.13)	0.15	−0.088 (1.31)	−0.866 (1.41)
24. Tobacco and manufactured tobacco substitutes	1379.4 (7928.49)	2.21	1408.74 (7428.15)	0.99	0.002 (1.23)	−0.022 (0.03)

(*Continues*)

Table 3. (Continued)

HS-2 commodity classification	Pre-AGOA U.S. imports from SSA countries (N = 304)		Post-AGOAUS imports from SSA countries (N = 256)		Import initiation effect	Import intensification effect
	Mean (St. Dev)	% (Total)	Mean (St. Dev.)	% (Total)		
25. Salt; sulphur; earth and stone; lime and cement plaster	730.19 (3939.34)	1.15	698.67 (3910.94)	0.50	0.040 (0.56)	0.370 (0.75)
26. Ores, slag and ash	9338.19 (43 477.32)	14.69	10 527.11 (47 576.95)	7.79	0.002 (0.05)	0.0386 (0.55)
28. Inorganic chemical; precious and rare-earth met and radioactive compound	1942.8 (11 684.38)	3.00	4546.77 (22 467.4)	3.19	0.042 (0.42)	0.426 (0.62)
29. Organic chemicals	1394.8 (8772.78)	2.21	4677.76 (26 083.06)	3.33	0.003 (0.11)	0.067 (0.41)
30. Pharmaceutical products	108.02 (1410.82)	0.17	127.28 (881.85)	0.09	0.021 (0.98)	1.683 (1.98)**
31. Fertilizers	190.3 (1145.63)	0.30	26.17 (164.16)**	0.02	0.002 (0.12)	−0.056 (0.12)
32. Tanning and dye ext etc.; dye, paint, putty etc.; inks	370.52 (2145.78)	0.58	596.04 (3278.89)	0.43	0.074 (0.96)	0.492 (0.76)
33. Essential oils etc.; perfumery, cosmetic etc. preps	69.43 (261.16)	0.11	426.03 (2057.7)***	0.30	1.056 (1.93)**	−0.470 (0.94)
34. Soap etc.; waxes, polish etc.; candles; dental preps	25.54 (124.97)	0.04	79.39 (378.96)	0.06	0.069 (0.65)	0.879 (1.36)
35. Albuminoidal subst.; modified starch; glue; enzymes	54.66 (324.7)	0.09	37.07 (203.15)	0.03	0.001 (0.72)	0.166 (0.72)
36. Explosives; pyrotechnics; matches; pyro alloys etc.	1.45 (13.2)	0.00	38.18 (212.81)***	0.03	0.046 (1.11)	0.722 (1.11)
37. Photographic or cinematographic goods	2.97 (15.09)	0.00	73.7 (575.16)**	0.05	0.108 (1.57)	1.237 (1.57)
38. Miscellaneous chemical products	150.47 (1066.41)	0.24	872.48 (5826.3)	0.62	1.195 (2.21)**	1.434 (2.21)**
39. Plastics and articles thereof	184.07 (1050.84)	0.28	789.4 (4125.41)**	0.56	2.199 (1.96)***	0.248 (1.96)***
40. Rubber and articles thereof	1203.02 (4693.44)	1.90	2809.98 (12 987.58)	1.98	0.163 (1.61)	0.975 (0.48)
41. Raw hides and skins (no Furskins) and leather	619.39 (33,22.25)	0.98	605.67 (3241.05)	0.43	0.117 (1.51)	0.840 (1.51)
42. Leather art; saddlery etc.; handbags etc.; gut art	60.91 (281.05)	0.10	120.47 (600.07)	0.09	0.088 (1.41)	0.654 (1.41)
43. Furskins and artificial fur; manufactures thereof	17.74 (64.94)	0.03	26.21 (129.99)	0.02	0.016 (0.48)	0.349 (0.48)
44. Wood and articles of wood; wood charcoal	721.75 (2474.04)	1.14	2394.86 (7617.57)***	1.70	0.003 (1.83)*	0.180 (0.23)
45. Cork and articles of cork	0.07 (0.78)	0.00	0.51 (4.97)	0.00	−0.0506 (0.53)	−0.260 (0.53)
46. Mfr of straw, esparto etc.; basketware and wickerwork	33.52 (138.78)	0.05	55.87 (162.5)	0.04	0.004 (1.09)	0.490 (1.09)
47. Wood pulp etc.; recovd (waste and scrap) ppr and pprbd	1202.83 (7097.64)	1.90	964.42 (5721.18)	0.68	0.010 (0.13)	0.076 (0.13)
48. Paper and paperboard and articles (inc paper pulp artl)	143.54 (1026.26)	0.22	126.44 (770.54)	0.09	0.053 (0.58)	0.3796 (0.58)
49. Printed books, newspapers etc.; manuscripts etc.	36.09 (217.04)	0.06	88.56 (450.06)	0.06	−0.029 (0.97)	−0.482 (0.97)
50. Silk; including yarns and woven fabric thereof	1.93 (13.22)	0.00	1.14 (5.13)	0.00	−0.046 (1.45)	−0.895 (1.45)
51. Wool and animal hair, including yarn and woven fabric	105.49 (660.11)	0.17	141.86 (817.62)	0.10	0.064 (0.70)	0.408 (0.70)

Table 3. (Continued)

HS-2 commodity classification	Pre-AGOA U.S. imports from SSA countries (N = 304)		Post-AGOAUS imports from SSA countries (N = 256)		Import initiation effect	Import intensification effect
	Mean (St. Dev)	% (Total)	Mean (St. Dev.)	% (Total)		
52. Cotton, including yarn and woven fabric thereof	157.86 (734.88)	0.41	176.23 (74.54)***	0.05	1.072 (2.33)**	2.749 (2.33)**
53. Veg text fib Nesoi; Veg fib and paper yns and wov fab	1.66 (9.65)	0.00	3 (13.08)	0.00	−0.021 (0.45)	−0.240 (0.45)
54. Manmade filaments, including yarns and woven fabrics	322.95 (1961.96)	0.51	267.14 (1522.99)	0.19	−0.011 (0.46)	−0.204 (0.46)
55. Manmade staple fibres, incl yarns and woven fabrics	37.31 (217.76)	0.06	29.23 (171.25)	0.02	0.026 (0.64)	0.417 (0.64)
56. Wadding, felt etc.; sp yarn; twine, ropes etc.	64.58 (344.75)	0.10	75.32 (432.76)	0.05	0.027 (0.34)	0.163 (0.34)
57. Carpets and other textile floor coverings	24.51 (171.69)	0.04	106.13 (617.16)*	0.08	0.127 (1.80)*	0.7833 (1.60)
58. Special woven fabrics; tufted fab; lace; tapestries etc.	131.95 (820.21)	0.21	200.21 (1149.61)	0.14	0.037 (1.26)	0.6581 (1.26)
59. Impregnated etc. text fabrics; tex art for industry	6.38 (45.32)	0.01	65.19 (450.25)	0.05	0.085 (1.43)	0.849 (1.43)
60. Knitted or crocheted fabrics	9.52 (81.85)	0.02	53.07 (291.98)	0.04	0.048 (3.78)***	0.556 (3.78)***
61. Apparel articles and accessories, knit or crochet	3570.07 (11313.76)	5.69	17891.46 (44168.91)***	12.75	0.008 (2.38)**	3.289 (2.38)**
62. Apparel articles and accessories, not knit etc.	6797.3 (23709.77)	10.74	18260.96 (45173.87)***	12.75	1.002 (1.84)*	2.019 (0.04)
63. Textile art Nesoi; needlecraft sets; worn text art	61.12 (274.24)	0.10	129.2 (647.31)	0.09	0.094 (1.03)	0.523 (1.03)
64. Footwear, gaiters etc. and parts thereof	41.37 (200.84)	0.07	55.59 (267.18)	0.04	−0.103 (1.21)	−0.470 (1.14)
65. Headgear and parts thereof	44.18 (192.31)	0.07	53.4 (261.69)	0.04	0.009 (0.89)	−0.306 (0.99)
66. Umbrellas, walking-sticks, riding-crops etc., parts	8.69 (81.94)	0.01	40.3 (238.89)	0.03	0.019 (0.28)	0.118 (0.28)
67. Prep feathers, down etc.; artif flowers; H hair art	44.21 (184.23)	0.07	39 (149.34)	0.03	−0.040 (0.55)	0.342 (0.55)
68. Art of stone, plaster, cement, asbestos, mica etc.	86.21 (424.71)	0.14	235.71 (1264.7)	0.17	−0.074 (0.87)	−0.5020 (0.87)
69. Ceramic products	29.48 (137.48)	0.05	92.57 (610.29)	0.07	−0.082 (1.12)	−0.552 (1.12)
70. Glass and glassware	384.92 (2357.55)	0.60	322.19 (1904.25)	0.23	−0.053 (1.36)	−1.131 (1.36)
72. Iron and steel	8637.13 (53866.9)	13.59	14446.69 (85141.98)**	9.92	0.001 (0.06)	0.046 (0.06)
73. Articles of iron or steel	669.25 (4118.86)	1.06	1517.85 (8940.59)	1.06	0.034 (0.38)	0.256 (0.38)
74. Copper and articles thereof	305.26 (1478.49)	0.49	579.46 (3102.82)	0.41	−0.117 (1.47)	−0.847 (1.67)
75. Nickel and articles thereof	478.89 (3365.94)	0.76	405.94 (2681.67)	0.29	0.001 (0.13)	0.046 (0.15)
76. Aluminium and articles thereof	637.37 (3819.21)	1.01	5721.51 (35898.78)***	4.04	0.077 (1.21)	0.858 (1.21)
78. Lead and articles thereof	11.55 (123.09)	0.02	1.57 (10.12)	0.00	0.003 (0.81)	0.157 (0.81)
79. Zinc and articles thereof	87.38 (655.55)	0.14	463.06 (5419.28)	0.33	−0.098 (0.54)	−0.232 (0.54)
80. Tin and articles thereof	0.72 (6.54)	0.00	2.92 (14.15)	0.00	1.0047 (2.35)**	2.543 (2.35)**
81. Base metals Nesoi; cermets; articles thereof	1898.65 (8751.61)	3.00	1321.4 (5262.38)	0.92	0.016 (0.72)	0.355 (0.72)

(*Continues*)

Table 3. (Continued)

HS-2 commodity classification	Pre-AGOA U.S. imports from SSA countries (N = 304)		Post-AGOAUS imports from SSA countries (N = 256)		Import initiation effect	Import intensification effect
	Mean (St. Dev)	% (Total)	Mean (St. Dev.)	% (Total)		
82. Tools, cutlery etc. of base metal and parts thereof	94.1 (640.73)	0.15	231.14 (1361.35)	0.16	−0.086 (1.30)	−0.792 (1.30)
83. Miscellaneous articles of base metal	84.79 (167.68)	0.05	39.92 (126.45)**	0.07	1.070 (1.82)**	−0.471 (0.82)
84. Nuclear reactors, boilers, machinery etc.; parts	2015.97 (11 622.76)	3.16	7723.59 (43 002.29)	5.45	−0.022 (0.66)	−0.502 (0.66)
85. Electric machinery etc.; sound equip; TV equip; pts	502.8 (2720.33)	0.79	1547.44 (7271.34)	1.06	0.092 (1.90)*	1.431 (1.90)*
86. Railway or tramway stock etc.; traffic signal equip	130.38 (849.15)	0.21	473.48 (2840.97)	0.33	0.041 (2.20)**	1.312 (2.20)**
87. Vehicles, except railway or tramway, and parts etc.	1261.54 (9383.17)	2.05	11 971.36 (71 249.15)	8.50	0.033 (0.39)	0.270 (0.39)
88. Aircraft, spacecraft, and parts thereof	65.24 (491.7)	0.10	113 (609.75)	0.08	0.066 (1.17)	0.683 (1.17)
89. Ships, boats and floating structures	60.09 (473.57)	0.09	298.46 (1746.13)*	0.21	0.009 (0.60)	0.393 (0.60)
90. Optic, photo etc., medical or surgical instruments etc.	279.1 (1098.01)	0.44	708.15 (2653.4)	0.50	0.015 (0.19)	0.126 (0.19)
91. Clocks and watches and parts thereof	9.53 (61.58)	0.02	11.89 (43.42)	0.01	0.000 (0.01)	0.003 (0.01)
92. Musical instruments; parts and accessories thereof	13.34 (51.98)	0.02	34.25 (99.53)	0.02	−0.036 (0.36)	−0.163 (0.36)
93. Arms and ammunition; parts and accessories thereof	48.95 (640.8)	0.08	126.37 (774.46)	0.09	0.018 (1.34)	0.773 (1.34)
94. Furniture; bedding etc.; lamps Nesoi etc.; Prefab Bd	277.69 (1519.43)	0.44	621.78 (2988.06)	0.44	0.1046 (1.42)	0.754 (1.30)
95. Toys, games and sport equipment; parts and accessories	85.21 (266.56)	0.13	224.47 (709.96)***	0.16	0.017 (0.20)	2.115 (2.20)**
96. Miscellaneous manufactured articles	37.72 (139.62)	0.06	48.02 (202.57)	0.03	−0.116 (1.29)	0.743 (1.29)
97. Works of art, collectors' pieces and antiques	242.05 (643.75)	0.38	497.94 (1216.38)***	0.35	1.004 (2.15)**	0.107 (0.15)
98. Special classification provisions, Nesoi	2705.1 (12 978.06)	4.27	4913.02 (18 878.71)	3.47	0.001 (0.73)	0.522 (0.73)
99. Special import provisions, Nesoi	208.96 (595.56)	0.33	850.63 (2257.58)***	0.60	0.000 (0.07)	3.030 (2.07)**
All commodities	92 938.73 (381 832.56)	100.00	221 128.23 (902 332.37)*	100.00	2.000 (2.91)***	0.010 (1.07)

Trade values are in 1000s of constant 1999 U.S. prices. The import initiation and intensification effects of AGOA on each of the HS-2 level product classification is derived by decomposing the marginal effects of the variable AGOA in regression of imports of each of the products on the variables included in Equation (2). For results on some selected products, see Table 3.
***, **, and * denote significant differences at $p < 0.01$, $p < 0.05$ and $p < 0.10$, respectively.

countries to substitute exports of certain goods that are subject to restrictions with exports of products or goods originating from other sectors covered by the concession. Given the disparities in the economic sizes of the AGOA eligible SSA countries, the variation in the basis of each country's comparative advantage for trade with the U.S. and the composition of the products that each of the SSA country might export to the U.S. under the Act, substitution effect among products is particularly likely and possible. One or more of the following questions may thus arise. Which countries and which products in each country have benefited most from AGOA? Has the implementation of the Act contributed to the initiation of exports in goods that were not previously exported? Did the implementation of the initiative result in increased level of goods that were being traded? While answering such important questions require substantial information for each product as defined in the Act on country-by-country basis, thus prohibiting us from making an inference on the first question, below we address the remaining two questions as our empirical model permits to disentangle the trade initiation and intensification effects of the implementation of the Act for each of the 99 different HS-2 digit level product classification.

A product-specific summary of the effects of AGOA on U.S. imports, estimated by decomposing the marginal effects of AGOA into trade-initiation and intensification effects, reported in Table 2a,b are presented in Table 3 together with the pre-and post-AGOA average annual U.S. imports of each HS-2 product. A comparison of the pre-and post-AGOA average annual values based on the results presented in Table 3 reveals a significant rise in the volume of U.S. imports in 23 of the 99 products sub-categories and a fall in the volume of a few product categories. Apparel articles (both knit and not knit) account for a dominant proportion of SSA countries' exports where we observe significant post-AGOA increase in the volume of U.S. imports.

The last two columns of Table 3 present the trade initiation and intensification effects that could be attributed to the implementation of AGOA. The computed effects in both columns essentially correspond to the coefficients reported in Table 2. The difference between those in Tables 2 and 3 is that the values in the former table are unconditional marginal effects while those in the latter table are computed by decomposing the marginal effect into changes from 0 to positive value, and subject to positive trade values, the changes in the volume of U.S. imports that could be attributed to the implementation of AGOA. Accordingly, the estimates presented in Table 3 indicate that AGOA had significant trade initiation effects across 24 product sub-categories, while it has resulted in both trade initiation and intensification effects only in limited number of products.

Among other interesting observations that could be made from the results in the table, we find that the implementation of the AGOA has generated new exports in several product categories even among those products that account for economically a small proportion of SSA countries' exports to the U.S. For some product categories, we also find an outcome where the significant increase in the U.S. imports from SSA countries cannot be attributed to the implementation of the Act. Yet in other products categories, while we observe a significant trade-initiation effect, the changes are not large enough to intensify the level of SSA exports implying that further enhancing SSA exports into the U.S. markets requires not only building upon the trade-initiation momentum generated by the unilateral policy change, but also solving other impediments to SSA export industries. These may include building networked communications and efficient transportation hubs that enable SSA countries to overcome the negative of effect of geographic distance and lack of access to a seaport, training and capacity building (as could be inferred from the positive coefficients

of income and experience under AGOA), and promoting their openness both in their product and foreign exchange markets.

5 CONCLUSIONS

Policy changes due to trade agreement may not only help raise the volume trade in goods that are already being traded, but also in the start-up of commerce in goods that were not previously traded between parties to such agreements. In this paper, we investigate whether there are changes in the volume of U.S. imports of several goods from SSA countries, and if the changes can be attributed to the implementation of AGOA, a unilateral trade policy initiative designed to eliminate trade barriers on exports of several, but selected products from eligible SSA countries. The results from our study show that the Act has enhanced the propensity of U.S. imports from eligible SSA countries by initiating imports in several sectors and product categories. Compared to the trade initiation effects it had, the impact of the initiative in raising the volume of U.S. imports from eligible SSA countries has, however, remained minimal. Our findings imply that the success of AGOA in further increasing SSA exports to the U.S. markets depends on the ability of African policy makers to build on the trade-initiation momentum generated by the Act. These may include building networked communications and efficient transportation hubs that enable SSA countries to overcome the negative of effect of geographic distance and lack of access to a seaport, training and capacity building (as could be inferred from the positive coefficients of income and experience under AGOA) and promoting their openness both in their product and foreign exchange markets.

While we explicitly bring to light the contribution of the implementation of the Act on aggregate and HS-2 digit level U.S. imports of different products from eligible SSA countries in general, the inadequacy of extensive product by country trade data limits our analysis from differentiating which products in which countries have benefited the most from the implementation of the Act. With the passage of time and the availability of sufficient cross-section and time series data for each product, future research using the same approach may focus on the identification of the same effects on product by country basis.

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