	Original Research Article

The African Growth Opportunity Act and Ghana's Exports: A Synthetic Control Approach

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Abstract

What is the economic impact of the African Growth and Opportunity Act (AGOA) on Ghana's exports? Using a synthetic control method, a quasi- experimental approach, and a panel dataset for the periods 1965 through to 2018, this study examines the effects of AGOA on Ghana's exports as a share of GDP. The findings show that AGOA has transitory positive effects in the initial stages but negative effects in the medium run. The positive impacts are largely attributed to sound macroeconomic environment and the discovery of oil while the negative impact is mostly due to the fall in US demands for exports from Africa in the wake of 2008-2009 financial crisis. AGOA does not automatically improve exports as a share of GDP of its member countries, which suggests the need for complementary government policies. However, the AGOA looks promising for Ghana if it is embarked by good policies.
Keywords: Africa Growth and Opportunity Act (AGOA), Synthetic Control Method (SCM), JEL Codes: F13, F14, F19.

1. INTRODUCTION

Trade liberalization has long been thought to have significant effects on exports. It is mostly thought theoretically to have improved exports performance of many economies. It increases market demand for a country's goods and services which leads to increase in exports performance. The introduction of the African Growth opportunity Act in 2010 has generated lots of interests amongst policy makers and the ordinary Sub-Sahara Africans in understanding the impact of nonreciprocal trade benefits in Sub Sahara Africa. This is because there have been robust studies supporting that open trade promotes growth and development according to Grossman and Helpman (2015). The recent studies by Kassa and Coulibaly (2019) also posited that the Preferential Trade Agreement has positive impacts on most of the countries that participate in it. Santos-Paulino (2002) and Santos-Paulino and Thirwall (2004) found a positive relationship between trade liberalization and exports growth. Using a panel data and gravity model estimator, Tadesse and Fayissa (2008) found that trade liberalization through WTO has negative impact on exports in middle and north African countries. However, the impact of trade liberalization on exports in developing countries have been very controversial both theoretically and empirically (Santos-Paulino, 2002). This is because researches done to estimate the

relationship between trade liberalization and exports yields different results depending on the variables, the estimation techniques and the sample included in the study. All other things being equal, trade liberalization should improve exports performance, however, we could easily tell that trade liberalization sometimes increases competition such that some countries who are not able to meet this competition see reduction in exports. In addition, weak coordination across governance and regulatory systems can reduce policy effectiveness by limiting implementation coherence, oversight, and institutional responsiveness, even where the policy itself appears beneficial on paper (Joseph, 2013).

In 2011, Ghana recorded exports earnings to the tune of US$779 million, which happens to be one of the highest the country had recorded over the last decades. However, this number dropped to US$292 million in 2012. This raised lots of concerns about the impact of the African Growth and Opportunity Act (henceforth, AGOA). AGOA is a United States Trade Act, enacted on 18 May 2000 as Public Law 106 of the 200th Congress. The legislation significantly enhances market access to the US for qualifying Sub-Saharan African (SSA) countries. Qualification for AGOA preferences includes countries working to improve its rule of law, human rights, and respect for core labor standards (The USTR

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2018). As we will see in Figure A1 of section 10, policy makers and economists are in uncharted territory, with little guidance on what the actual impact of the policy would be. In this paper, I address one major question. Does the AGOA increase Ghana's export as a share of its GDP? To answer this question, I study the trends of Ghana's exports over the years before and after the policy was implemented. In this comparative study, I also look at the exports of other countries which have similar structural process with Ghana during the same period. Other factors that determine the exports of these countries were studied in order to determine the driving factors of the policy. To be able to do that, the synthetic control method was employed using a panel dataset spanning from the year 1965 through 2018, and 20 control units. The analysis yields two major findings. First, we can see that initially there is transitory positive effect, then it becomes negative in the medium run. The findings from this study are strongly in line with the findings of Kassa and Coulibaly (2019). The finding indicates that AGOA does not automatically improve exports of its member countries, which suggests the need for complementary government policies.

The rest of the paper is organized as follows. The literature review discusses the studies from other researchers and their findings on the trade policy and exports performance as a share of its GDP. Section 3 addresses data and hypothesis of the study. The estimation method (the Synthetic Control) and the techniques used in obtaining the results for the study are explained in section four. Section five presents the actual effects of AGOA on Ghana's exports, followed by section six where the robustness checks of the study were discussed. The discussion and limitations of the results were discussed in section seven, followed by section eight which gives a brief summary, conclusion and remarks of the work.

2. LITERATURE REVIEW

AGOA was intended with the standard of economic benefits of trade policies in mind but according to several recent studies, the realization of the Act in improving Ghana's exports has been a subject of a series of debates. The papers associated with the World Bank have found that exports tend to increase due to liberalization (Michaely *et al.,* 1991) and that reforming countries have performed better than non-reformers. However, this difference is not statistically significant. Another group of studies from Shafaedin (1994), UNCTAD (1989: Part 1, Ch. V.B) and (Iwanow and Kirkpatrick 2009) concluded that there is little evidence to support the link between trade liberalization and exports performance. In the words of (Iwanow and Kirkpatrick 2009), "Despite the widespread adoption of trade liberalization and lowering of average nominal tariff levels, Africa's trade performance has fallen well below the expectations. The continent's share in world trade has declined over the past three decades and primary commodities continue to account for a large

share of total exports". Lastly, Kassa and Coulibaly (2019) conducted a study on revisiting the trade impact of the African Growth and Opportunity Act using the synthetic control approach. They used the synthetic approach to address the trade impacts of AGOA. This study focuses on the analysis of the aggregate impact on Sub Sahara African countries. They found out that most of the African countries that registered for the policy had gains in exports. The results from their study are varied and the gains from exports are unsteady. Broader evidence from emerging markets also suggests that governance quality and oversight structures can shape economic outcomes and market performance, which implies that the benefits of trade preferences may also depend partly on the strength of domestic institutional arrangements (Ogundipe, 2019). They posited that the positive impact of the policy was mainly in the areas of information and communications technology infrastructure, integrity in the institutions of legal and property rights, ease of labor markets regulations, and sound macroeconomic environment such as stable exchange rates and low level of inflation. Raghavan (2000), and (Nouve and Staatz, 2003) argue that South Sahara African countries' exports to U.S are dominated by petroleum products and are concentrated in a few countries such as Nigeria and South Africa. Bedassa Tadesse and Bichaka Fayissa (2008) conducted a study on the impact of AGOA on U.S imports from Sub Sahara African (SSA) using the gravity estimation method on US-SSA countries' trade data for the years 1991-2006 and they found out that the impact 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.

Cestepe *et al.,* (2015) conducted a study on the effects of trade liberalization on exports of 13 Middle East and Northern African (MENA) countries to 30 Organization for Economic Cooperation and Development (OECD) trading partners. In their study, they used alternative estimators to take the zero-trade problem and endogeneity problem into account. They found that whereas WTO membership negatively affects the exports of MENA countries, free trade agreements have positive impact on exports of those countries. Thus, trade liberalization via a trade agreement is a useful policy to increase exports in the MENA countries. Again, Stojcic *et al.,* (2018) conducted a study on the effects of trade liberalization with European Union on changes on the structure and quality of exports performance from the New Member States in the period 1990-2015. Results obtained using the SCM shows that trade liberalization increased the quality of exports and the share of high technology intensive industries in its structure across all Northern Member States (NMS). In summary, the empirical studies that have been conducted so far indicates that the trade policy and exports performance relationship remain an interesting area of research despite most of the studies point to the fact that trade policy improves export performance. According to

Kassa and Coulibaly (2019), most of the studies on the impacts of the AGOA employed augmented versions of gravity models of trade to estimate the effects of AGOA on trade flows. One major problem of this approach is that the standard empirical method used to estimate gravity equations may be using inappropriate functional forms.

This study seeks to employ more recent estimation techniques -the synthetic control method- that allows the use of different countries all over the world. The selection techniques in this approach gives a broad understanding of the relationship between exports performance and trade liberalization policies because it incorporates many predictor variables and covers a large sample size. This modern approach will address the empirical challenges in estimating the impact of AGOA on exports as a share of GDP. Another contribution of this paper is extending the existing literature by estimating the country specific impacts of the AGOA and hence providing insights for policy actions in both the design and the structure of the AGOA in the next generation. To the best of my knowledge, this is the only paper that studies the impacts of the AGOA with the emphasis on country specific effects using countries across the globe to construct its synthetic control.

3. DATA AND HYPOTHESIS

I estimate the statistical quantitative impact of African Growth and Opportunity Act (AGOA) on exports in Ghana. The Synthetic Control Method (SCM), which is introduced in section four, uses samples of countries among whom one unit is the case of interest and the rest of the units are potential comparisons. The unit of interest is called the treated unit and it is the unit that is exposed to the event or intervention or policy of interest. The rest of the comparison units constitute the donor pool. That is, the reservoir of potential comparison units. The donor pool is restricted to units with outcomes that are thought to be similar in structural process as the unit representing the case of interest (Ghana). Again, there is no treatment to the donor pool during the period of the study. The control units are selected from developing countries that have been exposed to all other forms of trade but not the AGOA treatment. The control units are Brazil, Argentina, Peru, Chile, Tunisia, and table 1 under section 4 shows the rest of the countries. The period of the study spans from the year 1965 to 2018. The outcome variable is the exports of goods and services measured as a share of GDP. The covariates or predictors are real GDP in constant 2010 USD, Foreign Direct Investment (net inflows) measured as percentage of GDP, and real exchange rate (EXR). All the variables for this study have been sourced from the World Development Indicators, (World Bank, 2020). This is because data from WDI shows representation of current statistics that are easily accessible and verifiable. The variables used are defined as follows:

Exports ≡ exports of goods and services measured as a percentage of GDP
FDI ≡ Foreign direct investment, net inflows measured as % of GDP
GDP per capita measured in constant 2010 US$ and
Real effective exchange rate index (2010 = 100)

The main hypothesis is:
$H0$: The African Growth Opportunity Act does not have any impact on exports performance in Ghana
$H1$: The African Growth Opportunity Act does have impact on exports performance in Ghana

As the policy eliminates trade barriers, the export performance of the member countries is expected to increase. The summary statistics of the outcome variable (exports as a share of GDP) for Ghana and donor countries for both the pre- and post- treatment periods are provided in table A1 in the Appendix.

4. THE SYNTHETIC CONTROL METHOD (SCM)

To estimate the impact of AGOA on exports as a share of GDP in Ghana, I use the SCM, an experimental modern approach initiated by Abadie and Gardeazabal (2003) and Abadie *et al.,* (2010, 2015). The SCM is a rigorous quantitative framework for carrying out comparative case studies and has been effectively used in the analysis of impacts of trade openness, economic liberalization according to Nannicini and Billmeier (2011), and Billmeier and Nannicini, (2013) respectively. Again, in a World Bank related study by Kassa and Coulibaly (2019), they adopted the SCM approach in their quest to revisit the trade impact of AGOA in Sub Sahara Africa. The SCM espouses data-driven approach in constructing the composite synthetic control group or counterfactual that mimics the characteristics of the treatment group in the pre-treatment period. The gap between the synthetic counter-factual and the treatment represents the impact of the treatment after the treatment period (see equation (1) below). The equation 1 represents the gaps in the figures which is the treatment effects for every post-treatment period. The SCM is more transparent and safeguards against extrapolation relative to the traditional regression method (Abadie *et al.,* 2010). The SCM is also comparatively more reliable in terms of the validity of the estimation because it not dependent on the assumption of parallel trend in the difference-indifference (DID) estimation approach. The SCM builds on the DID but uses more attractive comparisons to get the causal effects according to Athey and Imbens (2017). It provides also a framework to address endogeneity associated with omitted variables bias by accounting for the presence of time varying unobservable confounders (Billmeier and Nannicini, 2013). In this study and following Abadie *et al.,* (2010,2015) and Kassa and Coulibaly (2019) extensively, the SCM is described as follows. Let Y_{it}^N be the outcome in terms of exports that would be observed

in the absence of the intervention or participation in AGOA for country units $i = 1,2, \ldots , J + 1$ and time periods $t = 1,2, \ldots , T$. Let T_0 be the number of pre-intervention periods, where 1: ($T_0 < T$). Let Y_{it}^I be the outcomes in terms exports that would be observed of country i at a time t if unit i is exposed to the intervention in periods $T_0 + 1$ to T. The intervention or participation in AGOA is assumed to have no effect on the outcome of exports before its implementation period. Then, we can define the difference between Y_{it}^I and Y_{it}^N as the effect of participation in the AGOA for country i at time t, if country i is participating in AGOA in periods $T_0 + 1$, $T_0 + 2$ to T by:

$$_{it} = Y_{it}^I - Y_{it}^N \qquad (1)$$

Since only Y_{it}^I is observed in periods $T_0 + 1$ to T, I use SCM to estimate the counterfactual Y_{it}^N, which is the level of exports of a country that has participated in the AGOA had the country not participated in the AGOA.

According to Abadie *et al.*, (2010, 2015), since no single unit is similar to the treated unit before treatment, they propose estimating optimal weights $W^* = (w_2 , \ldots , w_{J+1})$, that can be used to get a suitable control from a weighted average of similar countries that did not participate in the AGOA. The optimal weight vector W^* for each country can be obtained following a synthetic control algorithm[1] that minimizes the objective function, i.e. a measure of the distance between the predictors of the treated unit X_1 and those of the synthetic control, X_0. The minimization problem can be written as:

Minimize$x$ $\quad \sum_{m=1}^{k} v_m(X_{1m} - X_{0m}W)^2 \qquad (2)$

Subject to $\quad w_2 \geq 0, \ldots, w_{J+1} = 0; \; w_2 + \ldots + w_{J+1} = 0.$

Where v_m is a weight that reflects the relative importance that we assign to the mth predictor variable when we measure the discrepancy between $X_1 \text{ and } X_0 W$. X_1 is a $(k \times 1)$ vector of pretreatment variables that are used to match as nearly as possible to the treated country and X_0 is a (k × j) matrix of the values of the same variables for the countries in the donor pool. The SCM employs an iterative reasoning to select optimal weights so that the synthetic controls closely reproduce the actual outcome variable before treatment. If the synthetic country and the counterfactual have similar behavior over extended periods of time prior to the treatment, the gap in the outcome variable after the treatment is interpreted as the impact of the AGOA policy. If there is similar trajectory between Ghana and its corresponding synthetic control for the pretreatment periods, then we can say that there is similar characteristics between the control and treated units in the main predictor of exports as a share of GDP. Abadie et al. (2010) showed that the bias in SCM is bounded by the expression that converges to zero with the number of the pretreatment periods, even if they are correlated with unobserved heterogeneity, provided there is a good match prior to the treatment periods. Therefore, we can say that equation one is an unbiased estimator.

5. RESULTS

I construct the synthetic Ghana as a convex of combination of countries from the donor pool that most closely resembled the "real Ghana" in terms of periods before the AGOA policy values of exports. The result is shown in Table 1. The table compares the pre-treatment characteristics of actual Ghana with that of synthetic Ghana as well as the weighted average of the countries in the donor pool. The synthetic Ghana reproduces values that exports, and export predictor variables had in Ghana prior to the AGOA policy. Like the matching estimators, the synthetic control method demonstrates some level of affinity between Ghana and its synthetic counterparts (the weighted average of countries chosen from the donor pool). This prevents the estimation of counterfactuals that fall far outside the convex hull of the data (King & Zeng, 2006). Then a value (V) is chosen among all positive definite and diagonal matrices that minimizes the mean square prediction error of exports in Ghana during the pretreatment period. This explains the difference between Ghana and its synthetic version in terms of exports.

**Table 1: Exports Share of GDP Predictor Means**

Year	Variables	Real Ghana	Synthetic Ghana	Average of 20 Control Units
1965	Exports	17.121	15.219	16.498
1968	Exports	20.353	16.733	16.291
1973	Exports	21.451	15.546	18.417
1978	Exports	8.358	16.184	19.712
1983	Exports	5.556	11.838	19.778
1988	Exports	18.183	16.893	23.857
1993	Exports	20.254	21.603	26.281
1998	Exports	33.871	28.8967	32.997

Table 2: Country Weights in Synthetic Ghana

Country	Weights
Honduras	0.223
Bangladesh	0.359
Nepal	0.000
India	0.000
Tunisia	0.000
Brazil	0.000
Nicaragua	0.000
Madagascar	0.333
Bolivia	0.0000.000
Colombia	
Paraguay	0.084
Morocco	0.0000.000
Turkey	
Egypt	0.000
Indonesia	0.000
Malawi	0.000
Malaysia	0.000
Phillipines	0.000
Thailand	0.000
Uruguay	0.000

Table 2 displays weights of each control country in the synthetic Ghana. The weights indicate that exports in Ghana prior to the AGOA policy was best represented by the combination of Madagascar, Paraguay, Honduras and Bangladesh. All the other countries were assigned zero weights.
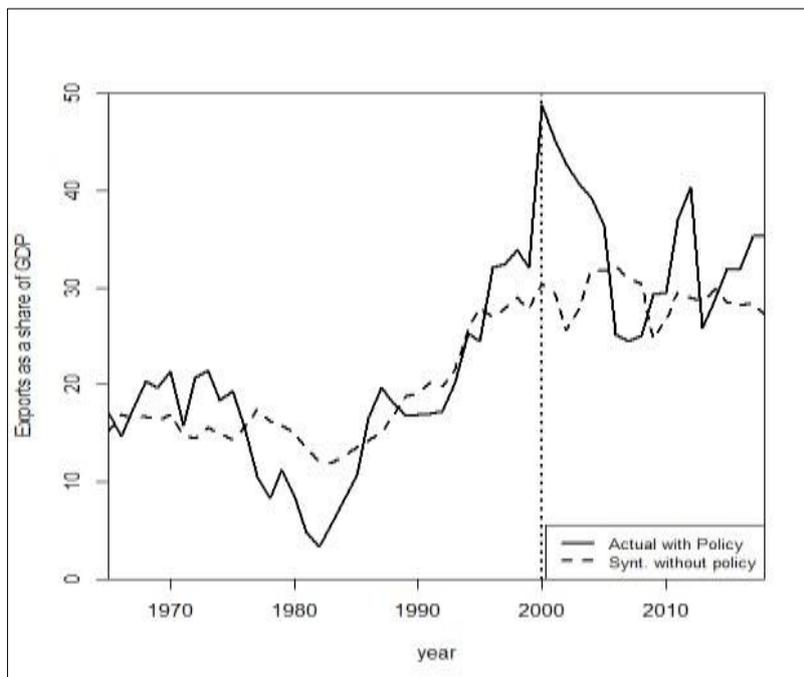

Figure 1: Trends in Exports as a share of GDP: Ghana vs. Synthetic Ghana

Figure 1 displays the exports as a share of GDP for Ghana and its synthetic counterparts for the period 1965 through to 2018. The exports as a share of GDP in synthetic Ghana somewhat closely tracks the trajectory of this variable in Ghana for the entire pretreatment period (except for the period between 1974 and 1983). Combined with some level of balance on exports predictors (from Table 1), it can be observed that the real Ghana and its synthetic were quite close. This suggests that the synthetic Ghana provides a reasonable approximation to the number of exports that would have been exported for the periods 2001 through 2018 in the absence of AGOA policy (that is periods after the implementation of the AGOA 2000 policy).

The estimate of the effect of the AGOA on exports in Ghana is the difference between the exports in Ghana and in its synthetic version after the AGOA policy. Immediately after the policy, the actual Ghana begins to fall till 2005 and rises afterwards till 2010.

Somewhere 2010, it begins to fall and finally starts rising from 2012 till 2018. On the contrary, the synthetic Ghana continues to rise after the policy till 2005 and begins to fall slightly. It is interesting to notice that after 2005 the two lines move in the same direction with actual Ghana being above. However, after 2010 the two lines tend to move in opposite direction markedly. It is also clear that after 2012 the policy seems to have a great positive impact on Ghana's exports. The divergence between the two lines suggests there is both positive and negative economic significance of the AGOA policy. However, we can conclude from the graph in Figure 1 that the positive effect is greater than the negative impact. The negative impacts of AGOA on Ghana's exports as a share of GDP is mostly attributed to a fall in the US demand for exports from Africa and elsewhere in the wake of the 2008-2009 financial crisis which further worsened by the substantial collapse of the commodity prices.
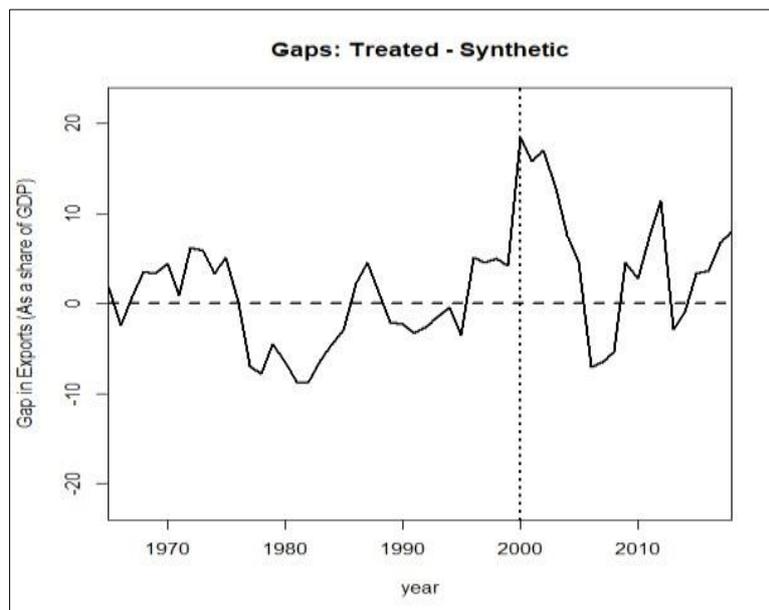
**Figure 2. Yearly Gaps in Exports Between Ghana and Its Synthetic Counterpart**

Figure 2 plots the yearly estimates of the effects of AGOA (the yearly gaps in exports between Ghana and its synthetic counterparts). The figure 2 suggests that the AGOA had both positive and negative effect on Ghana's exports and that is not easily predictable over the time. The magnitude of the estimated impact of AGOA in Figure 2 is quite large. Based on Figure 2, we can say that the estimated effects of AGOA on Ghana's exports as a share of GDP reached 18% during the first years. The results suggest that for the entire 1965-2018 period exports was not following one direction.

To find out if the results were driven entirely by chance, I used the placebo test to assess the estimates. The main idea is finding out how the estimates or the results differ if other countries were chosen at random for this study. Following the study of Abadie and

Gardeazabal (2003), I run the placebo studies using the synthetic control method to countries that did not implement major trade policy during the sample period of the study. If the placebo tests create gaps of magnitude like the one estimated for Ghana, then we can say that the analysis does not provide significant evidence of effect of the AGOA on Ghana's exports. On the other hand, if the placebo studies show that the gap estimated for Ghana is remarkably large relative to the countries that did not implement the AGOA 2000, then we can conclude that the analysis provides significant evidence of the effect of the AGOA policy on Ghana's exports. To do that I conduct series of placebo studies iteratively by applying the synthetic control method that was used in estimating the effects of AGOA on Ghana's exports to every other country in the donor pool. The AGOA policy was reassigned to one of the control units shifting Ghana

to the donor pool and using all the countries in the donor pool one after the other (that is in iteration). Figure 3 displays the results for the placebo runs. The gray lines show the estimated gaps associated with each of the placebo runs. It shows the difference between the Exports as a share of GDP between every country in the donor pool and its corresponding synthetic control. The red thick line shows the estimated gap for Ghana and its synthetic control. To qualitatively verify if the treatment effects is significant using the placebo tests, one can look at the graph to determine the periods in which the red thick line was either above or below the gray lines. Based

on Figure 3, the red line is below the gray lines throughout the years of the post-treatment period. The probability of obtaining a pre/post MSPE ratio as large as Ghana is 3/20 (0.15) which is approximately 15%. So, we can say that the probability we get similar estimates if any other country was chosen as the treated unit (other than Ghana) will be 15%. From the graph, it is clear the estimated gaps for the placebo studies and that of the gap estimated for Ghana are somewhat similar. Based on this, it cannot be concluded that the results presented in this study is not by chance.
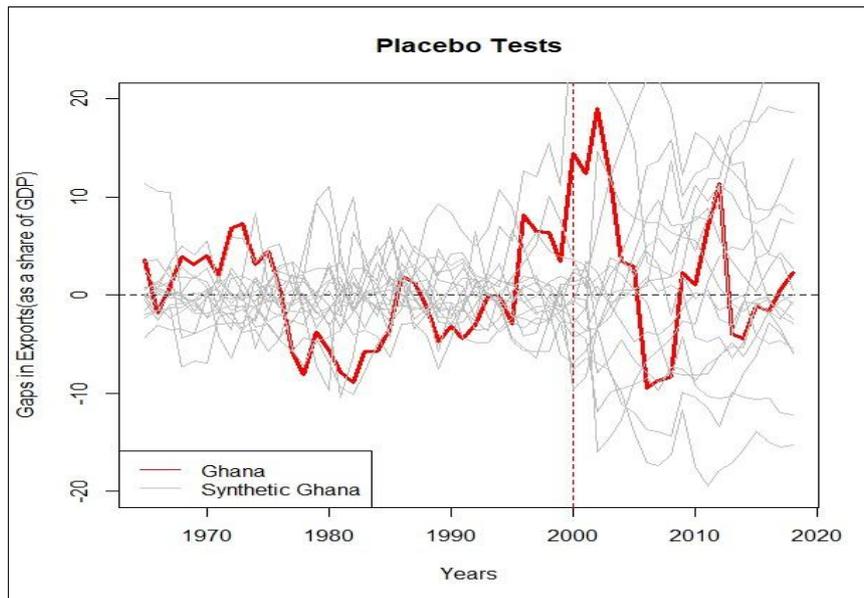
Figure 3. Exports as a Share of GDP Gaps in Ghana and the Placebo

Before proceeding to the robustness checks of the study, it is important to determine if the synthetic method is a good fit for exports as a share of GDP before the AGOA policy. The Root Mean Square Predictor Errors (RMSPE) which is the root of average of the

difference between exports as a share of GDP and its synthetic countries during the pre-intervention periods, shows this fitness. The smaller the values, the better the fits. The RMSPE values for the various estimations are shown in Table 3 below.

Table 3: Root Mean Square Predictor Error for both the Baseline Estimation and the Robustness Checks

Estimations	RMSPE
Baseline estimation	4.5277
Backdating the treatment period to 1995	4.1310
Leave-Madagascar-Out	4.6171
Leave-Honduras-Out	4.7630

6. ROBUSTNESS AND DIAGNOSTIC CHECKS

Abadie (2020) recommends performing certain robustness checks whenever the synthetic control method is used. The idea is to verify that the main results and conclusions of the study hold when some features or assumptions related to the study design are modified in sensitive ways. I carry out two kinds of robustness

exercises. First, backdating the intervention period five years before the treatment period to address the anticipation effects on the exports as a share of GDP before an intervention occurs. Second, the leave-one-out analysis of the AGOA policy, taking from the sample one-at-a-time each of the countries that constitute the synthetic control in Table 2. For each exercise, I report the country weights, the estimates and the gaps below.

Table 4: Country Weights in Synthetic Ghana

Using 1995 as the Treatment Period- Backdating Approach	
Country	Weights
Honduras	0.000
Bangladesh	0.065
Nepal	0.000
India	0.000
Tunisia	0.000
Brazil	0.000
Nicaragua	0.000
Madagascar	0.878
Bolivia	0.000
Colombia	0.000
Paraguay	0.057
Morocco	0.000
Turkey	0.000
Egypt	0.000
Indonesia	0.000
Malawi	0.000
Malaysia	0.000
Phillipines	0.000
Thailand	0.000
Uruguay	0.000

**Table 5A. Leave-Madagascar-Out Country Weights in Synthetic Ghana Using 2000 as the Treatment Year**

Country	Weights
Honduras	0.078
Bangladesh	0.518
Nepal	0.000
India	0.000
Tunisia	0.000
Brazil	0.000
Nicaragua	0.086
Bolivia	0.000
Colombia	0.000
Paraguay	0.081
Morocco	0.000
Turkey	0.000
Egypt	0.000
Indonesia	0.000
Malawi	0.237
Malaysia	0.000
Phillipines	0.000
Thailand	0.000
Uruguay	0.000

Table 5B. Leave-Honduras-Out Country Weights in Synthetic Ghana Using 2000 as the Treatment Year

Country	Weights
Madagascar	0.7100
Bangladesh	0.0.096
Nepal India	0.0000.00000
Tunisia	0.0000
Brazil	0.0000
Nicaragua	0.0.000.0000000000
Bolivia	
Colombia	
Paraguay	0.0590
Morocco	0.000
Turkey	0.000
Egypt	0.000
Indonesia	0.000
Malawi	0.000
Malaysia	0.001
Phillipines	0.000
Thailand	0.134
Uruguay	0.000

In order to evaluate the robustness of the outcomes, Abadie and Gardeazabal (2003) included additional predictors but contrary to that approach, I included one more lag of the outcome variable to construct the synthetic control. The results stayed virtually the same. This is shown in Figure A2 and Figure A3 of section 10. To further assess the robustness, the backdating and the leaveone-out approach in the study of Abadie (2020) were adopted. Backdating approach assesses how the outcome variable would have behaved if we artificially moved the pre-treatment period 5 or 10 years back. Figure 4 shows the results of estimating the effect of the AGOA on Ghana's exports with the intervention backdated to 1995. Two important features of the results are as follows. First, as one would hope for, the synthetic control estimator closely tracks exports as a share of GDP for Ghana in the 1995-2000 period before the start of the intervention of AGOA. This is the in-time placebo test in Abadie et al. (2015) and like the pre-program test in Heckman and Hotz (1989). The absence of estimated effects (the Figures 4, 5A and 5B have similar trajectory) prior to the intervention provides credibility of the synthetic control estimator, as it demonstrates that the synthetic control is able to reproduce the trajectory of the outcome variable for the treated unit before the intervention occurs. Second, a gap between exports as a share of GDP and its synthetic control counterpart appears around the time of the AGOA policy as in Figure 1. This is the case even when the intervention is 5-year backdated in the data and the procedure uses no information on the timing of the actual intervention. The shape and direction of the gap in Figure 4 is similar to that of Figure 1.
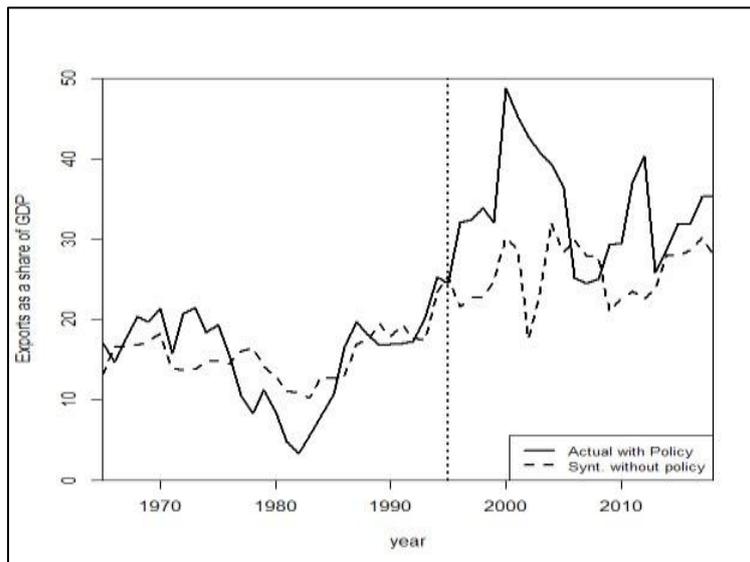
Figure 4: Backdating the 2000 AGOA Policy to the year 1995

For the leave-one-out approach as another way to test the robustness of the results, I take away Madagascar from the sample and the results is shown in Figure 5A. The results of a leave-one-out analysis, taking from the sample one-at-a-time each (that is Madagascar, Honduras, Bangladesh and Paraguay) of the countries that contribute to the synthetic control in Table 2. All leave-oneout estimates closely track the exports as a share of GDP series for Ghana before 2000. The resulting estimates for the years after the AGOA are similar to the results estimated using the entire donor pool. The main conclusion of the estimate of the AGOA on Ghana's exports seems to remain the same after the exclusion of any one particular country.
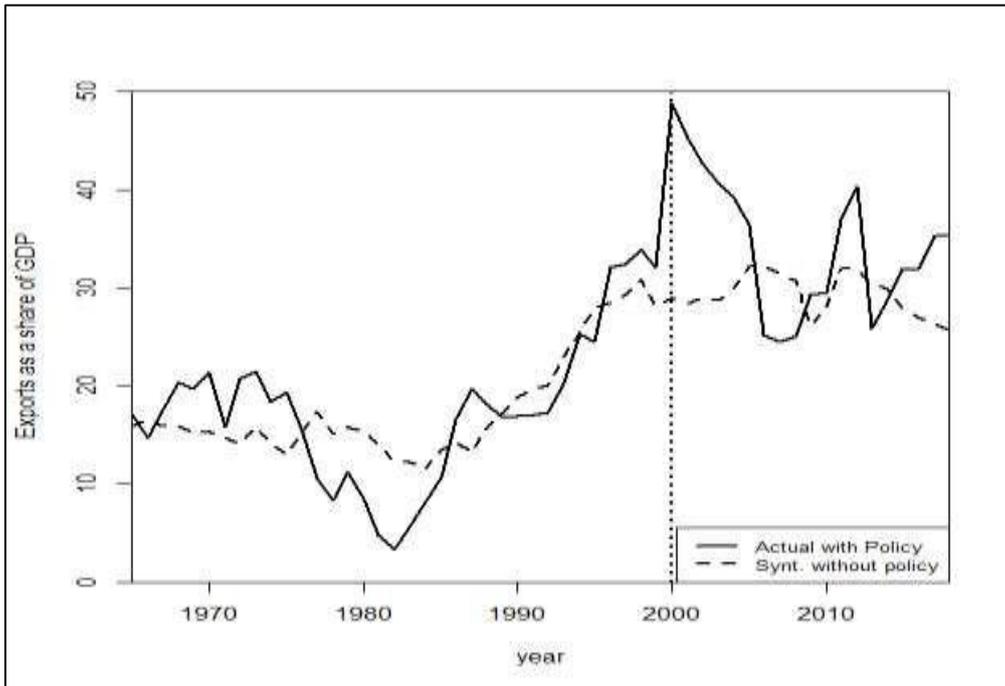

Figure 5A: Leave-Madagascar-out estimates of the AGOA 2000 Policy on Ghana's exports as a share of GDP
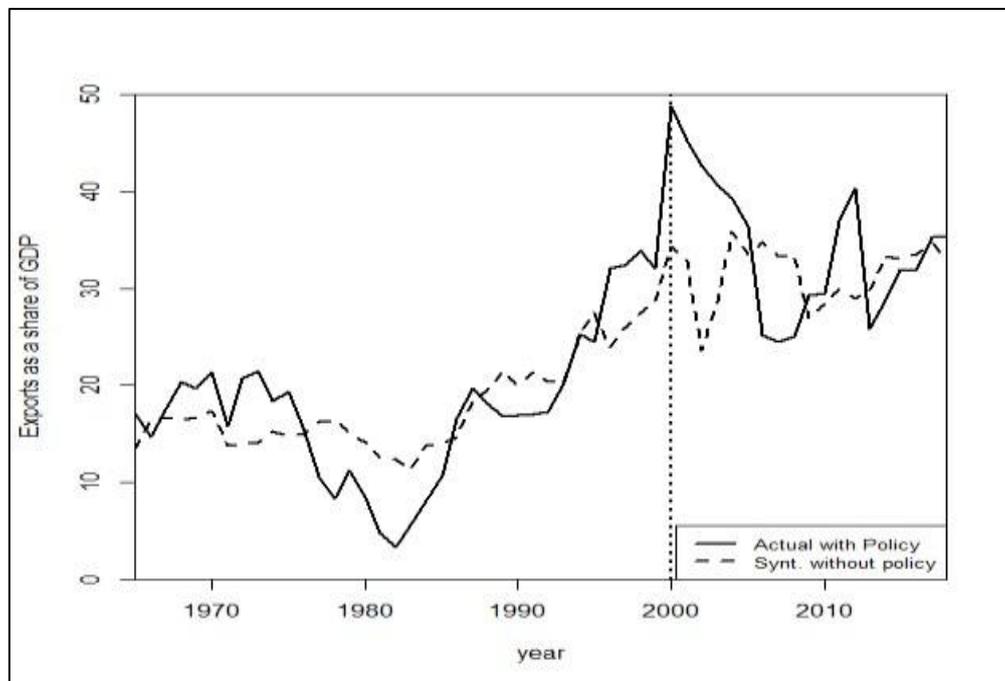

Figure 5B: Leave-Honduras-out estimates of the AGOA 2000 Policy on Ghana's exports as a share of GDP

7. DISCUSSION AND LIMITATIONS

Based on the results from the study so far, we can say that Ghana's exports might have been influenced by lots of unpredictable factors or policies. One major factor that could cause this is the discovery of natural resources which could influence Ghana's exports.

Despite this, there is the need for the policy makers to critically analyze if the policy has achieved its purpose. One major concern of this study is the fact that the synthetic control could not mimic the actual Ghana in the pre-treatment period. Some could argue that there could be other factors like geographical location of countries included in the study, the economic policies that could influence their exports at a certain point in time, and natural disasters that is beyond control of policy makers that can cause the differences which was not captured in the study undertaken. Research of this nature is important for policy makers to have fair ideas of how exports as a share of GDP can help boost the economy.

This study is also limited to time frame which does not allow the application of other estimation approaches to estimate the effects of the policy on Ghana's exports. This limits the study to further investigate whether the countries which constitute the weights to form the synthetic Ghana have similar economic structures in the pretreatment period. It is important to note that this study encountered other limitations such as unavailability of data on the important predictor variables (real exchange rate) for most of the countries that would have given a good donor pool. Lastly, one major limitation is the inability to explore why the AGOA has negative impacts on Ghana's exports as a share of GDP during some periods. Further research could be done looking into the effects of this policy based on the year of entry into the policy.

8. CONCLUSION AND RECOMMENDATION

This paper examines the impact of the African Growth and opportunity Act (AGOA) on Ghana's exports. Using the synthetic control method and a panel dataset from 1965 to 2018, I found that initially the AGOA has a significant positive transitory effect but after some years, it tends to have negative effects on Ghana's exports. The African Growth and Opportunity Act policy did not unambiguously promote Ghana's exports. However, the placebo studies (the significance test of the estimates) shows that the results cannot be said to have not been drawn by a chance. The major finding of the study indicates that the AGOA has transitory positive impact few years after the policy but after some years, the effect of the policy was negative. However, the impacts are not statistically significant. The study recommends that, international policy advocates and the Ghanaian economists should critically examine the time span of any trade policy before embarking on it. This also highlights the importance of stronger monitoring and evidence-based policy tracking systems, since better regulatory intelligence and data-driven oversight can improve implementation quality and policy adjustment over time (Odutayo, 2020). With good measures put in place, the policy is promising to positively impact the exports performance of Ghana.

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10. APPENDIX

Table A1. Summary Statistics of the Outcome Variable for Ghana and the Donor Countries for Both the Pre- and
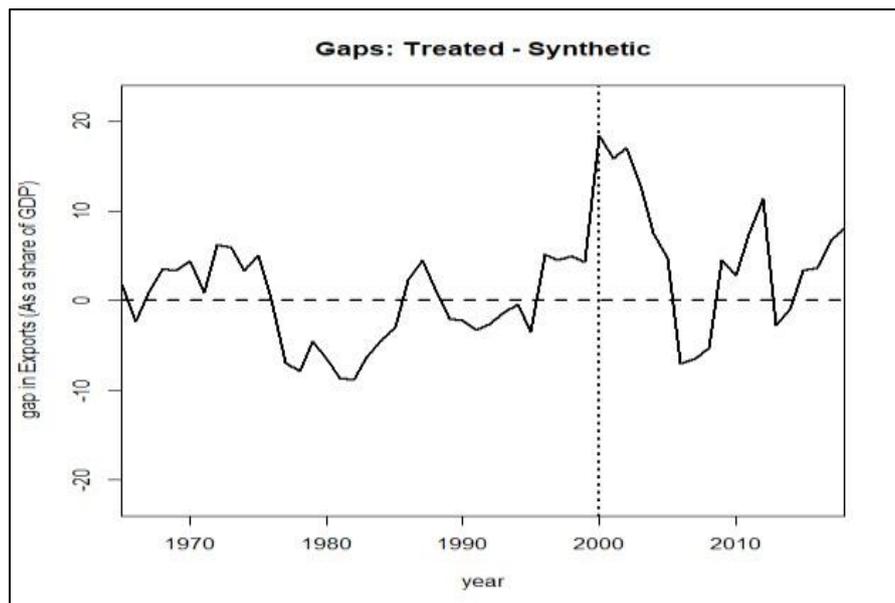
Ghana						
Variable	Mean	SD	Min	Max		N
			3.338307	33.87135		35
Pre- Treatment Exports	17.58662	7.685305				
Post-Treatment Exports	33.56134	6.510729	24.52509	45.23302		18

Donor Countries					
Variable	Mean	SD	Min	Max	N
Pre- Treatment Exports	24.20932	18.51371	2.491556	126.2086	1330
Post-Treatment Exports	36.17991	29.7603	8.25732	221.6101	685
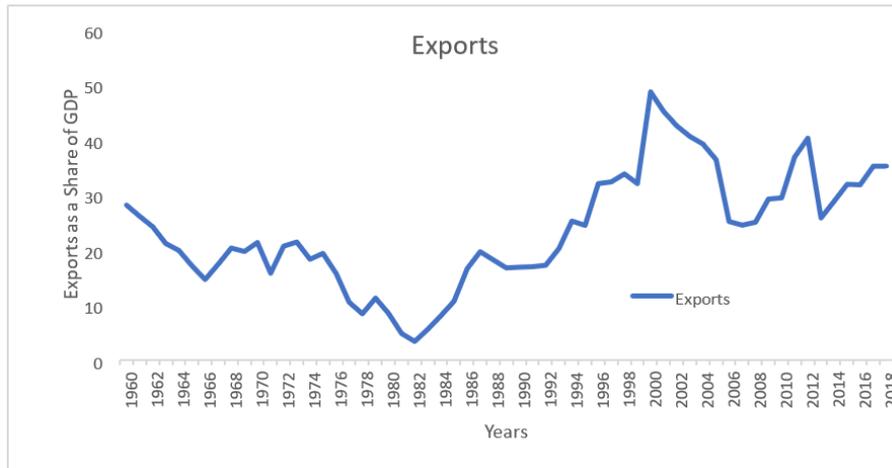
Figure A1: Trends in Ghana's exports as a share of GDP (1960-2018) from WDI
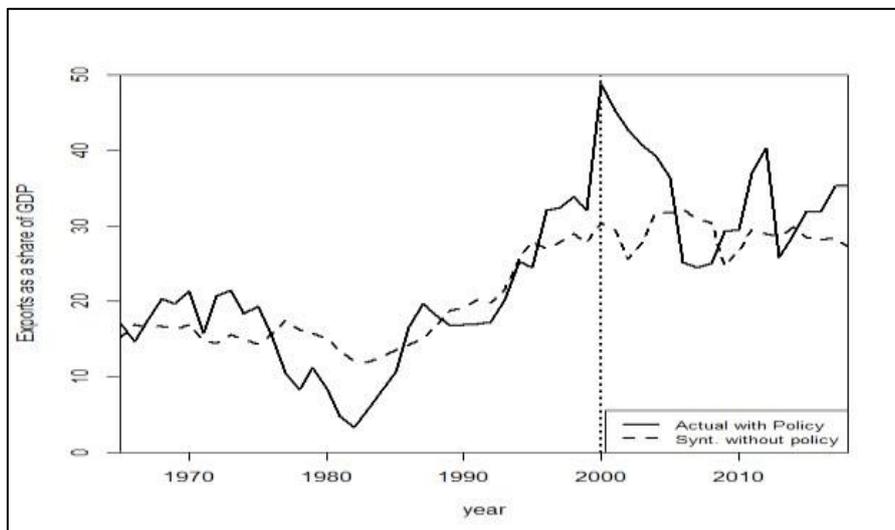
Figure A2. Trends in Exports as a Percentage of GDP: Ghana vs. Synthetic Ghana after taking one more lag of the outcome variable

Figure A3. Yearly Gaps in Exports Between Ghana and Its Synthetic Counterparts After Adding One More Lag to the Outcome Variable