CHINA'S PARTNERSHIP WITH GHANA IN MEASURING AID FOR TRADE AND ITS SOCIO-ECONOMIC IMPACTS: GHANA BEYOND AID

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ABSTRACT

The role of Aid remains a relevant concept in deciding the direction and content of development assistance. This paper argues that while there is a continuing strategic interest in aid, there has been growing anxiety with the performance of aid for trade as a development resource. The study employs ARDL cointegration technique to examine the extent to which China's Aid-for Trade impact on Ghana's Per Capita growth during the transition period "Ghana beyond Aid" using data ranging from 1961 to 2019. Based on the data, it is found that China's Aid-for-Trade in Ghana has a positive and statistically significant impact on its Per Capita Growth as well as other controlling variables such as trade openness and business regulatory policy in both the short-run and the long-run. Furthermore, the Granger Causality test showed a unidirectional causal relationship that goes from Aid-for-Trade to Per Capita growth and also, a positive significant causal relationship between Per Capita Growth and other controlling variables. From a policy-oriented point of view, the study concludes by citing appropriate measures to help streamline the roadmap towards a Ghana beyond Aid policy in sustaining a stronger national development towards a workforce of industrial expansion.

Keywords: Sino, Ghana, Aid for Trade, Per Capita Growth, Dependency Theory, Socio-Economic.

1. INTRODUCTION

The origin of aid can be traced to the 18th century when Prussia subsidized most of her allies to boost their military support and effectiveness (Ekiring, 2000). This was followed by the United States of America (1812, Venezuela crisis), British (1929, LDC), and USA (the 1940s, Marshall Plan, officially the European Recovery Program, ERP). This generated a resurgence of European industrialization and brought extensive investment into the region. Reports from the World Bank show that out of the 700 million people who were pulled out of poverty between 1981 and 2010, 627 million of them were in China. That leaves us with 73 million throughout the rest of the world. In 2017 foreign aid to countries including Ghana amounted to US$ 146.6 billion. This amount showed a small decrease of 0.6 percent from 2016. But aid to Africa rose by 3 percent to US$ 29 billion and within that, aid to Sub-Saharan Africa was up 3 percent to US$ 25 billion (Adams & Atsu, 2014). Instead of drastically improving the living conditions of the recipients who live below the poverty line, this aid makes the rich richer, the poor poorer, and hinders economic growth in the region, not to mention catalyzing the viciousness of corruption. Burnside and Dollar (2000) found that aid had been effective in promoting economic growth in countries with 'good policies'. The numerous debates over aid are based on how it would affect important economic

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variables such as growth, investment, savings, and real exchange rate (Hussain et al., 2009). Additionally, aggregate growth is probably the single most important factor affecting individual levels of income (Sala-i-Martin et al., 2004). Significantly, this has implications for the welfare of individuals, most importantly the plight of the poor making it widely considered a necessary condition for poverty alleviation (Oosterbaan et al., 2000). Also, Clemens et al., (2004) use sectoral aid and finds a positive short-run effect on economic growth and that institutional factors may impact the effectiveness of aid. It is imperative for the study to mention that improved aid via trade policies has the potential to increase transparency and accountability, promote the rule of law, and build domestic governing capacity. Recent empirical works in development economics emphasized the optimistic appraisals of aid efficacy if it is injected into a good policy environment (Burnside & Dollar, 2000; Collier & Dollar, 2004) whereas more negative assessments suggest that political regime type trumps aid as a determinant of economic development thereby making aid agencies having difficulties ensuring the transparent and efficient dispersal of aid resources that could lead to growth (Easterly, 2006). Traditionally, the interaction of aid and trade policies were promoted by different constituencies represented in different institutions, the General Agreement on Tariffs and Trade (GATT) and the World Trade Organization (WTO) on one hand, and development agencies on the other (Hoekman & Mattoo, 2007). As analytical and empirical work on donors' aid implementation record shows that aid transfers between donor and recipient governments are at great risk of aid capture through agency problems and bureaucratic inefficiencies in poorly governed countries (Svensson, 2000; Brautigam & Knack, 2004; Reinikka & Svensson, 2004; Fielding & Gibson, 2005; Djankov et al., 2008). It is interesting to note that in recent years there has been a significant increase in aid flows to developing countries although other types of flows such as foreign direct investment and other private flows are declining. For example, according to the Organization for Economic Corporation and Development (Fuchs et al., 2014), foreign direct investment and other private flows are on the decline, and remittances are expected to drop significantly in 2009. Arguably, from the late 1970s, aid to Ghana rose from $40.9 US million to $190.81 US million in 1980. Again, it rose further from $598.17 US million to $1306.93 US million in 2008 and finally to $ 2.9 US billion (Brown, 2017). The current government of Ghana's economic and social policy regime is intended to create a self-confident, optimistic, and prosperous nation via creative exploitation of the country's human and natural resources. Similarly, good policies create favourable economic conditions via reducing interest rates and improved productivity. The major concern is to draw the linkage between donors of aid and recipient interactions. To some extent, how aid influences policies and government decisions at international platforms. The basis of my research is to outline the benefits attributable to the effectiveness of China's aid inflows and the linkage in trade policies in achieving economic growth and development. On the other hand, the bone of contention is that key question needs utmost attention on how ready Ghana is in providing the needed stimulus to aid-dependent institutions and distressed local industry, assisting new companies to grow and also creating jobs for the people in the country. Other critical areas of concern include: is there an enabling domestic

environment with adequate resource mobilization, good governance, sound economic policies, solid rule of law and sound national policy strategies to ensure a country without aid. With about 80 percent of foreign aid channeling into the four main pillars of the economy, namely; healthcare, education, economic growth and government spending (politics), it has become necessary that the authors undertake such research and recommend if the Government of Ghana needs to embark without aid now or postpone it for a future date. Hence, the main objective of this paper is to investigate the extent to which China's Aid impact on Ghana's GDP per capita growth as well as trade flows of the transition policy "Ghana Beyond Aid (GBA)". Additionally, this study analyses the trend of foreign aid, identify sectors attracting aid, and examines the pattern of natural resources (gains) and finally, probe into the industry policies of the Ghanaian economy. Furthermore, the study seeks to answer the questions on how significant are Ghana's natural resources dependent on Aid for trade. Secondly, how significant are Ghana's macroeconomic indicators dependent on Aid and lastly, how Ghana's institutional policies are contributing to Aid inflows and trade regulations. On the basis of hypothesis testing, the study does that in three main areas.

H1: Aid focused on trade promotion will have a positive impact on Ghana's per capita growth.

H2: Trade flows are more likely to influence Aid inflows in Ghana.

H3: Business environmental policy is more likely to influence Ghana's per capita growth.

In the organization of this study, the present section provides a general description of the study. The next section specifies a theoretical model and factual evidence (literature) on the subject matter; followed by data description and econometric model. Afterwards, the study presents empirical results and lastly, concludes on its findings.

2. LITERATURE REVIEW

2.1. DEPENDENCY THEORY

In the late 1950s, Dependency Theory developed under the guidance of the Director of the United Nations Economic Commission for Latin America, Raul Prebisch was troubled by the fact that economic growth in the advanced industrialized countries did not necessarily lead to growth in the poorer countries. Prebisch found that increases in the wealth of the richer nations appeared to be at the expense of the poorer ones. Dependency theory advocated an inward looking approach to development and an increased role for the state in terms of imposing barriers to trade, making inward investment difficult and promoting nationalisation of key industries. Indeed, studies suggested that economic activity in the richer countries often led to serious economic problems in the poorer countries. Again, Prebisch and his colleagues found that poor countries exported primary commodities to the rich countries who then manufactured products out of those commodities and sold them back to the poorer countries. The authors observe that the terms of trade for underdeveloped countries relative to the developed countries had deteriorated over time where the underdeveloped countries

were able to purchase fewer and fewer manufactured goods from the developed countries in exchange for a given quantity of their raw materials exports. This idea is known as the Prebisch–Singer thesis (1950). This concept of value added by manufactured product always cost more than the primary products used to create those products. As a result, poorer countries would never be earning adequate from their export earnings to pay for their imports. At this point, dependency theory was viewed as a possible way of explaining the persistent poverty of the poorer countries. However, Marxists theorists viewed the persistent poverty as a consequence of capitalist exploitation. And a new body of thought, called the world systems approach, argued that the poverty was a direct consequence of the evolution of the international political economy into a fairly rigid division of labor which favored the rich and penalized the poor. Significantly, dependency theory explain the current underdeveloped state of many nations in the world by examining the patterns of interactions among nations and by arguing that inequality among nations is an intrinsic part of those interactions. On the other hand, the dominant view of dependency theorists is that there is a dominant world capitalist system that relies on a division of labour between the rich 'core' countries and poor 'peripheral' countries. Over time, the core countries will exploit their dominance over an increasingly marginalised periphery. Within the world political and economic system there is a tremendous amount of interaction among core countries and peoples, and between the core and the periphery. There is very little interaction just among periphery countries. The consequences of this are great, resulting in an isolated and weak periphery country having an unequal relationship with the united and strong core. Meaning that dependency theory focused on individual nations, their role as suppliers of raw materials, cheap labour, and markets for expensive manufactured goods from industrialized countries. Nevertheless, it was concluded that the underdeveloped nations must employ high degree of protectionism in trade if affected countries were to enter a self-sustaining development path, arguing for import-substitution industrialisation rather than a trade and export orientation as the best strategy for underdeveloped countries.

2.2. TRANSFER PARADOX THEORY

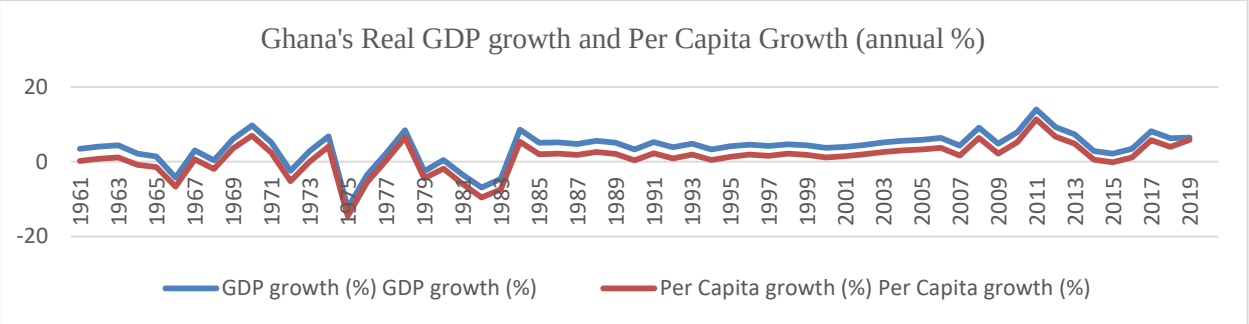
The transfer paradox describes the situation in which transfers of initial endowments within competitive market make the donor better off and/or the recipient worse off. This means that the transfer paradox takes place in a two agent exchange economy when a transfer from the first agent to the second leads to a gain of welfare for the donor and a loss in welfare for the recipient. The existence of the transfer paradox was first noticed by Leontief (1947). Shortly afterwards, Samuelson (1952, 1954) demonstrated in a two agent and two commodity exchange economy that a transfer paradox can only occur if the initial equilibrium is unstable. Furthermore, Balasko (2014) provided the first complete characterization of the transfer paradox. He showed that in a two agent exchange model, with an arbitrary number of commodities and arbitrary (well-behaved) preferences, the transfer paradox can occur at a regular equilibrium if and only if the equilibrium has an index value of -1. Given that equilibria

with index value -1 are unstable (the reverse is not always true if the number of goods is larger than two) this shows that the transfer paradox cannot occur at a stable equilibrium. On the other hand, the dismissal of the transfer paradox as empirically irrelevant on grounds of instability is not possible. Likewise, a phenomenon similar in spirit to the paradox of transfer is the phenomenon of advantageous (disadvantageous) reallocation, where a group of agents, by reallocating their initial endowments, may all attain a higher (lower) level of utility at the new equilibrium. Such an example was given by Gale (l974) and the phenomenon was further elaborated by Guesnerie and Laffont (1978), and Safra (1981). But for the paradox to occur, the change in relative prices/utility following the transfer must be not only favorable to the donor but also strong enough to outweigh the loss in resources on his part. A major issue about transfer paradox is how they affect the welfare levels of the donor and the recipient countries. However, to the issue of the interactions between aid instruments and trade policies, the possibility of welfare-worsening transfers in the recipient country arises when one departs from the distortion-free world. A recent interesting contribution along a similar line is Schweinberger (2002), who considers the effect of foreign aid in the context of an economy with a public good the labour costs of which are financed from tariff revenue levied on the private importable good. Clearly, aid, though, is never pure and always has a tied component related to the purchase of goods in the donor economy with respect to the distribution of utility gains and losses prior to the transfer.

2.3. TRENDS IN CHINA-GHANA RELATIONS

Over the past 55 years, the cordial friendship between Chairman Mao Zedong and Dr Kwame Nkrumah during their presidency ignited the growing interest of Chinese merchants and businessmen into Ghana. Since the 1960s, China has assisted Ghana's development with technical support, grants and interest-free, interest-subsidised and concessionary loans. Afterwards, China has become a major development partner for Ghana, focusing its assistance especially on the development of roads, energy and telecommunications infrastructure and technical cooperation. On the other hand, China-Ghana bilateral trade volume hit US$2.06 billion, breaking through US$2 billion for the first time. Within two years, the bilateral trade volume between the two countries recorded a figure of US$5.4 billion in 2012, with an increase of 163 percent over 2010. According to the Chinese statistics, the trade volume between China and Ghana in the third quarter of 2013 reached US$3.8 billion. Moreover, in 2010, Ghana signed a succession of multibillion dollar contract with China to finance infrastructure projects and change its economy through gas and anticipated oil-driven industrialization. Again, Ghana's export volume to China during this period saw an annual increase of 46.1 percent representing US$1.5 billion while the non-financial FDI reached US$112 million. Consequently, more and more Chinese businesses divert their attention to Africa and therefore show eager assistance in various economic sectors of those countries of which Ghana is no exception.

Figure 1: Ghana's Real GDP growth and Per Capita Growth (annual %): 1961-2019



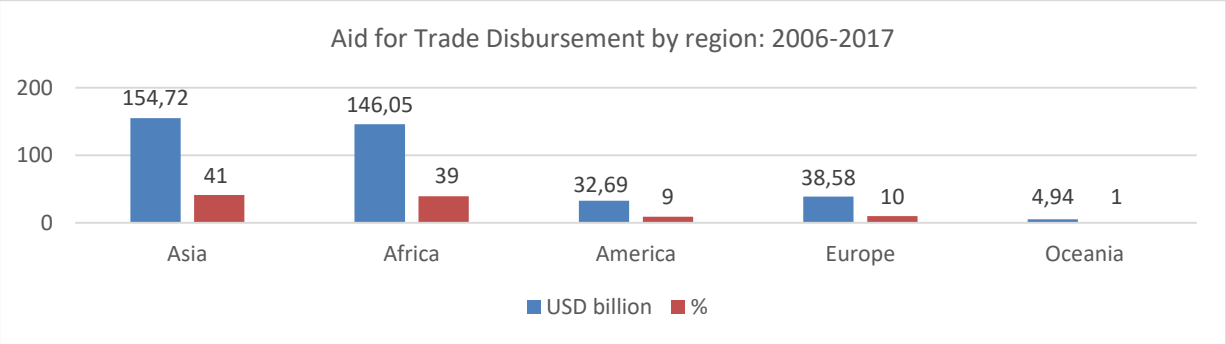
(Source: World Bank Group)

In 2007, Ghana discovered oil in commercial quantities and this has raised hopes but has also generated some fears about the resource curse. Economic reforms (ERP/SAP) supported by the IMF and the World Bank were instituted to stabilize the economy and correct a number of structural imbalances in order to spur growth. The economy responded positively to the ERP/SAP and the favorable trend has continued since that time, with growth settling around 5 percent for most parts of the almost three decades following the reforms. By and large, Ghana's long term development goal as contained in the Ghana Shared Growth and Development Agenda (GSGDA) is to achieve a per capita income of at least US$3,000 by 2020.

2.4. RATIONALE FOR AID-FOR-TRADE

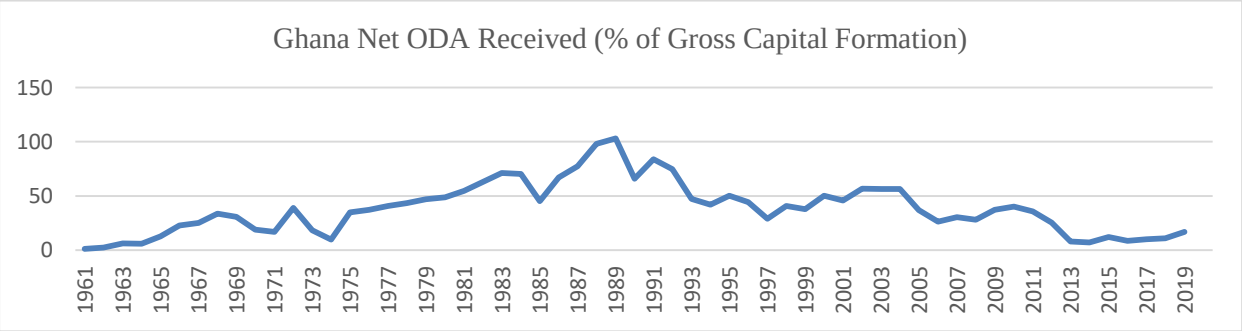
Until the recent economic slowdown, the global process of economic integration among countries intensified, underpinned by an unprecedented rise in the volume of trade and capital flows and a reduction in barriers of worldwide trade and investment activities. There is a large and growing body of evidence that there are positive links between openness to trade and economic performance, which depending on the pace and pattern of growth is important for achieving sustained poverty reduction. This can be seen in the developing countries that have succeeded in benefitting from the expansion of global markets. Conceptually, Aid-for-trade (AfT) is development assistance aimed to bolster trade capacity and reduce trade costs in low-income countries. For it to be effective, AfT must address national trade-related priorities identified through domestic policy formulation processes. However, the significantly positive effects on recipient countries' exports did not hold for the low-income group among aid-recipients.

Figure 2: Aid for Trade Disbursement by region: 2006-2017



Source: OECD-DAC CRS: aid activity database (2019)

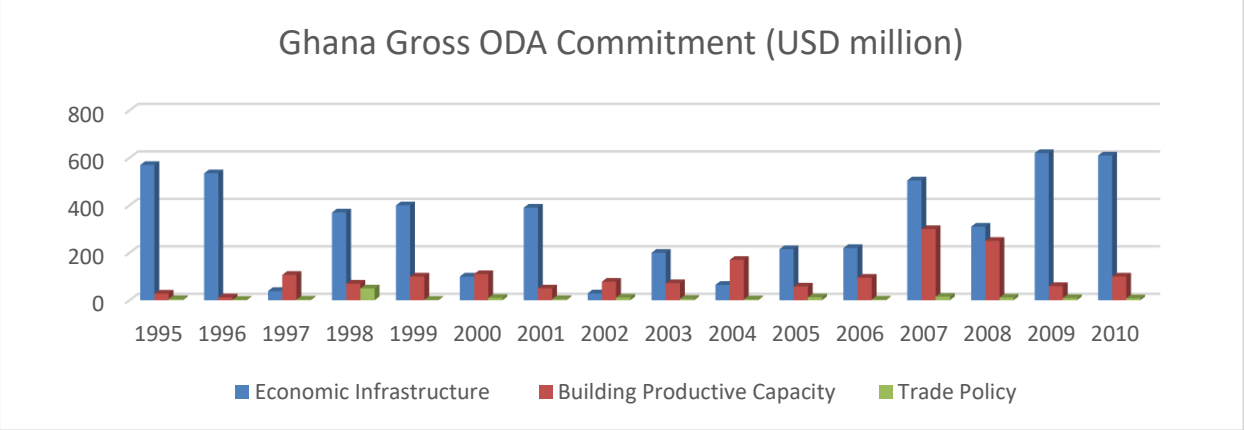
Figure 3: Ghana Net ODA Received (% of Gross Capital Formation): 1961-2019



Source: Bank of Ghana

Ghana receives a significant amount of aid by African standards. Figure 4 (below) shows ODA commitments as captured by the OECD CRS into three sectors often associated with aid-for-trade for the period 1995-2010. The bulk of AfT goes into economic infrastructure and the building of productive capacities of the real sectors of the economy (such as agriculture). Also, the agriculture sector received at least 50 percent of aid in building productive capacity. It received a high of 93.6 percent of the total flows into building productive capacity in 2007.

Figure 4: Ghana Gross ODA commitments, (US$ m): 1995 - 2010



Source: OECD-DAC CRS: aid activity database (2019)

2.5. THE ROLE OF TRADE FOR DEVELOPMENT

The importance of trade to growth and development is well-grounded as provided by comparative advantage theory which says all countries gain when each concentrates on and export goods that they can produce at lower opportunity cost than their trading partners. Successful trade provides for developing/emerging nations a source of foreign currency to help a nation's balance of payments (trade surplus countries build up US$ reserves). Also, it is an important way of financing imports of essential imports of capital equipment/technologies and energy supplies. Additionally, it increases employment in export industries and related industries which can lead to rising per capita incomes and stronger Human Development Index scores. Moreover, there is an injection of demand into the circular flow of income and spending thereby creating positive export multiplier effects. Likewise, falling prices for consumers helps to increase real incomes e.g. by opening up markets to new competition. These beneficial factors help create a global trading system that is more open, reliable, and predictable for all.

2.6. MANAGING AID-FOR-TRADE FOR RESULTS

Ghana receives substantial amounts of aid into the agriculture sector which can go a long way in improving the productive capacity of the sector in order to be able to achieve both domestic and international market objectives of the sector. Improving export competitiveness and diversifying and increasing exports and markets is one such international market objectives. In 2011 Ghana introduced an aid policy, titled Ghana Aid Policy and Strategy, which spans the period 2011 and 2015. The aid policy was developed in response to available evidence showing that recipient country policies and procedures, human capacity, economic management and institutional arrangements determine to a large extent the optimal allocation of aid and its impact on growth and poverty reduction. The policy was fashioned out of the objectives of the Paris Declaration on Aid Effectiveness, 2005 and the Accra Agenda for Action, 2008. The aim of the aid policy is to ensure that aid is managed and monitored properly, i.e.

to ensure effectiveness and coordination by aligning external aid to national development priorities. The aid policy spells out some measures to ensure effective monitoring and evaluation of aid in general, and can thus serve as a minimal framework for introducing trade objectives and indicators to measure the impact of AfT. In 2016 however, Ghana received foreign aid to the tune of US$2.9 billion and the ingredients that go into this include Ghana's own targets as defined in its policies and the nature of AfT flows. Also important is finding targets that can be monitored without expending too many resources both human and financial. The mechanism should reflect donors' views on mutual accountability and adequately put in place structures to ensure appropriate measurement of impacts and outcomes.

3. METHODOLOGY

The chapter focus on the research methods in order to examine and provide answers to the research questions. In order to understand and establish reliable results, the study adopts the quantitative research method via Stata 15.0 statistical software (analysis) in answering the research questions.

3.1. Research Design

According to Myers et al., (2010), research design provides comprehensive coverage of the design principles and statistical concepts necessary to make sense of real data. For the study, a quantitative approach was used to collate, aggregate and analyse data as well as the presentation of findings (Agiomirgianakis et al., 2003). Quantitative analysis allows for a broader study, generating knowledge and create understanding about the social world (Vanderstoep & Johnson, 2008). Moreover, it allows for greater objectivity and accuracy of results. It is easy to measure and the results can be clearly shown through objective data. By and large, the quantitative approach gives a better understanding of the relationship between dependent and independent variables (Kruger, 2003). Meaning that it is ideal for explaining variables relationships and also, useful in producing factual and reliable outcomes.

3.2. Sources of Data

Time series data were used to examine the extent to which China's Aid impact on Ghana's Per Capita growth as well as trade flows during the transition period "Ghana Beyond Aid" using data ranging from 1961 to 2019. The primary advantage of using time series data is that almost all pure analysis used in the real world is based on such data (aiding better analysis and reliable forecast). The study period was chosen because of the emergence of Official Development Assistance (ODA) commonly known as aid to developing countries in the late 1950s aimed at reversing a protracted period of serious economic decline. The choice of Secondary data is because the data collection process is valid and accurate and generated by well-informed expertise and professionals. Also, it helps in improving the understanding of a problem and lastly, economical (time, efforts and expenses). The secondary data used includes Per Capita Growth, Foreign Aid (Net Official Development Assistance and Official Aid Received),

Real Exchange Rate, Trade Openness, Regulatory Policy and Management, Foreign Direct Investment and Government Spending statistics of Ghana. The dataset for this study was obtained from a variety of different sources. Namely, World Bank Group, UNCTAD, Bank of Ghana (BoG), Ghana Statistical Service (GSS) and Ghana Investment Promotion Centre (GIPC).

3.3. Model Specification

In answering the research questions as well as meet the objectives of the study, OLS (Multiple Linear Regression) Model, ARDL-ECM Bounds Testing approach and Granger-causality test were employed.

1. OLS (MLR model)

$$\ln PCG_t = \beta_0 + \beta_1 \ln AfT_{t-1} + \beta_2 \ln RER_{t-1} + \beta_3 \ln TOP_{t-1} + \beta_4 \ln RPM_{t-1} + \beta_5 \ln FDI_{t-1} + \beta_6 \ln GoS_{t-1} + \xi_t \quad (1)$$

2. Dickey and Fuller (1979) ADF unit root test

Empirically, as cited below (equations) it is mandatory to perform unit root tests to ensure the study variables are not I(2) or beyond because the bounds test is based on the assumption that variables are I(0) or I(1). Moreover, the primary reason for performing such a test is to eliminate the issue of serial correlation.

No trend and no intercept

$$\Delta y_t = \delta y_{t-1} + \sum_{i=1}^{p} \beta_1 \Delta y_{t-i} + \xi_t \quad (2)$$

Intercept but no trend

$$\Delta y_t = \alpha_0 + \delta y_{t-1} + \sum_{i=1}^{p} \beta_1 \Delta y_{t-i} + \xi_t \quad (3)$$

Intercept and trend

$$\Delta y_t = \alpha_0 + \delta y_{t-1} + \alpha_{2t} + \sum_{i=1}^{p} \beta_1 \Delta y_{t-i} + \xi_t \quad (4)$$

Furthermore, the cointegration ARDL model used in the analysis of long-run relations when the data generating process underlying is stationary at either integrated at level (I(0)) or integrated at order one (I(1)) or mixer (Pesaran and Shin, 1999; Pesaran et al., 2001). The model assumes a cointegration test based on the bounds testing procedure to estimate the long-run relationship between the study variables. Again, this test is fairly simple because it allows the cointegration relationship to be estimated by OLS after determining the lag order in the model. Crucially, the ARDL bound testing approach is considered to be more robust and appropriate when dealing with large sample data (Pesaran et al., 2001). The ARDL (p,q) model approach to cointegration testing can be written as follows:

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \beta_1 x_{t-1} + \sum_{i=1}^{p} \delta_i \Delta y_{t-i} + \sum_{j=0}^{q} \theta_j \Delta x_{t-j} + \xi_t \quad (5)$$

Alternatively, the equation (5) can be specified as (6):

$$\Delta \ln PCG_t = \beta_0 + \sum_{i=1}^{1} \beta_1 \Delta \ln PCG_{t-1} + \sum_{i=1}^{1} \beta_2 \Delta \ln AfT_{t-1} + \sum_{i=1}^{1} \beta_3 \Delta \ln RER_{t-1} + \sum_{i=1}^{1} \beta_4 \Delta \ln TOP_{t-1}$$
$$+ \sum_{i=1}^{1} \beta_5 \Delta \ln RPM_{t-1} + \sum_{i=1}^{1} \beta_6 \Delta \ln FDI_{t-1} + \sum_{i=1}^{1} \beta_7 \Delta \ln GoS_{t-1} + \phi_1 \ln PCG_{t-1} + \phi_2 \ln AfT_{t-1} + \phi_3 \ln RER_{t-1}$$
$$+ \phi_4 \ln TOP_{t-1} + \phi_5 \ln RPM_{t-1} + \phi_6 \ln FDI_{t-1} + \phi_7 \ln GoS_{t-1} + \xi_t$$

(6)

3. Pesaran et al., (2001): ARDL-ECM Bound Testing Approach

The five cases depending on which deterministic components are included in the model specification and whether we disregard the implied restrictions on their coefficients or not can be expressed as follows:

Case 1: no intercepts; no trends, $c_0 = c_1 = 0$,

Case 2: restricted intercepts; no trends, $c_0 = -\prod' b_0$ and $c_1 = 0$,

Case 3: unrestricted intercepts; no trends, $c_0 \neq 0$ and $c_1 = 0$,

Case 4: unrestricted intercepts; restricted trends, $c_0 \neq 0$ and $c_1 = -\prod' b_1$,

Case 5: unrestricted intercepts; unrestricted trends, $c_0 \neq 0$ and $c_1 \neq 0$.

Using case 3 above, the null hypothesis of no long-run relationship ($H_0 : \alpha_1 = \alpha_2 = 0$) against the alternative hypothesis of long-run relationship ($H_A : \alpha_1 \neq \alpha_2 \neq 0$) using the F-statistic (Wald Test).

Going by the test rule:

If the Wald F-statistics fall above the upper critical value – cointegrated.

If the Wald F-statistics falls between the lower bound and upper bound critical value – inconclusive.

If the Wald F-statistics falls below the lower critical value – no cointegration.

In addition, the author estimated the unrestricted Error Correction Model associated with the ARDL (p,q) model (reparameterization of ARDL Model). With the specification of ECM, both long-run and short-run information is incorporated (in a single model).

$$\Delta y_t = \beta_0 + \beta_{1t} + \alpha(y_{t-1} - \theta x_{t-1}) + \sum_{i=1}^{p-1} \Psi y_i \Delta y_{t-i} + w' \Delta x_t + \sum_{i=1}^{q-1} \Psi' x_i \Delta x_{t-1} + \xi_t \qquad (7)$$

Alternatively, the equation (7) can be specified as (8):

$$\Delta \ln PCG_t = \beta_0 + \sum_{i=1}^{1} \beta_1 \Delta \ln PCG_{t-1} + \sum_{i=1}^{1} \beta_2 \Delta \ln AfT_{t-1} + \sum_{i=1}^{1} \beta_3 \Delta \ln RER_{t-1} + \sum_{i=1}^{1} \beta_4 \Delta \ln TOP_{t-1}$$
$$+ \sum_{i=1}^{1} \beta_5 \Delta \ln RPM_{t-1} + \sum_{i=1}^{1} \beta_6 \Delta \ln FDI_{t-1} + \sum_{i=1}^{1} \beta_7 \Delta \ln GoS_{t-1} + \alpha ECT_{t-i} + \xi_t \quad (8)$$

4. Granger Causality Test (1969)

The rule of thumb is that in the Granger-sense x is a cause of y if it is useful in forecasting y and vice versa. The three different situations in which a Granger-causality test can be applied:

In a simple Granger-causality test there are two variables and their lags.

In a multivariate Granger-causality test more than two variables are included because it is supposed that more than one variable can influence the results.

Lastly, Granger-causality can also be tested in a VAR framework, where multivariate model is extended in order to test for the simultaneity of all included variables.

$$y_t = \beta_0 + \sum_{i=1}^{m} \beta_i y_{t-i} + \sum_{j=1}^{n} \Psi_j x_{t-j} + \xi_t \quad (9)$$

$$x_t = \beta_0 + \sum_{i=1}^{m} \beta_i y_{t-i} + \sum_{j=1}^{n} \theta_j x_{t-j} + \xi_t \quad (10)$$

The empirical results presented in this paper are calculated within a simple Granger-causality test in order to test whether FDI "Granger cause" employment and vice versa. Based on the estimated OLS coefficients for the equations (9) and (10), four different hypotheses about the relationship between y_t and x_t can be formulated: (i) $y_t \rightarrow x_t$ (y_t causes x_t, unilateral causality); (ii) $x_t \rightarrow y_t$ (x_t causes y_t, unilateral causality); (iii) $y_t \leftrightarrow x_t$ (feedback or bilateral causality); and (v) y_t x_t (Independence).

The null hypothesis is $H_0 : \sum_{j=0}^{n}$, that is lagged x_t and y_t terms do not belong to equations 9 and 10 respectively. The test of significance of the overall fit can be carried out with an F-test while the number of lags can be chosen with Akaike Information Criterion (AIC, (Akaike 1974) or Bayesian Information Criterion (BIC, (Schwartz 1978).

Where:

PCG = Per Capita GDP Growth rate

AfT = Aid-for-Trade from China (Net ODA as a % of Imports and Exports)

RER = Real Exchange Rate (purchasing power parity conversion factor)

TOP = Trade Openness (Trade as a % of GDP)

RPM = Regulatory Policy and Management (Regulatory Quality)

FDI = Foreign Direct Investment (% of GDP)

GoS = Government Spending (total government expenditure as a % of GDP)

β_0 = Constant Coefficient

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ = Short-run Coefficients

ξ_t = Error Term

α = Coefficient of Error Correction (with the speed of adjustment coefficient = $1-\sum_{j=1}^{p}\delta_i$). The larger the value, the quicker the convergence to the long-run equilibrium. For stability, we require that α < 0.

ψ = ECM Short-run Coefficient

θ = ECM Long-run Coefficients $(\sum_{j=0}^{q}\theta_j / \alpha)$

p,q, m, n = Optimum lag length used in the model

t-i / t-j = lag period / number or years of lag

ϕ = ARDL Long-run Coefficient

Note: lnPCGt-1, lnAfTt-1, lnRERt-1, lnTOPt-1, lnRPMt-1, lnFDIt-1, lnGoSt-1 are natural logarithmic transformations of above mentioned variables in past years.

3.4. Description and Measurement of Variables

Dependent Variable

a) Per Capita Growth

Per capita GDP is one of the other indicators that measure the economic well-being of every country. The economy of well-being highlights the need for putting citizens at the center of policy. By definition, the indicator can be seen as the capacity to create a virtuous circle in which citizens' well-being drives economic prosperity, stability and resilience over a given period of time (Osberg & Sharpe, 2001). This means that it is a metric that breaks down a country's economic output per person and is calculated by dividing a country's GDP by its population. It is a global measure for gauging the prosperity of nations using economic growth. It is the dependent variable in the regression model. Data on per capita growth were obtained from the Bank of Ghana (BoG).

5. Independent Variables

b) Aid-for-Trade

The OECD-CRS reporting system map aid-for-trade agenda into three categories. Firstly, trade policy and regulation which comprises aid flows to facilitate the participation in multilateral trade negotiation and to improve the implementation of multilateral trade agreements. Secondly, trade development covering business development and activities aimed at improving the business climate, access to trade finance, trade promotions and related services. Thirdly, economic infrastructure involving aid inflows directed towards the improvement of the infrastructure for transport, storage, communication and energy. It's measured as Net ODA (% of imports and exports) flow in/out of China-Ghana. Data on Aid-for-Trade (Net Official Development Assistance and Official Aid Received as a percentage of Imports and Exports) were obtained from the World Bank Group, UNCTAD and Ghana Statistical Services (GSS).

c) Real Exchange Rate

The importance of the real exchange rate for every economy (especially the Central Bank) is related to the effects of the real exchange rates on the Central Bank balance sheet and, in turn, with its ability to conduct a prudent monetary policy. The real exchange rate was measured as the ratio of the exchange rate to purchasing power parity conversion factors. This means that a decline in the purchasing power parity can be interpreted as the real appreciation of the exchange rate and vice versa. It is one of the controlling variables for the estimation. Data was sourced from the Ghana Statistical Services (GSS).

d) Trade Openness

Used as the proxy variable to control for trade liberalization policies. It was included in our model because trade policy is one of the determinants of Aid, FDI and exports (Kutan and Vuksic, 2007). This means that a country's trade policy that restricts exports or imports could lead to a decrease or an increase in trade volume (Menyah, Nazlioglu and Wolde-Rufael, 2014), it is calculated as the ratio of trade to GDP. As well we expect a positive coefficient and relationship because effective trade liberalization policies provide solutions to anti export-bias and make them become more competitive in overseas markets. Data on the subsectors were obtained from UNCTAD.

e) Regulatory Policy and Management

Good government policy is a core tool of every administration and also determines its success or failure. The regulatory policy addresses opportunities via a mixture of technical assistance and national capacity building. Currently, policy regulation is becoming government's preferred choice in the implementation of its national agenda. Data on variable were obtained from The World Bank Group.

f) Foreign Direct Investment

According to Fernandez-Arias & Hausmann (2001), FDI is seen as a safer form of finance. It is an investment in the form of a controlling ownership in a business in one country by an entity based in another country. FDI (% of GDP) was used because it reflects the proportion of economic growth and also the investment flow into the country. Data on foreign Investment were obtained from the Ghana Investment Promotion Centre (GIPC).

g) Government Spending

Government spending is an essential ingredient needed to fulfill government economic objectives via the provision of goods and services for societal needs. Governments around the world rely heavily on such spending on physical assets like bridges, hospital buildings, roads and other expenses. Zakaria and Ghauri (2011); and Ravn, Schmitt-Grohe, and Uribe (2012) state that government spending positively affects the real exchange rate, which implies that government consumption leads to depreciation of the real exchange rate. Therefore, government expenditures comprise different payments including purchases of consumption goods and services, tangible assets, interest payment and transfer payments to individuals, companies (profit and non-profit organizations). Data on government spending were obtained from The World Bank Group.

3.5. Validity and Reliability

Validity refers to the conceptual and scientific soundness of a research study or investigation, and the primary purpose of all forms of research is to produce valid conclusions (Adcock & Collier, 2001). The validity of a measure depends on how we have defined the concept it is designed to measure. Significantly, validity is related to research methodology because its primary purpose is to increase the accuracy and usefulness of findings by eliminating or controlling as many confounding variables as possible, which allows for greater confidence in the findings of any given study (Marczyk & DeMatteo, 2005). According to Huck (2007), reliability testing is important because it refers to consistency in all parts of the measuring instrument. Also, reliability can be seen as a measurement procedure to which a test produces similar results under constant conditions on all occasions, thereby minimizing the errors and biases in a study (Heale & Twycross, 2015; Taherdoost, 2016).

3.6. Discussion of Results

Empirical result analyses presented are based on the statement of hypothesis and/or research questions, which measures China's Aid for Trade and its Modern Day effect on the Socio-Economic Impact of the transition: Ghana Beyond Aid. Under this

chapter, the composition of results is into four sections. From below statistics, table 1 provides a descriptive analysis of the variables under consideration, followed by other diagnostic tests depicting summary output on regression results, Pearson correlation and other coefficient variable output from the robust (model) test.

6. Descriptive Statistics

Table 1: Descriptive Statistics

Variable	Mean	SD	Min	Max	Skew	Kurt
lnPCG	4.596483	0.184724	1.927483	6.492924	0.673825	0.482937
lnAfT	7.135034	0.093705	4.729402	9.638593	0.704812	0.547839
lnRER	3.041802	0.108483	2.739215	5.038821	0.537498	0.948822
lnTOP	0.618539	0.219470	0.237364	1.784382	0.738219	0.674934
lnRPM	0.791045	0.118374	0.392821	2.038754	0.363028	0.738293
lnFDI	3.641062	0.061932	1.638287	4.879943	0.286873	0.493058
lnGoS	0.658293	0.128374	0.217402	1.837485	0.747282	0.564821

Source: Author's computations (2020)

The descriptive results presented in Table 1 shows the mean level of 4.596483 and 7.135034 representing an average figure of approximately 5 percent per capita growth and 7 percent growth in China's Aid-for-Trade to Ghana's economy whilst real exchange rate represents 3 percent of the overall exchange rate structure in the country. This symbolizes an appreciating rate of 3 percent in relation to the currency price of an identical bundle of goods compared with different countries. All other things been equal, trade openness contributed 61 percent to national output and business regulatory policy experienced favourable regulation of approximately 79 percent in the country. Also, growth in foreign direct investment recorded a mean score of 4 percent whereas government spending saw a growth rate of averagely 66 percent (approximately). Lastly both skewness and kurtosis recorded a positively low near zero digits and below benchmark figure of 3 which confirms near normality (respectivey).

7. Empirical Regression Results

The model is in the form:

$$\ln PCG_t = \beta_0 + \beta_1 \ln AfT_{t-1} + \beta_2 \ln RER_{t-1} + \beta_3 \ln TOP_{t-1} + \beta_4 \ln RPM_{t-1} + \beta_5 \ln FDI_{t-1} + \beta_6 \ln GoS_{t-1} + \xi_t \quad (1)$$

Table 2: Regression Output (Dependent Variable: lnPCG)

	Coefficients	Std. Error	P-value
lnAfT	0.898653	0.065301	0.000***
lnRER	0.629875	0.138765	0.040**
lnTOP	0.690641	0.105614	0.003***
lnRPM	0.714520	0.171689	0.000***
lnFDI	0.538764	0.085860	0.021**
lnGoS	0.627642	0.216845	0.013**
Constant	6.847329	0.165507	0.000***
Prob > F	0.0000		
R-Squared	0.8798		
Adjusted R-Squared	0.8465		
Observation	59		

* * *, * *, and * denote significance at 1%, 5%, and 10% respectively

Source: Author's computations (2020)

Table 2 regression result shows that the proposed model is significant at the level of p-value 0.0000. Again, the model recorded an R-squared and adjusted R-squared of 0.8798 and 0.8465 (respectively). The former (0.8798) which is of higher value suggests that 88 percent of the variations in per capita growth is explained by the independent variables whilst only 12 percent is unexplained, suggesting that the above equation is an ideal model in answering our research question. The coefficient for AfT is positive and significant at the .01 level. This finding support Burnside & Dollar (2000) and Easterly et al., (2004) works on aid, policies and growth reiterating the positive impact of aid on growth in developing countries with good fiscal, monetary and trade policies but has little effect in the presence of poor policies. Meaning China's Aid-for-trade impact positively on Ghana's per capita growth due to its good policies conditions in the country. Furthermore, per capita growth showed a rate of about 62 percent as a result of an increment in real exchange rate. This means that per capita growth is very responsive to the real exchange rate. This empirical evidence confirms Gala (2007) study on the positive relationship between real exchange rate levels and economic development. In addition, trade openness and business regulatory policy had a positively significant coefficient on per capita growth by 69 percent and 71 percent

(respectively). Meaning for every 1 percent increase in both trade openness and business regulatory policy, per capita grows at a rate of 69 percent and 71 percent respectively. Likewise foreign direct investment showing a growth rate 54 percent approximately. Empirically, this means that for every 1 percent increase in FDI, per capita grows at a rate of 54 percent. This affirm the work of Alfaro et al., (2004) suggesting that FDI plays an important role in contributing to economic growth. Finally, Government spending showed a positive coefficient of about 62 percent on per capita growth. The result is in line with the empirical works of Oketch (2006) and Fan & Zhang (2008) who found a positive relationship with public spending impact on human capital development and economic growth in developing countries.

Correlation Analysis

Table 3. Pearson Correlation Analysis

Variable	lnPCG	lnAfT	lnRER	lnTOP	lnRPM	LnFDI	lnGoS
lnPCG	1.000000						
lnAfT	0.731394***	1.000000					
lnRER	0.520376**	0.402891	1.000000				
lnTOP	0.708541*	0.648245**	0.287439	1.000000			
lnRPM	0.625763	0.659924**	0.702125***	0.602842**	1.000000		
lnFDI	0.398532	0.318493	0.492185	0.592748	0.487649*	1.000000	
lnGoS	0.532942**	0.495025***	0.637248**	0.747294	0.568943	0.387648**	1.0000000

* * *, * *, and * denote significance at 1%, 5%, and 10% respectively.

Source: Author's computations (2020)

The above table (3) shows that China's AfT is positively correlated with per capita growth by approximately 73 percent in Ghana. This outcome supports Naito (2016) who observed a unique interior growth-maximizing aid/GDP ratio. Additionally, real exchange rate, trade openness and regulatory policy had a positive correlation of 52 percent, 70 percent and 62 percent (respectively) to per capita growth. These positive trends in national per capita growth are consistent with Zulfiqar and Kausar (2012), suggesting that real exchange rate and world per capita growth have a positive relationship on export but only if trade is more liberalized. Moreover, FDI recorded a positive correlation of 39 percent on per capita growth. The outcome support Kumar (2014) empirical work of FDI in India and its positive movement on economic growth. Finally, table 3 further shows a positive and significant correlation between per capita growth and Government spending in the country. Clearly, this result is consistent with Gisore et al., (2014) showing that expenditures on health and defense are positive and statistically significant on per capita growth in East Africa.

3.7. Stationarity Test and ARDL Bound Testing, ECM and Granger-Causality Test

From table 4 (Appendix) it can be observed that per capita growth, Aid-for-Trade, real exchange rate, trade openness, regulatory policy and management, foreign direct investment and government spending are integrated of order one (I(1)). As suggested by the lag length selection criteria, the OLS estimates of ARDL-ECM shows a VAR (1) as suggested by Pesaran et al., (2001) in table 5 (Appendix). The regression for the underlying ARDL model (equation 6) fits very well and significant at 5% level.

Additionally, the model passes all the diagnostic tests against serial correlation and multicollinearity (see Appendix: Tables 10 and 11). Further diagnostic test results suggest that the stability of the model is largely stable as shown below Appendix (Figures 5 and 6). Moreover, ARDL model test reveals a significant p-value (0.0394) indicating no evidence of model misspecification in equation 6 (above). Again, the cointegration analysis shows that when optimal lag (1) is used, the null hypothesis of no cointegration between lnPCG and lnAfT is rejected at 5 percent level. Therefore, the study accept the three alternative hypothesis listed above in the introduction section. Hence, representing the long-run equilibrium relationship between the variables. Also, the bound testing statistics (F-statistics) for equation 6 as shown in table 7 (Appendix) is 7.593762 which is above the lower and the upper bound critical values (2.45 and 3.61 respectively; see Pesaran critical value table). Nevertheless, as cited by Bahmani-Oskooee and Brooks (1999) and Bahmani-Oskooee and Rehman (2005) no final conclusion can be formed about a cointegrating relationship among the study variables without going further to perform other test based on the error correction term. The estimated coefficients and p-values for the ECT in equation 8 is indicated in table 8 (appendix) showing estimated statistically significant (5 percent level of significance). The estimation has the correct sign with considerable variation in the speed of adjustment (that's, how the model is getting adjusted towards long-run equilibrium at the speed of 73 percent). The results reinforce that there is cointegration among the variables specified in the model. Empirically, this supports that in a long-run AfT impacts on per capita growth in Ghana. Meaning China's Aid-for Trade impact statistically on Ghana's per capita growth at a significant p-value of 0.003. Additionally, the result from Granger causality test (Table 9) Appendix shows that there is a unidirectional causal relationship from AfT to PCG and other controlling variables in the short run. Furthermore, there is no reverse Granger-causality from PCG to AfT among other variables in the short-run (see Appendix, table 9). In sum, the study concludes by accepting the three alternative hypothesis cited above in the introduction section and again confirming the presence of both short and long-run relationship/cointegration among the study variables whilst further robust findings show evidence of unidirectional causality running from Aid-for-Trade to Per Capita growth in the short run.

4. CONCLUSION

As seen from the empirical results, aid tying in Ghana has been more prevalent with investment project assistance (IPA) and these bilateral donors attribute their increasing share in total aid to project initiatives that yield direct observable impacts. This study set out to examine the extent to which China's Aid-for Trade impact on Ghana's Per Capita growth during the transition period "Ghana Beyond Aid" from 1961 to 2019 using the ARDL Bounds test and Granger-causality test. Also, the purpose of the study is to establish how significant macroeconomic indicators and institutional policies are dependent on aid-for-trade. The empirical results suggest that there exists a positive relationship between aid-for-trade and per capita growth. Again, the study found other key controlling factors that equally influence per capita growth in the

country. Further robust tests showed that the main causal effect of China's aid-for-trade on per capita growth is positive and significant on Ghana's economy. Moreover, real exchange rate measured as the ratio of exchange rate to purchasing power parity conversion factors saw a percentage-point increase in per capita growth by 62. This gives a general photo that Ghana's currency is performing well on the goods market compared with different countries. Likewise the country's trade and regulatory policies showing favorable signs in the business environment and economic well-being as a whole. Similarly, foreign investment and government spending in productive areas such as infrastructure and economic affairs proportionately induced Ghana's per capita growth during the period under review. By and large, China's aid-for-trade had a positive and statistically significant short and long-run impact on per capita growth in Ghana and that, the role of China's aid on Ghana's economic development remains an important component in the country's fiscals as well as a pivotal tool for leveraging government policy.

From a policy-oriented point of view, taking into accounts the empirical results from this study suggest that achieving "Ghana Beyond Aid" will require a conscious effort by the Ghanaian government and its stakeholders to move beyond political rhetoric and partisan politics to set out clear policy direction in addition to building a national consensus in promoting the agenda. Clearly, Ghana Beyond Aid is a welcome development for promoting structural economic transformation and ownership over national development priorities, mechanisms for propelling the Ghana Beyond Aid are largely absent. Therefore, the study concludes that although the vision of a Ghana Beyond Aid is a laudable one, it can be achieved when there is advanced stakeholders consultations especially agreement among politicians on the direction of the nation when it comes to its development trajectory. From all indications, it is clear that, the "Ghana Beyond Aid" policy which of course is a realistic initiative as it has been realized by other continents and nations, but under the current state of affairs in Ghana, this policy initiative need to be postponed for a future date.

8. Limitations of the Study

Considering the fact that Ghana has had a well-documented dalliance with many donor countries and multilateral donor agencies since the 1960s calls for diverse investigations as to the options to foreign aid the government seeks to explore and how it intends to achieve this new policy direction. Future studies are suggested to examine more deeply about Ghana's multilateral aid, for example, from other top donor countries, to help the country made informed decisions as to whether embarking on the journey of "Ghana Beyond Aid" policy initiative is rhetoric or realistic. In spite of the above limitation, the results of the study give credible information on the empirical examination of Ghana prospects and challenges that could result from this new direction of Ghana Beyond Aid (GBA).

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10. Appendices

Table 4: Results of ADF Unit Root Test (stationary test)

	Unit Root Test: Intercept but no trend				
	Level		1st Difference		
Variable	t-Stat	P-value	t-Stat	P-value	AIC Lag
lnPCG	-1.374832	0.648	-3.849351	0.020**	1
lnAfT	-1.064785	0.584	-3.588694	0.013**	1
lnRER	-0.685773	0.783	-3.396905	0.001***	1
lnTOP	-1.293840	0.369	-3.405864	0.005***	1
lnRPM	-2.198543	0.392	-4.694038	0.000***	1
lnFDI	-2.294859	0.375	-5.476597	0.002***	1
lnGoS	-1.097364	0.475	-6.795854	0.000***	1

***, ** and * denote significance at 1%, 5% and 10% respectively.

Intercept but no trend (equation 3): 1%, 5% and 10% significance level is given as -4.004425, -3.098896 and -2.690439 respectively.

	Unit Root Test: Intercept and trend				
	Level		1st Difference		
Variable	t-Stat	P-value	t-Stat	P-value	AIC Lag
lnPCG	-0.902546	0.847	-4.837493	0.014**	1
lnAfT	-2.483953	0.483	-4.584715	0.010**	1
lnRER	-0.648594	0.869	-3.684932	0.023**	1
lnTOP	-3.048576	0.493	-6.596873	0.000***	1
lnRPM	-1.590864	0.598	-3.539584	0.020**	1
lnFDI	-3.289943	0.324	-6.139506	0.001***	1
lnGoS	-2.748573	0.590	-5.647328	0.000***	1

***, ** and * denote significance at 1%, 5% and 10% respectively.

Intercept and trend (equation 4): 1%, 5% and 10% significance level is given as -4.800080, -3.791172 and

-3.342253 respectively.

Source: Author's computations (2020)

Table 5: VAR Lag Order Selection Criteria

Lag	LR	FPE	AIC	SC	HQ
0	NA*	0.028475	-1.624752	-0.892432	-1.463954
1	1.394852	0.031549*	-1.241078*	-1.053984*	-1.739281*
2	0.000703	0.049851	-1.483759	-0.498576	-1.519385

* indicates lag order selected by the criterion; LR: sequential modified LR test statistic (each test at 5% level), FPE: Final Prediction Error, AIC: Akaike Information Criterion, SC: Schwarz Information Criterion and HQ: Hannan-Quinn Information Criterion.
Source: Author's computations (2020)

Table 6: Estimated long run coefficients using ARDL model

Variable	Coefficient	Std. Error	P-value
lnPCGt-1	-1.389407	4.576931	0.014**
lnAfT t-1	-0.102463	2.296504	0.001***
lnRER t-1	1.815746	5.038275	0.057*
lnTOP t-1	2.564839	3.294886	0.015**
lnRPM t-1	-0.104857	1.956835	0.001***
lnFDI t-1	0.843426	2.736329	0.095*
lnGoS t-1	0.457695	0.384302	0.006***
ΔlnPCGt-1	0.596783	3.598832	0.081*
ΔlnAfT t-1	0.276441	1.768590	0.036**
ΔlnRER t-1	-0.159475	5.598324	0.413
ΔlnTOP t-1	-0.694759	2.857431	0.073*
ΔlnRPM t-1	0.1698483	0.109732	0.036**
ΔlnFDI t-1	-0.475924	1.637853	0.492
ΔlnGoS t-1	-0.841839	0.149305	0.057*
Constant	1.493982	0.297483	0.020**
R-squared	0.8530		
Adjusted R-squared	0.7296		
F-statistic	2.4837		
Prob(F-statistic)	0.0394		

***, ** and * denote 1%, 5% and 10% respectively.
Source: Author's computations (2020)

Table 7: Cointegration Test (Bound testing)

Dependent Variable: ΔlnEMR	
F-statistic	7.593762
5 percent critical value	I(0) 2.45
(Pesaran et al., 2001; n=59 and k=6)	I(1) 3.61

Computed F-statistic: 7.593762 (Significant at 0.05). Critical Values are cited from Pesaran et al., (2001). Table: Pesaran et al., 2001; critical value table: Case III: Unrestricted intercept and no trend. n is observation/sample size and k is the number of non-deterministic regressors in the long-run relationship. Source: Author's computations (2020)

Table 8: Results of Unrestricted Error Correction Model (ECM)

Variable	Coefficient	Std. Error	P-value
ΔlnPCGt-1	0.783205	0.137845	0.008***
ΔlnAfT t-1	0.891383	0.247864	0.004***
ΔlnRER t-1	0.802509	1.285637	0.006***
ΔlnTOP t-1	0.693025	0.174968	0.062*
ΔlnRPM t-1	0.712315	1.395843	0.021**
ΔlnFDI t-1	0.529864	0.101837	0.001***
ΔlnGoS t-1	0.708243	0.071523	0.076*
ECT(-1)	-0.739504	0.194684	0.009***
Constant	0.529481	0.150705	0.002***
R-squared	0.6497		
Adjusted R-squared	0.2837		
F-statistic	0.3795		
Prob(F-statistic)	0.0030		

The error correction term (ECT) is the speed of adjustment towards long-run equilibrium.
* * *, * *, and * denote 1%, 5%, and 10% respectively.
Source: Author's computations (2020)

Table 9: Results of Short run Granger Causality Test

		lnPCG as the only dependent variable				
Independent variables	lnAfT	lnRER	lnTOP	lnRPM	lnFDI	lnGoS
F-stat and P values	4.2716(0.002)***	2.4832(0.031)**	5.8347(0.018)**	3.7135(0.000)***	2.0893(0.025)**	1.6274(0.016)*
Test results	lnAfT granger-cause lnPCG	lnRER granger-cause lnPCG	lnTOP granger -cause lnPCG	lnRPM granger -cause lnPCG	lnFDI granger -cause lnPCG	lnGoS granger cause lnPCG
		lnAfT as one of the independent variables				
Variables	lnRER	lnTOP	lnRPM	lnFDI	lnGoS	lnPCG
F-stat and P values	1.3684(0.312)	5.3983(0.036)**	2.5938(0.014)**	4.8753(0.395)	2.9714(0.475)	2.5792(0.784)
Test results	lnRER doesn't granger-cause lnAfT	lnTOP granger-cause lnAfT	lnRPM granger -cause lnAfT	lnFDI doesn't granger -cause lnAfT	lnGoS doesn't granger -cause lnAfT	lnPCG doesn' granger- caus lnAfT

* * *, * *, and * denote 1%, 5%, and 10% respectively.

Source: Author's computations (2020)

Residuals Diagnostic Tests

Table 10: Results of Residuals Diagnostic Tests

	F-stat	P-value
Breusch-Godfrey Serial Correlation test	1.584932	0.591
Heteroskedasticity: Breusch-Pagan-Godfrey White	0.739481 1.958037	0.694 0.295
Jarque-Bera test	0.594342	0.867
Ramsey RESET Test (log likelihood ratio)	2.659409	0.320

Source: Author's computations (2020)

Coefficient Diagnostics Test

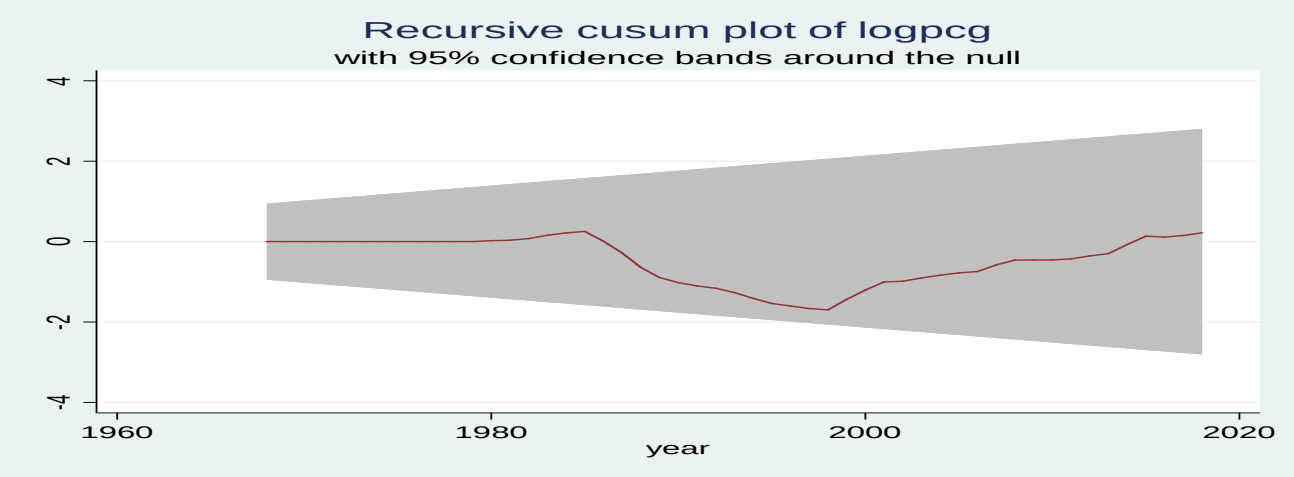
Table 11: Result of Coefficient Diagnostics Test: Variance Inflation Factors (Multicollinearity)

Variable	VIF	1/VIF
lnAfT	1.22	0.818880
lnRER	1.18	0.845082
lnTOP	1.46	0.685870
lnRPM	1.71	0.584272
lnFDI	2.46	0.407272
lnGoS	1.95	0.512982
Mean VIF: 1.66		

Source: Author's computations (2020)

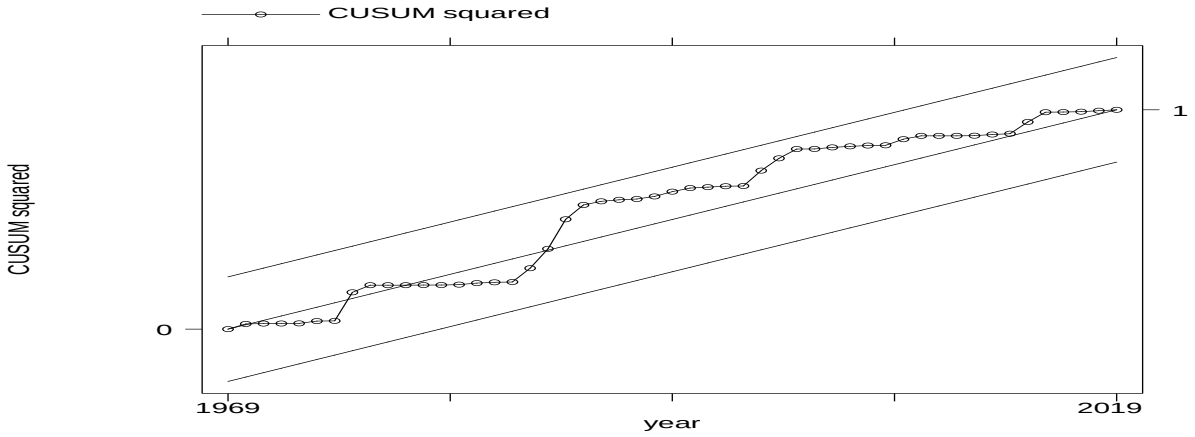
Stability Test

Figure 5: CUSUM Test for stability: ECM (equation 8)



The straight lines represent critical bounds at 5% significance level.
Source: Author's computations (2020)

Figure 6: CUSUMSQ Test for stability: ECM (equation 8)



The straight lines represent critical bounds at 5% significance level.

Source: Author's computations (2020)