Foreign Aid, Dutch Disease and Manufacturing in African Countries

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Abstract

Foreign aid is meant to enhance economic growth. At best, this is the dominant theory in the literature on aid effectiveness. Although Africa gets a lot of foreign aid, the continent still lags behind, in terms of key development indicators. Indeed, recent evidence suggests that aid does not influence economic growth because of the negative effect of aid flows on manufacturing growth. However, this paper argues that this may not be the case when spillover effects of manufacturing are considered. The paper has two hypotheses. First, the paper test the hypothesis that where foreign aid and the real exchange rate interact, there is a positive effect on manufacturing growth in African countries. Secondly, the paper tests the hypothesis that where foreign aid is targeted at increasing labour intensity in manufacturing, the effect on manufacturing growth may be positive. The paper uses panel econometric analysis to analyze data for 45 African countries over the period 1990 - 2017. The paper controls for possible spillover effects by controlling for cross-section correlation in the panels. First, the paper finds that foreign aid and the real exchange rates have a negative influence on manufacturing growth in African countries, where country and time fixed effects are controlled for. However, when cross-sectional correlation is controlled for, foreign aid and the real exchange rates have a positive influence on manufacturing growth in African countries. Also, the paper finds that foreign aid and manufacturing labour have a negative influence on manufacturing growth where country and time fixed effects are controlled for. However, where cross-sectional correlation is controlled for, the results show a positive and significant influence of manufacturing labour intensity and foreign aid on manufacturing growth in African countries. The results imply that the evidence of the Dutch disease phenomenon from foreign aid could be present in African countries. However, where spillover effects from manufacturing growth are controlled for, the influence of the Dutch Disease and manufacturing labour changes.

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1 Introduction

Foreign aid and its influence in developing countries still remains a topical issue in the literature (Mahembe & Mbaya Odhiambo 2019, Balli et al. 2019, Maitra 2019, Ravetti et al. 2018). Indeed, developing countries are still receiving aid support from developed countries. The main argument in the literature has been that foreign aid is meant to enhance economic development of less developed countries. Developing countries in Africa are usually part of the list of countries that regularly receive foreign aid, which can be deployed in diverse ways. Indeed, African countries get a lot of foreign aid and yet these countries continue to lag behind, in terms of key development indicators.

Given that aid is limited, it is important that it is used wisely (Lane & Bulir 2002). And yet even after Africa has received millions in foreign aid, the continent still struggles with development issues such as poverty, unemployment and social development. In this paper, aid effectiveness is the problem that is investigated. This is because the effectiveness of aid is still a relevant policy issue for developing countries, especially those in Africa. Debates in the literature show mixed results on the effect of foreign aid. Most common of the debates are those that focus on the effect of foreign aid on economic growth. Recent studies by Lof et al. (2015), Arndt et al. (2015) have confirmed that foreign aid actually has a positive influence on economic growth of countries through fixed capital investment. It is this fixed capital investment, which can be directed at specific sectors in order to create jobs and encourage growth [1]. Other literature have also shown that the influence of aid on growth varies under different circumstances. Such studies have argued that the effect of aid on growth is different for resource-rich countries that are experiencing political instability (Ravetti et al. 2018, Cai et al. 2018) and for countries that have decentralized (Lessmann & Markwardt 2016). Others have also argued that the effect of aid on growth depends on the quality of donors (Minasyan et al. 2017), the volatility of public investment (Museru et al. 2014) and the level of involvement or activity from civil society organizations (Dupuy et al. 2016).

However, of interest in this paper is the literature which has argued that the effect of foreign aid on growth is negative because of its resident influence on manufacturing growth. In the literature, the argument has been that foreign aid has a negative influence on growth due to its effect on manufacturing growth (Rajan & Subramanian 2011). This argument has served as a counter to studies that have pushed consistently that foreign aid is beneficial for economic growth (Lof et al. 2015, Arndt et al. 2015). The theoretical foundation of this argument is that foreign aid influences manufacturing growth through real exchange rate appreciation, which then causes the economy to show symptoms of the Dutch disease (Magud & Sosa 2013). This is because excess spending of aid inflows and incomes on non-tradable items triggers an increase in the imports of non-tradables and skews the exchange rate in favour of the exporting country. In another breadth, the domestic tradable sector of the spending economy suffers because of the real exchange rate appreciation. This results in a situation where exports from the aid-receiving country become expensive whiles imports to the aid-receiving country become less expensive. This paper re-examines this argument in the case of Africa and argues that where spillover effects of manufacturing are considered, foreign aid may still have some beneficial effects for manufacturing growth. This paper focuses on manufacturing growth because industrialization is back on the agenda again for African countries and research can contribute to

[1] Additional literature which finds a positive relationship between economic growth and aid include Burnside & Dollar (2000), Hansen & Tarp (2001), Collier & Dollar (2002), Dalgaard et al. (2004).

show whether foreign aid could have a significant impact on industrialization in African countries (Cherif & Hasanov 2019). Furthermore, this argument is examined in light of recent literature that has suggested that African countries may be on unsustainable growth paths (Rodrik 2018).

In this paper, the central research question is: To what extent does foreign aid, real exchange rates and labour intensity influence manufacturing growth in African countries? To address this question, the paper puts forth two hypotheses. First, the paper tests the hypothesis that foreign aid and the real exchange rate have a positive influence on manufacturing growth in African countries, where spillover effects are considered. This is based on the theory of aid-induced Dutch disease, mentioned earlier. Secondly, the paper tests the hypothesis that where spillover effects are considered, foreign aid which is targeted at improving labour intensity in manufacturing can improve manufacturing growth in African countries. This second hypothesis is premised on literature that has argued that labour intensity reduces where there is deindustrialization.

As a result of the two hypotheses, the paper conducts two rounds of empirical tests. At the center of this paper is the theoretical understanding that foreign aid is conceived to be a cause of the Dutch disease through its effect on the real exchange rate and the tradable sector. Studies which have analyzed this aspect of aid effectiveness include Magud & Sosa (2013), Rajan & Subramanian (2011). Hence, to gather evidence for the first hypothesis, this paper examines this theory in the first set of empirical estimations.

The second hypothesis is addressed in the second section of the empirical analysis. Essentially, this paper argues the influence of aid on manufacturing growth can be enhanced if foreign aid is directed at increasing manufacturing labour intensity. This hypothesis is guided by research on deindustrialization in developed and developing countries. Such studies have shown that the reduction in labour intensity is one of the key characteristics of deindustrialization (Tregenna 2008).

This paper differs from other literature in terms of the contribution that it makes. The main contribution of this paper is the consideration of spillover effects in the relationship between foreign aid and manufacturing growth. Although earlier studies have argued that foreign aid is harmful because of the Dutch Disease effect (Rajan & Subramanian 2011), this paper argues that where spillover effects of manufacturing are considered, the effect of foreign aid is positive and not negative.

Secondly, this paper makes a contribution by determining whether aid-induced labour intensity can influence manufacturing growth in African countries, in light of the spillover effects that manufacturing possesses.

Indeed, some studies have questioned Africa's potential to industrialize and have examined if Africa has what it takes to industrialize. Others have also focused on the effectiveness of aid in African economies, thus re-examining the dependence of these countries on aid (Ravetti et al. 2018, Minasyan et al. 2017, Museru et al. 2014, Chang 2013, Page 2012). However, by focusing on the connection between aid and manufacturing growth, this paper brings to light some potential implications for industrialization in African countries.

The literature which analyses the relationship between foreign aid and manufacturing growth is not large and leaves room for studies such as this. Indeed, African countries have mostly taken the brunt of deindustrialization, which is occurring at earlier levels of per capita income (Tregenna 2016). An implication of deindustrialization for African countries suggests that African countries are looking to the short-term options such as services-based growth or resource-based growth paths, whereas none of these paths offer

a sustainable growth path (Rodrik 2018). However, the paper conjectures that where the effect of manufacturing labour, enhanced by aid inflows is positive, manufacturing can growth and deindustrialization can be reversed.

The remaining sections of the paper are structured as follows: Section two reviews relevant theoretical and empirical literature connecting foreign aid, the Dutch Disease and manufacturing. After this, Section three presents the methodology used to address the research question in this paper whiles Section four presents the results from the empirical analysis and a discussion of the results. In Section five, conclusions are drawn and implications of the findings are discussed.

2 Literature Review

In this section, theories and empirical studies relating to foreign aid, manufacturing growth and economic growth are discussed. The first section covers the theory of foreign and aid induced Dutch disease whiles the second reviews empirical literature that have examined the foreign-aid, Dutch disease and manufacturing relationship.

Theoretical Literature

The dominant theory for foreign aid provision is that foreign aid has a positive effect on economic growth. This positive effect is seen through the increase in savings, the stimulation of investment or capital accumulation as well as enhancement of human capital in terms of education and health. The theory is traced back to the seminal work of Chenery & Strout (1968). The theory which explains the relationship between foreign aid and economic growth is based on a "two-gap" model. This model shows that foreign aid is given to developing countries to increase their savings and address balance of payment pressures which result from the lack of foreign exchange. The model shows that there are literally two gaps that foreign aid can fill for a developing country: the gap between the amount required to achieve a certain level of growth and domestic savings, and the gap between the total import bill required to meet domestic needs and the level of foreign exchange reserves that the country has (Easterly 2003). Chenery and Strout argued that by providing foreign currency to a developing country, savings rates could be increased and foreign exchange could be used to acquire necessary resources for development, while allocating existing domestic resources towards other productive sectors. Hence, the theory implies that increases in savings, capital accumulation and human capital will yield positive externalities that will influence the growth drivers of the economy and increase overall economic growth of developing countries. In addition, the "two-gap" model showed that at any given time, one gap was meant to be binding. Hence where this gap was known to policy makers, foreign aid could be used to easily fill either gap (Easterly 2003).

The theory by Chenery and Strout has since sparked a long line of scholarship, in which arguments for and against the influence of foreign aid on economic growth have been made, especially for developing countries. First, some scholars argued that the influence of aid on growth was conditional on several factors that could influence growth. Some also suggested that trade was more relevant to developing countries rather than aid (Thirlwall 1976), while others argued that it was a paradox that was seen differently at macro and micro levels (Mosley 1986). Furthermore, other scholars argued that the influence of aid on growth was conditioned on good fiscal, monetary and trade policies

as well as the level of poverty (Burnside & Dollar 2000, Collier & Dollar 2002). While generally accepted that foreign aid and growth relate positively because of the effect on savings and investment, further literature refined this position using better research methods that earlier studies failed to consider. Some of these studies include popular work of Hansen & Tarp (2000, 2001), Dalgaard & Hansen (2001) and Dalgaard et al. (2004).

In addition, later studies examined the aid-effectiveness hypothesis by looking at the quality of the theoretical relationship in the long-run. This has been the focus of some recent studies by Nowak-Lehmann et al. (2012), Lof et al. (2015) and Arndt et al. (2015).

In sharp contrast to the main theory of Chenery and Strout, several other studies have questioned the positive influence of foreign aid. For instance, Boone (1996) found that aid was not being spent on investment as expected or used to benefit the poor in developing countries. Instead, this paper revealed that aid had been used in expanding the size of governments. The paper argued that based on the findings, the effect of aid on growth would never be realized in countries with such political regimes. Secondly, Arellano et al. (2009) argued that the transfer effect of foreign aid is costly for developing countries. In most cases where aid is to be provided, there are conditions that require massive imports of capital from the donor country. What this means is that for the donor country to accept the trade deficit in their books,in terms of giving out aid, the recipient country is often required to import a lot more, leaving relatively lower exports and an exchange rate appreciation of the recipient's currency.

An implication of this issue with the cost of transfers is the Dutch disease phenomena that comes along with the continuous provision of aid. Rajan & Subramanian (2011) mention that although the transfers of aid result in higher levels of physical investment, education and health services, the main costs that results is a Dutch disease syndrome between the non-tradable sector and the sector for tradables. The Dutch disease theory is trade back to the seminal work of Corden & Neary (1982), and was later developed by Van Wijnbergen (1986). The Dutch disease theory basically shows the detrimental effects that result from the over-reliance on revenues that flow from a particular resource in an economy, at the expense of the growth and contribution of other sectors of the economy. This situation crowds out possible revenues from other sectors of an economy and results in wider trade and budget deficits for the economy that relies on revenues from this particular resource. This concept can be applied to aid inflows into developing countries that are tied to imports of capital goods from the donor country and expenditure on non-tradable goods. In the Dutch disease theory, a two-sector economy is assumed: the non-tradable sector that receives expansion using aid inflows and supports imports of capital and inputs, and the tradable sector that is hurt by exchange rate depreciation and a loss in competitiveness.

Further, based on this two-sector economy, the Dutch disease effect is decomposed into two: the *resource movement effect* and the *income spending effect*. In the case of aid inflows, the resource movement effect is shown when skilled labour move into sectors such as education, health care and construction to earn their share of higher wages in these sectors. The higher wages result from increased spending of aid inflows in those sectors as part of aid efforts to improve service delivery in the country. For such sectors, which may be classified as non-tradable sectors, imports of raw materials and other inputs needed to expand these sectors and the high wages of labor, may result in exchange rate appreciations, a lack of competitive advantage for the tradable sector and a dip in the profitability of the tradable sector. Secondly, the spending effect is seen in the

consumption patterns of labour who earn higher wages in the sectors that benefit from the aid inflows. Labour in these sectors is likely to spend on consumables and imports of luxurious goods, to the detriment of domestic tradable sectors such as manufacturing. Such actions also result in exchange rate appreciation of the domestic currency and hurt the competitiveness of the domestic manufacturing sector (the tradable sector). The Dutch disease syndrome for countries receiving aid eventually results in a decline in growth because of the loss of competitiveness of exports from the tradable sector, which actually has the potential to earn foreign exchange for the economy. In other words, foreign aid can have a negative influence on growth through the Dutch disease effect on manufacturing growth.

Empirical Literature

Recent empirical evidence suggests that foreign aid and its influence still remains a topical issue for developing countries. For instance,Mahembe & Mbaya Odhiambo (2019) analysed the relationship between poverty, foreign aid and economic growth for 82 developing countries over the period from 1981-2013.The study used panel unit root tests, panel vector error correction modelling and the panel Granger causality test to determine the relationship between foreign aid, poverty and economic growth. The study found that in the short-run, whiles there was a uni-directional causality from economic growth to foreign aid and from foreign aid to poverty, there was bi-directional causality between economic growth and poverty. In addition, the study found that both economic growth and poverty Granger cause foreign aid in the long-run. Another example is Ravetti et al. (2018), who focuses on whether foreign aid and natural resources act as a double curse for developing countries whose governance is poor. The paper argues that foreign aid given to countries who are governed by dictators, creates the opportunity for looting of public resources and creates the opportunity to reduce spending on public investment.The study finds that the interaction of foreign aid and natural resources are associated with political instability in countries with non-democratic regimes and lower growth records.

Furthermore, Cai et al. (2018) focused on foreign aid and economic growth but argued that the effectiveness of aid depends on the political stability of the country similar to Ravetti et al. (2018). Other studies like Lessmann & Markwardt (2016) have also argued that for developing coutnries, the type of decentralization influences aid effectiveness differently. The paper indicates that whereas fiscal decentralization negatively influences aid effectiveness, political and employment decentralization actually enhance aid effectiveness. Other studies have further argued that the effect of aid on growth depends on the quality of donors (Minasyan et al. 2017), the volatility of public investment (Museru et al. 2014) and the level of involvement or activity from civil society organizations (Dupuy et al. 2016).

However, not many have focused on the effectiveness of aid and the Dutch disease. A number of studies have researched the Dutch disease-related effect of foreign aid and have found that there is a possible effect of foreign aid on manufacturing growth and exports of countries that receive such aid. The evidence is mixed so far and the differences depend on the unit of analysis within which the study is conducted. Earlier studies such as Magud & Sosa (2013) and Rajan & Subramanian (2011) have focused on the relationship between foreign aid and the Dutch disease. Specifically for Rajan & Subramanian (2011), the authors focus on the influence of foreign aid on the growth of manufacturing using a methodology which controls for country and industry fixed effects. The paper shows

that foreign aid has an adverse effect on the growth of manufacturing of a country by reducing the country's competitiveness, through the real exchange rate.

Again older studies like Younger (1992) examine the relationship between aid and Dutch disease in Ghana, highlighting how aid inflows have caused an appreciation of the real exchange rate, higher inflation and crowding out of the private sector after governments have increased their spending. The study argues that these negative influences of aid only come in after the country has been successful at implementing economic reform programs that the donor community approves of, making the receiving country a favourite of the donor community and international financial organizations. Also, the study mentions that where the real exchange rate has appreciated and governments have increased their spending, tight monetary policies are introduced to further crowd out private investment. In conclusion, although the study acknowledges that aid-induced Dutch disease occurs in Ghana, the study recommends that there should be prudent macroeconomic policy to manage aid inflows and prevent crowding out of private investment, based on the premise that further aid inflows are not necessarily bad for Ghana.

In contrast to Younger (1992), Nyoni (1998) also investigates foreign aid and economic performance in Tanzania. This paper first examines the relationship between aid inflows and the real exchange rate and further investigates the Dutch disease theory for Tanzania. The study found that aid inflows opened up the economy and caused a depreciation of the local currency while increased government expenditure caused the local currency to appreciate. The study argues that because aid inflows caused a depreciation of the local currency, foreign aid had not caused the Dutch disease in Tanzania. The study therefore suggested that Tanzania should continue receiving foreign aid and target such aid at productive investments.

For panel studies, Elbadawi (1999) estimates the relationship between Official Development Assistance (ODA), real exchange rates and non-traditional exports for 62 developing countries, where 28 of the countries sampled are African. The results of the study show a detrimental effect of foreign aid on the real exchange rate and non-traditional exports of African and non-African countries. The study found an inverted U-shaped relationship between foreign aid and non-traditional exports such that beyond a certain threshold, further increases in foreign aid cause a misalignment in the real exchange rate and harm the competitiveness of the exports sector. The findings certainly imply that increases in aid influence export capacity of the sampled countries. More so, the study emphasizes that the effects of aid dependency for developing countries are detrimental to economic progress and suggests that such countries will need to revise their approach to aid and reduce dependency on aid.

Furthermore, Arellano et al. (2009) analyze the dynamic implications of foreign aid and its variability for developing countries. Arellano and her colleagues examine the influence of aid variability on consumption, investment and the production structure, highlighting the channels of aid flows in developing countries. The study finds that there is an effect of aid on manufacturing and exports of developing countries as a result of the cost of transferring foreign aid from the donor to the receiving country. This cost of foreign aid transfer is essentially equivalent to the sum of both effects of aid-induced Dutch disease that results from transferring foreign funds from one country to another. The paper also shows that aid shocks reflect in fluctuations in investment. The paper argues that such variations in investment result decreased domestic consumption expenditure, eventually cause welfare losses to citizens of the countries that receive aid and influence manufacturing exports negatively.

Irrespective of policy choices and aid variability, it is possible that countries that receive aid do not spend on expanding sectors and instead only focus on balance of payment support. It also possible that countries receive aid for other reasons besides investment and balance of payment support. Berg et al. (2005) mentions that although aid is used to enhance consumption and investment, aid effectiveness policies are equally important. This is because whereas the effects of aid provision can be seen at the micro level in communities and households, the macro level effect can be detrimental to the economy. In other words, the effectiveness of aid is still an empirical question. This paper chooses to focus on whether aid induces or does not induce Dutch disease in African countries and make contribution to the literature on foreign aid, Dutch disease and manufacturing growth. In the next section, an illustration of the conceptual framework of this paper is presented.

3 Methodology

The empirical strategy used in this paper is discussed in this section. The paper adopts the model of Rajan & Subramanian (2011) and modifies it to address the research objectives. Firstly, unlike the model of Rajan and Subramanian, this paper does not estimate an aid supply function. Rajan and Subramanian use the aid supply function to generate data, which they use in another regression model that estimates the effect of aid on manufacturing growth in developing countries. However, this paper argues that such an approach risks inaccuracy of data for the countries it should be representing, since foreign aid data is collected based on actual amounts disbursed. Foreign aid data is not collected based on determining factors such as history or the strength of colonial relationships.

Instead, this paper relies on an updated data source, which has published foreign aid data for developed and developing countries. This paper focuses on data that is available for African countries. This approach is useful because it avoids possible measurement errors that may come with estimating an aid supply function. In addition, by focusing on credible data that has been published officially, the paper avoids possible data gaps that may bias the estimates of the main regression model of this paper.

Secondly, while Rajan and Subramanian use the growth rate of industry as the dependent variable in their model, this paper uses the share of manufacturing value added in total output as the dependent variable for countries in the sample. This is considered as one of the key measures of industrial progress for countries (Andreoni & Chang 2016, Andreoni & Gregory 2013, O'Sullivan et al. 2013). Again, this approach is used because the focus of this paper is on manufacturing growth. The manufacturing sector is an aspect of the industrial sector. The industrial sector of most countries comprises of a number of other sub-sectors, aside manufacturing. These include other sub-sectors like construction, mining and quarrying as well as utilities.

Furthermore, Rajan and Subramanian calculate two export sensitivity indices which are meant to show the extent of change in a particular industry when the exchange rate appreciates. In this paper, the real exchange rate is used in place of the sensitivity indices used in Rajan's paper. Again, Rajan and Subramanian capture country and industry fixed effects in their estimations. However, given that this paper focuses on a section of industry, the paper focuses on only country and time fixed effects, which are relevant in the estimations concerning the manufacturing sub-sector across African countries.

Finally, whereas Rajan and Subramanian use ten-year averages in their estimations,

this paper does not use averaged data. This is because averaged data reduces the actual number of data points, which is not helpful for the econometric analysis in this paper.

After implementing all these adjustments, two regression models were used to address both hypotheses in this paper. The models to be estimated in this paper are now discussed in the next section.

Model Specifications

Based on the modifications mentioned above, the econometric models of the paper can now be presented. First, to determine the Dutch Disease effect of foreign aid, the paper specifies the following econometric model:

$$MAN_{it} = \beta_0 + \alpha_1 MANI_{it} + \rho_1 AID_{it} + \rho_2 ER_{it} + \rho_3 (AID_{it} \times ER_{it}) + \mu_i + \nu_t \quad (3.1)$$

where MAN_{it} refers to the share of manufacturing value added in total output for country i over time t measured in constant prices, $MANI_{it}$ measures the annual growth of manufacturing value added in each country i over time t, AID_{it} is measured as the sum of Net official Development Assistance and Official aid received for each country i over time t. Furthermore, ER_{it} is the price level of GDP, which is the measure of the real exchange rate for each country i over time t. This essay follows Rodrik, who suggests that the real exchange rate can be proxied using data on the price level of GDP (Rodrik 2008, p .371).

Furthermore, the interactive term, $AID_{it} \times ER_{it}$ is included in the regression. This is to capture any influences from the interaction of aid and real exchange rates. This interaction is meant to capture the negative influence of aid and the real exchange rates on manufacturing growth. As a result,the interactive term is captured for each country i over time t. Finally, the beta (β), alpha (α) and rhos (ρ) are coefficients to be estimated with expected signs. Finally, the normal error term is decomposed to capture country fixed effects (μ_i) and time fixed effects (ν_t).

In a second estimation, the paper tests the hypothesis that where foreign aid is targeted at labour intensity in manufacturing, both foreign aid and labour intensity can have a positive influence on manufacturing growth in African countries.

In order for this analysis to hold, certain assumptions about foreign aid need to be made. Although earlier indicated, the assumptions are now outlined to guide the analysis in this paper.

First, it should be assumed that the receiving countries have the priority to decide on specific sectors, in which they would like to target aid, based on their own assessment and prioritization of development challenges that they may be dealing with. Secondly, it should be assumed that once foreign aid is targeted, the financial support continues to flow for an average of five years. Where this hypothesis holds, labour benefits in two main ways: they are gainfully employed and trained in manufacturing firms and earn an income to support themselves. In this way,labour benefits from the transfer of skills and there is knowledge transfer to the domestic workforce from expatriates who may be brought in to setup these manufacturing firms.

These spillover effects may apply to other sectors of the economy whiles the knowledge transfers can be useful in the future when such labour find themselves in other fields of employment. Beyond these, there are greater spillover effects that result from the growth of manufacturing over time. In the theory of manufacturing, manufacturing is known to have spillover effects that influence production and output, thus making the

manufacturing sector to be one of the sectors with the most significant and sustainable growth potential (Szirmai & Verspagen 2015). Hence, this paper argues that because of these spillover effects, the influence of foreign aid on manufacturing growth may not be negative, as argued in the literature and that in the case where foreign aid is used to increase labour content in manufacturing, these spillover effects will contribute to a positive influence on manufacturing growth over time.

In that regard, to test the second hypothesis, this paper specifies another regression model to capture the interaction of foreign and manufacturing labour intensity. Now, to obtain the second regression model, Equation 3.1 is adapted and is specified as follows:

$$MAN_{it} = \beta_0 + \alpha_1 MANI_{it} + \rho_1 AID_{it} + \rho_2 LI_{it} + \rho_3 (AID_{it} \times LI_{it}) + \mu_i + \nu_t \qquad (3.2)$$

where all variables maintain the same representation as described for Equation 3.1. However, the variable LI_{it} represents manufacturing labor intensity for each country i over time t. In order to estimate both models, the estimation strategy used in this paper is outlined in the next section.

Estimation Strategy

The analysis in this paper is systematic and is based on a number of techniques. For the estimation of both regression models, the Ordinary Least Squares (OLS) technique is used first to estimate the results.This method is meant to provide unbiased estimates and control for minimum variance in the estimations. The purpose of using the OLS estimation technique is to see some kind of baseline results, from which comparison can be made because the OLS technique assumes that all countries are identical in nature. However, because panel data suffers from omitted variable bias, it is possible that the OLS estimates may be biased and may not be showing the true influences of the variables on the dependent variable.

The next option is to account for heterogeneity or omitted variable bias by controlling for country and time fixed effects. These have been shown in the notations (μ_i, ν_t) in the regression models outlined above. This means that the regression model considers factors that may change over time like the size of the factories and the type of plant or equipment that is used in the industry. Also country fixed effects are unique factors about each country that may influence their manufacturing ability such as the location or the culture of the country or its people.

After estimating the models with country and time fixed effects, diagnositic tests are conducted on the models to determine whether the models are sound to be used for interpretation. Two diagnositic tests are conducted: a test for serial correlation and another for groupwise heteroskedasticity. Where these tests confirm the existence of autocorrelation of heteroskedasticity, it would suggest that the results from the fixed effects estimations are biased.

The first test is the Wooldridge test for serial autocorrelation, developed by Wooldridge (2002) and simulated by Drukker (2003). The null hypothesis of this test is there is no first order serial correlation or that the residuals of the first-difference variables should have an autocorrelation of -0.5. The alternative hypothesis is that there first order serial correlation in the panel or that the residuals of the first difference variables have an autocorrelation different from -0.5. The critical value is calculated using an F-distrubution. In addition, the probability value of this critical value determines whether the null hypothesis can be rejected or accepted. Where the probability value is less than the 10%

level of significance, the null hypothesis can be rejected. Where the probability value of the critical value is greater than the 10% level of significance, the null hypothesis cannot be rejected.

The second test is the Modified Wald test for groupwise heteroskedasticity in the fixed effects model. The test estimates a Wald statistic for groupwise heteroskedasticity in the residuals of the fixed effects model. The null hypothesis for this test is: all the variances for each country i are the same as the varaince for all cross-sectional units ($\sigma^2 = \sigma$ for i = 1,N_g, where N_g is the number of cross-sectional units.). The critical value calculated follows a χ^2 distribution under the null hypothesis of homoskedasticity (Greene 2003).

To address the issues found with the fixed effects model, this paper adopts the Feasible Generalized Least Squares (FGLS) technique. This technique controls for the autocorrelation and heteroskedasticity found in the panel data. In addition, the technique controls for possible correlation in the cross-sections and across the panels. This technique is used to capture the possible spillover effects, which are known to come from the growth of manufacturing over time. In addition, the technique requires the panel to be balanced (Greene 2018, Maddala & Lahiri 2006). Prior to presenting the results from the estimations, the data and sampling approaches must be discussed.

Data and Sampling

In this section, the sample size and data sources used in the paper are discussed. The sample size is selected based on data availability and in this case, data on the share of manufacturing across countries dates back to the year 1990. This paper uses a balanced panel, containing data for 45 countries in Africa, gathered for the period 1990 to 2017. Data was sourced mainly from three sources: the World Development Indicators (WDI) database of the World Bank, the Penn World Tables (PWT) database version 9.1 and the statistical database of the International Labour Organization (ILO). Both of these sources host publicly accessible data on a wide number of variables relating to the macroeconomy and employment. In Table A of the Appendix, a full definition of all the variables are presented. Now, each variable is described.

First, the dependent variable (MAN_{it}) is measured as the share of manufacturing value added in total output for each country i over time t. This variable is obtained as annual data from the WDI and serves as the measure to capture manufacturing growth in African countries. WDI defines manufacturing to include industries belonging to the International Standard Industrial Classification (ISIC) divisions 15 - 37, whereas the origin of value added is determined by ISIC revision 3.

The first independent variable is $MANI_{it}$. This variable captures the growth in manufacturing value added for each country i over time t. This paper uses $MANI_{it}$ in order to capture internal manufacturing capacity for each country over time. The prior expectation for this variable is that the coefficient will be positive, suggesting that increases in the growth of manufacturing value added would increase the share of manufacturing value added in total output.

The second independent variable is AID_{it}. This variable is measured as the current dollar value of net Official Development Assistance (ODA) and official aid received. This data is also sourced from the WDI and is observed annually. The WDI mentions that the net ODA is made up of disbursement of loans on concessional terms and grants by official agencies of the members of the Development Assistance Committee (DAC) and other stakeholders in order to promote economic development in countries that are selected for

ODA. Also, WDI mentions that net official aid refers aid flows to countries who are on the second part of the list of the DAC and is given to countries on similar terms as those for ODA. In Table A of the Appendix, a full definition of this variable is presented. The prior expectation for this variable is that coefficeint will be positive, indicating that increases in foreign aid will increase the share of manufacturing value added in total output.

The next independent variable is the real exchange rate variables (ER_{it}) for each country i over time t. The real exchange rate in this paper is proxied by data on the price level of total output, following studies such as Rodrik (2008). The data for this variable also has annual observations and is sourced from the Penn World Tables (PWT) version 9.1 (Feenstra et al. 2015).The prior expectation for this variable is that the coefficient will have a positive sign, indicating that increases in the real exchange rate will result in an increase in the share of manufacturing value added in total output in the sampled African countries. The full definition of this variable is also presented in Table A of the Appendix section.

Finally, the measure of labour intensity in manufacturing is the number of persons (in thousands) employed in the manufacturing sector for each country i over time t. This data is observed annually and was obtained from the ILO. This data is modelled and estimated by the ILO and covers several sectors of the economy including manufacturing. According to the ILO, manufacturing is categorized as ISIC revision 4C and the source of the estimations is the Trends Econometric Models (TEM) of the ILO. The full definition of this variable is presented in Table A of the Appendix section. The prior expectation of this variable is that coefficient will have a positive sign, indicating that increases in labour intensity in manufacturing will result in an increase in the share of manufacturing value added in total output.

Having described all the variables, the paper now presents the results and the discussion of the findings.

4 Results

In this section, results from the regression analysis used in this paper are presented. In conducting the analysis, the paper used the estimation strategy discussed earlier in the section on empirical strategy.

The results from the regression analysis of Equation 3.1 are shown in Table 4.1 below. The results from the table below show the evidence of the interactions between aid and the exchange rate and the resulting influence of this interaction on manufacturing growth in African countries. Across the columns in the table are estimations using the OLS, OLS fixed effects and the GLS techniques.

The OLS results from Table 4.1 show that only the growth of manufacturing value added ($MANI_{it}$), has a negative and statistically significant influence on the share of manufacturing value added in total output (MAN_{it}) for countries in the sample.The results imply that a one unit increase in $MANI_{it}$ will reduce MAN_{it} by 0.0362%, holding all other influences constant. However, this cannot be the true situation the evidence in the literature on foreign aid. Therefore, additional estimations were conducted.

In the second column of the table above, the results show that the growth of manufacturing value added, foreign aid and the interaction of foreign aid (AID_{it}) and the real exchange rate (ER_{it}) have a statistically significant influence on (MAN_{it}). In this instance, where country and time fixed effects are controlled for, the growth of manufac-

Table 4.1: Regression Estimates Showing the Interaction of Aid and Exchange Rates on Manufacturing Growth in African countries.

Variables	(1) MAN_{it}	(2) MAN_{it}	(3) MAN_{it}
$MANI_{it}$	-0.0362**	0.0152*	-0.0308***
	(0.0142)	(0.00857)	(0.00140)
AID_{it}	0.0205	-0.0395*	0.0181***
	(0.0342)	(0.0225)	(0.00359)
ER_{it}	-0.781	0.556	-0.688***
	(0.596)	(0.345)	(0.0611)
$(AID_{it} \times ER_{it})$	0.0302	-0.0330*	0.0257***
	(0.0308)	(0.0180)	(0.00318)
Constant	1.702**	3.017***	1.748***
	(0.663)	(0.434)	(0.0688)
Observations	1,260	1,260	1,260
R-squared	0.018	0.036	-
Wald $\chi^2(4)$	-	-	1773.18***
Estimation Technique	OLS	OLS	FGLS
Fixed Effects	No	Yes	No
Number of i	45	45	45
Groupwise Heteroskedasticity	No	2.0e+05***	No
Serial Autocorrelation	No	82.4***	No
Cross-sectional Correlation			Yes

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

turing value added has a positive and statistically significant influence on (MAN_{it}). The results suggest a one unit increase in $MANI_{it}$ will increase MAN_{it} by 0.0152%, holding all other influences constant.

Also from the second column of the table, the results show that foreign aid has a negative and statistically significant influence on MAN_{it} for countries in the sample. This finding suggests that a one unit increase in AID_{it} will reduce MAN_{it} by 0.0395%, holding all other influences constant.Furthermore, where foreign aid is interacted with the real exchange rate ($AID_{it} \times ER_{it}$), the results show that the interaction has a negative and statistically significant influence on MAN_{it}. This finding suggests that where a unit increase in both foreign aid and the real exchange rate results in a decline in MAN_{it} by 0.0330, holding all other influences constant. This finding is consistent with studies that have analysed the Dutch-disease effect of foreign aid and the real exchange rates, through its influence on manufacturing growth (Magud & Sosa 2013, Rajan & Subramanian 2011).

Further the results from the second column showed that the fixed effects estimation

had serial autocorrelation and groupwise heteroskedasticity present. This is based on the significance of the critical values of serial autocorrelation test (2.0e+05) and the heteroskedasticity test (82.4), obtained in the tests. On that basis, the paper considered the GLS estimation showed in the third column of the table, which controls for these issues and the cross-sectional correlation in the panel.

However this paper argues that the Dutch disease effect of foreign aid may not exist where spillover effects of manufacturing are considered. In the third column of the table, the results from the GLS estimation are presented, controlling for cross-sectional correlation in the panel, which is the measure of spillover effects in this paper. The results first show that the growth of manufacturing value added has a negative and statistically significant influence on MAN_{it}, implying that a one unit increase in MAN_{it} reduces MAN_{it} by 0.0308%, holding all other influences constant.The coefficient of $MANI_{it}$ is found to be significant at the 1% level of significance.

Also from the third column of the table, foreign aid and the real exchange rate have statistically significant influences on MAN_{it} at the 1% level of significance, although these influences are opposite in sign. Whereas the results show that AID_{it} influences MAN_{it} positively, it can also be seen that ER_{it} influences MAN_{it} negatively. The results suggest that a unit increase in AID_{it} will result in an increase in MAN_{it} by 0.0181%, holding all other influences constant. This finding is consistent with earlier studies that argue that foreign aid has positive influences on growth, given the positive relationship between manufacturing and economic growth (Su & Yao 2017, Szirmai & Verspagen 2015, Arndt et al. 2015, Lof et al. 2015). On the other hand, the results from the table show that a one unit increase in ER_{it} will reduce MAN_{it} by 0.688%, holding all other influences constant.

Finally, where foreign aid and the real exchange rates interact, the results show that there is a positive and statistically significant influence on MAN_{it}, at the 1% level of significance. The results suggest that a one unit increase in foreign aid and the real exchange rate will increase MAN_{it} by 0.0257%, holding all other influences constant.The paper argues that this finding is obtained because of the spillover effects that result from manufacturing growth. This because as manufacturing develops, spillover effects encourage more firms and industries to participate in the production processes. As more firms begin to manufacture goods and services, they would require access to capital and technology to support their domestic production. In order to support the production processes of industries over time, the interactions of foreign aid and the real exchange rate facilitates the import of fixed capital equipment and technology that industries may need to work. This finding differs from the results of earlier studies who had argued for the negative influence of foreign aid and the real exchange rates on the share of manufacturing value added in total output (Magud & Sosa 2013, Rajan & Subramanian 2011).

Based on the results from Table 4.1, this paper agues that the hypothesis that the hypothesis that foreign aid and the real exchange rate have a negative influence on manufacturing growth in African countries should be rejected.

Indeed, this is not the end of the story in this paper. This paper continues to argue that foreign aid may just have some more positive influences. In that light, the results from the estimation of Equation 3.2 are presented. This equation was estimated to address the hypothesis that where foreign aid and labour intensity in manufacturing are increased, a positive influence on manufacturing growth will result. Using the same estimation strategy as described in the empirical strategy, the OLS, OLS fixed effects and

GLS results are shown in Table 4.2 below.

Table 4.2: Regression Estimates Showing the Interaction of Foreign Aid and Labour Intensity on Manufacturing Growth in African countries.

VARIABLES	(1) MAN_{it}	(2) MAN_{it}	(3) MAN_{it}
$MANI_{it}$	-0.0231*	0.0146*	-0.0202***
	(0.0138)	(0.00844)	(0.00114)
AID_{it}	-0.0960***	0.0544**	-0.0946***
	(0.0311)	(0.0211)	(0.00281)
LI_{it}	0.101	0.0705	0.0957***
	(0.107)	(0.0776)	(0.00904)
$(AID_{it} \times LI_{it})$	0.00179	-0.0103***	0.00202***
	(0.00553)	(0.00353)	(0.000484)
Constant	3.458***	1.917***	3.430***
	(0.583)	(0.444)	(0.0518)
Observations	1,260	1,260	1,260
R-squared	0.092	0.049	-
Wald $\chi^2(4)$	-	-	15271.5***
Estimation Technique	OLS	OLS	FGLS
Fixed Effects	No	Yes	No
Number of i	45	45	45
Groupwise Heteroskedasticity	No	1.50E+05***	No
Serial Autocorrelation	No	86.8***	No
Cross-sectional Correlation			Yes

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

From the first column of the table above, the OLS results show that the growth of manufacturing value added ($MANI_{it}$) and foreign aid have a statistically significant influence on the share of manufacturing value added in total output (MAN_{it}) in African countries, at the 1% and 10% levels of significance. The results suggest that a one unit increase in $MANI_{it}$ will reduce MAN_{it} by 0.0231%, holding all other influences constant. Similarly, from the first column of the table above, the results suggest that a unit increase in foreign aid will result in a decrease in MAN_{it} by 0.096%, holding all other influences constant. However, these results are the baseline results and are not relied on because they do not control for heterogeneity and omitted variable bias.

Hence, in the second column of the table, the results from the fixed effects estimations are presented. Those results show that in addition to $MANI_{it}$ and AID_{it}, both AID_{it} and labour intensity in manufacturing (LI_{it}) have a statistically significant influence on MAN_{it} at the 1%, 5% and 10% levels of significance respectively. However, both $MANI_{it}$

and AID_{it} are shown to have a positive influence, such that a unit increase in $MANI_{it}$ will result in an increase in MAN_{it} by 0.0146%, whiles a unit increase in AID_{it} will result in an increase in MAN_{it} by 0.0544%, holding all other influences constant. Where both AID_{it} and LI_{it} interact, the results suggest that there is a negative and statistically significant influence on $MANI_{it}$, such that a unit increase in both AID_{it} and LI_{it} will result in a decrease in MAN_{it} by 0.0103%, holding all other influences constant.

However, model diagnostics test for serial autocorrelation and groupwise heteroskedasticty showed that the residuals in the fixed effect model were serially correlated and did not have the same variance. This was based on the significance of the critical values of the serial autocorrelation test(1.50E+05) and the heteroskedasticity test (86.8), discussed in the earlier section on the empirical strategy.

Therefore, the paper estimated another model using the GLS technique in order to control for both issues and also control for cross-sectional correlation in the panel. The paper argues that the cross-sectional correlation is the control for spillover effects that result from the growth of manufacturing over time. These results are shown in the third column of Table 4.2. The results show that not only do $MANI_{it}$ and AID_{it} have statistically significant influences on MAN_{it}, but LI_{it} and $AID_{it} \times LI_{it}$ also have a statistically significant influence on MAN_{it} in African countries in the sample. This means that although $MANI_{it}$ and AID_{it} have a negative and statistically significant influence on MAN_{it} at the 1% level of significance, LI_{it} and $AID_{it} \times LI_{it}$ have a positive and statistically significant influence on MAN_{it} at the 1% level of significance.Hence a one unit increase in $MANI_{it}$ and AID_{it} will reduce MAN_{it} by 0.0202% and 0.0946$ respectively. Also, a one unit increase in LI_{it} and $AID_{it} \times LI_{it}$ would increase MAN_{it} by 0.0957% and 0.00202% respectively.

The results obtained therefore can be used as evidence to accept the hypothesis that where foreign aid and manufacturing labour intensity interact, there is a positive influence on manufacturing growth in African countries.

Discussion of Results

First of all, from the GLS estimates in Table 4.1 and Table 4.2, the growth of manufacturing value added ($MANI_{it}$) and the share of manufacturing value added in total output (MAN_{it}) have a negative relationship, indicating that increases in the growth of manufacturing value added do not increase the share of manufacturing value added in total output. One reason for such a finding is the increasing importance of global value chains and financialization. With global value chains, countries only contribute to sections of the production process of a final good, by producing components or providing raw materials for components of final goods to be made. The production of such primary goods are meant to contribute to further inputs required to make the final product, which would count as value added for the economy in which the final good is produced. However, although some of the raw materials or components may be manufactured in African countries, there is very little value added that these inputs count for after their manufacture. Furthermore, with increased financialization, not much venture capital can be sourced to set up large scale manufacturing plants that contribute to value added by making final goods and services for consumption or investment. Where financial capital is sought, investors would be interested in putting their money in ventures which have very little risk and yet offer high rewards, such that selling repackaged components of a car will be more profitable compared to selling an entire automobile. In other words,

this paper argues that due to the increasing importance of financial markets, very little resources will be committed to establishing manufacturing plants, which can contribute meaningfully to the share of manufacturing value added in total output.

More importantly, the results infer on the effectiveness of aid in African countries.The argument in the literature has been that foreign aid has a negative influence on the growth of manufacturing because foreign aid contributes to the resource movement and spending effects, which cause an increase in the level of consumption and cause the real exchange rate to rise. The rise in the real exchange rates is what makes exports of manufactures less competitive, thus hurting the growth of manufacturing. The findings in the fixed effects estimations have supported such arguments made by Magud & Sosa (2013) and Rajan & Subramanian (2011).Even in the GLS estimations, the results show that the real exchange rates and foreign aid only negatively influence manufacturing growth in African countries. These findings lend support to the negative influence of foreign aid and the real exchange rates.

However, contrary to the argument in the literature about the negative influence of foreign aid on manufacturing through the Dutch disease, this paper argues that interaction of foreign and the real exchange rate are not detrimental, but beneficial to manufacturing growth in African countries where spillover effects are considered. This is because as more manufacturing firms set up shop, they develop knowledge and technical skills and also import the necessary equipment to enhance their work. The spillover effects occur through a process of learning that enables the companies to learn from their past mistakes and develop better solutions to advance their production boundaries. In the stage of learning however, manufacturing firms may not have all the technology required, which is where the issue of foreign aid and the real exchange rates come in. Due to the interaction of foreign aid and the real exchange rate, manufacturing firms can import the needed technology at relatively manageable costs to aid their production processes. Hence, the point is that the Dutch disease influence of foreign aid that earlier studies argued for may an occur at a point in time, implying a kind of static effect of the interaction of foreign aid and the real exchange rates (Magud & Sosa 2013, Rajan & Subramanian 2011). However, this paper makes the case that where spillover effects from manufacturing growth are considered, foreign aid and the real exchange rate may help enhance the import of needed capital equipment that can increase manufacturing growth in African countries.

Furthermore as an addition to the literature on aid effectiveness, this paper argues that foreign aid can have a positive influence on manufacturing growth in African countries through its interaction with manufacturing labour intensity. This evidence comes about again where spillover effects of manufacturing are considered. In particular, knowledge spillover effects are known to be associated with the development of manufacturing over time (Szirmai & Verspagen 2015). Hence, where there is increased foreign aid or support for increasing labour intensity in manufacturing in African countries, manufacturing growth is enhanced and the knowledge spillovers benefit labour within the industries and even out of industries. With increased labour intensity in manufacturing, labour can gain the knowledge of production in specialized fields and share this knowledge with others, who can apply such knowledge to their own lines of work. In addition, increased labour intensity in manufacturing helps to reduce unemployment, which is still a significant development challenge for African countries.

These findings are relevant based on the assumptions made about the ability of the receiving country to target the foreign aid that they receive. It is important that the

country which receives foreign aid be able to decide on which sectors that it would choose to direct such development assistance.In principle, there are several motives that could influence the decision to give out foreign aid to developing countries. However, this paper argues that where aid is truly meant for development assistance, promoting manufacturing should be first on the list. Otherwise, such assistance could contribute to other detrimental influences in any developing country, which earlier literature had adduced to. In other words, this paper supports with the argument that aid is effective so long as it is used to support productive sectors in a developing country. Where this is not possible, the objective of the assistance may not be fully achieved and the potential which such assistance could have unlocked could remain hidden.

5 Conclusion

This paper sought to tests two main hypotheses: that foreign aid can positively influence manufacturing growth in African countries through the real exchange rate, and that foreign aid targetted at labour intensity in manufacturing could improve manufacturing growth in African countries. The evidence showed in the paper leads to the following conclusions:

Foreign aid could have a negative influence on manufacturing growth through the real exchange rate for African countries. However, this paper argues that manufacturing growth and the process of learning generates spillover effects, which when considered, change the effect of foreign aid on manufacturing growth in African countries to positive. As manufacturing develops, the interaction of foreign aid and the real exchange rates supports the inflow of technology and capital equipment, which manufacturing firms can use to improve their production.

Also, where African countries have the ability to direct foreign aid into sectors in which they are challenges, this paper concludes that foreign aid which is targetted at improving labour intensity in manufacturing would enhance manufacturing growth in African countries. This is because the knowledge spillover effects contribute to increased manufacturing across sectors and create additional employment opportunities for labour, which contribute positively to the development of African countries.

The results in this paper has implications for the use of foreign aid by African countries, as countries who invest such resources wisely are likely to have stronger growth record.

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Appendix

Table A: Definition of Variables

Variable	*Definition*	Source
MAN_{it}	Manufacturing refers to industries belonging to ISIC divisions 15-37. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 3. Note: For VAB countries, gross value added at factor cost is used as the denominator.	WDI
$MANI_{it}$	Annual growth rate for manufacturing value added based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. Manufacturing refers to industries belonging to ISIC divisions 15-37. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 3.	WDI
ER_{it}	Price level of Gross Domestic Product (GDP).Used as a proxy for the real exchange rate, following the work of Rodrik (2008).	PWT

Table B: Definition of Variables

Variable	*Definition*	Source
AID_{it}	Net official development assistance (ODA) consists of disbursements of loans made on concessional terms (net of repayments of principal) and grants by official agencies of the members of the Development Assistance Committee (DAC), by multilateral institutions, and by non-DAC countries to promote economic development and welfare in countries and territories in the DAC list of ODA recipients. It includes loans with a grant element of at least 25 percent (calculated at a rate of discount of 10 percent). Net official aid refers to aid flows (net of repayments) from official donors to countries and territories in part II of the DAC list of recipients: more advanced countries of Central and Eastern Europe, the countries of the former Soviet Union, and certain advanced developing countries and territories. Official aid is provided under terms and conditions similar to those for ODA. Part II of the DAC List was abolished in 2005. The collection of data on official aid and other resource flows to Part II countries ended with 2004 data. Data are in current U.S. dollars.	WDI
LI_{it}	Manufacturing employment estimates, measured in thousands. The data is estimated by the ILO based on Trends Econometric Models (TEM). Maufacturing is classified using ISIC revision 4C.	ILO

List of Countries Sampled

Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cape Verde, Cameroon, Central African Republic, Chad, Comoros, Congo Democratic Republic, Congo Republic, Cote d'Ivoire, Djibouti, Egypt, Equatorial Guinea, Eritrea, Eswatini (Swaziland), Ethiopia, Gabon, The Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, South Sudan, Sudan, Tanzania, Togo, Tunisia, Uganda, Zambia, Zimbabwe.

Table C: Summary Statistics of Variables

Variable	Definition	Expected Sign	N	Mean	Std. Dev.	Min	Max	Source
MAN_{it}	Manufacturing, value added (% of GDP)	N/A	1,260	11.541	7.510	0.233	50.637	WDI
$MANI_{it}$	Manufacturing, value added (annual % growth)	-	1,260	4.873	17.29	-54.007	375.158	WDI
ER_{it}	Price level of GDP	-	1,260	0.386	0.134	0.148	1.163	PWT
AID_{it}	Net official development assistance and official aid received (current US$)	-	1,260	639000000	822000000	520000	11400000000	WDI
LI_{it}	Manufacturing Employment (Thousands)	+	1,260	489.13	735.34	3	4311	ILO

Table D: Correlation Estimates between Variables

	$MANI_{it}$	AID_{it}	ER_{it}	LI_{it}
$MANI_{it}$	1			
AID_{it}	-0.0009	1		
	0.7351			
ER_{it}	-0.0009	0.0382	1	
	0.9733	0.1757		
LI_{it}	-0.0792*	0.5283*	-0.0429	1
	0.0049	0.0000	0.1280	