

PhD Thesis in
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Export Oriented Growth and Poverty Alleviation: Understanding the effects of aid, economic policy and liberalization reforms on the African economy.

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Introduction Note

This dissertation tries to answer specific questions on the subject matter that we investigate. Scholars of international economics have investigated a host of issues that affect growth, poverty industrialization etc. This dissertation contributes to past literature by identifying gaps that have not been previously filled or exhaustively researched in the past.

Foreign aid to sectors that can promote trade, the effect of economic policy on longevity and the effect of economic liberalization on trade in the presence of possible growth strategies are the issues that we dwell on in this dissertation. While scholars continue to argue for and against giving foreign aid to developing poor countries, few have actually investigated the impacts that disaggregated aid can have on trade. Export oriented growth can have strong consequences on a country's foreign exchange earnings, as this can improve the living standard of people in trading countries as well as lead to transfer of technology across borders.

Country specific economic policy if effectively implemented can act as a substitute for foreign aid, making the need of giving temporal self limiting aid to stimulate growth, to give way to foreign investment inflows. The impact that good economic policy can have on life expectancy particularly in developing countries will therefore be strong particularly since sustained growth could mean more people leaving poverty and moving into the middle class in such developing countries.

Many developing countries have also carried out one form of economic liberalization reforms or the other either with the aim of driving growth or due to conditions placed on such countries by the Bretton-Woods institutions (World Bank, International Monetary Fund etc) as the requirement necessary to access for capital inflow to revamp their ailing economies. Economic liberalization reforms alone are likely not to promote growth in the absence of good growth strategies. Exploring strategies that countries that liberalize their economies can employ in this dissertation provides a window through which the process of liberalization reforms can be viewed.

This rest of this study is divided into three chapters one each for the three papers included in this dissertation and finally a concluding note.

Thesis Abstract

This thesis investigates factors that can affect export oriented growth and reduce poverty in some African countries. The reason for this is that if exports usher in a period of mild prosperity and effective and consistent economic policy implemented through institutions which is capable of improving life expectancy in developing countries are given adequate attention, this can have a positive impact on the general economic outlook of many of these developing countries. Aid-trade dynamics is studied extensively in the first paper in the thesis, and it was found that aid has the capacity to increase exporting in the African countries in our sample. The theory relied on is that aid which is initially altruistic allows for the development of a close connection between developing countries and developed donor countries, which eventually leads to trade. Secondly certain types of aid were particularly useful in promoting exports. These included aid to sectors that are likely to boost trade, these sectors are the educational, banking and financial services, agricultural and infrastructural and services sectors. Donors who pay attention to promoting good economic policies and institutional quality are likely to have aid improve trade in a more significant manner since weak policies and institutions can reduce aid effectiveness, while the presence of natural resources affects aid effectiveness in promoting trade negatively.

The relationship between economic policy and life expectancy in some African countries is studied in the second paper. An index for economic policy was developed using two methods (i.e. principal component analysis and regression component analysis previously used by Burnside and Dollar). The results in the second paper show that economic policy has a negative effect on life expectancy. However after interacting economic policy with institutions, this interactive variable had a positive effect on life expectancy. The implications of this result are that implementing economic policy through institutions is likely to improve economic policy effectiveness in improving life expectancy. Improving life expectancy also means that poverty in general can be reduced in an effective manner in many developing countries through effective economic policy, therefore sound and consistent economic policy is a likely factor that has the capability of reducing poverty in developing countries.

The third paper in this thesis studies the impact of economic liberalization reforms on exports in some African countries from the early 1980s when such reforms began. This paper also explores the effect of growth strategies such as trade openness policy and technology transfer policies on exports in general. The results show that economic liberalization has probably been promoting exporting, while countries that implemented the policy of trade openness are likely to have such growth strategies promote exports but the effect of their liberalization reforms on exporting were significantly weaker than those that pursued the policy to transfer technology through training human capital. The implication of these results is that implementing the strategy of opening up ones domestic economy in return for exports concession slots is likely to promote exporting on the short run but do not make liberalization reforms very successful. While countries that pursue the policy of allowing the influx of foreign enterprises on the condition of hiring, training its indigenous manpower and sharing technical know are likely to have economic liberalization reforms have a more effective effect on exports even though manpower training has little or no effect on exports on the short run.

JEL Codes: F13, F16, F40, F42, H5, I15, I18, I28, I38, J1, L16,L38O24.

Chapter 1

Does Aid Promote Trade? Evidence from Some African Countries

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Abstract

Many African Countries look towards increase in trade driven growth, as a means of improving living standards and boosting growth of their economies. Aid given to trade in desperately poor countries, can be of tremendous advantage to such countries. We find in this study that aid was contributing to exporting in a significant manner in the countries in our sample. The conditionality associated with multilateral aid, was probably making multilateral aid more effective in promoting exports, in developing countries. We also investigate for some peculiar components of development assistance to sectors, which can affect trade in developing countries. Aid to four sectors was found to have a significant impact on trade, although the presence of natural resources, institutions and economic policies were found to reduce the effectiveness of aid, in promoting trade. We find after comparing results obtained using two different methods of constructing our measures of economic policy and institutional quality indexes that our results are robust and that official aid (both bilateral and multilateral in nature) and aid to sectors was contributing to exporting, except for aid to the agricultural sector.

Keywords: Aid, aid effectiveness, exports, sectoral aid, economic policy & institutions

JEL: F13, F16, O24.

Introduction

The International Trade Centre (ITC) taskforce report 2010/13, states that global markets and export oriented growth are an effective way of alleviating poverty, improving livelihood and supporting entrepreneurship in a sustainable way. Therefore trade could be vital in driving growth in developing countries. Studying aid-trade dynamics in this paper¹ is likely to provide an insight into the possible effects that aid can have on trade with particular emphasis on Africa. Exports (as a measure of trade) can have a strong effect on the living conditions of people in advanced countries where strong trading capabilities have already been attained and in developing countries that are emerging from economic and political disruptions who wish to establish strong trade ties (see ITC Trade Report 2010/2013 and DFID (Department for international development) strategy report working paper on economic growth 2008/2013). Exports also has the capability to increase employment, improve earning power, raise government revenue to provide more services to its population, provide economic empowerment for the poor through commerce and deal with environmental and climatic problems, if the gains accruing from exports are used for common good (see International Trade Centre (ITC) Taskforce Report 2010/13 for details). Africa's per capita GDP is significantly low and that is why it remains the World poorest continent (see World Bank Statistics 2012). The African economy requires a strong industrial effort to drive it out of its current economic doldrums. The richest countries in Africa based on World Bank 2009 statistics are South Africa and Egypt, (measured by their purchasing power parity) with South Africa's GDP being around \$488.6 billion as of 2009, see Economic Watch "An African Economy Overview" (2010), however many African countries remain extremely poor. Foreign aid given to these poor countries can have strong effects on the economy of these countries (particularly in sub Saharan Africa), especially in circumstances where it consist of a significant percentage of their national budget or gross domestic product. If the reason behind giving foreign aid is

¹ I wish to express my thanks to Bergamo University Italy for funding the course of this research and for the guidance and feedback obtained in writing this paper.

purely altruistic, then foreign aid can have a positive impact on the recipient country's development, if well utilized. The aims of this study is to identify what components of foreign aid (channeled to trade) is useful in promoting productivity and increasing trade in developing countries by dividing aid into sectors, and secondly to determine what the impact of government economic policy and institutional quality is on aid effectiveness in Africa?

Previous papers have estimated reduced forms equations of trade-aid dynamics they find that country specific economic and social variations and its proximity or distance to both local and foreign markets have a significant effect on trade (particularly exports)" see Morrissey, Osei and Lloyd (2004). In this paper it is assumed that aid is endogenous. The reason for this is that aid is likely to suffer from measurement problems since the data for aid might not capture all aid flows to developing countries for instance. The econometric approach we use is instrumental variable estimation, this allows us to control for endogeneity. Aid to sectors was found to have little or no significant effect on trade using OLS, and it had a somewhat increased effect in sectors using two stage least squares. Lots of literatures have argued that aid is useful, while others have suggested that giving aid does not help developing countries achieve economic growth. Some papers e.g. that of Jempa (1991)² examine vast literature on foreign aid and finds that foreign aid has the tendency to overshadow private savings contribute to consumption spending and has no significant impact on a country's growth. Others like Boone (1994, 1996) find out that aid has no effect on investment. Burnside and Dollar (1997) find that aid is only beneficial to countries that have good policies in place. Other authors have found some similar inconclusive results regarding aid and growth (see Bourguignon and Sundberg, 2008; Douclouliagos and Paldam, 2007). There is also, conflicting evidence that aid may have a positive impact on growth (Gormanee et al, 2003; McPherson and Rakowski, 2001). In addition to endogeneity, Svensson (2000) finds that disaggregating aid into sectors is a more promising route in trying to identify the effects that aid can have on a developing country. Clemens et al (2004) uses sectoral aid and finds a positive short-run effect on economic growth and that institutional factors may impact the effectiveness of aid. See

² Jempa, C. (1991) suggests foreign aid in most cases does not contribute in a significant manner to economic growth.

Renzio (2006) or Jensen (2008) for a review of aid literature. The rest of this paper is divided into five parts, the theoretical part, data description, some constraints to trade in Africa and index construction, empirical analysis and conclusion.

Theory

The theoretical model we present suggest that some specifically channeled aid can influence exports, the simple export demand model as developed by Fontagne et al (2002)³, used by Morrissey et al (2004) and Cali and Velde (2011), shows the possible effect that aid can have on trade. If we assume a situation where each country produces one good, differentiated from the others as a result of its place of production (origin), with the supply of each good constant and consumers having identical and homothetic choices which is represented by a constant elasticity of substitution (CES) utility function. The overall utility function of individuals in a given country k can be defined as a sum of the utility function of individuals in country i. we represent

$$(1.) \quad U_k = (\sum_{i=1}^N \varphi_i^{\frac{1}{\sigma}} C_{ik}^{\frac{\sigma-1}{\sigma}})^{\frac{\sigma}{\sigma-1}}$$

this in equation 1 above, where σ = elasticity of substitution of all goods and services, this can be defined as the share of goods and services from country i expended upon by individuals in country k, C_{ik} = the value of consumption of the goods produced in country i by individuals in country k, φ_i = share of goods produced by country i, expended on by individuals in country k,

where $k \in [1, N]$ this subject to the budget constraint that the value of goods and services consumed by individuals in country k, needs to be equal to the total national income of country k. The income of country K is given as shown in equation 2 below as

$$(2.) \quad y_k = \sum_{i=1}^N C_{ik} P_{ik}$$

Where P_{ik} = is the price in importer country k of goods produced in exporting country i

³ The model first developed by Fontagne et al (2002) describes the role of country specific effects particularly infrastructure in determining trade cost. We extend this model to the private sector and show how aid will affect factors of production such as cost of capital, labor and cost of developing a suitable environment for trade.

P_i is expressed as the supply price of the exporter i

Then therefore $P_{ik} = P_i \tau_{ik}$ where $\tau_{ik} \geq 1$ which is the exporters price times the cost of transaction

This will capture all types of trade related transaction cost for example potential tariffs and import taxes, likely administrative cost of trade, , transportation to ports and other local and international market destinations etc see Morrissey et al (2004) and Cali and Velde (2011) for further discussion. After maximizing eqn.1 subject to the budget constraint in eqn. 2 the real consumption C_{ik} with respect to import of goods from country i by country k is given below in equation 3.

$$(3.) \quad C_{ik} = \frac{\varphi_i Y_i}{\tau_i P_i} \left(\frac{\varphi_i Y_i}{\tau_i P_i} \right)^{1-\sigma}$$

The constant elasticity of substitution can be expressed as the likely trade cost in exporting to country k this can be defined as an index of how far in terms of distance, that country k is to country i, given by the distance factor. The distance factor can be defined as how remote goods from country i are from the market of country k. We express it in terms of remoteness in eqn. 4

$$(4.) \quad R_i = \left(\sum_{i=1}^N \varphi_i \tau_i^{1-\sigma} P_i^{1-\sigma} \right)^{\frac{1}{1-\sigma}}$$

country's k income can be expressed as $y_k = P_k Q_k$ which is the price multiplied by quantity consumed. The total export from country i to country k can be given as X_{ik} expressed below in terms of the exporting price and the total consumption in k of country i goods and services.

$$(5.) \quad X_{ik} = C_{ik} P_i = \frac{\varphi_i Y_i}{\tau_{ik}^\sigma} \left(\frac{R}{P_i} \right)^{\sigma-1}$$

The total exports from country i can also be expressed as

$$(6.) \quad X_i = \frac{\varphi_i}{P_i^{\sigma-1}} \sum_{k=1}^N \frac{Y_i R_k^{\sigma-1}}{\tau_{ik}^\sigma}$$

This indicates that exports from country i will depend significantly on individual country preferences for goods from i. This will depict how competitive, attractive and

the degree to which goods from country i are in demand in the international market. Total demand from country i therefore, will be affected in a negative manner by the cost of carrying out trade transaction in i, since this will affect its final selling price. This will therefore be displayed by its constant elasticity of substitution σ (CES). If $\sigma = 1$ this will mean that the CES is high therefore increases in price of goods from country i will lead to a significant decrease in exports since buyers will have to look elsewhere for cheaper goods, therefore change in exports with respect to price will reduce which we can express as $\frac{\partial X_i}{\partial p_i} < 0$.

Incorporating foreign aid into our exports model, it is likely that it could influence a whole lot of factors that could lead to increase in exports. Some factors that it could influence are the quality of goods produced by a country which could lead to product competitiveness in the international market this will likely increase the country's share of trade φ_i . Secondly it could reduce transaction cost in carrying out trade since aid is likely to improve infrastructure this will make the final price of country i products to be cheaper. Finally it might also reduce administrative and legal cost since aid might strengthen both financial and civil institutions so as to increase access to capital and reduce the bureaucracy of obtaining business permits and processing exports at ports. We define all these as transaction cost τ_{ik} and express it below in equation 7 as

$$(7.) \quad \tau_{ik} = (1+t_{ik}) b_i b_k f(I_i I_k) d_{ik}$$

Where τ_{ik} is the transaction cost of carrying out trade in i relative to exporting to k. We express b_i and b_k as the cost of preparing goods for exports (which is the exports processing cost) in country i and k respectively. We assume that transaction cost is a linear function of distance between i and k therefore country specific infrastructure should exert a positive effect on transaction cost depending on its state. The factor d_{ik} is the trade distance between i and k and therefore a barrier that should be overcome for trade to take place this could also affect price significantly, I_i and I_k are the quality of infrastructure in country i and k. This shows that aid given towards improving trade capacity is likely to facilitate trade in a positive manner by reducing transaction cost of trade in general. With this we establish that there might indeed exist, a relationship

between trade and aid. This relationship can be expressed as the inverse function between trade transaction cost and infrastructure. We can express trade transaction cost to reflect this by writing it as shown in equation 8. Where I_d is each country's domestic infrastructure and A_{4INFR} is aid channeled towards infrastructure.

$$(8.) \quad \tau_{ik} = \frac{(1+t_{ik}) b_i (A_{4T}) b_k d_{ik}}{(A_{4INFR} + I_D)_i + I_k}$$

Putting equation 8 into 6 the export becomes

$$(9.) \quad X_i = \frac{(\varphi_i (A_{4PC})) (A_{4INFR} + I_D)_i^\sigma}{P_i^{\sigma-1} (b_i (A_{4T}))^\sigma} \sum_{j=1}^N \frac{Y_j R_k^{\sigma-1}}{E_{ik}^\sigma}$$

The total trade cost (in exports) by country i with its trading partners is given by E_{ik} . It is assumed therefore that different types of aid depending on the sector it is allocated to will likely have a positive effect on exports. Therefore we can express a change in exports with respect to trade as shown in equation 10 below by including different constraints to trade.

$$(10.) \quad \frac{\partial X_i}{\partial (A_{4T})_i} = \frac{\partial X_i}{\partial b_k} \frac{\partial b_i}{\partial (A_{4T})_i} > 0$$

A change in exports with respect to aid will depend on how aid given to boost trade will reduce cost of production within a given country (see Morrissey et al (2004) and Cali and Velde (2011) for further discussion on how aid can influence export oriented growth).

Relating this to the private sector, the approach of our model will depict how aid will affect trade within a country, which will be a straightforward profit-maximization problem where trade within a country leads to a situation where firms in the private sector are attempting to maximize their profits (π_i). We can express profits (π_i) as the difference between total revenue and total cost $\pi_i = TR_i - TC_i$. In constructing the total revenue function we will for simplicity assume that firms' quantity choice does not impact the output price. This will be particularly true for firms in the export sector as they will be selling at the world price. The total revenue function for firms operating in sector i can thus be written as the price of output from sector i (P_i) multiplied by the output level (X_i), $TR_i = P_i X_i$. So, the marginal revenue is equal to the

price $MR_i = P_i$. In sectors of an economy firm costs are a function of several factors. These include the cost of labor (w), the cost of capital (v), transportation costs (t), and rent seeking (r). The cost of labor is the wage rate per unit of output produced. The cost of capital can be viewed as the typical rental price of capital but also more broadly as to include additional factors impacting the cost of obtaining capital such as access to credit. Transportation costs are a function of both the distance to market and more importantly the level of infrastructure. For example, in many developing countries the distance in kilometers to market is considerably less important than the state of the roads that lead there. Rent seeking represents the cost of dealing with corrupt government officials imposed on firms. So, the firms total cost function can be written as $TC_i = f_i(w, v, t, r)X_i$. The marginal cost (MC) can be expressed as $f_i(w, v, t, r)$. As firms increase output we can assume that eventually scarcities will occur and the marginal cost of production will rise. This can occur because of the rising cost of labor per unit of output produced and/or because of capital costs per unit is rising. Eventually, there reaches a point at which equilibrium occurs in firms. This profit maximization point (X_i^*) will represent the point at which $MR_i = MC_i$, also expressed as $P_i = f_i(w, v, t, r)$.

One of the goals of foreign aid (a_i) is to improve conditions for private sector businesses in developing countries (see Appendix e for graph). There are many ways in which this can occur. Foreign aid can increase education and training of workers, which would lower the firms labor cost per unit produced. So, the wage cost per unit produced can be expressed as a negative function of foreign aid, $w_i(a_i)$. Aid may also be used to subsidize equipment/technology purchases for firms or come in the form of credit extensions which may be used for capital purchases. Therefore, we can write the cost of capital as a negative function of foreign aid, $v_i(a_i)$. It is common for both multilateral and bilateral aid to be used for infrastructure projects (roads, harbors, airports, etc). These would lower the transportation costs for firms resulting in the following function where transportation costs are a negative function of foreign aid, $t_i(a_i)$. The flow of foreign aid into a sector may have a negative side effect; however, by increasing the rent seeking behavior of government officials since more funds flowing into a sector may result in corrupt officials seeking higher payout from firms. Therefore, the costs imposed by rent seeking officials is modeled as a positive function

of aid, $r_i(a_i)$. With foreign aid included in the model we can rewrite the equilibrium condition as $P_i = f_i[w_i(a_i), v_i(a_i), t_i(a_i)r_i(a_i)]$.

We can now examine the impact of the equilibrium condition from a change in foreign aid. We will assume that foreign aid does not impact output prices, especially for the export driven sector. Therefore, the differentiation of this condition with respect to foreign aid is only a differentiation of the marginal cost function. This can be expressed as

$$(11.) \quad \frac{\partial f_i}{\partial a_i} = \frac{\partial f_i}{\partial w_i} \frac{\partial w_i}{\partial a_i} + \frac{\partial f_i}{\partial v_i} \frac{\partial v_i}{\partial a_i} + \frac{\partial f_i}{\partial t_i} \frac{\partial t_i}{\partial a_i} + \frac{\partial f_i}{\partial r_i} \frac{\partial r_i}{\partial a_i}$$

first expression on the right hand side ($\frac{\partial f_i}{\partial w_i} \frac{\partial w_i}{\partial a_i} \leq 0$) represents foreign aid potentially lowering the cost of labor. The potentially lowering of cost of capital from aid is

represented as $\frac{\partial f_i}{\partial v_i} \frac{\partial v_i}{\partial a_i} \leq 0$. The potential reduction in transport costs is shown as

$\frac{\partial f_i}{\partial t_i} \frac{\partial t_i}{\partial a_i} \leq 0$. The possible rise in rent seeking costs is the last term on the right hand

side which is $\frac{\partial f_i}{\partial r_i} \frac{\partial r_i}{\partial a_i} \geq 0$. Therefore, the overall impact of foreign aid is combining

three potential cost reduction factors (w, v, and t) with one potential cost increase (r).

Whether or not the overall sign of $\frac{\partial f_i}{\partial a_i}$ is greater or less than zero will depend to a large extent on the quality of a country's institutions and on how foreign aid is directed. If aid is directed towards more productive uses that lower firm' labor, capital and/or transport costs then this will help turn the prediction towards lower marginal costs. If marginal costs of production fall for firms as a result of foreign aid then output in the sector will increase. In other words, if $\frac{\partial f_i}{\partial a_i} < 0$ then $\frac{\partial X_i}{\partial a_i} > 0$. We do not use the gravity trade model because aid is typically between the rich and least developed nations however we use a partial log equation to depict the effect that aid can have on trade in developing countries. Therefore our model asserts that exports will depend on a set of exogenous variables $X_{i,t}$ and aid. Our set of exogenous variables consists of a set of variables that affect trade. The model we present is the trade model below in equation 12. We extend the model to sectors and relate the effect of aid to sectors to total trade in a country to determine the effect that aid to each sector has on trade. (See Appendix H for more on the relationship between exports and aid).

$$(12.) \text{Exports}_{i,t} = \beta_0 + \beta_1 X_{i,t} + \beta_2 Aid_{i,t} + \varepsilon_{i,t}$$

We expect our above model, to yield the following hypotheses which will be tested in this paper for the export sector.

Hypothesis #1.) Aid focused directly on export promotion (extensions of trade credit, etc) will have a positive impact on exports.

Hypothesis #2.) The positive impact of aid on exports will be reduced if the country has lower institutional quality (more corruption).

Hypothesis #3.) Aid focused on infrastructure investments will increase exports.

Hypothesis #4.) Due to conditionality, it is expected that multilateral aid will suffer from less rent seeking and will be directed more towards lowering firms' costs as opposed to bilateral aid. Therefore, the positive impact of aid on exports should be higher for multilateral aid rather than bilateral aid.

Hypothesis #5.) Aid directed towards the agricultural and educational sector may or may not increase exports depending on whether the aid is promoting production for export or for domestic consumption.

Hypothesis #6.) Economic Policy can either improve or reduce aid effectiveness in countries, depending on whether country specific economic policy was taken into account in the disbursement and utilization of aid to promote exporting.

Hypothesis #7.) Natural resource presence can either weaken or strengthen aid effectiveness in promoting trade, depending on whether government has the courage to promote trade in other sectors of its economy by diversifying its economy and reducing its reliance and focus on resource rich sectors in promoting its exports capacity

Data

The descriptive statistics of all data used, is presented below (see Table 1). We use panel data in our study. We obtain data for five African countries, four in sub Saharan Africa and one in North Africa (i.e. Kenya, Botswana, Ghana, Cameroon and Egypt) for a period of 39 years (1970 to 2008) although some data are missing. The countries are not selected randomly however we select one country each from each of the five regional divide in Africa. The reason for this is to capture exporting from all five regions in Africa (North, west, central, east and Southern regions in Africa) which

will indeed be a miniature reflection of exports from the African continent as a whole, this is obviously a limitation of the paper.

Table-1 Descriptive Statistics

Variable	Observations	Mean	Std. Dev	Min	Max
Log of exports	195	3.25	0.48	1.21	4.32
Log of GDP/capita	194	13.35	0.84	11.87	15.79
Natural Resources	195	0.6	0.49	0	3
Exchange Rate	195	1.15	1.92	0.0004	7.03
Landlocked Status	195	1.8	0.4	1	2
Economic Policy	190	-1.25	1.09	-1.80	5.22
Institutional Quality	140	-1.67	1.24	-1.83	1.83
Crude price	195	42.72	21.48	15.93	99.11
Life Expectancy	195	55.04	5.11	44.63	68.41
Health Access	140	73.33	22.62	5	99
Inflation	190	15.05	17.4	-3.21	122.88
Openness	195	70.24	30.56	22.25	157.63
Torture	140	0.59	0.61	0	2
Electoral Self Determination	140	0.99	0.73	0	2
Freedom of movement	140	1.01	0.82	0	2
Political Imprisonment	140	0.87	0.83	0	2
Effective Bilateral Aid	105	2.98	2.43	0.42	15
Effective Multilateral Aid	105	1.41	1.37	0.11	6.4
Total Effective Aid	105	4.39	2.98	0.77	16
Official Multilateral Aid	195	1.62	1.64	0.03	8.28
Total Official Aid	195	5.75	3.91	0.17	18.24
Log of Official aid to Education	144	-6.34	1.74	-14.81	-2.99
Log of Official aid to Agriculture	145	-6.1	1.77	-10.68	-3.46
Log of Official Aid to Infrastructure	145	-4.76	1.3	-10.08	-2.19
Log of Official Aid to Trade Policy	130	-6.96	1.89	-13.28	-3.23
Log of Official aid to industry	144	-6.84	1.85	-13.41	-3.04
School enrollment rate	183	88.94	15.64	55.15	120
Life Expectancy in Years	195	55.04	5.11	2	68.4

Dependent Variable

Our dependent variable is exports, we use exports as our measure of trade, it is the total amount of goods and services exported overseas from a given country in constant US dollars, it however does not capture domestic trade which is a major

limitation. Data for exports is obtained from World Bank database. Logarithm of exports is taken because the data on exports is too noisy therefore this helps to resolve scaling issues. Exports overseas depicts the exporting country's capacity to exports and its share of oversea trade which is often its foreign exchange earning capacity, therefore export is a vital measure of a country's international trade.

Description of explanatory variables

Data for aid, gross domestic product (GDP), Population, exchange rate, trade openness, government spending and inflation was also obtained from World Bank database. Two different measure of aid is used in this paper. One is effective aid (pure aid) which consist of grants and grants component of loans, initially constructed by Chang, Fernandez- Arias, and Serven (1999) and the other is official aid which we described as distorted and conditional in nature (distorted because donors often require recipient to use a sizable amount to import goods from donor countries) it also consists of grants and loans whose grants component is at least 25% according to World Bank data. This allows us to determine the difference in their respective impact on trade. Bilateral and multilateral aid is added up to obtain what we call total effective aid and total official aid respectively. Effective aid data was available only for a period of 1975 to 1985 and official aid data for the period of 1970 to 2008. We intend to compare the difference of the impact of effective aid with that of official aid on trade and note the difference between aid without conditionality (effective aid) and aid with conditionality (official aid) on trade since donor often require recipient to purchase goods from donor countries as a condition for giving official aid, this could make official aid to be too stringent thereby limiting its impact on trade.

Effective aid to sectors was not available for individual sectors, comparing the difference in total aid allocation allows us to know the difference of the impact of official aid from effective aid on trade, so as draw conclusion of their impact on trade. Official aid to sectors alone was used to determine the impact of aid to sectors on trade this will probably affect our results since we lack data on effective aid to sectors. Data on official aid to sectors was obtained from The College of William and Mary Williamsburg Virginia aid data base www.aiddata.org, for the period of 1980 to 2008 (29 years) for five the sectors that we wish to consider their effect on trade, although

some years of data are missing. The sectors are trade and business support services, infrastructure, education, agriculture and industry. Country specific income was represented as GDP per capita which is the average per capita income of individuals in a country, exchange rate is the average dollar local currency exchange rate by country this captures fluctuation in the global economy that are likely to affect trade since the dollar is the global currency used in international trade. Economic liberalization rate was captured using the number of phone lines, since businesses are likely to acquire more phone lines in a liberalized economy than in a highly regulated one. We use indexes to capture the effect of economic policy and institutional quality on trade in the presence of aid. This method of construction of the indexes is shown in the next section.

Economic policy is the fluctuation in government regulatory decisions reflected in its monetary and trade policies. We capture this using inflation and trade openness variables and develop a single index for this using principal component analysis (PCA). Investors are likely to consider how sound and consistent government economic policy have been overtime in the course of their future investment in the private sector of an economy. While institutional quality is reflective of government attitude and behavior towards governance. We capture these using political variables. Institutions will also capture a whole host of factors such as transaction cost involved in running businesses, the cost and time in acquiring business permits and the quality of infrastructure which will affect the cost of transportation to both local and foreign markets, since access roads linking rural agricultural areas to ports will depend on governments ability to create enabling environment for trade. We obtain data on institutions from Binghamton University political data; we create an index also for institutions using PCA (see next section for index construction). Foreign direct investment is the inflow of foreign investment to the private business sector in a country in constant US dollars, school enrollment was used to capture the level of skill available in the labor market, this was the total primary school enrollment rate of boys and girls between the ages of 0 to 15 years of age, therefore we expect that this will affect the overall quality of manpower in countries which could have an effect on output productivity, all variables are for a period of 1970 to 2008 except otherwise stated. (See Appendix I. for data summary).

Some Constraints to Trade in Africa: *Constructing economic and institutional indexes*

Business surveys such as World business environment (WBE) report and World development reports (WBR) of the World Bank of 1999/2000 and 1996/1997

Table-2 Constraints on Trade in Africa

WBE(1= no constraint 4= severe constraint)	WBR(1= no constraint 6= severe constraint)
Corruption	2.80
Weak Infrastructure	2.75
Street Crime	2.70
Inflation	2.67
Financing	2.64
Organized Crime	2.57
Political Instability	2.43
Taxes and Regulation	2.24
Exchange Rate	2.15
Taxes and Regulation	4.50
Corruption	4.47
Weak Infrastructure	4.28
Crime	4.25
Inflation	4.11
Lack of Access to Finance	3.95
Policy Uncertainty	3.88
Cost Uncertainty	3.75
Regulation of Foreign Trade	3.64

Source: World Bank Business Report (2000), also used by Asiedu (2002)

Note: The table above shows the different constraints on trade in Africa using results from two World Bank surveys

respectively have listed some constraints to foreign direct investment and trade in Africa (See Table 2). They used a sample of 413 and 540 firms respectively in Africa in the two surveys, and respondents were asked to determine on a four point scale (1= no constraint and 4 = severe constraint) for the first survey and six point scale (1= no constraint and 6 = severe constraint) for the second, to depict the extent to which some factors constrained business operation in African countries for each of the reports. As can be seen above in Table 2, institutional and economic factors rank highest on the list of constraints to business and trade in Africa. Corruption, weak infrastructure and crime are the greatest institutional impediments to trade while inflation and financing are strong financial impediments to trade in Africa. In this paper we group most of these constraints into institutional and economic factors and reduce the number of variables by creating an index which captures their effect.

Developing a single variable from a list of variables that have been identified to be relevant to our topic under study (trade) makes the discussion of what the effect of institution or policy is on trade to be easier. Most variables used to capture institutional

quality are often political indicators, they show the direction of a country's internal governing style and are often used to rate the reputation of its government and its inclination to good governance through its affinity for democratic values. Principal component analysis (PCA) allows us to create a single index for economic policy and institutional quality, this is a statistical technique used, to derive summary measures from a set of variables by capturing their variation. The difficulty most economists face when considering institutions is that they find numerous indicators for institutions and it becomes difficult to analyze institutions using every single one of them. The variables we use to capture institutional quality are country specific freedom of movement and electoral self determination rate. These variables depict a country's respect for rights to social assembly and right to self electoral determination. The reason for using these two variables is that it allows us to capture country specific freedom of association since this could affect trade if people are prohibited from doing business because of their opposition to government or unnecessary threats to life and property. While electoral self determination rate allows us to capture political stability and the presence of enabling environment that can promote trade.

Governments also find it difficult to control many economic indicators, however some of the economic policies that governments float are captured using indicators that governments try to control, and some examples of such policies are its monetary, trade and fiscal policies. To capture these three policies economist use indicators such as inflation, trade openness and government spending or budget surplus to measure the effect of these policies on growth. The difficulty arising from using such indicators is that if one wants to talk about economic policy as an entity it also becomes virtually impossible or quite cumbersome using more than one indicator to discuss the effect of government economic policy on the issue under focus. Due to this difficulty we use these three indicators (inflation, trade openness and government consumption spending) to develop a single index for economic policy. In this paper we show the index construction below. We create the index for institutional quality using the two variables stated above. They include freedom of movement (freedomove), which is the right to social association and electoral self determination rate (elecsd) which captures political stability as stated earlier. We obtain these variables from Brigham university data set for political indicators developed by international non-governmental organizations.

Freedom of association was developed by assigning a score of 0 in cases where it did not exist, 1 in situations where it was interfered with and 2 in cases where it was present. Electoral self determination rate was measured by assigning a score of 0 in cases where it did not exist, 1 in a case where it existed but there were some limitations and 2 in a case where citizens have ability to exercise full political and voting rights.

Principal component analysis uses a weighted average of the underlying variables above to develop an index for institutional quality using the matrix of eigenvectors transformation allowing us to obtain an uncorrelated index from a group of correlated variables. The result of our scatter matrix plot using the two variables used for generating institutional quality is presented below in fig 1. Where the variables 1 and 2 are freedom of movement and electoral self determination rate respectively. The scatter matrix shown below show that electoral self determination and freedom of movement are identically distributed (see blue dots) and closely correlated. This might not be clear but a case where variables are not correlated will be explained when developing the economic policy index subsequently.

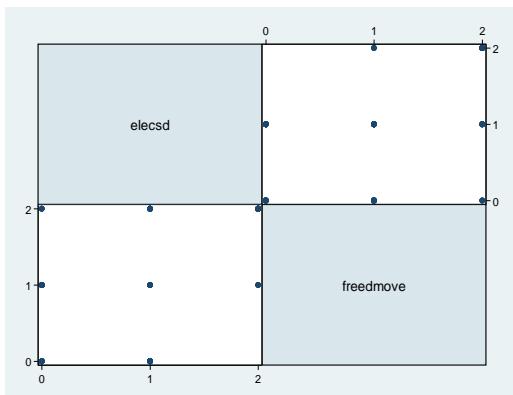


Fig.1

The results of the eigenvectors values is obtained in Table-3 above, (we show by hand below how this is constructed although “Stata” does it automatically) using the PCA command “pca elecsd freedmove”. The index is obtained by adding the two principal components obtained from the eigenvalue transformation using the two variables alternately as shown below.

$$PC1 = (0.7071 * \text{elecsd}) + (0.7071 * \text{freedmove})$$

$$PC2 = (0.7071 * \text{elecsd}) - (0.7071 * \text{freedmove})$$

where freedmove = freedom of movement and elecsd = electoral self determination rate.

Table 3 Construction of institutional quality index using eigenvectors

	(1) PCA Component 1	(2) PCA Component 2
Method of construction		
Variables		

Electoral self Determination Rate 0.7071 0.7071
 Freedom of movement 0.7071 -0.7071

Note: The above values are generated using eigenvalue transformation. We used the PCA command “pca elecsd freedmove” to construct the institutional quality index. The index captures the variation in the two variables allowing us to generate a single index by adding the individual principal component of the variables.

Institutional quality index is given by Institutional quality = PC1+PC2

where PC1 and PC2 are principal components 1 and 2 obtained from our variables.

The score plot is shown below in figure 2 for the two components to depict the variation in our new index, it shows that there exist sufficient variations among our variables to capture the effect of institutions.

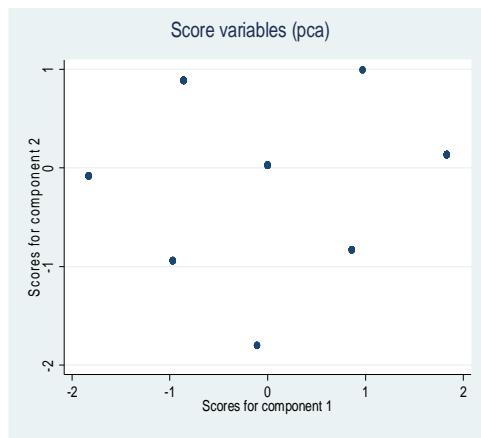


Fig.2

An index for economic policy was also created using the three variables inflation, trade openness and government consumption spending which captures government monetary, trade and fiscal policies respectively. Inflation is the change in price of goods over time in US dollars, trade openness is the ratio of exports to imports by country and government consumption spending is government welfare spending in US dollars,

which displays its fiscal discipline. The scatter matrix plot for the variables used in the construction of economic policy is shown below below in figure 3. The results of our scatter plot show that government consumption spending has a poor spread (variation) and is not correlated with inflation but only slightly correlated with trade openness (see comparison of the narrow blue scatter on the left with openness and inflation). We find that inflation and openness have a stronger correlation with each other. Using a set of uncorrelated variables could affect the quality of our index since it could either reduce the variation of the index or over exaggerate its variation making the index to have a strong negative or strong positive effect leading to poor conclusions as to the effect of the index in our study. Government consumption spending was dropped to avoid such problems and we used only inflation and trade openness in our index construction. Past literature e.g. Burnside and Dollar (2000) and Easterly (2003) also lend credence to our assertion since they state that countries can experience growth or trade increase with poor fiscal conditions (i.e. growing budget deficit) as most developed countries have for decades allowing to justify dropping the fiscal variable.

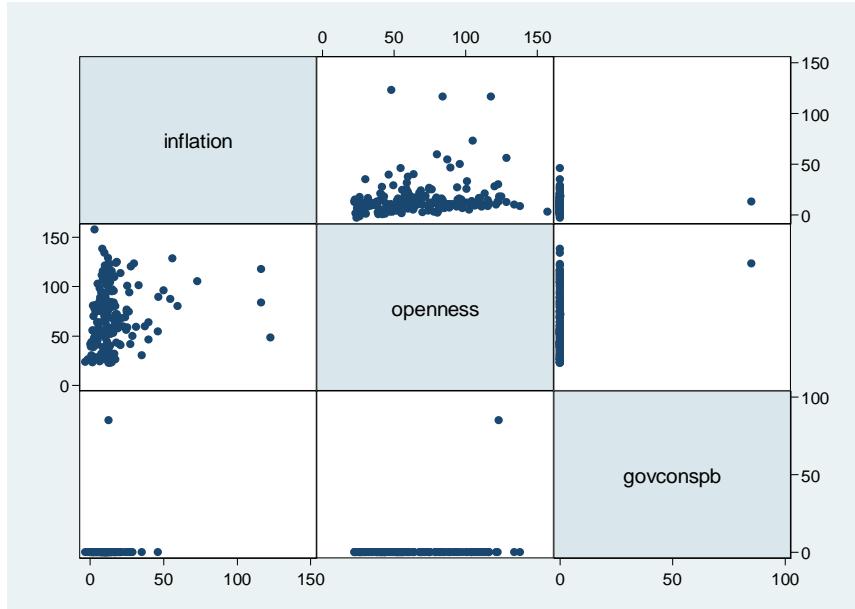


Fig3

The PCA command in stata used to produce the eigenvectors in Table-4 is “pca openness inflation”

Table 4 Construction of Economic policy index using eigenvectors

	(1) PCA Variables	(2) PCA Component 1	Component 2
Openness	0.7071	0.7071	
Inflation	0.7071	-0.7071	

Note: The above values are generated using eigenvalue transformation. Using the PCA below we also show how we construct

the economic policy index from our matrix of eigenvectors as follows using the command “pca openness inflation”.

Economic policy index is generated from our principal component eigenvector table shown in Table-4 above as

$$PC1 = (0.7071 * openness) + (0.7071 * inflation)$$

$$PC2 = (0.7071 * openness) - (0.7071 * inflation)$$

Economic policy index is obtained from summation of the principal components shown below as Economic policy index = PC1+PC2

where PC1 and PC2 are our principal component, 1 and 2 respectively. The results of the score plots also shows the correlation between openness and inflation in figure 4 whereas figure 5 shows all three variables, in figure 5 we observe that government consumption spending affects

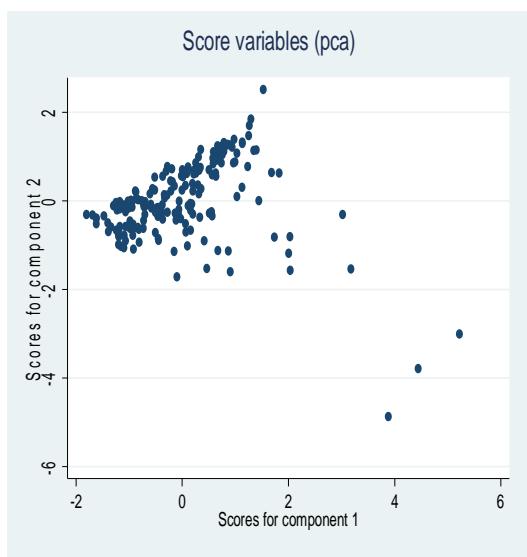


Fig 4

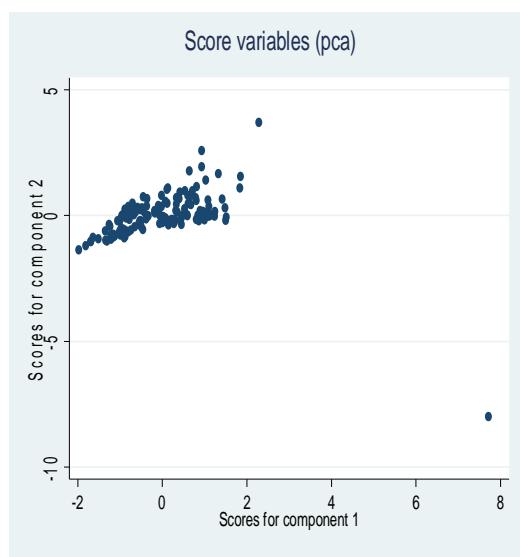


Fig 5

the spread of our score plots in such a manner as to skew our spread more in the positive direction (compare the spread on the vertical axis of both figures). This gives some more leverage as to why it was dropped. See Abeysekera (2004) and Schlens (2009) for further discussion on how PCA produce consistent indexes.

Empirical Analysis

Does Aid Attract Trade?

Our empirical model tries to answer, if aid promotes trade? The argument we present is that many middle income countries receive higher amounts of aid than low income countries (see USAID 2010 fast facts), this can be attributed to the fact that there is a higher volume of trade between middle income countries and developed countries who give aid. Based on this one might be tempted to say absolutely that it is trade alone that attracts aid. When one considers cases like that of Rwanda or Kenya that are particularly poor countries with little or no mineral resources and a low volume of trade but receive aid, we can state otherwise since there exists little or no incentive of giving aid to such countries. One can argue from sound judgment based on reasons for giving aid, that aid is initially altruistic to poor developing countries. Past studies e.g. Easterly (2003) suggest that giving aid to a country can establish a close connection between two countries leading donor country, to search for the presence of minerals and other country specific endowments in recipient country, on finding a sizeable deposit of resource this could lead to trade between both countries giving leverage to the argument that aid could be initially altruistic in nature, causing aid to attract trade.

Model specification

Hausman specification test was run to choose between using fixed and random effects model for estimation. Results accept the null hypothesis that the fixed effects estimator is not biased (p-values are all considerably lower than .01). The use of instrumental variables approach is because of the endogeneity of the aid variables. A Hausman-Wu test rejected the null hypothesis that aid was exogenous, with a p-value of 0.00. Therefore, using aid as an independent variable could lead to biased results. We then used fixed effect method of estimation to estimate our equations. We present the

reduced forms of our three versions of aid and trade equations below (for effective, official and aid to sectors). We lag aid and exports by one period, therefore exports from past period will depend on aid from past period.

The EDA versions of these equations are

$$(13a) \text{ } EDA_{i,t-1} = \alpha_0 + \alpha_1 X_{i,t} + \alpha_2 I_{i,t} + c_i + \mu_{i,t}$$

$$(13b) \text{ } Exports_{i,t-1} = \beta_0 + \beta_1 X_{i,t} + \beta_2 \widehat{EDA}_{i,t-1} + c_i + \mu_{i,t}$$

The ODA versions of these equations are

$$(14a) \text{ } ODA_{i,t-1} = \alpha_0 + \alpha_1 X_{i,t} + \alpha_2 I_{i,t} + c_i + \mu_{i,t}$$

$$(14b) \text{ } Exports_{i,t-1} = \beta_0 + \beta_1 X_{i,t} + \beta_2 \widehat{ODA}_{i,t-1} + c_i + \mu_{i,t}$$

The sectoral versions of these equations are

$$(15a) \text{ } AID_{i,t-1}^j = \alpha_0 + \alpha_1 X_{i,t} + \alpha_2 I_{i,t} + c_i + \mu_{i,t}$$

$$(15b) \text{ } Exports_{i,t-1} = \beta_0 + \beta_1 X_{i,t} + \beta_2 \widehat{AID}_{i,t-1}^j + c_i + \mu_{i,t}$$

The trade (exports) equations are linear specifications, where i is the index for the countries, t the index for time and trade is the logarithm of per capita export resulting from trade with other countries, aid (be it EDA, ODA and aid to sectors) is expressed as the logarithm of aggregate aid allocated for purposes that can stimulate trade. Our vector of exogenous variables $X_{i,t}$ consists of a group of specific variables that affect trade they consist of government economic policy, average dollar-local currency exchange rates which capture global shocks that affect trade, institutional quality, school enrollment rate foreign direct investment, economic liberalization and GDP per capita. We excluded natural resources as a variable since we experience negative R-squared with its presence but use it in interacting aid. We assume that aid is endogenous in the trade equations, since aid is likely to suffer from measurement problems. Therefore we employ an instrument $I_{i,t}$ for aid to capture the effect of aid in our aid equation. The dynamics that govern the different types of aid in promoting trade was found to be complex and different from one another. We find that with some types of aid, trade was found to depend on additional factors, since aid was to be used in

promotion of trade, for instance with effective and official aid we found that such aid will likely be given to assist trade in the presence of reasonable foreign direct investment (FDI) and economic liberalization. With aid to sectors which was in fact official aid to sectors, aid will depend on some level of economic liberalization which allows for private ownership and some investment in the private sector but not necessarily foreign direct investment. Where c_i represents time invariant unobserved effects on trade and μ_{it} represents time varying unobserved effects on trade. The fixed effect method will produce consistent estimate of the effect of aid on trade by allowing arbitrary correlation between unobserved time invariant effects (c_i) and explanatory variables in the trade equations. The consistency of the FE estimators will depend on following assumption (a.) The time varying unobserved effects μ_{it} are uncorrelated with the explanatory variables across all time periods. (b.) There is significant variation in aid flow over time and (c.) The assumption of strict exogeneity of explanatory variables must also be fulfilled. The assumption of strict exogeneity is going to rule out feedback effects from aid to trade and country specific effects over time.

In some other instance we estimate variants of the trade (exports) equation using GLS including the variable “interact” the interaction between aid and policy, aid and institutional quality and aid and natural resources using interaction variables. This allows us to know how these factors affect aid effectiveness since interacting aid with these variables is likely to improve or reduce the effect of aid on trade. The predicted value for the instrumented variable (sectoral aid) was then interacted with the institutional quality, economic policy or natural resources. The second equation (with exports as the dependent variable) then included the predicted aid variable, one of the interaction variables and the other explanatory variables used in the regressions.

The interaction versions of these equations are

$$(16a) AID_{i,t-1}^j = \alpha_0 + \alpha_1 X_{i,t} + \alpha_2 I_{i,t-1} + v_i + \varepsilon_{i,t}$$

$$(16b) Exports_{i,t-1} = \beta_0 + \beta_1 X_{i,t} + \widehat{\beta_2 AID_{i,t-1}^j} + \beta_3 interact_{i,t} + v_i + \varepsilon_{i,t}$$

In all government economic policy and income were lagged by one period. We have a total of two right hand side endogenous variables (aggregate aid and aid to sectors) and at least 6 excluded exogenous variables (logarithm of income, government economic

policy, and institutional quality, exchange rates, market access, foreign direct investment, economic liberalization rate and school enrollment rate) with three interaction variables (aid interacts with economic policy, institutional quality and natural resources).

Instrument

We carefully explain here why our exclusion restriction will hold. We use one instrument “life expectancy” for aid (i.e. for bilateral, multilateral and aid to sectors for the three sets of equations), so our model is exactly identified, life expectancy is defined as the average life span for men and women living within any specified geographical location. It depicts the average mortality rate for men and women by country. In most cases it is calculated separately for men and women due to the difference in probability of dying. Life expectancy is therefore calculated as the average probability of surviving based on age, sex, geographical location etc therefore it is defined as an arithmetic mean calculated by integrating the survival curve from age 0 to positive infinity. We expect aid to flow to areas with low life expectancy, making life expectancy to be positively correlated with aid. Our exclusion restriction will hold since it is reasonable to state that on the long run low life expectancy will attract foreign aid but will not directly promote exports allowing us to solve our first stage and second stage equations simultaneously. This is reasonable since the only way life expectancy can affect exports in poor countries is through aid or access to international credit facilities, secondly illiteracy is also an issue, this can also be addressed by aid.

Exclusion restriction assumptions are typically theoretical an instrument that is valid should therefore be correlated with aid in our model specification but not with trade (exports). One of the most important aspects of the instrumental variable approach is having a variable (or variables) in the aid equation which is not included in the trade (export) equation; these variables are referred to as the “instruments”. We expect that our instruments should fulfill certain conditions in our case which will be particular for exports. First, instruments should have a significant impact on the variable they are predicting, in this case the aid variable. The second condition is that the instrument should not have an impact on the dependent variable, exports in the second equation.

While often this is tested empirically, Wooldridge (2010) and others have pointed out that this also needs to be done on the theoretical level as testing the impact of the instrument on the dependent variable in the second equation (exports) with a full model could be biased as the instrumental correction has not been made for the endogenous variable (aid). The exclusion restriction we impose on our trade equation therefore is that life expectancy is correlated with aid but not with trade, this will hold econometrically, if the coefficient for aid in our structural equation after imposing the restriction in our trade equation (where we use life expectancy as a proxy for aid) tends to that in our reduced form equation and secondly, if the correlation between the instrument $I_{i,t}$ and the error term $\varepsilon_{i,t}$ is identically equal to zero as shown below in equation 17.

(17) $E/I_{i,t} \cdot u_i = 0$

This then shows that the only way life expectancy is related with trade is only through aid therefore the instruments $I_{i,t}$ is not correlated with the disturbances (u_i and ε_i) in our model specification and finally, if the exogenous component of the instrument, (the fitted value of aid) is uncorrelated with the error term we can therefore identify the variation of the dependent variable trade (exports) as the slope of the aid coefficient. This shows that there is sufficient variation (which is non zero) between aid and our instrument which we represent in the covariance (cov) equation 18 below.

(18) $Cov(Aid_{i,t}, I_{i,t}) \neq 0$

(where aid can be EDA or ODA, this means that α_2 is not zero). This implies that exports will vary according to changes in aid inflow to countries (see Kraay (2008) for further discussion on exclusion restriction). We argue that our instrument meet the criteria theoretically for our exclusion restriction to hold, since the behavior of the instrument life expectancy (see the first stage results and F-tests in Tables 5 to 7), support previous literature such as e.g. Ebbes (2004) that argue that a good instrument should capture the variation in the dependent variable and be highly correlated with the endogenous variable therefore β_2 (our aid coefficient) will no longer biased in our model specification.

We also present a convincing argument since the assumption that the exclusion restriction hold, are theoretical and can only be tested in the first stage, our argument is

based on the fact that although life expectancy has been on the increase in many developing countries it has not had a significant effect on exports this is particularly true for many African countries with young population which according to United Nations statistics 2010, still have more than 65% of their population under the age of 30, past studies have shown that life expectancy have little or no significant effect on growth except in developed countries with life expectancy above the age of 50 and rises until the age of 69, since investment and saving can be handed directly to the next generation and life expectancy a negative effect on growth as it reaches 70 years of age and beyond since failing health of seniors reduces savings and private investment which is used to take of the health of the elderly see Barro(1989) and Acemoglu (2007). This line of reasoning is also consistent with other literature such as that of Kelly and Schmidt (1995) who find that as death rate reduces growth increases for developed countries but not particularly for developing countries. Therefore we do not expect life expectancy to have direct significant effect on exports and argue that the only way life expectancy can have an effect on exports is through aid. If the conditionality associated with aid forces governments in many developing countries to improve institutions so as to improve health care access and infrastructure, aid used in an effective manner to create enabling environment for trade is likely to create more employment leading to more economic empowerment of the indigenous population which can affect output production. Therefore the only way through which life expectancy can affect exports will be only through aid since aid used in an effective manner can improve life expectancy in developing countries which could lead to increased exporting from such countries.

Table 5. First Stage: EDA Regressions

Method of Estimation	OLS Bilateral EDA	OLS Multilateral EDA	OLS Total EDA
Life expectancy	0.36 (.12)***	0.35 (.11)***	0.71 (.20)***
Policy index	-0.06 (.12)	-0.21 (.15)	-0.30 (.23)
Institution index	-0.0004 (0.35)	-0.31 (0.17)	-0.04 (0.34)
Exchange rate (LCU per \$)	0.27 (.26)	0.23 (.11)**	0.49 (.30)
FDI	-0.06 (.89)	-0.06 (.06)	-3.08 (.10)**
School enrollment rate	0.01 (.07)	-0.12 (.03)	-0.11 (.08)
Liberalization rate	-0.42 (.88)	0.97 (.36)**	1.38 (1.03)
GDP per capita	-2.67 (1.39)*	-0.47 (.66)***	2.07 (1.67)
F-Test	8.23	10.13	12.90
Chi ² (p-value)	0.00	0.00	0.00
# of observations	73	73	73
R-Squared	0.22	0.52	0.36

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. .

Table 6. First Stage: ODA Regressions

Method of Estimation	OLS Bilateral ODA	OLS Multilateral ODA	OLS Total ODA
Life expectancy	0.28 (.05)***	0.16 (.04)***	0.44 (.08)***
Policy index	-0.24 (.15)	-0.35 (.15)**	-0.56 (.26)**
Institution index	0.24 (0.20)	-0.03 (0.16)	0.26 (0.32)
Exchange rate (LCU per \$)	-0.42 (.31)	0.22 (.13)	-0.18 (.40)
FDI	-0.08 (.06)	0.03 (.04)	3.10 (.09)
School enrollment rate	0.02 (.03)	-0.06 (.02)***	-0.04 (.04)
Liberalization rate	-0.63 (.12)***	-0.13 (.07)*	-1.75 (1.58)
GDP per capita	-3.95 (.75)***	-0.56 (.39)	4.47 (1.02)***
F-Test	37.28	13.54	29.52
Chi ² (p-value)	0.00	0.00	0.00
# of observations	131	131	131
R-Squared	0.53	0.34	0.48

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively.

Table 7. First Stage: Sectoral Aid Regressions

	Aid to Trade	Aid to Infrastructure	Aid to Agriculture	Aid to Education
Life expectancy	0.23 (.08)***	0.16 (.04)***	0.13 (.04)***	0.18 (.05)***
Policy index	0.27 (.24)	-0.02 (.15)	-0.02 (.17)	-0.14 (.32)
Institution index	0.21 (.24)	0.04 (.13)***	0.37 (.14)***	0.39 (.20)*
Exchange rate (LCU per \$)	-0.05 (.33)	-0.01 (.13)	0.30 (.33)	-0.23 (.25)
School enrollment	-0.02 (.02)	0.01 (.01)***	-0.04 (.02)	0.04 (.02)*
Liberalization rate	-0.11 (.12)	-0.09 (.08)**	0.12 (.08)	-0.17 (.09)**
GDP per capita	-0.78 (.52)	-1.25 (.42)***	-0.03 (.57)	-2.40 (.57)***
F-Test	7.95	18.72	10.25	14.24
Chi ² (p-value)	0.00	0.00	0.00	0.00
# of observation	132	140	140	139
R-Squared	0.21	0.43	0.28	0.25

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to

significance at the 1%, 5% and 10% levels, respectively.

Results

We use fixed effect regression as stated earlier, since the result of the Hausman test with p-value 0.000⁴ (we included this in our results only for aid to sectors results) suggest that fixed effect estimation is more appropriate for our model, see Baltagi (2005), Baltagi and Wu (2010) and Wooldridge (2010) for further discussion. We find that the factors that affect effective aid are quite different from those of official aid since effective aid is pure aid devoid of conditionality. Time effect “year” is included to

⁴ This did not hold in some cases with effective and official aid

control for differences in exports from countries in years. This allows us to control, for production shocks and fluctuations in global demands for exports that is likely to affect volumes of exports. We present our result for effective aid and official aid below in Tables 8 to 11. We compare the results of the OLS estimates with those of the 2SLS. As expected the results of the standard errors of our 2SLS estimates are larger than those of our OLS estimates for aid see standard errors in Table 8 and 9 for our regressions of trade (using log of exports) on effective aid and other factors that affect trade. In Table 8 the OLS estimate for bilateral and multilateral effective aid are 0.06 and 0.10 respectively (see coefficients in table 8 Column 1 and 2) it shows that bilateral aid contributed 6 percentage points towards trade (with p-value 0.037) while multilateral aid contributed 10 percentage points to trade but had a stronger effect (with p-value 0.023) on trade. But the estimate is quite different when we use 2SLS in Table 9 the result of the F-test for excluded instruments for the 2SLS shows that the instrument life expectancy is valid and highly correlated with aid (see first stage regression results for effective aid). The estimated aid effect on trade is now 0.15 and 0.16 (see Table 9 Column 1 and 2) using 2SLS showing that multilateral aid contributed about 1 percentage point more to trade (with p-value 0.03) compared to bilateral trade with only 15 percent (with p-value 0.07) . This showed that controlling for endogeneity helps to solve the problem of aid measurement, through the instrumental correction of aid since this could lead to bias in our results.

The results of the regression of trade on official aid are presented in tables 10 and 11. The result of the OLS regression with estimates for bilateral and multilateral official aid respectively of 0.06 and 0.05 in Table 10 Column 1 and 2, shows that bilateral aid contributed 6 percentage points to trade (with p-value of 0.000), while multilateral aid contributed 5 percentage points (with p-value of 0.052) to trade which is 1 percentage points less than bilateral aid contribution to trade. The results of our 2SLS estimates where we control for endogeneity are different from our OLS estimates. The result of the F-test for excluded instruments shows that our instrument life expectancy is valid and highly correlated with aid (see first stage official aid regression). The result in Table 11 Columns 1 and 2 shows that official bilateral aid contributes 12 percentage points to trade (with p-value 0.000) while multilateral official aid contributes 21 percentage points to trade with (p-value of 0.000) which is 9 percentage points more

than bilateral aid contribution to trade. This result suggests once again that using 2SLS to address the issue of endogeneity is important, since aid is likely to suffer from measurement problems making the OLS results to be biased. Table 12 and 13 present the estimates of the regression of trade on aid to sectors and factors that affect trade in sectors. The result of our OLS estimates (see Table 12) show that aid to sectors had no effect on trade except for aid to infrastructure that contributed 10 percentage points to trade (with p-value 0.000) while aid to trade policy and business support services, agriculture and education contributed 2,1 and 3 percentage points to trade respectively and had no significant effect on trade. The results of our 2SLS are different from that of the OLS estimates for aid to sectors. Aid had a significant effect in four sectors, With aid to trade and business support services, infrastructure, agriculture and education contributing 15, 22, 17 and 16 percentage points respectively to trade using 2SLS (see Table 13 Columns 1, 2, 3 and 4 for aid estimates of 0.15, 0.22, 0.17and 0.16 respectively) therefore controlling for endogeneity using 2SLS was also relevant in this case. Aid to industry had no significant effect on trade so we left that out in our results. The result of our F- test show that our instrument is relevant and valid since it is highly correlated with aid (see first stage results using official aid to sectors). Finally GLS was used in estimating our trade equation with the interactive variables, the three interactive variables aid*economic policy, aid*institutions and aid*natural resources had reduced effect on trade showing that these variables reduce aid effectiveness (we show the results in the Appendix-A to C in Tables 14 to 16).

Robustness Check: We test for robustness in our regression estimates. We use a set of alternative indexes constructed using Regression Component Analysis (RCA) previously used by Burnside and Dollar (2000). This captures the weight of our economic and institutional variables using OLS on trade. The difference between this index and the one constructed using PCA is that PCA allows us to obtain an index based on the average variation in the set of index that capture economic policy effects or institutional effects as the case may be, however the index obtained using regression component approach captures the weights as institutions or economic policy affects trade by country which is subjective. See Appendix I. for how these indexes are constructed.

The results where we compare the estimates between the PCA and RCA regressions are shown in appendixes F and G, in Tables 19 and 20. We present results for only official aid and aid to sectors. Our results show that aid contributes to exporting using both set of economic and institutional indexes, multilateral official aid contributed more to exporting in both cases than bilateral official aid, although bilateral aid had a less significant effect on exporting in the regression using the RCA indexes (see Columns 1a, 1b, 2a and 2b of Table 19). In explaining the results of aid to sectors we leave out aid to agriculture since we experience negative R-Squared using the RCA index. Aid to all three other sectors which include trade policy and business support services, infrastructure and education contributed positively to exporting with aid to infrastructure contributing most to exports (see Columns 2a and 2b of Table 20) even though aid to infrastructure and education were less significant using RCA index (see Columns 2b and 2c Table 20) the results using this alternative set of index do not differ significantly from those where we used the PCA set of indexes. Aid in general was found to contribute significantly to exporting in the countries in our sample even though we have cause to doubt if aid to agriculture does. We also find that the variable interact reduces aid effectiveness in sectors, (the results are available on demand) we do not include these results.

Based on the above results we answer the hypothesis that we posed earlier as follows:

Hypothesis #1.) Aid focused directly on export promotion (extensions of trade credit, etc) was found to be contributing to exporting in a significant manner. Therefore aid channeled to sectors that could improve output productivity is likely to be useful in promoting trade.

Hypothesis #2.) Institutions were probably contributing negatively to aid effectiveness in promoting exports. The interactive variable aid*institutions had a reduced effect on exporting. It is likely that institutions are weak and not helping in effective utilization of aid to promote trade.

Hypothesis #3.) Aid focused on infrastructure investments was found to be contributing to exports in a positive manner. It is likely that aid used in developing infrastructure will create enabling environment that can promote trade by way of cost reduction in the trade facilitation process.

Hypothesis #4.) Multilateral aid was found to be contributing to exporting in a more significant manner than bilateral aid. It is likely that the altruistic nature and good policy

requirement conditions associated with multilateral aid made it more effective in promoting trade than bilateral aid.

Hypothesis #5.) Aid directed towards the agricultural and educational sectors was contributing to exporting significantly. It is likely that aid used in improving the level of education of the working population as well as modernizing methods used in cultivation was useful to improving trade.

Hypothesis #6.) Economic Policy was likely reducing aid effectiveness in countries and possibly also in sectors, country specific economic policy was probably not taken into account in the disbursement and utilization of aid to promote exporting. Weak and inconsistent economic policy was likely making aid not contribute in an effective manner towards promoting exports.

Hypothesis #7.) Natural resource presence was found to weaken aid effectiveness in promoting trade, it was likely that government efforts were not sufficiently encouraging non resource producing sectors to contribute to exports therefore it was possibly falling short of diversifying its economy and reducing its reliance on resource rich sectors in promoting its exports capacity

Table 8. Impact of EDA on Exports

Method of Estimation	OLS (1)	OLS (2)	OLS (3)
Bilateral EDA	0.06 (.03)**	-	-
Multilateral EDA	-	0.10 (.04)**	-
Total EDA	-	-	0.06 (.02)***
Policy index	0.08 (.05)	0.07 (.05)	0.07 (.05)
Institution index	0.28 (.06)***	0.30 (.06)***	0.28 (.06)***
School enrollment	0.01 (.004)***	0.02 (.004)***	0.02 (.004)***
Exchange rate (LCU per \$)	0.08 (.04)*	0.09 (.04)**	0.09 (.04)**
Liberalization rate	0.09 (.10)	-0.29 (.12)**	0.18 (.10)*
FDI	0.06 (.02)***	0.06 (.02)**	0.06 (.02)**
GDP per capita	0.15 (.10)	0.19 (.10)*	0.22 (.10)**
Chi ² (p-value)	0.00	0.00	0.00
# of observations	73	73	73
R-Squared	0.72	0.73	0.73

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively..

Table 9. Impact of EDA on Exports

Method of Estimation	2SLS (1)	2SLS (2)	2SLS (3)
Bilateral EDA	0.15 (.09)*	-	-
Multilateral EDA	-	0.16 (.07)**	-
Total EDA	-	-	0.08 (.04)***
Policy index	-0.11 (.06)**	-0.09 (.05)*	-0.10 (.05)*
Institution index	0.14 (.06)**	0.15 (.04)***	0.15 (.05)***
School enrollment	-0.001 (.01)	0.02 (.01)**	0.01 (.01)
Exchange rate (LCU per \$)	0.21 (.11)**	0.21 (.08)***	0.21 (.09)**
Liberalization rate	-0.13 (.17)	-0.04 (.10)**	-0.09 (.13)*
FDI	0.01 (.02)***	-0.01 (.01)**	0.001 (.01)**
GDP per capita	0.12 (.45)	0.61 (.18)***	0.38 (.27)
Chi ² (p-value)	0.00	0.00	0.00
# of observations	73	73	73
R-Squared	0.28	0.51	0.64

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively.

Table 10. Impact of ODA on Exports

Method of Estimation	OLS (1)	OLS (2)	OLS (3)
Bilateral ODA	0.06 (.02)***	-	-
Multilateral ODA	-	0.05 (.02)*	-
Total ODA	-	-	0.04 (.01)***
Policy index	-0.10 (.04)	-0.11 (.05)	-0.10 (.04)
Institution index	0.23 (.04)***	0.25 (.04)***	0.23 (.04)***
School enrollment	0.01 (.003)***	0.01 (.003)***	0.01 (.003)***
Exchange rate (LCU per \$)	-0.01 (.02)	-0.01 (.02)	-0.01 (.02)
Liberalization rate	0.02 (.02)	0.02 (.02)	0.02 (.02)
FDI	0.03 (.02)*	0.03 (.02)**	0.03 (.02)*
GDP per capita	0.17 (.06)***	0.12 (.06)**	0.19 (.06)***
Chi ² (p-value)	0.00	0.00	0.00
# of observations	131	131	131
R-Squared	0.64	0.61	0.64

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively.

Table 11. Impact of ODA on Exports

Method of Estimation	2SLS (1)	2SLS (2)	2SLS (3)
Bilateral ODA	0.12 (.03)***	-	-
Multilateral ODA	-	0.21 (.06)***	-
Total ODA	-	-	0.07 (.02)***
Policy index	-0.05 (.07)	-0.01 (.07)	-0.04 (.07)
Institution index	0.14 (.05)***	0.16 (.05)***	0.15 (.05)***
School enrollment	-0.001 (.001)	0.01 (.004)***	0.04 (.003)
Exchange rate (LCU per \$)	-0.02 (.07)	-0.12 (.06)*	-0.06 (.06)
Liberalization rate	0.05 (.02)**	-0.0002 (.01)	0.03 (.01)*
FDI	0.02 (.01)	0.02 (.01)*	0.02 (.01)*
GDP per capita	0.10 (.20)	-0.24 (.13)*	-0.02 (.16)
Chi ² (p-value)	0.00	0.00	0.00
# of observations	131	131	131
R-Squared	0.31	0.36	0.39

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. .

Table 12 Impact of Sectoral Aid on Exports

Method of Estimation	OLS (1)	OLS (2)	OLS (3)	OLS (4)
Aid to trade	0.2 (.02)	-	-	-
Aid to infrastructure	-	0.10 (.03)***	-	-
Aid to agriculture	-	-	0.01 (.02)	-
Aid to education	-	-	-	0.03 (.02)
School enrollment	0.01 (.003)***	0.01 (.003)***	0.01 (.003)***	0.01 (.03)***
Exchange rate	-0.02 (.02)***	-0.01 (.02)	0.0002 (.02)	-0.01 (.02)
Economic policy	0.09 (.05)**	0.11 (.04)**	0.10 (.05)**	0.10 (.04)**
Institutional quality	0.25 (.03)***	0.26 (.03)***	0.29 (.04)***	0.27 (.04)***
Liberalization rate	0.01 (.20)	0.01 (.20)	0.02 (.20)	0.02 (.20)
GDP per capita	0.07 (.05)	0.17 (.06)***	0.07 (.06)	0.08 (.05)
Chi ² (p-value)	0.00	0.00	0.00	0.00
# of observations	118	131	131	131
R-Squared	0.60	0.53	0.69	0.69

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively.

Table 13 Impact of Sectoral Aid on Exports

Method of Estimation	2SLS (1)	2SLS (2)	2SLS (3)	2SLS (4)
Aid to trade	0.15 (.06)**	-	-	-
Aid to infrastructure	-	0.22 (.07)***	-	-
Aid to agriculture	-	-	0.17 (.10)**	-
Aid to education	-	-	-	0.16 (.06)**
School enrollment	0.01 (.004)	0.02 (.004)	-0.001 (.01)**	0.003 (.01)
Exchange rate	-0.12 (.06)*	-0.06 (.06)	-0.13 (.10)	-0.03 (.08)
Economic policy	-0.04 (.06)**	-0.08 (.06)**	-0.07 (.09)**	-0.05 (.09)**
Institutional quality	0.12 (.06)**	0.17 (.05)***	0.10 (.07)	0.12 (.06)**
Liberalization rate	-0.01 (.02)	0.004 (.01)	0.01 (.02)	0.02 (.02)
GDP per capita	-0.38 (.14)***	-0.20 (.15)	-0.41 (.15)***	-0.04 (.21)
Chi ² (p-value)	0.00	0.00	0.00	0.00
# of observations	118	131	131	131
R-Squared	0.16	0.43	0.01	0.02

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. .

Conclusion

In this paper we investigated some questions raised during the course of this study. They are what component of aid is useful in promoting trade in developing

countries? We found that aid to sectors was useful in promoting trade, with aid to trade policy, infrastructure, agriculture and education being significant in promoting trade. This is consistent with past findings by Morrissey et al (2004) and Velde and Cali (2011) who state that channeling aid to productive sectors in an economy could boost export oriented growth. Aid to industry had no impact on trade so we neglected it in our results. It was likely that finished goods from developing countries do not compete favorably with goods from developed countries and technology is often a problem in developing countries making it difficult to produce. Bilateral effective aid had contributed less to exports compared to bilateral official aid. However multilateral aid proved more useful in promoting exports than bilateral aid this is attributable to conditions associated with multilateral aid disbursements which make them more effective in promoting exporting.

We also investigated if economic policies and institutional quality improves or decreases aid effectiveness in promoting trade in Africa? We found that economic policy and the quality of institutions in Africa generally weakens the effectiveness of aid in promoting trade. The interactive variables “aid*government economic policy” “aid*institutional quality” and “aid*natural resources” had a reduced effect on trade. This is consistent with past findings such as Burnside and Dollar (2002) and (2004) which state that aid will be effective in the presence of good policies and other findings by Sachs and Warner (1995) and Ross (2001) that suggest the presence of natural resources and weak institutions can affect economic development in developing countries. The inclusion of natural resources in our model caused our model to suffer from misspecification resulting in negative R-squared so we exclude it and used its interaction with aid in our subsequent GLS regression. This interactive variable aid* natural resources exerted a reduced effect on trade across all sectors, reducing aid effectiveness across sectors. Therefore diversifying the economy in many African countries should be a strong concern to governments.

The policy implications of our findings is that economic policy can have a significant effect on aid effectiveness in Africa, therefore donors should continue to emphasize the need for African countries to float sound and consistent economic policies. Such policies could be vital in shoring up investor's confidence and ensure the

effective use of aid to boost capacities that can improve trade and stimulate export oriented growth on the long run. Secondly channeling aid to sectors that are likely to improve export capacities in developing countries could likely improve the way that aid can be used in an effective manner. Aid given to trade capacities will likely fulfill the short term intention of giving aid to developing countries since it is likely to contribute to export driven growth in many African countries allowing for a discontinuation of aid giving policies to promote growth. Over reliance on natural resources continue to remain an impediment to the growth of other sectors in many African economies, promoting diversification is likely to help prevent shocks (due to price fluctuation in natural resources) in many African countries that rely on specific natural resources for income. The reliance on natural resources as a source of revenue often prevents governments from implementing sound policies that could improve growth. Alternative revenue sources through for example a creation of an effective taxation scheme can help create other sources of financing government activities thereby reducing overdependence on resource derived revenues.

Appendix A. Table 14 Trade Regressions With Aid*Economic Policy Interaction

Method of Estimation	GLS (1)	GLS (2)	GLS (3)	GLS (4)
Aid to trade	0.19 (.07)***			
Aid to trade*Policy	0.01 (.01)**			
Aid to infrastructure		0.16 (.19)***		
Aid to infrastruc.*policy		0.01 (0.01)**		
Aid to agriculture			0.37 (.13)***	
Aid to agriculture*policy			0.02 (.01)**	
Aid to education				0.64 (.22)***
Aid to education*policy				0.01 (.01)**
School enrollment	0.01 (.003)***	0.01 (.003)***	0.01 (.003)***	0.01 (.003)***
Exchange rate	0.07 (.02)***	0.02 (.02)	0.22 (0.14)	0.01 (0.02)
Institutional quality	0.27 (.04)***	0.26 (.04)***	0.26 (.04)***	0.26 (.04)***
Liberalization rate	-0.03 (.03)***	-0.03 (.03)***	-0.03 (.03)***	-0.03 (.03)***
GDP per capita	0.07 (.05)	0.08 (.05)**	0.07 (.05)	0.08 (.05)
Chi ² (p-value)	0.00	0.00	0.00	0.00
# of observations	131	131	131	131
R-Squared	0.62	0.62	0.62	0.62

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively.

Appendix B. Table 15 Trade Regressions With Aid*Institutions Interaction

Method of Estimation	GLS (1)	GLS (2)	GLS (3)	GLS (4)
Aid to trade	0.22 (.07)***			
Aid to trade*institutions	-0.04 (.01)***			
Aid to infrastructure		0.84 (.28)***		
Aid to infrastr.*institutions		-0.06 (0.01)***		
Aid to agriculture			0.40 (.13)***	
Aid to agric*institutions			-0.04 (.01)***	
Aid to education				0.67 (.22)***
Aid to educ*institutions				-0.04 (.01)**
School enrollment	0.01 (.003)***	0.01 (.003)***	0.01 (.003)***	0.01 (.003)***
Exchange rate	0.02 (.02)	0.02 (.02)	0.02 (.02)	0.02 (.02)
Liberalization rate	-0.05 (.03)***	-0.04 (.03)***	-0.04 (.03)***	-0.04 (.03)***
GDP per capita	0.07 (.05)	0.08 (.05)**	0.07 (.05)	0.08 (.05)
Chi ² (p-value)	0.00	0.00	0.00	0.00
# of observations	131	131	131	131
R-Squared	0.62	0.62	0.62	0.62

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively.

Appendix C. Table 16 Trade Regressions With Aid*Natural Resources Interaction

Method of Estimation	GLS (1)	GLS (2)	GLS (3)	GLS (4)
Aid to trade	0.22 (.10)***			
Aid to trade*resource	0.0004 (.0004)			
Aid to infrastructure		0.89 (.40)***		
Aid to infrastr.* resource		0.0001 (.001)		
Aid to agriculture			0.42 (.19)***	
Aid to agric.* resource			0.0004 (.0005)	
Aid to education				0.71 (.32)***
Aid to educ.* resource				0.0004 (.0005)**
School enrollment	0.01 (.004)**	0.01 (.004)**	0.01 (.004)**	0.01 (.004)**
Exchange rate	0.04 (.03)***	0.04 (.03)	0.04 (.03)	0.04 (.03)
Institutional quality	0.19 (.04)***	0.19 (.05)***	0.19 (.05)***	0.19 (.05)***
Liberalization rate	-0.04 (.03)***	-0.04 (.03)***	-0.04 (.03)***	-0.04 (.03)***
GDP per capita	0.07 (.07)	0.08 (.07)	0.07 (.07)	0.07 (.07)
Chi ² (p-value)	0.00	0.00	0.00	0.00
# of observations	131	131	131	131
R-Squared	0.61	0.61	0.61	0.61

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively.

Appendix D. Table 17 Robustness Check

Method of Estimation	PCA Index			RCA Index		
	OLS	OLS	OLS	OLS	OLS	OLS
	(1a)	(2a)	(3a)	(1b)	(2b)	(3c)
Life expectancy	0.25 (.05)***	0.16 (0.04)***	0.44 (0.08)***	0.29 (.05)***	0.18 (.05)***	0.47 (.09)***
Policy index	-0.24 (.15)	-0.35 (.15)**	-0.56 (.26)**	-1.07 (.66)	-0.81 (.65)	-1.94 (.17)*
Institution index	0.24 (.20)	-0.03 (.16)	0.26 (.32)	2.36 (.75)***	0.24 (.53)	2.63 (1.14)**
School enrollment	0.02 (.03)	-0.06 (.02)***	-0.04 (.04)	0.02 (.03)	-0.06 (.02)***	-0.04 (.04)
Exchange rate (LCU per \$)	-0.42 (.13)	0.22 (.13)*	-0.18 (.40)	-0.52 (.32)	0.21 (.13)	-0.29 (.41)
Liberalization rate	-0.63 (.12)***	-0.13 (.07)*	-1.75 (1.58)	-0.56 (.14)***	0.16 (.09)**	0.70 (.19)***
FDI	-0.08 (.06)	0.03 (.04)	3.10 (.09)	0.03 (.06)	0.04 (.06)	0.07 (.10)
GDP per capita	-3.95 (.75)***	-0.56 (.39)	-4.47 (1.02)***	-3.75 (.73)***	-0.47 (.39)	-4.21 (.10)
F-Test	37.28	13.54	29.52	34.30	13.71	28.00
Chi ² (p-value)	0.00	0.00	0.00	0.00	0.00	0.00
# of observations	131	131	131	126	126	126
R-Squared	0.53	0.34	0.48	0.54	0.30	0.48

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively.

Appendix E. Table 18 Robustness Check

Method of Estimation	PCA Index			RCA Index		
	OLS (1a)	OLS (2a)	OLS (3a)	OLS (1b)	OLS (2b)	OLS (3c)
Life expectancy	0.23 (.08)***	0.16 (.04)***	0.18 (.05)***	0.25 (.09)***	0.17 (.04)***	0.20 (.05)***
Policy index	0.27 (.24)	-0.02 (.15)	-0.14 (.32)	-0.72 (.85)	1.15 (.39)***	1.10 (.75)
Institution index	0.21 (.24)	0.04 (.13)***	0.39 (.20)*	1.23 (.85)	0.02 (.43)	1.11 (.74)
School enrollment	-0.02 (.02)	0.01 (.01)***	0.04 (.02)*	-0.02 (.02)	0.003 (.01)	0.03 (.02)
Exchange rate (LCU per \$)	-0.05 (.33)*	-0.01 (.13)	-0.23 (.35)	-0.13 (.33)	0.04 (.13)	-0.23 (.27)
Liberalization policy	-0.11 (.12)	-0.09 (.08)**	-0.17 (.09)**	-0.11 (.14)	-0.04 (.08)	-0.14 (.09)
GDP per capita	-0.78 (.52)	-1.25 (.42)***	-2.40 (.57)***	-0.71 (.54)	-0.88 (.40)**	-1.95 (.58)***
F-Test	7.95	18.72	14.24	8.42	14.77	14.92
Chi ² (p-value)	0.00	0.00	0.00	0.00	0.00	0.00
# of observations	132	140	139	116	126	126
R-Squared	0.21	0.43	0.45	0.22	0.46	0.40

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively.

Appendix F. Table 19 Robustness Check

Method of Estimation	PCA Index			RCA Index		
	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
	(1a)	(2a)	(3a)	(1b)	(2b)	(3c)
Bilateral ODA	0.12 (.03)***			0.10 (.04)**		
Multilateral ODA		0.21 (.06)***			0.16 (.06)***	
Total ODA			0.07 (.02)***			0.06 (.02)***
Policy index	-0.05 (.07)	-0.01 (.07)	-0.04 (.07)	0.55 (.16)***	0.57 (.15)***	0.56 (.15)***
Institution index	0.14 (.05)***	0.16 (.05)***	0.15 (.05)***	0.05 (.17)	0.24 (.15)	0.12 (.16)
School enrollment	-0.001 (.001)	0.01 (.004)***	0.04 (.003)	-0.003 (.01)	0.01 (.03)**	0.001 (.03)
Exchange rate (LCU per \$)	-0.02 (.07)	-0.12 (.06)*	-0.06 (.06)	0.01 (.06)	-0.08 (.06)	0.03 (.05)
Liberalization rate	0.05 (.02)**	-0.0002 (.01)	0.03 (.01)*	0.06 (.02)***	0.03 (.01)**	0.05 (.01)***
FDI	0.02 (.01)	0.02 (.01)*	0.02 (.01)*	0.01 (.01)	0.01 (.01)	0.01 (.01)
GDP per capita	0.10 (.20)	-0.24 (.13)*	-0.02 (.16)	0.11 (.21)	-0.19 (.11)*	-0.01 (.15)
Chi ² (p-value)	0.00	0.00	0.00	0.00	0.00	0.00
# of observations	131	131	131	126	126	126
R-Squared	0.31	0.36	0.39	0.38	0.47	0.45

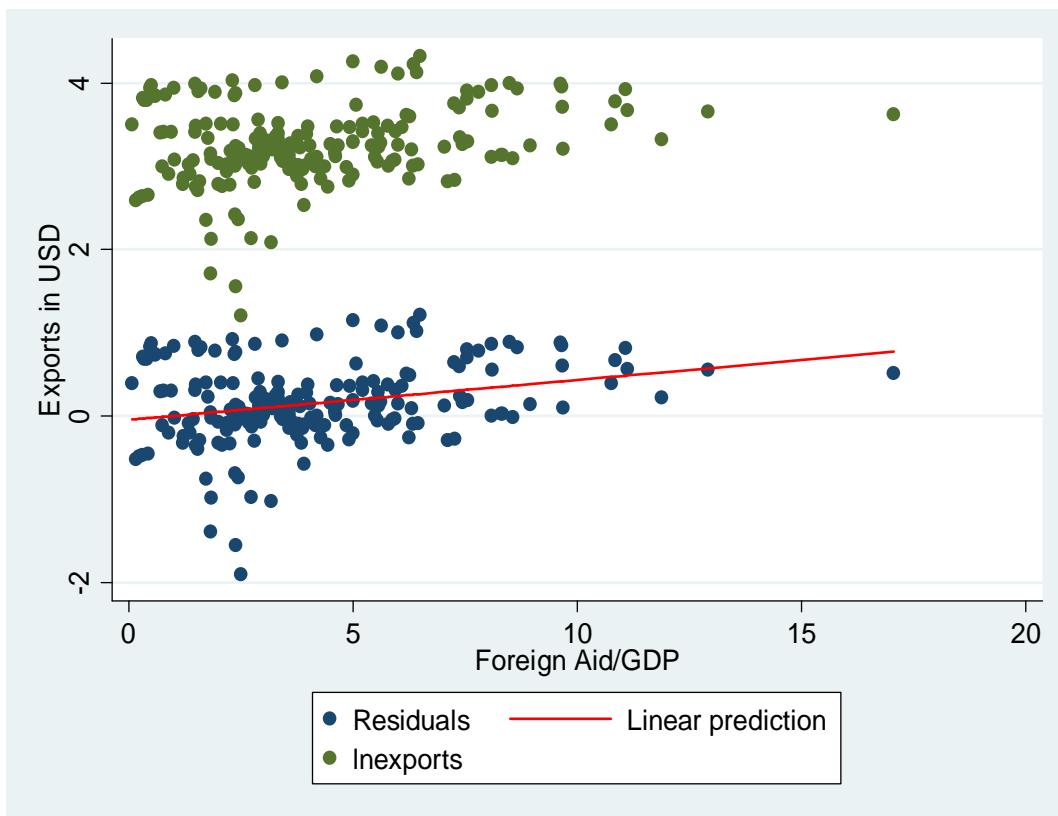
Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively.

Appendix G. Table 20 Robustness Check

Method of Estimation	PCA Index			RCA Index		
	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
	(1a)	(2a)	(3a)	(1b)	(2b)	(3c)
Aid to trade	0.15 (.06)**			0.15 (.06)**		
Aid to infrastructure		0.22 (.07)***			0.17 (.08)**	
Aid to education			0.13 (.06)**			0.16 (.07)*
Policy index	-0.04 (.06)**	-0.08 (.06)**	-0.05 (.09)**	0.47 (.17)***	0.28 (.19)	0.33 (.21)
Institution index	0.12 (.06)**	0.17 (.05)***	0.12 (.06)**	0.23 (.20)	0.30 (.18)	0.16 (.18)
School enrollment	0.01 (.004)	0.02 (.004)	0.003 (.01)	0.001 (.01)	-0.001 (.004)	-0.004 (.01)
Exchange rate (LCU per \$)	-0.12 (.06)*	-0.06 (.06)	-0.03 (.08)	-0.11 (.06)*	-0.05 (.06)	-0.01 (.07)
Liberalization rate	-0.01 (.02)	0.004 (.01)	0.02 (.02)	0.01 (.02)	0.02 (.02)	0.03 (.02)*
GDP per capita	0.38 (.14)***	-0.20 (.15)	-0.04 (.21)	-0.30 (.13)**	-0.13 (.13)	-0.02 (.19)
Chi ² (p-value)	0.00	0.00	0.00	0.00	0.00	0.00
# of observations	118	131	131	116	126	126
R-Squared	0.16	0.43	0.02	0.29	0.40	0.11

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively.

Appendix H. The Relationship between Exports and Foreign Aid



Note: The relationship between aid and trade in developing Africa countries is such that we expect aid to contribute in a significant manner to creating enabling environment for trade. This can take place by using aid to influence government to make sound and consistent policies, aid can also help establish a robust banking and financial services sector to promote micro credit lending schemes to small scale entrepreneurs, assist in building social infrastructure such as roads from rural areas to exports centers such as ports and reduce the cost of training manpower making it cheap and attractive for foreign firms to set up production facilities in developing countries.

Appendix I. Data and Sources

- i. Dependent variable: Exports, this is the total volume of goods exported overseas in constant USD. This was obtained from World Bank data.
- ii. Explanatory variables
 - a. Foreign aid/GDP: These consist of different measures of aid which we divided by

GDP such as bilateral effective aid/GDP, multilateral effective aid/GDP, total effective aid/GDP, bilateral official aid/GDP, multilateral official aid/GDP, total official aid/GDP. Aid to sectors/GDP consist of official to five sectors they include aid to trade policy and business support services/GDP, aid to infrastructure and social services/GDP, aid to agriculture/GDP, aid to education/GDP, aid to industry and mining/GDP

Effective aid is aid without conditions and consists of only grants and grants component of loans for a period of 1975 to 1985 constructed by Chiang et al (1999). This was obtained from World Bank Data. Official aid is aid given with conditionality, it consist of grants and loans whose grant components is at least 25%.

b. Economic policy index: We constructed economic policy index from country specific data on inflation and trade openness. This is the variation in both variables developed using a matrix of eigenvectors transformation using Principal Component Analysis (PCA). To test for Robustness of results we developed another version of economic policy index using Regression component analysis (RCA) here we used Exports as dependent variable and regressed exports on inflation, openness and other explanatory variables using OLS. Economic policy was given in this case as Economic policy = Constant + (inflation*its coefficient) + (openness*its coefficient)

c. Institutional quality index: This was constructed institutional quality index using

political variables from Brigham university CIRI data, such as electoral self determination rate and freedom of movement, we obtained the variation in the two variables using PCA. We also constructed an alternative measure of institutions to test for robustness of regression results using RCA. We used exports as dependent variable and regressed it on the electoral self determination rate, freedom of movement and other explanatory variables.

d. Economic liberalization rate: Level of economic activity regulation by country is represented by an infrastructural measure. We used the no of phone lines to capture this effect. We expect businesses to experience booms in liberalized economies and acquire more phone lines.

e. Exchange rate: This is the fluctuation in the value of the local currency with respect to the dollar we obtain this from World Bank data. We used this to economic capture fluctuations globally.

f. GDP/capita: This is the total amount of goods produced by country we divide this

by population to obtain GDP/Capita and this represents country specific income. This was obtained from World Bank data.

g. FDI: This is the total inflow of all foreign investment to a country in constant USD. We obtain this from World Bank data..

h. School enrollment rate: This represent the average primary school enrollment rate for boys and girls between the ages of 1-15 years of age. It represents human capita development rate (level of literacy by country and skill) we obtained this from World Bank data.

i. Life expectancy: This is the average life span of people living within a country. We also obtained this from World Bank.

All data are for a period of 1970 to 2008 unless otherwise stated.

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Chapter 2

Economic Policy, Does it Help Life Expectancy? An African Evidence of the Role of Economic Policy on Longevity

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Abstract

This paper evaluates some factors that affect longevity in Africa, with the aim of offering an insight on how government economic policy and consumption spending affect the lives of people in developing countries. Government economic policy was found to be contributing in a negative manner to life expectancy in the countries in our sample. It was also found that apathy between the civil service (the embodiment of institutions) and political office holders is the greatest stumbling block against the success of governmental economic policy, this creates a hole in institutions since they remain the pipe through which revenue is disbursed and policies are implemented for the general good of the populace. After interacting institution with economic policy economic policy had significant effect on life expectancy it was likely that institutions were either circumvented or ignored, leading to possible short comings on the overall effect that government economic policy would have had on life expectancy. Here also we use two different set of policy and institutional index one constructed using principal component analysis (PCA) and the other using regression component analysis (RCA) and find out that our results are robust with economic policy having a negative effect on life expectancy and the interaction effect (economic policy*institutions) having a positive effect on life expectancy.

Keywords: Corruption, life expectancy, economic policy, institutions, government spending.

JEL: H5, I15, I18, I28, I38, J1

Introduction

Africa is plagued by a lot of diseases, social strife and civil wars, that are otherwise preventable. Malaria fever according World Health Organization report 2010 was responsible for about 655000 deaths in Africa in 2010 alone. Africa's has a high population living below the poverty line, this makes it one of the poorest continents in the world past literature state that the average per capita income in sub-Saharan Africa is less than one-twentieth that of North America (Acemoglu D et al (2002) and Acemoglu (2004)). This paper⁵ addresses the impact of economic policy on longevity. According to United Nations statistics 2010, the average life expectancy in sub Saharan Africa is between 31.88 years for very poor countries like Swaziland to about 60.1 for middle income African countries like Ghana, with only very few people having access to public benefits (government fund). Some basic reasons for this are the lack of viable markets for domestic trade, its high amount of poorly educated people, and finally the presence of old and outdated machineries which are nonexistent in some instances for its manufacturing industry (Acemoglu D. et al (2002)). However these are just some theoretical and secondary reasons for under development in Africa⁶. The primary reason for underdevelopment in Africa continues to lie on the foundation upon which the present method of governance is built. Most of the institutions of governance were developed during the colonial era and where meant to serve the purpose of the colonial governments therefore they were not well suited to meet indigenous societal circumstances, since most of the colonies were used as raw material exporting economies particularly in tropical regions. This meant that institutions were apparently weak and unreliable.

Africa's huge deposits of untapped natural resource also contributes to its burden, it makes it highly susceptible to corruption. Past studies also show that countries endowed with high levels of natural resources do tend to grow more slowly compared to those with little or no resource (see Sachs and Warner, 1995), and growth

⁵ I am grateful to Bergamo University Department of Economics for providing funds for this research.

⁶ Acemoglu, Johnson and Robinson (2002) examine the differences in European death rates in order to estimate the effect of institutions, on economic performance. Europeans were noticed to have adopted very different colonization policies in different colonies with rest to its geographical position, with different associated institutions.

could also be weakened if institutional frameworks are weak (see Mehlum et al, 2006)⁷. The presence of natural resource in developing countries therefore plays a role in weakening institutions in developing countries, since it provides government with alternative revenue to run government, thereby preventing the setting up of effective taxation mechanism for sustainable revenue generation (see Ross 2001). Institutional weakness is also prevalent today among African countries because of the gross neglect of the civil service and due process in policy implementation, government can for example rely on its revenues from natural resource to repress dissent, either through paying off opposition (by awarding them contracts in high profile infrastructure projects) resulting to weakening of the civil service or governing through violence and intimidation. Corruption can also lead to failure of democratic governments in developing countries since this can have adverse effect on growth and internal stability (Karl, 1997; Ross, 2001)⁸. The weaknesses in the internal structures of developing countries often give room to corrupt officials to run government policies in a vague manner or to lead the populace in these developing countries in complete secrecy. Through the implementation of weak economic policies an oligarch class often emerges that rules with impunity and become gradually insensitive to the plight of the populace. The effective use of institutions for governance in conjunction with a reliable civil service structure can help rectify this problem. Institutions can be classified into different categories such as judicial institutions, democratic institutions, and economic institutions.

Life expectancy can also have serious effects on productivity in developing countries. Past literature has discussed the relation between longevity and growth in a host of industrialized countries. Barro (1989) discovered that as the life expectancy of a country rises to the age of 69, the level of investment and the growth rate increased in a reasonable manner for many developed countries; but in cases where life expectancy rises to the age of 70 and beyond, the level of investment and the growth rate drops, this

⁷ Mehlum, Moene and Torvik (2006) also explain how institutions are weakened by the presences of natural resources through corruption and the scramble for allocation of exploration rights thereby limiting growth in resource rich countries.

⁸ Michael Ross (2001) in “Extractive Sectors and the Poor” explains the link between corruption and mineral extraction and how democracies are likely to fail due to foreign interest and institutional weakness in resource rich developing countries. He finds that the scramble for power is often associated with the presence of natural resources in many developing countries.

was higher for developed countries compared to developing countries.⁹ (See Lee, Zhang and Zhang (2002) for more explanations). Other papers have investigated the impact that population aging has on growth Auerbach and Kotlikoff (1992), found that population aging has a possible adverse impact on national savings, while Preston (1987) found that aging increases the competition for resources between the consumption and health needs of old people and the investment in children. Attaining old age also means that inheritance could likely be received by the children of such elderly people, who will likely pass on their wealth to their offspring, and the amount of such inheritance may be reduced however by longer years of consumption by the elderly due to sickness or possible periods of inactivity see Kalemi-Ozcan (2002) and Soares (2005). Kelley and Schmidt (1995)¹⁰ found a positive effect, in the reduction in death rates, on growth in less developed countries suggesting that longevity drives growth in a number of countries. Acemoglu and Johnson (2007) also find a slight positive effect of life expectancy on growth but state that life expectancy does not affect income.

The aim of this study is to examine the effect of government economic policy on life expectancy in Africa. Some problems that could affect life expectancy on the short run were identified as short term pay out used to dose civil agitations such as political unrest and civil strikes as these are likely factors that is unobservable overtime, since these kind of agitations many a times forces governments to make humane decisions, and are likely to be correlated with life expectancy on the short run, it is expected that this will be reflected in government consumption spending. Therefore government economic decisions can be divided into two spheres which are its monetary and trade policies which is referred to as economic policy on the one hand in this paper, and its policies regarding social spending which is referred to as government consumption spending on the other. The reason for this is that it is likely that government spending will contribute positively to longevity, but it is not expected that its monetary and trade policies will contribute to longevity in a positive manner particularly in developing

⁹Barro(1989) using a cross-section of countries, found that investment ratio and growth increased for developed countries with life expectancy of up to 69 years, but as life expectancy increased beyond 70 years growth rate decreased and investment reduced considerably.

¹⁰Kelly and Schmidt (1995) in “Aggregate Population and Economic Growth Correlation: The Role of The Component of Demographic Change” found that longevity has a positive significant effect on growth. The implication of their study is that cushioning factors that increase mortality will benefit government by allowing people to contribute more to the society if they live longer thereby creating wealth for the society.

countries with weak institutions, since institutions can weaken government policies if they are ineffective or bypassed. Secondly this paper will also study the extent to which government consumption spending (its fiscal policy component) cushions factors that are a risk to longevity in Africa. Panel data from five African countries one each from the five regional divide in Africa is used in this study and two stage least squares (2SLS) instrumental variable approach is also used to address the problem of endogeneity since government economic policy and its fiscal spending are likely to suffer from measurement problems. The rest of this paper is divided into five sections, constraints to longevity in Africa, some theory, data description, empirical analysis and finally the concluding sections.

Constraints to Longevity in Africa

Several factors work together to increase mortality rate in developing countries and sub-Saharan Africa in particular. Some of these include infectious tropical diseases that often affect their marginalized population due to poor education, lack of social awareness, political instability and civil strife. Infectious tropical diseases are often a major cause of high death rate prevalent in many sub-Saharan African countries since most of the people in sub-Saharan Africa live below the poverty line, therefore the tendency for disease to spread and patients to die as a result of inability to afford medical treatment is high. Cholera for instance, according to the World Health Organization report 2010 caused about 130000 deaths with over 2.5 million infected worldwide. In Africa alone according to United Nations Children Emergency Fund (UNICEF) report 2011 more than 85000 cases of cholera infection has been recorded with a 4.7 percent mortality rate. Other diseases such as human immunodeficiency virus (HIV), responsible for acquired immune deficiency syndrome disease (AIDS) for instance is a major cause of death in sub-Saharan Africa. Sub-Saharan Africa according to 2009 United Nations Statistics also accounts for about 65% of HIV AIDS infected people and about 75% of all deaths associated with HIV AIDS Worldwide. While malaria fever, polio, tuberculosis etc are widely responsible for a high amount of deaths among Africa's population. Government economic policies if favorable can empower

people through employment, to afford access to health care and decent living which can prevent premature death.

Social factors such as poor education and lack of information regarding treatment and preventive methods of diseases that could be useful in avoiding the risk of infection are also lacking, poor literacy rate makes it cumbersome to pass on such information to the populace. UNESCO World education regional review of year 2000 showed that only about 52% of the children in sub-Saharan Africa were enrolled in primary schools, this was the lowest anywhere in the World. Africa also recorded the highest number of children deprived of basic education according to Transparency International World report of 2010 conducted among 8500 educators in seven countries. Africa continues to account for the highest amount of illiterate adults worldwide and has one of the lowest school enrollment rates. Preventing major illness and other factors that can lead to early deaths can many a time hinge on early detection and prevention which can be achieved better in a more literate and socially aware society. Good information can help eradicate poor religious practices, outdated customary traditional rites and beliefs that are a risk to longevity such as female genital mutilation which can in some instance lead to death through female circumcision infections. Poverty and unemployment is also rampant among the population, this often makes a large section of the population to be vulnerable since in some instances they are likely not to be able to afford access to basic social amenities.

Political factors such as instability and civil strife can in some cases lead to civil war and a high degree of uncertainty. This can make government to fail leading to a disruption in daily life. This in turn can affect economic activities and cause a lot of suffering due to shortages of basic supplies, which if exist for a prolonged period of time can lead to poor living standard and outbreak of epidemics. Some examples of political factors that can increase mortality rates are civil wars, civil disturbances, ethnic cleansing and ethnic clashes. The second Congo civil war of 1998 to 2003 according to United Nations 2004 Statistics is recorded among the most devastating African civil wars in modern history, with the war alone responsible for as many as 5.4 million deaths, with most deaths as a result of the underlying effects of the war particularly starvation. Institutional weakness within the body polity of a country can also be

responsible for most political factors related deaths since good institutions can prevent a systematic breakdown of the governing authority thereby preventing a gradual drift into anarchy.

Theory

A simple theory is presented to depict how governmental policy will interplay with other interaction within and outside a system in shaping the life expectancy or longevity of people living within a specified geographical location. The theoretical model is such that a change in life expectancy depends on the change in government economic policy and its interaction with other country specific factors and exogenous variables that affect life expectancy. Changes in life expectancy will depend upon other interactions, such as other factors within the system e.g. wages (w) which represents the relative individual income that allows the citizenry to access the basic provisions within a system with an intent of living a comfortable life, the cost of capital (v) which depicts the cost of maintaining and providing social amenities, the quality of institutions (I) through which these policies are implemented and other exogenous variables (z). The model suggests that it is the factors that affect life expectancy in general that determine how long an individual within any given system will live. So government will tend to maximize their policy subject to the constraints that limit or improve how effective economic policies can produce the desired effects in improving longevity.

If countries are considered as firms whose cost are functions of several factors. These include the cost of labor (w), the cost of capital (v) in executing socio economic projects, day to day costs of running institutions (I), and some other form of social or economic interest (z). The cost of labor is the wage rate per unit of output produced. The cost of capital can be viewed as the typical rental price of capital but also more broadly as to include additional factors impacting the cost of obtaining capital such as access to credit. Running costs are a function of provision of basic amenities such as health care and more importantly other forms infrastructure, while the cost of maintaining an international status and ideology of some form can be viewed a form of

social or national interest that can attract investment or international confidence by portraying the presence of stability in a country to shore up investor confidence. So, the firms total cost function can be written as $TC_i = f_i(w, v, I, z)X_i$. The marginal cost (MC) can be expressed as $f_i(w, v, I, z)$. as firms' investment in human capital increase we expect an increase in output leading to some level of prosperity thereby improving longevity. It can be assumed that eventually scarcities will occur and the marginal cost of production will rise. This can occur because of the rising cost of investing in an additional citizen and/or because of increase in capital costs of maintaining a citizen is rising. Eventually, there reaches a point at which equilibrium occurs. This profit maximization point (X_i^*) will represent the point at which $MR_i = MC_i$, also expressed as $P_i = f_i(w, v, I, z)$ where the cost in maintaining a citizen or catering for an additional citizen will equal the output that such a citizen will produce on the long run . One of the goals of government economic policy (p_i) is to improve living conditions of the citizens in their countries. There are many ways in which this can occur. Government economic policy can increase education and training of workers, which would lower the firms labor cost per unit produced. So, the wage cost per unit produced can be expressed as a negative function of economic policy $w_i(p_i)$. Economic policy may also subsidize social amenities for citizens or come in the form of provisions of schools or product subsidy like petrol or gas used for individuals and households. Therefore the cost of capital can be written as a negative function of government economic policy, $v_i(p_i)$. The availability of wealth to a country may also lead to the promotion of a social status for a country with it might come some form of rent seeking behavior of government officials since more funds flowing into ideological projects may end up been diverted by corrupt officials seeking higher payout and have a spillover effect on the quality of institutions. Therefore, the costs imposed by rent seeking officials are modeled as a positive function of government economic policy, $z_i(p_i)$. with policy included in the model we can rewrite the equilibrium condition as $\sigma_i = f_i[w_i(p_i), v_i(p_i), I_i(p_i)Z_i(p_i)]$.

This equilibrium condition can be examined from changes in economic policy. It is reasonable to assume that economic policy does not impact output; therefore, the differentiation of this condition with respect to economic policy is only a differentiation of the marginal cost function. This can be expressed as shown below.

$$(1.) \quad \frac{\partial l_i}{\partial p_i} = \frac{\partial l_i}{\partial w_i} \frac{\partial w_i}{\partial p_i} + \frac{\partial l_i}{\partial v_i} \frac{\partial v_i}{\partial p_i} + \frac{\partial l_i}{\partial I_i} \frac{\partial I_i}{\partial p_i} + \frac{\partial l_i}{\partial z_i} \frac{\partial z}{\partial p_i}$$

first expression on the right hand side ($\frac{\partial l_i}{\partial w_i} \frac{\partial w_i}{\partial p_i} \leq 0$) represents government economic policy potentially lowering the cost of labor. The scenario where government economic policy potentially lowers cost of capital is represented as $\frac{\partial l_i}{\partial v_i} \frac{\partial v_i}{\partial p_i} \leq 0$. The potential reduction in costs of running institutions is shown as $\frac{\partial l_i}{\partial I_i} \frac{\partial I_i}{\partial p_i} \leq 0$. The possible rise in rent seeking or other socio economic interest costs of some sorts is the last term on the right hand side which is $\frac{\partial l_i}{\partial z_i} \frac{\partial z}{\partial p_i} \geq 0$. Therefore, the overall impact of government economic policy is combining three potential cost reduction factors (w, v, I,) with one potential cost increase (z). Whether or not the overall sign of $\frac{\partial l_i}{\partial p_i}$ is greater or less than zero will depend to a large extent on the quality of a country's institutions and on how the government economic policy is directed. If government economic policy is directed towards more productive uses that lower ' labor, capital and/or institutional costs of providing basic social amenities then this will help turn the prediction towards lower marginal costs. If marginal costs of providing basic social amenities fall for countries as a result of effective government economic policy devoid of corruption, then life expectancy will increase. In other words, if $\frac{\partial l_i}{\partial p_i} < 0$ and $\frac{\partial x_i}{\partial p_i} > 0$. Two variants of our life expectancy equation are estimated as shown in equation 2 and 3 below, variables such as country specific income using GDP/capita, the percent of people who earn wages with the total labor market participation rate and institution using an index for the quality of institutions are used to depict exogenous effects that affect life expectancy. The model present a case where life expectancy ($Life.\ exp_{it}$) is a function of, government economic policy ($policy_{i,t}$), and the vector of exogenous effects that affect life expectancy X_{it} . The list of exogenous variables in equation 2, consist of, income (GDP per capita), the quality of institutions which captures the effectiveness of institutions in executing government policies and

$$(2.) \quad Life.\ exp_{i,t-1} = \beta_0 + \beta_1 X_{i,t} + \beta_2 policy_{i,t-1} + \varepsilon_{it}$$

$$(3.) \quad Life.\ exp_{i,t-1} = \beta_0 + \beta_1 X_{i,t} + \beta_2 Gov.\ Spending_{i,t-1} + \varepsilon_{it}$$

bringing its impact close to the grassroots, labor market participation rate which reflects the percentage of the population that can access basic facilities (since they are not free) through been empowered by some form of employment, foreign aid since most African countries receive foreign aid, access to basic health care which reflects how easy it is for the population living within a country to access basic health services to reduce risk of death related to infections and diseases, access to basic clean drinking water which captures the availability of social amenities, country specific total population which puts a strain on the budget of a country depending on how populated a country is although we use the logarithm of population in our final analysis due to scaling issues in our estimates. The fiscal variables is separated from what we refer to as government economic policy so as to allow us differentiate the difference of the impact of government monetary and trade policy from its fiscal policy. The reason for this is that government consumption spending is likely to have a strong positive effect on life expectancy therefore investigating its effect on life expectancy will allows us know the extent to which government welfare spending in African countries contributes to life expectancy. (see Appendix D for the relationship between life expectancy and economic policy). Equation 2 can be rewritten to depict the effect of government consumption spending $Gov. Spending_{i,t}$ on life expectancy in equation 3 as shown above. Finally economic policy is interacted with institutions to determine the effect of institutions on economic policy effectiveness. In this case equation 2 is rewritten below as equation 2¹

$$(2^1.) \quad Life. exp_{i,t-1} = \beta_0 + \beta_1 X_{i,t} + \beta_2 \widehat{policy}_{i,t-1} + \beta_3 interact_{i,t} + \varepsilon_{it}$$

Where interact = economic policy*institutional quality, some hypothesis that we wish to test in this paper are as follows,

Hypothesis #1.) Government Economic policy (it's monetary and trade policy) can have either a positive or negative effect on life expectancy due to poor institutions.

Hypothesis #2.) Government Consumption spending (government fiscal policy) will have a positive effect on life expectancy due to high prevalence of diseases and shortages of social amenities in Africa.

Hypothesis #3.) Economic policy will have a positive effect on life expectancy if institutions are taken into consideration in executing economic policies.

Hypothesis #4.) Social amenities can have a positive or negative effect on life expectancy in countries, depending on the level of their availability.

Hypothesis #5.) School enrolment might contribute to longevity in a positive or negative manner depending on the extent to which schools are accessible and affordable in African countries. Since social awareness through education can be greatly affected by the level of literacy in countries.

Hypothesis #6.) Labor market participation can have a positive or negative effect on longevity in countries depending on the level of employment present in countries. Since medical care and use of social amenities are not free and will be more accessible to a greater percentage of the populace depending on their earning power and available employment.

Hypothesis #7.) GDP/capita can have a positive or negative effect on economic policy in countries. Since poor income could lead to government inability to fulfill its social obligation in countries.

Data

The summary of all variables used is presented below. Data is obtained for five countries in Africa, four in sub Saharan Africa and one in North Africa (i.e. Kenya, Botswana, Ghana Cameroon and Egypt) for a period of 1980 to 2008 although some are missing. Each country come from one of the five regional divide in Africa (North, west, east south and central Africa). This allows us to capture peculiarities of each of these regions.

Description of Dependent Variable

The dependent variable life expectancy is obtained from World development indicator data of the World Bank; life expectancy is defined as the average life span for men and women living within any specified geographical location. It depicts the average mortality rate for men and women by country. In most cases it is calculated separately for men and women due to the difference in probability of dying. Many factors affect life expectancy such as infant mortality rates and geographical location since some diseases are likely to thrive in some areas of the world than others. Life expectancy is therefore calculated as the average probability of surviving based on age,

sex, geographical location etc therefore it is defined as an arithmetic mean calculated by integrating the survival curve from age 0 to positive infinity.

Table 1. Descriptive statistics

	Observation	Mean	Std.Dev.	Min	Max
Life expectancy	195	55.04	5.11	44.63	68.41
logarithm of GDP per Capita	195	13.36	0.84	11.87	15.79
Foreign Aid/GDP	104	4.39	2.98	0.77	16
Health Access	141	73.33	22.62	5	99
Population	195	2.1	1.92	0.06	7.73
Labor Market Participation Rate	145	68.8	10.95	47.8	82.4
Water Access	195	48.1	28.93	2	97
School Enrollment Rate (0-15years)	183	88.94	15.64	55.15	119.87
Torture Rate	140	0.59	0.61	0	2
Electoral Self Determination Rate	140	0.99	0.73	0	2
Ethnic Fractionalization Rate	195	83	78.13	8	230
Political Imprisonment	140	0.87	0.83	0	2
Government Economic Policy Index	143	50.36	1.19	48.52	53.68
Institutional Quality Index	140	78.81	1.9	74.65	81.17
Government Consumption Spending	143	3.85	42.63	0.01	510
Market Capitalization Rate	78	1.01	2.32	0.01	14
Foreign Direct Investment	171	1.67	2.6	-10.782	15.59
Inflation	190	15.05	17.4	-3.21	122.63
Openness	195	70.24	30.56	22.25	157.625
Crude Oil Prices	195	42.72	21.48	15.93	99.11

Description of Government Economic Policy and Institutional quality indexes

Government economic policy index is constructed using principal component analysis (PCA). Data that depict government monetary (inflation), trade (trade openness) and fiscal(government spending)policies are used to capture the variation in economic policy, based on past literature e.g. Burnside and Dollar (2000), and Elbers et al (2001) that have previously used regression component approach to generate indexes. Having a single index for economic policy allows us to discuss the effect of economic policy as a whole on life expectancy instead of enumerating the individual effect of the different economic policy variables. Inflation is the increase in the price of goods and services in a country over a period of time; we obtain this from World Bank data. While

openness is given as the ratio of exports to imports we obtain this data from Penn World Tables both for a period of 1980 to 2008. The fiscal variable government consumption spending is dropped to explore the effect of government monetary and trade decisions on life expectancy independent of the fiscal variable, government consumption spending has the tendency to alleviate poverty and cushion the effect of factors that can affect longevity, this allows us to evaluate the difference in the effect of government consumption spending on life expectancy differently. How the economic policy index is arrived at is presented in Table-2 below using principal component eigenvectors which we generate using PCA. PCA allows us to generate an index from a set of correlated variables by capturing the variation in the variables in a single index. Using the PCA command “PCA openness inflation” we generate the eigenvectors as shown in the table below.

Table-2 Construction of Economic policy index using eigenvectors

	(1)	(2)
Method of construction	PCA	PCA
Variables	Component 1	Component 2
Openness	0.7071	0.7071
Inflation	0.7071	-0.7071

Note: The above values are generated using eigenvalue transformation

Economic policy index is generated from the principal component eigenvector table above from each of the principal components by adding up the principal components

$$PC1 = (0.7071 * openness) + (0.7071 * inflation)$$

$$PC2 = (0.7071 * openness) - (0.7071 * inflation)$$

Where economic policy Index=PC1+PC2

Figures 1 and 2 show the matrix scatters plots and the score plots for inflation and trade openness. The scatter plots show that inflation is correlated with openness. While the score plot shows the overall variation in our index which is a combination of the variation in both variables.

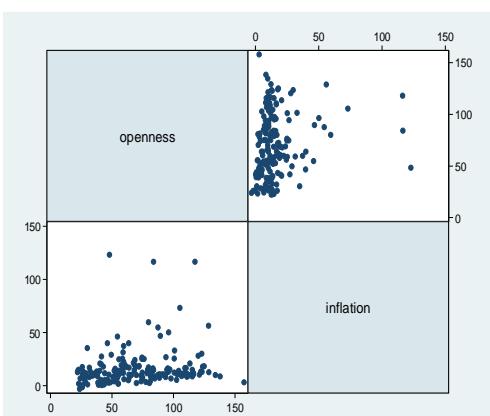


Fig. 1

Note: This is the matrix scatter plot for inflation and openness showing their correlation

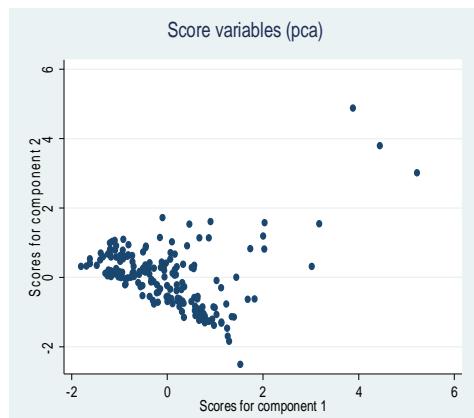


Fig.2

Note: This is the score plot for economic policy index it depicts the total variation in the variables in the variables used in its creation

Political variables that capture the quality of institutions were obtained from Binghamton University, Cingranelli-Richards (CIRI) dataset, these three variables (namely freedom of movement, torture and political imprisonment) were used to capture country specific institutional qualities that are likely to affect life expectancy since it will depict the quality of governance and the quality of a country's civil service, these variables include rate of torture, a measure of electoral self determination rate (elecsd), and freedom of movement (freedmove). Torture rate was measured by assigning a score of 0 in cases where torture was practiced very frequently, 1 when somewhat less frequently and 2 in cases where there was no torture. Freedom of movement was assigned a score of 0 in case where it did not exist, 1 in situations where it was interfered with and 2 in cases where it existed, while electoral self determination rate was measured by assigning a score of 0 in cases where it did not exist, 1 in a case where it existed but there were some limitations and 2 in a case where citizens have ability to exercise full political and voting rights this allows us to capture the level of political stability by country. With these variables an index for institutions was also constructed using PCA. The results of how we arrive at our institutional index are presented in Table-4 using Principal Component Analysis (PCA). This also allows us to represent institutions using a single index. The eigenvectors were obtain as shown below using the PCA command "pca elecsd torture freedmove"

Table-3 Construction of institutional quality index using eigenvectors

Method of construction Variables	(1) PCA Component 1	(2) PCA Component 2	(3) PCA Component 2
Electoral Self Determination	0.5660	0.5376	0.6250
Torture	-0.6382	-0.7657	-0.0806
Freedom of movement	0.5219	0.3533	0.7764

Note: The above values are generated using eigenvalue transformation

The principal components is derived from the table of eigenvectors above in Table 3, and it is expressed below as

$$PC1 = (elecsd * 0.5660) + (torture * -0.6382) + (freedmove * 0.5219)$$

$$PC2 = (elecsd * 0.5376) + (torture * -0.7657) + (freedmove * 0.3533)$$

$$PC3 = (elecsd * 0.6250) + (torture * -0.0806) + (freedmove * 0.7764)$$

Institutional quality index is the sum of all the individual principal components expressed as

$$\text{Institutional quality index} = PC1 + PC2 + PC3.$$

The scatter matrix for all variables used in creating the institutional index show that they are highly correlated with one another (see identical distributive properties for all variables used in fig. 3). Using a set of highly correlated variables allows us to generate a more exact index that is not skewed in one particular direction. The score plot in fig. 4 shows the total variation in the new index. The identical distribution characteristics (see distribution of blue dots in fig. 4) show that there is sufficient variation in the variable used in creating the index. See

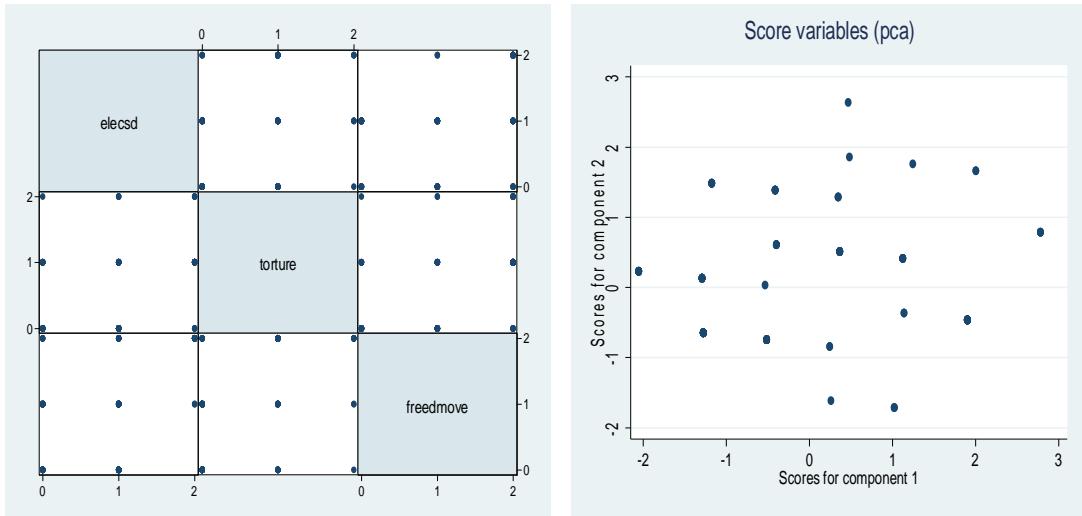


Fig. 3

Note: This is the matrix scatter plot for electoral self determination, torture and freedom of movement showing their correlation

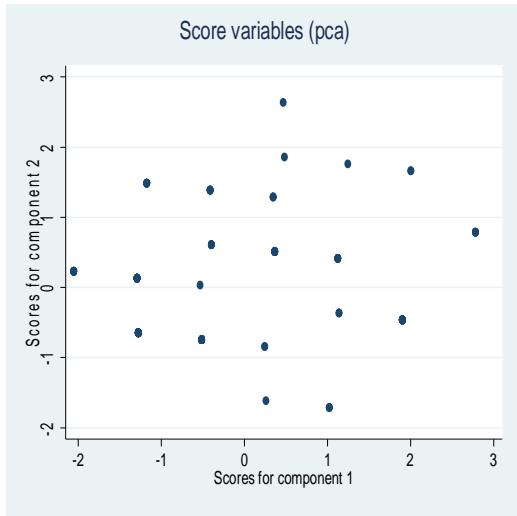


Fig.4

Note: This is the score plot for institutional quality it depicts the total variation in the variables used in its creation

Abeyasekera (2004) and Schlens (2009) for further discussion on how PCA produce consistent indexes. See Appendix E. for a brief enumeration of data and their sources.

Other explanatory variables

Other data used include population which represents the number of people living per geographical square kilometer per country, but we take the logarithm of population to resolve issues of scaling so as to have our estimates in three decimal places, access to healthcare, labor market participation rate, school enrollment rate and foreign aid. Labor market participation represents the percentage of the working population that participates in a country's job market, while school enrollment is the percentage of children from 0-15 years that are enrolled in schools this reflects the level of social awareness and enlightenment present in a country. The data for foreign aid captures total flow of official aid to countries (bilateral plus multilateral aid) we also include aid because aid consists of a reasonable percentage of the GDP of most developing countries. Market capitalization was used to capture the effect of organized domestic trade on life expectancy since the capital market often acts as a way of saving or investing money for the future, while foreign direct investment captures the effect of

inflow of foreign investment and international trade on life expectancy. Country specific cost of living was measured using transportation cost represented as the cost of crude oil price to reflect the impact that country specific cost of living has on life expectancy. Percentage immunization rate for children between the ages of 0 to 15 years of age was used to capture country specific access to medical (or health) care, while the percentage of the population that had access to good drinking water was used to capture the level of provision of basic social amenities. Finally the data on government spending was obtained from data market of Iceland. All other data are obtained from the World Bank data for a period of 1980 to 2008, except otherwise stated.

Empirical Analysis

Does economic policy affect life expectancy?

In this study three variants of life expectancy equations is estimated, this is shown in equations 4 to 9 below. The assertion is based on the argument that government decisions is of two forms one that deals with its monetary and trade decisions (which is referred to as economic policy in this study) and the other that captures its public spending (which is referred to as government spending). It is reasonable that they should have an impact on life expectancy in a different manner with government consumption spending having much more capability in reducing mortality rate due to its direct focus on welfare projects while government economic policy on the other hand could either have a positive or negative result depending on institutions. If the aim of government is to make life relatively comfortable for its citizens, it is expected that government economic and social decisions will be one that mitigates risk associated with mortality rate and alleviates poverty through employment.

Hausman specification test was run to choose between fixed and random effects. Results accept the null hypothesis that the fixed effects estimator is not biased (p-values are all considerably lower than .01) for the two variants of our life expectancy equation. The use of instrumental variables approach is because of the endogeneity of the economic policy and government consumption spending variables since they are likely to suffer from measurement problems. A Hausman-Wu test rejected the null hypothesis

that economic policy and government spending were exogenous, with a p-value of 0.00. Therefore, using them as independent variables could lead to biased results. An instrument was used as proxy in each case for both government policy and consumption spending which were assumed to be endogenous. The three variants of our life expectancy equation is presented below to explain how economic policy and consumption spending affects life expectancy.

Life Expectancy Model Specification with Economic Policy

In the first variant of the life expectancy specification, in equation 5 life expectancy depends on economic policy (both from past periods therefore we lag life expectancy and economic policy) and our vector of exogenous $X_{i,t}$ which consist of foreign aid, access to health

$$(4.) \quad \text{Policy}_{i,t-1} = \alpha_0 + \alpha_1 X_{it} + \alpha_2 Z_{it} + c_i + \mu_{it}$$

$$(5.) \quad \text{Life.exp}_{i,t-1} = \beta_0 + \beta_1 X_{i,t} + \beta_2 \widehat{\text{Policy}}_{i,t-1} + c_i + \mu_{it}$$

care, the logarithm of income (GDP per capita), the quality of institutions, access to water (which capture provision of basic social amenities), country specific population, labor market participation rate, cost of living and school enrollment rate. Life expectancy therefore is expected to be affected by the rate at which government responds to economic factors that are likely to increase mortality rate. Hyper inflation for example could mean firms closing down and laying off workers and adverse reduction in trade could result in a general shrinkage of a nation's economy leading to adverse economic circumstances such as reduced national income and lack of funds to maintain infrastructure and social services. Since we suggest that government economic policy is likely to suffer from measurement problems, so we assume that it is endogenous this is supported by results of the Hausman-Wu test for endogeneity as stated earlier therefore using economic policy as an exogenous variable is likely to lead to inconsistent estimates. Equation 4 represents the reduced form of the equation for government economic policy, government economic policy depends on country specific income, and our vector of instrument Z_{it} . Therefore equation 4 and 5 are estimated

simultaneously. Exclusion restriction is achieved by assuming that certain variables (in this case a variable) are correlated with government economic policy in equation 4 but not with life expectancy in equation 5, allowing us to achieve identification by excluding some variables in equation 5. Country specific investment in stocks was used as instrument for economic policy this allows us to conduct instrumental correction for economic policy in equation 4.

Life Expectancy Model Specification with Government Consumption Spending

The second variant of the life expectancy specification is shown below, government consumption spending is assumed to be endogenous in equation 7, so the instrumental correction

$$(6.) \quad \text{Gov. Spending}_{i,t-1} = \alpha_0 + \alpha_1 X_{i,t-1} + \alpha_2 Z_{it} + c_i + \mu_{it}$$

$$(7.) \quad \text{Life. exp}_{i,t-1} = \beta_0 + \beta_1 X_{i,t} + \beta_2 \widehat{\text{Gov. Spending}}_{i,t-1} + c_i + \mu_{it}$$

was conducted in equation 6. Life expectancy depends on government consumption spending (both from past period since lag them by one period) and our vector of exogenous variables. Our vectors of exogenous variables ($X_{i,t}$) are the logarithm of population, income (GDP per capita) labor market participation, market capitalization rate, foreign direct investment inflow, school enrollment rate, electoral self determination (political stability) exchange rate, inflation and openness. The disposition for increased government consumption spending will depend on a host of factors, its income, and the condition of its economy as well as its political disposition. Therefore if a government sees its citizens as some form of assets that will bring some meaningful economic gains to it on the long-run it will embark on social spending with the aim of getting returns. It is expected that government spending will have a positive effect on life expectancy. It was also assumed that government consumption spending is endogenous since it suffers from measurement problems since short term payouts such as salary increases and social benefits e.g. subsidies make up government consumption spending and affect life expectancy on the short run this was also supported by the Hausman-Wu test for endogeneity. In equation 6, government consumption spending depends on the logarithm of country specific income, and our vectors of

instruments Z_{it} . In this health access was used as instrument for government consumption spending, this allows the instrumental correction to be done in equation 6, using health access since we assume that government spending is endogenous as stated earlier.

*The interactive variable (policy*institutions)*

The third variant of the life expectancy specification is presented in equations 8 and 9. Including an interactive variable (interact) policy*institutions offers additional opportunity to study the effect institution has on policy effectiveness. Using predictive variables that capture economic policy in our first stage we regressed economic policy on income and stocks of investment and obtain the residuals since economic policy is endogenous, we multiplied the residuals with institutions to get our interaction variable (interact) and use the interaction variable in our second stage this method is known as general least square (GLS).

$$(8.) \quad \text{policy}_{i,t-1} = \alpha_0 + \alpha_1 X_{it} + \alpha_2 Z_{it} + \varepsilon_{it}$$

$$(9.) \quad \text{Life.exp}_{i,t-1} = \beta_0 + \beta_1 X_{i,t} + \beta_2 \widehat{\text{policy}}_{i,t-1} + \beta_3 \text{interact}_{i,t} + \varepsilon_{it}$$

Our interaction variable will depend on institutional quality's effect on economic policy this allows us to depict how institutions affect economic policy effectiveness using GLS random effects. We also lag life expectancy and economic policy in this case.

Instruments

A careful explanation of why our exclusion restriction will hold for our different model specifications is offered here to depict the validity and relevance of utilized instruments. The exclusion restriction that is imposed on the life expectancy equation is that the instrument should be correlated with economic policy in the first set of equations (equations 4 and 5), government consumption spending in the second set of equations (equation 6 and 7), and economic policy again in the third set of equations where we used two stage GLS (equation 8 and 9) but not with life expectancy.

Theoretically this will hold based on the following conditions, if the coefficient for the

endogenous variable in the structural equation after imposing the restriction (where the instrument is used as a proxy for the endogenous variable) tends to that in the reduced form equation and secondly, if the correlation between the instrument Z and the error term $\varepsilon_{i,t}$ is identically equal to zero as shown below in equation 10.

$$(10) \quad E[Z_{i,t} \cdot \varepsilon_{i,t}] = 0$$

This shows that the instrument $Z_{i,t}$ is uncorrelated with the disturbances $\varepsilon_{i,t}$ and this therefore stipulates that the only way the instrument is related with life expectancy is only through the endogenous variable and finally, if the exogenous component of the instrument, (the fitted value of the endogenous variable for economic policy and government spending as the case maybe) is uncorrelated with the error term, the variation in the dependent variable life expectancy (in years) can be identified as the slope of coefficient β_2 (see Kraay (2008) for further discussion on exclusion restriction) we depict this in equation 11 below.

$$(11) \quad \text{Cov}(policy_{i,t} \cdot \varepsilon_{i,t}) \neq 0 \text{ and } \text{Cov}(gov.\text{ spending}_{i,t} \cdot \varepsilon_{i,t}) \neq 0$$

This means that α_2 is not zero therefore life expectancy will vary with changes in economic policy and government spending as the case may be. The instruments should fulfill the above conditions for our exclusion restriction to hold, this can be explained further below in a nut shell econometrically as follows. First, the instruments should have a significant impact on the variable they predict. Secondly the instrument should not have an impact on the dependent variable (life expectancy in this case) in the second equation. While often this is tested empirically, Wooldridge (2010) and others have pointed out that this also needs to be done on the theoretical level as testing the impact of the instrument on the dependent variable in the second equation (life expectancy) with a full model could be biased as the instrumental correction has not been made for in the endogenous variable (i.e. economic policy or government consumption spending as the case maybe). Stock of investment was used as instrument for economic policy, while health access was used as instrument for government consumption spending. Investment in stocks reflects the value that investors place on a country stocks and the value of stocks at any point in time reflects the quality of government economic policy. It is expected that stock of investment will be correlated with government economic policy but not with life expectancy for our exclusion restriction to hold for our first set of equations (i.e. equations 4 and 5). One way to view this is that investors will hold a

country's stocks as long as the government maintains stable, sound and consistent economic policies and in cases where a government economic policy is weak, investors are likely to dump such stocks or not invest in such economies. It is also expected that a country specific stock of investment will have no direct effect on life expectancy since if government does not have good economic and social policy to reduce factors that are a risk to longevity, gains from investment might not affect life expectancy. Therefore the only way through which stock of investment will be related to life expectancy is through government economic policy. This allows us to solve the first and second stage equation simultaneously to overcome the problem of endogeneity, which we associate with government economic policy in equations 4 and 5. In equations 6 and 7, which is the second specification where we consider the effect of government consumption spending on life expectancy, country specific access to health care is used as instrument for government consumption spending. It is also expected that for the exclusion restriction to hold (in the second set of equations i.e. 6 and 7), that health care access should be correlated with government spending in equation 6, but not directly with life expectancy in our second in equation 7. This will be based on the fact that access to medical care even though if available, is not likely to be free nor easily afforded in many African countries which are characterized with high a population of poor people, so we do not expect that the availability of medical care will lead automatically to increase in life expectancy. The only way through which health access will be related to life expectancy is through government spending, if government creates enabling environment (through its spending) in which people can develop skills at subsidized rate through investment in skill acquisition and training of human capital so that its citizens can become empowered economically (since this could likely lead to job creation), its citizens will therefore have the means to afford health care. Based on these two assumptions we are able to impose the exclusion restriction on the two different model specifications (i.e. the life expectancy models with economic policy and government spending) and argue that the restrictions will hold. Only one instrument is used in each case so our model specifications are exactly identified since the number of instrument is the same as endogenous regressor (i.e. for economic policy and government consumption spending). Therefore the test for the third condition for instrument validity, which is the Sargan over-identification test which is necessary if there are more

instruments than endogenous variables being estimated (which is not the case in our analysis) is not done.

Good instruments for government economic policy are not easily available. Many economic factors cannot be directly controlled by policy makers however some that can be directly controlled are used in the construction of our economic policy variable, Tinbergen (1978) Asiedu (2006) identified specific factors that influence economic policy such as inflation and trade openness as factors within the control of government and policy makers. Country specific investment in stocks is a good instrument for government economic policy. Since government can for instance decide to set rules regarding the levels of public private ownership within their domain, thereby regulating the amount of the stock of private investment, therefore governments can indirectly determine the degree of economic liberalization present in the economy of a country (see Winters (2004) for further discussion of how governments regulate markets during liberalization reforms). Investment in stocks should be highly correlated with economic policy but not with life expectancy since it is reasonable that the flow of foreign and domestic investment into the private sector will be due investor's perception that there will be continuity in governments sound and consistent economic policies overtime but not related directly with life expectancy. It is also expected that government consumption spending should improve welfare and reduce mortality rate. This makes health access a good candidate for instrument for the second specification. Access to healthcare should therefore be correlated with government consumption spending but not life expectancy. One possible way to depict this as stated earlier is the fact that developing countries can experience an increase in the numbers of clinics for instance which could be reflective of increased government consumption spending, without necessarily achieving an increase in employment rate so its poor citizens are not likely to afford medical care since it is not free, making availability of healthcare not to have a significant effect directly on life expectancy. The instruments we use are highly correlated with our endogenous variables and quite relevant (see first stage regressions results in Tables 4 and 5 below)

Results

Fixed effect regression was used , for the first two specification of the life expectancy equations, since the result of the Hausman test with p-value 0.000 suggest

that fixed effect estimation is more appropriate for our model, see Baltagi (2005), Baltagi and Wu (2010) and Wooldridge (2010) for further discussion. . Time effect (year dummies) was included to capture the differences in life expectancy over years. The results are shown in Tables 6 to 8. We controlled for time effect using year dummies for the specification for economic policy and government consumption spending but this did not hold for the model with the “interact” effect instead year effect was used because our results did not follow a chi square distribution with year dummies. The results of the F-test in Tables 4 and 5 shows that our instruments are highly correlated with the first stage dependent variables respectively. The results in Table 6 show that economic policy has no effect on life expectancy using OLS (with p-value 0.914) and has a negative significant effect on life expectancy using 2SLS after controlling for endogeneity, using investment in stock as instrumental correction for economic policy (with p-value 0.016). This shows the importance of controlling for endogeneity since economic policy might suffer from measurement problems. The results in Table 7 show that government consumption spending has an effect (with p-value 0.014) on life expectancy using OLS and has a stronger effect (with p-value 0.000) on life expectancy using 2SLS. This shows the relevance once more of using health access as instrumental correction for government consumption spending, since we assume that government consumption is endogenous. The results in Table 8 show that government economic policy has a negative effect (p-value 0.019) on life expectancy without interacting economic policy with institution. After interacting economic policy with institutions the interactive variable (interact) becomes weakly statistically significant (p-value 0.061). This shows that economic policy contributes to a reduction in life expectancy, without the appropriate institutions to execute policies. It is likely that economic policy is not effective due to apathy between the civil service (the embodiment of institutions) and government officials who float economic policies making economic policy not to be contributing in a significant manner to improving life expectancy.

Robustness Check: Alternative measure of economic policy and institutional quality indexes were used, this was constructed using regression component approach previously used by Burnside and Dollar (2000) to determine how robust our regression estimates are. The economic policy index developed with regression component

approach (RCA) weighs the effect that economic policy has on life expectancy therefore this index depends on life expectancy. Using another set of index allows us to know if indeed the economic policy results obtained using the PCA index are robust. The results are presented in the appendix see Tables 9 to 11. Appendix A. Table 9 Columns 1 and 2 shows the first stage results where a comparison is made in the results where PCA and RCA were used as controls in the model specification for economic policy. The result shows that investment in stocks is highly correlated with economic policy. Appendix B. Table 10 Columns 1 and 2 show that economic policy was contributing in a negative manner to life expectancy in the countries in our sample using 2SLS, although the results where RCA index was used as control for economic policy contributed significantly in a negative manner in reducing life expectancy (see regression estimates in Table 10 Columns 1 and 2 for economic policy of -2.13 and -4.19 for PCA and RCA values respectively). Appendix C. Table 11 Columns 1 and 2 show the results of the interaction variable economic policy*institutions used to determine how effective economic policy will be on life expectancy if channeled through appropriate institutions. The results do not differ significantly from those where the PCA index was use as controls. The interaction variable showed that economic policy contributed in a significant manner to life expectancy (see regression estimates of 3.08 and 0.23 in Table 11 Columns 1 and 2 respectively) although the result where we used the economic policy index constructed using the RCA index was more significant than using that obtained using PCA. However the RCA measure of institutional quality contributed in a positive significant manner to life expectancy whereas the PCA measure had a negative effect on life expectancy but was not significant (see Table 10 Columns 1 and 2 regression estimates for institutions of -2.4 and 2.82 for PCA and RCA indexes). The institutional measure using RCA was obtained from weights that our variables that capture institution have on life expectancy using OLS, institutions are likely to exert either a positive or negative effect on any dependent variable. The use of interaction variables allows us to determine how effective they are in the presence of a policy that can affect life expectancy. This was found not to affect the quality of the index since as stated earlier that the interaction variable economic policy*institutions show that institutions improve the effectiveness of economic policy for both results (see

Appendix C. Table 11) since after interacting economic policy with institutions it exerts a positive effect on life expectancy in both cases.

Based on the above results we answer the hypothesis that were posed earlier below

Hypothesis #1.) Government Economic policy (governments monetary and trade policy) had a negative significant effect on life expectancy. It was likely that economic policy was contributing negatively to longevity in the countries in our sample.

Hypothesis #2.) Government Consumption spending (government fiscal policy) had a positive effect on life expectancy. This shows that government consumption spending was likely contributing to increase in longevity since it consisted of welfare spending used in cushioning risk factors to longevity through the establishment of health facilities, provision of social infrastructure such as schools, access to clean drinking water, creating social awareness etc.

Hypothesis #3.) Economic policy was found to contribute to longevity in a significant manner when institutional quality was interacted with economic policy. It was likely that institutions were not taken into consideration or bypassed in economic policy implementation. Implementing economic policies through appropriate channels such as a credible civil service and following due process could lead to a substantial improvement in economic policy effectiveness.

Hypothesis #4.) Social amenities had a negative effect on life expectancy in countries, it was likely that lack of basic amenities such as portable drinking water, and electricity etc was contributing in a negative manner to longevity.

Hypothesis #5.) School enrolment had a positive effect on longevity. This shows that provision of means to accessible and affordable education in African countries was likely promoting longevity. Therefore it was likely that social awareness through education was likely affecting longevity positively therefore improving literacy rates was probably useful in increasing life expectancy.

Hypothesis #6.) Labor market participation had a negative effect on longevity in countries. This shows that it was likely that the level of employment present in countries can make medical care and use of social amenities which are not free more accessible to a greater percentage of the populace depending on their earning power.

Hypothesis #7.) GDP/capita had a negative effect on economic policy in countries, therefore it was possible that poor income led to governments inability to fulfill its social obligation in countries making economic policy to have a negative effect on life expectancy in countries.

Table 4. First Stage: Economic Policy Regressions

Method of Estimation	OLS
GDP/capita	-0.73 (.75)
Institutional quality	-0.31 (.21)
Foreign aid	-0.008 (.05)
Access to medical care	-0.008 (.05)
Provision of social amenities	-0.01 (.01)
Population	1.59 (1.21)
Exchange rate	0.19 (.14)*
FDI	0.05 (.04)
Labor market labor participation	0.14 (.23)
School enrollment	0.07 (.05)
Cost of living	0.30 (.06)
Stock of investment	-0.003 (.001)***
F-Test	8.55
Chi ² (p-value)	0.03
# of observations	70
R-Squared	0.50

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively.

Table 5. First Stage: Government Consumption Spending Regressions

Method of Estimation	OLS
GDP/capita	-1.17 (.63)*
Population	0.33 (1.21)
Labor market participation rate	-0.68 (.35)
FDI	-0.04 (.04)
Market capitalization	0.01 (.01)
School enrollment	0.003 (.02)
Exchange rate	0.02 (.01)**
Inflation	-0.001 (.01)
Openness	-0.04 (.01)
Political stability	-0.12 (.14)
Health access	0.04 (.01)***
F-Test	17.99
Chi ² (p-value)	0.00
# of observations	52
R-Squared	0.99

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively.

Table 6. Economic Policy Regressions

Method of Estimation	OLS	2SLS
Economic policy	0.04 (.32)	-2.13 (.89)**
GDP/capita	1.32 (1.61)	-2.56 (1.77)
Institution index	-0.11 (0.35)	-0.24 (0.40)
Foreign aid	0.33 (.12)**	0.06 (.12)
Access to medical care	0.03 (.03)	0.04 (.04)
Provision of social amenities	-0.03 (.03)	-0.07 (.03)***
Population	0.15 (.71)	-0.79 (2.06)
Exchange rate	-1.33 (.30)***	0.48 (.32)
FDI	0.23 (.14)	0.20 (.16)
Labor market participation	-0.19 (.12)	-0.73 (.73)
School enrollment	0.11 (.05)**	0.21 (.04)***
Cost of living	-0.04 (.02)	0.31 (1.25)
Instrument	-	Investment in stocks
Chi ² (p-value)	0.00	0.00
# of observations	70	70
R-Squared	0.90	0.57

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively.

Table 7. Government Consumption Spending Regressions

Method of Estimation	OLS	2SLS
Government Consumption Spending	2.89 (1.08)**	3.02 (.62)***
GDP/capita	1.36 (3.24)	6.08 (1.34)***
Population	1.33 (2.24)	-2.29 (3.13)
Labor market participation	1.0 (.54)*	-1.70 (.60)***
FDI	-0.45 (.27)	0.04 (.07)
Market capitalization	0.08 (.06)	-0.06 (.02)***
School enrollment	-0.12 (.13)	0.05 (.03)
Exchange rate	-0.13 (.05)**	0.003 (.03)
Inflation	0.09 (.08)	-0.01 (.02)
Openness	-0.02 (.06)	0.03 (.05)
Political stability	0.49 (1.14)	0.66 (.32)**
Instrument	-	Health access
Chi ² (p-value)	0.00	0.00
# of observations	52	51
R-Squared	0.95	0.97

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively.

Table 8. Economic Policy and interaction with institutions Regressions

Method of Estimation	GLS
Economic Policy	-14.23 (5.96)**
Economic policy*institutions	3.08 (1.64)*
GDP/capita	0.70 (1.22)
Foreign aid	0.28 (.10)***
Access to medical care	0.06 (.02)
Provision of social amenities	-0.03 (.02)
Population	-0.61 (.45)
Exchange rate	-0.93 (.20)***
FDI	0.11 (.11)
Labor market participation	-0.09 (.09)
School enrollment	0.04 (.04)**
Cost of living	-0.01 (.02)
Chi ² (p-value)	0.00
# of observations	70
R-Squared	0.94

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively.

Conclusion

In this paper some factors that affect life expectancy in Africa were investigated, some questions asked were, if government economic policy affects life expectancy in Africa? It was found that government economic policy has a negative effect on life expectancy in Africa. This showed that economic policy was not contributing positively to longevity. Secondly it was also investigated if government consumption spending cushions the factors that are a risk to longevity in Africa? It was found that government consumption spending has a positive significant effect on life expectancy, and therefore cushions factors that militate against longevity. The impact of the interactive effect of economic policy and institutions were also considered on life expectancy. We found that the variable “interact” has a positive effect and significantly improves the effect of economic policy on life expectancy thereby making it contribute to positively longevity. This showed that channeling policies through appropriate institutions makes economic policies to have an effect on life expectancy. It was likely that government economic policy was weakened due to corruption and circumventing of due process in policy implementation. Interestingly the findings show that economic policies in Africa are relatively weak and do not improve the living conditions of people in Africa, making our analogy that only a few people in Africa benefit directly from public goods to be valid. Government consumption spending proved to have a positive impact on longevity, showing that it is likely that welfare spending improves life expectancy in Africa. Institutions which should act as pipes that should channel government funds towards executing programs that can alleviate poverty in Africa, were either not used (in apathy with economic policies) or are corrupt making them to be like leaking pipes which can weaken policy effectiveness. Executing economic policies through good institutions could lead to useful and effective result for many African countries.

The policy implication of our results is that improving government economic policy (i.e. it's monetary and trade policy) could significantly improve life expectancy in African countries, since economic policy is currently contributing negatively to longevity among African countries. Sound and consistent policies could help create employment and can play a role in the effective execution of public projects that can affect the lives of people living in many poor countries significantly. Reducing inflation

and allowing strong private participation in business could rapidly transform many African countries and help reduce mortality rates by economically empowering its indigenous population. The results are consistent with past literature such as Karl (1997) and Ross (2001), which states that corruption significantly, weakens economic policy in many African countries making such policies to be ineffective in alleviating poverty among their indigenous population. Government consumption spending was contributing positively to longevity, this implies by our results that governments in Africa are likely to continue to spend heavily on consumption. Executing sound policies that could reduce government consumption spending to a sustainable level should be a top priority for many African countries. Empowering people through employment to be able to afford basic social and medical amenities and the establishment of a strong public-private partnership in social and infrastructure development could help reduce government spending on welfare so that this can be used for further development programs. Our results also support reports by World Health Organization 2010 and UNICEF report 2011, that a host of factors are responsible for low life expectancy in Africa this makes government to be overwhelmed with numerous risk factors that reduce longevity leading to huge spending to mitigate such risks which are the causes of high death rate plaguing the African continent.

Appendix

The robustness check results are shown in the appendix. All of the other results are shown in the body of the paper

Appendix A. Table 9 First Stage Robustness Check

Method of Estimation	PCA Index	RCA Index
	(1) OLS	(2) OLS
Investment in Stocks	-0.003 (.001)***	-0.0002 (.0001)***
GDP/capita	-0.73 (.75)	-0.73 (.26)***
Institution index	-0.31 (0.21)	0.36 (0.14)***
Foreign aid	-0.01 (.05)	0.003 (.02)
Access to medical care	0.01 (.01)	-0.004 (.03)
Provision of social amenities	-0.01 (.01)***	-0.01 (.01)
Population	1.59 (1.21)	0.76 (.49)
Exchange rate	0.19 (.14)	0.02 (.06)
FDI	0.05 (.04)	0.02 (.03)
Labor market participation	0.14 (.23)	0.26 (.11)**
School enrollment	0.07 (.05)	0.03 (.01)**
Cost of living	0.30 (.06)	-0.05 (.05)
F-Test	8.55	13.09
Chi ² (p-value)	0.03	0.00
# of observations	70	66
R-Squared	0.50	0.74

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively.

Appendix B. Table 10 Robustness Check

Method of Estimation	PCA Index	RCA Index
	(1) 2SLS	(2) 2SLS
Economic Policy	-2.13 (.87)**	-4.19 (1.22)***
GDP/capita	-2.56 (1.77)	-4.77 (1.44)***
Institution index	-0.24 (0.40)	2.82 (0.82)***
Foreign aid	0.06 (.12)	0.07 (.07)
Access to medical care	0.04 (.04)	0.05 (.03)
Provision of social amenities	-0.07 (.03)***	-0.05 (.02)**
Population	-0.79 (2.06)	-4.37 (1.70)**
Exchange rate	0.48 (.32)	-0.33 (.25)
FDI	0.20 (.16)	0.30 (.10)***
Labor market participation	-0.73 (.73)	-0.92 (.52)***
School enrollment	0.21 (.04)***	0.20 (.03)***
Cost of living	0.31 (1.25)	0.18 (.36)
Instrument	Investment in stocks	Investment in stocks
Chi ² (p-value)	0.00	0.00
# of observations	70	66
R-Squared	0.57	0.63

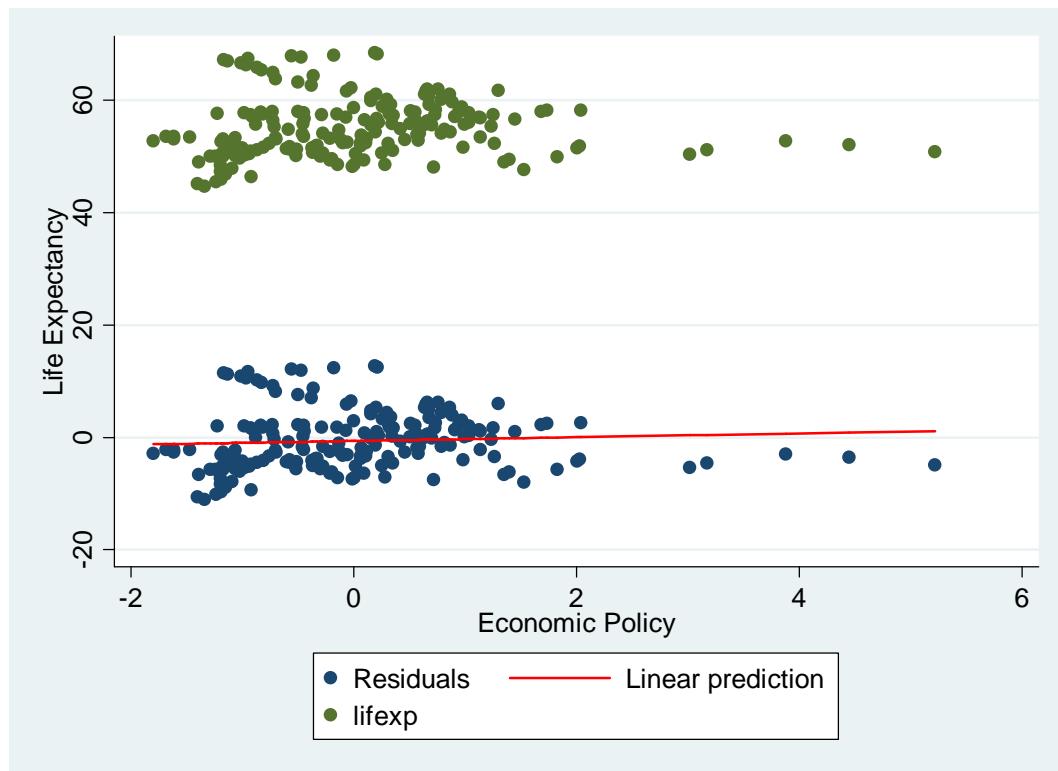
Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively.

Appendix C. Table 11 Robustness Check

Method of Estimation	PCA Index		RCA Index
	(1) GLS	(2) GLS	
Economic Policy	-14.23 (5.96)**		-4.70 (.23)**
Economic policy*institutions	3.08 (1.64)*		0.23 (0.02)***
GDP/capita	0.70 (.22)		0.57 (.88)***
Foreign aid	0.28 (.10)***		0.18 (.07)***
Access to medical care	0.06 (.02)***		0.05 (.02)***
Provision of social amenities	-0.03 (.02)***		-0.03 (.02)***
Population	-0.61 (.45)		-0.71 (.34)**
Exchange rate	-0.93 (.20)***		-0.83 (.16)***
FDI	0.11 (.11)		0.06 (.08)
Labor market participation	-0.09 (.09)		-0.12 (.07)*
School enrollment	0.04 (.03)		0.09 (.03)***
Cost of living	-0.01 (.02)		0.002 (.02)
Chi ² (p-value)	0.00		0.00
# of observations	70		70
R-Squared	0.94		0.96

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively.

Appendix D. Relationship between Life Expectancy and Economic Policy



Note: It is expected that the relationship between economic policy and life expectancy will be one in which economic policy will have a negative or no effect on longevity in Africa, due to a host of factors. However it is believed that institutions will play a role in either making economic policy more effective or further weakening its effects on longevity. If government Economic policy is sound and consistent and implemented through appropriate channels (institutions) therefore it is likely that institutions will make economic policy contribute to longevity in a positive manner.

Appendix E. Data and Sources

- i. Dependent variable: Life expectancy, this is the average life span of men and women living in a geographical location. This obtained from World Bank data.
- ii. Explanatory variables:
 - a. Economic policy, this was obtained using PCA from variables such as inflation and trade openness which we obtain from World Bank data. The PCA measure captures the average variation in the two variables to obtain a single index for economic policy using Eigen value transformation. To test for robustness of our estimates we also use another method RCA to construct a measure of policy by regressing life expectancy on inflation, trade openness and other exogenous variables. The RCA index allows us to derive another economic policy index using the weight that inflation and openness exert on life expectancy. RCA Index is given by Economic policy = constant + (inflation*coefficient) + (openness*coefficient)
 - b. Institutional quality: We also construct two measures of institutions using PCA and RCA. The PCA index captures the average variation in three variables electoral self determination rate, torture rate and freedom of movement. While the RCA variables were obtained by regressing life expectancy on the three aforementioned variables plus other exogenous variables. It is given as Life Expectancy=Constant+(electoral self determination rate* coefficient) + (Torture*coefficient)+(freedom of movement*coefficient) .We obtain these political variables from Brigham University CIRI data .
 - c. Government consumption spending is amount in USD that government spends on welfare and social infrastructure. It is obtained from data market of Iceland for a period of 1980 to 2008.
 - d. Exchange rate: This is the fluctuation in the value of the local currency with respect to the dollar we obtain this from World Bank data. We used this to economic capture fluctuations globally.
 - e. GDP/capita: This is the total amount of goods produced by country we divide this by population to obtain GDP/Capita and this represents country specific income. This was obtained from World Bank data.
 - f. FDI: This is the total inflow of all foreign investment to a country in constant USD. We obtain this from World Bank Data.
 - g. School enrollment rate: This represent the average primary school enrollment rate for boys and girls between the ages of 1-15 years of age. It represents human capita development rate (level of literacy by country and skill) we obtained this from World Bank data.
 - h. Cost of living, we used crude oil price to capture cost of living
 - i. Health care access is the percentage of the population of children of ages 0-10 years who are immunized.
 - j. Provision of social amenities, was measured using percentage access to clean drinking water
 - k. Population is the total number of people living in a geography area; this was used to capture budget constraints to government planning.
 - l. Labor market participation rate percentage of employed among workforce
 - m. Investment in Stocks this is the total value of countries stock of investment in USD.
 - n. Foreign aid/GDP this was measured using effective aid per GDP.

All data are for a period of 1980 to 2008 and obtained from World Bank data except otherwise stated.

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Chapter 3

Economic Liberalization, Does it Promote Trade? Evidence from Some African Countries

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Abstract

Critics of economic liberalization argue that it has largely been a failure in developing countries over the past three decades, this paper answers otherwise. The effect of the International Monetary Fund (IMF) and World Banks economic liberalization program in Africa from 1980 to 2008 on trade has been a modest success on promoting exports; we find that economic liberalization has been contributing to exporting in Africa and that countries that pursue policies of trade openness are likely to experience increase in exports faster than in those who pursue policies to develop human capital on the short run. Economic liberalization was found to contribute more effectively to exporting in countries that adopted growth strategies. Strategies such as developing human capita to facilitate skill transfer was found to make economic liberalization effectively contribute to exporting than strategies of trade openness which involves the relaxation of import regulation in return for exports concession slots.

Keywords: Exports, economic liberalization, growth strategies, trade openness, skill transfer

JEL Classification: F13, F40, F42, I38, L16, L38

Introduction

The effect of economic liberalization such as the privatization of public enterprise and opening up of the African market to private sector ownership and investment have been a case of debate over the last decades. The extent of success of such economic reforms is of great concern to policy makers and governments. Many African countries are experiencing growth today, due to the increase in commodity prices in the global market despite the global recession however transfer of technology has not been successful. The strategy of opening up the economy for trade (through allowing imports in return for gaining exports concessions) or (and) the privatization of public enterprise to facilitate technology transfer through skills acquisition can lead to increased exports and economic growth. A country can decide to pursue one or both growth strategies in carrying out its liberalization policies. This paper¹¹ investigates how successful economic liberalization reforms have been so far in Africa since its introduction. Economic liberalization is a reform process that involves the reduction of state control of the financial sector, privatization of public enterprises and finally the implementation of trade liberalization. Economic liberalization can be implemented to achieve growth using any of the above growth strategies, government can for instance decide to relax tariffs on imports so as to gain export concession slots or (and) allow entry of foreign and domestic investment into its market to allow for private ownership through privatization of its public enterprises to reduce the cost of running such enterprises on conditions of transferring skill through the employment of its indigenous human capita.

The World Bank liberalization policy in developing countries dates back to 1980 according to Arinwin and Sundaram (2008)¹², which was also the time the World Bank published a blue print for developing countries known as “The Influential Accelerated Development in Sub-Saharan Africa: An Agenda for Action” popularly referred to as the Berg Report¹³. The report particularly recommended that “African

¹¹ We express thanks to Bergamo University Italy for providing funds for this research

¹² Arnin and Sundaram (2008) explains the how World Bank economic liberalization programs in Africa originated, with emphasis on its accelerated development program policy for sub Saharan Africa, based on a policy of conditions for access to credit in return for increased liberalization of their economies.

¹³ Berg Report emphasises that Africa’s comparative advantage lies with exports of agriculture produce and that reducing market regulations by eliminating pricing boards to allow market forces control price and changes to the supply side drive growth.

countries give top priority to exports in raw materials”, to stimulate growth through the removal government subsidies so as to allow market forces set the prices of exports. The outbreak in the early 1980s, of the international sovereign debt crises also gave grounds for the World Bank and International Monetary Fund (also known as the Bretton Woods Institutions) to propagate this agenda and implement its liberalization reforms on governments in developing countries as a condition in its policy, for providing the credit they needed desperately to resuscitate their ailing economies. The International Monetary Fund (IMF) focused on monitoring short term macroeconomic stabilization programs, while the World Bank on the other hand concentrated on enforcing medium-term structural adjustment programs (SAPs), these resonated around the ‘Washington Consensus’,¹⁴ which represented the views of economist responsible for policy formulation in these organizations. This Consensus according to Sundaram and Arnim (2008) has been generally responsible for the establishment of stronger economic liberalization reforms since the 1980s. Even though the objectives of such policies have changed with time due in part to poor economic results in participating countries at the onset, despite this it has continued to remain the bedrock for IMF and World Bank economic policy in Africa till date also see Sundaram (2005) for further discussion.

Past studies have shown that countries that have experienced significant growth are not those that have liberalized their domestic markets alone but also those that have executed effective growth strategies over time in conjunction with liberalization reforms (see Rodrik (2001) Hallak and Levinsohn (2003) and Andersen and Babula (2008) for how growth strategies can improve a country’s economy). Therefore for economic liberalization to be successful effective policies to drive growth should also be in place. Market capitalization as a measure of economic liberalization is often difficult to understand, governments may place conditions on domestic companies or the extent of internal market liberalization programs therefore using market capitalization as a measure of liberalization in an economy may not be reminiscent of the extent of the internal liberalization structure in a country since government could hold a considerable amount of shares in enterprises. The number (in percentage) of businesses privately owned and the level at which new businesses spring up are often determined by the

¹⁴ Washington Consensus is the agreement on economic thoughts among policy makers and economists by Washington-based institutions (i.e. International Monetary Fund, World Bank, and U.S. Treasury Department), who designed recovery plans for developing countries in the early 1980s.

extent of the internal liberalization in a country's economy this can be associated with the number of phone lines in use since businesses tend to acquire more phone lines during economic expansion, therefore using the number of phone lines as a proxy for economic liberalization might be a remedy for this situation. Other literature has also used the number of phone lines as a measure of the level of infrastructure provision in a country (Meggison et al 2000)¹⁵ one of the expectations of countries that liberalize their economy is increased infrastructural development since handing off public enterprises will allow government to free up resources for further development programs. Effective and planned liberalization programs can stimulate infrastructural development as well as improve market capitalization rates in developing countries. The extent to which market liberalization has impacted trade in developing countries is also a source of concern to policy makers because most developing countries have on the recommendation of the World Bank carried out one form of liberalization or the other. Past literature such as Chapple (1990) explains that financial market liberalization can only be successful with adequate planning and after monetary stability have been achieved. He further argues that there should be sequencing in economic liberalization reforms, therefore countries should implement a strategy for deficit reduction, liberalize the financial sector, seek trade liberalization and finally liberalize the capital account. Stiglitz (2000) state that market liberalization causes instability and does not promote growth. Winters (2004) acknowledges that market liberalization have to a large extent been detrimental to growth, but argues that trade liberalization has been contributing towards exporting in many countries. Gumuscu (2008) compares economic liberalization in Turkey and Egypt and state that restricted levels of liberalization in Egypt reduced the success of its liberalization reforms preventing it from integrating its domestic market with the international market while Turkey with a less restricted reform program proved more successful. Economic liberalization reforms therefore should encompass trade policy reforms, financial sector reforms and capital market reforms. These categories of reforms have been undertaken over the past three decades in Africa. The aim of this paper therefore is to examine the effect of economic liberalization in Africa, the questions we wish to answer are, to what extent has economic liberalization policy in Africa promoted trade in exports and how successful has the implementation of

¹⁵ Meggison et al (2000) in their paper the impact of privatization on capital market development and individual share ownership used the number of phone line as a measure of infrastructure present in a country.

economic liberalization policy been, since the World Bank introduced it to most developing countries in Africa from the early 1980s till date? To answer the above questions we use panel data and two stage least squares (2SLS) instrumental variable approach since we assume that economic liberalization suffers from measurement problems. This allows us to control for the presence of endogenous regressors in our model specification. For recent literature on economic liberalization, see Winters (2004)¹⁶.

Why Do Countries Liberalize Their Economies?

Countries that undergo liberalization can expect to follow one or both policies of either trying to improve exports on the short run so as to gain concessions for exports (to allow for exports in agricultural products and minerals) by opening up their economy for trade or privatize their public enterprises to imbibe skills and possibly transfer technology to their domestic manufacturing sectors, which can improve their economies. In this paper we try to investigate the difference that such policies are likely to contribute to trade. Many developing countries liberalized their economies to reap the benefits that could accrue from such reforms associated policies, some examples of the gains that countries that undergo the World Bank and IMF recommended liberalization reforms are likely to benefit are, improved access to international trade markets for increased exports and gaining access to international credit facilities.

African countries continue to lack a fair access to the international market due to the complex regulation on imports imposed by export destination countries, other factors that militate against exports from African countries are their inability to produce goods due to poor technology combined with the inability of their goods to compete favorably with those on the international market because of their quality. Protectionist policies of developed countries also contribute negatively to reduction in exports from developing countries, for instance if the OECD (Organization for Economic Cooperation and Development) were to abolish its protectionist agricultural subsidies, it could mean up to 182 billion dollars in earnings from agricultural exports for Africa

¹⁶ Winters (2004) in “Trade liberalization and economic performance: An overview” studies past literature on economic liberalization and find that it has a short term effect on growth in many developing countries he also finds that the overall trade performance depends also on other country specific factors such as institutions and trade openness.

which by far surpasses the yearly aid allocation to the continent see article by Farah Khan (2003) in inter press service news agency. Such protectionist policies by developed countries often prevent developing countries from gaining access to international markets. Lack of international and private participation in the domestic market also spells doom for many African countries making them not to develop sufficient ties to allow for exports to foreign markets. Liberalizing their economies is likely to offer them the opportunity to overcome such conditions since it is likely that foreign investors may want to produce goods destined for their home markets in developing countries, due to cheap labor and available raw materials present in many developing countries so as to allow them cut cost. This could lead to transfer of technology since international enterprises seeking to cut the cost of production in their indigenous countries could train manpower in developing countries to improve skill and in some cases transfer technical knowhow to such developing countries see Sousa (2001)¹⁷ for further discussion on skill transfer.

Another advantage a developing country is likely to gain from undergoing economic liberalization is increased access to international credit facilities to boost their productive capacities and improve foreign exchange earning capacity see Winters (2004). Privatization of public enterprise and reduction of trade regulation is often a precondition that the Bretton -Woods institutions (BWIs) often want developing countries to fulfill before granting them loans for infrastructural development and economic recovery facilitation. Gaining access to international credit will allow governments of developing countries to create enabling environment that could improve the ease of doing business in such countries such as developing stable power supply networks, good roads to link domestic markets and rural agricultural areas to ports for exports purposes and building of schools and vocational facilities to develop indigenous skill. Access to international credit could also mean that developing countries can afford cost of importing machinery for industrialization and spare part replacement for industries, since unavailability of foreign exchange could mean prolong downtime and under production in the industrial sector. Economic liberalization reforms could also

¹⁷ The paper by Sousa (2001) particularly places emphasis on why multinationals will want to train labor in developing countries due to the relative cost of doing so instead of employing expatriate workers that are likely to be more expensive. It uses the term globalization, to describe the effect of economic liberalization that developing countries are experiencing due to liberalization reforms and their subsequent integration into the global economy.

open up various sectors of a country's economy to international and domestic competition which can drive growth positively. Countries wishing to stimulate growth are likely to take advantage of such reforms to improve the potentials of their economies on the long run. Improved competition between enterprises across sectors could drive down prices in a country, improve quality of products and make domestic market more vibrant and competitive, while encouraging exports and a favorable disposition for its goods in the international markets. Acceptance and the subsequent integration of the African economy into the global economy could be of enormous advantage to African nations. It could mean reduced tariffs for its exports and free and easy relocation of international businesses to the continent due to cheap labor and abundance of raw material supply, therefore economic liberalization could subsequently lead to integration of many developing economies into the global economy in a manner that could provide enormous incentive for many developing countries to want to undertake liberalization reforms. Economic liberalization in a nutshell from the points enumerated above, has the potential to increase exports, stimulate competition, improve domestic market, cause skill acquisition and transfer of technology and make products from developing countries more competitive in the global market. Improved infrastructure is what a country that has undergone economic liberalization should also expect to enjoy since privatization of public enterprises for instance will allow government to focus its funds on infrastructural development. This shows why many developing countries are likely to consider the prospect of liberalizing their economy with the aim of improving output productivity.

Theory

Our theory show how economic liberalization will open up a developing country's economy to trade and private sector investment. Economic liberalization rate is defined as the level of openness that a government permits for private investment and participation in the business sector of its economy. Our theoretical model suggests therefore that an economy open to private investment and less control of the business sector will be more efficient and have increased productivity. Trade in such a developing economy will depend on country specific liberalization rate and other

country specific factors and exogenous variables that affect trade. The change in trade with respect to changes in liberalization will depend also upon other interactions that affect trade, such as country specific cost of employment which is the wages (w) which represents the relative individual income and also reflects private companies cost of hiring workers , the cost of capital (v) which is reflective of the cost of setting up new businesses and maintaining them, the quality of institutions (I) which represent the channel through which economic policies are implemented and also depicts the level of corruption which can affect cost and time of obtaining permits for setting up a business and other exogenous variables (z).In this model we assert that it is the factors that affect trade in general, that determines the level of output productivity in countries. So government will tend to maximize their trade policy subject to the constraints that limit or improve how effective economic liberalization rate can produce the desired effects of increasing trade (in exports) in their domains.

If we then consider the individual countries in our model to be firms whose cost are functions of several factors. These include the cost of labor (w), the cost of capital (v) in setting up private businesses, and the time involved in obtaining new business permits which depicts the ease of doing business by country, which is reflected in institutions (I), and some other factors that affect trade (z). We can define cost of labor as the wage rate per unit of output produced. The cost of capital can be viewed as the typical rental price of capital but also more broadly will include additional factors impacting the cost of obtaining capital such as access to credit. The cost of running business enterprises are a function of country specific enabling environments for trade such as the provision of basic infrastructure such as roads, the provision of portable water supply or more importantly other forms of infrastructure etc, while the cost of maintaining an international reputation for business such as good economic policy and friendly ties with other nations can be viewed as a form of social or national business interest that can attract investment or international confidence by portraying the presence of stability in a country to shore up investor confidence. Therefore the total cost function of running and setting up new businesses can be written as $TC_i = f_i(w, v, I, z)X_i$. The marginal cost (MC) can be expressed as $f_i'(w, v, I, z)$. for firms this is the cost of investment in the private sector of a country. We expect an increase in output production to be the results of increased liberalization since this leads to more

efficiency and more private investment. We can assume that eventually as time goes on scarcities will occur and the marginal cost of production will rise. This can occur because of the rising cost of investing in an additional business could become more expensive overtime and/or because of increase in capital costs of maintaining existing businesses. Eventually, it reaches a point at which equilibrium occurs in the private sector. This is the profit maximization point (X_i^*), this will represent the point at which $MR_i = MC_i$, also expressed as $l_i = f_i(w, v, I, z)$ where the cost of maintaining a business or opening an additional new enterprise will equal the output that such a business will produce on the long-run. One of the goals of economic liberalization (l_i) is to improve output productivity (particularly exports) from developing countries. This can occur in many ways economic liberalization can increase skill among workers since new businesses might invest in human capital since it is cheap by educating and training of workers, which would lower the firms labor cost per unit produced. So, the wage cost per unit produced can be expressed as a negative function of economic liberalization $w_i(l_i)$. Economic liberalization may also lead to increased presence of social amenities that can attract foreign investment, since governments seeking to attract foreign investment will pay attention to the provision of infrastructure. Therefore, we can write the cost of capital as a negative function of economic liberalization, $v_i(l_i)$.

Country specific income obtained from taxes or royalties due to trade or natural resource presence may also lead to the promotion of a social status for a country with it might come some form of rent seeking behavior of government officials since more funds flowing into ideological projects such as shoring up investors confidence and attracting investment towards the business sector may end up been diverted by corrupt officials seeking higher payout and have a spillover effect on the quality of institutions. Therefore, the costs imposed by rent seeking officials are modeled as a positive function of economic liberalization, $z_i(l_i)$. with economic liberalization included in the model we can rewrite the equilibrium condition as $\sigma_i = f_i[w_i(l_i), v_i(l_i), I_i(l_i)Z_i(l_i)]$. We can now examine the impact of the equilibrium condition from changes in economic liberalization rate by country. We will assume that economic liberalization does not impact output therefore, the differentiation of this condition with respect to economic liberalization is only a differentiation of the marginal cost function. This can be expressed as shown below.

$$(1.) \quad \frac{\partial e_i}{\partial l_i} = \frac{\partial e_i}{\partial w_i} \frac{\partial w_i}{\partial l_i} + \frac{\partial e_i}{\partial v_i} \frac{\partial v_i}{\partial l_i} + \frac{\partial e_i}{\partial I_i} \frac{\partial I_i}{\partial l_i} + \frac{\partial e_i}{\partial z_i} \frac{\partial z}{\partial l_i}$$

first expression on the right hand side ($\frac{\partial e_i}{\partial w_i} \frac{\partial w_i}{\partial l_i} \leq 0$) represents economic liberalization potentially lowering the cost of labor. The scenario where economic liberalization potentially lowers cost of capital is represented as $\frac{\partial e_i}{\partial v_i} \frac{\partial v_i}{\partial l_i} \leq 0$. The potential reduction in costs of running institutions is shown as $\frac{\partial e_i}{\partial I_i} \frac{\partial I_i}{\partial l_i} \leq 0$. The possible rise in rent seeking or other socio economic interest costs of some sorts is the last term on the right hand side which is $\frac{\partial e_i}{\partial z_i} \frac{\partial z}{\partial l_i} \geq 0$.

Therefore, the overall impact of economic liberalization is combining three potential cost reduction factors (w, v, I,) with one potential cost increase (z). Whether or not the overall sign of $\frac{\partial e_i}{\partial l_i}$ is greater or less than zero will depend to a large extent on the quality of a country's institutions and on how economic liberalization reform is directed. If economic liberalization reforms are directed towards more productive uses that lower ' labor, capital and/or institutional costs of increasing out productivity, then this will help turn the prediction towards lower marginal costs. If marginal costs of providing basic social amenities fall for countries as a result of effective government economic liberalization reforms, then trade will increase. In other words, if $\frac{\partial I_i}{\partial l_i} < 0$ and $\frac{\partial x_i}{\partial l_i} > 0$. Our model in equation 2 presents a case where trade ($Exports_{it}$) is a function of, economic liberalization ($Liberalization_{i,t}$), and the vector of

(2.) $Exports_{it} = \beta_0 + \beta_1 X_{i,t} + \beta_2 Liberalization_{i,t} + \varepsilon_{it}$
exogenous variables X_{it} that affect trade . Our list of exogenous variables consist of, foreign aid, market access (cost of transportation to local and foreign markets), GDP per capita, population, electoral self determination (political stability), exchange rate, market access, inflation, political stability, trade openness school enrollment rate and natural resource presence. See Appendix I for a relationship between exports and economic liberalization. We list below the hypothesis that we wish to test in this paper based on the above theoretical assertion made above as follows.

Hypothesis #1

Economic liberalization policy can have a positive or negative effect on trade in African countries. Depending on the extent of its implementation.

Hypothesis #2

Countries that Adopt trade openness policy instead of human skills acquisition policy during liberalization reforms are likely to have such a policy contribute more to trade increase (in a positive manner) than those that have adopted the policy of human skills acquisition.

Hypothesis #3

Economic liberalization reform is likely to be more effective in promoting trade in countries with strong human capital acquisition policy than in those that adopt trade openness policy.

Hypothesis #4

The presence of natural resources can have a positive or negative effect on trade. Since natural resources might prevent countries from diversifying their dependence on revenues from mineral resources leaving them with less incentive to promote growth in other sectors.

Hypothesis #5

Market size can have a positive or negative effect on exporting. It is likely that countries with low GDP/capita will export less compared to countries with higher GDP/capita. Trade will also depend on the level of country specific past investment.

Hypothesis #6

Inflation can affect trade in a negative manner thereby eroding the gains accruing from liberalization reforms. It is likely that monetary policy can affect the setting up of new business as this has the possibility of increasing the cost of investing in new business ventures.

Hypothesis #7

Exchange rate can have a positive or negative effect on exporting. This can adversely affect the cost of importing machinery and acquiring spare parts for the industrial and manufacturing sectors in African economies.

Data

We present a summary of all variables used below. We obtain data for five countries in Africa, four in sub Saharan Africa and one in North Africa (i.e. Kenya, Botswana, Ghana Cameroon and Egypt), the countries are not selected randomly however one country is selected from each of the five regional divide in Africa (i.e. one each from North, west, east, south and central Africa). We obtain all data for a period of 1970 to 2008 although some data are missing.

Table-1 Descriptive Statistics

Variable	Observation	Mean	Std. Dev	Min	max
log of exports	195	3.26	0.48	1.21	4.32
log of GDP/capita	194	13.35	0.87	11.87	15.79
Foreign Aid/GDP	195	5.75	3.91	0.17	18.24
log of population	195	9.37	9.37	1.31	6.37
Political Stability	140	0.99	0.73	0	2
School enrollment rate	181	88.73	15.59	55.15	119.87
Exchange rate	190	1.15	1.93	0.0004	7.03
Natural resource	130	23.38	19.25	1.14	69.44
level of market capitalization	169	0.8	2.17	0.0047	11.85
investment in stocks	135	3574.27	6409	232.9	38925
government consumption spending	143	38.53	426.26	0.12	5100
Crude price	195	42.72	21.48	15.93	99.11
liberalization policy	169	0.08	0.22	0	1.2

Dependent Variable

Our dependent variable is logarithm of exports, it is the total volume of goods exported overseas by a country in constant US dollars it however does not capture domestic trade which is a major limitation. We obtain data for exports from World Bank database for a period of 1970 to 2008. We take log of exports because the data on exports is too noisy, this therefore helps to resolve scaling issues in our estimates. Exports overseas depicts the exporting country capacity to exports and its share of

oversea trade that acts as a measure of its foreign exchange earning capacity, therefore export is a vital measure of a country's international trade.

Explanatory variables

Economic liberalization is the degree to which governments permit private participation in the economy of their countries. It depicts the level of deregulation in the private sector in a country over a period of time. We encounter problems using market capitalization rate as a measure of economic liberalization rate for two reasons, the first is that market capitalization might not be a good measure of economic liberalization since internal restrictions regarding the levels of holding and restrictions on foreign ownership of private business within a country makes it difficult for market capitalization rate to capture the level of liberalization in a country, another reason is that the data on market capitalization is too stringent since most African countries often lack information on market capitalization from the early eighties (1980s). We use the number of phone lines by country as a measure of economic liberalization since we assume that businesses are likely to thrive more in liberalized markets than in controlled markets, therefore the number of phone lines are likely to increase more in a deregulated business environments than in highly regulated economies.

We obtain data for number of phone lines from world development indicator data of the World Bank. We use a set of dummies to capture the effect of economic liberalization reforms from a period of 1970 to 2008, we divide this period into the pre reform period of 1970 to 1979 which we assign a score of 0 since no reform had not taken effect and the post reform period of 1980 to 2008 which we assign a score of 1. We generate the variable for liberalization policy by multiplying economic liberalization rate (no of phone lines) by the dummy variable of liberalization reform to obtain country specific liberalization policy. Our dummy variable is such that we assign a value of 0 in the period before liberalization and 1 in the period when it came into effect. Other data such as foreign aid, gross domestic product (GDP), population, exchange rate, crude oil price, electoral self determination rate (this reflects political stability and institutional quality) school enrollment rates and natural resources were also obtained from World Bank data.

Foreign aid is the flow of official bilateral and multilateral aid to developing countries in constant US dollars. Foreign aid often consist of a reasonable amount of developing countries income, therefore it could be vital to setting up enabling environment that can stimulate trade, GDP is the market value of all final goods and services produced within a country in a given period time we divide this by the population to obtain GDP/capita which represents country specific income, this was used to represent the overall market size of a country since each country will trade according to their level of income, population is the demographic distribution by country this captures country specific market potential since it displays its propensity to consume, while exchange rate is the average dollar local currency exchange rate which we use to capture fluctuations in the global economy that are likely to affect trade.

School enrollments rates is the number of children from 0-15 years of age enrolled in schools by country, we use this to represent country specific economic policy towards manpower development and training , the data for trade openness which is the ratio of exports to imports by country, measures country attitude towards trade and therefore its trade policy. Our data for natural resources is obtained by combining exports from minerals such as metals, oil and agricultural products in constant US dollars. Political stability is represented using country electoral self determination rate, this is the ability of countries to maintain right to stable and peaceful transition of power. It also represents the level of political stability present in a country which is a measure of how conducive a country is for trade. We obtain this from Binghamton University, Cingranelli- Richards (CIRI) dataset, it is measured by assigning a score of 0 in cases where it did not exist, 1 in a case where it existed but there were some limitations and 2 in a case where citizens have ability to exercise full political and voting rights. We also obtain data for crude oil prices from World Bank data; it is the average fluctuation in the price of crude oil over time in years. We use this to capture cost of transportation to local and foreign markets. Therefore it represents market access to both domestic and international markets. Data for government consumption spending is obtained from data market of Iceland it is the total amount in US dollars of government social spending by country. It depicts government disposition to welfare spending by country. Investment in stocks consist of country stocks of investment it depicts the level of private holding of stocks in the capital market of a country. It also depicts investor's

perception of a country's capital market and in general the health of a country's economy. All data are for a period of 1970 to 2008 unless otherwise stated.

Empirical Analysis

Does economic liberalization promote trade?

We investigate if economic liberalization policy has the capacity of promoting trade in developing countries that have undergone economic liberalization reforms. To test the impact that economic liberalization reforms has on trade, we bear in mind that economic liberalization will empower the private sector business in a country which in turn is likely to promote trade since private ownership will promote more efficiency and increase output in an economy. The use of instrumental variables approach is because economic liberalization policy variable is endogenous. Hausman specification test was run to choose between fixed and random effects. Results accept the null hypothesis that the fixed effects estimator is not biased (p-values are all considerably lower than .01). We include time effects and use panel data to control for unobservable effects (differences in exports by years) that are likely to affect trade such as country specific potential for exporting and productivity shocks. A Hausman-Wu test rejected the null hypothesis that economic liberalization policy was exogenous, with a p-value of 0.00. Therefore, using economic liberalization policy as an independent variable could lead to biased results.

Model specification

We use fixed effect to estimate the reduced form equations for economic liberalization and trade (exports) in equations 3and 4 below. In the trade equation (in equation 4) exports

$$(3.) \quad \textbf{Liberalization}_{i,t-1} = \beta_0 + \beta_1 Z_{i,t} + \beta_2 \textbf{Gov. Spending}_{i,t} + c_i + \mu_{it}$$

$$(4.) \quad \textbf{Exports}_{i,t-1} = \beta_0 + \beta_1 X_{i,t} + \beta_2 \widehat{\textbf{Liberalization}}_{i,t-1} + c_{i,t} + \mu_{it}$$

depends on economic liberalization policy(both from past periods since we lag them) and the vector of exogenous variables which consist of foreign aid, logarithm of population, political stability, which we capture using electoral self determination rate, income (GDP per capita),inflation, market access, school enrollment rate, trade openness, exchange rate and natural resource presence. Economic liberalization policy is endogenous since it is likely to suffer from measurement problems so we do the instrumental correction in equation 3 in our first stage regression. The first stage of the model specification in equation 3 shows that economic liberalization will depend on our vector of instrument (government spending) Z_{it} which should be correlated with economic liberalization policy in equation 3 but not with trade in equation 4. This allows us to conduct the instrumental correction in equation 3. We run two different specification of the trade equation where we separate the variables for human capital (school enrollment rate) from openness to trade. We wish to determine if paying attention to human capital development policy is likely to promote trade more than adopting openness to trade policy, so as to draw conclusions on their weight on trade.

Instrument

The exclusion restriction we impose on the trade equation is such that our instrument (government spending) should be correlated with economic liberalization policy in the first equation (equation 3), but not with trade (exports) in the second equation (equation 4), this will hold if the coefficient for our endogenous variable in our structural equation after imposing the restriction (where we use our instrument as a proxy for the endogenous variable economic liberalization) tends to β_2 in our reduced form equation , secondly if the correlation between the instrument (*government spending*) $Z_{i,t}$ and the error term $\varepsilon_{i,t}$ (where $\varepsilon_{i,t} = c_i + u_{i,t}$) is identically equal to zero as shown in equation 5 below.

$$(5) \quad E[Z_{i,t} \cdot \varepsilon_{i,t}] = 0$$

This will show that the instrument $Z_{i,t}$ is uncorrelated with the disturbance $\varepsilon_{i,t}$. This indicates that the only way our instrument is related with trade is only through the endogenous variable (in this case economic liberalization) and finally if the exogenous component of the instrument, i.e. the fitted value of the endogenous variable is uncorrelated with the error term as depicted in equation 5, we can identify the variation

in the dependent variable trade (exports) as the slope of coefficient β_2 of endogenous variable which is non zero as shown in equation 6 (see Kraay (2008) for further discussion on exclusion restriction).

(6.) $\text{cov}(\text{liberalization}_{i,t}, \varepsilon_{i,t}) \neq 0$ This states that β_1 differs from zero

Once our restrictions hold, our Instruments will fulfill the following conditions of validity, first our instrument (government spending) should have a significant impact on the variable it is predicting, in this case economic liberalization policy. The second condition is that the instrument should not have an impact on the dependent variable, which is “exports” in the second equation. While this is often tested empirically, Wooldridge (2010) and others have state that this also needs to be done on the theoretical level as testing the impact of the instrument on the dependent variable in the second equation (for exports) with a full model could be biased as the instrumental correction has not been made for the endogenous variable (economic liberalization). The third condition for testing the validity of instruments is the Sargan over-identification test which is necessary if there are more instruments than endogenous variables (this was not the case in our analysis since we use only one instrument) being estimated. Our instrument should satisfy these conditions. Factors that determine the level of liberalization in countries are numerous, therefore instruments for economic liberalization are not easily available, but we identify government consumption spending as a major factor that influences economic liberalization. The reason for this is that if a government spends huge amounts to keep companies that provide social services afloat due to inefficient management, it is likely to privatize such companies so as to reduce its social spending to support such ailing enterprises and diversify them towards infrastructural development to create enabling environment for trade (through the promotion of infrastructural development for example) so as to attract foreign investment, leading to increased liberalization of the economy, therefore we expect government consumption spending to have a positive effect on increased liberalization rate but not trade. Past studies such as Fatas and Mihov (2001) and Blanchard and Perotti (2002) have identified exogenous shocks to government spending and argue that it is determined with respect to the other economic factors, they further state that such fiscal spending or expansion is what often attracts foreign investment. Economic

liberalization in general will depend on factors that can create enabling environment for privatization. Our instrument government consumption spending performs well in general. Government consumption spending is highly correlated with economic liberalization policy; we assume therefore that our instrument is valid and relevant. (See Table 2 and 3 below for first stage regression economic liberalization results)

Table 2: First Stage Regressions Using School Enrollment Rate

Method of Estimation	OLS
Natural resource	0.001 (.01)
Market access	0.01 (.02)***
Population	-0.008 (.05)***
GDP/capita	-0.33 (.07)***
Political stability	0.03 (.002)
Inflation	-0.002 (.01)*
School enrollment	0.001 (.001)
Exchange rate	-0.03 (.02)
Government spending	0.15 (.02)***
F-Test	62.05
Chi ² (p-value)	0.00
# of observations	74
R-Squared	0.97

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

Table 3: First Stage Regressions Using Trade Openness

Method of Estimation	OLS
Natural resource	-0.0003 (.001)
Market access	0.005 (.002)**
Population	-2.17 (.51)***
GDP/capita	-0.20 (.07)**
Political stability	-0.03 (.002)
Inflation	-0.002 (.001)**
Trade openness	0.01 (.002)***
Exchange rate	-0.02 (.02)
Government spending	0.15 (.02)***
F-Test	91.53
Chi ² (p-value)	0.00
# of observations	80
R-Squared	0.97

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

Results

We use fixed effect regression, for both specification of our trade equation, since the result of the Hausman test (with p-value 0.000) suggest that fixed effect estimation is more appropriate for our model, see Baltagi (2005), Baltagi and Wu (2010) and Wooldridge (2010) for further discussion. We include year effect to capture the differences in exports over years. We present the result of the two specifications

where we use the human capita and trade openness measures of economic policy to promote growth separately, to reflect their impact on trade and try to verify the hypothesis we posed earlier in our study. In the first specification where we include school enrollment (to capture the effect of skill transfer due to human capita training) liberalization policy contributes 28 percentage points to trade using OLS (see OLS estimates 0.28 in Table 4 Column 1) but had no effect on trade (with p-value 0.284). After controlling for endogeneity, economic liberalization policy contributed 60 percentage points to trade (see 2SLS estimates in Table 4 Column 2) which is 32 percentage points more than the OLS estimate and had a highly significant effect on trade (with p-value 0.001). This shows the importance of controlling for endogeneity using instrumental correction, since economic liberalization might suffer from measurement problems leading to biased results. In the second specification where we include trade openness variable (to capture the effect of trade openness in countries that focus on gaining exports concessions through relaxing imports regulations) liberalization policy contributes 51 percentage points to trade and had a significant effect on trade (with p-value 0.039) see Table 5 Column 1 for OLS estimates. After controlling for endogeneity, economic liberalization contributes 46 percentage points to trade five percentage points less than the OLS estimate and had a highly significant effect on trade (with p-value 0.000) see Table 5 Column 2 for 2SLS estimates, showing once again, the importance of controlling for endogeneity using government spending as instrumental correction for economic liberalization.

Both results above suggest that economic liberalization policy was contributing to exporting in countries, and has made significant contributions to trade. This supports our first hypothesis. In our first specification where we included the human capita variable (school enrollment) as an economic variable, school enrollment contributed 1 percentage point to trade see OLS estimate in Table 4 Column 1 with OLS estimate of 0.01 and had no effect on trade (with p-value 0.307). The 2SLS estimates show that school enrollment contributes -0.2 percentage points to trade and also has no significant effect on trade (with p-value 0.364). In our second specification where we included trade openness as an economic variable, trade openness contributed 1 percentage point to trade using OLS and 2SLS see estimates of 0.01 in Table 5 Columns 1 and 2 respectively and had significant effect on trade (with p-value of 0.016 and 0.001) for

OLS and 2SLS respectively. The implication of our results is that countries that adopted policies of trade openness, were likely to experience increase in exporting than those with the policy of developing skills acquisition through training of human capita. This supports our second hypothesis. We find that in general economic liberalization was on the overall more effective in countries that adopted policies of human skills acquisition than in countries that adopted policies of trade openness, since liberalization policy was contributing 60 percentage (see 2SLS estimates of 0.60 in Table 4) points to exporting in our specification with human capital compared to the specification with trade openness where it contributed 49 percentage points which is less (see 2SLS estimates of 0.49 in Table 5) this also supports our third hypothesis.

Robustness Check: We test for robustness in our regression estimates, to do this we develop other measures of economic liberalization based on our previous assertions about factors that characterize economic liberalization reforms in countries. We use two additional measures of economic liberalization, we expect that countries that liberalize their economies will undergo market reforms and gain access to international credit facilities. So we introduce stock of investment and number of tractors for agricultural production to capture these two effects. The reason for this is that we expect that a country that has undergone liberalization reforms will enjoy increased investment and investors' perception about its stocks owing to implementation of sound liberalization reforms which are likely to raise the overall value of its stocks with time. While increased credit access could mean that countries that liberalize their economies can also have access to foreign exchange (FOREX) to purchase machinery and spare parts replacement for the industrial and agricultural sectors of their economies. We see no reason why results using these as different measure of economic liberalization should differ significantly from that in which we used country specific number of phone lines although the number of observation for stock of investment are lower due to stringency in data, another limitation with using stock of investment was the fact that it reflects market liberalization reforms which only captures a particular stage in the economic liberalization reforms sequence and does not reflect other facets of liberalization reforms such as trade liberalization and fiscal policy reforms. We present the results in the Appendix in Tables 6 to 13. Tables 6 and 7 show the first stage results where we use the three measures of economic liberalization. Our instrument government spending is

highly correlated with economic liberalization in both specifications where we test for the effect of economic liberalization in the presence of technology transfer and trade openness policies. The results in tables 8 and 9 are not very different using the three measures of economic policy. Economic policy was contributing in a significant manner to exporting in the countries in our sample, although the measure of economic liberalization where we use investment in stocks (a market measure) was contributing in a lesser way than our measures of infrastructure (no of telephone lines, which in this case could represent countries specific fiscal disposition through infrastructural provision) and international credit access (the number of tractors) respectively. We also combine the effect of the three measure of economic liberalization policy by creating an economic liberalization index using principal component analysis (PCA) and regression component analysis (RCA). We wish to examine the overall effect of economic liberalization using a measure that captures country specific fiscal disposition, market liberalization and trade liberalization using measures of infrastructure, investment in stocks and number of tractors on exporting. The scatter matrix plot show that our set of measure for economic liberalization are closely correlated with one another (see cluster of blue dots in Appendix J), while the score plot show that there is sufficient variation in all three variables used in constructing the PCA index for economic liberalization (see Appendix K). Our results are robust and do not differ significantly for both indexes. Economic liberalization was contributing in a positive manner using both indexes, however economic liberalization was more effective in the specification with school enrollment than that with trade openness which was consistent with previous results (see Tables 12 and 13 in Appendix G and H).

Based on these results we answer the hypothesis that we posed earlier.

Hypothesis #1

Economic liberalization policy was found to have a positive effect on trade in African countries since it was likely contributing towards increase in exports in a significant manner.

Hypothesis #2

Adopting trade openness strategy instead of skills acquisition policy could contribute more to trade increase (in a positive manner) than adopting strategy to promote skills acquisition on the short run.

Hypothesis #3

Economic liberalization reforms seemed to be more effective in promoting trade with growth strategy of human capital acquisition than adopting trade openness strategy. This shows that economic liberalization is likely to contribute more effectively to exports when countries adopt the strategy to transfer of technology through skills acquisition than a strategy of openness to trade where a country relaxes import regulation in return for export concession slots.

Hypothesis #4

The presence of natural resources had a negative effect on trade. It was likely that natural resources presence prevented countries from diversifying their dependence on revenues from mineral resources leaving them with less incentive to promote growth in other sectors.

Hypothesis #5

Market size had a negative effect on exporting. It is likely that countries with low GDP/capita will export less than countries with higher GDP/capita. Trade will also depend on the level of country specific past investment.

Hypothesis #6

Inflation had a negative effect on exporting. It is likely that monetary policy was affecting the setting up of new businesses as this has the possibility of increasing the cost of investing in new business ventures.

Hypothesis #7

Exchange rate had a negative effect on exporting. This was probably adversely affecting the cost of importing machinery and acquiring spare parts for the industrial and manufacturing sectors in African economies.

Table 4. Trade regressions using School Enrollment

Method of Estimation	OLS	2SLS
Liberalization policy	0.28 (.29)	0.60 (.18)***
Natural resource	0.001 (.01)	-0.002 (.002)*
Market access	0.01 (.01)	0.001 (.01)
Population	-0.23 (.11)**	0.63 (1.26)
Market Size		
GDP/capita	-0.19 (.12)*	-0.33 (.13)**
Political Variable		
Political instability	0.24 (.10)**	0.01 (.03)
Economic Variable		
Inflation	-0.01 (.003)***	-0.01 (.003)*
School enrollment	0.01 (.01)	-0.002 (.002)
Exchange rate	-0.05 (.04)	-0.01 (.04)
Instrument		Govt. spending
Chi ² (p-value)	0.00	0.00
# of observations	90	74
R-Squared	0.57	0.82

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

Table 5. Trade regressions using Trade Openness

Method of Estimation	OLS	2SLS
Liberalization Policy	0.51 (.24)**	0.46 (.17)***
Natural resource	-0.003 (.004)	-0.002 (.002)
Market access	0.01 (.01)	0.004 (.003)
Population	-0.20 (.10)**	-1.24 (1.28)
Market Size		
GDP/capita	-0.14 (.11)*	-0.30 (.10*)**
Political Variable		
Political instability	0.13 (.10)	0.001 (.03)
Economic Variable		
Inflation	-0.015 (.003)***	-0.004 (.002)*
Trade openness	0.01 (.003)**	0.01 (.003)***
Exchange rate	0.02 (.05)	-0.02 (.03)
Instrument		Govt. spending
Chi ² (p-value)	0.00	0.00
# of observations	97	80
R-Squared	0.61	0.85

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

Economic liberalization and Growth, Skill Transfer Versus Trade Openness

Strategy

Our results have shown that countries that carry out economic liberalization by promoting growth strategies based on either promoting trade openness or skill (technological) transfer are likely to have economic liberalization contribute positively

to exporting and leading to increase in output productivity. Countries that liberalize their economy should certainly then expect to promote growth in a strategic manner since it is not likely that economic liberalization reforms alone will promote growth. We expect that country specific liberalization policy together with its strategy to promote growth will enter into the classical macroeconomic production function. We therefore consider the case of export oriented growth, where trade strategies intertwined with liberalization reforms will stimulate growth in African countries. The Cobb-Douglas production function defines macro production as a function of technology (or multifactor productivity), capital and labor which is expressed below.

$$(7.) \quad Y = AK^\sigma L^{\sigma-1}$$

Where Y represents Growth, A , represents multifactor productivity or technology, K is capital, L is labor and σ is the elasticity of substitution which is often the transaction cost. Growth or output productivity will depend on technology, cost of capital, and the quality and cost of hiring labor. We will redefine this production function to suit country specific economic liberalization policy in presence of growth strategies to promote export oriented growth through trade therefore we can rewrite output productivity in a case with no growth strategy to depend on the Cobb-Douglas function which we rewrite below to suit our study, where growth depends on technology, country specific access to capital (Cre.Acc) to promote productivity and its labor regulations (Lab.Reg).

$$(8.) \quad Y = Technology \cdot Cre. Acc^\sigma Lab. Reg^{\sigma-1}$$

We explain below how governments should strategize to make economic liberalization policy a success. We state that trade strategies in conjunction with liberalization reforms that can lead to sustainable economic development and the industrialization of the African economy remain the best way to promote growth in Africa. Therefore trade openness policy will only promote growth in the midst of strong government regulation in sectors that will shield the weak sectors of an economy from hostile competition. This means that government will have to develop a strategy to open up sections of its economy where the domestic market can adequately compete with

their foreign counterparts, in return for exports concession slots. We include economic liberalization reforms in the presence of trade openness strategy in the equation 9 below.

$$(9.) \Delta Y = \Delta \text{Existing Technology} (\text{Ac. Cre})^\sigma (\text{Lab.Reg})^{1-\sigma} (\text{liberalization reforms strategy with openness policy})$$

In this case where we use trade openness as a growth strategy, growth will depend on a number of factors in countries that liberalize their economies, such as change in technology although we do not expect significant transfer of technology in this case, access to international credit facilities, labor regulation and liberalization reforms strategy coupled with a policy of trade openness. Liberalization reforms strategy in the presence of trade openness strategy in this case is represented in equation 8 by a host of factors such as sectoral strength, which is the ratio of output in weak versus strong sectors in the economy $\left(\frac{ws}{ss}\right)$, the level of trade openness which is the ratio of exports to imports since this can affect domestic production if imported goods are less costly or of better quality, the level of internal sectoral regulation present such as expatriate quotas for foreign companies or the number of sectors that government is willing to open to foreign or domestic private participation and finally the amount of exports concession (EC) that the government can achieve depending on its trade negotiating power.

$$(10.) \text{Liberalization reform strategy} = \Delta \left(\frac{ws}{ss} \right) + (\Delta \text{Trade Openness}) + \Delta \text{Sec Reg} + (\Delta \text{EC})$$

Economic liberalization in the presence of trade openness policy as expressed in equation 10 therefore will rely strongly on bilateral trade negotiations between nations the nature of which will be complex and slow in providing the needed growth. The tendency to take advantage of the domestic market by foreign enterprises will be high since for instance foreign firms could seek to monopolize specific sectors of the domestic market in developing countries owing to their comparative advantage e.g. superior technical knowhow preventing indigenous firms from remaining or entering into the sector. Therefore we expect that governments will want to dictate what sectors to open up without necessarily controlling activities of firms in the liberalized sectors. Therefore government will want to protect its domestic market by opening up only sectors that will not adversely weaken its domestic economy. Liberalization of

economies in developing countries without specific regulation techniques to shield weak sectors using trade openness strategy will spell doom for many developing countries, this could lead to the total failure of domestic companies and subsequent deindustrialization of the economy, liberalization reforms based on policy of trade openness is likely to boost short term growth in Africa since this will depend on commodity (mostly from agriculture and minerals) price fluctuation in the global market and can have a negative effect on the total economy if not handled diligently since it is unlikely that developing countries under this situation will be able to develop a local manufacturing sector due to their reliance on agricultural and mineral exports .

Economic liberalization policy in the presence of skill or technological transfer strategy on the other hand will promote growth in a different manner, such that a government will actually open up its economy by relaxing entry and taxation on foreign enterprises on the condition that they employ a sizeable amount of its domestic manpower by making labor cheap. This will make foreign enterprises to train manpower to adequately fit into roles for production purposes leading to skill and technological transfer to the domestic economy. We express the output productivity equation once again as a function of technology, access to credit and labor

(11.) $\Delta Y = \Delta \text{Existing Technology} (\text{Acc.Cre})^\sigma (\text{Lab.Reg})^{1-\sigma}$ (liberalization reforms strategy with technology transfer policy)

regulation we include liberalization reforms with the strategy to transfer technology. Where output productivity will depend on changes in existing technology, access to international credit (Acc.Cre), labor regulation (Lab.Reg) laws and liberalization reforms strategy, in this case liberalization reforms strategy is given below in equation 12

(12.) Liberalization reforms strategy= (Technological Transfer + (Inflw.Ent) + (cop. taxes))

Economic liberalization reforms strategy in this case, will now depend on technological transfer, the inflow of foreign enterprises (Inflw.Ent) , and reduction in corporate taxes (cop. taxes). In this case allowing the influx of foreign enterprises without government labor regulation could lead to adverse effects on the economy as foreign

enterprises might fail to hire domestic workers leading to failure to transfer technology due to the use of expatriate services. It is reasonable to state that countries that use the strategy of economic liberalization in the presence of skill or technological transfer will promote growth on the long run since they are likely to develop a strong domestic economy by the development of a modest domestic manufacturing sector, this is likely going to insulate them from shocks associated with global price fluctuation in commodities.

For countries that imbibe both growth strategies, output productivity will depend on the production function multiplied by economic liberalization in the presence of both growth strategies as shown below

(13.) $\Delta Y = \Delta \text{Technology} (\text{Ac.Cre})^\sigma (\text{Lab. Reg})^{1-\sigma}$ economic liberalization reforms with both growth strategies

While economic liberalization reforms in equation 14 will depend on factors that are taken into consideration in the implementation of both strategies. Governments can start to enjoy short term gains of liberalizing their economies through adopting policies of trade openness and gradually acquire technology so as to maximize and consolidate on the advantage of long run benefits of liberalizing their economies. Government will initially therefore open up some section of its economy in return for exports concessions while also allowing the influx of international investment on the condition of training and hiring indigenous manpower in a strategic manner to improve exports.

(14.) Liberalization reform strategy =

$$\Delta \left(\frac{ss}{ws} + (\text{Inflw. Ent}) \right) + \Delta(\text{Trade Openness} + \text{Technological Transfer}) + \Delta(\text{Sec Reg} + \text{cop. taxes}) + (\Delta EC)$$

Since we expect changes in existing technology, in the case of trade openness strategy and transfer of new technology in the case of skill acquisition strategy, to account for total change in technology. We can rewrite the above equation 14 in 15, since we expect that the overall change in technology will affect output production depending on whether government reforms policy regarding economic liberalization are successful or

unsuccessful in which case it will lead to industrialization or the otherwise deindustrialization of the economy.

$$(15.) \quad \Delta Y = \Delta \text{Total Technology} (\text{Ac.Cre}) \sigma (\text{Lab. Reg})^{1-\sigma} \cdot \left(\Delta \left(\frac{ss}{ws} + (Inflw. Ent) \right) + \Delta(\text{Trade Openness}) + \Delta(\text{Sec Reg} + \text{cop. taxes}) + (\Delta EC) \right)$$

Where $\Delta \text{total technology} = \Delta \text{Existing Technology} + \text{Technology transferred}$

We expect developing countries that transfer technology to experience reliable and sustainable growth whereas countries that embark on the policy of trade openness will experience short run growth which will be affected by fluctuation in commodity prices in the global market since we do not expect them to have developed their domestic markets sufficiently to cushion them from the effect of such shocks, this depicts that the strategy of adopting skill acquisition through transfer of technology is likely to benefit developing countries more. However combining both growth strategies is likely to be of enormous advantage to many developing countries.

Conclusion

In this paper we investigated how successful the effect of economic liberalization in some selected Africa countries has been on trade. We find that economic liberalization has a positive significant effect on trade. This is consistent with past literature that state that trade liberalization through privatization raises productivity and hence lowers marginal costs, (see Tybout (2000) for a review and Pavcnik (2002) for further discussion on how economic liberalization and free trade can promote exports and output productivity). We also find that trade openness policy was likely to contribute to exports more than the policy of developing human capita on the short run. We also investigated what kind of growth strategies can make economic liberalization most effective, we find that although economic liberalization in the presence of trade openness will contribute to increase in exports on the short run, adopting the strategy to transfer of technology through the training of human capital was likely to make economic liberalization policy contribute towards exporting in a more effective manner.

This is consistent with past literature such as Rodrik (2001) Hallak and Levinsohn (2003) and Andersen and Babula (2008) who state that sound and consist policies are the mechanisms needed to stimulate growth therefore implementing economic liberalization reforms in the presence of export oriented growth strategies could lead to economic liberalization reforms success.

The implication of our findings is that economic liberalization has been modestly successful in promoting trade in a host of Africa countries although many of them are yet to achieve full gains of such economic reforms. Several factors still militate against trade in developing countries and Africa in particular. Some of them are market size and high inflation rate that have a negative effect on trade in Africa. Another point that should be stressed is that adopting trade openness policy might contribute positively towards increase in trade on the short run, but building strong skills acquisition among the working population is likely to make economic liberalization policy more effective in promoting trade even though it might not have a positive effect on trade on the short run. Transfer of technology could improve the efficiency of output production and reduce the cost of hiring expatriate services this could be achieved effectively by focusing on skills acquisition and manpower training that can reduce the overall cost of production and improve the quality of products making exports to be cheaper and more competitive in the international market. Sound and consistent economic policy are needed to create enabling environment. Our results show that economic liberalization success will depend considerably on the provision on infrastructure such as access to both domestic and foreign markets (through provision of good roads and easy access to ports) that can promote trade and attract foreign investors. Good laws to protect private investment and make the privatization of public enterprises transparent remain the best way of increasing efficiency and improving output productivity that can foster increase in trade in most Africa countries, since it is very likely that liberalization reforms will depend on such laws. Enacting good property rights laws as well as displaying transparency in privatization and liberalization reforms is a possible way of sustaining a strong private sector participation in business. This will help increase service delivery while reducing the burden on government by way of cost of running public enterprises allowing government to free up resources for further development programs. Our results are also consistent with past literature such as Parker and Kirkpatrick (2004) who state

that the foreign investment will produce growth more effectively in environments where good policies and private sector reforms have been carried out effectively. A planned and well implemented economic liberalization reform coupled with effective growth strategies is likely to contribute significantly to exports in many African countries. Therefore it is likely that economic liberalization reforms coupled with strategies to transfer technology can in the long run help develop a robust manufacturing sector in many African countries.

Appendix A . Table 6. Robustness Check

Method of Estimation	Inf. Mes.	Market Mes.	Cred Access. Mes.
	OLS (1)	OLS (2)	OLS (3)
Government spending	0.15 (.02)***	0.29 (.09)***	0.46 (.13)***
Natural resources	0.001 (.01)	-0.002 (.01)	0.001 (.004)
Market access	0.001 (.02)***	0.06 (.07)	0.03 (0.03)
Population	-0.008 (.05)***	-4.23 (1.89)**	-10.39 (1.43)**
GDP/capita	-0.33 (.07)***	-0.70 (.29)**	0.73 (.42)*
Political instability	0.03 (.02)	-0.05 (.07)	-0.13 (.11)
Inflation	-0.002 (.01)*	-0.01 (.004)**	-0.002 (.01)
School enrollment	0.001 (.001)	0.01 (.01)	0.01 (.01)***
Exchange rate	-0.03 (.02)	-0.03 (.07)	0.02 (.11)
F-Test	62.05	10.07	12.75
Chi ² (p-value)	0.00	0.00	0.00
# of observations	74	70	74
R-Squared	0.97	0.91	0.97

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

Note: Where Inf Mes., Market Mes., and Cred. Acc. represents infrastructural, market capitalization and international credit access measures of economic liberalization respectively

Appendix B. Table 7. Robustness Check

Method of Estimation	Inf. Mes.	Market Mes.	Cred Ass Mes.
	OLS (1)	OLS (2)	OLS (3)
Government spending	0.15 (.02)***	0.20 (.06)***	0.33 (.10)***
Natural resources	-0.0003 (.001)	-0.001 (.01)	0.001 (.005)
Market access	0.005 (.02)**	0.06 (.04)*	0.04 (0.02)*
Population	-2.17 (.51)***	-12.00 (3.46)***	-17.39 (3.27)***
GDP/capita	-0.20 (.07)**	-0.14 (.28)**	0.91 (.39)**
Political instability	-0.03 (.02)	-0.04 (.05)	-0.11 (.10)
Inflation	-0.002 (.001)**	-0.01 (.004)**	0.004 (.01)
Openness	0.01 (.002)***	-0.004 (.003)	0.02 (.01)***
Exchange rate	-0.02 (.02)	0.01 (.07)	-0.02 (.10)
F-Test	91.53	11.49	11.03
Chi ² (p-value)	0.00	0.00	0.00
# of observations	80	73	77
R-Squared	0.97	0.93	0.98

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to

significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

Note: Where Inf Mes., Market Mes., and Cred. Acc. represents infrastructural, market capitalization and international credit access measures of economic liberalization respectively

Appendix C. Table 8. Robustness Check

Method of Estimation	Inf. Mes.	Market Mes.	Cred Ass Mes.
	2SLS (1)	2SLS (2)	2SLS (3)
Liberalization policy	0.60 (.18)***	0.27 (.11)**	0.19 (.05)***
Natural resources	-0.002 (.002)	-0.002 (.002)	-0.003 (.002)
Market access	0.001 (.01)	-0.003 (.01)	0.01 (0.01)
Population	0.63 (1.26)	0.40 (1.47)	1.50 (1.39)
Market Size			
GDP/capita	-0.33 (.13)**	-0.35 (.15)**	-0.67 (.07)***
Political Variable			
Political instability	0.01 (.03)	0.01 (.03)	0.02 (.02)
Economic Variables			
Inflation	-0.01 (.003)*	-0.004 (.003)	0.01 (.003)**
School enrollment	-0.002 (.002)	-0.01 (.003)**	-0.01 (.003)***
Exchange Rate	-0.01 (.04)	-0.02 (.04)**	-0.03 (.03)**
Chi ² (p-value)	0.00	0.00	0.00
# of observations	74	70	74
R-Squared	0.82	0.80	0.85

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to

significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

Note: Where Inf Mes., Market Mes., and Cred. Acc. represents infrastructural, market capitalization and international credit access measures of economic liberalization respectively

Appendix D. Table 9. Robustness Check

Method of Estimation	Inf. Mes.	Market Mes.	Cred. Acc. Mes.
	2SLS (1)	2SLS (2)	2SLS (3)
Liberalization policy	0.46 (.17)***	0.32 (.16)**	0.20 (.07)***
Natural resources	-0.002 (.002)	-0.002 (.002)	-0.003 (.001)*
Market access	0.004 (.003)	-0.01 (.02)	0.004 (.01)
Population	-1.24 (1.28)	1.00 (2.95)	1.33 (2.11)
Market Size			
GDP/capita	-0.30 (.10)***	-0.32 (.13)**	-0.59 (.09)***
Political Variable			
Political instability	0.001 (.03)	-0.01 (.03)	0.0003 (.02)
Economic Variables			
Inflation	-0.004 (.002)*	-0.001 (.03)**	-0.01 (.002)***
Openness	0.01 (.003)***	0.004 (.01)	0.01 (.003)***
Exchange rate	-0.02 (.03)	-0.02 (.04)**	-0.03 (.03)**
Chi ² (p-value)	0.00	0.00	0.00
# of observations	80	73	77
R-Squared	0.85	0.79	0.86

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to

significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

Note: Where Inf Mes., Market Mes., and Cred. Acc. represents infrastructural, market capitalization and international credit access measures of economic liberalization respectively

Appendix E. Table 10. Robustness Check

Method of Estimation	Inf. Mes.	Market Mes.	Cred Ass Mes.
	2SLS (1)	2SLS (2)	2SLS (3)
Liberalization policy	0.60 (.18)***	0.27 (.11)**	0.19 (.05)***
Natural resources	-0.002 (.002)	-0.002 (.002)	-0.003 (.002)
Market access	0.001 (.01)	-0.003 (.01)	0.01 (0.01)
Population	0.63 (1.26)	0.40 (1.47)	1.50 (1.39)
Market Size			
GDP/capita	-0.33 (.13)**	-0.35 (.15)**	-0.67 (.07)***
Political Variable			
Political Instability	0.01 (.03)	0.01 (.03)	0.02 (.02)
Economic Variables			
Inflation	-0.01 (.003)*	-0.004 (.003)	0.01 (.003)**
School enrollment	-0.002 (.002)	-0.01 (.003)**	-0.01 (.003)***
Exchange rate	-0.01 (.04)	-0.02 (.04)**	-0.03 (.03)**
Chi ² (p-value)	0.00	0.00	0.00
# of observations	74	70	74
R-Squared	0.82	0.80	0.85

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to

significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

Note: Where Inf Mes., Market Mes., and Cred. Acc. represents infrastructural, market capitalization and international credit access measures of economic liberalization respectively

Appendix F. Table 11. Robustness Check

Method of Estimation	Inf. Mes.	Market Mes.	Cred. Acc Mes.
	2SLS (1)	2SLS (2)	2SLS (3)
Liberalization policy	0.46 (.17)***	0.32 (.16)**	0.20 (.07)***
Natural resources	-0.002 (.002)	-0.002 (.002)	-0.003 (.001)*
Market access	0.004 (.003)	-0.01 (.02)	0.004 (.01)
Population	-1.24 (1.28)	1.00 (2.95)	1.33 (2.11)
Market Size			
GDP/capita	-0.30 (.10)***	-0.32 (.13)**	-0.59 (.09)***
Political Variable			
Political instability	0.001 (.03)	-0.01 (.03)	0.0003 (.02)
Economic Variables			
Inflation	-0.004 (.002)*	-0.001 (.03)**	-0.01 (.002)***
Openness	0.01 (.003)***	0.004 (.01)	0.01 (.003)***
Exchange rate	-0.02 (.03)	-0.02 (.04)**	-0.03 (.03)**
Chi ² (p-value)	0.00	0.00	0.00
# of observations	80	73	77
R-Squared	0.85	0.79	0.86

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

Note: Where Inf Mes., Market Mes., and Cred. Acc. represents infrastructural, market capitalization and international credit access measures of economic liberalization respective

Appendix G. Table 12. Robustness Check

Method of Estimation	PCA Index	RCA Index
	2SLS (1)	2SLS (2)
Liberalization policy	0.10 (.04)***	1.71 (.62)**
Natural resources	-0.002 (.002)	-0.003 (.002)
Market access	0.002 (.001)	0.02 (.01)
Population	0.52 (1.47)	1.29 (1.74)
Market Size		
GDP/capita	-0.39 (.14)***	-0.63 (.08)***
Political Variable		
Political instability	0.01 (.03)	0.02 (.03)
Economic Variables		
Inflation	-0.004 (.003)*	-0.01 (.003)**
School enrollment	-0.004 (.003)***	-0.002 (.003)
Exchange rate	-0.02 (.04)	-0.02 (.04)
Chi ² (p-value)	0.00	0.00
# of observations	70	70
R-Squared	0.83	0.81

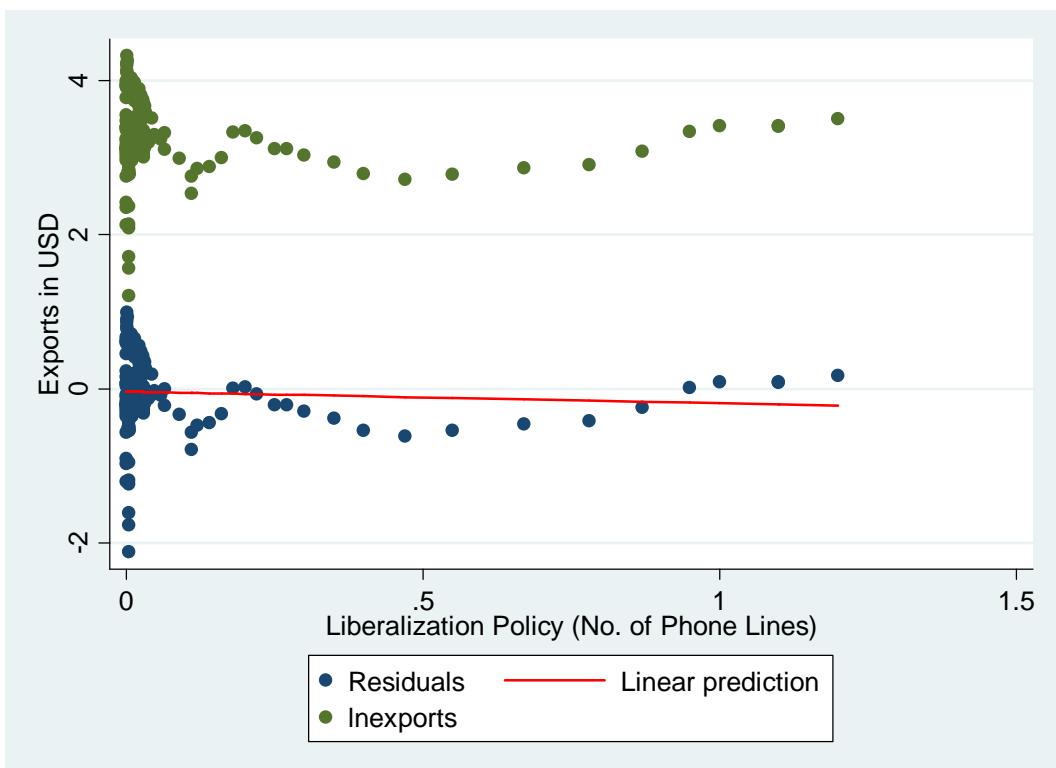
Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

Appendix H. Table 13. Robustness Check

Method of Estimation	PCA Index	RCA Index
	2SLS (1)	2SLS (2)
Liberalization policy	0.09 (.04)**	1.27 (.46)***
Natural resources	-0.002 (.002)	-0.003 (.001)*
Market access	0.0002 (.01)	0.01 (.01)*
Population	-0.88 (1.86)	-1.79 (1.30)
Market Size		
GDP/capita	-0.30 (.11)***	-0.30 (.11)***
Political Variable		
Political instability	-0.01 (.03)	-0.002 (.02)
Economic Variables		
Inflation	-0.01 (.002)**	-0.01 (.002)***
Openness	0.01 (.01)**	0.01 (.002)***
Exchange rate	-0.01 (.03)	-0.01 (.03)
Chi ² (p-value)	0.00	0.00
# of observations	73	73
R-Squared	0.85	0.88

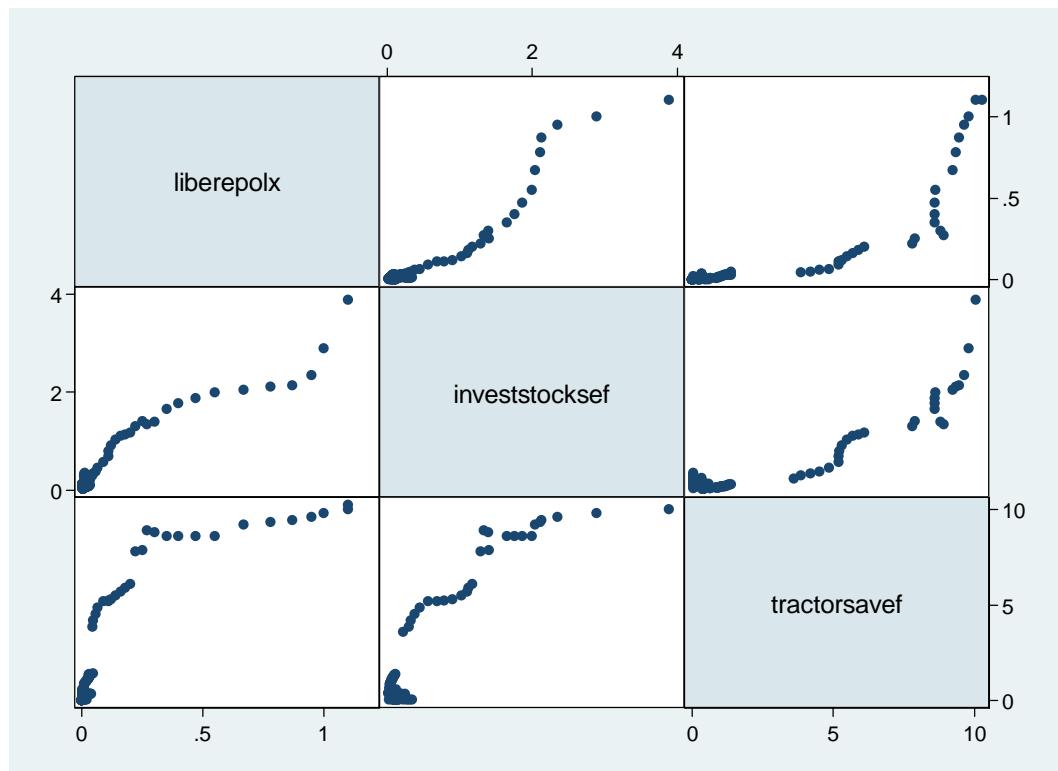
Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

Appendix I. Relationship between Trade and Economic liberalization



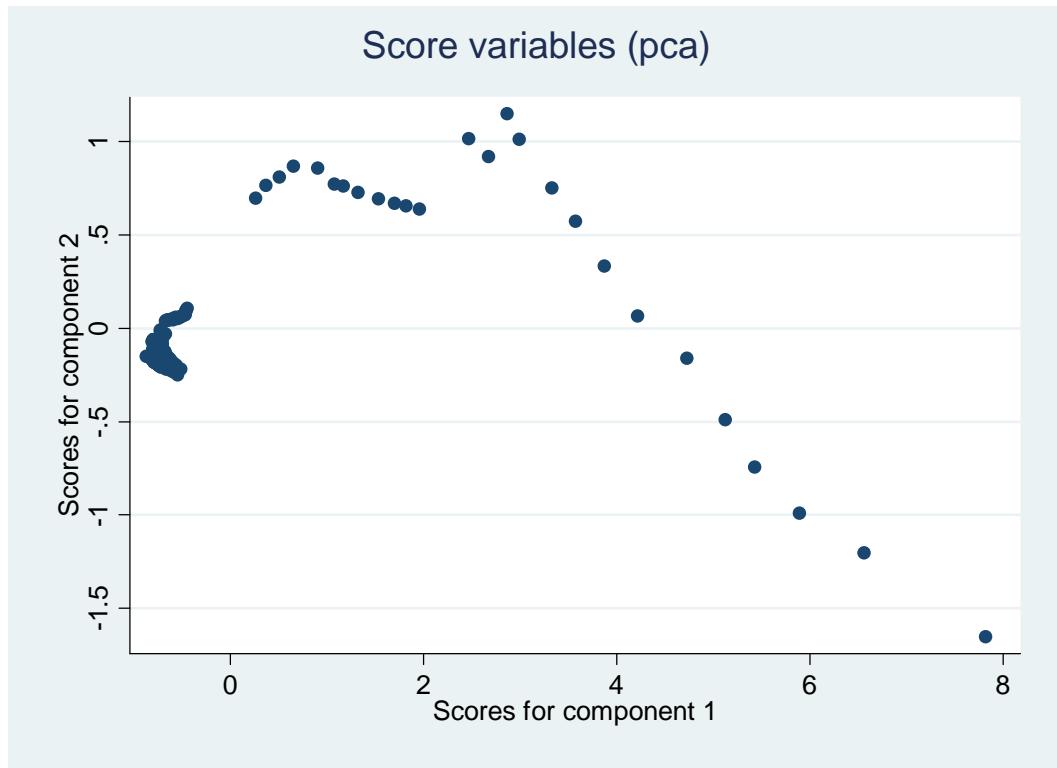
Note: The relationship between exports and economic liberalization is that economic liberalization reforms is likely to promote exporting by reducing cost of labor, access to capital and possibly grant countries that engage in liberalization reforms exports concession slots and the possibility to transfer technology. Competition through privatization can also increase quality of goods while reducing prices.

Appendix J. Scatter Matrix for Variables used in constructing the PCA index



Note: The above shows the scatter matrix for the three variables used in constructing the economic liberalization index. No of phone lines (liberepolx), Investment in stocks (investstocksef) and No of tractors in a country which captures access to international credit facilities were used to construct the economic liberalization index. The matrix shows that the three variables are closely correlated with one another. Using a set of closely correlated variables often allows us to create a good index using PCA

Appendix K. Score Plots for Variables used in constructing the PCA index



Note: The above is the score plots for the three variables used in constructing the economic liberalization policy. It depicts the average variation in the new index. PCA uses Eigen matrix transformation to derive an index from a set of correlated variables. This allows us to have a single index for economic liberalization that captures the reforms policy in a broader perspective since economic liberalization often entails fiscal, market and trade reforms. Using a set of variables such as No of phone lines which reflects the level of privatization inherent in a country, investment in stocks which captures market reforms and access to international credit which captures gains associated with trade liberalization allows us to construct a broader variable that capture economic liberalization in a broader perspective.

Appendix L. Data and Sources

- iii. Dependent variable: Exports, this is the total volume of goods exported overseas in constant USD. This was obtained from World Bank.
- iv. Explanatory variables
 - a. Economic liberalization rate: Level of economic activity regulation by country represented by an infrastructural measure. We used the no of phone lines to capture this effect. We expect businesses to experience booms in liberalized economies and acquire more phone lines. Other measure of liberalization are investment in stocks and number of tractors we used this to capture country specific market and trade liberalization reforms. We created an Index using PCA and RCA that captures the three variables we used these to test for robustness in regression estimates.
 - b. Exchange rate: This is the fluctuation in the value of the local currency with respect to the dollar we obtain this from World Bank data. We used this to economic capture fluctuations globally.
 - j. GDP/Capita: This is the total amount of goods produced by country we divide this by population to obtain GDP/Capita and this represents country specific income. This was obtained from World Bank data.
 - k. FDI: This is the total inflow of all foreign investment to a country in constant USD. We obtain this from World Bank data.
 - l. School Enrollment Rate: This represent the average primary school enrollment rate for boys and girls between the ages of 1-15 years of age. It represents human capita development rate (level of literacy by country and skill) we obtained this from World Bank data for a period of 1970 to 2008.
 - m. Government consumption spending is amount in USD that government spends on welfare and social infrastructure. It is obtained from data market of Iceland for a period of 1980 to 2008.
 - n. School enrollment rate: This represent the average primary school enrollment rate for boys and girls between the ages of 1-15 years of age. It represents human capita development rate (level of literacy by country and skill) we obtained this from World Bank data.
 - o. Market access, we used crude oil price to capture access to domestic and foreign markets we obtain.
 - p. Provision of social amenities, was measured using percentage access to clean drinking water
 - q. Population is the total number of people living in a geography area; this was used to capture budget constraints to government planning.
 - r. Investment in stocks this is the total value of countries stock of investment in USD.
 - s. Trade openness is the ratio of exports to imports by country
 - t. Inflation is the change in monetary value of goods and services overtime
 - u. Natural resources was captured using exports in USD from precious metals and oil
 - v. Political stability was captured using country specific electoral self determination rate obtained from CIRI political data base.

All data are for a period of 1970 to 2008 and obtained from World Bank data unless otherwise stated.

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Concluding Note

The three papers in this dissertation provide insights into how useful aid can be in promoting exports oriented growth, the relevance of economic policy in alleviating poverty and finally strategies that should be implemented during economic liberalization reforms to boost trade.

Lots of issues still need to be resolved such as strategies to make aid more effective and exactly how to determine when a developing country's economy is mature for a shift from foreign aid to receiving substantial foreign direct investment. Tackling poverty with people oriented reforms, such as educational training, in the presence of sound and consistent economic policy implemented in the presence of good institutions, can also be of immense help in eradicating poverty in many developing countries. Issues such as how economic policy can be effectively implemented through weak institutions, since many developing countries are relatively young countries continue to give concern to policy makers and scholars, making the possibility of eradicating poverty in the near future an illusion.

While economic liberalization reforms enacted with sound growth strategies could yield positive results by driving exports oriented growth. Many gaps still exist in the economic liberalization literature. An example is how exactly to measure economic liberalization? And secondly how to effectively combine liberalization reforms with growth strategies in practical terms to realize the needed economic growth in countries.

However in implementing the results in this dissertation, policy makers should exercise caution and take into account country specific peculiarities since this can be a prudent way towards using the incites from this work in promoting export oriented growth through aid to sectors that promote growth and alleviating poverty through tailored-made economic policy for specific countries. Finally achieving export oriented growth through liberalization reforms in the presence of growth strategies, is probably a way for many developing economies to achieve robust and sustainable growth in the future.