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Determinants of Poverty in Sub-Saharan Africa

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Abstract

This paper examines the determinants of poverty in Sub-Saharan Africa using a set of cross-country data drawn from 48 countries. It adopts a multiple regression analysis. The results obtained indicates that factors like increase in the rate of population, inflation and external debt servicing, lack of safe water, low economic activities, gender discrimination, ethnic and religious conflicts and HIV/AIDS have influenced the increase in the rate poverty in the sub-region. Given these results, measures such as debt forgiveness, use of family planning devices, stable macro-economic variables like inflation and exchange rate volatility and good governance are suggested as possible solutions to poverty in Sub-Saharan Africa.

Introduction

Achieving the Millennium Development Goal of eradicating extreme poverty and hunger before 2015 seems to be a mirage in Sub-Saharan Africa. This is against the backdrop of a number of factors, such as, macroeconomic instability e.g. increase in the rate of inflation and exchange rate instability; socio-political instability (e.g. ethnic/religion and civil conflicts), external

debt burdens, adult illiteracy, lack of social services (e.g. health care, safe water and sanitation) and HIV/AIDS that have continued to reverse development initiatives and efforts. These and other factors has made the sub-region one of the poorest in the world with 46.4 percent of its people living on less than \$1 a day in 2001 (World Bank 2005a, 2005b).

The consequences of this situation include among others: low life expectancy at birth, increase in mortality rate (infant and maternal), increase in malnutrition and high incidence of HIV/AIDS. For instance, the average life expectancy at birth in Sub-Saharan Africa was 40 years in 2003, far below the rates in South Asia and Europe that had 63 years and 79 years respectively in the same year (UNDP 2003; GCA 2005; World Bank 2005a, 2005b).

Governments and donor agencies in Africa therefore need to evolve policy reforms that geared towards tackling poverty from the root of its occurrence. In other words, a blow-by-blow account of factors that lead to poverty in the region must be obtained so as to provide direction for such reforms, other wise policies will be targeted randomly without an idea of which factors(s) is/are stronger at causing or aggravating levels and severity of poverty among the people of the Sub-Saharan African region.

Drawing from the above scenario, the aim of this paper therefore, is to examine the relative contributions of selected micro and macroeconomic variables on the level of poverty as observed in Sub-Saharan Africa, using a set of cross-country data and a multiple regression analysis.

Conceptual Issue: Poverty

Meaning and Measurement of Poverty

Poverty can be defined as lack of material well-being, insecurity, social isolation, psychological distress, lack of freedom of choice and action, unpredictability, lack of long-term planning horizons because the poor can not see how to survive in the present, low self confidence and not believing in one self (Narayan 2000) Sengupta (2003) defined poverty as not only an insufficient income to buy a minimum basket of goods and services but as the lack of basic capabilities to live in dignity. This definition recognizes poverty's broader features, such as hunger, poor education, discrimination, vulnerability and social exclusion. In the light of the International Bill of

Rights, poverty is defined as a human condition characterized by sustained or chronic deprivation of the resources, capabilities, choices, security and power necessary for the enjoyment of an adequate standard of living and other civil, cultural, economic, political and social rights (see also Sen 1985; UN 2001; Hunt, et.al 2004). As observed by Kankwanda, et.al (2000) poverty is either absolute or relative or both. Absolute poverty being that which could be applied at all time in all societies, such as the level of income necessary for bare subsistence, while relative poverty relates to the living standard of the poor to the standards that prevail elsewhere in the society in which they live.

Related to the definition of poverty are the measurements of poverty whose importance is to know who is poor, how many people are poor, and where the poor are located. According to Foster, et.al (1984), the most frequently used measurements are:

- (i) the head count poverty index given by the percentage of the population that live in the household with a consumption per capita less than the poverty line;
- (ii) poverty gap index which reflects the depth of poverty by taking into account how far the average poor persons' income is from the poverty line; and
- (iii) the distributionally sensitive measure of squared poverty gap defined as the means of the squared proportionate poverty gap which reflects the severity of poverty.

Studies by UNDP also advocate the use of Human Development Index (HDI) and Capability Poverty Measure (CPM). According to UNDP (various issues) HDI combines three components in the measure of poverty which include: longevity as measured by life expectancy at birth; educational attainment as measured by a combination of adult literacy (two-thirds weight) and combined primary, secondary and tertiary enrolment ratios (one-third weight); and improvement in standard of living as measured by real GDP per capita income (PPP\$). The first relates to survival - vulnerability to death at a relatively early age. The second relates to knowledge – being excluded from the world of reading and communication. The third relates to a decent living standard in terms of overall economic provisioning. On the other hand, CPM focuses on the average state of peoples' capabilities by reflecting on the percentage of people who lack basic or minimally essential human capabilities that are ends in themselves, needed to lift one from

income poverty and sustain strong human development. A situation further stressed by Sen (1985) as not what people possess, but what their possessions enable them to do.

Determinants of Poverty

According to the World Bank (1990), and the United Nations (1995), poverty has various manifestations which include the lack of income and productive resources sufficient to ensure sustainable livelihood, hunger, and malnutrition, ill health, limited or lack of access to education and other basic services, increased morbidity and mortality from illness, homelessness, inadequate, unsafe and degraded environment, social discrimination and exclusion. It is also characterized by lack of participation in decision making in civil, social and cultural life (see World Bank 2001).

Yahie (1993) reiterates that the factors that cause poverty include: (i) structural causes that are more permanent and depend on a host of exogenous factors such as limited resources, lack of skills, locational disadvantage and other factors that are inherent in the social and political set-up; and (ii) the transitional causes that are mainly due to structural adjustment reforms and changes in domestic economic policies that may result in price changes, unemployment and so on. Natural calamities such as drought and man-made disasters such as wars, environmental degradation and so on also induce transitional poverty. (see Narayan et.al. 2000a, 2000b).

In their discussions of the factors that cause poverty, de Haan (2000) and Sindzingre (2000) note that poverty could also be caused by general exclusion of the people from social life. To them exclusion reflects discrimination, which is a process that denies individuals from full participation in material exchange or interaction. The concept is tied to exclusion from the labour market, long-term unemployment and the destruction of the social links and integration that usually accompany work. The definition also widens to include precariousness, vulnerable and insecurity (especially that of employment) and exclusion from social life.

As observed by Obadan (1997) in Sub-Saharan Africa, the main factors that cause poverty include: inadequate access to employment opportunities; inadequate physical assets such as land, capital and minimal access by the poor to credit even on a small scale; inadequate access to the means of supporting rural development in poor regions; inadequate access to markets

where the poor can sell goods and services; low endowment of human capital, destruction of natural resources leading to environmental degradation and reduced productivity; inadequate access to assistance for those living at the margin and those victimized by transitory poverty and lack of participation. That is, failure to draw the poor into the design of development programmes.

The Poverty Situation in Sub-Saharan Africa

The poverty situation in Sub-Saharan African countries is precarious given the percentage of people living below \$ 1 a day (45 percent), more so, when compared with other regions of the world. The poverty situation also depicts country variations with countries like Uganda, Mali, Nigeria, Zambia, Niger, Madagascar, Zimbabwe, Burundi and Rwanda having more than 50 percent of their population living below \$ 1 a day in 2002. The sub-region also records more rural poverty than urban poverty with 37 percent of the population in the rural areas living below two-third of their national mean per capita income in 1999. The country with the highest rural poverty is South Africa with 86 percent, followed by Central African Republic with 77 percent of her rural population living in poverty (World Bank 2005a, 2005b).

The use of socio-economic indicators like per capita income, life expectancy at birth (years), access to health care services, access to safe water, access to education and access to sanitation facilities also depicts the extent of poverty in Sub-Saharan Africa. As indicated in Table 1, the rate of poverty in Sub-Saharan Africa has not shown any remarkable reduction when viewed from these indicators and when compared with other continents. For instance, apart from countries like Mauritius that had a per capita income of about \$11287 in 2003, majority of the countries in the sub-region have very low per capita income. Most of the countries' life expectancy at birth is also low ranging from 35 to 50 years, with the exception of countries like Cape Verde, Mauritius and Sao Tome and Principe that had 65, 69 and 62 years respectively during the same period. (See table 1)

Data Source and Methodology

Data Source

A cross-country data drawn from 48 countries in Sub-Saharan Africa for the period 2003 were used (see Appendix 1). From the general opinion in the literature some of the determinants of poverty considered for this study

include among others; the rate of inflation, external debt service, the prevalence of HIV/AIDS, adult illiteracy level, lack of access to health, lack of access to safe water, lack of access to safe and healthy environment, high rate of population and low economic activities; however, the magnitude of their impact are yet unknown. The data were obtained from the African Development Bank's Gender, Poverty and Environmental Indicators on African Countries for the 2003; World Bank African Development Indicators for the year 2005; and World Bank World Development Indicators also for the year 2005.

The Model

There are a number of approaches to modeling the determinants of poverty, with the appropriation of each method depending on the availability of data and the objective of the study. Drawing from the studies by Datt and Jolliffe (1999), Okurut, et.al 2002 and Similer, et. al (2004), that uses household data, the most common methods are the household's consumption model and the household poverty measures. The household consumption measure is given as follows:

$$\text{Inc}_j = \beta x_j + n_j$$

Where: Inc_j = log of household_j per capita consumption.

x_j is a set of household characteristics.

n_j = the random error term.

β = parameter estimate

While the household poverty measure is Foster, et. al (1984) model written as:

$$P_{\alpha j} = [\max (1 - c_j/z), 0]^\alpha$$

$$\alpha \geq 0$$

Where: c_j = household_j per capita consumption

z = the poverty line

α = non-negative parameter.

The household equivalents of the headcount index, the poverty gap index and the squared poverty gap index are obtained when $\alpha = 0, 1$ and 2 respectively.

For the purpose of this study and given the nature and availability of data, the consumption model approach is therefore adopted with some modifications given the cross-country nature of the data used.

In its simplest form, the model for this study is formulated as:

$$POV_i = f(DPOV_i) \quad (1)$$

With $DPOV_i = f(\text{Popn}_i, \text{infla}_i, \text{Exdebt}_i, \text{Aduill}_i, \text{LacHeal}_i, \text{LacSW}_i, \text{PoEnv}_i, \text{LoEcAc}_i, \text{Gdis}_i, \text{Ethiconfl}_i, \text{HIV}_i)$ (2)

When equation (2) is substituted into equation (1) it then becomes:

$POV_i = f(\text{Popn}_i, \text{infla}_i, \text{Exdebt}_i, \text{Aduill}_i, \text{LacHeal}_i, \text{LacSW}_i, \text{PoEnv}_i, \text{LoEcAc}_i, \text{Gdis}_i, \text{Ethiconfl}_i, \text{HIV}_i)$ (3)

With a multiple linear relationship such as:

$$\begin{aligned} \ln POV_i = & \alpha_0 + \alpha_1 \ln \text{Popn}_i + \alpha_2 \ln \text{Infla}_i + \alpha_3 \ln \text{Exdebt}_i + \alpha_4 \ln \text{Aduill}_i + \\ & \alpha_5 \ln \text{LacHeal}_i + \alpha_6 \ln \text{LacSW}_i + \alpha_7 \ln \text{PoEnv}_i + \alpha_8 \ln \text{LoEcAc}_i + \alpha_9 \text{Gdis}_i + \\ & \alpha_{10} \text{Ethiconfl}_i + \alpha_{11} \text{HIV}_i + z \end{aligned} \quad (4)$$

Where:

$\ln POV_i$ = log of poverty proxy by household consumption-expenditure in each country.

$\ln \text{Popn}_i$ = log of population in each country.

$\ln \text{infla}_i$ = percentage rate of inflation in each country.

$\ln \text{Exdebt}_i$ = log of external debt service in each country.

$\ln \text{Aduill}_i$ = log of adult illiteracy in each country.

$\ln \text{LacHeal}_i$ = log of the percentage of people without access to health care services in each country.

$\ln \text{LacSW}_i$ = log of the percentage of people without access to safe water in each country.

$\ln \text{PoEnv}_i$ = log of the percentage of people with poor environmental condition proxy with the percentage of those without access to sanitation facilities in each country.

$\ln LoEcAc_i$ = log of low level of economic activities proxy by the per capita income in each country.

$Gdis_i$ = gender discrimination proxy by low women status relative to men determined by the ratio of female life expectancy at birth to men in each country.

$Ethnicfl_i$ = ethnic/civil conflicts e.g. war. Dummy 0 for absence of wars and dummy 1 for war torn countries or countries recovering from war (see Appendix 1).

HIV_i = prevalence of HIV/AIDS in each country.

α_0 = the intercept

$\alpha_1 \dots \alpha_{11}$ = parameter estimates associated with the influence of the independent variables on the dependent variable.

z = the disturbance terms

To estimate the model, a multiple linear regression analysis is used in order to reflect the explanatory significance of the variables. To verify the validity of the model, two major evaluation criteria were used: (i) the a-priori expectation criteria which is based on the signs and magnitude of the coefficients of the variable under investigation; and (ii) statistical criteria based on statistical theory which in other words is referred to as the First Order Least Square Test, consisting of R-square (R^2), F- statistic and t- test. The R-square (R^2) is concerned with the overall explanatory power of the regression analysis, the F- statistic is used to test the overall significance of the regression analysis and the t- test is used to test the significance of the contribution of the independent variables (Oyeniyi 1997).

Drawing from the model, our-a-priori expectations or expected behaviour of the independent variables on the dependent variable in the model are: $\alpha_1 > 0$; $\alpha_2 > 0$; $\alpha_3 > 0$; $\alpha_4 > 0$; $\alpha_5 > 0$; $\alpha_6 > 0$; $\alpha_7 > 0$; $\alpha_8 < 0$; $\alpha_9 > 0$; $\alpha_{10} > 0$; $\alpha_{11} > 0$.

Results and Discussion

The results of the multiple regression analysis of the model conducted at 5 percent level of significance are presented in Table 2.

The regression results of the model show that the R^2 is 74 percent which is the variation by which the dependent variable is explained by the explanatory variables, while the error term take care of the remaining 26 percent which are variables in the study that can not be included in the model because of certain qualitative features. At 5 percent level of significance, the F-statistic show that the model is useful in determining if the explanatory variables have any significant influence on the dependent variable, as the computed F-statistic which is 4.96 is greater than the tabulated F-statistic valued at 2.08.

In terms of the individual independent variables, the co-efficient estimates and the associated t-statistic of the rate of population, the rate of inflation, the rate of external debt service, the lack of safe water, the low level of economic activities, gender discrimination, ethnic/religious conflicts and the prevalence of HIV/AIDS have the expected signs, thus fulfilling our a-priori expectations. But when viewed statistically only the low level of economic activities and the rate of population are statistically significant at 5 percent and 10 percent respectively. The positive signs of these variables are indications that their existence has led to increase in rate of poverty in Sub-Saharan Africa. Situations that can be linked to a number of factors that is political, economic and social in nature. Politically, most the countries in the sub-region have since independence known no peace and witnessed the largest number of military coups and dictatorial rules that end up breeding corruption. Economically, this is also a sub-region that has witnessed more macroeconomic instability and poor economic performance than any other sub-region in the world due also to high rate of corruption, political patronage, political instability and nepotism. For instance, since the mid-1980s countries like Democratic Republic of Congo, Uganda and Somalia have been at war, while countries like Sierra Leone, Liberia, Rwanda, Burundi, Sudan and Cote d' Ivoire are either recovering from years of war or making efforts to resolve their conflict.

The lack of access to health care services, lack of access to western education and the poor state of the environment did not matter much to the outcome of this study because they fall short of our a-priori expectations. Several factors can be linked to this. For instance, the lack of health care services can be linked to the individual's perception of health care needs and choices that are available to him or her when ill. Thus, with the presence of traditional health care services which served as alternative, the people in the sub-region usually pay little attention to modern health care services that are usually expensive.

A general look at the results seems to conform with the views of scholars and institutions like Yahie (1993), Obadan (1997), and the World Bank (2001), who in their various studies established reasons like structural adjustment reforms that have had negative effects on well-being, external debt overhang, price instability, increase in unemployment and fall in the purchasing power of the people as the causes of poverty. Other reasons include; inadequate physical assets such as land and capital, minimal access to credit facilities, inadequate access to social services like safe water, low endowment of human capital, increase in the rate of social discrimination and exclusion, mostly against women, continuous political instability, e.g. wars and conflicts in some of the countries and the high prevalence of HIV/AIDS that has affected the level of economic activities and well-being of some of the people in the sub-region.

GCA (2005) also identified the following factors as the cause of poverty in Sub-Sahara Africa: increase deterioration in the nations' terms of trade which in turn translated into low growth rates; adverse weather patterns in drought-prone zones and the invasions of swarms of locusts in Southern Africa, the Horn of Africa and the Western Sahel that leads to weaker agricultural performance and GDP growth; continuing conflicts and instability in countries like Cote d'Ivoire which resulted in further economic decline and negative spillover effects in neighbouring countries, particularly Mali and Burkina Faso; the high incidence of HIV/AIDS and its effect on morbidity and mortality, most especially in the Southern African countries of Botswana, Lesotho, Swaziland and South Africa; and the high incidence of corruption and bad governance.

Conclusion and Recommendations

An empirical study of the determinants of poverty in Sub-Sahara Africa was carried out using a cross-country data and a multiple regression analysis. Some of the determinants of poverty considered include the nations' population, the rate of inflation, external debt servicing, adult illiterates, the level of economic activities, the lack of access to safe water, and health care services, poor environmental situation, gender discrimination, ethnic/civil conflicts, and the prevalence of HIV/AIDS. Of these variables only adult illiterate, lack of access to health care service and poor environmental situation ran contrary to our a-priori expectations while other variables fulfilled our expectations.

Addressing these situations would therefore require a broad-based approach given the multi-dimensional nature of poverty. One area to look at for is the stability of the nations' macroeconomic variables, like inflation, interest rate, exchange rate and external debt servicing, given their strong link to economic growth since the stability of these variables will not only build a friendly environment for domestic investment but would facilitate the involvement of foreign investors that have the tendency of providing jobs, technical and managerial skills and income to the people.

Equally importance is the provision of social services e.g. education, safe water, sanitation facilities and modern health care services, the prevention and quick resolution of conflicts and wars, and prevention of the spread of HIV/AIDS in the sub-region. These are against the backdrop of the emergence of more poor people resulting from the destruction of human, social and physical capital, disruption of economic activities, the huge amount of financial and material resources that goes for humanitarian assistance to displaced people, disinvestments witnessed as a result of capital flight and the lost of breadwinners and prospective manpower due to HIV/AIDS.

In addition to the above are the issues of accountability, transparency and openness in the application of anti-poverty measures by political leaders and their agencies. African leaders should be made to know that they are in power to provide services to their people and not to enrich themselves. Thus the fight against corruption should be intensified within the sub-region in order to guide against the abuse of funds and national resources that are meant to the uplift the standard of living of the people.

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Table 1: Socio-economic Indicators in some Sub-Saharan African Countries in 2003

Country	GNP Per Capita based on PPP (US\$)	Population living below \$1 a day	Life Expectancy at Birth	Infant Mortality Rate per 1000	Access to Safe Water (%)	Access to Sanitation (%)	Literacy Rate (%)
Angola	2344	-	47	154	50	30	-
Benin	1115	-	53	91	68	32	40
Botswana	8714	-	38	82	95	41	76
Burkina Faso		45	43	107	51	12	-
Burundi		55	42	114	79	36	50
Cameroon	648	17	48	95	63	48	-
Cape Verde	2118	-	69	26	80	42	76
Central Africa Rep.	5214	-	42	115	25	27	-
Chad	1089	-	48	117	34	8	46
Comoros	1210	-	62	54	94	23	56
Congo	1714	-	52	81	46	9	83
Congo DR	965	-	45	129	46	29	-
Cote'd Ivoire	697	11	45	117	84	40	-
Djibouti	1476	-	43	80	80	50	-
Equatorial Guinea	2086	-	52	97	44	53	-
Eritrea	-	-	51	97	57	9	-
Ethiopia	849	23	42	45	22	6	42
Gabon	711	-	53	60	87	36	-
Gambia	6397	-	53	90	82	53	-
Ghana	1859	45	54	59	79	58	74
Guinea	2238	-	46	104	51	13	-
Guinea Bissau	2097	-	46	126	59	34	-
Kenya	711	23	45	79	62	48	84
Lesotho	1037	36	37	79	76	37	-
Liberia	2561	-	47	157	62	26	56
Madagascar	-	61	56	78	45	33	-
Malawi	809	42	38	112	67	46	62
Mali	605	72	41	122	48	45	-
Mauritania	994	26	51	77	56	42	41
Mauritius	1766	-	72	16	100	99	-
Mozambique	11287	38	41	101	42	27	46
Namibia	1117	-	40	48	80	30	83
	6180						

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Niger	835	61	46	154	46	12	17
Nigeria	1050	70	45	98	60	38	67
Rwanda	1268	52	40	118	73	41	69
Sao Tome & Principe	-	-	66	75	79	24	-
Senegal	1648	22	52	78	72	52	39
Seychelles	-	-	73	11	87	-	-
Sierra Leone	548	-	37	166	57	39	-
Somalia	-	-	47	133	29	25	-
South Africa	10346	11	46	53	87	67	86
Sudan	1910	-	59	63	69	34	60
Swaziland	4726	8	43	105	52	52	81
Tanzania	621	-	43	104	73	46	77
Togo	1696	-	50	78	51	34	60
Uganda	1457	85	43	81	56	41	69
Zambia	877	64	36	102	55	45	80
Zimbabwe	-	56	39	78	83	57	90

Sources: World Bank (2005a 2005b)

Table 2: Regression Results of the Determinants of Poverty in Sub-Saharan Africa.

Variable	Co-efficient estimates and t-value
Intercept (t)	0.66(0.11)
In Popu _i (t)	0.94(1.66)**
Infla _i (t)	0.07 (0.38)
In Exdebt _i (t)	0.19(0.49)
InAduill _i (t)	-0.13(0.24)
InLacHeal _i (t)	-0.32(-0.21)
InlacSW _i (t)	0.35(0.79)
InLoEcAc _i (t)	1.21 (3.00)*
InPoEnv _i (t)	-0.89 (-1.64)**
Gdis _i (t)	1.84 (0.60)
Ethiconfl _i (t)	0.71 (1.33)
HIV/AIDS _i (t)	9.55 (0.35)
R ²	0.74
R ² Adjusted	0.59
F	4.96

t-values in parenthesis * statistically significant at 5 percent level ** Statistically significant at 10 percent level

Appendix 1: Countries selected for the study in Sub-Saharan Africa

Angola*	Cote'd Ivoire*	Liberia*	Senegal
Benin	Djibouti	Madagascar	Seychelles
Botswana	Equatorial Guinea*	Malawi	Sierra Leone*
Burkina Faso	Eritrea*	Mali	Somalia*
Burundi*	Ethiopia*	Mauritania	South Africa
Cameroon	Gabon	Mauritius	Sudan*
Cape Verde	Gambia	Mozambique*	Swaziland
Central Africa Rep.*	Ghana	Namibia	Tanzania
Chad*	Guinea	Niger	Togo
Comoros*	Guinea Bissau*	Nigeria	Uganda*
Congo*	Kenya	Rwanda*	Zambia
Congo DR*	Lesotho	Sao Tome & Principe	Zimbabwe

*Indicates the countries that are either recovering from war or still at war in Sub-Saharan Africa