Sensitivity Analysis of Operational Priorities (Strategies) of African Development Bank in Poverty Eradication in Africa

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Abstract

Specifically, this paper examines the applicability and effectiveness of the African Development Bank's priorities known as the "High-Five priorities" in poverty eradication in Africa. These priorities are agriculture, industries, regional integration, infrastructures and quality of human life. The study uses exploratory research strategy and simple random technique. The panel data are sampled from 2013 to 2017 in 48 Sub -Saharan African countries. The random effects model and vector autoregressive (VAR) model are used to analyse the data. The study finds that the High-Five Bank priorities are ineffective to reduce the income and non-monetary poverty rate in a short – term and evidenced to be effective for long-term. Moreover, the priorities evidence to have a power to reduce the poverty gap in a short-term. The paper recommends that the prioritising on the High-Five priorities is a relevant for the long-term goals, but lacks its relevance for short- term interventions. Therefore, for optimal poverty eradication strategy, short- term and long- term strategy are required.
Keywords: High-Five priorities; Poverty eradication; Poverty gap index; Multidimensional poverty index; And poverty headcount rate.

1. Introduction

Africa has been implementing its poverty and development action plans for many decades with success on economic growth, but still experiences steady failures on its poverty eradication action plans (African Development Bank, 2015; United Nations, 2015a). The major challenge faces is how to choose an appropriate set of targets (prioritized macroeconomic variables) that will foster economic growth and the same time reduce the poverty in a country. In other words, despite the impressive growth performance the continent still faces two major growth-related challenges. The first challenge is that it is not known whether the current growth paths to either sustainable or sufficient to make real inroads into poverty. The second concern is the existence of the wide disparity between observed growth and the scale of poverty reduction across the continent (African Development Bank, 2015). In most countries in Africa, economic growth has not translated into commensurate levels of poverty reduction (African Development Bank, 2015). There is apparent disconnect between growth and poverty reduction, that raised concerns among policy makers and researchers, leading to consensus that this mismatch needed to be addressed with a sense of urgency (African Development Bank, 2015). This mismatch increases the cost of implementation and misallocation of resources for inappropriately set of prioritised macroeconomic variables (African Development Bank, 2015).

The report of African Development Bank (2015), United Nations (2015a) and other evidence the poverty situation in Africa is still an issue of emergence. The reports show that poverty has declined in Africa but remain high in comparison with regions (African Development Bank, 2015). High inequality undermines the efficacy of growth in reducing poverty (African Development Bank, 2015).Gender disparities in income, access to health, and education, youth unemployment, poor agriculture practices are pervasive in the continent, and contributing more on hindering the poverty reduction in Africa (African Development Bank, 2015; United Nations, 2015a;2015b).

One decisional question to ask is why there is an apparent mismatch of the growth and poverty reduction? What is the proper set of prioritising macroeconomic variables in poverty eradication strategy in Africa? In attempting to answer these policy and decisional questions African Development Bank Group sets its operational priorities in eradicating the poverty in Africa. For the next ten years, the Bank will be implementing its Ten Year Strategy (TYS) identified by five key priority areas called the High-Five 2015. The High-Five priorities of the Bank include agriculture development, infrastructure development, economic integration, industrialization, and improvement of the quality human of life of Africans (African Development Bank, 2015).

The Bank priorities are now *convincing targets* for African countries as they set by an economical and financial influential organ in the Africa. Until now, there has been no empirical evidence provided by academicians, researchers or policy makers on the effectiveness of these Bank priorities in reducing poverty. No empirical studies have been done on this. They have not tested empirically to understand their sensitivity on poverty reduction. In addition the literature provides contradicting supports on Bank priorities. Some studies in Africa do not support the agriculture to be priority in poverty reduction in Africa, for example Geda *et al.* (2005), Jerve and Ostad (2000), Krantz (2001) and Anyanwu (2005). They confirm that full engagement in agriculture activities increases the likelihood of poverty of an individual. Moreover, health, education, gender equity, employment are sub-sets of the

priorities of the Bank, but also the literature poses contradicting conclusions on these variables. For example, Dursun and Ogunleye (2016) confirm employment– intensive growth is necessary but not sufficient to reduce poverty.

From this contradiction of empirical fact we cannot conclude that the growth under High Five will eradicate poverty in Africa and the same time offers the sustainable economic growth. We need further empirical examination on the growth and poverty eradication in relation to Bank priorities.

Specifically, this study aims to examine the applicability of High-Five Bank Priorities in policy setting in Africa, examine the effectiveness of High-Five Bank Priorities in eradicating the poverty in Africa (the link and causality analysis), and to establish the effective macroeconomic prioritised strategies (MPS) for poverty eradication in Africa (directive-policy priorities). The paper confirms if the Bank's priorities overcome the problem of growth and poverty mismatch and ensure the growth sustainability in Africa, or not.

2. Theories Analysis

The preceding theories of the poverty and inequality explain more on the causes of poverty and inequality. The sociologist, Herbert Spencer (1820–1903), the founder of the individualism theory, blamed poverty on the poor. He claimed that the poor were lazy, and those who did not want to work should not be allowed to eat, and the government should intervene little. The core philosophical standing of the Spencer was individual to stand alone with his/her ability and develops his /her capacity to master his/her environment. The theory criticized by Ehrenreich (2012a), Ehrenreich (2012b) that it ignores discrimination and other problems in   society and exaggerates the degree to which the poor and non- poor do in fact hold different values. On the other hand, and Small *et al.* (2010) support the individualistic explanation by showing that the poor do have certain values and follow certain practices that augment their plight. Actually, the theory ignores the inequality in income and social values in the society.

Lewis (1961), developed the theory of culture of poverty. This theory figures the poverty as the way of life (culture) that an individual or society live. This culture is learned, shared and socially transmitted from generation to generation (psychological effects on children). Recently study criticises this theory. For example, Leacock (1971) disagrees with the assumption that culture is relatively fixed and unchanging. That is, once a population exists within the culture of poverty, no amount of intervention in terms of alleviation of poverty will change the cultural attitudes and behaviours held by members of that population. Moreover, there is no conclusive empirical evidence that public assistance to the poor, in the form of welfare or other direct assistance cannot eliminate poverty, since poverty is inherent in the culture of the poor (Leacock, 1971; Lewis, 1959).

Sen's series of academic works in between the 1980s and 1990s developed the approach concern on determining the poverty of an individual. The individual poverty is determined in his/her level of deprivation of his/her endowed a set of capabilities. This approach suggests a set of the capabilities that required for escaping the poverty includes the basic capabilities as to have enough food, to be sheltered, to be clothed, and to have a good health and education (Sen, 1985). Thus, according to this approach resources accessibility, social inclusion, freedom and gender equality are good strategies for poverty reduction. The theory criticised by Gore (1997) as only considers states of affairs and social arrangements in terms of how good or bad they are for an individual's well-being and freedom.

3. Review of Empirical Studies

The issue of poverty has been addressed empirically by various scholars in Africa and out of the continent. McKinley (2003), found the policy prioritization on public investments will foster both economic growth and reduce poverty. He suggests that controlling inflation, increasing saving rate, improving financial institutions for direct credit, stronger regulations, employment generation and agricultural development will be the prioritization macroeconomic intervention. This finding supports the United Nations Development Programme (UNDP) (2006) that reports that the public investment and allocating credit will stimulate growth and employments. The report evidences that, in other countries the growth cannot be translated effectively into poverty reduction without creating broad-based employments. Moreover, the increases of tax revenues and job generation will be given priority to support the public investments United Nations Development Programme (UNDP) (2006).

The empirical studies in Africa evidence some contradicting facts. According to Adeyemi *et al.* (2009) suggest that control of population rate; inflation and external serving, and improve economic activities and gender equity will be prioritised as they found to have an influence on the poverty reduction in Africa. They support McKinley (2003). On the other hand, (Fosu, 2015) finds that the income growth is an engine of the poverty reduction in SSA countries. Dursun and Ogunleye (2016), evidence that economic growth and employment have a positive influence on poverty reduction, but with statistically insignificant with employments. They suggest that employment-intensive growth is necessary but not sufficient to reduce the poverty and linked to the economic sectors that affect the poor.

Some empirical studies confirm that government expenditure, population growth and flow of FDI increase the poverty, the domestic investment, trade openness , GNI per capita and income inequalities increases the poverty in Africa (Ncube *et al.*, 2014). Thus, improving the domestic investment, offering education particular primary, women empowerment in rural areas, will be prioritised. Moreover, the involving on the private partners, improving infrastructure, trade openness policy and family planning are among the priorities. Apata *et al.* (2010), in Nigeria, found limited access of micro-credit, education and gender discrimination in the rural cause the poverty in the country. They   recommend that only priorities on poverty eradication in the rural are increasing the agricultural participation, remove the gender disparity through women empowerment to legal property, channelling the microcredit services in the rural areas. Contrary to Geda *et al.* (2005); Jerve and Ostad (2000); Krantz (2001), and other who suggest that the participation in agriculture increase the poverty intensity (vulnerability) of an individual. Some studies evidence some cultural practices have an influence on poverty intensity. For example, Anyanwu

(2013a) found that the monogamous marriages, separated or divorce and widowhood are negatively and significantly correlated with poor and the household size is positively related to probability of being a poor. Therefore, education and gender, being educated and a man reduce the probability of being a poor. He suggests a legal setting to encourage monogamous marriages, free education and family planning scheme are policy priorities in Nigeria.

Anyanwu (2013b), evidences that a high inflation, mineral rent, primary education alone, population and income inequality are constraints for poverty reduction in Africa. They find that trade openness, higher real capita GDP, and secondary education reduce the poverty in Africa. Therefore, these are sets of priority for the macroeconomic reform. He confirms to Anyanwu (2005); Aikaeli (2010); Yusuf *et al.* (2015); Kamuzora and Mkanda (2000) and other who find that household size, age, employment status of the head, primary education and below, rural occupation in the clerical, production and other activities are determinants of poverty. Anyanwu (2005) goes in line to Sekhampu (2013) who suggests that the most intervention on poverty eradication in South Africa Township is creating employment opportunities for household head.

In Ethiopia, Bogale *et al.* (2005) confirm that the poverty in a country is linked to the failure of the household to own important resources such as lands, human capital and oxen. Geda *et al.* (2005), support Anyanwu (2005), Sekhampu (2013); Magombeyi and Odhiambo (2016); Anyanwu (2013a); Anyanwu (2013b); and contrary suggest that engaging on agricultural activities increases the poverty probability. They recommend the increasing of the investment in agriculture, provision of education mostly in rural areas, and women education, and attainment of education (secondary and universities) for heads of the households are the policy priorities in Nigeria. According to Abebe and Quaicoe (2014) define poverty by encompassing the political factors, economic factors, cultural factors, agricultural and health factors. They suggest that net official aids, fertility rate, infant mortality rate has negative impact on SSA countries. On the other hand, the ratio of credit to private sector, access to drink water and food product, have significant impact on poverty reduction.

In Tanzania, Mashindano and Maro (2011), examine the causes of economic growth mismatch to poverty reduction. They find that unequal sector growth is the major problem in Tanzania. They evidence the lower growth in the agricultural sector than in other sectors, such as industrial and services. Furthermore, they find a poor channelling of the microcredit to the poor, poor agricultural policy and implementation, weak auditing and financial accountability, limited education for girls and economic opportunities for women, long time of schooling and high population growth rate are poverty contributory factors in Tanzania. They support to Anyanwu (2005); Sekhampu (2013); Mashindano (2009), and other.

According to Jerve and Ostad (2000), the target school-feeding programme, intensive public works, group based saving and credit schemes, good governance and anti-corruption programmes are good policy priorities for reduction of poverty. VoiPio and Hoebink (1998), find that the poor farming causes of poverty are declining soil fertility, poor farming technology (hand hoes), lacks of land and others assets, skills, employment opportunity and capital (credit), irresponsibility, laziness and alcoholism. They support to Aman (2005); Lyatuu and Nie (2015), and Lyatuu *et al.* (2015) who suggest that the increases of agricultural productivity and farming technology in Tanzania will reduce the poverty. On the other hand, Mbilinyi and Nyoni (2000) suggest that the community self-help programmes, universal primary education, health services and water are priorities for poverty reduction. Moreover, they suggest that progressive taxation policies, employment creation, and scholarship for poor to secondary schools and tertiary level, involvement of civil - society organisation and NGOs in all levels should be prioritised.

4. Research Gap Identified

The debate on what macroeconomic variables to be prioritised in poverty eradication has not put at an end by a literature. The previous literature shows contradicting findings in some areas of the Bank's High-Five priorities. For example, Geda *et al.* (2005); Jerve and Ostad (2000), Krantz (2001) and Anyanwu (2005) suggest that full engagement in agriculture activities increases the likelihood of poverty of an individual. This means, prioritising agriculture is not worth. On the other hand, Apata *et al.* (2010), Aman (2005); Mashindano (2009); Lyatuu and Nie (2015) suggest that the increases of participation in agriculture activities will reduce the poverty. Moreover, Krantz (2001); Mbilinyi and Nyoni (2000) find that prioritization in primary education reduce the poverty but contradicted to Anyanwu (2013a); Anyanwu (2013b) and Anyanwu (2005) who find that prioritisation in secondary and tertiary education will reduce the poverty in the country. Furthermore, United Nations Development Programme (UNDP) (2006); Sekhampu (2013) and Anyanwu (2005) confirm that employment –intensive growth is a relevant priority to reduced poverty. They contradict to Dursun and Ogunleye (2016) who find employment –intensive growth is necessary but not sufficient to reduce poverty. Therefore, the literature does not close the window on debates on growth and poverty reduction mismatch as no general consensus reached. Moreover, the there is no study done on specifically to test empirical effectiveness of the High-Five Bank priorities in Africa. This study is going to bridge up this literature gap.

5. Conceptual Framework

The previous literature shows some pitfalls in addressing the challenge of a mismatch of growth and poverty reduction in Africa. The literature provides contradicting empirical findings on agriculture, education and employment priorities. Moreover, the literature excludes some of the Bank priorities, which are regional integration, quality human life, and industrialisation. From this standing, we build up an economical model that determines/defines the empirical function of the poverty on TYS Bank priorities.

Proposition: *In the competitive market economy, the poverty intensity is determined by the level (status) agriculture, infrastructure, regional integration, quality human life, and industrialisation.*

6. Economic Model

Poverty intensity = f (Agriculture, Infrastructure, Regional Integration, Quality Human Life, Industrialisation)

Let Poverty intensity be measured in multidimensional poverty index (MPI), Poverty Headcount Rate (H), and Poverty Gap Index (Z) be an *empirical function* of High-Five Bank priorities measured in Agriculture-Growth Ratio (AGR), PIDA infrastructure Score (β), Regional Integration Stage-Score ($RISS$), Industrialisation-Growth Ratio (IGR), and Quality of Human Life Score (HQL),

Therefore,

$$Poverty\ intensity\ (MPI, H, Z)\ =\ f\ (AGR, \beta, RISS, IGR, HQL)\ ,\ldots\ldots\ldots\ldots\ldots.(i)$$

Taking the partial derivatives of equations (i) –Sensitivity Analysis, we get *Variable Elasticity Coefficient (VEC) of Poverty*

That is,

$$\frac{\delta(MPI, H, Z)}{\delta(AGR, \beta, RISS, IGR, HQ)}\ =\ VEC\ \ldots\ldots\ldots\ldots\ldots\ldots..\ldots\ldots\ldots..\ldots\ldots\ldots\ldots\ldots\ldots.(ii)$$

The *Variable Elasticity Coefficient of Poverty* is a rate of change of the poverty level per unit macro variable at a particular time. VEC is just simply the first derivative of poverty empirical function with respect to its predictor variables.

6.1. Research Hypotheses

The study is guided with the following null hypotheses statements:-

$H_{0.1}$: There is no significance relationship between multidimensional poverty index and the High- Five Bank priorities in Africa.

$H_{0.2}$: There is no significance relationship between poverty headcount rate and the High-FiveBank priorities in Africa.

$H_{0.3}$: There is no significance relationship between poverty gaps index the High-Five Bank priorities in Africa.

7. Material and Methods

7.1. Research Strategies and Sampling Design

This study uses exploratory research strategy. Exploratory research seeks to generate posterior hypotheses by examining a data-set and looking for potential relations between variables (Saunders *et al.*, 2003). The advantage of exploratory research is that it is easier to make new discoveries due to the less stringent methodological restrictions (Kothari, 2009; Saunders *et al.*, 2003). The study describes the population as all the African countries. The main reason to select the Africa continent is due to African Development Bank (2015) to show that Africa continent is still suffering from extreme poverty and failing to reduce the poverty. The study is conducted on 48 Sub-Saharan Africa countries.

7.2. Sampling Design and Procedures

This study uses a simple random technique that offers equal chances of being selecting in the study for Sub-Saharan Africa countries. The sample size of this study is 48 Sub -Saharan African countries obtained by using Slovin's formula because of nature of data assumed to be normally distributed.

$$n = \frac{N}{1 + Ne^2} = \frac{54}{1 + 54.(0.05)^2} = 48$$

Where, n = a sample size, N =Population size, and e =desired margin of error.

7.3. Type of Data and Data Sources

This study uses panel data, the data that involve repeated observations of the same items over long periods of time. The panel data is used because only quantitative data can be analyzed statistically and thus more rigorous assessments of the data are possible (Kothari, 2009). The study used secondary data extracted from National Bureau of Statistics (NBS), Household Budget Survey (HBS), World Banks, IMF and African Development Bank Group. This study uses the records the tools of collecting data. Records refer to all numbers and statistics that institutions, organisations and people keep as a record of their activities (Kothari, 2009; Saunders *et al.*, 2003). The tools have methodological advantages that are unbiased, often cover long period of time, can provide comparative and contextual data and inexpensive. Moreover, the study employed the multistage secondary data analysis – documentary data and survey-based secondary data analysis.

7.4. Data Processing and Analysis

The data are analysed in two strong statistical measures, i.e., the random effect regression and vector autoregressive (VAR) model are used because the study aims to generalise the finding to the large population –the Africa Continent. *Regression coefficient analysis (RCA)* is done to explore the most influential explanatory variables. In order to ensure the most important or influential variables the *differential sensitivity analysis (DSA)* is done. DSA is the application of the partial derivatives of the stepwise regression model (SRM).

7.5. Empirical Econometric Model

From the economic model,

$$Poverty\ (MPI, H, Z) = f\ (\alpha, \beta, \chi, A, \mu)\ , \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (iii)$$

We establish the econometric variables relations,

$$(MPI, H, Z)_{it} = \beta_0 + \beta X_{it} + Z_i \gamma + \alpha_i + \varepsilon_{it} \ldots \ldots \ldots \ldots \ldots (iv)$$

Whereby,

β_0 = constant values, whereby all the explanatory variables at zero or equal to zero

β = are acceleration factors/sensitivity coefficients of the explanatory variables.

$(MPI, H, Z)_{it}$ = dependent variable observed for individual i in time t. These are Multidimensional Poverty Index, H =Poverty Headcount Index, and Z =Poverty Gap Index.

X_{it} = the time-variant regressor, these are Agricultural – Growth Ratio, Regional Integration Stage-Score, Industrialization – Growth Ratio, PIDA Infrastructure Scores, and Human Life Quality (HLQ) Scores.

Z_i = the time –invariant regressor observed

α_i = the unobserved individual effect, and

ε_{it} = is the error term

8. Results and Findings

8.1. Validation of Econometric Data and Models

Both data collected and econometric models are technically and scientifically validated. Redundant Fixed Effects Tests and Correlated Random Effects - Hausman Test are used.

8.1.1. The Redundant Fixed Effects Tests

In order to determine whether the fixed effects are necessary or not, we run the redundant fixed effects test, which means F-test between the restricted model (Pooled OLS) and the unrestricted model (fixed effect model). The F-statistic indicates that the fixed effects model is not redundant, the null hypothesis is rejected at 5 percent of the significance level, since the probability of F-statistic is less than 0.05, that is 0.000 (Table 1). That is, the fixed effect coefficients of the fixed effects model are not zeros; therefore the fixed effects are necessary in this study.

Table-1. The Redundant Fixed Effects Tests

Redundant Fixed Effects Tests			
Pool: Untitled			
Test cross-section fixed effects			
Effects Test	Statistic	d.f.	Prob.
Cross-section F	0.000000	(47,11464)	1.0000
Cross-section Chi-square	0.000000	47	0.0000

Source: Author (2017).

Table 1 shows the redundant fixed effects tests of the panel data of the range 2013 to 2017, sampled from 48 African countries. The tests reject the null hypothesis that all the fixed effect coefficients of the fixed model are zeros.

8.1.2. Correlated Random Effects - Hausman Test

The Hausman test is used to choose an appropriate panel estimation model between the fixed and random effects. The test evidence (Hausman test) accepts the null hypothesis, at 5 percent level of significance, that is, there is no significant correlation between regressors and effects. This means that both Fixed Effects and Random Effects are consistent, but Random Effect is more consistent. From this statistical evidence, the study employs *Random Effects Model (Table 2).*

Table-2. Correlated Random Effects –Hausman Test Results

Correlated Random Effects - Hausman Test			
Pool: Untitled			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	8	1.0000

Source: Author (2017).

Table 2 shows the Hausman test of the panel data of the range of 2013 to 2017, sampled from 48 African countries. The table profiles that the null hypothesis is accepted since the probability value of the Chi-Sq Statistic greater than 5 percent.

8.1.3. Pooled Descriptive Statistics of Variables

The descriptive statistics of the panel data from 48 countries of Africa are established for the purpose of describing the general empirical profile of the poverty and the High –Five Priorities in Africa. The main statistical

measures aimed are mean, maximum, minimum and standard deviation of both dependent variables and independent variables (Table.3)

Table-3. The Pooled Descriptive Statistics of the Panel Data 2013 to 2017

	Z	AGR	IGR	RISS	PAE	PAW	PICT	PPR	HLQ	MPI	H
Mean	0.460	0.232	0.239	0.35	0.379	0.697	0.189	0.231	0.367	0.370	0.466
Maximum	0.890	0.711	0.717	0.43	10.03	0.999	0.565	0.980	0.786	0.660	0.890
Minimum	0.080	0.002	0.057	0.10	0.010	0.102	0.009	0.005	0.183	0.003	0.003
Std. Dev.	0.167	0.169	0.138	0.019	0.672	0.192	0.138	0.211	0.117	0.153	0.228
Skewness	-0.006	0.747	1.761	15.29	12.39	-0.837	0.986	1.994	1.539	-0.453	-0.101
Kurtosis	2.487	3.024	6.287	235.8	177.7	3.700	3.590	6.895	5.473	2.442	2.139
Probability	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observation	11520	11520	11520	11520	11520	11520	11520	11520	11520	11520	11520
Cross sections	48	48	48	48	48	48	48	48	48	48	48

Source: Author (2017)

Table 3 shows the pooled descriptive statistics of the panel data sampled from 48 countries in Africa. The table profiles the general characteristics of the macroeconomic variables in the Africa. It evidences that about 46.6 percent of the populations in Africa is living on less than $1.90 a day, and the range of poverty headcount rate is 88.7 percent.

8.2. Cross- Country Analysis of Poverty in Africa

The cross-country analysis of poverty is done in order to examine the intensity level of poverty within the continent. The study uses three indicators of poverty which are poverty headcount rate, poverty gap index, and multidimensional poverty index.

Table-4. The Cumulative Frequency of the Poverty Headcount Rate in Africa

Tabulation of H				
Date: 10/23/17 Time: 21:49				
Sample: 2013- 2017				
Included observations: 240				
Number of categories: 5				
			Cumulative	Cumulative
Value	Count	Percent	Count	Percent
[0, 0.2)	34	14.17	34	14.17
[0.2, 0.4)	49	20.42	83	34.58
[0.4, 0.6)	75	31.25	158	65.83
[0.6, 0.8)	57	23.75	215	89.58
[0.8, 1)	25	10.42	240	100.00
Total	240	100.00	240	100.00

Source: Author (2017)

Table 4 shows the frequency distribution of poverty headcount rate of 48 African countries, sampled from 2013 to 2017. The poverty headcount rate is averaged to 46.6 percent (Table 3). The cross-country analysis (Table 4) shows that more than 54 percent of African countries experience a poverty rate of about 40-60 percent. Moreover, 10.4 percent of African countries experience the highest poverty rate of at or more than 80 percent. Only 14.6 percent of African countries experience with a poverty rate below 20 percent.

The depth of poverty (poverty gap) is still high in Africa. The table 3 shows that Africa has averaged to 46.0 percent of the income/consumptions demanded/required by the population living under the poverty line of living below at $1.90 per day to run out from the poverty line/boundary. The continent of Africa is characterized by deep poverty gap. The empirical analysis (Table 5) shows the cross-country analysis and it profiles that about 29.2 percent of the African countries experience a poverty gap of about 20-30 percent, 41.7 percent of African countries experience a poverty gap of a range of 40-50 percent. Moreover, about 22.9 percent of countries in Africa experience a poverty range of 60-70 percent, and only 2 percent of countries in Africa experience a poverty gap at 80 percent or more.

Table-5. Cumulative Frequency of the Poverty Gap in Africa

Tabulation of Z				
Sample: 2013 - 2017				
Included observations: 240				
			Cumulative	Cumulative
Value	Count	Percent	Count	Percent
[0, 0.2)	14	5.83	14	5.83
[0.2, 0.4)	68	28.33	82	34.17
[0.4, 0.6)	101	42.08	183	76.25
[0.6, 0.8)	54	22.50	237	98.75
[0.8, 1)	3	1.25	240	100.00
Total	240	100.00	240	100.00

Source: Author (2017).

Table 5 shows the frequency distribution of poverty gap of 48 African countries, sampled from 2013 to 2017.

The multidimensional poverty –the acute poverty in Africa is still extremely high. The study (Table 3) evidences that about 37 per cent of the African people suffer from an acute poverty, that is, the continent has limited access of good education in term of quality, limited access of health services and having poor living standard. The cross-country analysis of multidimensional poverty shows that about 31.25 percent of African countries experience multidimensional poverty rate at a range of 20-30 percents, about 43.7 percent experience 40-50 percent. Only 18.8 percent experience the rate below 20 percent.

Table-6. The Cumulative Frequency of the Multidimensional Poverty Index in Africa

Tabulation of MPI				
Date: 10/23/17 Time: 21:50				
Sample: 2013- 2017				
Included observations: 240				
Number of categories: 4				
			Cumulative	Cumulative
Value	Count	Percent	Count	Percent
[0, 0.2)	47	19.58	47	19.58
[0.2, 0.4)	77	32.08	124	51.67
[0.4, 0.6)	107	44.58	231	96.25
[0.6, 0.8)	9	3.75	240	100.00
Total	240	100.00	240	100.00

Source: Author (2017)

Table 6 shows the frequency distribution of the multidimensional poverty index (MPI) of 48 African countries sampled from 2013 to 2017. The table depicts that about 48.23 percent of the African countries have at least 40 percent of MPI. This indicates the presence of high multidimensional poverty in many countries in Africa.

8.3. Cross- Country Analysis of High-Five Priorities in Africa

In 2015 African Development Bank Group, for the purpose of eradicating poverty in Africa by 2025 sets five policy priorities on eradication of poverty. These priorities known as the High-Five Bank Priorities, *which includes agriculture, industry, African regional integration, PIDA infrastructure priorities, and the quality of human life*. The Bank believes that these High- Five priorities if would be fully and effectively implemented by African countries, the poverty would be eradicated by 2025. These priorities are also area for funding priorities of the Bank. In order to understand *post or current* profile of each priority, the cross-country analysis is done. This helps to capture the real picture on how the Bank priorities had being given priority in Africa.

8.3.1. Agriculture in Africa

Agriculture is a one of the High-Five priorities of a Bank that had been implemented for many years by African countries. The study measures the agriculture intensity by agricultural – growth ratio (AGR). The table 3 shows that the AGR is averaged at 23.2 percent in Africa. The cross-country analysis shows that the table depicts the agriculture is given policy consideration/priority in Africa, as evidenced by the study that about 43.33 percent of the countries in Africa use less than 20 percent of AGR on the GDP. Only about 14.58 percent of the countries in Africa allocate more than 40 percent of agricultural budget on their national income but less than 60 percent (Table 7).

Table-7. Cumulative Distribution of Agricultural –Growth Ratio (AGR)

Tabulation of AGR				
Sample: 2013- 2017				
Included observations: 240				
Number of categories: 4				
			Cumulative	Cumulative
Value	Count	Percent	Count	Percent
[0, 0.2)	104	43.33	104	43.33
[0.2, 0.4)	94	39.17	198	82.50
[0.4, 0.6)	35	14.58	233	97.08
[0.6, 0.8)	7	2.92	240	100.00
Total	240	100.00	240	100.00

Source: Author (2017)

Table 7 shows the cumulative frequency of the AGR of 48 African countries, for the range of 5 years from 2013 to 2017. This empirical fact indicates that the agriculture in Africa is still given less policy priority for poverty eradication as recommended African Development Bank (2015). Only about 2.9 percent of the samples countries use more 50 percent.

8.4. Industrialization in Africa

Generally, the industrialization in Africa is still an infant and less competitive. The empirical study uses industrialisation growth rate (IGR) to measure the intensity of the industrial budgetary priority in a country. The empirical data show that about 23.9 per cent of the GDP of African countries allocated to the industrial sector. The cross-country analysis indicates that industrialisation is less given less priority in the most of Africa countries (Table 8).

Table-8. The Cumulative Frequency of Industrial –Growth Ratio (IGR)

Tabulation of IGR				
Sample: 2013 -2017				
Included observations: 240				
Number of categories: 4				
			Cumulative	Cumulative
Value	Count	Percent	Count	Percent
[0, 0.2)	113	47.08	113	47.08
[0.2, 0.4)	107	44.58	220	91.67
[0.4, 0.6)	5	2.08	225	93.75
[0.6, 0.8)	15	6.25	240	100.00
Total	240	100.00	240	100.00

Source: Author (2017).

Table 8 shows the cumulative frequency of the IGR of 48 African countries data sampled from 2013 to 2017. The table depicts the fact that the industrialization is not a priority in most of African countries. The table portrays that about 47.08 per cent of the African countries allocate less than 20 percent of their GDP for industrial sector to support industries activities. Moreover, about 44.58 percent of the African countries allocate at 20-30 percent of their GDP.

8.5. Regional Integration in Africa

Regional integration is historical agenda in Africa as framed early in 1963 under the Organisation of African Unity (OAU) and later on the African Union (AU) in 26, May 2001. In this study the African Regional Integration (ARI) measured in African Regional Integration Index established by UNECA, (African Development Bank Africa Union and United Nations Economic Commission for Africa, 2016)[1].

The empirical data show Africa is still in the early stages of the regional integration agreements. The regional integration index is averaged at 0.3 (Table 3). This means that the most of regional economic communities (RECs) in Africa are in early stage of the integration process. The cross-country analysis shows that more than 99 percent of the African countries are not entered in the second stage of the regional integration process (Table 9). This indicates that the regional integration in Africa is given less consideration. In other words the regional integration is not the policy priority in African countries. Most of the RECs in Africa are in the first stage of the integration process, that is, Free Trade Agreement (FTA).

Table-9. The Cumulative Frequency of the Regional Integration Stage Score (RISS)

Tabulation of RISS				
Sample: 2013- 2017				
Included observations: 240				
Number of categories: 2				
			Cumulative	Cumulative
Value	Count	Percent	Count	Percent
[0, 0.1)	239	99.58	239	99.58
[0.3, 0.4)	1	0.42	240	100.00
Total	240	100.00	240	100.00

Source: Author (2017).

Table 9 shows the cumulative frequency of the RISS of 48 African countries sampled from 2013 to 2017. The table evidences that about 99.58 percent of African countries that are still on negotiation or implementing the Free Trade Agreement (FTA). This means that the regional integration is not given a priority in most of the African countries. The study evidences that only 0.42 percent of the African countries have entered the second stage of integration that is customs union, but not completed the stage.

8.6. PIDA Infrastructure Priorities in Africa

The Programme for Infrastructure Development in Africa (PIDA) establishes a set of four key infrastructure priorities for poverty eradication in Africa. This set of infrastructure is one the elements of the High-Five priorities.

[1]African Regional Integration Index (ARII) is made up of five Dimensions (trade integration, regional infrastructure, production integration, free movement of people, and financial and macroeconomic integration).

Sixteen Indicators (based on available data), which cut across the five Dimensions, have been used to calculate the Index.

These infrastructures include energy particularly electricity, transportation, water and sanitation, and information and technology.

To measure these sets of infrastructure established by PIDA, this study establishes the PIDA scores by the Population –Access Percentage System (PAPS). These scores are the percentages of population accessing electricity, improved water, use internet and percentages of the paved roads in a country (Appendix A).

8.6.1. Electricity Accessibility in Africa

Table 3 profiles that about 37.9 percent of the population in Africa access electricity, with a range of 1 percent to 100 percent. This means that the most of African countries have limited access of electricity. The range is extremely large about 99 percent; this indicates the extreme variation within the continent. The cross-country analysis of the empirical data shows that about 99.58 percent of the African countries have 0 - 5 percent of their population that access electricity, and only 0.42 percent of the African countries have about 10-15 percent of their population who access electricity (Table 10). The electricity has a positive role in industrialization in Africa. Less priority on electricity endangers the industrialization in Africa.

Table-10. Cumulative Frequency of the Percentage of Accessing Electricity (PAE)

Tabulation of PAE				
Sample: 2013 -2017				
Included observations: 240				
Number of categories: 2				
			Cumulative	Cumulative
Value	Count	Percent	Count	Percent
[0, 5)	239	99.58	239	99.58
[10, 15)	1	0.42	240	100.00
Total	240	100.00	240	100.00

Source: Author (2017)

Table 10 shows the cumulative frequency of percentage of population accessing electricity (PAE) for 48 African countries sampled from 2013 to 2017. The table evidences that Africa is not fully electrified. That is, it still needs more efforts on electrification and powering Africa, particularly in rural.

8.6.2. Improved Water Accessibility in Africa

Improved water has a positive contribution on health status in a country. The empirical data on table 3 depict that about 69.7 percent of the population in Africa access improved water. Even though there is an extreme variation within the countries of about 89.7 percent, the issue of water and sanitation is now solved to some extent in African countries. The cross-country analysis shows that only 5.83 percent of the countries in Africa offer improved water for less than 40 percent to their population (Table 11).

Table-11. The Cumulative Frequency of Percentage of Accessing Water (PAW)

Tabulation of PAW				
Sample: 2013- 2017				
Included observations: 240				
Number of categories: 5				
			Cumulative	Cumulative
Value	Count	Percent	Count	Percent
[0, 0.2)	9	3.75	9	3.75
[0.2, 0.4)	5	2.08	14	5.83
[0.4, 0.6)	63	26.25	77	32.08
[0.6, 0.8)	89	37.08	166	69.17
[0.8, 1)	74	30.83	240	100.00
Total	240	100.00	240	100.00

Source: Author (2017)

Table 11 shows the cumulative frequency of the percentage of population accessing improved water (PAW) for 48 African countries, sampled from 2013 to 2017. It shows that about 67.91 percent of the countries in Africa, at least 60 percent of their population access the improved water. This is an improvement.

8.6.3. Information and Communication Technology (ICT) Accessibility in Africa

The advancement of ICT in a country has a positive impact on the human developments. The use of ICT is the one of PIDA infrastructure priorities. The study uses the internet accessibility proxy to ICT development. The people in Africa who access internet are about 18.9 percent. The percentage ranges from to 0.9 percent (minimum)

to 56.5 percent (maximum). The cross-country analysis shows that about 55.42 percent of African countries, less than 20 percent of their population access internet (Table 12).

Table-12. The Cumulative Frequency of Percentage Accessibility of ICT in Africa

Tabulation of PICT				
Sample: 2013- 2017				
Included observations: 240				
Number of categories: 3				
			Cumulative	Cumulative
Value	Count	Percent	Count	Percent
[0, 0.2)	133	55.42	133	55.42
[0.2, 0.4)	87	36.25	220	91.67
[0.4, 0.6)	20	8.33	240	100.00
Total	240	100.00	240	100.00

Source: Author (2017).

Table 12 shows the cumulative frequency of Percentage of population accessing internet (PICT) in 48 African countries sampled from 2013 to 2017. It shows that only 8.33 percent of African countries about 40- 60 percent of their population access internet. The application/use of ICT in Africa is still limited. The number of people who access internet in each country is very small (see Appendix A). This potentially limits the advancement of innovation and creativity in a country. That is, advancement of ICT in a country activates the innovation and creativity and fosters the industrial advancement/growth by cut-off the inputs and production costs.

8.6.4. Paved Roads Accessibility in Africa

Transportation is the one component of PIDA infrastructure priorities that Bank believes that the improvement of transportation in a country will foster the poverty eradication in Africa. The study used the percentage of the paved road (PPR) in a country to indicate the situation of transportation in each country. The empirical data evidenced that about 23.1 percent of the total roads in Africa are paved and are passable throughout a year (Table 3).

The variation of the paved road within the continent is range from 0.5 percent to 98.0 percent. The cross-country analysis shows that 54.58 percent of African countries paved their national road networks at less than 20 percent of the total national road networks. This fact evidences that the transportation in Africa is still a problem. Roads are the main or prime component in the transportation (air and marine transport are not considered in this study, because are not demand for majority in Africa).

Table-13. The Cumulative Frequency of the Percentage of Paved Roads (PPR) in Africa

Tabulation of PPR				
Sample: 2013 2017				
Included observations: 240				
Number of categories: 5				
			Cumulative	Cumulative
Value	Count	Percent	Count	Percent
[0, 0.2)	131	54.58	131	54.58
[0.2, 0.4)	75	31.25	206	85.83
[0.4, 0.6)	14	5.83	220	91.67
[0.6, 0.8)	10	4.17	230	95.83
[0.8, 1)	10	4.17	240	100.00
Total	240	100.00	240	100.00

Source: Author (2017)

Table 13 shows the percentage of the paved roads (PPR) in 48 African countries sampled from 2013 to 2017. It is evidences that about 8.34 percent of African countries paved their roads at least 60 percent of their national road network.

8.7. Quality of Human Life in Africa

The quality of human life is the one of the High-Five priorities that aims to improve three social components, namely quality education, health and improved living standards. This variable measured in Inequality-Adjusted Human Development Index (IAHDI). Table 3 profiles that about human life quality scores (HQL) of Africa are averaged at 36.7 percent. It is ranges from 18.3 percent to 78.6 percent. This means that the quality of human life is Africa is highly dispersed. On the other hand, Africa has limited education/less quality education, poor health services and poor living standards. These obviously endanger the race of eradicating the poverty in Africa. The cross-country analysis shows that about 72.08 percent of African countries ranges to 20 - 30 percent of the human life quality scores (Table 14).

Table-14. The Cumulative Frequency of Human Life Quality Score/IHDI in Africa

Tabulation of HLQ				
Sample: 2013- 2017				
Included observations: 240				
Number of categories: 4				
			Cumulative	Cumulative
Value	Count	Percent	Count	Percent
[0, 0.2)	3	1.25	3	1.25
[0.2, 0.4)	173	72.08	176	73.33
[0.4, 0.6)	49	20.42	225	93.75
[0.6, 0.8)	15	6.25	240	100.00
Total	240	100.00	240	100.00

Source: Author (2017).

Table 14 shows the cumulative frequency of the HLQ for 48 African countries, sampled from 2013 to 2017. The table evidences the presence of low quality of human life in Africa.

8.8. High-Five Priorities and Poverty Eradication Nexus

The random effects model and vector autoregressive (VAR) model were run on poverty headcount rate, poverty gap index and multidimensional poverty index - as dependent variables against the High-Five priorities. The VAR model is run to cross-examine the findings of the random effects model. This is done to examine the long-run relationship of the variable (co-integration analysis).

The random effects model on poverty headcount rate shows that the probability to show up the zero coefficients for regressors of the model is almost zero, and standard deviation of the regression are almost zero (Table 15). This means, the model has less statistical noise; all the coefficients of the model are significant (non-zeros). From this model we find that, the agricultural activities, industrialization, regional integration, and increases of percentage of people who accessing improved water and percentage of paved roads do not reduce poverty rate in Africa. On the other hand, increasing the percentage of people who access electricity, improved quality of human life and uses ICT appliances, significantly reduces the poverty headcount rate in Africa. This finding should be interpreted by caution! Notice that, the Africa provision of improved water had been improved but Africa still experiences poverty. This means that the improved water is not accounted for income poverty measurement.

Table-15. The Pooled EGLS of Poverty Headcount Index and High-Five Priorities

Dependent Variable: H				
Method: Pooled EGLS (Two-way random effects)				
Sample: 2013- 2017				
Included observations: 240				
Cross-sections included: 48				
Total pool (balanced) observations: 11520				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.528576	0.011322	46.68480	0.0000
AGR	0.267831	0.014196	18.86650	0.0000
IGR	0.229661	0.013467	17.05363	0.0000
RISS	0.325379	0.096759	3.362797	0.0008
PAE	-0.016566	0.002103	-7.877398	0.0000
PAW	0.020652	0.008246	2.504457	0.0123
PICT	-0.985642	0.018190	-54.18602	0.0000
PPR	0.041780	0.007177	5.821759	0.0000
HLQ	-0.057573	0.017199	-3.347546	0.0008
	Effects Specification			
			S.D.	Rho
Cross-section random			0.000000	0.0000
Period random			0.164556	1.0000
Idiosyncratic random			5.52E-16	0.0000
	Weighted Statistics			
R-squared	0.496921	Mean dependent variance		2.04E-16
Adjusted R-squared	0.496571	S.D. dependent variance		1.04E-16
S.E. of regression	7.30E-17	Sum squared residual		6.14E-29
F-statistic	1421.260	Durbin-Watson stat		0.365832
Prob(F-statistic)	0.000000			
	Unweighted Statistics			
R-squared	0.479969	Mean dependent variance		0.465544
Sum squared resid	311.2985	Durbin-Watson stat		0.378509

Source: Author (2017)

Table 15 shows the random effects model for 48 African countries, sample from 2013 to 2017. The model is regressed by poverty headcount index as the dependent variable and time-variant regressors-the High –Five priorities. The model is explained at 50 per cent.

The random effects model was run on poverty gap index and the High-Five priorities. The model evidences that the Bank priorities reduce the poverty gap in African countries (Table 16).

Table-16. The Pooled EGLS of Poverty Gap Index and High-Five Priorities

Dependent Variable: Z				
Method: Pooled EGLS (Two-way random effects)				
Sample: 2013 -2017				
Included observations: 240				
Cross-sections included: 48				
Total pool (balanced) observations: 11520				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.951121	0.012898	73.74380	0.0000
AGR	-0.264846	0.014748	-17.95818	0.0000
IGR	-0.387081	0.016023	-24.15750	0.0000
RISS	-0.727588	0.074201	-9.805614	0.0000
PAE	-0.021798	0.002381	-9.153612	0.0000
PAW	-0.220171	0.009655	-22.80499	0.0000
PICT	-0.423194	0.013534	-31.26996	0.0000
PPR	-0.162218	0.007770	-20.87664	0.0000
HLQ	-0.015697	0.017448	-0.899620	0.3683
	Effects Specification			
			S.D.	Rho
Cross-section random			0.000000	0.0000
Period random			0.147645	1.0000
Idiosyncratic random			2.90E-16	0.0000
	Weighted Statistics			
R-squared	0.096549	Mean dependent var		1.61E-16
Adjusted R-squared	0.095921	S.D. dependent var		6.05E-17
S.E. of regression	5.56E-17	Sum squared resid		3.56E-29
F-statistic	153.7686	Durbin-Watson stat		0.451583
Prob(F-statistic)	0.000000			
	Unweighted Statistics			
R-squared	0.152882	Mean dependent var		0.460456
Sum squared resid	271.7911	Durbin-Watson stat		0.454860

Source: Author (2017)

Table 16 shows the random effects model; poverty gap index regressed with High-Five priorities. The model is explained by 10 percent of best of fit.

The random effects model was run to multidimensional poverty index and the High-Five priorities. The model evidences agriculture, industrialization, regional integration, improved water increase the poverty rate. On the other hand, the access of electricity and uses of ICT appliances reduce the poverty rate in Africa (Table 17).

Table-17. The Pooled EGLS of Multidimensional Poverty Index and High-Five Priorities

Dependent Variable: MPI				
Method: Pooled EGLS (Two-way random effects)				
Sample: 2013 2017				
Included observations: 240				
Cross-sections included: 48				
Total pool (balanced) observations: 11520				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.251600	0.008860	28.39838	0.0000
AGR	0.326911	0.011129	29.37348	0.0000
IGR	0.186065	0.010432	17.83585	0.0000
RISS	0.124213	0.051208	2.425678	0.0153
PAE	-0.000257	0.001664	-0.154585	0.8772
PAW	0.036666	0.006464	5.672108	0.0000
PICT	-0.574434	0.012958	-44.33175	0.0000

PPR	0.054303	0.005329	10.18930	0.0000
HLQ	0.170954	0.012552	13.61959	0.0000
	Effects Specification			
			S.D.	Rho
Cross-section random			0.000000	0.0000
Period random			0.118192	1.0000
Idiosyncratic random			5.06E-16	0.0000
	Weighted Statistics			
R-squared	0.399051	Mean dependent var		2.44E-16
Adjusted R-squared	0.398634	S.D. dependent var		9.96E-17
S.E. of regression	7.75E-17	Sum squared resid		6.91E-29
F-statistic	955.4648	Durbin-Watson stat		0.402130
Prob(F-statistic)	0.000000			
	Unweighted Statistics			
R-squared	0.419942	Mean dependent var		0.369900
Sum squared resid	156.1578	Durbin-Watson stat		0.398091

Source: Author (2017).

Table 17 shows the random effects model of the multidimensional poverty index as the dependent variable and High-Five priorities. The model is determined at 40 percent.

8.9. The Long-Run Effects of High-Five Priorities on Poverty

The VAR model evidences that in a long-run, industrialisation and accessibility of electricity, improved water, uses of ICT (the internet) and increases of paved roads reduces the poverty rate (Table 18). On the other hand, agriculture and quality of human life in long –run increases the poverty rate.

Table-18. The Vector Autoregressive (VAR) Model Estimates

	AGR	IGR	RISS	PAE	PAW	PICT	PRR	HQL
Z	-0.004192	0.002145	-0.027188	-0.067128	0.020507	-0.004968	0.000949	-0.002362
	(0.00602)	(0.00324)	(0.01723)	(0.10025)	(0.03463)	(0.00555)	(0.00294)	(0.00877)
MPI	0.008310	-0.002113	0.004293	0.106055	0.015093	0.001646	0.002153	0.009997
	(0.00702)	(0.00377)	(0.02008)	(0.11683)	(0.04036)	(0.00646)	(0.00343)	(0.01022)
H	0.004678	-0.001159	0.012649	-0.193301	-0.007072	-0.000336	-0.002367	0.003784
	(0.00573)	(0.00308)	(0.01638)	(0.09532)	(0.03293)	(0.00527)	(0.00280)	(0.00834)
R-squared	0.997579	0.998938	0.065701	0.682537	0.935613	0.996828	0.999627	0.989545
Adj. R-sq.	0.997230	0.998785	-0.068838	0.636822	0.926341	0.996371	0.999573	0.988039
Sum sq.re	0.010159	0.002935	0.083126	2.813259	0.335761	0.008611	0.002420	0.021544
S.E. equat	0.009015	0.004845	0.025788	0.150020	0.051827	0.008300	0.004400	0.013128
F-statistic	2861.262	6533.137	0.488340	14.93036	100.9105	2182.156	18618.32	657.2507
Log L/h	483.9354	573.3390	332.5918	79.02667	232.0770	495.8365	587.2213	429.8103
AkaikeAIC	-6.457436	-7.699152	-4.355442	-0.833704	-2.959403	-6.622729	-7.891962	-5.705699
Schwarz SC	-6.065586	-7.307302	-3.963592	-0.441853	-2.567553	-6.230879	-7.500112	-5.313849
Mean depen	0.236726	0.243497	0.006166	0.344111	0.704853	0.193033	0.234931	0.377885
S.D. depend	0.171295	0.139026	0.024944	0.248937	0.190963	0.137778	0.213053	0.120040

Source: Author (2017).

Table 18 shows the VAR model estimates of the poverty (dependent variable) and High-Five priorities (independent variables). The model examined the long-run causality effects of the High-Five priorities of the Bank.

In long-run, only industrialisation reduces the multidimensional poverty, the rest of the High-Five priorities increase the multidimensional poverty. On the other hand, in long-run, industrialisation and accessibility of improved water increase the poverty gap, while the rest of the High-Five priorities reduce the poverty gap.

9. Test of the Hypotheses

The study aims to test three pairs of hypotheses for purpose of understanding the short and long-run relations of multidimensional poverty index, poverty headcount rate and poverty gap index and the High –Five priorities in the context of Africa.

The pooled regression model on poverty headcount rate and High-Five priorities was run at 5 percent of significance level. The model has R-sq of 50 percent, F-statistics of 1421.26, Prob(F-statistic) is 0.000. The estimated coefficients of the model are significant at 5 percent, since have P-value 0.000. The standard errors of the estimated coefficients are significantly minimal, that indicates less statistical noise in the model. The prob(F-statistics) is less than 5 percent, that is, there is no strong statistical evidence to accept the null hypothesis, therefore the null hypothesis is rejected and the alternative hypothesis is accepted. That is, the poverty headcount rate significantly related to High-Five priorities in Africa.

The pooled regression model on poverty gap index and High-Five priorities was run at 5 percent of significance level. The model has R-sq of 9.6 percent, F-statistics of 153.77, Prob(F-statistic) is 0.000. The estimated coefficients

of the model are significant at 5 percent, since have P-value 0.000. The standard errors of the estimated coefficients are significantly minimal, that indicates less statistical noise in the model. The prob(F-statistics) is less than 5 percent, that is, there is no strong statistical evidence to accept the null hypothesis, therefore the null hypothesis is rejected and the alternative hypothesis is accepted. That is, the poverty gap index is significantly related to High-Five priorities in Africa.

The pooled regression model on multidimensional poverty index and High-Five priorities was run at 5 percent of significance level. The model has R-sq of 40 percent, F-statistics of 955.46, Prob(F-statistic) is 0.000. The estimated coefficients of model are significant at 5 percent, since have P-value 0.000. The standard errors of the estimated coefficients are significantly minimal, that indicates less statistical noise in the model. The prob(F-statistics) is less than 5 percent, that is, there is no strong statistical evidence to accept the null hypothesis. Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted. Thus, the multidimensional poverty index is significantly related to High-Five priorities in Africa.

10. Discussion

The study evidences that poverty intensity is influenced by the High-Five Bank priorities. The study reveals the nature of contradiction of causality of poverty in Africa, is due to variety of the poverty definitions (measures). For example, if the poverty is defined or measured on the basis of the income or consumption of an individual, the countries that offer more "pure public goods and services" such as public water, road and free education" most of their citizen will be accounted to have low income/consumption base, if the quantification of the "public goods and services" will not be done to the personal /household income. Therefore, they will be accounted as a poor due to the income substitution effects (negative effects) of the pure public goods and services. But in turn, this effect does not affect the individual welfare in long-run term.

This will quite difference for countries that have limited pure goods and services that offer "partial or impure public goods and services, for example, sharing cost policy or priced water service, electricity, maternal services, etc. Most of the people of these countries will have a broad range of need of income/consumptions; therefore, the people will be counted as non-poor due to income substitution effects (positive effects) of the pure public goods and services. In this case, the positive effects have a negative impact on the welfare of an individual as well as the society.

The situation will be quite difference if the poverty is measured by using non-monetary measures, such a health, education, water accessibility standards, etc. Defining or measuring the poverty in this scale, reduces the effects of the public goods and services on the personal income/consumption. This is because the measures will compose both non- monetary standards such heath, education, water which is immaterially offered as pure or impure public goods do not affect the measures of poverty.

For more clarification of this effect, our study evidences that poverty headcount rate is increasing with the increase of provision of improved water and paved road. This is due to this effect. The water and paved road in most of the African countries are mostly offered as pure goods and services, because most of these projects are funded by foreign agencies-donors projects. These projects are enjoyed by the most African for free, not accounted to determine the either income/consumption of the individual/household. In this phenomenon if the poverty is measured by using the monetary indicator, the individual /household income/consumption will be accounted less and therefore an individual accounted as poor.

On the other hand, if the poverty is measured by using non-monetary scale, the pure goods and services reduce the poverty. This evidenced by this study. The study finds that the increases of provision of water and paved road (public goods and services) reduce the multidimensional poverty in Africa. This means, the water or paved roads have a positive contribution on the components of this non-monetary measure. For example, one of the components of this measure is health, which is directly influenced by the level of accessibility of the improved water in a country. On the other hand, this study finds the agriculture is not relevant in reducing income poverty and multidimensional poverty but reduces the poverty gap. What does it mean? This implies that, agriculture acts as the "*supplementary work"* that adds value to the poor in a short time, usually a year. Actually, agriculture reduces the deepness of the poverty does not removes an individual from the pool of poverty. This nature of the agriculture is the roots of the ongoing debates of where agriculture is good or bad for poverty eradication. Through this study, we establish that both sides of the debate are true accordingly. The improved and productive agriculture initiatives will reduce the poverty gap in a country. The sustainable reduced poverty gap (long term) will remove an individual from a pool of poverty. If the agriculture will not be improved, then it will pull down an individual to the pool of poverty. This study confirms to Geda *et al.* (2005), Jerve and Ostad (2000), Krantz (2001) and Anyanwu (2005), which find that agriculture increases poverty in a country. On the other hand, the study contradicts to Apata *et al.* (2010) which ague the concentration on agriculture reduces the poverty.

This study finds that industry, regional integration, water and sanitation (improved water), and transportation (paved road) increase both the income and multidimensional poverty, but reduce the poverty gap. The ICT uses, electricity reduces and improving the quality of human being reduces income and multidimensional poverty and the poverty gap. It is quite true, that some of the Bank priorities (variables) are of nature of pure goods and services, e.g., water and roads, which reduce the "shadow" income/consumption of an individual. This is due to the effects of income substitution of the pure goods and services. On the other hand, the variables such as industrialisation and regional integration have more macro impact than micro impact on the individual income/consumption. The use of ICT for an individual has a positive role on poverty eradication. It reduces the operation costs and supplements the individual /household income/consumption. For example the use e-mail, electronic money transfers, such as Mobile-

money banking and other technology facilitates and reduces the associated demand costs. This finding supports VoiPio and Hoebink (1998) who found the limited use of technology increase the poverty. The phenomenon of these variables only to reduce the poverty gap it is due to the national policy structure and needs on which a country adopts, most of the African countries, these variables are applied as the "supplementary works" – the work that offer a minimal income for reducing individual/household budget deficit for a short-time. For example, most of the industries in Africa, of any size offer more causal works, which are not sustainably improving the income/consumption of an individual/household.

11. Summary, Conclusion and Policy Implications

The High-Five Bank priorities have less capacity to reduce the income and non-monetary poverty rate in a short – run term. The priorities evidenced to have a power to reduce the poverty gap in the short-run term. The study finds that the High-five priorities are effective to reduce the both the income and non-monetary poverty rate in long-run term in Africa. The contradiction of the agriculture to reduce or not to reduce the poverty is due to differences of definition of the poverty. The agriculture will be given priority for aiming to reduce the poverty gaps, but will increases the multidimensional poverty, and poverty headcount rate.

In summary, this study meets its specific objectives. The study aims to find out the applicability of High-Five Bank Priorities in policy setting in Africa, the effectiveness of High-Five Bank priorities in eradicating the poverty in Africa (the link and causality analysis), and to establish the effective macroeconomic prioritised strategies (MPS) for poverty eradication in Africa (directing-policy priorities).

The study finds that High-Five priorities in Africa are less prioritised for poverty eradication. It is evidenced that the budget allocated on agriculture sectors in Africa is averaged at 23.2 percent of the national GDP. This means the agriculture as the one of Bank priority is not given considerable priority in Africa. Traditionally, agriculture is left for small-farm holders in rural. There are no intensive agricultural schemes in Africa that offer both inclusive and sustainable growth.

The industry sectors in Africa have not been developed and given a considerable priority. The study finds that only 23.9 percent of GDP allocated to the industrial sectors in Africa. Most of the countries in Africa had not been given a priority to the industrial developments. It about 47.08 percent of the African countries allocate less that 20 percent of their GDP to the industrial activities. The Africa has less reliable, stable and competitive industries to meet the international market competition. African industries suffer from the abroad market competitions, particularly Dubai and China. This study evidences that the less technology (use of ICT), unimproved transportation infrastructure (paved/passable roads, ports and railways) and energy (electricity) are the major challenges to the growth of the industrial sector in Africa.

The regional integration as the one of the Bank priorities for poverty eradication in Africa, it evidenced to have a less progress and impact on poverty eradication. The regional integration scores in Africa are averaged at 0.3 (Table 3). This means that the regional integration in Africa is still in the infant stage/early stage, that is, there are in the second stage, i.e., Custom Union Agreements. The study finds the regional integration in African countries is not a country or state priority. It is not given the policy consideration in most of the African countries. Generally, the Abuja Treaty that framed the regional integration in Africa is likely to fail.

The PIDA infrastructure priorities implementation is evidenced in four areas, transportation (paved roads), energy (electricity), water and sanitation (improved water) and ICT (internet uses). The study finds that the status of the transportation in Africa is not improved; the paved roads that are the veins of transportation are average at 23.1 percent. And, about 54.58 percent of the African countries have less than 20 percent of paved roads in their countries. This indicates the problem of transportation is Africa is still huge, and it is an active challenge for the industrial growth.

The energy problem in Africa is still a problem. The study finds the African countries have averaged to 37.9 percent of the population who access electricity in their countries. And, about 99.58 percent of the African countries have electricity accessibility of not more than 50 percent of their population. This problem is connected with the problem of poor and unreliable industries in Africa. On the other hand, the water and sanitation are the one of the PIDA infrastructure priorities. The study finds that about 69.7 percent of the population in Africa access improved water. And about 67.92 percent of the African countries offer improved water for at least 60 per cent. There is an improvement of water and sanitation services in Africa.

The information and communication technology (ICT) are among the PDA infrastructure that given priority by a Bank. The study finds it is about 18.9 percent of the population in Africa access internet. It is observed that about 91.67 percent of the countries in Africa, less than 40 percent of their population access internet. This indicates that the use of ICT in Africa is still poor and needy. The less application of ICT comes with many associated social and economic problems, such as poor health, high operating costs that likely to harm the infant industries in a country. Moreover, high market competition, low innovation and creativity are the aftermaths of poor technology in Africa. On the other side, the study finds the quality of human life is averaged to 36.7 percent. Also it is evidence that about 93.75 percent of the African countries have less than 60 percent of human life quality scores. This indicates that the quality of human life is low in term of quality education, improved health services, and living standards. The most of African people have limited to access quality education, health services and experiencing poor living standard due their limited poverty of income.

In conclusion, the study finds the High-Five priorities are effective for reduction of poverty gap. The VAR model provides the empirical evidence that these priorities are appropriately for the long-run term strategy of poverty eradication. The priorities are not suitable for short term poverty eradication strategy since does not have negative

impact on both income and non-income poverty intensity. Therefore, prioritising these Bank priorities is a relevant for the long- term goals, but lacks its relevance for short- term interventions.

The policy implication of this study is based on the answers of the question that, does the poverty eradication in Africa require long term, and or short- term intervention/strategies? If the poverty eradication requires the long term intervention, then the High-Five priorities is relevant and the countries should be prioritised. On the other hand, if the poverty reduction requires short term intervention, then the High –Five priorities should be irrelevant and should be not prioritised. But for, optimal poverty eradication strategy, short- term and long- term strategy are required. Therefore, taking this consideration, the African Development Bank should restructure their priorities to incorporate the short- term priorities that will have quick social impacts. Preferably, this study recommends the improvement of the social-community initiatives such as entrepreneurship engagement supports, reducing the aids dependency by increasing the cost sharing programmes.

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Appendix A: Definition Variables

A: Dependent Variable: Poverty Measures

(i) Multidimensional Poverty Index (MPI): is an international measure of acute poverty covering broad dimension of poverty. Multidimensional poverty index (MPI) value is the product of two measures, the multidimensional poverty headcount ratio and the intensity of poverty (United Nations Development Programme UNDP, 2010).

$$MPI = H.A$$

Where A is the total deprivation scores divided by the total number of poor people and H is the headcount ratio

$$A = \frac{\sum_i^q C_i}{q}$$

Where C_i the deprivation score that the ith poor individual experience

$$H = \frac{q}{n}$$

Where q is the number of people who are multidimemsionally poor and n is the total population

(ii) Poverty Headcounts Rate (H): Poverty headcount rates at \$1.90 a day (PPP) (% of population) is Population below \$1.90 a day - is the percentage of the population living on less than \$1.90 a day (World Bank, 2010). It is given by:-

$$H = \frac{1}{N}\sum_{i-1}^{N} I(y_i < z)$$

Here, I (.) is an indicator function that takes on a value of 1 if the bracketed expression is true, and 0 otherwise. So if expenditure (y_i) is less than the poverty line (z), then I (.) equal to 1 and the household would be counted as poor. N is the total number of the poor.

(iii) Poverty Gap Index (Z): Poverty gap at \$1.90 a day (PPP) (%) is the mean shortfall from the poverty line (counting the non-poor as having zero shortfalls). It expressed as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence (World Bank, 2010).

The poverty gap index (Z) measures the extent to which individuals fall below the poverty line (the poverty gaps) as a proportion of the poverty line. The sum of these poverty gaps gives the minimum cost of eliminating poverty, if transfers were perfectly targeted. The measure does not reflect changes in inequality among the poor. It is given by:

$$Z = \frac{1}{N} \sum_{i=1}^{N} \frac{G_i}{z}$$

Where, $G_i = (z - y_i).(y_i < z)$

B: Independent Variables: The High-Five Priorities Measures

(i) Agricultural –Growth Ratio: is the strategic advantage gained by a country in prioritising agricultural sector. It is a weight ratio of Agricultural output to the GDP of nation. It is given by:-

$$AGR = \frac{1}{N} \sum_{i=1}^{n} \left(\frac{TAO_i}{GDP_i} \right)$$

Where TAO = Total Agricultural output

(ii) Industrialization –Growth Ratio: is the strategic advantage gained by a country in prioritising

industrialization.   It is a weighted ratio of industrial output to the GDP of nation. It is given by:-

$$IGR = \frac{1}{N} \sum_{i=1}^{n} \left(\frac{TIO_i}{GDP_i} \right)$$

 Where TIO = Total industrial outputs

(iii) PIDA Infrastructure Scores: is a set of 4 key infrastructure priorities formulated by Programme for Infrastructure Development in Africa (PIDA). These are energy particularly electricity, Transportation, water and sanitation, and Information, and communication Technology. The score is established by *Population-Access percentage System (PAPS).*
PIDA Score = (% population accessing electricity, % population accessing improved water, % population accessing ICT facilities, and % paved roads)
That is:-

$$PIDA\ Score = 100 \left[\left(\frac{PAE}{TP}, \frac{PAW}{TP}, \frac{PICT}{TP}, \frac{PR}{TR} \right) \right]$$

Where PAE = population that accessing electricity in a country
   PAW = population that accessing improved water in a country
   PICT = population that accessing the ICT facilities in a country
   PR = Paved Roads in a country
   TP = total population in a country
   TR = Total Roads in a country.

(iii) Human Life Quality (HLQ) Scores: this is the score that measures the accessibility of the individual in a country for four mains variables, employment (income), health, educational and gender equality. For this study HLQ will be proxy for Inequality-adjusted human development (IHDI).

Appendix B: Vector Auto-Regression Estimates of the Poverty and High-Five Priorities

Vector Autoregression Estimates
Date: 10/21/17   Time: 21:51
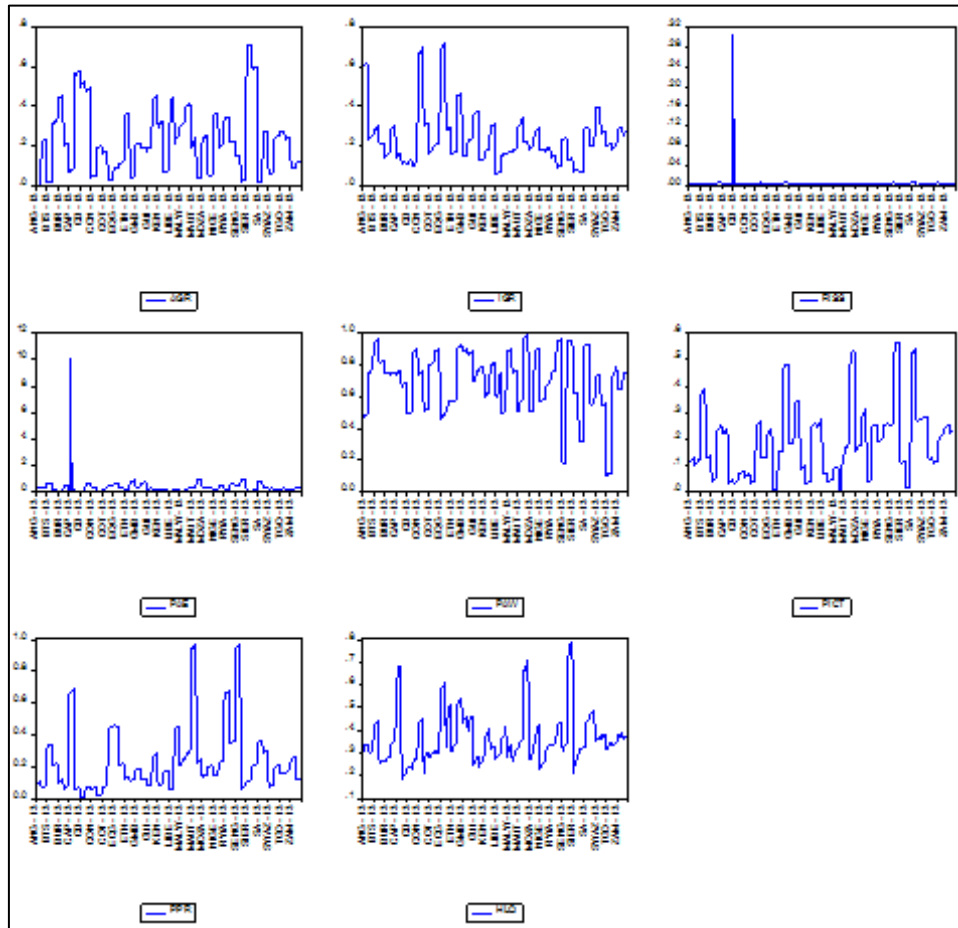Sample (adjusted): 2015 2017
Included observations: 144 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	AGR	IGR	RISS	PAE	PAW	PICT	PPR	HLQ
	(0.06370)	(0.03424)	(0.18222)	(1.06004)	(0.36621)	(0.05865)	(0.03109)	(0.09276)
	[21.3380]	[2.28587]	[0.29948]	[-0.25810]	[0.14300]	[-0.38872]	[-0.71159]	[-0.72631]
AGR(-2)	-0.362188	-0.075927	-0.024089	0.280259	-0.047259	0.026510	0.020744	0.056470
	(0.06318)	(0.03396)	(0.18073)	(1.05142)	(0.36323)	(0.05817)	(0.03084)	(0.09201)
	[-5.73239]	[-2.23580]	[-0.13328]	[0.26655]	[-0.13011]	[0.45572]	[0.67265]	[0.61374]
IGR(-1)	0.011786	0.807363	-0.364536	0.368349	0.259651	0.270916	-0.157392	0.061768
	(0.17382)	(0.09342)	(0.49720)	(2.89246)	(0.99926)	(0.16003)	(0.08484)	(0.25312)
	[0.06781]	[8.64199]	[-0.73318]	[0.12735]	[0.25984]	[1.69292]	[-1.85522]	[0.24403]
IGR(-2)	-0.014749	0.202896	0.379555	-0.146468	-0.261667	-0.267119	0.154917	-0.070199
	(0.17440)	(0.09374)	(0.49887)	(2.90216)	(1.00261)	(0.16056)	(0.08512)	(0.25397)
	[-0.08457]	[2.16453]	[0.76083]	[-0.05047]	[-0.26099]	[-1.66362]	[1.81995]	[-0.27641]
RISS(-1)	3.528355	1.283602	6.289313	-54.18274	5.222972	1.032765	-0.249752	-2.985186
	(2.40636)	(1.29338)	(6.88341)	(40.0442)	(13.8341)	(2.21548)	(1.17451)	(3.50428)
	[1.46626]	[0.99244]	[0.91369]	[-1.35307]	[0.37754]	[0.46616]	[-0.21264]	[-0.85187]
RISS(-2)	-4.326007	-1.396492	-5.968052	50.18650	-1.031866	-0.572044	0.622739	3.761653
	(2.60086)	(1.39792)	(7.43977)	(43.2808)	(14.9522)	(2.39455)	(1.26944)	(3.78752)
	[-1.66330]	[-0.99898]	[-0.80218]	[1.15956]	[-0.06901]	[-0.23889]	[0.49056]	[0.99317]
PAE(-1)	-0.001194	0.000507	-3.71E-05	-0.008045	5.55E-05	0.000228	0.000583	0.002565
	(0.00114)	(0.00061)	(0.00325)	(0.01892)	(0.00653)	(0.00105)	(0.00055)	(0.00166)
	[-1.05023]	[0.83028]	[-0.01140]	[-0.42527]	[0.00849]	[0.21803]	[1.05023]	[1.54968]
PAE(-2)	0.000556	-0.000219	0.001968	-0.014592	-0.000198	0.000571	-0.000992	-0.001711
	(0.00111)	(0.00060)	(0.00318)	(0.01848)	(0.00638)	(0.00102)	(0.00054)	(0.00162)
	[0.50056]	[-0.36655]	[0.61970]	[-0.78967]	[-0.03101]	[0.55884]	[-1.82960]	[-1.05825]
PAW(-1)	-0.104340	0.085499	-0.137636	-0.070256	0.665726	-0.002273	0.123785	-0.168391
	(0.08402)	(0.04516)	(0.24034)	(1.39820)	(0.48304)	(0.07736)	(0.04101)	(0.12236)
	[-1.24182]	[1.89323]	[-0.57266]	[-0.05025]	[1.37821]	[-0.02938]	[3.01841]	[-1.37623]
PAW(-2)	0.106291	-0.084161	0.143988	0.166514	0.294908	0.005714	-0.120273	0.173132
	(0.08465)	(0.04550)	(0.24215)	(1.40871)	(0.48667)	(0.07794)	(0.04132)	(0.12328)
	[1.25560]	[-1.84969]	[0.59462]	[0.11820]	[0.60597]	[0.07331]	[-2.91090]	[1.40441]
PICT(-1)	0.028469	0.043106	0.009875	-0.151926	-0.140106	0.946201	0.126712	0.057633
	(0.09544)	(0.05130)	(0.27301)	(1.58822)	(0.54868)	(0.08787)	(0.04658)	(0.13899)
	[0.29829]	[0.84031]	[0.03617]	[-0.09566]	[-0.25535]	[10.7682]	[2.72013]	[0.41467]
PICT(-2)	-0.020613	-0.048030	0.007156	1.011487	0.182418	0.048285	-0.133315	-0.076076
	(0.09380)	(0.05041)	(0.26831)	(1.56088)	(0.53924)	(0.08636)	(0.04578)	(0.13659)
	[-0.21976]	[-0.95271]	[0.02667]	[0.64802]	[0.33829]	[0.55913]	[-2.91199]	[-0.55695]
PPR(-1)	0.083222	-0.027862	-0.057975	0.315426	-0.120490	0.139554	0.930714	-0.139582
	(0.07724)	(0.04151)	(0.22094)	(1.28534)	(0.44405)	(0.07111)	(0.03770)	(0.11248)
	[1.07745]	[-0.67114]	[-0.26240]	[0.24540]	[-0.27135]	[1.96244]	[24.6877]	[-1.24095]
PPR(-2)	-0.081572	0.030343	0.055353	-0.308931	0.181608	-0.138325	0.075731	0.145334
	(0.07783)	(0.04183)	(0.22262)	(1.29510)	(0.44742)	(0.07165)	(0.03799)	(0.11334)
	[-1.04812]	[0.72537]	[0.24864]	[-0.23854]	[0.40590]	[-1.93049]	[1.99366]	[1.28234]
HLQ(-1)	0.013644	0.025918	0.007145	0.243191	-0.002870	0.008456	-0.012186	1.141074
	(0.04316)	(0.02320)	(0.12346)	(0.71825)	(0.24813)	(0.03974)	(0.02107)	(0.06285)
	[0.31612]	[1.11721]	[0.05787]	[0.33859]	[-0.01157]	[0.21280]	[-0.57847]	[18.1543]
HLQ(-2)	-0.017527	-0.025778	-0.028900	0.253515	-0.029866	-0.013392	0.013584	-0.131665
	(0.04358)	(0.02342)	(0.12465)	(0.72513)	(0.25051)	(0.04012)	(0.02127)	(0.06346)
	[-0.40223]	[-1.10064]	[-0.23185]	[0.34961]	[-0.11922]	[-0.33380]	[0.63871]	[-2.07489]
Z	-0.004192	0.002145	-0.027188	-0.067126	0.020507	-0.004968	0.000949	-0.002362
	(0.00602)	(0.00324)	(0.01723)	(0.10025)	(0.03463)	(0.00555)	(0.00294)	(0.00877)
	[-0.69591]	[0.66238]	[-1.57778]	[-0.66962]	[0.59214]	[-0.89583]	[0.32290]	[-0.26929]
MPI	0.008310	-0.002113	0.004293	0.106055	0.015093	0.001646	0.002153	0.009997
	(0.00702)	(0.00377)	(0.02008)	(0.11683)	(0.04036)	(0.00646)	(0.00343)	(0.01022)
	[1.18361]	[-0.55996]	[0.21374]	[0.90777]	[0.37394]	[0.25463]	[0.62839]	[0.97780]
H	0.004678	-0.001159	0.012649	-0.193301	-0.007072	-0.000336	-0.002367	0.003784
	(0.00573)	(0.00308)	(0.01638)	(0.09532)	(0.03293)	(0.00527)	(0.00280)	(0.00834)
	[0.81680]	[-0.37649]	[0.77202]	[-2.02800]	[-0.21478]	[-0.06381]	[-0.84678]	[0.45359]
R-squared	0.997579	0.998938	0.065701	0.682537	0.935613	0.996828	0.999627	0.989545
Adj. R-squared	0.997230	0.998785	-0.068838	0.636822	0.926341	0.996371	0.999573	0.988039
Sum sq. resids	0.010159	0.002935	0.083126	2.813259	0.335761	0.008611	0.002420	0.021544
S.E. equation	0.009015	0.004845	0.025788	0.150020	0.051827	0.008300	0.004400	0.013128
F-statistic	2861.262	6533.137	0.488340	14.93036	100.9105	2182.156	18618.32	657.2507
Log likelihood								
Akaike AIC	-6.457436	-7.699152	-4.355442	-0.833704	-2.959403	-6.622729	-7.891962	-5.705699
Schwarz SC	-6.065586	-7.307302	-3.963592	-0.441853	-2.567553	-6.230879	-7.500112	-5.313849
Mean dependent	0.236726	0.243497	0.006166	0.344111	0.704853	0.193033	0.234931	0.377885
S.D. dependent	0.171295	0.139026	0.024944	0.248937	0.190963	0.137778	0.213053	0.120040
Determinant resid covariance (dof adj.)		1.39E-29						
Determinant resid covariance		4.49E-30						
Log likelihood		3230.909						
Akaike information criterion		-42.76263						
Schwarz criterion		-39.62782						
Number of coefficients		152						

Source: Author (2017).

Appendix B: Country specific- trends of poverty and High –Five priorities for 2013-2017

Source: Author (2017).