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Growth and Institutions: A Potential Medicine for the Poor in Sub-Saharan Africa

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***Abstract*:** The conventional wisdom is that growth is a precondition for poverty reduction. Paying particular attention to the level of growth, poverty and institutions in sub-Saharan Africa (SSA), this paper investigates the effect of GDP per capita growth and sectoral growth on poverty and explores whether the growth-poverty link can be strengthened by institutions. Using the panel dataset of 41 SSA countries over the period 1981–2010 and dynamic two-step system generalized method of moment (GMM) estimator; it is found that GDP per capita growth is an important instrument for poverty reduction. Also, the growth of agriculture and the service sectors have direct poverty-reducing effects. The paper further reveals that good and accountable government, bureaucratic quality and sound policies and regulations are important ingredients in sustaining the growth-poverty link in SSA.

> 'Historically nothing has worked better than economic growth in enabling societies to improve the life chances of their members, including those at the very bottom.' (Rodrik, 2008, p. 2)

1. Introduction

Sub-Saharan African (SSA) countries face the major development challenges of improving growth and reducing poverty. Economic growth rates are still not high enough to stimulate a real decline in the prevalence of poverty (Ghura *et al*., 2000; UNDP, 2010). Life expectancy in SSA is as low as 52.5 with Zimbabwe and Lesotho having being at 45 in 2009 (ADI, 2011). A report from the UN (2009) provides that every year about 10 million children in the world die before their fifth birthday, with many of these cases occurring in SSA.

Figure 1a depicts the comparison of the poverty and GDP per capita growth of SSA with other regions of the world in 2011. SSA has the highest poverty and the lowest GDP per capita growth. Figure 1b shows the actual number of the poor and the population of the different regions. SSA's population (887.43 million) is below East Asia and Pacific and also South Asia but has the highest number of the poor (415.4 million). Figure 2 demonstrates poverty and the growth for the 41 SSA countries over the period of the study (1981–2010) with a five-year average. Poverty is generally very high with low growth rates.

Many scholars have investigated the effect of growth on poverty. However, literature on the effect by sectors and how institutions facilitate the growth-poverty link is scarce. This paper contributes to the existing literature by providing macro-level evidence of the direct impact of GDP per capita growth and sectoral growth on poverty and how the growth-poverty link can be reinforced by institutions. To estimate the impact of growth on poverty, this paper adopts a dynamic panel-data modelling by two-step system generalized method of moment (GMM) estimator developed by Blundell and Bond (1998). The GMM estimator purges the country fixed effect, instruments the endogeneity of growth and caters for the persistence of poverty.

The paper is organized as follows. Section 2 reviews the findings of studies on the relationship between growth, institutions and poverty. Section 3 provides the hypotheses and the research questions. Section 4 presents the dataset. Section 5 utilizes

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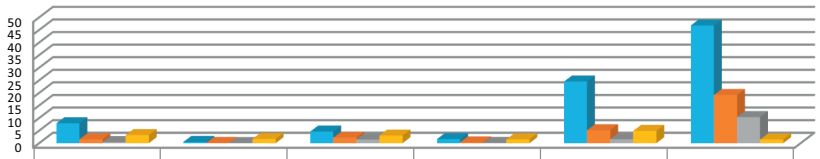
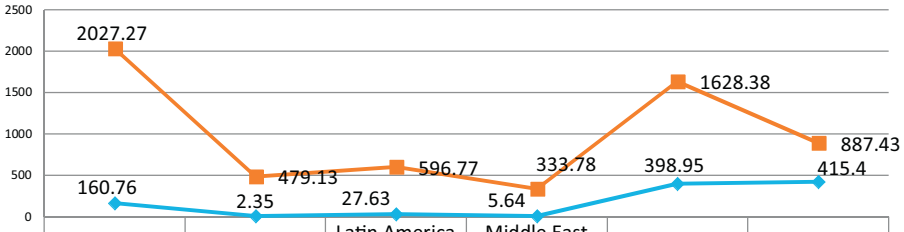
Figure 1: Poverty, growth and number of the poor in 2011

(a) Poverty and GDP per capita growth in 2011



	East Asia and Pacific	Europe and Central Asia	Latin America and the Caribbean	Middle East and North Africa	South Asia	Sub-Saharan Africa
Poverty headcount	7.93	0.49	4.63	1.69	24.5	46.81
Poverty gap	1.56	0.14	2.17	0.35	5.16	19.18
Squared poverty gap	0.47	0.09	1.48	0.14	1.61	10.38
GDP per capita growth	3.23	1.70	3.05	1.53	4.90	1.48

(b) Number of poor and population in 2011



	East Asia and Pacific	Europe and Central Asia	Latin America and the Caribbean	Middle East and North Africa	South Asia	Sub-Saharan Africa
Number of poor (m)	160.76	2.35	27.63	5.64	398.95	415.4
Population (m)	2027.27	479.13	596.77	333.78	1628.38	887.43

Source: Author, using World Bank Development Indicators Database.

econometric methodology to estimate the relationship between growth, institutions and poverty. Section 6 discusses the results and Section 7 concludes and suggests policy recommendation.

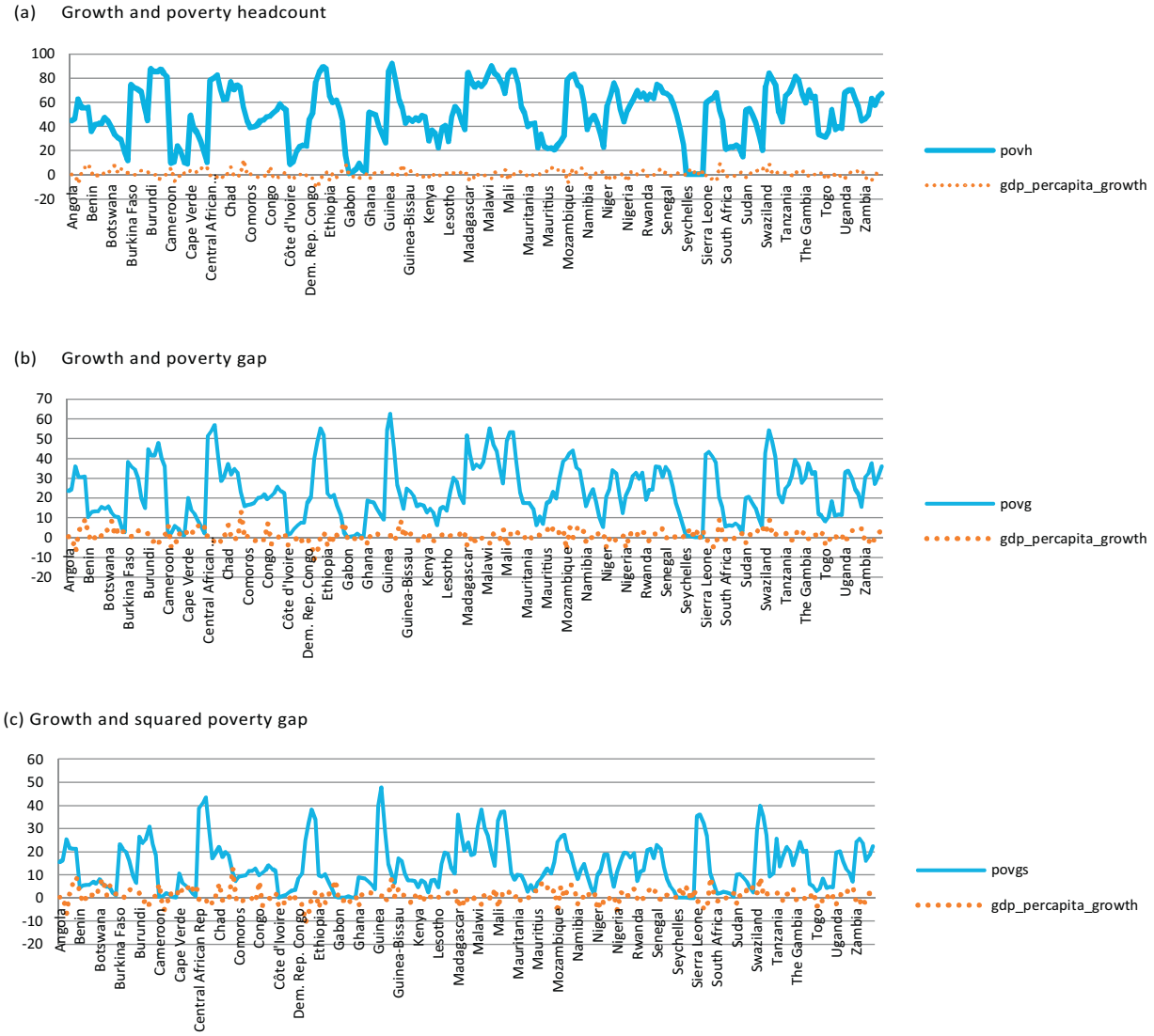
2. Literature Review

2.1 Growth and Poverty

The main views about the relationship between economic growth, poverty, and inequality between the late 1950s and the early 1970s drew expansively from the Kuznets (1955) and Solow (1956) models.

In the 1970s, many poor countries were unable to converge with the rich countries in the world economy, and the distribution of income was worsening in many parts of the world. Thus, the equality-generating processes could not materialize. The influence of monetarism and new classical economics between the mid-1970s and the late 1980s moved the development paradigm towards the trickle-down effect (DESA, 2010). There was the conception that growth that would trickle down would come, seemingly, from the application of Washington Consensus-type economic policies. The failure of this approach by the start of the 1990s led to a call for the World Bank and the International Monetary Fund to reconsider the issue of inequality and poverty once again. This was associated with the birth of the new institutional economics. Then in the 2000s, emphasis shifted towards the notion of inclusive growth (Zagha and Nankani, 2005).

Figure 2: Poverty and GDP per capita growth of SSA (1981–2010, 5-year average)



Source: Author, using World Bank Development Indicators Database.

The relationship between growth and poverty has been an interesting area of development research. Some economists argue that growth has a significant and positive impact on poverty and inequality while others have established that economic growth tends to increase income inequality. Others find that growth is seen as a necessary but not sufficient condition for poverty reduction. Adelman and Morris (1973) assert that hundreds of millions of poor people have been negatively affected rather than helped by growth. They argue that the higher levels of inequality ensure that economic growth benefits the rich rather than the poor. Todaro (1997, p. 155) termed this as 'trickle-up'. Research that compares the experiences of developing countries finds strong supportive evidence that poverty tends to decline with economic growth.[1] Other evidence from single country studies suggests that the poor do share in the fruits of increasing growth and suffer from growth contraction. It is also argued that economic growth associated with the productive use of labour, which is the main asset belonging to the poor, can result in rapid reduction in poverty (Squire, 1993; McKay, 1997; Ravallion, 1995).

Very few studies have looked at growth at a sectoral level. Grabowski (2006) argues that political development and broad-based expansion in agricultural productivity are important ingredients for long-run growth in Africa. Warr (2001) finds evidence

that agriculture and service growth are associated with poverty reduction. De Janvry and Sadoulet (2010) show that agriculture growth reduces poverty whilst Warr and Wen-Thuen (1999) establish that industrial growth reduces poverty. In a recent study, Jones *et al*. (2015) demonstrate that increasing productivity in agriculture and the informal sectors that employ the majority of the poor can be an important panacea for poverty reduction. Also, AfDB (2013) and Akobeng (2016) point to the importance of structural transformation and capital formation in the development process in Africa.

2.2 Institutions and Poverty

North (1990, p. 110) argues that 'World countries are poor because the institutional constraints define a set of pay-offs to political and economic activity that do not encourage productive activity'. Chong and Calderón (2000) and Tebaldi and Mohan (2010) provide empirical evidence to show that an economy with a good system of an accountable government and a peaceful political terrain provides conducive environment for poverty reduction. Gupta *et al*. (2002) show that corruption has a harmful effect on the income growth of the poor in the bottom 20 per cent of the income distribution and Mujumdar (2001) and Chetwynd *et al*. (2003) demonstrate that corruption has a negative effect on economic and governance indicators that eventually lead to poverty.

Keefer and Knack (1997, p. 594) argue that if public authorities are of low professional calibre, greater mistakes are introduced into the administration decision-making process which undermine the 'predictability of the government decision making'. This increases the insecurity of property and contractual rights. According to the authors, an incompetent bureaucracy would aggravate the effects of highly distortionary rules.

2.3 Institutions and Growth

The early literature by Knack and Keefer (1995) and Keefer and Knack (1997) initiated the debate about the impact of good institutions on economic growth. Anyanwu (2014) and Mijiyawa (2013) clearly demonstrate that government effectiveness positively and significantly affect Africa's economic growth. Many papers find that political institutions of limited government serve as catalysts for economic growth.[2]

Institutional ingredients identified to accelerate the effectiveness of growth are well-defined property rights (Knack and Keefer, 1995; Scully, 1988), the effectiveness of interest groupings (Olson, 2008), political stability and credibility (Barro, 1991; Borner *et al*., 1995), control of corruption (Mauro, 1995) and regulatory and bureaucratic quality (Keefer and Knack, 1997). Lane and Tornell (1996) find that the coexistence of weak institutions and powerful industrial groups affects growth and investment negatively and significantly. Nissanke and Thorbecke (2008) assert that for Africa to enjoy the full benefit of globalization the political institutions must be strong and adequate and Diop *et al*. (2010) illustrate that investment rate is positively correlated with per capita GDP growth when accountability is taken into account.

Barro (1996) finds evidence suggesting that after a certain threshold, further extension of political rights could retard growth, perhaps due to pressures for income redistribution. According to the author, the good effects of growth include the existence of the rule of law, free market, small government consumption and high level of human capital. Once these indicators and the initial level of real per capita GDP are held constant, the overall impact of democracy on growth is weakly negative.

2.4 Growth, Institutions and Poverty Reduction

Dollar and Kraay (2002) argue that institutions and policies that promote overall growth advance growth in the incomes of the poor. These include moderate government size, strong property rights and the rule of law. Hasan *et al*. (2003) find that growth-enhancing economic freedom is closely linked to poverty reduction. The economic freedom indicators used by these authors include government size, price stability, and freedom to trade with foreigners, and measures of political and civil liberties.

The size of the public sector and bureaucratic quality affect income and growth. For a given distribution of income, this will have an effect on poverty (Hasan *et al*., 2007). If the government believes in making society more egalitarian, it will use its bureaucratic machinery to provide social services for the relatively poorer segments of the society. On the other hand, the government can just be an instrument of the elite by using the bureaucratic system to worsen the distribution of income.

Glaeser *et al*. (2004) provide empirical evidence to demonstrate that poor countries get out of poverty through good policies. Anyanwu (2013, p. 17) asserts that 'complementary inclusive growth-promoting socio-economic strategies and policies' will go a long way in facilitating the poverty reduction process in Africa. Democracy acting through various channels may have both

positive and negative implications for the enhancement of growth-poverty relationship (Alesina and Rodrik, 1994; Helliwell, 1994; Alesina and Perotti, 1996). On the positive side, transparency and accountability may enhance economic and other rights, including respect for contracts. On the negative side, the consensus required by democratic institutions, or interest group lobbies, may delay responses to shocks and implementation of legislation.

3. Research Hypotheses

Based on theoretical explanations and empirical evidence from the earlier scholars, the following testable hypotheses are formulated with associated research questions:

h1: Growth has a significant positive effect on poverty.
  h1.r1: Does growth reduce poverty in SSA?
  h1.r2: Do growth sectors reduce poverty in SSA?
h2: Institutions reinforce the poverty-reducing effect of growth.
  h2.r2: Do institutions enhance the effectiveness of growth in SSA?

4. Data

This article examines the relationship between GDP per capita growth, institution and poverty in SSA with a cross-country panel data set of 41 SSA countries. A 5-year non-overlapping average (5-year average from 1981 to 2010) panel data was used because the World Bank does not provide information on poverty indicators annually. The empirical dynamic panel models have a $N * T$ dimension such that $N = 41$ and $t = 1, 2, 3, \ldots T$ so that $T = 6$. The poverty measures used in this paper are the class of poverty measure developed by Foster *et al*. (1984). These are the poverty headcount (poverty rate), poverty gap (poverty depth) and squared poverty gap (poverty severity). The Gini index is used as a proxy for income inequality. The other controlled variables are: inflation, domestic credit to the private sector as a percentage of GDP (finance), gross capital formation as a percentage of GDP (investment), general government expenditure as a percentage of GDP and trade openness. The institutional variables are the World Bank's institutional democratic score, polity, regulatory quality, voice and accountability and rule of law. The other institutional variables from the International Country Risk Guide (ICRG) are control of corruption and bureaucracy quality. The descriptive statistics for the variables are presented in Table 1. The mean of poverty headcount, poverty gap, squared poverty gap and Gini are 50, 23, 14 and 47 per cent respectively. By the global standard, these percentages are very

Table 1: Descriptive statistics

Variable	Mean	St. dev.	Min.	Max.	*N*
Poverty headcount	50.0	22.9	0.2	92.1	246
Poverty gap	23.2	14.3	0.1	62.6	246
Squared poverty gap	13.6	10.4	0.0	47.8	246
GDP per capita growth	1.0	3.1	–10.5	13.2	245
Agriculture growth	2.9	3.9	–12.9	14.8	221
Industry growth	4.1	6.5	–17.2	60.5	221
Service growth	3.9	4.3	–15.9	23.8	220
Gini	46.5	10.4	28.9	79.3	246
Inflation	56.4	430.6	–3.0	6517.0	246
Finance	17.4	18.9	1.0	151.8	246
Investment	19.4	8.7	3.2	70.5	246
Government expenditure	16.0	7.0	6.2	42.2	246
Trade openness	70.7	36.9	13.3	220.5	246
Democracy	–2.5	16.8	–85.8	10.0	239
Polity	–6.0	16.7	–85.8	10.0	239
Control of corruption	2.5	1.0	0.0	6.0	170
Bureaucratic quality	1.4	0.9	0.0	4.0	169
Regulatory quality	–0.6	0.6	–2.1	0.7	116
Voice and accountability	–0.6	0.7	–2.0	0.9	116
Rule of Law	–0.7	0.7	–2.0	1.0	123

Notes: This table depicts the descriptive statistics for the data of 41 SSA countries over the period 1981 to 2010. The descriptive statistics are based on the raw data.

high. The mean of GDP per capita growth is 1 per cent. Thus, SSA as a whole has a low GDP growth rate. The means of the institutional indicators are all low. The statistics clearly indicate that SSA countries have fragile political and economic institutions.

5. Empirical Model and Methodology

The paper adopts a dynamic panel data technique to accommodate for the persistence of poverty and to allow country-level variables to be time-variant. The empirical model is, therefore, specified as:

$$Pov_{it} = \beta_1 Pov_{i,t-1} + \beta_2 gdp\_percapita\_growth_{it} + \beta_3 gini_{it} + \beta_4 inst_{it} + \gamma X'_{it} + \mu_{it} \quad (1)$$

$$Pov_{it} = \varphi_1 Pov_{i,t-1} + \varphi_2 sectoral\_growth_{it} + \varphi_3 gini_{it} + \varphi_4 inst_{it} + \delta X'_{it} + \mu_{it} \quad (2)$$

where

$$\mu_{it} = v_i + \lambda_t + \varepsilon_{it}$$

The subscripts i and t represent the country and year index. β and ψ are parameters. Pov_{it} is the poverty measure. $gdp\_percapita\_growth_{it}$ and $gini_{it}$ are the GDP per capita growth and the Gini coefficient for country i at time t, respectively. $inst_{it}$ represents the institutional variables. $Pov_{i,t-1}$ is lagged poverty. X'_{it} is a vector of other variables that affect poverty. Time-invariant country characteristics or the fixed-effects are contained in the composite error term (μ_{it}) which consists of the unobserved country-specific effects v_i, the observation specific or the idiosyncratic errors ε_{it} and λ_t, which is the time-varying parameter. The poverty and GDP per capita growth are in logs so the β_2 in Equation (1) is the growth elasticity of poverty. Equation (2) captures the sectoral growth effects. The sectoral growth components are also in logs so φ_2 is the sectoral growth (agriculture, service or industry) elasticity of poverty. ε_{it} is assumed to be independent and identically distributed with mean of zero and variance of σ^2. The variables of interest are β_2 and φ_2, which measure the direct impact of GDP per capita growth and respective sectoral growth on poverty. The estimate of γ and δ represent the direct impact of the other variables on poverty in Equations (1) and (2) respectively. Equations (1) and (2) provide the path for the testing of hypothesis h1.

In order to capture the effect of GDP per capita growth, institutions and poverty, Equation (1) is reformulated to include the interaction of GDP per capita growth and institution:

$$Pov_{it} = \beta_1 Pov_{i,t-1} + \beta_2 gdp\_percapita\_growth_{it} + \beta_3 gini_{it} + \beta_4 inst_{it} + \beta_5 (gdp\_percapita\_growth_{it} * inst_{it}) + \gamma X'_{it} + \mu_{it} \quad (3)$$

where $gdp\_percapita\_growth_{it} * inst_{it}$ is an interaction term of GDP per capita growth of country i at time t and institution of country i at time t. Equation (3) allows the testing of hypothesis h2. To obtain the marginal effects of growth on poverty at levels of institution, we differentiate Equation (3) with respect to GDP per capita growth to obtain $\beta_2 + \beta_5 inst_{it}$. β_5 reflects the extent to which the institutional variables moderate or enhance the effect of GDP per capita growth on poverty. With the presence of the interaction terms, the effect of GDP per capita growth on poverty is given by $\beta_2 + \beta_5 inst_{it}$.

The empirical estimation of Equations (1) to (3) needs econometric attention to prevent endogeneity problems that could arise from estimating the effect between growth, institutions and poverty. The country fixed effect captured by v_i in Equations (1) to (3) needs to be swept out. To do away with the country fixed effect these equations are subjected to differencing.

The next empirical concern is that the lagged dependent variable may violate the orthogonality condition by correlating with the transformed error term. To deal with this concern, Arellano and Bond (1991) recommend the difference GMM estimator which uses the lagged levels of endogenous variables as instruments in the differenced equation. The authors' point is that in order to do away with endogeneity of lagged poverty, GDP per capita growth and the institutional indicators in the differenced equation, their lags in levels starting from the second lag and beyond can be used as valid instruments.[3]

The challenge here is that if there is measurement error or the regressors are persistent in nature, lagged levels of these variables serve as weak instruments for the difference estimation (Blundell and Bond, 1998; Alonso-Borrego and Arellano, 1999). There will be an asymptotic problem as the coefficients will be seen to be very high and weak instruments can produce biased coefficients. To deal with this problem, Arellano and Bover (1995) and Blundell and Bond (1998) propose the system GMM estimator and recommend the inclusion of the equation in level to their own differenced equations to obtain a system of

equations. The novelty here is that instead of differencing the equations to eradicate the fixed effect, it rather differences the instruments and renders them exogenous to the fixed effects. The variables in levels are then instrumented using the lagged first difference of the corresponding variables.

6. Estimation Results

Table 2 presents the estimation results of Equations (1) and (2). The estimates are essentially sectoral growth/GDP per capita growth elasticity of poverty. GDP per capita growth appears to be negatively signed as expected and is 1 per cent significant across all the poverty measures. The results show that GDP per capita growth has a strong significant effect on poverty. The effect depends on how poverty is measured. In particular, a 1 per cent increase in GDP per capita growth is associated with a 0.3 per cent decline in the share of people living on less than US$1.25 per person per day, 0.5 per cent decline in poverty gap and 0.6 per cent decline in squared poverty gap or poverty severity. Thus, the effect is strongest with the squared poverty gap measure, which takes into account distribution changes within the poor by giving top priority to the state of the poorest of the

Table 2: GDP per capita growth, sectoral growth and poverty relationship

	Poverty rate		Poverty gap		Squared poverty gap	
Dependent variable: Poverty	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
lgdp_percapita_growth	–0.257***		–0.457***		–0.563***	
	(0.092)		(0.159)		(0.200)	
lagric_growth		–0.105**		–0.177**		–0.253**
		(0.047)		(0.087)		(0.109)
lind_growth		–0.024		–0.115		–0.083
		(0.057)		(0.070)		(0.111)
lserv_growth		–0.186***		–0.266***		–0.282**
		(0.051)		(0.057)		(0.116)
$Povh_{i,t-1}$	0.861***	0.996***				
	(0.120)	(0.093)				
$Povg_{i,t-1}$			0.948***	0.988***		
			(0.116)	(0.175)		
$Povgs_{i,t-1}$					0.892***	0.946***
					(0.151)	(0.099)
Included variables						
lgini	√	√	√	√	√	√
lainf	√	√	√	√	√	√
lfin	√	√	√	√	√	√
linv	√	√	√	√	√	√
lgxp	√	√	√	√	√	√
ltrade	√	√	√	√	√	√
dem	√	√	√	√	√	√
Intercept	1.240**	0.298	1.280*	0.443	1.508*	0.406
	(0.504)	(0.710)	(0.685)	(0.892)	(0.882)	(1.170)
Observation	185	118	185	118	185	118
Hansen *J* test *p*-value	0.256	0.882	0.224	0.873	0.256	0.889
Resid. AR(2) test *p*-value	0.968	0.679	0.937	0.566	0.475	0.443

Notes: All regressions are estimated using the Dynamic Two-Step System GMM estimator technique developed by Blundell and Bond (1998). Windmeijer (2005) finite-sample corrected standard errors are in parentheses. Time dummies are included in all regressions. Tables 7 and 8 provide the construction of the variables and the sample SSA countries respectively.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

poor. This is consistent with the finding of Ravallion (1995, p. 416) that the growth elasticity of poverty is greater for a 'distribution-sensitive' poverty index (see also Ravallion, 1997). Adams (2004) finds that economic growth measured with survey mean income affects poverty but when measured with GDP per capita growth is statistically insignificant. The current result is in line with the potential effect of GDP per capita growth on poverty as established by Chen and Ravallion (2004) and also Dollar and Kraay (2002, p. 1) with the influential title 'growth is good for the poor' and answers the research question h1.r1.

When growth is looked at from a sectoral perspective, agriculture and service growth have a direct significant effect on poverty. The service sector is stronger in terms of the magnitude of the coefficients across all the poverty measures. The industrial sector is negatively signed as expected but not significant. This result is consistent with Warr (2001). The result that poverty reduction has been associated with agricultural growth is in line with De Janvry and Sadoulet (2010). The result for the industrial sector is in contrast to a study of Taiwan by Warr and Wen-Thuen (1999). We can infer from the result that the service and the agriculture growth elasticities increase as we move from poverty headcount to squared poverty gap. This enriches the GDP per capita growth result and provides backing for research question h1.r2.

Tables 3 to 5 provide the estimation results of Equation (3). For the poverty headcount model (see Table 3), I find evidence of a negative and significant coefficient of GDP per capita growth and of a negative interaction between GDP per capita growth and all the institutional indicators. The interaction of GDP per capita growth and the institutional democracy is negative and significant. Polity index is negative and its interaction with GDP per capita growth is also negative and appears significant. Voice and accountability and rule of law follow with negative sign and significant coefficient and their interaction with growth is also significant. The interaction of GDP per capita growth with regulatory quality is also negatively signed and significant. The interaction terms of GDP per capita growth with bureaucratic quality and control of corruption are negatively signed but insignificant. With the poverty gap specification (see Table 4), GDP per capita growth is negative and fairly significant across the poverty measures. The interaction terms of growth with democracy, polity, voice and accountability and rule of law are significant. With the squared poverty gap specification (see Table 5), GDP per capita is again negative and fairly significant across the poverty measures. The interaction terms of GDP per capita growth with the institutional indicators are all negatively signed and the interaction of growth with polity remains significant. These results lend support to research question h2.r2.

The results imply that the poverty-reducing effect of GDP per capita growth is an increasing function of institutions. The effect depends on the poverty measure and the institutional indicator used. These findings suggest that the marginal effect of GDP per capita growth in reducing poverty is increasing with the level of institutional development. Particularly, polity, institutional democracy, regulatory quality, voice and accountability and rule of law contribute significantly to the growth effect on poverty headcount (see Table 3). Also, institutional democracy, polity, voice and accountability and rule of law contribute significantly to the growth effect on poverty gap (see Table 4) whilst polity has again contributed significantly to the growth effect on squared poverty gap (see Table 5). This is in line with the call for policies and institutional development in promoting growth and reducing poverty by Acemoglu *et al*. (2002, 2006), Dollar and Kraay (2003), Rodrik *et al*. (2004) and Anyanwu (2013). The revelation points to the fact that institution complements GDP per capita growth in reducing poverty.

6.1 Dynamic Panel Two-step GMM Estimation Diagnoses

The validity of the instruments is examined with the Hansen (1982) *J*-test for over-identifying restrictions. The null hypothesis of the test is that the over-identifying instruments are uncorrelated with the error term. The *p*-values of the Hansen *J*-statistics of the specifications are above 0.1. This fails to reject the null hypothesis that the instruments are valid. The maximum lag of the dependent variable is restricted to one in all estimations and the endogenous variables are instrumented with their levels lagged by two periods. More so, the instruments are applied with the collapse option in order to reduce 'proliferation' of instruments (Roodman, 2006, p. 1).

In order to test for first- and second-order serial correlation, this article uses the Arellano and Bond (1991) AR(2) test. Theoretically, first-order serial correlation is expected in the differenced equations and evidence of it is not informative. Thus to check for first-order serial correlation in levels, we have to look for second-order serial correlation in the differenced equation (Roodman, 2009). The absence of second-order serial correlation is not rejected in all the estimations. Finally, Windmeijer's (2005) finite-sample correction is used to correct standard errors for small sample bias.

Table 3: GDP per capita growth, institutions and poverty headcount relationship

Dependent variable: Poverty headcount	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
$Povh_{i,t-1}$	0.910***	0.831***	0.853***	0.860***	0.969***	0.987***	0.883***
	(0.081)	(0.101)	(0.050)	(0.070)	(0.173)	(0.162)	(0.091)
lgdp_percapita_growth	–0.350***	–0.460***	–0.244*	–0.237**	–0.692*	–0.981**	–0.541***
	(0.127)	(0.134)	(0.145)	(0.097)	(0.381)	(0.443)	(0.182)
dem	–0.008*						
	(0.005)						
*growth * dem*	–0.008**						
	(0.004)						
polity		–0.026***					
		(0.009)					
*growth * polity*		–0.024***					
		(0.007)					
icrg_corrup			–0.011				
			(0.074)				
*growth * icrg corrup*			–0.081				
			(0.057)				
icrg beauqu				−0.094			
				(0.115)			
*growth * icrg beauqu*				–0.088			
				(0.075)			
wdireg_quality					0.699		
					(0.450)		
*growth * wdireg_quality*					–0.580*		
					(0.301)		
wdiV_acc						–0.673**	
						(0.312)	
*growth * wdiV_acc*						–0.873**	
						(0.392)	
rol							–0.423**
							(0.197)
*growth * rol*							–0.320***
							(0.116)
Observation	184	184	133	133	110	110	117
Hansen *J* test *p*-value	0.301	0.623	0.862	0.569	0.236	0.257	0.305
Resid. AR(2) test *p*-value	0.772	0.639	0.308	0.470	0.207	0.224	0.672

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Time dummies and all explanatory variables are included.

6.2 Extension: Marginal Effect Analysis

A threshold analysis is carried out with the interaction term between GDP per capita growth and the institutional measures of polity, regulatory quality, institutional democracy, voice and accountability and rule of law at the 25th, 50th and 75th percentile levels. This assesses the marginal effect of GDP per capita growth on poverty at the different percentile levels of the institutional indicators. Table 6 provides the marginal effect analysis.

The polity index is evaluated at 25 per cent (–7.000), 50 per cent (–4.000) and 75 per cent (4.200). The analysis with the polity index (see Table 6, item 1) indicates that a 1 per cent increase in GDP per capita growth will decrease poverty headcount by 0.29 per cent, 0.36 per cent and 0.55 per cent at the 25th, 50th and 75th percentiles of polity respectively, at the 1 per cent significant level. Again, a 1 per cent increase in GDP per capita growth will decrease poverty gap by 0.49 per cent, 0.61 per cent and 0.95 per cent at the 25th, 50th and 75th percentiles of polity respectively. This is also at 1 per cent statistical significance. Also, a 1 per cent increase in GDP per capita growth will significantly decrease the squared poverty gap by 0.63 per cent, 0.78 per

Table 4: GDP per capita growth, institutions and poverty gap relationship

Dependent variable: Poverty gap	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 5
$Povg_{i,t-1}$	0.973***	0.906***	0.872***	0.884***	0.942***	0.995***	0.912***
	(0.090)	(0.105)	(0.068)	(0.088)	(0.181)	(0.197)	(0.110)
lgdp_percapita_growth	–0.634***	–0.821***	–0.428	–0.324**	–0.906	–1.293**	–0.688***
	(0.237)	(0.276)	(0.269)	(0.150)	(0.556)	(0.624)	(0.251)
dem	–0.015*						
	(0.008)						
*growth * dem*	–0.014**						
	(0.007)						
polity		–0.046**					
		(0.018)					
*growth * polity*		–0.043***					
		(0.015)					
icrg_corrup			–0.020				
			(0.144)				
*growth * icrg corrup*			–0.136				
			(0.103)				
icrg beauqu				–0.098			
				(0.152)			
*growth * icrg beauqu*				–0.109			
				(0.119)			
wdireg_quality					0.711		
					(0.636)		
*growth * wdireg_quality*					–0.677		
					(0.489)		
wdiV_acc						–0.867*	
						(0.451)	
*growth * wdiV_acc*						–1.054**	
						(0.521)	
rol							–0.551*
							(0.282)
*growth * rol*							–0.407**
							(0.189)
Observation	184	184	133	133	110	110	117
Hansen *J* test *p*-value	0.268	0.494	0.716	0.506	0.174	0.324	0.238
Resid. AR(2) test *p*-value	0.953	0.880	0.335	0.760	0.220	0.364	0.660

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Time dummies and all explanatory variables are included.

cent and 1.18 per cent at the 25th, 50th and 75th percentiles of polity respectively. Thus, the higher the level of polity index, the greater the poverty-reduction effect of GDP per capita growth.

The democratic score is evaluated at 25 per cent (0.000), 50 per cent (0.200) and 75 per cent (5.00). The regulatory quality is evaluated at 25 per cent (–1.006), 50 per cent (–0.515) and 75 per cent (–0.275). The voice and accountability is evaluated at 25 per cent (–1.135), 50 per cent (–0.627) and 75 per cent (–0.076). The rule of law is evaluated at 25 per cent (–1.205), 50 per cent (–0.643) and 75 per cent (–0.240). The threshold analysis clearly illustrates the crucial role of citizens' participation, good, accountable and responsible government, and sound policies and regulations in facilitating the growth process for poverty reduction in SSA.

6.3 Robustness Checks

The three poverty measures are used and qualitatively consistent results are obtained. The results of the sectoral growth specifications buttress the GDP per capita growth results. The models that incorporate the interaction between GDP per capita

Table 5: GDP per capita growth, institutions and squared poverty gap relationship

Dependent variable: Squared poverty gap	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 5
$Povgs_{i,t-1}$	0.923***	0.892***	0.905***	0.947***	0.964***	0.982***	0.996***
	(0.114)	(0.116)	(0.091)	(0.161)	(0.134)	(0.175)	(0.106)
lgdp_percapita_growth	–0.791***	–1.027**	–0.458**	–0.478*	–0.742	–0.800	–0.432
	(0.285)	(0.404)	(0.221)	(0.273)	(0.504)	(0.524)	(0.303)
dem	–0.015						
	(0.010)						
*growth * dem*	–0.014						
	(0.009)						
polity		–0.053**					
		(0.023)					
*growth * polity*		–0.052**					
		(0.021)					
icrg_corrup			–0.039				
			(0.138)				
*growth * icrg corrup*			–0.124				
			(0.100)				
icrg beauqu				–0.114			
				(0.237)			
*growth * icrg beauqu*				–0.179			
				(0.200)			
wdireg_quality					0.478		
					(0.592)		
*growth * wdireg_quality*					–0.551		
					(0.514)		
wdiV_acc						–0.484	
						(0.381)	
*growth * wdiV_acc*						–0.629	
						(0.428)	
rol							–0.217
							(0.303)
*growth * rol*							–0.232
							(0.218)
Observation	184	184	133	133	110	110	117
Hansen *J* test *p*-value	0.296	0.393	0.711	0.530	0.235	0.228	0.230
Resid. AR(2) test *p*-value	0.961	0.917	0.795	0.462	0.229	0.224	0.584

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Time dummies and all explanatory variables are included.

growth and the institutional indicators support the GDP per capita growth and poverty results. By restraining extreme values in the data to reduce the effect of spurious outliers, fairly robust estimates are obtained.

6.4 Comparison with other Results

Adams (2004) looks at growth elasticity of poverty using mean survey income and also GDP per capita growth. The paper finds that growth reduces poverty when measured with mean survey income but finds a statistically insignificant result with GDP per capita growth. The specification is estimated with ordinary least squares (OLS), which may not address the possible reverse causality between GDP per capita growth and poverty. The current contribution finds a statistically significant result of growth

elasticity of poverty with GDP per capita growth. The result for the industrial sector is in contrast with a study of Taiwan by Warr and Wen-Thuen (1999) using baseline survey data. In this study, the industrial sector leads to poverty reduction. The difference may be due to the industrialization of Taiwan associated with strong outward-oriented trade policies that provide the enabling environment for poverty reduction.

Table 6: The marginal effect of GDP per capita growth on poverty at specified levels of institutions

1. Polity index at	**25% (−7.000)**	**50% (−4.000)**	**75% (4.200)**	**Based on**
Poverty headcount	−0.288***	−0.359***	−0.552***	*Table 3, Model 2*
	(0.099)	(0.108)	(0.148)	
Poverty gap	−0.488***	−0.612***	−0.950***	*Table 4, Model 2*
	(0.188)	(0.203)	(0.270)	
Squared poverty gap	−0.629**	−0.776**	−1.178***	*Table 5, Model 2*
	(0.317)	(0.344)	(0.446)	
2. Regulatory quality at	**25% (−1.006)**	**50% (−0.515)**	**75% (−0.275)**	**Based on**
Poverty headcount	−0.137	−0.301*	−0.381*	*Table 3, Model 5*
	(0.146)	(0.185)	(0.209)	
Poverty gap	−0.195	−0.417**	−0.525**	*Table 4, Model 5*
	(0.168)	(0.185)	(0.209)	
Squared poverty gap	−0.178	−0.327*	−0.400*	*Table 5, Model 5*
	(0.152)	(0.184)	(0.223)	
3. Democracy at	**25% (0.000)**	**50% (0.200)**	**75% (5.000)**	**Based on**
Poverty headcount	−0.369***	−0.370***	−0.408***	*Table 3, Model 1*
	(0.111)	(0.112)	(0.122)	
Poverty Gap	−0.655***	−0.658***	−0.728***	*Table 4, Model 1*
	(0.204)	(0.204)	(0.222)	
Squared poverty gap	−0.785***	−0.788***	−0.861***	*Table 5, Model 1*
	(0.281)	(0.282)	(0.312)	
4. Voice and accountability at	**25% (−1.135)**	**50% (−0.627)**	**75% (−0.076)**	**Based on**
Poverty headcount	−0.636*	−0.708*	−2.419	*Table 3, Model 6*
	(0.381)	(0.430)	(1.644)	
Poverty gap	−0.965***	−1.059**	−3.302*	*Table 4, Model 6*
	(0.373)	(0.425)	(1.867)	
Squared poverty gap	−0.788	−0.859	−2.566	*Table 5, Model 6*
	(0.557)	(0.626)	(2.431)	
5. Rule of law at	**25% (−1.205)**	**50% (−0.643)**	**75% (−0.240)**	**Based on**
Poverty headcount	−0.145	−0.315**	−0.439***	*Table 3, Model 7*
	(0.095)	(0.130)	(0.170)	
Poverty gap	−0.193*	−0.388**	−0.530*	*Table 4, Model 7*
	(0.100)	(0.191)	(0.279)	
Squared poverty gap	−0.160	−0.239	−0.296	*Table 5, Model 7*
	(0.110)	(0.201)	(0.303)	

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Variables

Variable	Abbreviation	Construction	Source
Poverty headcount	lpovh	Log of poverty headcount	PovcalNet, World Bank
Poverty gap	lpovg	Log of poverty gap	PovcalNet, World Bank
Squared poverty gap	lpovgs	Log of squared poverty gap	PovcalNet, World Bank
GDP per capital growth	lgdp_percapita_growth	Log of GDP per capita growth	WDI, World Bank
Agriculture growth	lagric_growth	Log of agriculture growth	WDI, World Bank
Industry growth	lind_growth	Log of industry growth	WDI, World Bank
Service growth	lserv_growth	Log of service growth	WDI, World Bank
Gini Index	lgini	Log of Gini index	PovcalNet, World Bank
Inflation	lainf	Log of 1 plus inflation rate	WDI, World Bank
Finance	lfin	Log of domestic credit to the private sector as % GDP	WDI, World Bank
Investment	linv	Log of gross capital formation as % GDP	WDI, World Bank
Government expenditure	lgxp	Log of general government expenditure as % GDP	WDI, World Bank
Trade openness	ltrade	Log of trade openness	WDI, World Bank
Democracy score	dem		ADI, World Bank
Polity	polity		ADI, World Bank
Control of corruption	icrg_corrup		International Country Risk Guide
Bureaucracy quality	icrg_beauqu		International Country Risk Guide
Regulatory quality	wdireg_quality		ADI, World Bank
Voice and accountability	wdiV_acc		ADI, World Bank
Rule of law	rol		ADI, World Bank

Source: PovcalNet database (available at http://iresearch.worldbank.org/PovcalNet/jsp/index.jsp); World Development Indicators (available at http://stats.ukdataservice.ac.uk/); ICRG Indicators (available at http://www.icrg.org/).

Table 8: Sample countries

Angola	Benin	Botswana
Burkina Faso	Burundi	Cameroon
Cape Verde	C.A. Republic	Chad
Comoros	Congo	Côte d'Ivoire
Democratic Republic of Congo	Ethiopia	Gabon
The Gambia	Ghana	Guinea
Guinea-Bissau	Kenya	Lesotho
Madagascar	Malawi	Mali
Mauritania	Mauritius	Mozambique
Namibia	Niger	Nigeria
Rwanda	Senegal	Seychelles
Sierra Leone	South Africa	Sudan
Swaziland	Tanzania	Togo
Uganda	Zambia	

7. Conclusion and Policy Implications

Economic growth is a powerful instrument for reducing poverty in SSA. The findings reveal that the services and agricultural sectors growth have been significant for poverty reduction. If the finding is causal, then it points to the important role of the services and agricultural sectors in the demand for unskilled labour, the main resource belonging to the poor. Thus, sectoral disaggregation of growth also matters for poverty. An effective poverty-reduction strategy must have at its core measures to promote speedy and sustained growth. The enhancing effect of the subjective institutional measures throws a challenge for

policy to combine growth-promoting agenda with policies that ensure rule of law, administrative effectiveness and well-strengthened legislation. As debate on the growth-poverty relationship continues, there is the need for a theoretical framework that can be used to evaluate institutional reforms and their part in the growth-poverty relationship. Future policy-led research may look at the extraction of the principal components of the governance indicators to form a composite institutional measure that can sufficiently determine the weight of institutions in the growth-poverty relationship.

Notes

1. For a detailed discussion see Ravallion (1995, 1997), Fields (2002), Dollar and Kraay (2002, 2004), Adams (2004), Chen and Ravallion (2004), Kraay (2006) and Ncube *et al*. (2014).
2. Acemoglu *et al*. (2002, 2006), Dollar and Kraay (2003), Easterly (2003), Ravallion and Chen (2003) and Rodrik *et al*. (2004) provide an excellent discussion on the important role of institutions in the growth process.
3. With this approach, Anderson and Hsiao (1982) suggest the possibility of IV estimation using $Pov_{i,t-2}$ as an instrument for $\Delta\ Pov_{i,t-1}$ as $E(Pov_{i,t-2}\ \Delta\ \varepsilon_{it}) = 0$.

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