

# COVID-19: WEIGHING THE IMPACT OF AFRICAN LABOUR MARKET ON WORKING POVERTY IN SUB-SAHARAN AFRICA

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## **Abstract**

*The experience of Sub Saharan African countries specifically on working poverty is quite overwhelming in the event of economic shocks or crisis. The recessionary period and financial meltdown, trade cycle effect and policy reversals, above all disease/Pandemic (Covid-19) continued to ravage the labour growth productivity thus impact on working poverty of SSA countries This study empirically investigate the relationship among Dependency ratio, Labour Productivity and Poverty in Sub Saharan African Countries using sample of thirty eight (38) countries spanning the period 2000 to 2022. This study employs the pooled ordinary least square regression model, fixed and random effect regression model. The study also employ the causality test approach and the GMM model. The result of fixed effect estimation shows that labour productivity is negative and statistically significant at 1 percent while dependency ratio posit a negative although significant at 10 percent level of significance. However, the result of panel causality test revealed that labour productivity granger causes poverty indicating a uni-directional relationship. However, there exists a bi-directional relationship between poverty and dependency ratio in SSA countries. The result of GMM estimation posit that lag value of the dependent variable poverty has a positive and statistically significant effect on current poverty labour productivity has a negative and statistical significant impact on poverty. Dependency ratio has a negative effect on poverty.*

Keywords: Weighing, labour market, working poverty, Sub-Saharan Africa

## **Introduction**

According to ILO (2019) following low productivity growth and rapid expansion of the population in sub-Saharan Africa, the region continues to record very high average rates of extreme working poverty a population living on less than US\$1.90 per day in PPP estimate, at (37.9 per cent) and moderate working poverty living on between US\$1.90 and US\$3.10 per day). However, considering the 2\$ criterion for poverty line, poverty head count index pegged at 66.2% for people in Sub-Saharan Africa. It is glaring that the incidence of extreme working poverty is expected to decline following several interventions, the incidences continued to be acute. For instance, the total number of workers living in extreme or moderate poverty is set to increase by 10 million between 2018 and 2020 (ILO, 2019). Furthermore, ILO (2019) report also shows that sub-Saharan Africa contains 18 of the 20 countries with the highest incidence of extreme and moderate working poverty globally; these rates range from 57 per cent in Benin to over 84 per cent in Burundi. The increased rate of dependency ratio in SSA region coupled with poor and undeveloped pension scheme and lack

of social protection framework for dependents aged 65 and above continued to deplete the working poverty of the region.

The experience of SSA is influenced by low productivity and decreased GDP which negatively affects extreme poverty and moderate poverty in the region. Statistically, the wide spread of extreme poverty is accounted for due to large number of work force engaged in subsistence agriculture. For instance, 35.9 per cent persons in the region live in extreme poverty while 25.4 per cent of the population live in moderate poverty in 2019 (ILO, 2020).

The emergence of COVID-19 in late 2019 reflects low productivity which worsened extreme poverty and moderate poverty rate globally and SSA to be specific in spite of the measures to prevent the severity of spread by world health organization (WHO) and Centre for disease control (CDC). Although governments have led series of programmes to reduce the shock especially in the area of providing palliatives, investment in the health sector and so on. The wide spread of the pandemic continued to be acute despite interventions in the region which cause an increase in the working poverty. This study is apt and timely thus will analyze critical issues on dynamics of labour market outcomes. It is in this light that this study investigates the impact of labour productivity and dependency ratio on working poverty in Sub Saharan African countries. To achieve this, the study is structured into five sections including this introduction, section two considers the review of literature, section three uncovers the methodology, section four of this study explores analysis of data and lastly, section five discusses summary conclusion and implication for policy.

## **2.0 Theoretical Framework**

The neoclassical labor-market theory in its framework assumes that there is a relatively free and open market in which the people can compete for positions and the positions depend on individual's ability, effort and training. According to Hurst and Grusky, the neoclassical labor-market theorists argue that people are rewarded in proportion to what people contribute in society. The neoclassical labor-market theory argued that one's education, training, skill and intelligence are very crucial components of productivity in free market society, and that in a free market economy, determines the reward of productivity. On theory of labour productivity and poverty (Gwartney and McCaleb, 1985) argued that poverty reduction is a function of productivity. This theory posits that poverty reduced or is achievable through skills acquisition, hard work, motivation and resilience.

The Progressive Social Theory do not see people as the source of poverty but economic, political and social distortions as well as discrimination, which limit opportunities and resources to create wealth and overcome poverty. According to this theory, people are productive but rather the social and economic systems overrode and created individual poverty situations in capitalist system. Thus, if the economic political and social distortions could be halted, individuals will have opportunities of productivity (Bradshaw, 2005).

## **Review of Empirical Literature**

Chaudhry, Malik and AulHassan (2009) in their study employed Multivariate Regression Models and logit model to investigate determinants of rural poverty in terms of a household's socioeconomic and demographic features using data on southern Punjab. The result of the study that household size, dependency on household have a significant impact on poverty incidence. In a recent study, Cruz and Ahmad (2016) analyzes the effects of demographic change on economic growth, savings, and poverty for the period 1950-2010 covering sample of 180 countries employing the fixed effect and generalized method of moment. The result of the study revealed that a 1 percent point change in the share of working-age and population is associated with an increase of 1.5 percentage points in GDP per capita growth, an increase of 0.78 percentage point in savings, and a decrease of about 0.75 percentage point in the poverty rate.

Vijayakumar (2013) examines the relationship among poverty, economic growth, employment and dependency ratio in 41 developing countries employing the OLS technique, the result of the study revealed that age dependency ratio has a positive and significant relationship with poverty. One of the consequences of high dependency ratio in developing countries is the fact that it leads to lower productivity of such labor force. There is positive relationship between dependency ratio and poverty (Vijayakumar, 2013). Bariyya and Kurniasih (2019) investigated the effect of labour productivity on poverty in Kalimantan for the period 2008-2017 applying the correlation test, the result of the study revealed that labour productivity has a negative effect on poverty.

In another study, ILO (2004) examined the effect of productivity growth on poverty reduction in developing countries spanning 1995 to 2015 applying the simple regression model and using the Sala –Martinn poverty estimate, result of the study shows that labour productivity growth reduces poverty. labour productivity growth reduces the incidence of poverty. Statistically, a one per cent rise in labour productivity will be associated with a 0.74 per cent decline in the incidence of poverty on average. The study also revealed that using HDI as a measure for poverty, result shows that labour productivity has a positive and significant effect on poverty reduction in Africa.

## **3. Methodology**

### **3.1. Sample**

The objective of this study investigate empirically the relationship between dependency ration, labour productivity and poverty in Sub Saharan African countries using sample of thirty eight (38) countries span the period 2000 to 2022. The sample countries includes: Angola, Benin, Botswana, Burkina Faso, Burundi, Cape Verde, central African Republic, Congo, Congo Dem Republic, Cote d'Ivoire, equatorial guinea, Ethiopia, Gabon, Gambia, Ghana, guinea, guinea Bissau, Kenya, Liberia, Madagascar, Malawi, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Somalia, south Africa, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe The rationale of employing the

span period of study is use of non-probability sampling technique in form of availability of data inform of non-probability sampling technique. Data is sourced from International Labor Organization (ILO).

### Model and Definition of Variables

This study follows the Beck, Levine and Loayza (2000) and Calderón and Servén (2004) that allows for resolving endogeneity problem by exploiting the time series variation in the data, hence allows for controlling of unobserved group-specific effects, and allowing for the inclusion of a lagged dependent as explanatory variable

$$poverty = \beta_0 + \beta_1 labprod + \beta_2 depratio ++ \varepsilon_{it}$$

While:

DV= poverty,  $\beta_0$  is constant  $\beta_1$  and  $\beta_2$  are parameters explaining dependent variable and  $\varepsilon_{it}$  implies the error term.

#### 3.2.1. Fixed Effect Model

The Fixed effects overcomes the problem of unobserved heterogeneity, the model can be expressed as:

$$y_{it} = \alpha_0 + \sum_{j=2}^k \alpha_j x_{jit} + \sum_{p=1}^s \beta_p z_{pi} + u_{it}$$

Where:

$Y$  is the dependent variable

$X_j$  are the observed explanatory variables

$Z_p$  are unobserved explanatory variables

Where the hausman specification test depict that the fixed effect is appropriate, the fixed effect within group will be efficient. Thus, it proofs the variation resulting from the mean of the dependent variable in terms of the variations resulting from the means of the explanatory variables for the group of observations relating to a given individual.

$$y_{it} - \bar{y} = \sum_{j=2}^k \beta_j (x_{ijt} - \bar{x}_{ij}) + (u_{it} - \bar{u}_i)$$

The fixed effect within group removes the observed heterogeneity that might exist in the panel so as to produce a robust output taking care of certain issues inherent in the fixed effect estimation.

Employing the dynamic fixed effect estimation, the model is expressed as:

To specify the dynamic model, we have

$$\ln Y_{it} = \phi \ln Y_{it-1} + \gamma Z'_{it} + \beta X'_{it} + d_t + \varepsilon_{it}$$

$Z'$  Implies control variables,  $X'$  implies explanatory variables  $\ln Y_{it-1}$  is lagged value of dependent variable (see Labra and Torrecillas (2018))

The differenced GMM is expressed as:

$$\ln Y_{it} = \phi \ln Y_{it-1} + \gamma Z'_{it} + \beta X'_{it} + d_t + \varepsilon_{it}$$

$$i = 1, 2, \dots, N; t = 1, 2, \dots, T$$

The implication of the above differenced GMM model is the if the dependent variable is close to random walk for instance ( $\phi \rightarrow 1$ ) that is the lagged dependent variable is moving toward one (1). The Difference GMM estimation will not yield a robust estimate rather a biased and inefficient estimate and consequently could be acute when the time panel is short Blundell and Bond (1998) and Arellano and Bond (1991).

The significant coefficients in the GMM estimations are important tool for determining long run equilibrium. The long-run coefficients are generated through short-run significant coefficient of ECM. Thus, the long-run effects for the  $K^{th}$  parameter is computed as

$$\beta_k + (1 - \phi)$$

### Definition of Variables

**Poverty:** The parameter is measured as Proportion of population below the international poverty line (%). This is in line with the measure by ILO (2020).

**Dependency Ratio:** this is the number of dependents age zero to 14 and age 65 and above as defined by ILO (2020).

**Labour productivity:** it is measured as Annual growth rate of real GDP per employed person (GDP constant 2010 US \$) (%) (See ILO 2020).

### Methodology

The pooled OLS and robust options used, we further employed the static model which includes the fixed effect estimation and random effect estimation. Hausman specification test is used to choose the appropriate model. The stationarity test is also used to examine the level of stationarity of series and the granger causality test is employed to establish the direction of causality. The lag value of the dependent variable is also used as one of the explanatory variable to explore the lag value of the explanatory variable can be used as an important instrument explaining poverty in SSA countries.

### Result

Table 1. Labour productivity, dependency ratio and poverty in SSA countries

	OLS		FE	RE	FE robust
Lag		1.009***			
pov25plus		(.0017)			
labprodi	.0009*	-.0018**	.0330**	.0049*	-.0199***
	(.002)	(.0014)	(.0459)	(.0110)	(.0071)
depratio	-10.15***	-.032***	4.530***	2.985**	-.451*
	(1.314)	(.0078)	(2.165)	(2.046)	(1.362)
R-squared	0.0652				
Adj R-squared	0.063				
Number of obs			874	874	836
Number of groups			38	38	38
Hausman test			Prob>chi2	=	0.0483

*Source: Author Computation*

*Notes: \*\*\* \*\* \*denotes statistical significance at 1%, 5% and 10% respectively Z statistics (n parentheses).*

We regress the explanatory variable by employing the pooled ordinary least square approach. In table 1 result of pooled OLS revealed that labour productivity has a positive but non-significant impact on poverty. However, the coefficient dependency ratio posit a positive and statistically significant impact on poverty. Statistically, a one percent increase in dependency ration increases poverty by ten 10 significance. We took the lag value of the dependent variable as one of the explanatory variable explaining poverty as dependent variable. The result posits that the lag value of the dependent variable poverty has a positive and statistical significant relationship with current poverty in SSA countries. Similarly, the significance of labour productivity seem to improve from 10 percent significance to 5 percent significance. Furthermore, the parameter dependency ration posit a negative and statistical significant effect on poverty.

Surprisingly, the result of fixed effect estimation shows that labour productivity indicates positive at 5 percent level of significance, dependency ratio has a positive and statistical significant effect on poverty at 1 percent level of significance.

The result of random effect model shows that labour productivity impact on poverty at 10 percent while the coefficient dependency ratio shows positive at 5 percent. The Hausman specification test reveals that the fixed effect estimation is appropriate. The rule of thumb explains that If the probability value  $<0.05$ , then FE otherwise RE model should be selected.

When we apply the fixed effect robust option, the result shows that labour productivity is negative and statistically significant at 1 percent while dependency ratio posit a negative although significant at 10 percent level of significance. This study also employed the Breusch-GodfrayLM test, residual normality test and heteroscedasticity test and serial correlation test as well. All the test indicates significant above 5 percent level. Time series by nature are known to be non-stationary. Hence, we employed the Fisher ADF and Phillip Peron test. We employed to test for stationarity of series and the parameters are all stationary at first difference and integrated of order 1(1). Consequently, we examine the direction of causality of series.

**Table 2. Panel granger causality test**

DEP VAR	Independent Variables		
	Pov25plusi	Labprodi	depratioi
Pov25plusi	-	-.021187***	-2.298822***
Labprod	.0460329**	.0076763	.6641771
Depratio	.0301173	-	-1.464806*
	.0008322***	-.0002467**	3.093192
	.0001625	.0002546	-

*Source: Author Computation*

*Notes: \*\*\* \*\* \*denotes statistical significance at 1%, 5% and 10% respectively Z statistics (n parentheses).*

The result of panel causality test in table 2 reveals that labour productivity granger causes poverty indicating a uni-directional relationship. However, there exist a bi-directional relationship between poverty and dependency ratio in SSA countries. This confirm with the findings by Vijayakumar (2013).

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
l.pov25plus	1.065***	1.082***	1.067***	1.031365***	1.065***	1.082***	1.08***
	.042	.053	.038	.0248539	.042	.053	.052
labprod	-.328***	-.402***	-.315**	-.064***	-.328***	-.402***	.402***
	.136	.213	.196	.032	.136	.213	.209
depratio	-4.935**	-6.41**	-4.923**	-7.714*	-4.935**	-6.418**	-6.41**
	4.513	5.903	4.309	1.293	4.513	5.903	5.799
No of Observation	228	228	228	228	228	228	228
F statistics	645.73	645.73	964.83	841.09	901.92	645.73	2007.23
Group of instrument	23	8	9	9	23	8	8
AR (2)	0.693	0.771	0.705	0.142	0.693	0.771	0.771
Hansen statistics	0.820	0.880	0.782	0.092	0.820	0.880	0.880

*Source: Author Computation*

### Table 3 DIFFERENCED GMM

The result in model 1 shows that the lag value of poverty has a positive and statistically significant effect on poverty at 1 percent level of significance indicating that previous poverty has effect on current poverty. Labour productivity has a negative and statistically significant impact on poverty. However, dependency ratio posit a negative effect on poverty at 5% level of significance. The result also indicates that the number of instrument is high (see Labra and Torrecillas, 2018)

In model 2, the lag value of the dependent variable poverty has a positive and statistically significant effect on current poverty at 1 percent level of significance. labour productivity has a negative and statistical significant impact on poverty at 1 percent level of significance. This is in line with findings by Bariyya and Kurniasih(2019)Dependency ratio has a negative



effect on poverty at 5 percent. This is contrary to the findings by Vijayakumar (2013) The number of instrument is proliferated in initial model 23 but later diminish to as low as 8 with inclusion of collapse option.

The result in model 3 posit increase in the instrument set in which demography age zero to 15 is added to the instrument set and the result shows that significance of coefficients lag value of poverty and labour productivity at 1 percent level of significance. While the former is positive the latter is negative. The implication of adding the instrument set is that Hansen statistics has reduced compared to the value in model 2.

Inn model 4, the nodiffsagan is removed and the result posits that lag value of poverty has positive and statistically significant effect on current poverty at 1%. Labour productivity has a negative effect relationship with poverty at 1% level of significance. The implication of this model is that AR (2) has increased and Hansen statistics has also increased. However, including labour productivity and dropping poverty age zero to 25 as instrument set, the Hansen statistics is poor indicating that labour productivity is a poor instrument set to be included in the model.

In model 5, removing the collapse option and nodiffsagan option, the result reveals that the coefficient lag value of poverty has a positive and statistically significant effect on current poverty at 1% level of significance. labour productivity is negative and statistically significant at 1 % level of significance. However, in model 6, including collapse option and removing the nodiffsagan option. In model 6, the small option is removed and the result revealed that lag value of poverty has a positive effect on current poverty. Labour productivity and dependency ratio have negative effect on poverty in SSA countries.

In table 2 model 1, result posits that the lag value of the dependent variable poverty has a positive and statistical significant relationship with current poverty. The AR (2) and Hansen are not significant not significant but the number of instrument is proliferated due to absence of collapse option. However, in model 2, including the collapse option, result posits that the lag value of poverty has a positive and significant effect on current poverty. The AR (2) and Hansen statistics are not significant but the number of instrument has reduced to 8 from initial 23 in model 1. Thus, this indicated that the model does not suffer from second order correlation and Hansen statistics is not over-identified

In model 3, the equation sun option without the collapse option is used and the result shows that the lag value of poverty has a positive relationship with current poverty, while labour productivity has a negative relationship. The implication of the option increased the instrument to 23. In model 4, the coefficient dependency ratio has always been treated as exogenous variable. Here it is treated as GMM instrument. The implication of this option employed is that the lag value of dependent variable has a positive and statistical significant relationship with current poverty rate in SSA. The number of instrument has reduced to 15 as compared to the instrument in model 3 i.e. 23. In model 5, without the equation level sub option, result reveals that the lag value of dependent variable is positive and significant at 1%

level of significance. Thus, the number of instrument is reduced as low as 10 compared to model 4. The coefficient labour productivity also posits a negative and statistical significant effect on poverty at 1% level of significance. However, dependency ratio posits a positive effect relationship on poverty at 5% level. The AR (2) also has not been proliferated and significant. The value stood at 0.547 and Hansen statistics stood at 0.360. The model is okay hence does not suffer from second order serial correlation and the instruments are valid.

In model 6, the nodiffsagan and collapse option is removed, the result shows that lag value of dependent variable is positive and statistically significant on current poverty at 1% indicating that the model does not suffer the second order serial correlation. Labour productivity is negative and statistically significant at 1%. However, dependency ratio posits a positive effect on poverty. The implication of no collapse option is that instrument is proliferated to 64 and the value of Hansen statistics is high at 0.991.

Surprisingly, the result changed in model 7 without nodiffsagan but with collapse option. The coefficients showed similar signs except for number of instruments that fell as low as 18. AR (2) stood at 0.547 which is not significant. Hansen statistics stood at 0.360 showing that the instruments are valid and the model does not suffer second order serial correlation.

In model 8, removing the orthogonal option, the lag value of poverty has a positive and statistical significant effect on current poverty. Labour productivity posit a negative and statistical significant effect on poverty at 1% level of significance. The model is valid. The result of model 9 shows a similar output without small option compared to model 8.

The result in model 10 including coefficient in the GMM instrument set shows that the lag value of dependent variable has a positive and significant relationship with current poverty while labour productivity has a negative and significant relationship with poverty. The Hansen stood at 0.198. While AR (2) statistics stood at 0.551 and instrument is 19.

**TABLE 4 System GMM**

Variable	1	2	3	4	5	6	7	8	9	10
l. pov25plus	1.051*** .031	1.074*** .052	1.05*** .031	1.0*** .023	.993*** .007	.993*** .005	.993484*** .0070128	.9932687** * .0070294	.993484*** .0068806	.9951643 .0071792
Labprod	-.262*** .110	-.37*** .16	-.26*** .110	-.108*** .058	-.330*** .080	-.206*** .039	-.330*** .080	-.332*** .073	-.330*** .078	-.2757772 .0644448
Depratio	-4.837** 2.734	-6.817** 4.64	-4.83 *** 2.73	-.66* 1.79	.11** .149	.132* .129	.1116431** .1494501	.114*** .142	.11** .146	.1780986 .1459971
No of Observation	228	228	228	228	266	266	266	266	266	266
F statistics	746.74	721.06	746.74	1292.78	9781.31	19394.70	9781.31	9511.07	30482.09	8181.89
Group of instrument	23	8	23	15	18	64	18	18	18	19
AR (2)	0.700	0.758	0.700	0.551	0.547	0.670	0.547	0.548	0.547	0.551
Hansen statistics	0.820	0.880	0.820	0.162	0.360	0.895	0.360	0.410	0.360	0.198

We found across all model specification that the lag level or past poverty is a strong predictor influencing current poverty in Table 4. Similarly labour productivity also shows negative and statistically significant at 1% level of significance across all model specification. Dependency ratio posit a negative effect on poverty at 1% level of significance in model 3 although positive in model 7.

**Table 5 Differenced GMM or System GMM**

Estimations	Coefficients
One step gmm	1.082639
Two step gmm	1.074372
Fixed effect	-.0026031
Pooled OLS	.0599367

From the estimation, Bond (2001) argued that when the one step and two step GMM are lower or closer to fixed effect estimation, the system GMM is most appropriate. Thus, result shows that the estimate for differenced and system GMM are greater than fixed effect estimation. Hence the differenced GMM is most appropriate model.

**TABLE 6 Causality test**

Variables	Coefficients
Labprod	5.001*** (2.154)
Depratio	75.037*** (34.335)

*Source: Author Computation*

*Notes: \*\*\* \*\* \*denotes statistical significance at 1%, 5% and 10% respectively Z statistics (n parentheses).*

Result in Table 6 also shows the long run coefficients generated from significant short run coefficients in differenced and system GMM. Thus, Differenced and System GMM are short run estimation (See Bond 2001). From the finding, it shows that both labour productivity and dependency ratio have long run relationship with working poverty in SSA countries.

## **Conclusion**

This study employ a panel data of 38 SSA countries to investigate the weighing impact of labour productivity, dependency ratio on working poverty in SSA for the period 2000 to 2022. From the findings, result of GMM estimation shows that the lag value of poverty has a positive and significant effect on current poverty implying that previous poverty impact positively on current poverty. Labour productivity is negative and statistically significant at on working poverty at 1 percent while dependency ratio posits a negative although significant at 5 percent level of significance. On long run relationship, labour productivity and dependency ratio have long run relationship with working poverty for the period of study. On causality test, result indicates labour productivity granger causes poverty indicating a uni-directional relationship. However, there exists a bi-directional relationship between poverty and dependency ratio in SSA countries.

## Implication of the study

1. The need for policy framework to sustain jobs and the global economy is essential to reduce working poverty cannot be underscore hence policy makers must provide a stimulus program to assist both formal and informal sector.
2. Policy to provide social protection for the dependents should be inherent in the policy framework to reduce the further impact on working poverty and should be a caveat for policy makers

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