Human Development, Government Spending and Economic Growth in West Africa

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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ABSTRACT

This study verifies the role of government spending on the relationship between human development and economic growth in West African Countries using an extension of human development measure. We generate a new measure of human development that considered environmental influence by performing Principal Component Analysis on environmental variables such as: (i) Atmospheric Pollution (i.e. carbondioxide (CO_2), (ii) emmissions, fossil fuel energy consumption, methane (CH_4) and (iii) Nitrous (N_2)) and incorporate welfare measures used by HDI (i.e. Education, Health and Income) to generate a scientifically weighted index (HDIGEN).The study employed Fixed effect method using annual time series data between 1980 and 2017. The results showed that human capital on its own is positively, statistically and significantly related with output. However, when human capital is interacted with government spending (GSHK), negative relation was found, but not statistically significant. These results might not be found wanton in the sense that all the countries under study are documented among the corrupt nations. Most of the funds meant for augmenting human capital might not be spent for the purpose for which they are meant. We found negative relationship between human development and output when we used the most common measure of human development (HDI) and the generated one (HDIGEN), but only the one generated was statistically significant. The results showed that measuring human development requires holistic approach of measure, especially consideration of environmental

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factors. When we interacted government spending with HDIGEN, we discovered positive relation and statistically significant results, while the interaction of government spending with HDI, showed negative and statistically insignificant results. The implication is that if government of these countries can be sincere in spending on improving environmental factors while focusing on improving human development, sustainable development goal can equally be achieved.

1. INTRODUCTION

There is no doubt about the essentiality of pursuing economic growth in an economy. Pursuing economic growth requires provision for necessary physical capital which is usually pursued in conjunction with economic growth. However, no matter the level of sophistication of any type of capital, one way or the other, they still rely much on the coordination of human development before economic growth objective can be achieved. One big mistake that many make is that they see human capital and human development as the same thing, whereas they are not. In a way, Schultz [1] sees human capital as the same as any other capital which can be improved through investment in education and training. To Psacharopoulos and Woodhall [2], "Human resources constitute the ultimate basis of wealth of nations. Capital and natural resources are passive factors of production, human beings are the active agencies who accumulate capital, exploit natural resources, build social, economic and political organization, and carry forward national development". Human development is the overall process of improving human skills as well as opportunities within and outside of any organization. Human development is regarded as both a process and an outcome. It is concerned with the process through which choices are enlarged, but it also focuses on the outcomes of enhanced choices. Although, human capital is naturally common to most economies of the world, its quality which dictates its efficient performance needs to be developed by various means.

Contrary to the passive role given to human development by early economists, its role in the determination of economic growth cannot be underestimated. Human development is concerned about education and health, which are integral to human well-being. This is because, only when people possessed the ability to read and apply their knowledge that they can have maximum benefit which will lead to a long and healthy life. Thus, human development is a process through which human capital is created through various developmental activities and programmes such as provision of basic healthcare and educational services. This then implies that, activating human development is an essential goal to pursue in the quest for spurring productivity and achieving sustainable development.

Aside from the above, most studies that examine the connection among human capital, human development and economic growth measure human development using Human Development Indicator of United Nation Development Program which majorly comprises of education, health and income. This index has been criticized on the basis of the fact that it is intrinsically correlated with gross domestic product (GDP) (McGillivray [3] and its possession of poor statistical quality due to arbitrary weighting of the included variables. Recently, the importance of environmental factors on human development has been highly pronounced. Studies have proposed that environmental sustainability cannot be separated from human welfare and therefore should be included in the measure of human welfare [4,5]. It has also been noted that attainment of increased human welfare is taken to be a beneficial factor in estimating how much pollution abatement is desirable, given the cost of attainment in the field of environmental economics Welsch [6]. Thus, this study incorporates environmental factor into measuring human welfare as opposed to HDI. The study clearly distinguishes between human capital and human development, their relationship with economic growth, as well as examining the role of government spending on the relationship between human development and economic growth, especially in West Africa.

2. LITERATURE REVIEW

Many studies have examined the relationship between human capital and economic growth [7,8]. Some of these studies have emphasized the positive roles of human capital on economic growth both in developed and developing

countries especially in Nigeria [9,10,11]. For example, while Aigbokan et al. [12] emphasized that human capital is concerned with the transformation of the total man to promote his productivity. Lawanson [11] noted that human capital is an essential ingredient towards economic growth in Nigeria. Coupled with this is the study of Lucas [13] where a large body of literature on the theory of economic growth was formulated. From these studies, human capital was seen as a vibrant engine which propels today's global economy to its present form. Human capital accumulation was also seen as a channel through which knowledge spillovers are generated, and this leads to higher productivity growth.

However, considering human development and economic growth, many studies have noted bidirectional causality between the two [14,15]. In contrast to the studies on human capital and economic growth, the concept of human development has been extended to the process of expanding capacity, freedoms and opportunities for people to choose, the ingredient by which productivity can be enhanced [16]. According to Ramirez et al. [15], a strong and positive relationship between human development and economic growth was found in both directions, while public spending on social services and education were noted to be important connections that determine the relationship between economic growth and human development. It has also been noted that investment rate and income distribution determine the relationship between human development and economic growth. While economic growth has been seen as important contributing factor to human development based on its ability to generate fund to enhance human development, it has also been seen as not an end in itself because it might not impact on future of human development [17], whereas, human development is seen as the overall process of strengthening human skills, promotes opportunities within and outside of any organization. Thus, human development is regarded as both a process and an outcome.

3. THEORETICAL FRAMEWORK AND MODEL SPECIFICATION

Following Romer's [18] model of increasing returns, in which there was a stable positive equilibrium growth rate resulting from endogenous accumulation of knowledge, we can specify a production function of firm j as:

$$y_{t,j} = A_t F(k_{t,j}, \ell_{t,j}) \tag{1}$$

Aggregate output-augmenting technological progress is captured by A_t, while capital accumulation without depreciation can be given as:

$$k_{t,j} = i_{t,j} \tag{2}$$

Suppose firms and individuals are distributed along the unit interval with a total mass of 1 in aggregate (with zero population growth), aggregate investment can be specified as:

$$I_t = \int_0^1 i_{t,j} dj \tag{3}$$

According to Romer, aggregate stock of knowledge in the economy is comparative to the cumulative sum of past aggregate investment and it is given as:

$$\Phi_t = \int_{-\infty}^t I_v dv \tag{4}$$

This is assumed to be identically, but not coincidentally, equal to the size of the aggregate capital stock,

$$K_t = \int_{-\infty}^t I_v dv \tag{5}$$

To Romer, it was assumed that the effect of the stock of knowledge determines productivity via

$$A_t = \Phi_t^\eta \tag{6}$$

where $\eta < 1$. Thus, if we suppressing the t subscript, the firm-level Cobb-Douglas production function can then be written as:

$$y_j = k_j^\alpha \ell_j^{1-\alpha} \Phi^\eta \tag{7}$$

Which is Constant Returns to Scale (CRS) at the firm level in (k, ℓ) holding aggregate knowledge, Φ fixed. Aggregate output then becomes:

$$Y = k_j^\alpha L_j^{1-\alpha} \Phi^\eta \tag{8}$$

Dividing by the size of the labor force L (or, equivalently, normalizing to L = 1), gives:

$$y = k^{\alpha}\Phi^{\eta} \qquad (9)$$

Assume households maximize a typical CRRA utility function, but each ignores the effect its own investment decision has on aggregate knowledge. Therefore, from the individual firm/consumer's perspective, the marginal product of capital equals $\alpha k_{t,i}^{\alpha-1}\ell_{t,i}^{1-\alpha}\Phi_t^{\eta}$. If we normalize the model by assuming that the aggregate quantity of labor L_t adds up to 1, setting up and solving the Hamiltonian, we have:

$$\dot{c}_{t,i} / c_{t,i} = \rho^{-1}(\alpha k_{j,i}^{\alpha-1}\Phi_t^{\eta} - \upsilon). \qquad (10)$$

Suppose all households are identical and $\Phi_t = K_t$, then aggregate consumption per capita evolves according to

$$\dot{c}_t / c_t = \rho^{-1}(\alpha k_{j,i}^{\alpha+\eta-1}\Phi_t^{\eta} - \upsilon) \qquad (11)$$

$$\dot{c}_t / c_t = \rho^{-1}(\alpha k_{j,i}^{\alpha-1}\Phi_t^{\eta} - \upsilon) \qquad (12)$$

A balanced growth path can occur in this economy if $\alpha + \eta = 1$, in which case

$$\dot{c}_t / c_t = \rho^{-1}(\alpha - \upsilon) \qquad (13)$$

This therefore causes continuous constant growth at a rate that depends on the degree of intolerance and capital's share in output.

Finally, the steady-state growth rate that would be chosen by the social planner is given as:

$$\dot{c}_t / c_t = \rho^{-1}(\alpha + \eta - \upsilon) \qquad (14)$$

This is because the social planner would always consider externalities, which implies that there are higher returns to capital accumulation at the social level than at the individual level. Thus, the model satisfies the condition that social planner should subsidized capital accumulation if they want to induce the private economy to move toward the social optimum. This therefore implies that social planners who desire increased output can pursue spending on improving human capital development as well as human development.

Given the above we can specify the relationship among output, government spending and human development as:

$$\Delta \ln y_{it} = \alpha_0 + \alpha_1 hk_{it} + \alpha_2 hdigen_{it}$$
$$+\alpha_3 hdi_{it} + \alpha_4 gshk_{it} + \alpha_5 gshdigen_{it} \qquad (15)$$
$$+ \alpha_6 domcreprv_{it} + \varepsilon_{it}$$

Where $y_{it} = $ output, $hk = $ human capital, $hdigen, = $ generated human development $hdi = $ human development index, $gsk = \text{int} eraction\ of\ government\ spending$ and capital stock, $gshdigen = \text{int} eraction\ of\ government\ spending$ and generated human development index, $domcreprv = domestic\ private\ credit$

4. METHODOLOGY, DATA MEASUREMENT AND SOURCES

We first examine the summary statistics of our data to ensure the normality of their distributions. After satisfying with the distributions of our data, we examine the presence of stationarity or not. The results show that all our variables are I(1) except output. We then proceed to test for which of Random or Fixed effect is suitable for this study using Hausman test. The results show that Fixed effect method is suitable. We then employ Fixed effect method to verify the relationship among human development, government spending on health, government spending on education, total government spending and economic growth in West African Countries.

Annual data for the period between 1980 and 2017 were used for the study. We measure the level of output (Y) by Real Gross Domestic Product per capital (RGDPK). These data are in constant 2005 international dollars. Total number of School enrolment is used as proxy for human capital. There are two human development indices constructed by UNDP. The first Human Development Index (HDI) covers three dimensions which include average achievements by districts in health, education and income. Average achievements are measured through health index, education index and income index. It is a composite index which combines these three indices with equal weightage. The second is Non Income Human Development Index (NIHDI). It is constructed by using health and education indicators. Unlike HDI, it does not use Gross National Product (GNP) in its construction. HDI measures improvements in a long and

healthy life, access to knowledge and decent standard of living, while NIHDI considers only two aspects which are a long and healthy life and access to knowledge. We employ HDI to measure human development in this study based on the fact that it is used by most studies. We also generate a new measure of human development index that considered environmental influence in this study by performing Principal Component Analysis on environmental variables such as: (i) Atmospheric Pollution (i.e. carbondioxide (CO_2), (ii) emmissions, fossil fuel energy consumption, methane (CH_4) and (iii) Nitrous (N_2)). and incorporate welfare measures used by HDI (i.e. Education, Health and Income) to generate a scientifically weighted index (HDIGEN). We then try to compare different impact of human development (i.e. HDI and HDIGEN) and human capital (HK) on economic growth. Our data were obtained for World Development Indicators (WDI, 2018).

5. DATA ANALYSIS AND DISCUSSION OF RESULTS

In an attempt to clarify the difference between human capital and human development as well as considering the importance of environmental factor in the measurement of human development, this study verifies the role of government spending on the relationship between human development and economic growth in West African Countries using an extension of human development measure. Our results showed that human capital on its own is positively, statistically and significantly related with output. An increase in human capital increased output by about 0.84%. This is high enough to buttress the importance of human capital to output. These results are in line with the growth theory that emphasized the contribution of capital, especially human capital to economic growth. However, when human capital was interacted with government spending (GSHK), negative relation was found, but statistically insignificant. These results might not be found wanton in the sense that all the countries under study are highly imaged in the record of corrupt nations. Most of the funds meant for augmenting human capital might not be spent for the purpose for which they are meant. We obtained negative relationship between human development and output when we used the most common human development index (HDI) and the generated one (HDIGEN), but the one generated was statistically significant. An increase in HDIGEN reduced output by about 232%. The results showed that measuring human development requires holistic approach measure especially when environmental factors are considered as part of

Table 1. Correlation matrix of the variables used

	Y	HK	HDIGEN	HDI	GSHK	GSHDIGEN	GSHDI	DOMCREPRV
Y	1.0000							
HK	0.8811	1.0000						
HDIGEN	0.0539	0.0381	1.0000					
HDI	0.0545	0.0555	-0.4971	1.0000				
GSHK	0.8478	0.9699	0.1310	-0.0007	1.0000			
GSHDIGEN	0.0558	0.0368	0.9891	-0.5357	0.1176	1.0000		
GSHDI	0.2131	0.1850	-0.0529	0.5344	0.3140	-0.1222	1.0000	
DOMCREPRV	-0.0745	-0.0702	-0.5100	0.3233	-0.0777	-0.5487	0.1321	1.0000

Table 2. Results of the study

Y	Coef.	Std. Err	t	P>|t|	[95% Conf. Interval]	
HK	0.8431	0.2067	4.08	0.000	.4235	1.2626
HDIGEN	-2.3233	1.0241	-2.27	0.030	-4.4023	0.2443
HDI	-0.6137	4.6882	-0.13	0.0897	10.1313	8.9039
GSHK	0.00035	0.0003	-1.26	0.216	-.0009	0.0002
GSHDIGEN	0.01476	0.0071	2.08	0.045	0.0003	0.0292
GSHDI	0.00291	0.0184	-0.16	0.875	-0.0403	0.0344
DOMCREPRV	0.3729	0.434	0.86	0.396	-0.5082	1.254
_cons	-0.1718	1.2631	-0.14	0.893	-2.7362	2.3926

human development. When we interacted government spending with HDIGEN (i.e. GSHDIGEN), we discovered positive relation and statistically significant results, while the interaction of government spending with HDI (i.e. GSHDI), negative and statistically insignificant results were found. The implication is that if governments of these countries can be sincere in spending on improving environmental factors while focusing on improving human development, sustainable development goal can equally be achieved. Also, increased domestic private credit (DOMCREPRV) yielded about 37% increase in output. Again, this was also in tandem with economic theory that postulates stimulation of an economy via appropriate funding through domestic credit. Our results are shown in Tables 1 and 2.

6. SUMMARY, POLICY RECOMMENDA-TION AND CONCLUSION

While governments focus attention on promoting economic growth as an essential macroeconomic objective that must be achieved, the role of human development as intervening variable has been played down. Unfortunately, most studies that claim to embrace the role of human development measured it using human development index. This measure has been criticized on many grounds. On this note, the study examined role of human development, human capital, government spending and domestic private credit on economic growth in eighteen West African Countries between 1980 and 2017. We measured our human development by considering environmental factors that are germane to human development and generate and index (HDIGEN) using principal component analysis. We also used human development index as a measure of human development and examined their relationship with economic growth. The findings of this study showed that human capital is an important variable that can spur economic growth. Our results also showed that government spending is an important variable that promote the performance of human development on economic growth. Our study concludes that environmental factors are important variables that should considered when measuring human development. Thus, the study suggests that policy makers should consider spending on environmental factors while focusing on human development as a channel through which sustainable development can be achieved.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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