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The role of savings in achieving human capital development in resource-rich countries

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Abstract

This paper examined the impact of savings on human capital development in Nigeria (resource rich-country) from 1981- 2020. Using Autoregressive Moving Average (ARMA) model, the results indicate that the estimated parameters on gross savings (GSA), official development assistance (ODA), and democracy (DEM) are statistically significantly different from zero with the expected signs except that of GSA. The slope coefficient for GSA is surprisingly negative (despite Nigeria's oil wealth) and implies that a percentage increase in the gross saving (GSA) will translate into a decrease in the level of human capital development. The possible reasons behind the negative impact of savings on human capital development could be that past governments did not effectively manage the country's oil wealth, thus leading to low savings which culminated in under-investment in human capital development. As such, Nigeria still grades among the poorest and most miserable in the world in terms of the human development index.

Keywords: Autoregressive Moving Average (ARMA) model; human capital development; Nigeria; resource rich-country.

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1. INTRODUCTION

Saving is the process of setting aside a portion of current income for future use, or the flow of resources accumulated in this way over a given period (Britannica, 2021). By investment, economists mean the production of goods that will be used to produce other goods (Hassett, 2021). For this study, it must be emphasized that " investment" refers to human capital development. Human capital consists of the knowledge, skills, and health that people invest in and accumulate throughout their lives, enabling them to realize their potential as productive members of society (World Bank, 2020). Savings and investment have been emphasized by Economists as a precondition for the growth and development of countries (Thirlwal, 1979).

According to UKessays (2017), development all around the world is related to the economy. The economy is in part a social system of production, exchange, distribution, and consumption of goods and services of a country. People produce, distribute and consume goods and services and as such, they need to be skillful, well experienced and be in good condition physically and mentally (Human Capital) for the economy to develop and prosper. Human Capital development especially through Health care and Education are primary factors needed for every individual in a society to function well and be able to reach his/her full potential, increasing overall productivity and thus development (UKessays, 2017).

Nigeria, a country with abundant natural resources and a high population is expected to be able to invest immensely in human capital development for its citizens to enjoy increased productivity. With the immense Oil revenues, Nigeria is expected to save and be able to channel sufficient resources to provide opportunities for all citizens to develop to their fullest potential as well as create the enabling environment for everyone to participate fully in national development, but like most resource-rich developing countries, Nigeria lies at the bottom of the Human Development Index. This raises the question: why?

Nevertheless, the foundation of developing human capital is savings and it results when some portion of present income is saved and invested to augment future output and incomes. The extent to which the level of savings can affect human capital development and growth largely depends on the capacity of the economy to channel the savings into productive use (investing in people through nutrition, health care, quality education, jobs, and skills). Higher savings then implies higher human capital development. For instance, the savings rate has to increase gradually to finance the increasing educational needs of future generations and to keep growing the stock of human capital over time. An empirical study by Barro and Lee (1994) has illustrated that higher education attainment, relative to the level of income, leads to higher economic growth rates in an extensive set of countries.

However, little attention has been paid to the relationship between savings and human capital development. According to Morisset and Revoredo (1995), this relationship is important for sustainable economic growth due to the following reasons. First, human capital may be an engine for attracting other inputs, such as physical capital, which in turn require higher savings rates (Romer, 1990; Benhabib and Spiegel, 1994). Second, the savings rate has to increase gradually to finance the increasing educational needs of future generations and to keep human capital development over time. Azariadis and Drazen (1990) emphasized this intergenerational aspect of the relationship between savings and human capital development.

From an empirical standpoint, many scholars have carried out studies on human capital development in Nigeria. Some examined the relationship between human capital development and economic growth in

Nigeria (Uzodigwe et al., 2019; Osoba and Tella, 2017; Jaiyeoba, 2015; Eigbiremolen and Anaduaka, 2014; Wakeel and Alani, 2012; Adelakun, 2011). Sulaiman et al (2015) study examined the role of human capital and technology on economic growth from the Nigerian experience. Adeosun and Popogbe (2020) investigated the effect of population growth on human resource utilization. However, none of these studies examined the effect of savings on human capital development in Nigeria.

Similarly, from an empirical standpoint, many scholars have carried out studies on savings in Nigeria. Dolado and Lutkepohl (1996); Olajide (2009); Abu (2010); Adelakun (2011); Bankole and Fatai (2013) empirically investigated the relationship between savings and economic growth in Nigeria. Similarly, several empirical studies focusing on the determinants of savings have been conducted in Nigeria: Chete (1997); Soyibo and Adekanye (1991); Nyong (2000).

1.1. Conceptual framework

Nigeria is a country in the southeast of West Africa, with its coast at the Bight of Benin and the Gulf of Guinea. The country is bordered by Benin, Cameroon, Chad, and Niger; it shares maritime borders with Equatorial Guinea, Ghana, and São Tomé and Príncipe. Nigeria has a population of 192 million people (UN est. in 2017), making it the seventh most populous country in the world (Nationsonline, 2021). Its gross domestic product (GDP) is estimated at 397 billion United States dollars (USD) for 2018 based on the information available from the Nigerian Bureau of Statistics (PWC, 2021).

As a developing country, Nigeria has been recognized by prominent members of the global investment community and economists as an up-and-coming market with tremendous growth potential over the next decades. A member of the Organisation of Petroleum Exporting Countries (OPEC) since 1971, Nigeria ranks as the largest oil producer in Africa and the 11th largest in the world (PWC, 2021). In addition to oil and gas, Nigeria has vast underexploited mineral resources, including coal, bauxite, gold, and iron ore. The country's natural resources have attracted the attention of the supermajor oil and gas companies as well as businesses in allied industries, including oil field equipment and services, transportation and logistics, and petrochemicals and plastics.

Nigeria's gross savings rate was measured at 21.7% in Dec 2020, compared with 21.7% in the previous year (CEIC Data, 2021). In 2018, the Government of Nigeria launched the Human Capital Development (HCD) Vision in recognition of the need to improve human capital to drive sustained economic growth and productivity. By 2030, the HCD Vision aims to have 24 million additional healthy, educated, and productive Nigerians (Options, 2021). However, Nigeria’s HDI value for 2019 was 0.539— which put the country in the low human development category— positioning it at 161 out of 189 countries and territories (UNDP, 2020).

1.2. Purpose of study

Though many studies on savings have been carried out in Nigeria, so also have studies been carried out on human capital development, but the impact of savings on human capital development in Nigeria has been under-researched with limited empirical works. Given this backdrop, this paper seeks to empirically analyze the relationship between savings and human capital development in a developing country like Nigeria. This paper contributes to the literature on savings and human capital development in Nigeria in several aspects. Firstly, the sample adopted for the dataset is more current than other contributions.

Secondly, the paper made use of the ARMA model to capture the dynamic autoregressive time series effects of the variables concerned.

2. Materials and Methods

A specific methodological approach was applied in this paper. The start-off point was to ensure that all the variables are stationary for estimation. Testing variables for stationarity is important given that if variables have a unit root, the results of the analysis may be spurious. This paper deployed the Augmented Dickey-Fuller (ADF) test to examine whether the variables are stationary or not. If the results show that a variable is not stationary at all levels, it is then differenced until stationarity is attained. Thereafter, autoregressive–moving-average (ARMA) models were deployed. In the statistical analysis of time series, autoregressive–moving-average (ARMA) models provide a parsimonious description of a (weakly) stationary stochastic process in terms of two polynomials, one for the autoregression (AR) and the second for the moving average (MA).

2.1. Data collection

The time-series data used in this paper was from 1981 to 2020. Apart from the dummy variable (institutional framework), all data are an annual frequency and expressed in logarithms to stabilize the variance of the series. The time-series data were extracted from Indexmundi.com (gross savings (% of GDP); the annual percentage growth rate of GDP; foreign direct investment). Others were from Knoema.com (Human Development Index), Statista.com (unemployment rate), and Central Bank of Nigeria Statistical Bulletin (government recurrent expenditure on education (N billion); government recurrent expenditure on health (N billion); unemployment rate; population growth; Net overseas development assistance (ODA) received (% of gross capital formation). A dummy variable was constructed to capture the institutional framework. The dummy variable was assigned a value of 0 for the non-democratic era, i.e., 1981-1998; a value of 1 for the democratic era, i.e., 1999-2020.

2.2. Analysis

2.2.1. Model Specification

Nigeria is a natural resource-rich country inhabited by an estimated 192 million people (UN est. in 2017) and covers a land area of around 924 thousand squares kilometers (OPEC, 2021). With the immense oil revenues, Nigeria is expected to save and invest in its human capital development. In the light of an investment, the human capital development function based on literature is specified as follows

$$\log HDI_t = \beta_0 + \beta_1 \log SAV_t + \beta_2 \log VEC_t + \Omega_t \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where HDI is human capital development (a variable of interest proxy by the human development index of UNDP); SAV is national savings (also, variable of interest. National savings is a proxy by GSA, i.e., gross savings (% of GDP) which are calculated as gross national income less total consumption, plus net transfers); VEC is a vector of other exogenous variables or rather other economic factors/determinants of human capital development (economic growth proxy by Gross Domestic Product (GDP) growth (annual %)), government recurrent expenditure on health (HEL); government recurrent expenditure on education (EDU); population growth (annual %) (POP); unemployment rate (%)(UEM); foreign direct investment, net inflows (% of GDP) (FDI); overseas development assistance (ODA); DEM is democracy which captures institutional framework (dummy variable with the value 0 for the non-democratic era, 1981-1998; 1 for the democratic era, 1999-2020)). An understanding of how these other variables influence human capital

development can serve as valuable inputs in national policy formulation and implementation regarding sustained capacity-building efforts in Nigeria; Ω_t stands for the error term. A priori $\beta_0>0$, $\beta_1>0$, $\beta_2>0$.

In that light, equation 1 is expanded as follows:

$$\log HDI_t = \Omega_0 + \Omega_1 \log GSA_t + \Omega_2 \log HEL_t + \Omega_3 \log EDU_t + \Omega_4 \log GDP_t + \Omega_5 \log UEM_t + \Omega_6 \log FDI_t + \Omega_7 \log ODA_t + \Omega_8 DEM_t + \mu_t \quad \text{.....(2)}$$

(Ω_1 - Ω_4, Ω_6, Ω_7, $\Omega_8>0$; $\Omega_5<0$)

In estimating equation 2, the simple OLS may not be able to capture the dynamic autoregressive time series effects of the variables in the model. In addition, there is a strong tendency for the presence of serial correlation in the model. Hence to cater to that, Autoregressive Moving Average (ARMA) Models are employed.

An ARMA model, or Autoregressive Moving Average model, is used to describe weakly stationary stochastic time series in terms of two polynomials. The first of these polynomials is for autoregression, the second for the moving average.

Often this model is referred to as the ARMA(p,q) model; where: p is the order of the autoregressive polynomial; q is the order of the moving average polynomial.

The equation is given by:

$$X_t = c + \varepsilon_t + \sum_{i=1}^{p} \varphi_i X_{t-i} + \sum_{i=1}^{q} \theta_i \varepsilon_{t-i}. \quad \text{.....(3)}$$

Where: ϕ = the autoregressive model's parameters; θ = the moving average model's parameters; c = a constant; Σ = summation notation; ε = error terms (white noise).

The ARMA processes are considered to be the working horse for time series analysis for the reason(s) being that typically the classical linear regression model(s) tries to explain the variation in the dependent variable by summing the linear functions of explanatory variables plus with some noise. Whereas ARMA processes regress the explanatory variables against their past values (hence called the autoregressive) and add the noise as a moving average process. This gives a greater advantage of eliminating the problems of serial correlation; in this paper, the scheme for the ARMA terms is assumed to be the traditional Markov first-order autoregressive scheme, i.e., autoregressive moving averages process of order 1 (Gujarati, 2012). Based on equation 2, the ARMA model is as follows:

$$\log HDI_t = \pi_0 + \pi_1 \log GSA_t + \pi_2 \log HEL_t + \pi_3 \log EDU_t + \pi_4 \log GDP_t + \pi_5 \log UEM_t + \pi_6 \log FDI_t + \pi_7 \log ODA_t + \pi_8 DEM_t + AR(1) + MA(1) + \phi_t \quad \text{.....(4)}$$

3. Results

Table 1

ARMA Estimates

Dependent Variable: HDI				
Method: ARMA Maximum Likelihood (OPG - BHHH)				
Sample: 1981 2020				
Included observations: 40				
Convergence achieved after 32 iterations				
Coefficient covariance computed using the outer product of gradients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.696483	0.098013	-7.106046	0.0000
GSA	-0.059974	0.023359	-2.567489	0.0159
HEL	-0.014959	0.018607	-0.803900	0.4282
EDU	0.028283	0.019148	1.477087	0.1508
GDP	0.000569	0.016410	0.034680	0.9726
DEM	0.044941	0.023839	1.885156	0.0698
FDI	-0.010697	0.010856	-0.985355	0.3329
UEM	0.033671	0.020491	1.643262	0.1115
ODA	0.016988	0.007112	2.388750	0.0239
AR(1)	0.533386	0.478326	1.115109	0.2743
MA(1)	-0.077509	0.525440	-0.147512	0.8838
SIGMASQ	0.000341	9.52E-05	3.583984	0.0013
R-squared	0.964401	Mean dependent var		-0.774787
Adjusted R-squared	0.950416	S.D. dependent var		0.099158
S.E. of regression	0.022080	Akaike info criterion		-4.538547
Sum squared resid	0.013651	Schwarz criterion		-4.031884
Log-likelihood	102.7709	Hannan-Quinn criteria.		-4.355354
F-statistic	68.95845	Durbin-Watson stat		1.985069
Prob(F-statistic)	0.000000			

Source: Author's computation using EViews 10 software

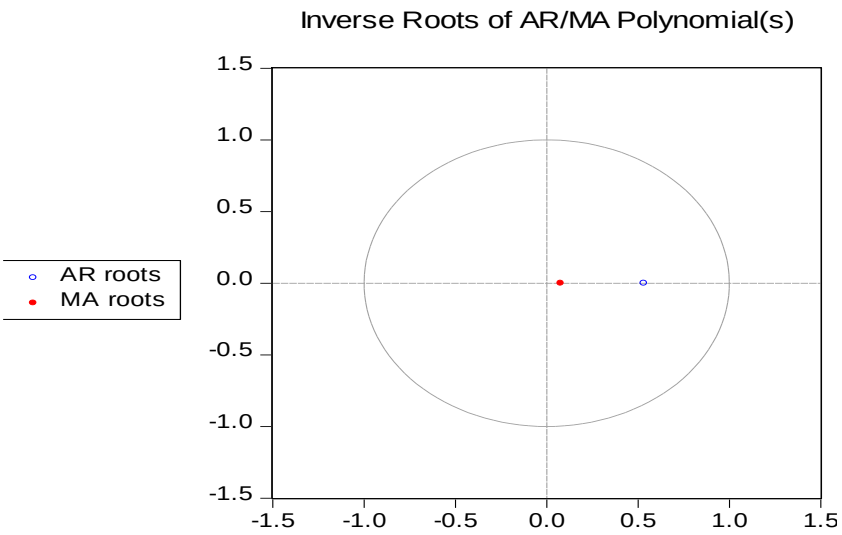
In estimating equation 4, the coefficient standard errors were computed using the observed Hessian. In addition, the Optimization method was set to BFGS, the Convergence tolerance to "1e-8", and the ARMA Method to ML automatically. The results presented in Table 1 indicate that the estimated parameters on GSA, ODA, and DEM are statistically significantly different from zero with the expected signs except that of GSA. The slope coefficient for GSA is surprisingly negative and implies that an increase in savings would result in a decrease in human capital development. Precisely, a percentage increase in the gross saving (GSA) will translate into a 0.059974% decrease in the level of human capital development. According to OPEC, Nigeria has almost 40 billion barrels of proven oil reserves (EITI, 2021). After nearly 50 years of exploration, the oil and gas sector continue to play a significant role in the economy and accounts for 65% of total revenue to the government but the country has faced significant challenges in managing the sector such as the unaccountable use of revenues and corruption (EITI, 2021).

In this paper, the result in Table 1 indicates that indicating that on average 0.044941 % increase is observed in human capital development due to a 1% increase in democracy in Nigeria. Though the country has experienced over twenty years of uninterrupted democratic rule, available evidence shows that

between 2005 and 2019, Nigeria's HDI value increased from 0.465 to 0.539, an increase of 15.9 percent (UNDP, 2020). But the development of human capital in Nigeria with a population estimated at 173 million (NBS, 2015) is characterized as poor in terms of education and healthcare by the Human Development Index (HDI, 2014). Nigeria's HDI value for 2019 was 0.539— which put the country in the low human development category— positioning it at 161 out of 189 countries and territories (UNDP, 2020).
In sum, the slope coefficients for HEL, EDU, GDP, FDI, and UEM are statistically insignificant at any conventional level of significance, hence losing significance in this paper.

The R^2 and the Adj. R^2 values tell the story of a perfect fit, however in ARMA models, these values are usually observed to be high, but at the same time, the Akaike Info Criterion and the Schwarz Info Criterion are exceptionally good, indicating a strong model fit. Similarly, the F-statistic also presents a favorable picture of a strong model fit. The test for autocorrelation using the Durbin-Watson (DW) statistics shows a value of 1.985069. This means that the results do not suffer from autocorrelation. In other words, there is the absence of serial correlation in the study and thus is said to be reliable and could be used for forecasting and policy recommendation. Further diagnostics for examining the properties of the ARMA model are shown in Figure 1. The graph plots the roots in the complex plane where the horizontal axis is the real part, and the vertical axis is the imaginary part of each root. If the estimated ARMA process is (covariance) stationary, then all AR roots should lie inside the unit circle. If the estimated ARMA process is invertible, then all MA roots should lie inside the unit circle. Figure 1 shows that the roots of both the AR and MA terms are comfortably within the unit root circle. That means the ARMA term is stable.

Figure 1
ARMA Diagnostics



4. Discussion

Invariably, the possible reasons behind the negative impact of savings on human capital development could be because past governments did not effectively manage the country's oil wealth. According to Trojan News (2016), with oil selling consistently for over $100 a barrel for many years in Nigeria, the country simply failed to save for the rainy days (fall in the price of crude oil), with the result that a country with a population of over 170 million (as at 2016) has just $26 billion in foreign reserves. This could have led to the health and education sectors in Nigeria being grossly underfunded. The impact of government

recurrent expenditure on health (HEL) and education (EDU) in this study were statistically insignificant as shown in Table 1.

However, official development assistance (ODA) showed a positive and significant relationship with human capital development at a 5% significant level. The argument for this result is that foreign capital inflows such as ODA could plug the savings and human capital development by enhancing investments that are primarily financed by foreign aid. According to Alonge (2020), in Nigeria, domestic spending on the health sector has been declining while foreign donations towards improving primary health care have been on the increase. Owoseye (2018) reported that Nigeria's health sector has been largely dependent on international donors. According to Adepoju (2019), many of Nigeria's key health interventions — including polio eradication, vaccination programs, malaria, tuberculosis, HIV/AIDS, and maternal and child health — remain almost entirely dependent on foreign donors, with the government committing just $5 per citizen to health under its current budget.

Similarly, in the education sector, international agencies such as the United Nations Education Scientific and Cultural Organization (UNESCO) are helping to fund education. The UNESCO in conjunction with the National Open University is working on addressing the barriers to accessing information and knowledge by promoting Open Education Resources (OER) (Akpoghome and Nwano, 2019). According to Akpoghome and Nwano (2019), there was a training of 400 youths in the UNESCO Youth Mobile Initiative project with the collaboration of the Federal Capital Territory Administration. In addition, UNESCO disbursed N500, 000 loans to young Nigerians who graduated from the UNESCO 'Tap Project 2018' (Akpoghome and Nwano, 2019). This is geared toward informal development to reduce unemployment. However, Owoseye (2018) warns that donor funding is drying up slowly. The policies are changing, especially in the United States of America. As explained by Adepoju (2019), over the next two decades, Nigeria is expected to become ineligible for a range of external health financing sources, from Global Fund grants to World Bank financing, due to the country's improving economic performance and the timelines of funds that are due to expire.

In Table 1, the institutional framework is also found to be a significant determinant for human capital development in Nigeria. This is evidenced by the positive and significant coefficient of the dummy variable (DUM) which took a value of 1 for a democratic era in Nigeria and 0 for a non-democratic era. This paper argues that the length of time democracy has been in existence serves as a rough indicator of its degree of institutionalization. By contrast, the length of time an authoritarian regime has been in existence may have little or no bearing on its level of institutionalization. It can be concluded that if a democratic form of government is maintained over a longer period the net effect of that regime type will be positive for the welfare of its citizens. This is in tangent with convention wisdom that democracy would lead to higher social spending and this, in turn, would enhance the welfare of the poor (Filmer and Pritchett 1999; McGuire, 2004). Besides, the institution of democracy tends to foster a well-developed civil society. They may also be instrumental in lobbying for legislation that addresses the needs of the poor and improves the quality of public administration. For instance, Gauri and Liebeman (2004), and Lake and Baum (2001) found out non-governmental organizations appeared to have played a critical role in child vaccination campaigns, campaigns for the treatment of HIV/AIDS, education and health care, and in many other policies that directly affect the general welfare.

5. Conclusion

This paper examined the impact of savings on human capital development in Nigeria(resource rich-country) from 1981-2020. Using the ARMA model, the coefficient standard errors were computed using the observed Hessian. In addition, the Optimization method was set to BFGS, the Convergence tolerance

to "1e-8", and the ARMA Method to ML automatically. The results presented in Table 1 indicate that the estimated parameters on GSA, ODA, and DEM are statistically significantly different from zero with the expected signs except that of GSA.

The slope coefficient for gross savings (GSA) is surprisingly negative and implies that savings have an inverse relationship with human capital development. Precisely, a percentage increase in the gross saving (GSA) will translate into a 0.059974% decrease in the level of human capital development in Nigeria. The possible reasons behind a negative impact of savings on human capital development could be that the past government did not effectively manage the country's oil wealth, thus leading to low savings which in turn resulted in under-investment in human capital development such that the country is placed in the low human development category as portrayed by human development index (HDI). On the contrary, the slope coefficients for HEL, EDU, GDP, FDI, and UEM are statistically insignificant at any conventional level of significance, hence losing significance in this study.

Conclusively, human capital remains one of the factors of production that is capable to learn, adapt, and being creative. Therefore, investment in human capital development in Nigeria is critical since it would help in ensuring that the nation's manpower is highly knowledgeable, skilled, and healthy enough for economic growth. Similarly, saving is important to the economic progress of a country because of its relation to investment in human capital development. In this regard, Nigeria's government should develop the political will to effectively manage the country's resources and save for the future. As a matter of priority, Nigeria's government must encourage further diversification of its economy towards agriculture, solid mineral development, entertainment, information, communication, etc., to increase its revenue base and savings.

Nigeria needs to seek alternative indigenous funding intervention (apart from official development assistance) for the health and education sectors (need for human capital development) and stop depending on international intervention because the funds have been dwindling. This calls for further diversification of its economy. Nigeria should strictly adhere to the principle of democracy and good governance, and the country's democracy should be geared toward improving the welfare of its citizens to create income and well-being enhancing opportunities needed to boost human capital development.

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