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Effect of Population Growth on Human Capital Development in Nigeria

Moses C. EKPERIWARE[1*], Mary Toluwani ADEBAYO[1], John A OYETADE[2,] Adeyinka ADEWUSI[1], & Lester Z. Tenny[1]

[1] Department of Economics, Caleb University, Imota, Lagos State, Nigeria

[2] Lagos State University of Science and Technology, Ikorodu, Lagos State, Nigeria

[*] Moses C. Ekperiware, Department of Economics, Caleb University, Imota, Lagos State, Nigeria

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Abstract

Despite several studies on the impact of human capital development on economic development and studies on the impact of population growth on economic development, only a few studies have directly linked the impact of population growth on human capital development. In view of this, this study analyzes the causal relationship between population growth and human capital development from the period of 1970-2020. The primary school enrolment rate was set as a proxy for human development capital and the population growth rate used to measure population growth. In carryout the study, the Augmented Dicker Fuller test, was used to test for stationarity. The two variables were stationary at levels. The granger causality test was then carried out and results revealed bi-directional causality in that population growth granger caused human capital development and vice versa. This is a preliminary study that hopes to spur up more studies in this direction with specific interest to Nigeria. The policy recommendation is for massive investment in human capital along Lucas postulation and UNESCO education policy for developing nations like Nigeria.

Keywords

human capital, population, Granger Causality, Nigeria, sustainable development

1. Introduction

Population is a great human resource of any nation. However, it is a dynamic resource that affects economic progress differently depending on the structure and resourcefulness of the population demography (demographic dividend or demographic disaster) (Ekperiware & Lester, 2017). Another variable that indicates how population affects economic growth is education and health of the

population (Ekperiware, Oladeji, & Yenusa, 2016).

The importance of the development of human capital in any economy cannot be overemphasized. The development of human capital has been recognized by economists to be a key prerequisite for a country's socioeconomic and political transformation (Ayanwu, Adam, Obi, & Yelwa 2015). Ekperiware (2017) noted that the two major ways of making human a capital and an essential factor of production are through requisite skills acquisition from education and through healthiness of the human. On one hand is the educational development, while on the other is the health development. The combination of these two aspects describes the human capital formulation of any economy. As far back as 2003, United Nations 2003 UN's report on education population and economic development established that at the World Education Forum (Dakar, 2000), the Millennium Summit in 2000 and the special session of the General Assembly on children in 2002, the international community of nations explicitly recognized that education especially primary schooling, is critical for achieving social and demographic progress, sustained economic development and gender equality. Similarly, The Commission for Macroeconomics and Health (2004), noted two ways health affects economic growth: directly through labor productivity and the economic burden of illnesses, for example. Health also indirectly impacts economic growth since aspects such as child health affect the future income of people through the impact health has on education. Theoretically, both the endogenous and exogenous growth models imply the necessity of a developed human capital in achieving economic growth and development with the role of human capital being even more emphasized in the endogenous growth model.

Understanding the technicalities of human capital development is essential to maximizing the benefits of a well formed human capital. Questions such as—How is human in capital formed? What variables affect human capital? How can an economy ensure the availability and presence of a competent labour force, highly skilled and healthy—Must be analyzed and research verified answers provided in understanding the In attempting to answer such questions researchers have expressed a variety of assertions such as and many others. Interestingly the specific interaction between population growth and human capital development has not been greatly researched upon.

Population: Ordinarily, population refers to the total number of people resident within a geographical location during a specified period of time. Population growth in a given year is measured as the natural population growth rate, i.e. crude birth rate minus crude death rate in that year, not taking into account the migration rate (Bucci, Eraydın, & Mülle 2018). The population growth rate is useful in helping governments make necessary plans for governing and ruling the populace.

According to Alika and Aibieye (2014), the history of human capital is traceable to the works of the Chicago school of economics where economists first developed the idea of human capital, such as T. W. Schultz and G. S. Becker in the 1960s. Human capital involves increase investment in education and training of individuals (Schultz, 1979). Ekperiware (2017) noted that the two major ways of making

human a capital and an essential factor of production are through requisite skills acquisition from education and through healthiness of the human. On one hand is the educational development, while on the other is the health development. The combination of these two aspects describes the human capital formulation of any economy. Human capital can be as a comprehensive approach to analyze a wide spectrum of human affairs in light of a particular mindset and propose policies accordingly (Tan, 2014). Human capital is the essential resource needed in every sector of an economy (Odonkor, Nketiah, Brown, & Miah, 2010). Human capital and physical capital, both determine growth endogenously and are crucial to economic growth (Madhu, 2017).

As far back as 1988, Rosenzweig through empirical evidence asserted that population growth and human capital investments jointly reflect and respond to changes in the economic environment; larger families directly impede human capital formation, and the inability of couples to control fertility is an important determinant of investment in human capital. The evidence suggests that widely observed correlations among population growth, human capital, and economic variables, which admit to alternative interpretations, are far stronger than are the estimates from studies whose objective is to quantify the causal mechanisms underlying the three assertions; however, there is empirical support for each.

Schultz (1994) analyzed human capital, family planning and their effects on population growth. Reduced form explanations of population growth were decomposed into fertility and mortality. The reduced form equations were estimated first from three cross sections of 68 low income countries from 1972 to 1989, and then re-estimated from changes occurring within the countries over time, by fixed effect methods. Using the age-standardized decomposition of population growth as the preferred basis for the analysis, he noted that the fixed-effect estimates were less likely to be biased than those from pooled cross sections due to the omission of unobserved variables, most of which were probably persistent within a country. According to these fixed-effect estimates, the study discovered that increasing the schooling of women is the best predictor for reducing fertility and curbing population growth, whereas family planning does not exhibit a significant effect. Conclusively, adult female schooling was revealed to be the most important factor related to lower fertility, mortality, and population growth, as is the availability of calories per capital. Also, a reduction in the proportion of the labor force in agriculture is also linked to lower fertility and mortality, and somewhat slower population growth.

Lee, R. and Mason, A. (2009) questioned whether low fertility and population aging lead to economic decline if couples have fewer children, but invest more in each child? The study extended previous work in which the authors showed that population aging leads to an increased demand for wealth that can, under some conditions, lead to increased capital per worker and higher per capita consumption. This study which based on an overlapping generations (OLG) model which highlights the quantity-quality trade-off and the links between human capital investment and economic growth incorporates new national level estimates of human capital investment produced by the National Transfer Accounts project. It employed simulation analysis to show that, even in the absence of the

capital dilution effect, low fertility leads to higher per capita consumption through human capital accumulation, given plausible model parameters.

Recognizing that recent work on capital accumulation has tended to abstract from population change, Hermannsson and Lecca (2014) examined human capital investment and population growth using an overlapping generation's analysis for Malawi. The paper also explores how expansion of education (in particular, secondary education of women) could influence population growth and how it modifies the impact of human capital policies. The results reveals a difficulty in predicting the impact of population growth due to fixed factors such as land.

Recently, Bucci et al. (2018), examined dilution effects, population growth and economic growth under human capital accumulation and endogenous technological change. Specifically, the paper attempted to empirically examine the ultimate long-run effects of demographic change (population growth) on per-capita income growth) and providing a theoretical basis for the existence of a differential impact of population change on economic growth across countries. While observing that at a country's level, population growth may be relevant (either positively or negatively) for economic growth depending on the specific way it affects the process of schooling-acquisition by agents foremost, the paper further uses these results to build a multi-sector growth model which is capable of accounting (depending on the strength of the found dilution effect of population growth on per-capita human capital formation) for the non-monotonous correlation between demographic and economic growth rates in the long-run. The first part of the study (which is the part that relates to this study) confirms that countries experiencing high population growth tend to be more negatively affected by population growth in terms of schooling than countries with low population growth. In particular for developing countries, the analysis finds considerable heterogeneity of the dilution effect of population growth on schooling across countries experiencing the same level of population growth. The result of such heterogeneity stems from the combination of various factors such as different drivers of population growth (birthrates versus life expectancy), different socio-economic characteristics affecting supply and demand of skilled labor, as well as differences in education policy.

Using the error correction model to ascertain the speed at which shocks can be corrected in the long-run, Adeosun T. O. and Popogbe O. O. (2021) analyzed the long run relationship between population growth and human capital utilization in Nigeria focusing on the 1986-2018 period. It was discovered that population growth has a negative and significant effect on human resource utilization. It further explained that unidirectional causality runs from employment rate to population growth rate and a unidirectional causality runs from employment growth rate to expected years of schooling.

2. Method

Based on the theoretical underpinnings of the Malthusian theory of Population Growth, which recognizes the exponential population growth while food supply or other resources (in this case,

human capital) grows linearly, this paper seeks to examine the effect of increasing population on the development of human capital in Nigeria. In this study, the primary school enrolment rate is used as a proxy for human capital development. This is similar to Bucci, et al (2018). Primary school enrolment rate is used as proxy for human capital development as it has readily available data. Understandably as noted by Bucci et al (2018), this measurement of human capital is not without limitations. However, several attempts have been made to overcome this criticism such as Hanushek and Woessmann (2008). The population growth rate will is used as a measurement of population growth. All data for the study is secondarily gotten from the publications of World Development Indicators. The study uses the Augmented Dicker Fuller Approach to test for unit root.

This study utilizes the granger causality method developed by Prof Clive Granger in 1969. The method provides a suitable way to analyze causality among two variables in a time series analysis. This method is a probabilistic account of causality; it uses empirical data sets to find patterns of correlation. In this study, empirical data for the time period of 1970 – 2020 is tested for causality. Therefore the model is specified as:

$$pser_t = \sum_{=1} ipopr(t-i) + c1 + u1(t)$$

$$popr_t = \sum_{=1} ipser(t-i) + c1 + u1(t)$$

where pser and popr represent primary school enrolment rate and population growth rate respectively.

3. Result

Table 1. The Augmented Dicker Fuller Test

	ADF value	T-statistics	Comment	
Pser	-2.979606	-2.923780	At level	Significant.
popr	-3.645115	-2.929734	At level	Significant

*Author's computation using Eviews 10.

Using the Augmented Dicker Fuller test for stationarity, the above table shows that the variables are stationary at level. This implies that the variables have unit root.

Table 2. Lag Length Criteria

VAR Lag Order Selection Criteria Endogenous variables: PSER POPR
Exogenous variables: C
Date: 03/03/22 Time: 19:27

Sample: 1970 2020

Included observations: 47

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-159.1972	NA	3.266481	6.859455	6.938184	6.889081
1	-51.92172	200.8562	0.040330	2.464754	2.700943	2.553633
2	-13.58922	68.50915	0.009369	1.003796	1.397445	1.151929
3	5.599259	32.66124*	0.004923*	0.357478*	0.908586*	0.564864*
4	8.409055	4.543501	0.005205	0.408125	1.116692	0.674764

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level) FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

*Author's computation using Eviews 10.

Table 3. The Causality Test

Pairwise Granger Test:

Pairwise Granger Causality Tests

Date: 03/03/22 Time: 19:45

Sample: 1970 2020

Lags: 3

Null Hypothesis:	Obs	F-Statistic	Prob.
POPR does not Granger Cause PSER	48	3.10788	0.0367
PSER does not Granger Cause POPR		3.59484	0.0214

Author's computation using Eviews 10.

4. Discussion

From the result of the analysis presented in the table above, the null hypothesis is rejected implying there the population growth rate granger caused primary enrolments rate in Nigeria and primary school enrolments rate also granger caused the population growth rate. This depicts a bidirectional causality between the two variables. As a result, the usefulness of one variable to forecast another is verified. In this case the possibility could be: An increase in population growth could cause an increase in human capital development while an increase in human capital development could cause a decrease in

population growth. The study concludes by recommending further and profound research on the exact relationship between population growth and human capital development in Nigeria. The result which will be useful by governments to formulate policies to optimize human capital development in the midst of surge in Nigeria population.

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