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Abstract
It should be noted that poverty has a strong link and two-way relationship with health: poverty makes people more vulnerable to ill-health, and ill-health tends to lead to low productivity, hence poverty. It is against this background that this study makes use of time series data from the secondary source, on Nigerian economy for the period 1980 – 2011, obtained primarily from the National Bureau of statistic and Central Bank of Nigeria (CBN) Bulletin, 2010 to explain the relationship among health, poverty and economic growth. It adopts some selected variables which have been tested valid as a measurement of health status and poverty measurement. The health care spending, life expectancy rate, fertility rate are used to capture health status, GDP per capita is used to measure the standard of living per head in Nigeria and unemployment rate to measure the level of poverty reduction in the economy while real GDP is used to capture economic growth. The results show that relationship between GDP per capital growth and the level of gross domestic is positive which satisfies the a priori condition. That is, a change in income will bring about 0.028 percentage change in the gross domestic product overtime but the variable is statistically insignificant using the probability value. The relationship between unemployment rate and economic growth is negative satisfying the a priori and statistically significant at 5% level. An indication that an increase in unemployment rate will reduce economic growth by 0.03 percent which affirms previous literatures on effect of unemployment on growth.

Key words: Health, Poverty, Economic Growth, Human Capital Accumulation

Introduction:
It is imperative to note that one of the developmental challenges facing Nigeria is poverty which holds a central place. Though Nigeria is a leading oil-producing nation and highly endowed in terms of various natural resources, the majority of her people are economically poor and living below economic standard. As recent national data show, over one-third of Nigerians (35%) live in extreme poverty while 54% are relatively poor, more than half of the Nigerian population live on less than a dollar a day (NBS, 2005). In view of the extent and depth of poverty in the land, it should not be surprising that the health status of the country is poor, with an average life expectancy of only 46.76 years (CIA World Fact Book, 2012) with male’s life expectancy rate of 46.76 years and female 48.41 years. Also according to the 2008 Human Development Report Nigeria is in the low human development index category and ranks 154 out of 179 countries, behind some West African countries with less economic potentials such as Ghana, Cameroon, and Senegal, which are in the medium human development category (UNDP, 2008).

It should be noted that poverty has a strong link and two-way relationship with health: poverty makes people more vulnerable to ill-health, and ill-health tends to lead to poverty. Hence, the common saying: “Health is wealth”. Among others, the poor are more likely to experience ill-health as a result of several factors, which include poor diet and poor living conditions, and when they are ill they are less likely to access health care services because of inability to pay. The poor in Nigeria are more likely to be found in the relatively deprived rural areas and peri-urban slums, where high quality health services are often lacking. On the other hand, ill health affects productivity, and therefore, reduces income and also tends to wipe away savings and diminish ability to invest (Akande, 2005). Thus, ill health and poverty reinforce one another, and compromise quality of life and longevity. Indeed, the poor is more likely to die young. Poverty can indeed be described as the leading global health challenge and “disease” in view of its ubiquitous effects on the health status of individuals and communities in the world. According to the World Health Organisation (WHO, 2000), “The world’s biggest killers and the greatest cause of ill-health and suffering across the globe is extreme poverty. Poverty is the main reason why babies are not vaccinated, why clean water and sanitation are not provided, why curative drugs and other treatments are not available and why mothers die in childbirth. Thus, better health enables better earning ability for both workers and enterprises (for example in the case of self-employment) which in turn enhances the tax base of the government leading to better fiscal posture. These interactions, all things being equal, will lead to economic growth (Petrakos, et al, 2007). On the
other hand, low labor productivity (say due to poor health) can be growth dampening as it will lead to poor remuneration. Of course, the manner in which growth is shared also influences the rate of poverty reduction.

Thus, given good macroeconomic policy framework, better health status leads to higher human capital accumulation (in the form of education, on-the job training, physical and cognitive development), technological advancement (in the form of scientific knowledge, innovation, and diffusion of technology from abroad) and enterprise development (in the form of fixed investment in plant and equipment, team work and organization of workforce, investment opportunities, and ability to attract labour and capital). All these will translate to economic growth in the form of higher levels of per capita gross national product (GNP), growth of GNP and aid also poverty reduction (CMH, 2001). Therefore, better health can be both growth inducing and poverty reducing. Consequently, higher levels of per capita GNP and reduced poverty will also lead to better health. Thus, the causal relationship does not run in only one direction—from health to aggregate economic performance—higher incomes potentially permit individuals (and societies) to afford better nutrition, better health care and, presumably, achieve better health.

It is also important to note that the health-growth-poverty relationship depends, to a large extent, on employment opportunities existing in the society, the extent to which labour intensive products are transacted in the market, sound macroeconomic environment that allows health to create wealth, and the available institutions that are pro-poor. In the light of the above, this broad objective of this study is to examine the relationship between health, poverty reduction and economic growth in Nigeria ranging for the period, 1980-2011. The next section considered the literature review. Thereafter, we have methodology and lastly, the empirical results and conclusion.

Literature review:

There are several literatures that have examined the link between poverty and health and the literature on economic growth has firmly demonstrated the role of health in influencing economic outcomes, at least at the micro level. Some of the literatures are reviewed in this section.

Strauss and Thomas (1998) and Schultz (1999) suggested that, all things being equal, healthier workers are more likely to be able to work longer, be generally more productive than their relatively less healthy counterparts, thus able to secure higher earnings than disease-ridden workers. It is posited that poor health infrastructure, illness and disease shorten the working lives of people, thereby reducing their lifetime earnings.

Strauss and Thomas (1998) and Schultz (1999) suggested that good health has positive effects on the learning abilities of children, which leads to better educational outcomes—school completion rates, higher mean years of schooling, achievements and increases the efficiency of human capital formation by individuals and households. For the health of a nation to be fully guaranteed, it is necessary to formulate and implement policies that will reduce the income margin between the rich and the poor, marginally and efficiently allocate resources between the tiers of health institutions, reduce the trickledown effect of poverty and promote the purchasing power of the dependent population.

Empirical research by Strauss (1998) has also established that higher income potentially permit individual, and society to afford better nutrition, better healthcare and presumably achieve better health. Therefore, it could be deduced that the income level of the working population greatly determines the quality of healthcare services afforded by the population. Thus, policies that encourage health care accessibility without concurrently addressing the problem of income inequality will ultimately lead to a disproportionate and inequitable distribution of healthcare provisions. The wider the income disparity between the poor and the rich, the poorer the health conditions of the people (Nam, 2000).

Kawachi and Kennedy (1997) further observed that since many health policies that seek to address the health problems of the people does not target a reduction in income inequality; the income ability of the poor has been constantly eroded. Thus, for health policies to be effective such policies should therefore targeted at improving the purchasing power of the poor while reducing income inequality.

Gupta and Mitra (2003) while conducting a research on the relationship between health,

Fogel (1994) showed that about one-third of the increase in income in Britain during the nineteenth and twentieth centuries could be attributed to improvement in health and nutrition. Improvement on health (following health system policies) when directed at the poor has the direct effect of reducing poverty as well as serve as an element of ‘pro-poor’ growth strategy.

According to Duraisamy and Sathiyavan (1998) the poor bear a disproportionately higher burden of illness, injury and disease than the rich. The poor suffer ill health due to a variety of causes, poor nutrition for instance, which reduces the ability to work and weaken their resistance to disease. Illness reduces the income earning ability of the poor and further increases dependency.

Bourguignon (2004), while examining theoretically the interaction between growth inequality and poverty, also showed that both growth and changes in inequality contribute to changes in poverty. Hence, healthy people are strong enough to work, earn good income and afford better nutrition. When poor people get sick, they are often unable to afford treatment from clinics or hospital. Even when they can afford such treatment, they tend to sell off productive assets, or rely on borrowing. These tend to decrease their long-run earning capacity and the capacity to take advantage of any trickle-down labour market advantage usually offered by growing economies.

Sambo, et al (2004) in their study on out-of-pocket health expenditure for under-five illness in a semi-urban community in Nigeria observed that factors that determine pattern of utilization of health care services include geographical and economic accessibility, literacy level and perceived derivable benefits. The study found out that people still accord high patronage to patent medicine vendors due to, not only lack of sufficient funds to attend instituted hospitals, but also lack of awareness of the consequences of such patronage. A well educated society has the ability to identify and avoid situation that will pose further risk to their health.

According to Zakir and Wunnava (1999) a well informed mother has the ability to take precautions against factors that will pose greater risk to her infant. Among other issues, she will remember to keep appointments with her doctor, attend ante and post-natal clinics as and at when schedule, and maintain good hygiene conditions necessary for the good health of her baby. They further added that a population with diseased and unhealthy infants has the danger of decreasing enrolment of children, particularly where mothers are illiterate.

Theoretical Review:

This study on health and poverty education is linked with Mises's Theory of Economic Growth which recognized the difficulty of measuring economic growth and believed that economics and, more importantly, policy makers and “the masses” – needed to understand the cause of growth if they were to avoid world wars and a reversion to types of systems in which economic growth would not occur, hence the historical consensus for a definition of growth. Taking it for granted that capitalism had led to higher standards of living, he proceed to present a praxeological theory (a theory in which all events could be traced to distinctly human action) in order to explain the higher standards. The theory started with the assumption, again based on experience, that humans first recognize what he called “higher productivity of labour” that can be achieved by specialization and trade. “Labour” here must be taken to mean human effort that which includes what modern economists would call human capital. Given this recognition, the individuals proceed to form contractual bonds, which are based on the mutual recognition of potential gains from interpersonal trade (Mises, 1966: 195). As the standard of living rises, increased saving is possible. For a people who then build the institutions that move them in the direction of laissez faire, the higher saving creates opportunities for “promoting entrepreneurs” to profit from their superior foresight, initiative, and eagerness to profit. They proceed to adopt methods of production that are more productive but also that take more time to complete. In addition, they recognize and cause a plethora of new methods of production to be discovered and employed. One result of their activities is the growth of natural science. Even in the absence of additional saving due to the higher productivity of
labour, technological advance and a favourable natural environment may enable additional saving to occur.

To maintain the conditions necessary for improving standards of living, people must avoid interventions that would have the opposite effect on the standards of living. These include restrictions on the production and sale of goods and resources, manipulation of money and credit, and a large public debt. The ability of people to avoid such interventions, in turn, depends on their being educated. The main task of economic theory in this regard is to educate the masses on the effects of market intervention. If this task is not performed effectively, what could be a steady improvement in the standard of living could become a decline. The health status of the people can be well increased if the standard of living rises; there will be fund to finance health care expenditure and other.

**Research Methodology**

From the discussions above, it is clear that a proper analysis of the relationship between, health, poverty reduction and economic growth would be done within a multiple regression framework and Granger causality framework to allow for the expected bi-directional or uni-directional causation amongst the variables. Thus, this study model economic growth, poverty and health. Basically, this study makes use of data from the secondary source. The secondary data is obtained primarily from the National Bureau of statistic and Central Bank of Nigeria (CBN) Bulletin, 2010

The study employs time series data on variable that can be used to explain the relationship among health, poverty and economic growth on Nigerian economy for 32-year period (1980 – 2011). In order to objectively and empirically research on the issue at hand, the study adopts some selected variables which have been tested valid as a measurement of health status and poverty measurement. The health care spending, life expectancy rate, fertility rate are used to capture health status, GDP per capita is used to measure the standard of living per head in Nigeria and unemployment rate to measure the level of poverty reduction in the economy while real GDP is used to capture economic growth.

Gross Domestic Product is given as the dependent variable while health indicators and poverty indicators are used as the explanatory variables.

**Model Specification**

The growth equation follows from Barro (1996) as derived by Bloom and Canning (2004) and also adopted by several author. This is an extension of the basic neoclassical growth model. In the model (though largely adapted for cross-country studies), growth is a function of some measure of poverty level, some indicators of health status.

\[
R_{GDP} = F (GDPPC, UM, LE, FR)
\]

The mathematically form of the model is given below:

\[
R_{GDP} = \beta_0 + \beta_1 GDPPC + \beta_2 UM + \beta_3 LE + \beta_4 FR + \mu
\]

Where 
GDPPC: GDP per capital growth (annual) 
UM: Unemployment rate 
LE = Life expectancy at birth, total (years) 
FR = Fertility Rate 

The natural logarithmic of equation is:

\[
\log (GDP) = \beta_0 + \beta_1 GDPPC + \beta_2 UM + \beta_3 LE + \beta_4 FR + \mu
\]

Where all variables are as defined earlier, and u is the error term.

**The a priori Expectation**

It is desirable and necessary to explain the theoretical relationship in respect of the expected sign among the variables whether they are in line with the economic theory.

Increase in life expectancy, human development index, GDP per capita and fertility rate are expected to yield positive relationship with the growth of GDP and increase in unemployment rate is expected to bring negative relationship with the growth of GDP. It is mathematically represented as follows: 
\[ b0<0, b1>0, b2>0, b3<0, b4>0, b5 > 0 \]

**EMPIRICAL RESULTS**

The empirical result is presented below starting with the descriptive statistics.
DESCRIPTIVE STATISTICS

<table>
<thead>
<tr>
<th>Variable</th>
<th>LGDPC</th>
<th>LRGDP</th>
<th>UNR</th>
<th>LER</th>
<th>FER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>9.517252</td>
<td>12.70576</td>
<td>4.534483</td>
<td>46.19655</td>
<td>6.182759</td>
</tr>
<tr>
<td>Median</td>
<td>10.12655</td>
<td>12.59047</td>
<td>4.500000</td>
<td>46.40000</td>
<td>6.300000</td>
</tr>
<tr>
<td>Minimum</td>
<td>6.609329</td>
<td>12.12031</td>
<td>2.000000</td>
<td>44.00000</td>
<td>5.100000</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>1.927605</td>
<td>0.440843</td>
<td>1.815268</td>
<td>1.082485</td>
<td>0.591650</td>
</tr>
<tr>
<td>Skewness</td>
<td>-0.181158</td>
<td>0.519556</td>
<td>0.963205</td>
<td>-0.171344</td>
<td>-0.484701</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>1.623328</td>
<td>2.015547</td>
<td>3.520309</td>
<td>3.210011</td>
<td>1.807776</td>
</tr>
</tbody>
</table>

Jarque-Bera

<table>
<thead>
<tr>
<th>Variable</th>
<th>Levels</th>
<th>First differences</th>
<th>Order of Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>0.9997</td>
<td>0.0043</td>
<td>I(1)</td>
</tr>
<tr>
<td>GDPc</td>
<td>0.9283</td>
<td>0.0191</td>
<td>I(1)</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>0.5875</td>
<td>0.0501</td>
<td>I(1)</td>
</tr>
<tr>
<td>Life expectancy</td>
<td>0.9221</td>
<td>0.0567</td>
<td>I(1)</td>
</tr>
<tr>
<td>Fertility</td>
<td>0.4405</td>
<td>0.0021</td>
<td>I(1)</td>
</tr>
</tbody>
</table>

From the above, the standard deviation shows that there is no presence of heteroscedasticity in the data since they are not largely deviated from their long run means and the range also shows that the variables are not widely spread from each other making the residuals to scatter around zero. While unemployment and life expectancy rate are positively skewed, the remaining three variables are negatively skewed. Also, the unemployment rate and life expectancy rate are mesokurtic while the remaining variables are not. The coefficient of variation (CV) also shows that the series are not volatile.

Unit Root Test (Augmented Dickey Fuller Test):

Since most economic time series are non-stationary, it is necessary to test for their stationarity in order to avoid spurious regression.

Engle Granger Residual Based Cointegration Test

This cointegration test was developed by Engle and Granger (1987) and they show that if after using either DF or Augmented DF (ADF) unit root test, the variables in the regression model are I(1) and the residual component obtained from the regression is I(0), there is a linear combination (long-run relationship or equilibrium) between or among the variables in the model. Since transforming the variables into logarithm has
removed the specific individual effects that may lead to heterogeneity in the time series, the cointegration is presented as follows:

\[ Y_t = \alpha + \beta x_t + u_t \] where \( y_t \sim I(1) \) and \( x_t \sim I(1) \)

For \( y_t \) and \( x_t \) to be cointegrated, \( u_t \) must be \( I(0) \); otherwise the regression is spurious. Thus, the basic idea behind the EG cointegration test is to test whether \( u_t \) is \( I(0) \) or \( I(1) \). We look at the tau-statistics and the z-statistics to assert the presence of cointegration from the dependent to the independent variables.

Null hypothesis: Series are not cointegrated
Cointegrating equation deterministics: C
Automatic lags specification based on Schwarz criterion (maxlag=6)

<table>
<thead>
<tr>
<th>Dependent</th>
<th>tau-statistic</th>
<th>Prob.*</th>
<th>z-statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>LRGDP</td>
<td>-4.230506</td>
<td>0.1562</td>
<td>-35.18555</td>
<td>0.0012</td>
</tr>
<tr>
<td>LGDPC</td>
<td>-4.762054</td>
<td>0.0653</td>
<td>-25.30318</td>
<td>0.0695</td>
</tr>
<tr>
<td>UNR</td>
<td>-5.306466</td>
<td>0.0244</td>
<td>-24.97687</td>
<td>0.0762</td>
</tr>
<tr>
<td>LER</td>
<td>-3.452762</td>
<td>0.4158</td>
<td>-17.51331</td>
<td>0.3897</td>
</tr>
<tr>
<td>FER</td>
<td>-5.233543</td>
<td>0.0280</td>
<td>-26.92171</td>
<td>0.0428</td>
</tr>
</tbody>
</table>


From the unit root test on \( U_t \) the MacKinnon approximate p-value for LRGDP = 0.00 which shows that there is a long run cointegrating relationship among the variables at 1% level of significance using the z-statistic. Since there exists a long run cointegrating relationship among the variables, it is necessary to estimate the short run dynamics of the model.

**ERROR CORRECTION MODEL**

\[
\text{LGDP} = 12.79 + 0.028\text{LGDPC} - 0.03\text{UNR} + 0.07\text{LER} - 0.55\text{FER} + 0.50\text{ECM}
\]

\[(0.61) \hspace{1cm} (0.05) \hspace{1cm} (0.00) \hspace{1cm} (0.00) \hspace{1cm} (0.01)\]

\[ R^2 = 0.98, \text{ Adj } R^2 = 0.98, \text{ D-W statistics} = 1.64 \]

From the above, the relationship between GDP per capital growth and the level of gross domestic is positive which satisfies the \( a \) priori. That is, a change in income will bring about 0.028 percentage change in the gross domestic product overtime but the variable is statistically insignificant using the probability value.

The relationship between unemployment rate and economic growth is negative satisfying the \( a \) priori and statistically significant at 5% level of significance. An increase in unemployment rate will reduce economic growth by 0.03 percent which affirms previous literatures on effect of unemployment on growth.

The life expectancy rate has the tendency of influencing positively the level of economic growth by 0.07 percent overtime in the country which also satisfies the a priori. The variable also is statistically significant at 1% level of significance. On the other hand, the fertility rate has a negative influence on the economic growth in the country and also statistically significant at 1% level of significance.

The error correction model shows that the gross domestic product is above its equilibrium since it is positive and statistically significant and the speed of convergence of gross domestic product to its short run equilibrium is 50%.

Both the \( R^2 \) and adjusted \( R^2 \) show that the model is of good fit since 98 percent variation in economic growth is captured in the model while the 2% remaining are the other factors not captured in the model.

The Durbin-Watson shows that there is no presence of first order serial correlation in the model since the statistics is closer to 2.

**Conclusion and Policy Implication:**

No doubt, extreme poverty leads to poor health and poor health leads to poor human capital
accumulation and development, low productivity and eventually, low economic growth. The analysis in this study has corroborated this long standing position and it is clear that large and wide improvement in health provisions will go a long way in building up human capital that is capable of contributing positively to economic growth and reducing poverty in the land. As a first step, it is essential that deliberate and calculated investment in health should be made to strengthen human capital development which in turn supports economic growth and reduces poverty. In any case, the vicious circle of poor health, low human capital development, low economic growth and poverty can be broken if calculated investment is made in health provisions.

REFERENCES


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