

# THE RELATIONSHIP BETWEEN HEALTH AND ECONOMIC GROWTH IN NIGERIA<sup>1</sup>

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## **I. Problem Statement**

There seems to be a broad consensus that economic growth can definitely lead to improvement in health. For example, economic growth could lead to increased availability of food; increased earnings which makes health spending more affordable; and also raises demand for good health services. Higher growth could also imply higher public revenue which can translate to higher investment in health infrastructure. Thus, the question that would readily come to mind is whether causality exists in the reverse direction? In other words, does improve health leads to higher growth? If yes, how important is the contribution of health when one accounts for other potential factors that are empirically known to drive growth? It is therefore likely that causality exist in both directions, though they could be difficult to measure and estimate. Nevertheless, it is evident that there is increasing debate on which direction dominates. A resolution or informed contribution to this debate would have profound policy implications. For example, an empirical finding which suggests that growth lowers infant mortality could spur the necessity for putting in place growth-enhancing policy reforms. In the contrast, if it is observed that improve health of the population is growth enhancing, then it would be noted that social returns on policies that improve health status have been largely understated, and thus health improving policies would be part of the set of intervention measures to increase growth.

There are several studies on economic growth in Nigeria. Most of the studies have related growth to other macroeconomic fundamentals while omitting the human capital (both in terms of education and health) dimension of the analysis. The role of health in these analyses is generally absent. Also, most of these studies are carried out at the micro-level using *single point* survey rather than *multiple points* survey. Therefore, the ability to generate a health production function from a point survey has been questioned. Furthermore, most of these studies have neglected the possibility of reverse causation and endogeneity in the health-growth-poverty relationship leading to what is generally regarded as specification bias. Hence findings from these studies have been inconclusive, contradictory and unreliable. Thus, there has been general absence of consensus on the relationship. Hence, the lack of consistent findings in the literature, and possibly specification problems in the early works, lends justification to the analysis that we pursue in this study.

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<sup>1</sup> In memory of Late Dr Tajudeen Oladipo Busari whom we started the work together but got snatched away by the cold hands of death. I pray that your soul will continue to rest in perfect peace.

## II Literature Review

There are two approaches to estimating the effect of health on economic growth. The first is to take estimates of the effect of health from microeconomic studies and use these to calibrate the size of the effects at the aggregate level. The second is to estimate the aggregate relationship directly using macroeconomic data. Research examining the link between health and economic outcomes, at either the individual or national level, has generally examined two types of health measures: inputs into health and health outcomes. Inputs into health are the physical factors that influence an individual's health. These include nutrition at various points in life (e.g. in childhood, and in adulthood), exposure to pathogens, and the availability of medical care. Health outcomes are characteristics that are determined both by an individual's health inputs and by his genetic endowment. Examples include life expectancy, height, the ability to work hard, and cognitive functioning. There are two critical issues relating to human capital—the extent of education and level of health (Weil, 2007).

Nevertheless, a good part of the literature on the microeconomics of health and economic outcomes examines the effects of varying health inputs on health outcomes themselves, human capital attributes that are contingent on health outcomes, and wages. Most of these studies have relied on micro-level data which focus on household and household members. Such studies include Behrman and Deolalikar (1988) and Strauss and Thomas (1998). In many studies, more than one of these groups of dependent variables is examined. For example, Alderman et al (2006) examined the long-run effects of childhood nutrition, using a variety of natural and man-made experiments that provide exogenous variation in nutrition and found that better nutrition leads to improvements in school completion, intelligent quotient (IQ), height, and wages. Similarly, Thomas *et al.* (2004) found positive effects of adult nutrition on labor input and wages. Another branch of the literature also attempted to answer the question how much do differences in health contribute to differences in income by focusing on health outcomes rather than health inputs, and conducting a macroeconomic analysis rather than individual level (Barro, 1996; Bhargava et. al 2001; Bloom, et al. (2000), Bloom and Malaney (1998), Bloom et al. (1999)). These studies present regressions of GDP per capita, GDP growth, or TFP on some measure of health outcomes, as well as a standard set of controls. Some of the studies reached similar quantitative results. Growth effect of increasing life expectancy by 5 years from the studies ranged between 0.006 (Sachs and Warner, 1997) to 0.58 (Barro and Lee, 1994).

However, the literature on the relationship between income/growth and health at the macro level is generally inconclusive (Gupta and Mitra, 2003; World Bank, 2004). In a study of 15 states from India for the period 1973/74, 1977/78, 1983, 1987/88, 1993/94, 1999/2000, Gupta and Mitra (2003) show that per capita public health expenditure positively influence health status, that poverty declines with better health, and that growth and health have a positive two-way relationship. Also, in a study of India, the World Bank (2004) examines the impact of per capita GDP, per capita health expenditure and female literacy on infant mortality using state-level data over the period 1980-99. The study observes that both per capita public spending on health and per capita GDP are inversely related to infant mortality rate, but the results were observed not to be very robust to alternative specification of the model. By using the adult survival rate as an indicator of health status, Bhargava, et al. (2001) finds positive relationship between adult survival rate and economic growth. Results remains similar when adult survival rate is replaced by life expectancy. However, fertility rate have a negative relationship with economic growth.

Due to the fact that life expectancy is highly influenced by the child mortality, growth in workforce is mostly lower than population growth. Consequently, high fertility rate reduces the economic growth by putting extra burden on scarce resources.

In the case of Nigeria, most of the studies have related growth to poverty while omitting the human capital (both in terms of education and health) dimension of the analysis. Some of such recent studies include Aigbokhan (2000), Ali (2000), Amaghionyeodiwe and Osinubi (2004) and Addison and Wodon (2007). While there is any doubt that a possible relationship between health and economic growth could exist, a fundamental reason why it is difficult to reach a definitive conclusion regarding the link is the web of interrelationships that is involved in the determination of a nation's income. Good health is very important in an economy, so also are other factors such as investment, trade, etc. In summary, there is no consensus on the relationship between growth and health in Nigeria. Consequently, the focus of this study is to establish the relationship between health and economic growth in the case of Nigeria, the channels in the relationship as well as the direction of causation.

### **III. Method of Analysis**

In the study, we modeled income and health within a simultaneous equation framework. This is because a proper analysis of the relationship between, income and health would, at best, be done within a simultaneous equation framework to allow for the expected bi-directional causation amongst the variables. This is a significant departure from related studies that have adopted single-equation models to examine this relationship. The study utilizes two equations: economic growth and health. In the economic growth equation, real income per capita is assumed to depend on investment, life expectancy at birth, infant and child mortality, total death rate, school enrollment, terms of trade volatility, health expenditure to total expenditure and per capita health expenditure. In the health equation, life expectancy is assumed to be a function of real per capita income, per capita health expenditure, and number of doctors per capita.<sup>2</sup>

The study uses annual data from 1970 to 2008 for Nigeria. In general, a more robust analysis could have been carried out using state-level data in a panel framework. However, this is notoriously absent for Nigeria, particularly, a key variable like gross domestic product (GDP). However, this study will serve as basis for such extension. The data to be used for the analysis are secondary data as published and freely made available by the National Bureau of Statistics (formerly Federal office of Statistic) and the Central Bank of Nigeria. Complementary source includes the World Bank Africa Development Indicator. Due to the issue of endogeneity and possibility of reverse causation (which theory argues it exists), we propose to use simultaneous equation techniques: 3SLS. The 3SLS is a system method that estimates all of the coefficients of the model, then forms weights and re-estimates the model using the estimated weighting matrix. Thus, the 3SLS estimator is used to (i) account for the simultaneity bias between growth and health variables and (ii) control for the probable existence of cross error correlation resulting from the simultaneity between the health and growth variables. The 3SLS is particularly efficient in the presence of endogeneity bias given appropriate instrumentation.

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<sup>2</sup> Interested readers can look at the technical paper for details.

#### **IV Key Findings**

The following important findings emerge from the growth regression:

- There is a two-way causation between economic growth and health status. The effect of health measured by life expectancy is positive and significant on economic growth even after controlling for initial income levels.
- The significance of life expectancy in all our specification is an indication that high levels of per capita income can be achieved by increasing and improving stock of health human capital, especially when current stocks are at lower end. Quantitatively, a 1% change in the life expectancy rate increases the level of growth by 0.876%.
- There is evidence of a significant negative effect of death rate on the growth of per capita income. The death rate is a significant variable that can retard economic growth. A 1% increase in the death rate was found to reduce growth by 2.53%.
- Average number years of schooling and school enrollment positively affect economic growth. A higher average years of schooling and enrollment which implies a higher years of schooling attainment, increases the growth rate of income per capita in Nigeria. . In quantitative terms, we find that one extra year increase in the average years of schooling raises the growth rate of income by 0.068%.
- The ratio of the working age of the population emerges as a significant determinant of economic growth in Nigeria. This implies that an increase in the share of working age population increases the potential labour force which in turn increases the growth rate.
- In addition, the growth in the share of working age over total population is positive and statistically significant. This also indicates that the rapid growth in the ratio of the working age in the total population stimulates economic growth.
- The effects on health expenditure as a ratio of total government expenditure, infant mortality rate and the growth rate of the ratio of working age to total population is not significant on economic growth.
- Perhaps, the reason for the insignificant effect of health expenditure on growth is hinged on the small share of health expenditure as a ratio of total government expenditure. Health expenditure is just about 5% of total government expenditure which therefore accounts for its insignificance in the regression analysis. Also, the explanation on the insignificance of the terms of trade variable could be because of the heavy dependence of Nigeria on crude oil whose price is determined exogenously.

The health equation result reinforces the results reported in the growth equation. The health equation estimates function estimates indicates that:

- Increases in income per capita have a positive and statistically significant effect on life expectancy. A 1% increase in the growth of income per capita raises life expectancy by 0.043%.
- Average number of years of schooling was found to be a significant determinant of life expectancy.
- There is evidence of a significant positive relationship between school enrollment and life expectancy

- There is evidence of a significant positive effect of doctors per capita on life expectancy. The more doctors are available the more the number of lives that are saved. A 1% increase in the number of physician per capita tends to raise life expectancy by 0.062%.
- Per capita health expenditure emerges as a significant determinant of life expectancy in Nigeria. It implies that a thousand naira increase in per capita health expenditure would lead to 0.03% increase in life expectancy.
- We can therefore posit that reverse causation exists between health and economic growth in Nigeria. This effect is assumed to work through human capital as measured by years of schooling and school enrollment rate.

Beyond the econometrics, it is interesting to compare the simple association between the health indicators and per capita income. This is expected to yield more insight into the nexus between health and economic growth. The simple association using scatter diagram between the health indicators, per capita income and doctors per capita reveals that:

- There is a positive relationship between per capita income and life expectancy. At low income levels there is a sharp improvement in health as incomes increase. There is a strong positive relationship between the life expectancy and per capita income up to a threshold per capita income level of about \$375. The relationship becomes weak as incomes rise beyond that point, although it remains positive.
- There is an inverse relationship between income and crude death rate. At a low level of development, crude death rate declines faster, with only a slight improvement in per capita income levels. Nevertheless, progress in reducing death rate slows after a threshold level of about \$375.
- There is a positive relationship between per capita health expenditure and life expectancy. At low expenditure levels there is a sharp improvement in health as expenditure increases.
- The number of doctors is positively related to life expectancy. At low doctors per capita levels there is a sharp improvement in health as the number of doctors' per capita increase.
- There is an inverse relationship between doctors' per capita and infant mortality rate as well as and doctors per capita and the death rate. The decline in the mortality rate is noted to be faster as the number of doctor increases.

#### **IV. Policy Implications/Lessons**

The following policy suggestions are made based on the empirical findings of our study:

- Higher investment in health infrastructure and control of diseases that will reduce the death rate is needed to reduce the negative effect of the death rate on growth.
- Growth-oriented policies would result in bringing about improvements in the health status of the population.
- Educational policies that can increase school enrollment should be instituted
- Effort should be made to train more doctors based on its importance on life expectancy. Incentives should be provided to attract people to take up the medical profession.
- Good Macroeconomic policy: National macroeconomic policy, in particular fiscal and monetary policies, can be designed and implemented in a way that is conducive to the

development of an efficient health sector. For example, a special tax (for example, 1 per cent) could be imposed on personal and corporate income and such revenue could be credited to a human development fund. The justification for such a tax is that health and education in most developing countries are subsidized. External donors could also be encouraged to contribute to such a fund, bearing in mind that developing countries are not compensated for losses associated with the brain drain to developed countries. These resources could be utilized to develop human capital by promoting health and education. Fiscal policy can also be used to improve the allocation and utilization of funds. In addition, effective monetary policy can be used to further promote the health sector. For example, a lower inflation rate can have a disproportionately high positive impact on the poor through relatively higher real income (in view of the greater relative expenditure on consumption goods and less tax being paid on these) than a higher rate.

- **Good Governance:** Good governance is essential for efficient and equitable health systems. Weak governance undermines the functioning of health systems and has a serious impact on public health in Nigeria, particularly since it is the public sector is often the sole, or main, provider of health services. Common weaknesses in Nigeria include: political interference in the management of health institutions; poor human resource management, including recruitment, training, promotions and transfers; and poor allocation of resources. A major consequence is the high frequency of work stoppages by health professionals. Weak governance also results in low professional standards in the delivery of health services and corruption, which leads to much misallocation of resources. High priority should be given to improving governance at all levels in order to improve health and promote growth. This should go hand-in-hand with pro-poor policies to ensure that all sectors of society have access to affordable health care.
- **Human Capital Development:** Trained health personnel are crucial for the delivery of health services, and shortages of health professionals are increasingly being felt in some states in Nigeria hampering health service delivery. The shortage of healthcare professionals in absolute terms is in the Northern part of the country. Among the underlying reasons for this gap in health workers are misallocation of human resources, ineffective training policy, weak institutions, lack of incentives for, and motivation of, health professionals and financial constraints. Addressing these issues requires an integrated approach that takes into account critical sectoral needs and resource availability. Potential gains in efficiency combined with resource constraints on Government may warrant opening up the health sector to private investment, as long as equity issues are not neglected. Such an initiative would provide room for strengthening public health institutions as well as increasing overall efficiency in health service delivery. Overall, there is a compelling reason for stepping up both public and private investment in health which would pay off in the long run.
- **Health systems development:** The government should give priority to developing health infrastructure and providing quality health services for several reasons. First, the inadequate health infrastructure negatively affects social welfare. Second, investment in human capital and public health increases labour productivity and thereby generates greater economic growth and income. Third, the health sector has the potential to become an active market for health products and services, although regulations are needed to ensure that all groups have access to good quality health care. In Nigeria, private expenditure on health far exceeds public sector spending. These private expenditures are

almost entirely out-of-pocket, and private Insurance (for example the National Health Insurance Scheme) plays only a marginal role. Studies have highlighted that out-of-pocket payments are an inequitable and inefficient way to mobilize resources for health services. The very nature of health issues requires certain aspects of health infrastructure to be treated as a public good, but in other aspects the private sector can play an important role. Public private partnerships can be considered in areas where such arrangements could yield better outcomes. Investment in targeted public social protection mechanisms would also be necessary to protect the neediest and most vulnerable groups. The coverage of health services in Nigeria also continues to be poor in rural areas and city slums. As a result, many poor people have to travel far or have other difficulties availing themselves of public services. The opportunity cost of this for those living on daily wages, particularly in the informal sector, is very high. Even when health services are free, people face transport and other costs to gain access to services. Increasing access to basic health services, especially for such people, can pay substantial dividends in terms of better health and its contribution to growth.

In conclusion, econometric evidence as determined in this study shows a clear two-way linkage between health and growth. Economic growth appears to lead to large health gains, particularly at low levels of economic development. In this case, an improvement in health enhances labour productivity and leads to gains in economic growth. Nevertheless, improved health outcomes alone are not sufficient for sustained high economic growth. Education, strong macroeconomic policies and efficient institutional set-ups are equally significant. However, improving public health can be an important tool for reducing poverty. In order for it to be effective, greater emphasis on health sector improvement is required at the local government, state and national levels.

## References

- Addison, D. and Q. Wodon (2007) *Macroeconomic Volatility, Private Investment, Growth, and Poverty in Nigeria. World Bank Working Paper No. 79.* Washington DC.
- Aigbokhan, B. E. (2000) *Poverty, Growth and Inequality in Nigeria: A Case Study. African Economic Research Consortium (AERC) Research paper 102.* Nairobi.
- Alderman, Harold, John Hoddinott, and Bill Kinsey, "Long-Term Consequences of Early Childhood Malnutrition," *Oxford Economic Papers* LVIII (2006), 450-474.
- Ali, A. G. (2000) "The Evolution of Poverty in Nigeria 1985–92." *African Development Review/Revue Africaine de Developpement* 12(2):206–20.
- Amaghionyeodiwe, L. A., and T. S. Osinubi. (2004) "Poverty Reduction Policies and Pro-poor Growth in Nigeria." *Brazilian Electronic Journal of Economics* 6(1):1–25.
- Barro, R. (1996). *Health and economic growth*, Mimeo. Cambridge, MA: Harvard University.
- Barro, R., and Lee, J. (1994). Sources of economic growth. *Carnegie-Rochester Conference Series on Public Policy* 40, 1–46
- Behrman, J. R. And A. B Deolalikar (1988) "Health and nutrition," In: Chenery H, Srinivasan TN (eds). *Handbook of development economics*, Vol. I, Amsterdam: North-Holland Press.

- Bhargava, A. D. T., Lau L. J. Jamison and C. J. L Murray (2001). “Modelling the effects of health on economic growth,” *Journal of Health Economics*, 20:423-40.
- Bloom, D., and P. Malaney (1998). Macroeconomic consequences of the Russian mortality crisis. *World Development*, 26, 2073–2085.
- Bloom, D., D. Canning, D. Evans, B. Graham, P. Lynch, and E. Murphy (1999). Population change and human development in Latin America. *Paper prepared for the Inter-American Development Bank*.
- Bloom, D. E., D. Canning, and P. N. Malaney, (2000). Demographic change and economic growth in Asia. *Population and Development Review*, 26(supp.), 257– 290.
- Gupta, I. and A. Mitra (2003) Economic growth, health, and poverty: An exploratory study on India. In: Misra R, Chatterjee R, Rao S (eds). *India Health Report*. New Delhi: Oxford University Press.
- Sachs, J., and Warner, A. (1997). Sources of slow growth in African economies. *Journal of African Economics*, 6, 335–337.
- Strauss, J. and D. Thomas (1998) “Health, nutrition and economic development.” *Journal of Economic Literature*, 36:766-817.
- Thomas, S. and S. Canagarajah (2002) Poverty in a wealthy Economy: The case of Nigeria. *IMF working paper* WP/02/114. Washington DC.
- World Bank. (2004) Attaining the Millennium Development Goals in India: Role of public policy and service delivery, Human Development Unit, South Asia Region *The World Bank*.