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THE CONSEQUENCES OF RAPID POPULATION GROWTH ON NIGERIA'S ECONOMIC DEVELOPMENT: A SIMPLE ECONOMETRIC ANALYSIS

by

Richard A. Eniang

A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF SCIENCE

in

Economics

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Logan, Utah

1977

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Richard A. Eniang

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ABSTRACT

The Consequences of Rapid Population Growth on Nigeria's Economic Development: A Simple Econometric Analysis

by

Richard A. Eniang, Master of Science

Utah State University, 1977

Major Professor: Dr. Bartell C. Jensen
Department: Economics

The purpose of this study was to examine the economic implications of a rapid population growth on Nigeria's economic development. It was particularly interesting to study the relationship, because at the present Nigeria is making some economic progress while undergoing a demographic transition. Apparently, despite the acceptable growth of the national income, the growth of the per capita output has not been encouraging. This output growth must have been hampered by the rather rapid population growth in Nigeria.

The neoclassical growth theory was basically employed to explain the growth of output in the economy in terms of both capital and labor inputs. For instance, the short-run impact of a possible fertility decline could lead to increased savings capability, possible through the curtailment of the consumption of the dependent population. The long-run impact, on the other hand, could be the opportunity to increase the rate of structural transformation needed to raise labor productivity and personal income in the economy.

The model revealed that economic growth rates in Nigeria have been declining with rising affluence. It is more likely that such a slowing would arise from the population pressure and resource limitation rather than from the propensity to invest.

(75 pages)

CHAPTER I

INTRODUCTION

The classical economic theory of population growth as postulated by Malthus stated that a rise in incomes, particularly among the poorer classes in any country, tends to increase fertility rates but decrease mortality rates. The course of events since Malthus' time has not only negated that theory but has also led to the gradual evolution of the theory of demographic transition. This theory is based on the hypothesis that man's reproductive behavior is highly responsive to his environment, and it typically relates a sequence of birth and death rates to a country's economic development.

In a typical agrarian peasant economy, characterized by a high degree of self-sufficiency and a relatively slow change in production techniques, birth and death rates are very high. While the birth rates may remain high and fairly stable in such a circumstance, the death rates respond immediately to fluctuations in nutrition, sanitation, and availability of effective preventive and curative medical practices. High birth rates are traditionally associated with social beliefs and customs and the feeling that large numbers of births are an economic advantage to a peasant family. For instance, it is often held that in a predominantly agrarian economy, the benefits of having children are derived from the utility received from enjoying them as a consumption good, from the income received by them working in a

productive capacity for the family and the potential security of receiving support and assistance from progeny in old age.[1]

As a consequence, therefore, when a country undergoes an evolution from an agrarian to a specialized market-oriented economy, the transition is often accompanied by a decline in mortality rates while the decline in fertility rates (if possible) occurs after a substantial time lag.

The consequences of population changes on the economic growth of most countries, especially the low-income ones, have attracted much attention in recent years, partly because of the rise in aspirations and plans to raise the per capita output in these economies. But the social and economic consequences of rapid population growth are only dimly understood today. Reasonable quantitative judgments about the presumed burden of population growth in general, or for specific countries, are not easily found.[2] Needless to say, a lot of empirical studies have shown recent scholarly attempts to estimate, at least in broad terms, the impact demographic factors could exercise on an economy given reliable data.

However, for analytical purposes, the implications of rapid population growth can be classified into two components: those which occur in the long run and those which primarily arise in the short run as the rate of population growth changes. The long-run burden of

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[1]Victor P. Diejomaoh, *Economic Development in Nigeria: Its Problems, Challenges and Prospects* (Princeton, New Jersey: Princeton University, 1965), p. 80.

[2]Charles Cooper and Sidney Alexander, *Economic Development and Population Growth in the Middle East* (New York: American Elsevier Publishing Company, Inc., 1972), p. 11.

rapid population growth, from the economic standpoint, is its constraining effect on the rate of structural transformation needed to raise labor productivity and personal income in a dual economy. One possible approach to determining the long-run effect of population growth on the rate of growth of per capita income is to find out the proportion of current savings needed to increase the capital stock sufficiently to maintain a required labor productivity and per capita incomes. Clearly, the higher the rate of population growth, the more capital accumulation is needed just to hold labor productivity constant. Another approach to the problem is to analyze the level of per capita income which could be attained if population growth and hence labor force growth were lowered with the level of unvestments unchanged.

In the short run, changes in the rate of population growth can impose immediate burdens on the family and society at large; their precise nature and extent, however, will depend on the source of the changes and their effect on the age structure of the population. Besides creating the dependency burden, changes in fertility patterns also affect the size of the labor force long before they alter the population of people old enough to work. In addition, any changes in family size and age composition affect per capita incomes associated with any given total output, and thus may have immediate implications for consumption, total demand, and capital formation.[3]

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[3]Daniel B. Suits, Ward Mardfin, Srawooth Paitoonpong, and Teh-Pei Yu, "Birth Control in an Econometric Simulation," *International Economic Review*, XVI (February, 1975), 92.

Nigeria was selected as the area of study partly because, from the analytical point of view, the relationship between its population and economic growths is fairly clear. Presently, the country is making some rapid economic progress and is also undergoing a demographic transition. Despite the absence of reliable demographic data, Nigeria is known to have a rapidly growing population. With a growth rate of 2.5 to 3.0 percent per annum, the population is getting fairly large relative to the available resources of the country. The rather hastening pace of urbanization which follows in the wake of rapid population growth has imposed both personal and social costs on the economy.

There exists a large potantial for rapid economic growth in Nigeria, but the current drive to exploit that potential is being thwarted by the rapid population increase. For instance, in the past two decades, a deliberate action to slow the population growth has been conspicuously left out of existing government policies. This attitude is reflected in the Current Third National Development Plan (1975-80) where it is stated explicitly that the demographic factors in Nigeria do not appear to constitute any significant or serious obstacle to domestic economic progress. It is further felt that since the country is well endowed with natural resources, a careful exploitation will provide the needed basis for building a viable economy to ensure a steadily rising standard of living for the population in the foreseeable future, and especially during the current phase of the country's demographic transition.[4]

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[4]Federal Republic of Nigeria, *Third National Development Plan (1975-80)* (Lagos, Nigeria: Federal Ministry of Economic Development, The Central Planning Office, 1975), p. 293.

The main emphasis of government policies is on accelerating the rate of economic growth through more purposeful investment programs in all the producing sectors of the economy, and it is generally believed that the fast pace at which Nigerian social and economic development will move is expected to accentuate those forces which will tend to lower fertility in the long run.

Despite the government stand on population, the general feeling is that because of the serious impediment posed by the country's large and rapidly growing population on the achievement of the targeted economic goals, the population need be slowed to permit, at best, a sustained development. Therefore, there is urgent need in Nigeria for policy makers to meet the challenge as posed by the population explosion and design appropriate plans to control the accelerating fertility patterns in the country to create an opportunity for future development.

CHAPTER II

LITERATURE REVIEW

Historical Background

In many instances, demographic factors have been regarded as long-run factors in forecasting economic growth of a country or have merely been assumed as factors contributing to negligible or constant effects on the economy. Some of the empirical and related studies already made by Adelman,[1] Blandy,[2] Ekanem,[3] Freedman,[4] Simon,[5] and Sommers and Suits,[6] to mention a few, have extensively examined the impact of population growth on the economic development of countries. Their conclusions underscore the belief that economic development, especially in relatively poor countries, could be hampered by rapid population growth.

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[1]Irma Adelman, "An Econometric Analysis of Population Growth," *American Economic Review*, LIII (June, 1963), 314-339.

[2]R. Blandy, "Population and Employment Growth: An Introductory Empirical Exploration," *International Labor Review*, CVI (October, 1972), 347-366.

[3]I. Ekanem, "A Further Note on the Relation Between Economic Development and Fertility," *Demography*, IX (August, 1972), 383-398.

[4]Deborah S. Freedman, "The Relation of Economic Status to Fertility," *American Review*, LII (June, 1963), 414-426.

[5]Julian Simon, "The Value of Avoided Births to Underdeveloped Countries," *Population Studies*, XXIII (March, 1969), 61-68.

[6]Paul M. Sommers and Daniel B. Suits, "A Cross-section Model of Economic Growth," *Review of Economics and Statistics*, LIII (May, 1971), 121-128.

However, since most of these studies are cross-sectional analyses with only a few time-series types, the specific results have led many scholars to conclude that the full advantages which could be expected from fertility reduction are still greatly misunderstood and underestimated.[7] While the cross-sectional studies have been useful in determining the general impact of demographic factors on economic development, the approach might not be very useful in forecasting a country's economic development since countries differ markedly on economic, social, and cultural grounds. For instance, it has been found that a reduction in fertility as a necessary condition for increased economic growth could only be valid in the context of a developing country. In richer nations, increased wealth could indirectly lead to increases in family size.[8] Similarly, evidence also shows that the positive correlation between economic growth and level of literacy could only be found in developing nations, while that relationship does not necessarily exist in developed nations. Besides, the negative correlation between fertility and literacy is more applicable in poor than rich nations.

Nonetheless, the impediment to economic growth which could be generated by rapid population increase in low-income countries is fairly obvious. The development process is more than just a simple process of factor augmentation and could be viewed as a process whereby an increasing number of people is absorbed into different

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[7]Etienne Van de Walle, "Population and Development," in *Population Change and Socioeconomic Change in West Africa*, ed. by John C. Caldwell (New York: Columbia University Press, 1975), p. 152.

[8]Ekanem, "Economic Development and Fertility," p. 385.

and more productive activities in the economy. As a result, more capital services and modern inputs are required per worker to sustain the economic activities. But, the rate at which additional labor is absorbed into the modern sector could be restrained and the development process prolonged by accelerating population growth. For growth to be possible under the circumstances, a greater share of the output must be saved and invested. Also, in a model of dual economy in which structural change is a needed result, the already existing savings constraint on development could be aggravated by any *rapid population* increase.[9]

Therefore, since the attainment of adequate levels of investment is particularly difficult in relatively low-income areas, the existence of an accelerating population growth could only worsen the situation by limiting the capital available per person in the economy. In developed nations where full utilization and full employment of existing resources are the targets, a rise in aggregate demand could provide some stimulus to the growth of the economy; and a possible source of this stimulus has been found to be a rapid population growth. But, an economy which suffers from a deficiency of capital (and not of effective demand) needs a higher schedule of savings rather than of consumption to generate higher per capita incomes in the future. Even though there may be some credibility to the belief that deficiency of effective demand also presents problems in low-income economies, adequate stimulus cannot possibly be obtained from

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[9]R. R. Nelson, T. P. Schultz, and R. L. Slighton, *Structural Change in a Developing Economy: Columbia's Problems and Prospect* (Princeton, New Jersey: Princeton University Press, 1971).

rapid population growth. For instance, a faster population growth might compel most households in these deficient economies to spread their meager incomes over their large numbers because there could be no apparent way in which the large numbers in such circumstances could immediately be translated into higher consumption expenditures or higher returns to capital. Therefore, the real capability to enlarge consumption could be minimal in these areas.

In general, a more rapid rate of population growth affects the younger population more than any other group, and therefore it gives rise to a younger composition of the population and a broader-based age distribution. This creates a dependency burden--one that is primarily borne by families supporting additional surviving children, but also transferred in part to the government which provides the social services to the people. However, the rapid increase in total population also leads to an increase in the rate of growth of the adult population; but the notable acceleration in the growth of the population of labor force age occurs about 15 to 20 years after the decline in mortality has begun and when the surviving cohort of children born enters the labor force.

Demographic Review: Patterns and Trends

By any standard, Nigeria has a rapidly growing population. Three decennial censuses have already been undertaken in the country, and although the results are questionable and subject to a lot of controversies, fairly realistic estimates exist which could provide a general idea on the course of the demographic trends. For example,

the 1965 projected mid-year population estimate was 48.7 million persons, while that for 1975 was 63 million, representing an annual growth rate of 2.4 to 2.8 percent.[10]

Basically, the persistent high levels of fertility in Nigeria have given rise to an age distribution characteristic of low-income economies--a broad-based pyramid that tapers rapidly with age. However, the precise structure of this age distribution is slightly obscured by the gross inaccuracies in the age reporting. Estimates also show that the proportion of the population 15 years and under remained at roughly 45 percent, while that for those 15 to 64 years of age actually decreased from 54 to 52.6 percent within the period 1960 to 1975. A set of these demographic estimates from 1960 through 2000 is presented in Table 10 (Appendix A).

The demographic evidence is consistent with an historic fall in crude death rates during the last few decades. From the estimates, the crude death rate declined from a level of about 26 per thousand in 1960 to roughly 22.7 per thousand in 1975. Further declines in the crude death, though a possibility, are likely to be more moderate as further improvements in health services in the country may have to hinge increasingly on gradual improvements in nutrition, control of epidemic diseases, and increased personal income. During the same period, the crude birth rates remained fairly stable at about 49 per thousand. As a consequence, therefore, these developments are essentially responsible for the rapid natural population increases.

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[10] U.S. Department of Commerce, "World Population: 1975 Demographic Estimates for the Countries and Regions of the World" (unpublished paper; Washington, D.C., 1975).

The range of plausible changes in fertility patterns in Nigeria is rather narrow. The fundamental reason why there is uncertainty as to the future course of fertility in the country is that any major downward trend can only depend on the existence and the effectiveness of nationwide programs to reduce the current level of birth performances. The underlying purpose of this study, therefore, will be to justify the benefits which could possibly accrue to the economy from any purposeful family limitation programs.

Demographic-Economic Interrelations

The demographic influence on an economy can be attributed to three aspects: effects of population size, rate of growth, and age distribution.[11] A question then arises as to whether a large population could be advantageous or otherwise to the economy by limiting the growth of the output per worker and the per capita incomes. The classical view is expressed in the theory of the optimum population which states that population size in itself is of little importance, and what matters is the combination of factors of production in the right proportions. In a situation of under-population, given a fixed amount of land and capital, an optimum number of workers is needed to exploit the available resources. But if the labor force does not reach that number, additional workers might be necessary to bring forth increasing returns per head, granted there is division of labor and specialization in the economy. Conversely, a stage of

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[11]Ansley J. Coale and Edgar M. Hoover, *Population Growth and Economic Development in Low-Income Countries* (Princeton, New Jersey: Princeton University Press, 1958), p. 18.

overpopulation exists when manpower is above the optimum amount with the average product down and a resultant underemployment.

Effects of population size on an economy can be both advantageous and undesirable. In small-holder agriculture, for instance, where most of the population derives its livelihood, there is little room for specialization and division of labor. Therefore, within the production units a population increase is not likely to permit any economies of size. Rather, it may result in greater fragmentation of the production units, thus creating smaller units than the existing ones. On the consumption side, the pressure of the Nigerian population on subsistence, as an example, is such that the supply of food is required to keep pace with the demand created by a large population. Research has also shown that the subsistence food sector in the country grows at about the same rate as the population. Besides, it is feared that Nigeria might run the risk of having its population press too much on food supplies, to the point of deprivation in the future in the face of a projected enormous population.[12]

The expected advantage of the effects of population size on the industrial and business sectors of the economy is that of producing a large market for the manufactured products. There is, however, little doubt that Nigeria's large population could be a favorable factor in the drive for its industrialization. The mere fact is that under the Nigerian situation, a large population hampers the improvement of the standard of living and the purchasing power of the inhabitants;

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[12]Glenn L. Johnson, Orlin J. Scoville, George K. Dike, and Carl H. Eicher, "Strategies and Recommendations for Nigerian Rural Development, 1969/85," *CSNRD*, XXXIII (July, 1969), 22-24.

hence, it also inhibits the development of a sizeable effective demand in the economy.

The rate of population growth is particularly important in determining the consequences of population changes on the economic growth of Nigeria. While there could be economies of scale as the overhead expenditures are shared among more persons, such gains are offset by the additional investments needed to maintain or improve the ratio of existing capital stock to the accelerating population. Present policies in the country are primarily aimed at realizing a level of investment which could expand faster than the population growth to insure a substantial increase in per capita income. These investments are usually financed out of savings and foreign capital or reserves. In economic planning, the most sophisticated instrument often used to integrate population growth into an overall strategy is the so-called development equation whose theory argues that investment should be increased at least at the same rate as the population to maintain some economic growth:

$$g = [(s/c) - n]$$

where g is the rate of increase of per capita incomes; s, the percent saved out of total income; c, the capital-output ratio; and n, the rate of population growth. Thus, from the equation, if a population should grow at 2 percent per year, and assuming the capital-output ratio is 3, 6 percent of the GDP should be saved and invested yearly just to keep per capita income constant, while 9 percent will be

needed to make it grow by 1 percent a year.[13] Despite the fact that the above equation is not very applicable in the Nigerian context, some important facts are evident in it: the capital stock and the efficiency of investment must improve or grow faster than the population growth for development to take place.

The age distribution of the population primarily influences the structure of investments in the economy and particularly at the macroeconomic level. In a country like Nigeria where high fertility rates persist, a large part of the population consists of children, with precisely more than 40 percent under 15 years of age. Hence, expenditures on health and welfare, housing, and education tend to receive more emphasis in the short run.

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[13]Van de Walle, "Population and Development," p. 145.

CHAPTER III

FACTORS IN NIGERIAN ECONOMIC DEVELOPMENT

Review of Sector Roles

Nigeria is a predominantly agricultural economy. The agricultural sector is fostered very effectively in the process of the economic development of the country. Although the proportion of output and employment accounted for by this sector has been declining in recent years, agriculture is still and will continue to be the mainstay of Nigerian economy in the foreseeable future. This is adequately reflected in the current national policy where the improvement of the performance of the sector is an important objective. Several reasons underly this assertion:

1. The current development plans recognize the relative importance of agriculture and expect substantial gains to be achieved in this sector and its related areas in order for it to play its role in the socio-economic growth of Nigeria.

2. Nigeria, being a populous country, will have agriculture furnishing the bulk of the nation's employment opportunities, meeting the rising demand for more and better staple foods and other essential products. Also, the sector will have to supply most of the country's raw material requirements for both the domestic industry and export markets.

3. The government of Nigeria is firmly committed to the policy of development that does not ignore the welfare of any socio-economic

group and attempts are made to raise the levels of living for all and to reduce any intergroup differentials. For this reason, active support to agriculture (and more generally the rural sector) has been stepped up.

The manufacturing sector plays a relatively small role in Nigeria's economy. Comparatively, it is underdeveloped relative to the size and the level of development of the economy. Nonetheless, in the past decade, this sector has grown fairly rapidly. Between 1962 and 1972, the value added in manufacturing and craft grew at a compound rate of 10 percent per annum; manufacturing alone grew at 12.2 percent. Despite this growth, the share of manufacturing and craft in the Gross Domestic Product (GDP) in that decade increased by only 2.15 percent, from 5.64 percent in 1962 to 7.79 percent of GNP in 1972.[1]

Manufactured products in Nigeria are varied and include almost all essential commodities. Presently, the volume and variety of these domestically produced goods is such that most trading outlets continually report that a significant proportion of their supplies is from factories located in the country.[2] However, most of the existing industries are small, with only a few comparatively large firms. A brief structure of the manufacturing sector, defined in relative shares by total value added, is shown in Table 12 (Appendix A).

The importance of mining and quarrying in Nigeria has increased substantially in the past few years, and this sector now provides the

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[1]Federal Republic of Nigeria, *Third National Development Plan*, p. 147.

[2]Diejomaoh, *Economic Development in Nigeria*, p. 10.

main momentum for the economic growth of the country. This increased importance is reflected in the sharp growth of the share of mining and quarrying in the GDP. The principal mineral resources of Nigeria are petroleum, tin, columbite, limestone, lead, zinc, coal, lignite, and iron ore. Petroleum is now the most important mineral product and its mining alone, for example, rose from 1.1 percent of GDP in 1962 to 15.9 percent in 1972 in constant 1962/63 prices. This growth pattern can be seen in Table 1.

There have also been gradual improvements in commercial, finance, transport, communications, and other social activities. Public responsibility and hence government participation in these areas have been increasing in order to ensure an orderly growth and development of the economy.

The general constraints limiting Nigeria's ability to exploit and develop her resources adequately are several. These include low producer incentives, transport and distribution bottlenecks, inadequate machinery for effective planning, insufficient qualified manpower, and the overall effectiveness of the private and public sectors of the economy.[3] Presently, there is a relatively strong disposition and capacity on the part of the governments in Nigeria to adopt and implement a policy of balanced development in the economy.

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[3]International Bank for Reconstruction and Development, *Nigeria: Options for Long-Term Development* (Baltimore, Maryland: John Hopkins University Press, 1974), p. 5.

Table 1. Gross domestic product at constant 1974 prices: Percentage distribution

Sector	Percent				
	1970	1971	1972	1973	1974
Agriculture	36.0	32.0	27.9	24.7	23.4
Mining & quarrying	33.1	39.3	43.4	45.1	45.5
Manufacturing & crafts	5.0	4.1	4.8	4.8	4.7
Electricity & water	0.3	0.3	0.4	0.4	0.4
Building & construction	3.5	4.1	4.7	5.4	5.7
Distribution	9.1	8.1	7.4	6.9	6.7
Transport & communications	1.8	1.9	2.1	2.1	2.3
General government	6.3	5.5	4.6	5.8	6.3
Education	2.7	2.6	2.5	2.3	2.6
Health	0.8	0.6	0.8	0.8	0.9
Other services	1.4	1.4	1.4	1.4	1.5
Total	100.0	100.0	100.0	100.0	100.0

Source: Federal Republic of Nigeria, *Third National Development Plan (1975-80)* (Lagos, Nigeria: Federal Ministry of Economic Development, The Central Planning Office, 1975), p. 22.

Income Differentials and Population Distribution

Adjustment between agriculture and the rest of the economy is a difficult task to accomplish. This is true partly because of the size of the agricultural sector which still employs about 65 percent of the total population. The importance attached to this balance reflects the great disparity existing between the farm and non-farm sectors with respect to production techniques, human skills, values, customs, motivations, and development requirements. The belief implicit in this study, therefore, is the fact that a very substantial progress in the rural sector of the economy is a prerequisite to the successful development of the Nigerian economy as a whole.

Another consideration of the balance involves the relative levels of productivity and per capita incomes in the main sectors. Development experiences in various countries indicate the persistence of per capita income differentials between agricultural and non-agricultural sectors. Moreover, this differential tends to be widened when industrialization and urbanization proceed rapidly, although it is believed that the differential in most instances helps to redistribute the labor force away from agriculture and other primary occupations.[4]

In Nigeria, for instance, the per capita farm income is still a low fraction of the per capita non-farm income. This differential, however, seems to have been sustained by the persistent constant ratio of agricultural to the total population and a steady increase in the

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[4]Coale and Hoover, *Population Growth*, p. 132.

ratio of urban to total population. The links between the rural and urban situations are exemplified by the flow of labor into the towns in search of employment and in response to the prevailing income differentials--an on-going process to ensure that the mass of the population shares in the benefits of economic growth. But under the most optimistic assumptions on the expansion on the non-agricultural sectors, Nigeria's future with respect to increasing income disparities will depend primarily on the course of its agricultural development. Precisely, in the next decade or so the economic well-being of the bulk of the population will still depend upon the growth of incomes and employment opportunities in the rural economy.

An approach to effect a major improvement in the urban-rural income differentials or the intra-sectoral income disparities is to bring the distributional and employment considerations into focus and to devote substantially increased resources to improving the rural infrastructure. Moreover, the promotion of rural small-scale industries could provide another important vehicle for rapid adjustments, because the mobility of labor from farms to rural industries could be greater than from rural to urban settings. Besides, the problem of social adjustments could be minimized under such circumstances. The underlying strategy of the emphasis on rural development, therefore, will be to achieve significant increases in the incomes of the rural population.

Financing Investment and Economic Growth

The theory of economic growth states in general that countries in which the per capita income is not increasing might have been

investing 4 or 5 percent or less of their national income per annum, whereas progressive economies invest 12 percent per annum or more.[5] Therefore, to achieve a progressive economic growth in a country like Nigeria, it would be necessary to invest a considerable proportion of the national income in ways which can contribute to that growth.

The composition of the total investment program is described in the Third National Development Plan and is also summarized in Appendix A of this study. The developmental outlays include all capital investments and additions to working capital. Public investments are implemented through the government's capital estimates and budgets on economic, social, and general government programs. Table 2 summarizes the distribution of the GDP (at current prices) for the period 1970 through 1975. It also shows that in the 1975/76 fiscal year, approximately 20 percent of the GDP went into gross fixed capital formation and about two-thirds of that was public investment. The relations of the public investment and other public outlays are presented in Table 9 (Appendix A). In the year 1975, for instance, the federal and state governments had a combined capital expenditure of about ₦5.4 billion ($8.59 billion), of which 70 percent represented the capital formation. Social services (primarily education and health programs) accounted for another 11.5 percent of the total outlay and about 8 percent was regional developmental outlays. Roughly 10.5 percent of total public outlays in that year could be regarded as

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[5]Arthus Lewis, *The Theory of Economic Growth* (Homewood, Illinois: Richard D. Irwin, Inc., 1955), pp. 225-226.

Table 2. Expenditures on the gross domestic product: Current prices

	₦ Million[a]					
	1970	1971	1972	1973	1974[b]	1975[b]
Aggregate consumption	4,834.5	5,837.3	5,960.2	6,483.1	7,808.1	8,973.4
(a) Private	(4,265.9)	(5,241.4)	(5,119.3)	(5,551.1)	(6,335.4)	(7,169.7)
(b) Government	(568.6)	(595.9)	(840.9)	(932.0)	(1,472.7)	(1,803.7)
Gross fixed capital formation	844.9	1,234.9	1,480.0	1,745.9	2,600.0	3,540.0
Gross domestic product at market prices	5,696.2	7,177.0	7,691.9	8,900.5	14,989.2	17,014.8
Less net factor payments and transfers	-66.8	-323.8	-559.3	-606.3	-923.4	-758.8
Gross national product	5,629.4	6,853.2	7,132.6	8,294.2	14,065.0	16,256.0
Gross national savings	794.9	1,015.9	1,172.4	1,811.1	6,257.7	7,282.6

[a]₦ represents Nigerian Naira (equivalent to about $1.58).
[b]Development Plan estimates.
Source: Federal Republic of Nigeria, *Third National Development Plan (1975-80)* (Lagos, Nigeria: Federal Ministry of Economic Development, The Central Planning Office, 1975), p. 24.

non-developmental since that much was mainly devoted to defense purposes and the general administration of the governments.

The rate of investment and other developmental outlays during the first plan period (1962-68) was barely sufficient to improve the per capita output, especially under the prevailing condition of the rapid population growth. But further remarkable improvement occurred during the second plan period (1970-74) with increases in real per capita incomes and the proportion of national income invested. It is believed that these increases in income and savings were aided by the nation's increasing wealth in petroleum resources which, of course, cannot be relied upon too long into the future. Finally, experience has shown that even the 8 percent per annum average growth rate of the gross domestic product achieved in the period 1970-74 was hardly satisfactory under the conditions where the population was growing very rapidly. The third development plan envisaged an average growth rate of the GDP of 10 percent per annum, but the very purpose of maintaining a satisfactory rate of development could easily be defeated if the current population growth rate is not slowed concomitantly, by policy actions.

Savings and Consumption

Estimates of savings in Nigeria are highly approximate and incomplete. Table 3 provides a rough idea of the principal sources of national savings. From this breakdown, governments apparently supplied about 77 percent of domestic savings in 1974, mainly from their surpluses of current revenues over current outlays. Private savings

Table 3. Gross national savings

Item	₦ million[a]					
	1974	1975	1976	1977	1978	1979
Gross domestic product at market prices	14,989.2	17,014.8	19,415.0	22,450.9	26,206.3	30,862.0
Less net factor payments	-923.4	-758.8	-698.1	-676.9	-705.0	-752.1
Gross national product	14,065.8	16,256.0	18,716.9	21,774.5	25,501.3	30,109.9
Less government consumption	1,472.7	1,803.7	2,364.4	2,780.2	3,182.6	3,769.7
Less private consumption	6,335.4	7,169.7	8,182.3	9,941.6	12,298.6	15,319.6
Gross national savings	6,257.7	7,282.6	8,170.2	9,052.7	10,020.1	11,020.6
Public savings	4,838.7	5,578.7	6,020.4	6,778.4	7,668.9	8,219.9
Private savings	1,419.0	1,703.9	2,149.8	2,274.3	2,351.2	2,800.7

[a]₦ represents Nigerian Naira (equivalent to about $1.58).
Source: Federal Republic of Nigeria, *Third National Development Plan (1975-80)* (Lagos, Nigeria: Federal Ministry of Economic Development, The Central Planning Office, 1975), p. 55.

borrowed for investments was only 23 percent. The projections on these estimates also show only a very slight change in the savings ratio by 1979.

An important source of increased savings capacity is in the prospective rapid growth of the organized private business sector which characteristically saves and invests a high proportion of its own earnings in addition to investing sums borrowed from other savers and then furnishing the government with a substantial share of its tax revenues. Therefore, as industrialization progresses in Nigeria, the large enterprise sector will increase in importance relative to the national income and they will also be expected to save and invest a higher proportion of their earnings than do smaller enterprises or individuals.

Aggregate consumption in the economy has been fairly high in the past, at times reaching a level of approximately 90 percent of GNP. This ratio has apparently been falling recently to an all-time low of 55 percent in 1975. Within this aggregate, however, the different movements of the private and public consumption ratio are clearly discernible. Public consumption, for instance, rose slightly from 10 percent of GNP in 1970 to 11 percent in 1973 and declined to approximately 10 percent afterwards.

Private consumption, on the other hand, has been fluctuating in the past two decades around a level of 80-85 percent of GNP. From 1966 to 1973, the average growth rate of private consumption derived as a residual from the official national accounts estimates was about 6 percent in current prices. This translated to an equivalent 4

percent in per capita terms. During the third plan period (1975-80), the implied annual growth rate is about 19 percent, and if allowance is made for a 2.5 percent per annum population growth rate and an annual price inflation of 6 percent, per capita consumption will probably rise at 10.5 per annum in real terms.

Productivity of Development and Investment Outlays

Over the past years and especially the past two decades, investment opportunities existed in Nigeria when the growth of its economy averaged about 5.5 percent per annum. The profitability of operating at productive capacity in a large domestic market had hitherto provided adequate investment incentives with a reasonable degree of protection. This was probably a major factor in the continued growth of private investment and savings in the country.

A gradual shift from a structure where growth originated largely from export-oriented sectors to one which intends to draw its impetus increasingly from production for domestic demand is very apparent now in Nigeria. The major exception to this assertion will be the oil-producing sector, which will continue to generate the domestic resources to permit an acceleration of economic growth and provide the necessary foreign-exchange earnings. Nigeria therefore should be able to concentrate on new investments on the provision of goods and services for domestic use while still maintaining the characteristics of an export-oriented economy capable of building up foreign-exchange reserves.

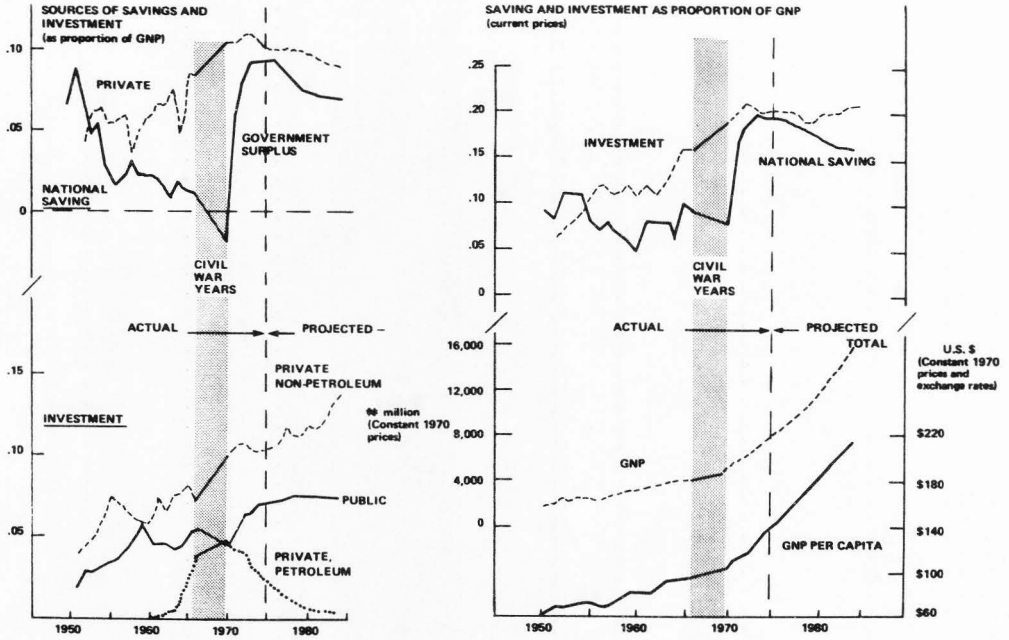

Figure 1. Nigeria: Macroeconomic trends, 1950 to 1975, and projections to 1985.

However, the economic growth potentials of Nigeria in the next decade or two could best be assessed in terms of the following:

1. The rate at which the available resources could be allocated to investments and other developmental.

2. The efficacy of the outlays in raising productivity.

In the current development plan, sufficient attention was not given to the question of the prospective ratios between the investment outlays and the growth of the national output. Nonetheless, historical experiences in other countries might allow one to assume a capital output ratio only in relation to the development visualized for a particular country, the capital stock already at its command, and the extent to which the available capital resources are being utilized.[6] In making any assumptions for Nigeria, therefore, a few factors need to be taken into account; viz., the possibility of raising agricultural yields with relatively small additions to capital equipment, the need for further expansion of basic industries and services, the lack of technical skills as reflected in the lower productivity of labor, the scope for intensive use of equipment in some key industries through full utilization of capacity, the shortage of necessary economic and social infrastructure and, of course, the accelerating population growth.

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[6]Planning Commission, *First Five-Year Plan* (New Delhi, India: Government Printing Service, 1955), pp. 19-20.

CHAPTER IV

METHODS AND PROCEDURES

General Theoretical Framework

It is generally agreed that overall economic development greatly influences population growth and is considered an extremely important factor in determining demographic behavior. Specifically, there is little dispute in the argument that a broad-based economic development usually results in major declines in fertility. But on the reverse relationship--the effect of demographic growth on economic growth and development--a broad range of views exist. These range from those suggesting that rapid rates of population growth will make economic growth impossible, to those suggesting that population growth rates are only negligible or irrelevant components of the development process, and to those suggesting that in fact, rapid population growth will contribute to economic growth. These differing views notwithstanding, the popular feeling shows that a country that experiences rapid population growth will find it more difficult to achieve a desired economic growth, other things being equal, than one with a slower rate of population growth.

The study of the relationship can be approached either by examining past historical examples or by the analysis of economic theories and econometric growth models. For instance, there are historical cases of countries experiencing both economic growth and high rates of population growth. Brazil and Mexico are good examples. But it

is often argued that in these situations, economic growth could have been even greater had population growth been reduced.

In recent years, however, econometric models have been developed to observe these relationships. Three general types can be distinguished which have been used to estimate the effects of declining fertility on economic growth. The econometric growth models, for instance, utilize the Harrod-Domar production function to link growth of output to changes in the amount of capital and changes in the capital-output ratio. The neoclassical growth models use both labor and capital in the production functions. The third analytical approach is the investment model, which involves a cost benefit analysis of programs to reduce fertility. The proliferation of the analytical approaches has given rise to many economic arguments for and against reduced fertility, such that the importance and validity of the few theoretical relationships often outlined seem to be in dispute. Besides, the causal relationships are themselves interactive and complex and there is not enough empirical knowledge in the world today about these issues.

Simon Kuznets even pointed out that our economic analysis seems inadequate in its concepts of nonconventional capital inputs, capital formation, qualities of labor, and economic organization, and concluded that the broad political, economic and social inputs and preconditions are important but difficult to incorporate into macroanalytic models.[1] Also, Gunnar Myrdal stated that these kinds of analysis in terms of capital investment and output, typical of the

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[1]Simon Kuznets, "Population and Economic Growth," *Proceedings of the American Philosophical Society*, III, No. 3 (June, 1967), 184-190.

modern approach to economic problems, are too mechanistic and schematic. He felt that increased attention has recently been paid to the economic effects of reduced fertility, and in consequence more complicated models have been constructed. But, he said, despite their disclaimers, they create a false air of precision and confidence in the models. He then suggested that there is a possibility of constructing models more adequate for the purpose, but such models would have to contain many more parameters and account for many more interrelations in order to be logically consistent and close to reality.[2] Coale and Hoover, in their econometric growth model of India, developed a classical theoretical relationship between a declining fertility and economic growth as shown in Figure 2.[3] This model was used to make quantitative estimates of the demographic effects on economic growth. Although there are some various criticisms on the realism of the estimates, the model expresses important relationships worth considering.

The first mechanism in the model shows the short-run benefits of a declining fertility and its effects upon dependency ratios and investment potentials. A fertility decline immediately begins to reduce the proportion of young dependent persons in the population. A reduction of this dependent, non-productive population frees capital that otherwise is spent for its maintenance. This in turn raises savings and investment potentials at both micro and macro levels.

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[2]Gunnar Myrdal, *Asian Drama: An Inquiry Into the Poverty of Nations* (New York: The Twentieth Century Fund, 1968).

[3]Coale and Hoover, *Population Growth.*

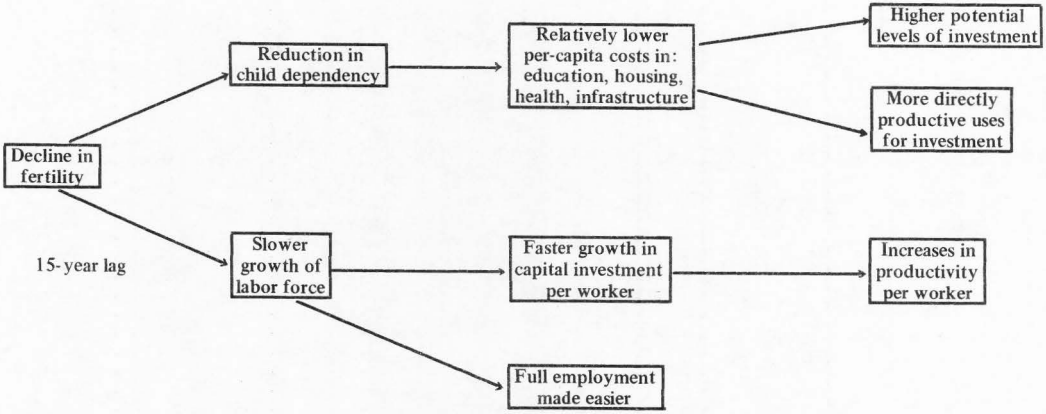

Figure 2. Some relationships between declining fertility and economic growth.

The second mechanism of the model deals with long-run benefits of a fertility decline. A decline in fertility does not affect the size of a country's labor force until at least 15 years later. After this lag, the growth of the labor force is expected to decline in order to permit more capital to be invested per worker. This raises the capital output and the productivity per worker.

Besides, per capita income in a reduced-fertility population could be higher because a larger proportion of the population is expected to be in the labor-force ages and especially when such a change could be coupled with the increase in the amount of capital available per worker.

In the case of Nigeria, the demographic impact could best be assessed by first examining the classical demographic transition theory which postulates four stages in the population growth of a developing country:

1. A traditional period of high birth and death rates in approximate balance and stable population growth.

2. A high growth period characterized by low death rates and continuing high birth rates.

3. A transitional period during which the birth rates also decline.

4. A stable growth period sustained by low birth and death rates.

The decline in the birth rates in phase three, for instance, is attributed to a combination of socio-economic factors associated with evolutionary forces such as modernization, urbanization, or industrialization. Stolnitz rightly noted that all nations in the modern era which have moved from a traditional agrarian-based situation to a

largely industrialized base, have also moved from a condition of high to low mortality and fertility.[4]

For the purpose of this analysis, Nigeria is assumed to be in the second phase of the demographic transition. The result of the precipitous decline in mortality while the birth rate remained unchanged is a rapid acceleration in the country's population growth, reaching, in some instances, rates of 2½ to 3 percent per year. This study will strive to examine the effects a possible fertility decline in Nigeria could have on its dependency burden, defined as the total number of persons in the population divided by the number in the labor force ages (15 to 64), on the rate of growth of the labor force, and the rate of capital formation (and the output per worker in the economy). These influences will then be examined to determine the impact a slowed Nigerian population could have on the per capita incomes.

Design for Investigation

The model employed in this study was first developed by Sommers and Suits in 1971,[5] and was later revised and expanded by Suits and others in 1976,[6] to permit an explicit investigation of the impact of

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[4]George Stolnitz, "The Demographic Transition: From High to Low Birth and Death Rates," in *Population: The Vital Revolution*, ed. by Ronald Freedman (Chicago: Aldine, 1965), p. 30.

[5]Sommers and Suits, "Economic Growth," p. 121.

[6]Suits, Mardfin, Paitoonpong, and Yu, "Birth Control," pp. 93-94.

birth control programs. Although the equations in the two models were fitted to cross-sectional data, they could also be fitted to time-series data to permit one to draw some useful conclusions from the results. A justification comes from one source of conflicts in economic cross-section studies in the choice of data. Considerable variance exists between countries on a number of values such as economic, social, and cultural differentials. It would, therefore, seem that a more homogeneous sample of observations within a country could be a more propitious beginning for an interpretation of the relationship between fertility rates and economic variables.

This model basically utilizes the neoclassical growth theory where the growth of output in the economy is assumed to depend on both capital and labor inputs.

$$Q = f(K,L) \qquad (K,L > 0)$$

where Q is output, K is capital, and L is the labor force. If f(K,L) is homogeneous of degree one, then

$$Q = L\phi(K^*) \qquad \text{where } K^* = \frac{K}{L} .$$

Other assumptions are:

$$K \left(= \frac{dK}{dt} \right) = sQ \text{ [constant proportion of Q is invested]}$$

where the symbol s represents a constant marginal propensity to save, and

$$L = L_o e^{nt} \ (n > 0) \text{ [labor force grows exponentially].}$$

For instance, in the short run, a declining fertility tends to increase per capita income as the rate of consumption of the dependent population is reduced to permit increased savings and thus allow for increased capital formation. But in the long run, the labor force itself is assumed to grow at almost the same rate as the population, and especially after the 15-year lag when the last cohort of those born before the initiation of birth control programs must have entered the labor force. Further decline in fertility is not expected to adversely affect output in the face of high unemployment, since such an impact could be offset by the poor performance of the marginal productivity of labor in the country.

Figure 3, a simple one-sector growth model, presents the diagrammatic exposition underlining the above expectations. One proposition allows for the assumptions that production requires the use of two basic inputs, labor and capital, employed in a production function subject to constant returns to scale and diminishing marginal productivity of each factor, and that labor force grows at the rate (n) and savings equals investment--taken as a constant fraction of income. The abscissa of the graph represents capital per worker (K^*) and the ordinate represents output per worker (q). O-q graphs output per worker as a function of capital per worker and 'O-(sq) graphs per capita savings as a function of capital per worker. The line O-(nK^*), with slope n (the rate of population growth) graphs the investment required to provide the new additions to the labor force with the existing capital per head.

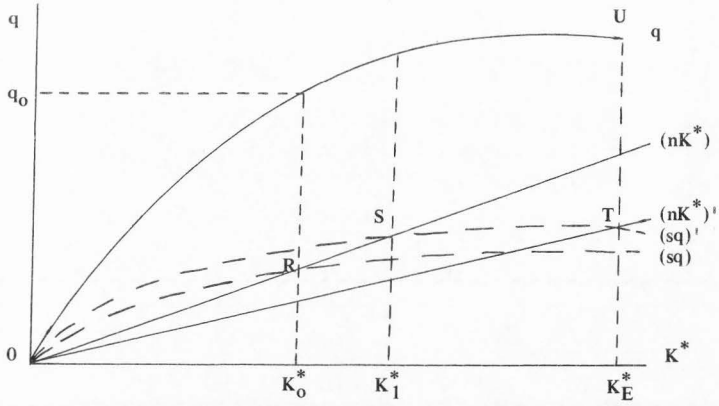

Figure 3. One-sector growth model diagram.

In the long run, other things being equal, the economy tends to converge on an equilibrium stock of capital per head and hence output per head, because to keep output per head constant, total output must grow at the same rate as the population (or labor force). In the diagram, such an equilibrium is indicated by the intersection of 0-(sq) and 0-(nK^*) at R where

$$n = s \cdot \frac{q}{K^*} ;$$

that is, the outgrowth rate equals the savings ratio divided by the capital-output ratio.

With the fertility decline, 0-(nK^*) tends to rotate downward to 0-$(nK^*)'$ since the investment required to equip the new workers with the same stock of capital per head will also be lower in that

circumstance, and subsequently, O-(sq) rotates to O-(sq)' to reflect the increased savings (consumption saved from reducing the dependent population). If these conditions prevail, the economy will eventually converge on a higher equilibrium capital stock per head and a higher output per head at T and U, respectively.

CHAPTER V

RESULTS AND DISCUSSION

After some experimentation with the data, a simple three-equation model of economic growth was finally adopted. These equations are represented as follows:

1. $GCF/GDP = F_1(GDP/N) + U_1$
2. $dN/N = F_2(GDP/N) + U_2$
3. $R = F_3(GCF/GDP, dN/N) + U_3$

Equation (1) expresses the fraction of GDP devoted to capital formation (GCF/GDP) as a function of the level of GDP per capita; equation (2) expresses the annual rate of population growth as a function of GDP per capita; and equation (3) expresses the rate of growth (R) of GDP per capita as a function of the investment ratio and the rate of population growth.

The equations were fitted to data published in the United Nations Yearbook of National Accounts 1975. The variables used and their units of measurement were:

GDP/N = gross domestic product per capita expressed in Nigerian Naira at constant 1962 prices.

GCF/GDP = percentage of GDP devoted to capital formation.

d/N = annual rate of population growth expressed as percent per year.

R = rate of growth in real GDP per capita, expressed as percent per year.

The final equations were:

1. $\ln(GCF/GDP) = 1.282 + 0.399 \underset{(.293)}{\ln(GDP/N)}$ $\quad R^2 = .73$

2. $\ln(dN/N) = 0.278 + 0.158 \ln(GDP/N)$ $\quad R^2 = .65$

3. $R = -3.182 \underset{10.979}{(GCF/GDP)} + 27.142 (dN/N)$

The Cochrane-Orcuit iterative technique was applied to the equations. This method provided the best fit since both autoregression and multicollinearity were found to be present in the model. However, these results obtained from this technique will obviously be subject to a simultaneous equation bias.

The positive coefficient on the income term in equation (1) indicates a tendency for the nation to invest more and a larger fraction of its GDP as its per capita income rises. Disappointingly, the income coefficient was not significant at the 0.05 level. On the other hand, in equation (2), the population growth was found to be positively correlated with the per capita income. This result was significant at the 0.05 level. A rise in the income levels must have been accompanied by a fall in mortality through the provision of better health measures, extended medical facilities, increased sanitation education, and growing urbanization in Nigeria. Figure 4 indicates graphically how the variations in population growth rates over the period 1950-75 are determined primarily by changes in the mortality rates. This is, however, in contradiction with the results of some cross-section studies where a negative relationship between population growth rate and per capita income is usually found. The inevitable difference between these statistics stems from the fact that results,

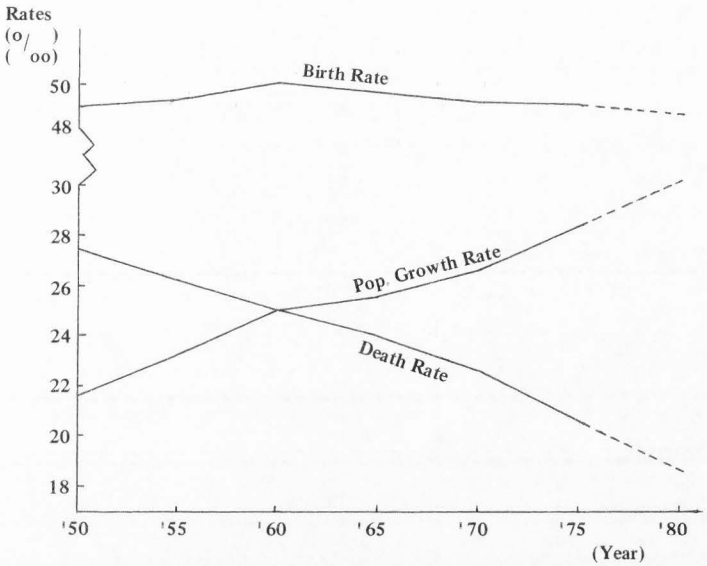

Figure 4. Nigeria: Trend in population growth rates.

obtained from combined samples of many countries, are often dominated by the behavior of the richer nations included in such samples. Equation (3) shows a negative relationship between the fraction of GDP invested and the growth rate of the per capita income. Surprisingly, the result is statistically significant at the 0.05 level. The positive coefficient of the population growth rate was caused by the fact that both population and per capita GDP growth rates were in fact increasing slightly during the sample period.

On the whole, although this little model produced results which were only fairly in general conformity to most of the expectations

about the growth process in Nigeria, its significance helps to show the basic interrelationship of the main or controlling elements in the economy. According to the model, economic growth rates declined with rising affluence. Although this is a reasonable finding, it is more likely that such a slowing would arise from population pressure and resource limitations rather than from the propensity to invest.

The shortcomings evident in the results are manifold:

1. The high standard errors of the coefficients in the above calculations could have resulted from relatively small dispersion of the explanatory variables in the sample, and probably coupled with substantial measurement errors in the data.

2. The data did not permit a distinction among different types of capital outlay. For instance, building and construction, transportation equipment, and machinery were given equal treatment despite the differences in their contribution to economic growth.

3. Some important growth factors were neglected entirely; no recognition was accorded investment in human capital in such forms as education and public health.

4. The period for which data were found (1960-1973) was badly affected by the civil disturbances in Nigeria.

However, it might be useful here to draw on a hypothetical simulation by some researchers[1] to further illustrate the trade-off between population growth and economic development. Two populations, each with 10 million people, $1 billion GNP, output per worker of

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[1]Suits, Mardfin, Paitoonpong, and Yu, "Birth Control," p. 103.

$312, rate of capital formation of 16 percent, and labor force ratio of 32 percent were assumed in year 0.

The birth and death rates in both societies were also assumed to be roughly 40 and 15 per 1,000, respectively. These populations were made to differ in that with a crude birth rate of 40 per thousand, one population has an additional 40,000 births; while in the other, a 10 percent decline in fertility resulted in averting approximately 40,000 of these births. The situation in these two societies as of one year is reproduced in Table 4. The first column gives results as were simulated in the absence of birth control and the other column shows the outcome from averting 40,000 births. The last column is the difference between the first two columns.

Table 4. Simulation of the effects of a birth control program: First year

	After one year with		Increase due to birth control
	No birth control	40,000 births averted	
Population	10,253,700	10,213,700	-40,000
Labor force	3,281,200	3,295,400	14,200
Output per worker (dollars)	319.2228	320.1402	.9147
GNP (millions of $)	1,047.43	1,055.00	7.57
Consumption (do)	881.31	879.05	-2.26
Investment (do)	166.12	175.95	9.83
Per capita (dollars)			
GNP	102.1514	103.2920	1.1406
Consumption	85.9504	86.0652	.1148
Investment	16.2010	17.2268	1.0258

Source: Daniel B. Suits, Ward Mardfin, Srawooth Paitoonpong, and Teh-Pei Yu, "Birth Control in an Econometric Simulation," *International Economic Review*, XVI (February, 1975), 103.

It could be observed that a prevention of 40,000 births, other things being equal, would mean a population smaller by that amount. Despite the smaller population, the labor force seems larger, primarily because the effect of reduced births is only noticeable in the long run. The increased productivity per worker was attributed to increased investment per capita. The combined effect of a larger labor force and increased productivity in the short run produced a sizeable gain in the GNP. The productivity gain is generated by the increase in gross capital formation which exceeds the rise in GNP in magnitude. This is also because reduced population invariably leads to lower consumption.

However viewed, it seems clear that a prevention of 40,000 births can give rise to substantial economic gain. At the minimum, the gain measured by the $7.5 million rise in GNP and spread over the 40,000 births yields an increase of about $188 per birth averted. A better measure used showed a gain of $12 million as the value due to the existence of a control program as a minimum estimate. This figure was arrived at by taking the per capita GNP of $102.15 obtained in the absence of birth control and multiplying it by 10,213,000 people found in the population where birth control was effected to arrive at a GNP of $1,043 million. The gain thus was the difference between this figure and the $1,055 million available.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary and Conclusions

Nigeria's high rate of population growth has long been accepted as a serious obstacle to a faster economic growth. Unfortunately, no program or a deliberate attempt has been made yet to reduce fertility. The First National Development Plan (1962-68) formally recognized the problem and stated thus:

> The population is increasing at a faster rate than the provision of new facilities. Health services, housing, schools, transport, and water are already inadequate. Despite major investments, the situation is liable to deteriorate further if the present rate of population increase continues.[1]

The Second Development Plan (1970-74) went a step forward to provide a framework for expanding and integrating family planning programs. Specifically, a Population Council was established to coordinate all population policy activities. The Plan described the situation as follows:

> Nigeria is going through a demographic transition phase of rising birth rate and declining death rate, leading to a potentially high rate of population growth. Available evidence suggests an estimated population growth rate of 2.5 percent per annum. Per capita income is, by world standard, still low. The youth dependency ratio is quite high and so is the rate of urbanization. Given the structure and techniques of production, a high proportion of the gainfully occupied population is concentrated in low-productive sectors of national economic activity. There is therefore, a high rate of urban unemployment

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[1]Federal Government of Nigeria, *First National Development Plan (1962-68)* (Lagos, Nigeria: F.M.E.D.R., 1962), p. 93.

> and disguised unemployment. All these factors combined, would have suggested stringent population control measures, but for her resource base and development potentials.
>
> The magnitude of the country's population is unlikely to be such that calls for extensive emergency action. Given the promising resource base of the economy, the country can, through careful planning, succeed in buying time to ward off undue population pressure. What seems appropriate in the present circumstances of Nigeria is for the government to encourage the citizens to develop a balanced view of opportunities for individual family planning on a voluntary basis, with a view to raising the quality of life of their offsprings.[2]

The thinking of the currently operative Third Development Plan (1975-80) is much the same as that of its immediate predecessor. The belief that actions to curb population growth could wait is both unnecessary and unfortunate. Definitely, rapid population growth places an economy at a disadvantage for a number of reasons. First, it retards capital formation. Directly productive capital must be expanded merely to provide for the population growth. Complicating the capital problem is the fact that a country with a rapidly growing population is further burdened in her development effort by the inability to save. Populations with heavy dependency burdens have their saving capacity reduced considerably, because children constitute a drain on income, as they are primarily consumers and produce very little. It could probably be argued that savings from petroleum exempt Nigeria from these conclusions, but such argument might overlook the fact that income growth could have been even greater had the rate of population growth been less.

Second, rapid population growth burdens development in that it interferes with human capital formation. Larger resource commitments

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[2]Federal Government of Nigeria, *Second National Development Plan (1970-74)* (Lagos, Nigeria: F.M.E.D.R., 1970), pp. 77-78.

are required to train a given proportion of the new labor force entrants. Evidence also shows that a rapidly growing population tends to produce a low skilled to unskilled ratio in the labor force.

Therefore, the impact of a reduction in the rate of population growth on the rate of growth of Nigeria's per capita income could be traced through three different paths:

1. The national income is shared by a smaller population.

2. The accumulation of capital. Capital is assumed to increase because a reduction in fertility enables a country to save from the income which otherwise would have been consumed.

3. The growth of the labor force. The reduction of the rate of growth of the labor force, in the long run, is desirable in Nigeria where there is "surplus unskilled labor" and high unemployment.

The cost elements which might be involved in effecting any fertility decline are not much of a problem. Zaidan, for instance, observed that the resources which may be required to achieve a desired increase in living standards are many times lower if they are used to reduce fertility than in any alternative investment.[3] A lot of existing evidence also seems to indicate that the costs usually incurred in any population control program are only a small proportion of the total expenditures on development (roughly a maximum of 3 percent).

Although insufficient data had tended to limit the scope of this study in its form, the analysis has been helpful in demonstrating

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[3]George C. Zaidan, "Population Growth and Economic Development," *Studies in Family Planning*, XLII (May, 1969), 1.

the important role of demographic factors in economic growth of Nigeria. This study also tried to underscore the great pay-off available from investments in birth control in absolute terms.

Recommendations

The simple case against rapid population growth in a country like Nigeria is that it absorbs large amounts of resources which otherwise could be used for development. Indeed, if all the resources released by a slowing down of population growth were to be adequately utilized, such a program holds out the prospects of accelerating economic growth.

There are a few alternative courses of action Nigeria could take to achieve a reduction in her population growth rate. These alternatives are:

1. Nigeria could continue with its present policy of making no special efforts to limit its population and depend upon those natural, economic, psychological, and sociological processes to achieve acceptable levels of fertility.

2. It could also emphasize those programs within the economic development mix thought to reduce fertility, such as urbanization, industrialization, secularization, or even education.

3. An important alternative is to carry out programs of information about family planning in conjunction with the provision of free and inexpensive medical services.

4. A possible approach could be for the country to engage in aggressive propaganda to persuade people to have smaller families.

Or better still, to make incentive payments to families that avoid births.

These alternatives are, however, not intended to be mutually exclusive. In fact, they could be undertaken separately or in some combination. Specifically, alternative (2) may provide a structure for (3) and (4). Current policies in Nigeria hinge on alternative (1) and partly on (2). In order to reap immediate benefits, the country needs a decisive policy on population to allow for alternative (3) or (4) to be implemented.

However, it is important to stress that control of the population growth alone will not guarantee Nigeria's economic development. Nigeria can and probably will continue to grow despite its rapid population growth. A reduced population growth will only provide the country with a unique opportunity to accelerate her economic development. Economic planners, by failing to direct attention to this area, are ignoring an area which has a potential to make substantial contributions to economic progress.

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APPENDICES

Table 5. Gross domestic product at constant 1974 prices

Sector	₦ million[a]				
	1970	1971	1972	1973	1974
Agriculture, etc.	3,399.7	3,575.3	3,351.8	3,246.5	3,372.7
Mining and quarrying	3,127.9	4,392.7	5,202.9	5,927.6	6,552.3
Manufacturing and crafts	475.1	460.3	570.1	626.5	683.9
Electricity and water	29.6	35.7	42.4	52.0	58.7
Building and construction	326.0	460.2	567.1	710.8	821.4
Distribution	854.5	907.1	882.5	910.6	971.2
Transport and communications	172.0	209.5	257.6	278.2	325.0
General government	594.6	614.9	551.4	764.3	901.8
Education	257.5	296.2	302.2	312.5	376.4
Health	71.7	74.1	92.2	109.8	132.0
Other services	133.5	151.9	172.9	196.7	215.3
GDP at factor cost	9,442.1	11,177.9	11,993.1	13,135.5	14,410.7
Growth rate	--	18.4%	7.3%	9.5%	9.7%

[a] ₦ represents Nigerian Naira (equivalent to about $1.58).

Source: Federal Republic of Nigeria, *Third National Development Plan (1975-80)* (Lagos, Nigeria: Federal Ministry of Economic Development, The Central Planning Office, 1975), p. 21.

Table 6. Gross domestic expenditures at current prices

Item	₦ million[a]					
	1974	1975	1976	1977	1978	1979
Private final consumption expenditure	6,335.4	7,169.7	8,182.3	9,941.6	12,298.6	15,319.6
Government: Final consumption expenditure	1,472.7	1,803.7	2,364.4	2,780.2	3,182.6	3,769.7
Gross fixed capital formation						
(a) Public	(1,600)	(2,340)	(3,015)	(3,815)	(4,810)	(6,020)
(b) Private	(1,000)	(1,200)	(1,450)	(1,850)	(2,440)	(3,060)
Exports of goods and non-factor services	6,837.2	7,558.2	8,368.6	9,144.1	10,110.1	11,159.8
Less imports of goods and non-factor services	2,256.1	3,056.8	3,965.3	5,080.0	6,635.0	8,467.1
Gross domestic product at market prices	14,989.2	17,014.8	19,415.0	22,450.0	26,206.3	30,862.0

[a]₦ represents Nigerian Naira (equivalent to about $1.58).
Source: Federal Republic of Nigeria, *Third National Development Plan (1975-80)* (Lagos, Nigeria: Federal Ministry of Economic Development, The Central Planning Office, 1975), p. 52.

Table 7. Growth rates of the GDP at constant 1974 prices

Sector	Percent			
	1971	1972	1973	1974
Agriculture	5.2	-6.3	-3.2	3.9
Mining and quarrying	40.4	18.4	13.9	10.5
Manufacturing and crafts	3.1	23.9	9.9	9.2
Electricity and water	20.6	18.8	22.6	12.9
Building and construction	41.2	23.2	25.3	15.6
Distribution	6.2	-2.7	3.2	6.7
Transport and communications	21.8	23.0	8.0	16.8
General government	3.4	-10.3	38.6	18.0
Education	15.0	2.0	3.4	20.4
Health	3.3	24.4	19.1	20.2
Other services	13.8	13.8	13.7	9.4
Aggregate annual growth rate	18.4	7.3	9.5	9.7

Source: Federal Republic of Nigeria, *Third National Development Plan (1975-80)* (Lagos, Nigeria: Federal Ministry of Economic Development, The Central Planning Office, 1975), p. 22.

Table 8. Gross fixed capital formation by type of asset (current prices)

Item	1974	% Share	1975	% Share	1976	% Share
Building and construction	2,056.1	79.1	2,799.5	79.1	3,520.7	78.9
Transport equipment	176.6	6.8	240.7	6.8	321.5	7.2
Machinery	346.3	13.3	471.5	13.3	593.8	13.3
Land improvement	21.0	0.8	28.3	0.8	29.0	0.6
Total	2,600.0	100.0	3,540.0	100.0	4,465.0	100.0

Source: Federal Republic of Nigeria, *Third National Development Plan (1975-80)* (Lagos, Nigeria: Federal Ministry of Economic Development, The Central Planning Office, 1975), p. 54.

Table 9. Public sector capital programs: 1975

Sector	₦ million[a]		
	Federal government	Total all states	Total all governments
Economic	3,149.645	604.658	3,754.303
Social	388.629	217.923	606.552
Regional development	243.155	195.435	438.590
Administration	493.534	68.343	561.877
Total	4,274.963	1,086.359	5,361.322

[a]₦ represents Nigerian Naira (equivalent to about $1.58).
Source: Federal Republic of Nigeria, *Third National Development Plan (1975-80)* (Lagos, Nigeria: Federal Ministry of Economic Development, The Central Planning Office, 1975), p. 22.

Table 10. Population and labor force estimates and projections by sex, 1960-85

Year	Population (in thousands)			Labor force (in thousands)		
	Male	Female	Total	Male	Female	Total
1960	21,685	21,262	42,947	11,249	7,273	18,523
1965	24,579	24,097	48,676	12,500	7,951	20,451
1970	27,686	27,387	55,073	13,803	8,731	22,534
1975	31,577	31,445	63,022	15,242	9,652	24,895
1980	36,381	36,403	72,784	16,905	10,702	27,607
1885	42,269	42,432	84,701	18,988	11,986	30,974
	Annual rate of increase (%)					
1960-65	2.5	2.5	2.6	2.1	1.8	2.0
1965-70	2.4	2.6	2.5	2.0	1.9	2.0
1970-75	2.7	2.9	2.6	2.0	2.0	2.0
1975-80	2.9	3.0	2.9	2.1	2.1	2.1
1980-85	3.0	3.1	3.1	2.4	2.3	2.3

Source: International Labor Office, *Labor Force Projections*, Part II (Geneva, Switzerland: International Labor Office, 1971).

Table 11. Nigeria: Selected demographic indicators (1960-2000)

Year	Total population (in thousands)	Population ages to total (%)		Vital rates (per thousand)	
		0-14	15-64	Crude birth	Crude death
1960	42,947.0	44.8	54.1	50.5	26.2
1965	48,676.0	44.8	54.0	50.0	25.0
1970	55,073.0	44.8	52.9	49.6	24.2
1975	62,925.0	45.1	52.6	49.3	22.7
1980	72,596.0	45.5	52.1	49.2	21.1
1985	84,400.0	46.1	51.4	48.9	18.8
1990	98,497.0	46.5	50.9	47.7	16.9
1995	115,258.0	46.6	50.7	46.4	15.1
2000	134,924.0	46.3	50.9	44.8	13.4

Source: U.N. Working Paper Number 55, p. 55.

Table 12. Relative structure of manufacturing by value added and employment

	1965 (%)		1971 (%)		1972 (%)	
	Value added	Employ-ment	Value added	Employ-ment	Value added	Employ-ment
Food and animal products	12.9	11.6	10.1	14.0	10.5	15.7
Liquor and drinks	15.9	4.0	15.0	3.0	13.1	3.3
Tobacco	n.a.	n.a.	9.7	2.9	8.7	2.5
Textiles	12.3	17.7	16.0	21.5	16.5	24.0
Leather goods	2.3	3.0	1.5	3.1	0.8	2.4
Woods and wood products	3.8	10.6	2.7	10.6	3.3	8.9
Paper and printing	3.8	7.5	3.4	7.4	4.0	7.9
Chemical products	12.3	6.5	14.6	9.5	14.3	10.4
Minerals	n.a.	n.a.	8.3	0.3	9.4	0.3
Rubber products	2.3	1.8	2.8	4.1	2.4	1.8
Hardwares	12.0	14.6	12.9	18.6	15.1	18.3
Machinery, equipment, and appliances	2.5	2.0	1.4	2.1	1.4	1.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Federal Republic of Nigeria, *Third National Development Plan (1975-80)* (Lagos, Nigeria: Federal Ministry of Economic Development, The Central Planning Office, 1975), p. 148.

Appendix B

```
LINE     0                    ** ECONOMETRIC SOFTWARE PACKAGE*UCSD VERSION OF 12/72 **
                                  THIS JOB WAS RUN AT 1259 HOURS ON 04/11/77

                                        PROGRAM
                 ***********************************************************************
LINE

  1              LOAD$
  2              GENR LR = LOG (RATIO)$
  3              GENR LI = LOG (INKOME)$
  4              GENR LN = LOG (DN)$
  5              GENR KAPITA = (GKF/N)$
  6              SMPL 1 14$
  7              CORC LR C LI$
  8              CORC LN C LI$
  9              CORC RT RATIO DN$
 10              END $
```

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** ECONOMETRIC SOFTWARE PACKAGE*UCSD VERSION OF 12/72 **

THIS JOB WAS RUN AT 1259 HOURS ON 04/11/77


                    EXECUTION

*******************************************************************************

LINE   1
   LOAD
SMPL 1 14$

SMPL VECTOR
     1    14
LOAD INKOME$
57.96 56.51 57.39 60.92 62.01 64.65 60.95 50.20 48.44 59.96 76.61 83.25 84.05 88
.31$
   INKOME
LOAD RATIO$
11.92 13.08 12.32 13.75 14.00 18.59 18.06 17.96 15.92 14.44 16.35 20.24 23.30 24
.37$
   RATIO
LOAD DN$
2.5 2.5 2.5 2.5 2.5 2.5 2.4 2.5 2.5 2.5 2.6 2.6 2.7 2.8$
   DN
LOAD RT$
-2.4 1.6 6.1 1.7 4.1 -5.6 -17.6 -3.5 23.7 27.5 8.8 1.0 5.1 6.0$
   RT
LOAD GKF$
296.6 326.0 319.8 388.6 412.6 585.0 550.0 462.0 405.0 465.6 689.9 954.4 1140.2
1286.7$
   GKF
LOAD GDP$
2489.0 2491.5 2596.1 2825.6 2947.1 3146.8 3044.8 2572.2 2543.8 3225.5 4219.0
4715.5 4892.8 5279.8$
   GDP
LOAD R$
0.1 4.2 8.8 4.3 6.8 -3.2 -15.5 -1.1 26.8 30.8 11.8 3.8 7.9 9.5$
   R
LOAD UBR$
50.4 50.3 50.2 50.1 50.0 49.92 49.84 49.76 49.68 49.60 49.54 49.48 49.42 49.36 $
LOAD UDR$
   UBR
25.96 25.72 25.48 25.24 25.0 24.8 24.6 24.4 24.2 24.0 23.73 23.48 23.22 22.96 $
   UDR
LOAD N$
42.947 44.093 45.239 46.384 47.530 48.676 49.955 51.235 52.514 53.794 55.073 56.
643 58.214 59.784$
   N
LOAD NI$
24.44 24.58 24.72 24.86 25.00 25.12 25.24 25.36 25.48 25.60 25.81 26.00 26.20 26.40$
```

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** ECONOMETRIC SOFTWARE PACKAGE*UCSD VERSION OF 12/72 **

THIS JOB WAS RUN AT 1259 HOURS ON 04/11/77


EQUATION  1
***********

SMPL VECTOR
     1    14

COCHRANE-ORCUTT ITERATIVE TECHNIQUE

VARIABLES...

   LR
   C
   LI
                    ITERATION                RHO
                    *********                ***

                          1              0.68469

                          2              0.71637

                          3              0.73318

                          4              0.74309

                          5              0.74929

                          6              0.75331

FINAL VALUE OF RHO =          0.75331
NO. OF ITERATIONS =          6

      INDEPENDENT          ESTIMATED              STANDARD                T-
        VARIABLE           COEFFICIENT            ERROR                 STATISTIC

       C                        .128227E+01            .125886E+01            .101860E+01

       LI                       .398688E+00            .293707E+00            .135743E+01

R-SQUARED =  0.7281

F-STATISTIC(  1, 11) =          .294540E+02

DURBIN-WATSON STATISTIC (ADJ. FOR  0 GAPS) =  1.6608

NUMBER OF OBSERVATIONS =   13

SUM OF SQUARED RESIDUALS =          .151880E+00

STANDARD ERROR OF THE REGRESSION =          .117504E+00

ESTIMATE OF VARIANCE-COVARIANCE MATRIX OF ESTIMATED COEFFICIENTS

   .158E+01  -.368E+00
  -.368E+00   .863E-01

LINE   8
   CORC
```

** ECONOMETRIC SOFTWARE PACKAGE*UCSD VERSION OF 12/72 **

THIS JOB WAS RUN AT 1259 HOURS ON 04/11/77

EQUATION 2
****

SMPL VECTOR
1 14

COCHRANE-ORCUTT ITERATIVE TECHNIQUE

VARIABLES...

LN
C
LI

ITERATION	RHO
*********	***
1	0,23438
2	0,24049
3	0,24211

FINAL VALUE OF RHO = 0,24211
NO, OF ITERATIONS = 3

INDEPENDENT VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	T= STATISTIC
C	,278242E+00	,185070E+00	,150344E+01
LI	,157624E+00	,442574E-01	,356156E+01

R-SQUARED = 0,6513

F-STATISTIC(1, 11) = ,205442E+02

DURBIN-WATSON STATISTIC (ADJ, FOR 0 GAPS) = 1,5909

NUMBER OF OBSERVATIONS = 13

SUM OF SQUARED RESIDUALS = ,680479E-02

STANDARD ERROR OF THE REGRESSION = ,248720E-01

ESTIMATE OF VARIANCE-COVARIANCE MATRIX OF ESTIMATED COEFFICIENTS

,343E-01 -,818E-02
-,818E-02 ,196E-02

LINE 9
CORC

```
** ECONOMETRIC SOFTWARE PACKAGE*UCSD VERSION OF 12/72 **

THIS JOB WAS RUN AT 1259 HOURS ON 04/11/77


EQUATION  3
***********

SMPL VECTOR
     1    14

COCHRANE-ORCUTT ITERATIVE TECHNIQUE

VARIABLES...

   RT
   RATIO
   DN
                        ITERATION                  RHO
                        *********                  ***

                                1              0.62123

                                2              0.67614

                                3              0.70590

                                4              0.72371

                                5              0.73507

                                6              0.74265

                                7              0.74784

                                8              0.75147


FINAL VALUE OF RHO =          0.75147
NO. OF ITERATIONS =          8

      INDEPENDENT            ESTIMATED              STANDARD                T-
        VARIABLE             COEFFICIENT            ERROR                 STATISTIC

       RATIO                    -.318209E+01            .133849E+01            -.237738E+01

       DN                        .271422E+02            .109787E+02             .247227E+01

R-SQUARED =  0.4473

F-STATISTIC(  1, 11) =          .890188E+01

DURBIN--ATSON STATISTIC (ADJ. FOR  0 GAPS) =  1.8303

NUMBER OF OBSERVATIONS =   13

SUM OF SQUARED RESIDUALS =          .886753E+03

STANDARD ERROR OF THE REGRESSION =          .897852E+01

ESTIMATE OF VARIANCE-COVARIANCE MATRIX OF ESTIMATED COEFFICIENTS

   .179E+01  -.138E+02
  -.138E+02   .121E+03

LINE  10
   END
```

VITA

Richard A. Eniang

Candidate for the Degree of

Master of Science

Thesis: The Consequences of Rapid Population Growth on Nigeria's Economic Development: A Simple Econometric Analysis

Major Field: Economics

Biographical Information:

Personal Data: Born at Itu, Nigeria, August 25, 1947; son of Asuquo and Bassey Eniang; married Stella Thomas May 26, 1974; one child--Charles.

Education: Attended elementary school in Calabar, Nigeria; graduated from Hope Waddell Training Institute, Calabar, Nigeria, in 1964; received the Bachelor of Science degree from the University of Ife, Nigeria, in 1971; completed requirements for the Master of Science degree, specializing in economic development, at Utah State University in 1977.

Professional Experience: 1971 to 1975, agricultural economist, Federal Government of Nigeria.