ABSORPTIVE CAPACITY AND GROWTH RATES IN NIGERIA, 1961-1976

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LIST OF VARIABLES

All variables marked with an asterisk are exogenous.

Yp = Gross domestic product at factor cost

Yn = Gross National Product at factor cost

Y = Full employment output

Yd = Disposable Income

Ypd = Personal disposable income

C = Aggregate consumption

Cp = Private consumption

Cg = Public consumption

TI = Aggregate investment

TE* = Total exports

Ip = Private investment

Ig = Public investment

K* = Capital stock

M = Total imports

Mc = Imports of consumer goods

Mk = Imports of capital goods

OR = Oil revenues

OX* = Oil exports

t* = Time in years measured from 1961=1

CPI = Price index, 1975=100

U = Error term

B = Coefficients of variables

T* = Total taxes

TIN* = Indirect taxes

Tr = Net transfers

TD* = Direct taxes

Gin* = Government income from property and extrepreneurship

Gth* = Government transfers to households and private non-profit institutions from abroad.

Ga = Actual growth rate of GNP

Yn_{t-1} = Lagged gross national product

s = Potential savings rate

S = Savings level

Δ = Change, say in capital stock, ie, ΔK

Gp = Potential growth rate = $\frac{s}{g}$

g = potential incremental Capital - Output Ratio, ICOR

Gd = Difference between actual and potential growth rates

I_{t-1} = Lagged gross investment or capital stock

UG = University graduate output

UGLA = Lagged university graduate output

MSS = Manpower in social sciences

MET = Manpower in engineering and technology

MANSM = Manpower in agriculture, natural science and medicine

MAHE = Manpower in arts, humanities and education

MNS = A combination of MET and MANSM

IKC = Infrastructure (1) - transport, storage and communications

IKCLA = Lag of IKC

IKW = Infrastructure (2) - roads and waterways.

IKWLA = Lag of IKW

IKA = Infrastructure (1) and (2) - in terms of flow of capital investment

IKALA = Lag of IKA

HEA = Flow of capital expenditure for health

HEALA = Lag of HEA

HEC = Flow of capital expenditure for higher education

HECLA = Lag of HEC

DIS = Flow of capital expenditure for defense and internal security

DISLA = Lag of DIS

AG = Flow of capital expenditure for agriculture

AGLA = Lag of AG

CMPT = Change in total imports

CMPTLA = Lag of CMPT

CXPT = Change in total exports

CXPTLA = Lag of CXPT.

DV = Dummy Variable associated with political stability

FEXC = Foreign Exchange

CHAPTER I

INTRODUCTION

Economic growth of most Less Developed Countries (LDCs) is often constrained by lack of capital and labor skills. Low productivity in these countries leads to low income which leads to low savings, low investment, and capital deficiency. Some bottlenecks common in LDCs are related to capital formation while others have to do with organizational, entrepreneurial and administrative skills/talents of the native population. The problems of capital formation and productivity in developing countries are, no doubt, brought about by shortages of foreign exchange, skilled labor force, entrepreneurial skills, and savings. The importance of savings, in particular, can hardly be over-emphasized as without savings capital cannot be increased. Recognizing this importance, Snyder (60) states that savings is a major factor in the process of economic development, directly by its diversion of resources into the formation of capital and indirectly through changes in technology which are implemented when new capital is put to use.

Population pressures constitute another major threat to the rapid economic growth of many developing economies. A sharp population increase can absorb all increments to output and create shortages of foreign exchange due to the demand for imports of essential food items

to supplement local production. To the extent that domestic consumption competes with exports, shortage of foreign exchange will be exacerbated. Since in many LDCs most capital goods are imported, growth of output is likely to be constrained by this shortage of foreign exchange.

The growth-limiting factors or impediments briefly cited above are not the same for all less developed countries. Some countries having oil as their economic base increasingly experience surplus rather than insufficient money capital. These countries (mainly those in the Organization of Petroleum Exporting Countries, OPEC) have tremendous inflow of oil revenues to spend for their different development programs, and yet they (the OPEC countries) have not achieved satisfactory rates of growth. Putting it differently, it could be said that growth is restricted by the inability of these economies to absorb oil revenues into productive investment. The total surplus enjoyed by OPEC countries on their current account in 1974 was $65 billion while the deficit endured by the Organization for Economic Corporation and Development nations (OECD nations) was approximately $32 billion (7). It holds, therefore, that an increase in the OPEC surpluses would mean an equal increase in the deficits of all oil consuming nations especially the OECD nations which consume a lot of oil. In view of the sharp increases in the price of oil since 1973 coupled with the high demand for its use, projections for cumulative OPEC surpluses are not uncommon. Enders (15) projects that the cumulative OPEC surplus in the late 1970s and early 1980s will peak at $200 to $250 billion in 1974 dollars. While financial capital may be necessary to achieve high rates of growth, it is not sufficient due to

limited or insufficient absorptive capacity.

Absorptive capacity may be viewed in different ways. Some economists simply define absorptive capacity in terms of the productivity of capital investment. These economists believe that if, on the average, the investments in the economy are productive such an economy will have high absorptive capacity. The question often asked is what measures or determines productivity of capital investment? Rate of return is usually given as the common answer to this question. It, therefore, follows that a high rate of return on most capital investments is an indicator of high absorptive capacity, whereas the reverse will occur in the case of a low rate of return. It is important to realize that lack of financial capital is not as such the problem of absorptive capacity, but the productivity of any capital investment. If financial capital investment for any economy is scarce for reasons of low savings and inadequate foreign exchange, foreign aid in the form of financial capital can be obtained and used. For surplus funds developing economies, financial capital is not a constraint. Whether or not a surplus funds economy, the productivity of financial capital investment is a problem of absorptive capacity.

Since the level of absorptive capacity depends on investment productivity, there is an indirect causal connection between capital investment and the flow of income (Gross National Product, GNP). In support of this indirect causal relationship, Alder (2) argues that as more productive investments are achieved, more capital likewise savings will be formed, and this will lead to greater output and its growth. The analysis made by Alder simply means that if investment is productive, output is bound to increase. Therefore, absorptive

capacity based on indirect relationship between capital investment and GNP, rather than on direct one between capital investment and expected rate of return, focuses on output and its growth. To associate absorptive capacity with the national output attained at a given point in time is, therefore, quite in order. It is important to note that the attained output may not be the desired, indicating that investments in the economy have not been very productive. A country whose output is below the desired level is often categorized as having limited absorptive capacity. With the concept of output implied, the terms "supply and demand" underlie the meaning of absorptive capacity.

Growth-determining absorptive capacity is the main thrust of this study. By growth-determining, it is meant that the emphasis is on the output approach to absorptive capacity. In this approach, both the actual and potential (desired) growth rates of national output will be determined, and the divergence between the two growth rates will be functionally related to growth-limiting factors. What distinguishes growth-determining from investment-determined absorptive capacity is that in the case of the latter, partial consideration is given to absorptive capacity as only the magnitude of physical investment and its individual productivity in selected projects is examined. In the growth-determining approach, the economy as a whole is considered. This means that all the components of aggregate demand, not necessarily the investment component alone, must be taken into account. The concept of total absorptive capacity is more implicit in output or growth-determining than in investment-determined approach. Also, growth-determining absorptive capacity recognizes that in order to overcome limited absorptive capacity, the constraints complementary

to capital must be relaxed. Manpower, work force with appropriate skills, infrastructure are among the major constraints complementary to capital.

Statement of the Problem

The concept of capital as the primary constraint on economic growth has been given a good deal of attention in the literature. To some developing countries with insufficient domestic saving, foreign aid is recommended. An important question is whether or not foreign assistance can be regarded as a substitute for sustained productivity and growth? Opinions have been mixed as to the answer to this question. Notable among those expressing positive views is Fei (21) who believes that outside help could be used to accelerate the rate of growth and overcome limited absorptive capacity. Other economists such as Mikesell (37) express some doubts. He recommends using foreign assistance only as a supplement or a catalyst (not as a substitute) to domestic investment and productivity. It is clear at this point that the application of external aid to countries with very low savings and hence domestic investment will not help significantly to improve productivity because of insufficient absorptive capacity. This situation is not only true for abjectly poor countries. Others like the OPEC countries with surplus oil funds now provide a good illustration of the distinction often drawn by development economists between capital accumulation[1] and capital

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[1]Capital Accumulation: An example of this is in the case of oil whose demand by industrialized nations has ever been increasing, causing its price to increase dramatically, likewise revenue. Capital is therefore domestically accumulated as huge funds from oil sales are derived and are often in excess of immediate investment needs.

formation. Over two decades ago capital accumulation was considered as almost the only prerequisite for capital formation (34). For most oil based economies this is no longer the case. A few studies have shown that these economies confront some difficulties in absorbing small or moderate volumes of capital over the period of a few years, especially if the capital is domestically accumulated[2](34). Less developed countries depending on foreign aid for investment share the same difficulty as larger doses of foreign aid may not produce appreciably higher rates of growth.

The investigation so far suggests that before accumulated capital or foreign aid can work to improve any developing country's productivity, the economy must be supported by a wide resource base, wide and effective internal and external markets, and wide structure and effective direct linkages. This type of economy requires skilled labor, good health and housing, good general education, and always, stable political atmosphere.

Like many other oil-based economies Nigeria would appear to suffer from capital absorption problems which directly affect the growth of output. Nigeria has four possible options to overcome these problems and ensure maximum economic growth. They are (1) improvement of infrastructure, including ports -- a way to enable the economy to move from essentially agrarian to market economy, (2) improvement in agriculture and farming methods, (3) improvement and increase in manpower quality and quantity including increasing literacy rate, and (4) improvement in health care and housing.

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[2]Ibid.

As mentioned earlier, oil accounted for over 80 percent of Nigeria's total exports in the 1970s. Because of the country's apparent concentration on oil industry and oil exports, one might be tempted to describe Nigeria as a single-export based economy. Such a description would be wrong. In fact before 1965, oil and other minerals accounted for less than 25 percent of Nigeria's total exports, whereas agricultural commodities such as cocoa, groundnut (peanut), rice, palm kernel, palm oil, cotton, rubber, hides, and skin, timber and plywood accounted for the balance. In short, it would be correct to describe Nigeria, positioned on the West Coast of Africa with a population of 80 million people (1973 Provisional Census Figures), as a predominantly agricultural country. Therefore, the failure of the Nigerian planners to come up with sound policies aimed at increasing agricultural production for both export and domestic consumption has been branded by some economists as gross government negligence (54). Others, however, hold the opinion that this neglect may somehow be justified because today's international oil market is a seller's market. If alternatives or substitutes for oil are found to command much lower prices than the prevailing prices of oil fixed by the OPEC countries their power to fix the price will be weakened (54). Since no such alternative at a lower price has yet been found, those supporting this latter argument think it reasonable for Nigeria to take advantage of the high price of oil. selling more oil now to insure increased revenue for use in the improvement of non-oil sectors in the future. Essentially this policy is tantamount to maximizing the present value of net benefits derived from oil sales by way of sectoral diversification to broaden the whole economic base of Nigeria.

However, in view of Nigeria's limited absorptive capacity neither of these strategies will result in desired rate of economic growth. The only remedy to quarantee a broad export outlook as well as sufficiently high growth of output for the country is to move aggressively to eliminate constraints to absorptive capacity.

Purpose and Nature of the Study

The main purpose of the study is to assess Nigeria's total absorptive capacity by investigating what factors contribute to the divergence between actual and potential growth rates of national output during the period, 1961-76.

Because a number of economists define absorptive capacity basically as the limit of productive investment to be determined, a few studies done in oil-based economies, such as those by El-Jehaimi (14), 1975, and Mallakh and Kadhim (34), 1977, concentrate on determining alternative investment policies, using in most cases, simulation models. This study differs in that it looks at absorptive capacity in terms of rates of growth of output. To be able to assess growth-determining absorptive capacity, knowledge of a country's economy is necessary. This study starts by examining the Nigerian economy with a view to (1) developing a macroeconometric model which will be used to project the growth of output up to 1983, and (2) identifying growth-limiting factors or bottlenecks in the economy. Efforts are made to quantify these bottlenecks. Growth-determining absorptive capacity is then modeled to enable the determination of actual and potential rates of growth. The divergence of actual from potential growth rates is related functionally to the quantified

growth-limiting factors. This model draws from the works of Chenery and Strout (10), and Alder (2) whose definition of absorptive capacity is in terms of limiting factors or impediments to growth.

Organization of the Study

The study is organized into six chapters. Chapter II reviews literature on absorptive capacity and growth rates. Growth-determining absorptive capacity is assumed to be the main focus of the study. Methods of measuring absorptive capacity are also examined in this chapter.

Chapter III takes a careful look at the Nigerian economy. Sectoral performance and government development policies are examined. Also examined are factors limiting growth of output. A macro model of the economy is developed for the purpose of projecting the growth of output up to 1983.

A model of growth-determining absorptive capacity is developed in Chapter IV. The research design in this chapter involves the description of the sources of data, the research hypotheses, and the recognition of the problems and limitations inherent in the study.

Chapter V discusses the findings of the study based on the model presented in Chapter IV.

A restatement of the research objectives and a brief summary of the major findings are provided in Chapter VI. Policy recommendations and conclusion are also provided in this chapter.

CHAPTER II

ABSORPTIVE CAPACITY AND ECONOMIC GROWTH

Introduction

This chapter discusses literature on absorptive capacity and economic growth. Growth-determining absorptive capacity is assumed to be the main focus of this study. Methods of measuring absorptive capacity are examined, and a choice made for measuring growth-determining absorptive capacity. In addition to evaluating the classical concept of absorptive capacity as it relates to developing countries with surplus funds, this chapter also examines potential constraints to growth of output.

Discussion of Absorptive Capacity

Absorptive capacity is a term often used in connection with discussions relating to economic development and foreign aid. The economic survival of less developed countries after the Second World War was believed by most economists to depend heavily on foreign aid (capital and technical assistance). Before extending any foreign aid, donor institutions or countries would conduct economic studies of the developing countries likely to benefit from such aid. The studies conducted by the World Bank between 1948 and 1949, for instance, admitted the existence of bottlenecks or limited absorptive capacity

in most underdeveloped economies. The Bank observed that such economies would hardly be in a position to absorb capital quickly for productive purposes, and suggested ways to reduce limited absorptive capacity. In addition to financial capital the Bank prescribed investing in human capital to build a skilled labor force and well planned and prepared projects (62).

Hirschman (28), one of the earliest users of the term defined absorptive capacity simply as the "ability to invest." The term, ability to invest, differs in meaning between developed and developing economies. When this term is used in developed countries, the focus is on what are in effect the two terminal points of savings - investment process, since it is taken for granted that investment will automatically take place provided savings and investment opportunities are available. In LDCs, this is not the case because the factors limiting growth are connected, not with the two terminal points themselves, but with the difficulties of connecting them. These difficulties, commonly referred to as "ability to invest," are due to lack of right attitude and shortage of abilities and skills needed to make and carry out investment decisions.

Like Hirschman, Meier (36) and Rosenstein-Rodan (55) define absorptive capacity as the limit of efficient investment physically possible in the short-run. Absorptive capacity depends on a number of factors. Among those factors listed by Meier are natural resources, taxes, technical and managerial skills, entrepreneurial capacity, the efficiency of public administration, the extent of "technology-mindedness" of the population, and so on. If these factors are insufficient, he argues the absorptive capacity is likely to be low

resulting, of course, in a low rate of investment.

Looking at absorptive capacity in terms of production maximization through time, Horvat (29, p. 748) defines it as the potential effect of the optimum adjustment of growth rates of factors. In support of this definition, he argues that in any production maximization situation, the focus is not only the allocation of factors of production, but also the adjustment of their various rates of expansion in the future. Conceiving an economy as a giant unit of productive capacity capable of being expanded, he argues that absorptive capacity can be increased by investment. Horvat's definition differs from Hirschman's "ability to invest " definition of absorptive capacity in that in Hirschman's, emphasis is on development of skills and right attitude as a means to improve absorptive capacity.

For better understanding of the concept of absorptive capacity, the definition advanced by Alder (2) in his insightful work on this topic cannot be ignored. Guided by the understanding that absorptive capacity means different things to different people who may also have in mind different concepts of productivity and different time spans, Alder refers to absorptive capacity as the total amount of capital, or the amount of foreign capital (capital and technical assistance) that a developing country can use productively. With this reference in mind, he goes on to define absorptive capacity specifically as:

> that amount of investment, or the rate of gross domestic investment, expressed as a proportion of Gross National Product (GNP), that can be made at an acceptable rate of return, with the supply of 'co-operant factors' considered as given (p. 5).

The terms acceptable rate of return[1] and co-operant factors[2] are defined in the footnote. By graphically relating capital investment with expected rate of return, Alder demonstrates that the expected rate of return curves for developed and less developed nations are not the same.

In Figure 1, the expected rate of return curve or the marginal efficiency of capital (MEC) curve for developed countries is D, because it is believed that the rate of return on existing capital is usually high, and hence the return rate for additional capital would as well be high. For less developed countries, the rate of return curve is L, suggesting that at any given level of investment the return will be lower in LDCs. At a given level of capital investment, k_1 the expected rates of return are R_D and R_L for developed and less developed countries respectively. The rate of return on capital is much higher in developed economies because of the absence of constraints to capital productivity.

Except for the fact that the two MEC curves intersect at point B, Figure 2 is identical to Figure 1. This point of intersection is the equilibrium point of the two curves. With k_1 capital employed, this point gives optimum expected rate of return (R_1) for both developed and less developed countries. As more capital, say k_2, is added the rate

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[1]Alder's "Acceptable Rate of Return" means socially acceptable discount rate.

[2]Co-operant factors - these factors are the elements complementary to capital, such as a work force with the appropriate skills.

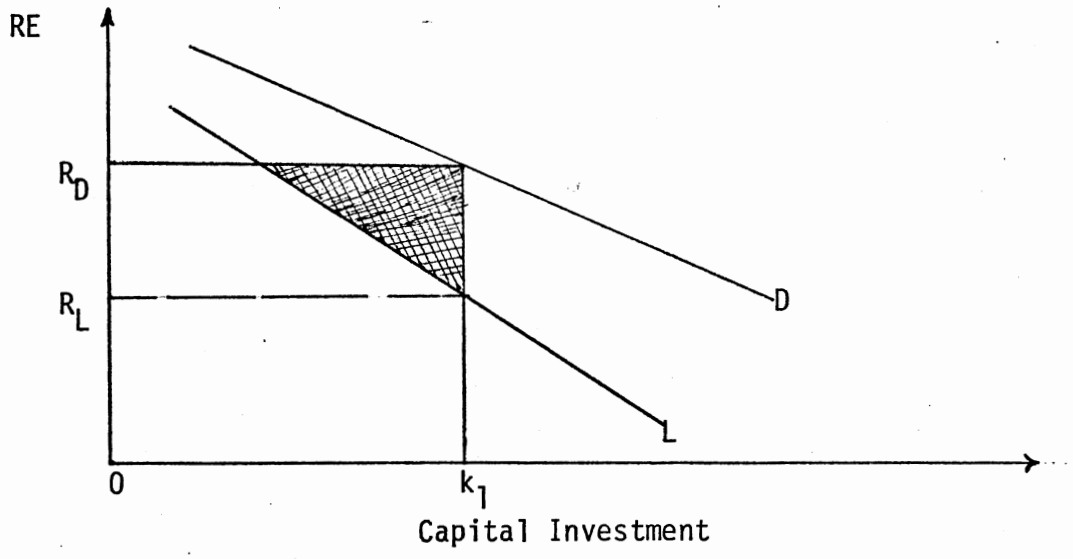

Figure 1. Absorptive Capacity

RE = Expected Rate of Return

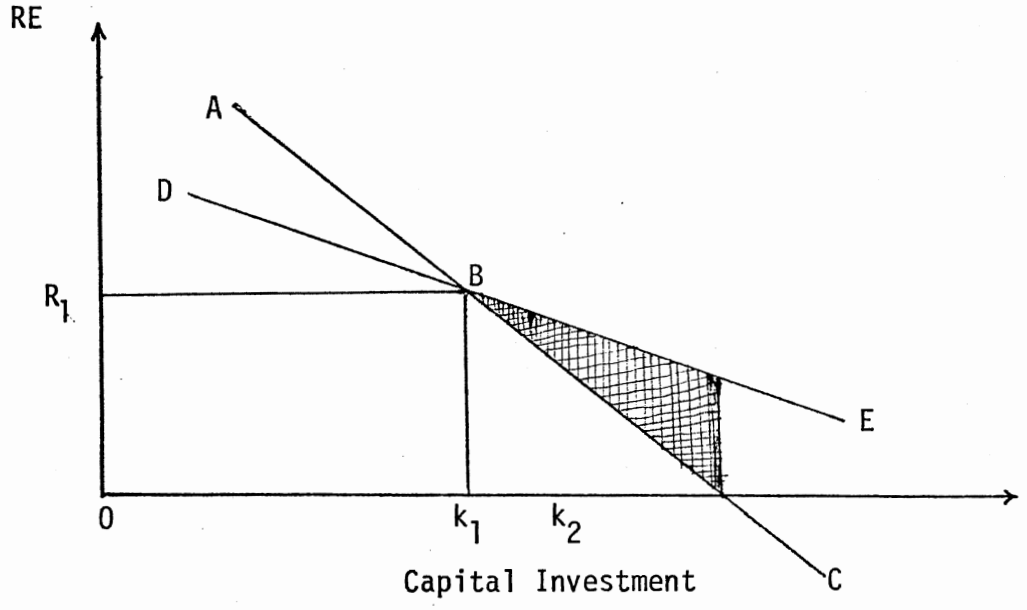

Figure 2. Absorptive Capacity

of return for LDCs will decline much more rapidly. What causes the curve, ABC associated with LDCs to be so steep are (1) limitations to absorptive capacity, and (2) scarcity of projects on which high rate of return can be expected.

Policy objectives aimed at achieving an average higher expected rate of return on capital investment or overcoming limited absorptive capacity in LDCs are often defined in terms of what could be done to shift the return on capital function upward. The shaded areas in the two diagrams represent limited absorptive capacity. It is important to note that the return on capital functions represented by L and ABC in the two diagrams are not unique. They can be moved up or down. For instance, if investment is undertaken at a larger scale with good co-ordination and careful planning, these functions can be shifted to the right, indicating greater absorptive capacity at a given rate of return on investment. The objective of policy, therefore, is to direct all effort at moving the rate of return function from BC to BE in the case of Figure 2. One such effort, Alder (2) emphasizes, is to increase all complementary (especially skill-related) elements to capital to the level prevailing in developed countries. Once this can be done, limited absorptive capacity is eliminated. However, most economists including Alder recognize that the possibility of increasing co-operant factors (since investments aimed at achieving appropriate increases in skills usually come from the public sector or government) cannot lead to a higher expected rate of return initially but can eventually after the passage of time. The justification of this practice is common among LDCs especially the oil-rich whose size of public capital expenditures for training in diverse skills has been

increasing. An acceptable rate of return initially is not always a criterion, since it is hoped that such a rate presently foregone is merely a postponement.

From Alder's analysis, it seems clear that the prime determinant of absorptive capacity is the pattern of capital investment. Absorptive capacity in this sense is none other than the rate of return on capital investment. If the rate of return is high, absorptive capacity is defined as high; if low, it will equally be low. Therefore, Alder's view of absorptive capacity suggests that absorptive capacity differs for different kinds of capital expansion.

Theoretical Relevance of Absorptive Capacity

The work of Alder (2) relates absorptive capacity to the law of diminishing returns[3] in that as capital increases the rate of return on capital decreases. This hypothesis is consistent with observations that there are limits to the output that can be obtained by increasing the quantity of a single resource applied to constant quantities of other resources. Using this law in the analysis of absorptive capacity, it could be said that as capital investment increases, the rate of return on applied capital decreases. Looking at it as a measure of absorptive capacity, it means that the amount of capital that can be productively invested depends on the rate of return the investor is willing to accept. As the level of capital investment tends to be

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[3]This law states that if the input of one resource is increased by equal increments per unit of time while the inputs of other resources are held constant, total product output will increase, but beyond some point the resulting output increases will become smaller and smaller (33) (8).

higher, the acceptable rate of return is bound to be lower. The reverse happends in the case of a lower level of capital investment.

Some economists, however, argue that the application of the law of diminishing returns to the concept of absorptive capacity is not quite appropriate as long as most under-developed economies are punctuated with obvious impediments. There seems not to be any theoretical limit to the capacity for absorption of capital in LDCs, if the availability of huge financial capital (see some oil surplus LDCs such as Libya, Kuwait, Iraq, Saudi Arabia, Algeria, to mention a few) permits the importation of all factor supplies. Whereas in actual fact, the limits to capital absorption in any developing country do exist, and can prevent the economy of such a country from achieving "sustained" growth of output. Mikesell (37) is one of those recommending that, in matters relating to absorptive capacity, we should not be concerned with the theoretical aspects of the problem of diminishing returns to capital, given fixed supplies of other factors of production. Such models, he says, are difficult to apply to LDCs in any case, since the availability of financial capital provides a means of importing technical personnel as well as capital equipment, and other productive factors. The meaningful approach, he further claims, is to relate capital absorptive capacity to net increase in social product of a country, both directly and indirectly (p. 167). Creating industries and importing everything from abroad, from skilled labor to capital goods can only give some false indication that a country has overcome its limited capacity to absorb capital. As Mikesell puts it, investments based on such industry creation and factor importation "are not directed toward maximizing

the potential of existing resources" as long as the unskilled natives are untrained and the soil unimproved. Even if the operation of importing everything should prove profitable, it is grossly wrong to assume that such an economy has unlimited capacity for capital absorption.

Incremental Capital-Output Ratio and Absorptive Capacity

With the introduction of Incremental Capital-Output Ratio (ICOR),[4] the concept of absorptive capacity takes a more aggregative view of the economy. As earlier observed Alder's view of absorptive capacity centered on expected rate of return to capital invested in some projects with little or no mention of ICOR. Indeed, absorptive capacity as presented by Alder takes a partial view of the economy. Because of associating absorptive capacity with the policy matters of the entire economy, economists such as Higgins (27), Hagen (24), Mikesell (37), Chenery (10), make a wide use of ICOR in the course of defining and assessing absorptive capacity. Higgins (27) defines absorptive capacity as:

> The amount of investment that can be undertaken, within a five-year program, without reducing the marginal contribution of the last block of capital below x. In other words, it is the amount that can be undertaken without raising the incremental capital-output ratio of the last block of investment or marginal ICOR above 1/x (p. 579).

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[4]ICOR: Hagen (24) defines this term as "the increase in a country's capital stock over a period of years, t, divided by the increase in the country's productive capacity expressed as output per year, during the same period"

That is $ICOR_t = \frac{\text{Investment in year, t}}{\text{Increase in value of output during the year, t}}$

In this case, x is the rate of return on investment. Undoubtedly, this definition is concerned with investment over the planning period and the resulting increase in income even beyond the planning period. If "x," the rate of return on investment, is set at zero, absorptive capacity, Higgins observes, would then be the total amount of capital that could be invested during the planning period, and still add something to future income. Putting it the other way, it is the amount that can be invested without raising the marginal ICOR to infinity. By drawing a connection between "x" and the cost of capital, Higgins' analysis assumes that if the cost of capital is zero, capital investment should be pushed to the point where its marginal efficiency becomes zero. If capital is to be borrowed, on the other hand, at a rate of "r" percent, the "x" should not be lower than "r." The general application should be that "x" ought to be set at the margin equivalent to the rate obtainable at the best alternative use of the invested capital. By setting the rate of return at zero in the course of defining the concept of absorptive capacity, Higgins assumes that this concept has no limit, that as long as the economy shows a rate of growth, that is, a positive capital-output ratio, investment expenditures of any size are justified. Similar views are shared by Ahumada (3) who believes that low rates of return on capital are <u>not</u> an indication that the limits of absorptive capacity have been reached, and that investment expenditures are justified as long as the economy shows a possible rate of growth, that is, positive capital-output ratio. As indicated already, Alder (2) and other notable economists <u>don't</u> share the above views as they strongly agree that absorptive capacity has a limit and one of the major ways to

overcome this limitation is to increase the supply elasticities of all elements complementary to capital.

Hagen's (p. 185) concept of absorptive capacity does not ignore the importance of ICOR either. He refers to absorptive capacity as the capital investment needed over a period of time to achieve a given increase in productive capacity or output. To make possible the ICOR to be smaller than the inverse of Marginal Productivity of Capital (MPC),[5] and hence achieve the desired increase in output, he recommends the accomplishment of two things, namely (1) introduction of new techniques, and (2) increase in labor force skills of the country, all of which may help to reduce the amount of capital needed to increase output (24).

The definition of "capital absorptive capacity" attempted by Mikesell (37) does not differ much from Hagen's, in that the emphasis in both cases is on how to increase the national product. Mikesell (37) defines the concept as:

> the capacity of a country to employ financial capital in a way which will result in an increment to the net national product, the discounted value of which is equal to the amount of the financial capital employed (p. 164).

This concept of capital absorption as he observes is not based on selecting only high-priority projects for external financing, but on the fact that a country's capacity to absorb capital depends upon the general economic and financial policies pursued by that country, including the soundness of its investment program from the standpoint of overall employment of resources available for investment.

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[5]If Marginal Productivity of Capital (MPC) is 8/100, for instance, its inverse would be 12, and the ICOR might be 2, 3, or 4.

The application of ICOR to the discussion aimed at assessing absorptive capacity of a country provides a direct link to the growth of national output, rather than to only investment productivity or its rate of return. Absorptive capacity in this regard is an "aggregate" concept, implying that investment in a country is not channelled only to projects with high rates of return.

So far different views have been expressed with regard to absorptive capacity. With these views in mind, it is my belief that the amount of financial capital, whether borrowed or domestically accumulated, is not the problem of absorptive capacity but the productivity of such financial capital. For this productivity to be assured, the economy must not be limited by the supply of technical, managerial, scientific, entrepreneurial and labor skills; by the willingness to accept the risk of investment in durable productive capacity; by the supply of natural resources; by adequate infrastructure; by the stability of the government; by the quality and scope of educational system, to mention a few.

Growth-Determining Absorptive Capacity

The use of ICOR to define absorptive capacity makes it possible to look at absorptive capacity directly as output or growth-determining. As earlier indicated, the existence of a direct relationship between the growth rate of total output and absorptive capacity has been strengthened by Higgins (27) and Hagen (24), among others. Growth-determining absorptive capacity is, therefore, a term specifically adapted for this study. The term may be defined as the level of investment required to attain the maximum growth of output. It

is important to note that the growth so attained may not be optimal or be sufficiently high, indicating that the capital investment in the economy has not been productive. If a country's growth is below the desired growth level, limited absorptive capacity is indicated. Another way of understanding output or growth-determining absorptive capacity is to look at indirect causal relationship between capital investment and the flow of income, otherwise GNP. Alder (2) argues that if investment is productive, more capital likewise savings will be formed and this will lead to more output and its growth. The growth of output is, therefore, indirectly related to the productivity of investment. Rather than directly relating capital investment with expected rate of return, the growth-determining approach acknowledges the indirect relationship between capital investment and GNP. With the focus on output and the growth of output, absorptive capacity takes a much more aggregative view of the economy. The terms "supply and demand" become directly relevant to the discussion of absorptive capacity in that national output represents aggregate supply while consumption, investment, and the foreign sector represent the components of aggregate demand. Since it is not necessarily the investment component alone which is associated with absorptive capacity, the concept of <u>total</u> absorptive capacity is more implicit in output or growth-determining approach. Using this approach in the assessment of a country's total absorptive capacity, it is necessary to investigate what factors account for the divergence between actual and potential (desired) growth of national output. Implicit in the concept of growth-determining absorptive capacity is the idea that to overcome limited absorptive capacity, constraints or impediments to growth must be eliminated.

Measurement of Absorptive Capacity

With regard to measuring absorptive capacity, the consensus among economists is that such a measurement should somehow relate to "productivity" or "effectiveness of capital." However, there are disagreements on what to measure. Alder (2) wonders why there should be any fuss at all, and emphasizes that since absorptive capacity means different things to different people, what to quantify should depend on what the researcher plans to examine. Knowledge of two things (1) the nature of the problem, and (2) the level of absorption the researcher is talking about determines what to quantify. The three approaches to measurement of absorptive capacity common in economic literature are:

(1) The Marginal Rate of Return Approach (MRR)

This approach favors the definition of absorptive capacity as being associated strictly with investment productivity or expected rate of return. Alder's definition of absorptive capacity is relevant here.

(2) The Historical Rate of Investment Approach (HRI)

The theory underlying this technique is that investment involves learning by doing. The idea came first from Arrow (4), and was put into practical use by Chenery and Strout (10).

(3) The ICOR Approach

This technique favors the definition of absorptive capacity as an aggregate concept with output and the growth of output being the focus. Absorptive capacity

as defined by Higgins (27) and Hagen (24) is consistent with this technique.

The MRR approach is very common with regard to investment theory. But when this approach is considered in terms of a developing economy's absorptive capacity, the work done by Alder (2) provides some guidance. In fact, in Alder's view, absorptive capacity using MRR technique refers to the aggregated cost of all adopted projects. From investment theory, it is clear that the MRR technique usually tries to link capital application to productivity, account for the economies and diseconomies resulting from the project, and use adjusted prices which properly reflect values. Indeed the purpose of MRR technique is to ensure optimum allocation of capital. Despite these advantages, the MRR approach has limited application in most LDCs because of the absence of comprehensive financial data among other things. Moreover, this approach can only be applied to small project evaluation, not at the aggregate or even sectoral level (39, 37, 35). Cost-benefit analysis used by the World Bank when studying loan applications from LDCs is similar to the MRR approach. In reality this approach, which is based on evaluating a small project within a sector of the economy, cannot be taken to be equal to an assessment of a country's absorptive capacity.

The second measurement approach is the past (historical) rate of investment (HRI). In this method, the nation's physical capacity to sustain a given rate of economic growth is determined. Among the early users of this method are Chenery and Strout, etc. This method is not concerned with individual productivity of investment projects as in the case of MRR, nor is disaggregation of the economy into

sectors considered. Arrow's (4, p. 80) theory underlying this technique is that investment involves learning by doing. According to Arrow, not allowing the natives in LDCs to participate in the development process would deny them the experience that goes with responsibility. A case in point is Nigeria before independence from Brittish rule in 1960. Prior to independence, there was a ten-year development plan which was later revised to a five-year plan. This plan was fully controlled by the British administrators at the colonial office in London, and the Nigerians were not at all brought into the planning process. The plan woefully failed to achieve its purpose. In fact, many of the schemes proposed under the plan resulted in no more than an expansion of existing government departmental activities (12). As used by Chenery and Strout (10), the past rate of investment method postulates that any period's investment is functionally related to the previous period rates of investment and "improvement in skills" as a catch-all variable. Their model specifies that investment in period, t equals investment in previous period, t-1, multiplied by skilled determined growth rate, (1 + g), thus: $I_t = I_o (I + g)^t$,

where

I_t = gross investment in period, t

I_o = gross investment in the base period (period zero)

g = growth rate determined by available skills, g in this case is exogenously determined, and is a function of past investment.

This formulation is understandable since they consider absorptive capacity essentially as a managerial problem which can only be overcome by overall improvement in skills. But, the flaw in this method

(past rate of investment) is that the skill rate of improvement (g) is exogenously determined, whereas skill improvement should be a major area to attract good investment in LDCs. Perhaps, if priority is given to investment in man or investment in education, skill limitations could gradually be removed in most LDCs, and this, in turn would enable investments in other key project areas to be handled productively. With productive investments, the desired growth of a nation's output would be assured.

The third approach is the ICOR technique, and is based on the assumption that as capital or investment application increases beyond a certain point, its marginal contribution to output will diminish. What this assumption implies is that the ICOR would rise slowly first, then rapidly, meaning that more capital is needed for each additional output. Hagen's (24) relationship between growth of output and ICOR provides a clearer appraisal of this concept. He points out that the higher the ICOR the lower the growth rate of output (p. 187). This point is also shared by Horvat (29) and Higgins (27) who were early users of ICOR technique. If the increase in ICOR is less than the increase in investment, GNP is likely to expand, and investment is considered worthwhile. The rule propounded by Horvat (29) is that investment should be expanded until the elasticity of the average ICOR with respect to investment is equal to one. In the event of a country borrowing investment capital abroad, Horvat's rule can strain the country's capacity to service external debt. To overcome this strain, Professor Higgins advocates that such a cut-off rate should take into account a country's ability to service foreign debt. Higgins (27) writes:

> investment financed by foreign aid should not be carried beyond the point where the addition to national income offsets the increase in the cost of servicing the debt (p. 580).

The ICOR technique in absorptive capacity is highly aggregative, and this is a major disadvantage. In LDCs, aggregation can be dangerous as it may be difficult to effectively tackle specific problems facing the economy. The advantages of the ICOR technique are that this technique takes into account all factoral changes which occur during any investment period, and is easy to compute as it does not call for detailed financial data as in the case of Marginal Rate of Returns.

Absorptive Capacity and Developing Economies With Surplus Funds

The classical views (21) that financial capital can overcome limited absorptive capacity, and cause rapid development and growth of output cannot stand, if factors complementary to capital are not substantially improved. Skill-related factors are often mentioned as the most important complement to capital (10, 28). If financial capital had been sufficient to explain rapid development and growth of output, developing economies, especially oil-based economies, with surplus funds could have developed since the 1960s. But these economies have not achieved the desired level of development and growth. The continued poor performance in these economies has led many development economists to believe that even though financial capital is desirable, it cannot itself overcome slow development and low growth of output. Because of the importance of skill factor, the equality between this factor and capital has been emphasized by economists such as Hirschman (28) who writes:

> among the proximate causes of economic development, the supply of entrepreneurial and managerial abilities now occupies in official documents a position of pre-eminence at least equal to that of capital (p. 1).

Indeed, financial capital is not the problem of absorptive capacity and should not be considered as a factor likely to overcome limited absorptive capacity. The only option to overcome limited absorptive capacity is to relax the constraints complementary to capital so that capital can be productive. This option applies to both surplus funds economies and non-surplus funds which rely on foreign financial assistance.

Mallakh and Kadhim (34) and El-Jehaimi (14) are among those whose studies relate to absorptive capacity in surplus funds economies. The findings of Mallakh and Kadhim are that whether a country depends on foreign aid for its investment needs, or on domestically accumulated funds even much in excess of investment needs, absorptive capacity will continue to be low if skill factors are not improved. Notable economists like Mikesell (37), Hirschman (28), Alder (2), and Chenery and Strout (10) share this opinion even though their focus is on the productive use of investment through foreign aid in developing countries.

Constraining Factors to Absorptive Capacity and Growth

Almost all those writing on the subject of absorptive capacity discuss the constraints on absorptive capacity. Remedies to overcome these constraints are also suggested.

Most economists seem to agree that labor factors limit investment productivity and growth of output, hence absorptive capacity. In

their landmark article, Chenery and Strout (10) see no factor limiting investment and output growth except "the skill limit," reflecting the skill formation required of managers, skilled labor and civil servants in order to increase productive investment. To achieve a sustained growth of output no matter whether the investment capital is externally (that is, by way of foreign aid) or domestically accumulated, they suggest four changes likely to lead to some transformation in the economy, such as: (1) increase in human skills, (2) adoption of more productive technology, (3) a substantial change in the composition of output and employment, and (4) development of new institutions, etc. (p. 680). From the work of Chenery and Strout, the following can be deduced: (1) to overcome limited absorptive capacity, substantial increase in skills is necessary (2) to increase absorptive capacity, simultaneous increase in domestic savings and export earnings is necessary.

Skill-limited growth constraints in the context of absorptive capacity can hardly be ignored in any developing economy, be it oil surplus or non-oil surplus countries. Of the Chenery's (10) three growth limited constraints (saving, skill and trade), skill is found to significantly affect all developing countries. Applying the other two constraints to oil-rich nations, such as Nigeria, saving constraint would be less significant, whereas that of trade would be rather insignificant. The postulate that saving and trade no longer serve as effective constraints in today's oil exporting nations may be right.

Emphasis on skill related factors as the major cause of limited absorptive capacity is also shared by Hirschman (28), who states that:

> a country's capacity to absorb capital may be lower than investment funds available to it because of shortages of skills and other obstacles (p. 37).

This statement is quite appropriate for the oil-surplus countries with more investment funds to spend than these economies are able to absorb. Millikan and Rostow (38) do not differ in the way they identify bottlenecks inhibiting the development of absorptive capacity. They blame such bottlenecks on "shortages of managerial and administrative skills."

Like Chenery and Strout, Alder's (2) work attempts to list several skill-related sources of impediments on absorptive capacity. Among these sources are: (1) lack of knowledge pertaining to natural resources and to the availability of technology, (2) lack of skills or expertise necessary to prepare investment projects, to carry out investment projects once they have been found to be feasible, to perform the clerical and manufacturing task of new enterprises, (3) lack of managerial talents and experience (Alder differentiates between lack of skills in (2) and lack of managerial talent and experience in that skills can be acquired by training, but it is doubtful whether management can be subject to systematic training), (4) institutional limitations, for example, the threat of riots, disorder, banditry and other forms of lawlessness. Cumbersome government procedures are also included, and (5) cultural and social constraints.

Foreign aid itself is cited as one of the major causes of limited absorptive capacity by several economists. Among them are Kindleberger and Herrick (32), Mikesell (37), Chenery (11), Griffen and Enos (23), etc. Kindleberger and Herrick (32) observe that if aid

stems from profit or political motives, its relation to an increase in the pace of economic development may become distant indeed. Associating foreign-aid with a number of factors, they agree that generally "aid provides a political lever or export promotion device in favor of donor countries, and it would be superficial to condemn it. The identification here is that aid does not necessarily service the overall interest and goals of the recipient nations. Focusing on the United States as one of the aid donor nations, Chenery's (11) views would appear to agree with the above. He states that:

> the main objective of foreign assistance, as of many other tools of foreign policy, is to produce a kind of political and economic environment in the world in which the United States can best pursue its own social goals (p. 81).

Griffen and Enos (23) are also among those who view the objective of foreign aid as not being for economic development as such, but for influencing the behavior of recipient countries. Arguing against the "myth" that foreign aid is usually given by rich nations, they say if it were so, a country like China which is not rich (if riches and poverty are measured in terms of income per capita) should not at all give aid. But China has been giving aid to some countries because of her desire to influence these countries. With no close association statistically seen between the amount of aid received by a number of countries, and the rate of growth of GNP, they conclude that "given the quantification of aid received by individual country, the thesis that aid may retard development cannot be rejected" (p. 318).

Most proposals to overcome stagnant growth are essentially the same as proposals to overcome limited absorptive capacity. The

literature surveyed so far shows that the most important constraint likely to limit growth as well as absorptive capacity in LDCs is the "skill limit" of the work force. There is no question about this as foreign assistance can provide financial capital investment assuming an economy is characterized by capital constraint. Notwithstanding this consensus i.e., the fact that skill factors generally affect the growth of output or absorptive capacity, some economists either disagree with the approach leading to the achievement of appropriate skills or give less attention to non-economic factors as being capable of limiting the economic growth of a nation. There are some instances. Rosenstein-Rodan (56) and others favor the theory of Balanced Growth or "Big Push" as the only means whereby the developing economy can accomplish the desired growth of output. He and other proponents of this theory believe that if the project is not considered in isolation, but together with a related project or several related projects, then the expected rate of return on investment is bound to increase, hence the growth of output. A contrary view is advanced by Hirschman (28) in his theory of unbalanced growth. He favors initially the development of one or two projects with good linkages since money is scarce (where no scarcity of money is experienced as in the case of oil rich developing economies, waste and unproductivity might result) and skills cannot be developed overnight to help in making all classes of investment productive. On the other hand, some economists, such as Alder (2), Mikesell (37), Chenery (10), etc., choose to take no position as to which growth theory is the best. But they generally agree that any theory aimed at output increase, whether balanced or unbalanced, must allow for a

comprehensive development of appropriate skills.

In addition to "skill limit" there are other non-economic elements which can affect investment productivity and growth of output. Among these non-economic elements are cultural and attitudinal factors. Smock (59) argues that these factors are not the same for all LDCs since traditional African societies are not stratified, ascriptive and organized hierarchically as claimed by Hagen (25). Smock, however, concedes that Hagen's generalization may refer to tradition-bound cultures of South Asia, Middle East and Latin America, rather than tribal-based African cultures whose societies are less rigidly stratified, have less pride for the past, less sense of history, and less glorfication of tradition. These differences notwithstanding, Smock further argues that cultural and attitudinal factors generally peculiar to developing African countries, and in particular to Nigeria, do affect agricultural development, productivity and growth in national output. The "shifting cultivation" in many communities in Nigeria and in other African countries is looked upon as having a strong background linked to culture. Also, changes in the way of farming, of accepting a new product, to mention a few, are considered a "taboo" or something offending culture and attitudes of the people.

Leaving generalizations in terms of cultural factors affecting LDCs aside, Hagen (25) insists that these factors, whatever they are, constitute barriers to change. The removal of these barriers as a means to achieve reasonable growth, he observes, requires aggressive changes in both economic and non-economic (cultural) variables.

Another socio-cultural variable often cited in some writings

directed to developing African countries is the "Institution of Extended Family."[6] This particular variable is known to deter economic growth, and entrepreneurial ability in Nigeria and other African countries. The study done by Nafziger (40) on the effects of the Nigerian extended family on entrepreneurial activity emphasizes this cultural institution as one of the major barriers to growth. The explanation is that since the family members in the extended family setup usually helped the entrepreneur when he was trained as apprentice-entrepreneur, he (the entrepreneur) would be required or culturally bound to help train other family members in different other occupations. This means that the use of a firm's profit (net income) for the expansion of a firm is unlikely in extended family setting. Statistically, Nafziger's findings show a strong positive relationship between the profit of a firm and the number of entrepreneur's dependents. What this further explains is that as income of the entrepreneur increases, the number of dependents he is required to support also increases. In addition to being compelled to hire only family members who may be deficient skill-wise, the inability to plow back the firm's profits for the firm's growth because of extended

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[6]The term "Extended Family" in African context implies extended responsibility beyond ones immediate family, that is, beyond ones wife and children. As long as some members of the family assisted in one way or another to train the successful entrepreneur, it would be culturally incumbent upon him to help train others outside his immediate family but within the extended family setup. Since under this setup the entrepreneur has no formal obligation to repay his family members money expended on his training, he is expected to abide by the culture - induced formal obligation to accept training others in the family. Usually there is no limit to the number of close and distant relatives or other family members he has to train, and help establish.

family obligations, depresses growth of output in every sector of the economy. In a similar analysis, Wolf, Jr. (65) finds that this extended family practice constitutes a serious barrier to productivity and growth.

However, to consider non-economic factors in general as being capable of halting agricultural productivity and growth of national output has no appeal to some economists, such as Schultz (58). His emphasis is that what determines new agricultural practice, productivity and growth is economic return. He adds, however, that non-economic factors abound where the economic return is not sufficiently dramatic. Indeed, Schultz may be right as any form of resistance to change can be better explained in economic than cultural and attitudinal terms.

Summary

This chapter examines literature on absorptive capacity and economic growth. There are different ways to define absorptive capacity, but most economists define it in terms of the productivity of capital investment. These economists believe that if average capital investment in the economy is productive such an economy will have high absorptive capacity. Having surplus capital for investment purposes is considered insufficient to overcome limited absorptive capacity, if the constraints complementary to capital are not relaxed. Among the major constraints to capital are manpower and work force with appropriate skills, adoption of more productive technology, infra-structure, development of new institutions, etc. Output or growth-determining absorptive capacity is the main concern of this study for

the simple reason that it takes an aggregate view of the economy. The three known measurement approaches of absorptive capacity discussed are:

(1) The Marginal Rate of Return Approach (MRR)

(2) The Historical Rate of Investment Approach (HRI), and

(3) The ICOR Approach.

The ICOR approach is considered relevant to measuring growth-determining absorptive capacity. In addition to skill constraint to growth are cultural and attitudinal factors.

CHAPTER III

THE NIGERIAN ECONOMY

Introduction

In this chapter the Nigerian economy will be discussed. Particular attention will be given to the discussion of the following: growth and composition of gross national product (GNP), investment programs and growth through development plans, foreign trade and Balance of Payments position, education and manpower, and government development policies in some sectors of the economy. To enable the projection of output, a macroeconometric model of the Nigerian economy will be developed.

Nigeria, situated south of the Sahara Desert on the west coast of the African Continent, is bounded on the south by the Gulf of Guinea and on the landward sides by Cameroon, Chad, Niger and the Republic of Benin (formerly Dahomey). Having the geographical area of about 357,000 square miles, Nigeria's size equals the combined size of the states of California, Nevada and Arizona. With the population of approximately 80 million people, Nigeria not only commands the largest population in the continent but one out of every five Africans is a Nigerian (54). In terms of population, she is one of the world's fifteen largest countries. The country's annual population growth rate is 2.5 to 3.0 percent while density is 224 inhabitants per

square mile. She has about 250 tribal groups with Hausa-Fulani, Ibo and Yoruba being the major groups. Each tribe speaks its own dialect but the official language of the country is English. About 36 percent of the population, mainly southerners, are Christians, and over 40 percent occupying the northern section of the country are Muslims. The remainder (over 19 percent) is made up of Animists and others. Although less than 25 percent of Nigerians are urban dwellers, at least 30 cities have populations in excess of 100,000. Lagos, with a population of over 1.5 million people, is the capital of the Federal Republic of Nigeria.

For the convenience of the British administrators, the country was divided into three regions of unequal sizes, namely: the Northern, the Western and the Eastern regions, while the federal territory of Lagos (capital of Nigeria) was not a part of any region. Three years after independence, October 1, 1960, the Mid-Western region was carved out of Western region, and in 1967, before the actual commencement of the civil war,[1] the entire country was divided into twelve states. The twelve states structure of the country continued to be in force until February, 1976 when additional creation of states brought the number of states in the country to nineteen.

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[1]Note that civil unrest, coupled with political and economic instability began in 1966. In that year, there were two military coups. Since no acceptable compromise aimed at restoring order, calm, and confidence to every section of the country, especially the former Eastern Nigeria section dominated by the Ibos, could be reached, the civil war broke out in 1967 and ended in January 1970. The forces of the federal military government of Nigeria marched against the forces of the military government of the then Eastern Nigeria, whose area before this time had been illegally declared a sovereign state and called Biafra. The federal cause was to fight to preserve Nigeria as one entity and this was achieved. Any reference to civil, political and economic distruption in Nigeria should, in fact, date from January 1966, the time of the first military coup to January 1970, the time the civil war officially ended.

Nigeria ceased to be under military rule on October 1, 1979 after thirteen years of such rule. The country's constitution is patterned after the American constitution. Like the United States, Nigeria is governed at the center by the federal government while at the state level there are state governments. Among the provisions in the Nigerian constitution are the office of Executive President as the country's Chief Executive (this contradicts with the practice of having Prime Minister as Chief Executive in the first Republic, that is, before the military take-over in 1966), two legislative houses - the Senate and the House of Representatives, two such houses on the state level with governor as the state's chief executive, etc. Despite the adoption of American type of constitution, the system of economic organization is not exactly American capitalism, nor is it altogether British capitalist socialism. It would be right to say that Nigeria's system of economic organization assumes a mixture of these two capitalist structures. Often times, the Nigerian politicians refer to the nation's economic organization as "Pragmatic Socialist Capitalism."[2] Other writers like Schatz (57) describe it as "Nurture Capitalism."

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[2]Capitalism in the Nigerian context embraces tendencies which do not only permit state participation in private business organizations and investments but also allow for greater welfare practice. Usually the role of government in many LDCs range from maintaining law and order to embarking strictly on social overhead capital investments (examples are investments for the construction of roads, bridges, airport, etc.). While the Nigerian governments have state-owned industries, they recognize the fact that the growth of the country's private enterprises must also have their joint financial support. The rationale is that since most individuals are short of funds to begin new businesses, governments can help to start some, and may later on, sell their shares/stocks to private citizens willing and able to buy them. The motive of government in this respect, it must be emphasized, is not profit but to help lay some financial foundation for the growth of the private sector.

Schatz points out that such capitalism or economic orientation is nationalist with state-capitalist, welfare and accelerated development tendencies. For these countries there are areas of organizational economic similarities or dissimilarities. These areas border on government basic economic institutions, government ownership or non-ownership as well as capital investments in basic industries. Like the governments of Great Britain and the United States, the Nigerian governments (federal and states) recognize basic economic institutions in a capitalist economy, such as private property, inheritance, freedom of enterprise and competitive market. But unlike the United States system in particular, the Nigerian governments can behave as individuals with such rights to own shares/stocks in any private company as well as remaining in partnership. In most cases, governments in Nigeria own shares or stay in partnership, not necessarily for profit motive but for the motive to encourage or invite indigenous businessmen to invest. This point is important and serves as an addition to the concept of the state-owned industries. For instance, the Nigerian federal government, almost like the government of Great Britain owns and controls some basic industries, such as railroad, gas, electricity, communication, transport, coal, mining, airways, etc. (49). The notion of partnership earlier raised finds expression in situations where the Nigerian governments join with either the indigenous or foreign entrepreneurs to establish some businesses in Nigeria. One of such instances is the supercomplex cement factory at Calabar in the Cross River State, likewise another one at Nkalagu near Enugu in Anambra State jointly owned by both the state governments of each state, a few indigenous investors and some foreign firms.

In terms of Nigeria's economic potentialities, agriculture constitutes by far the most important sector of the country's economy. Up to 1969, over 50 percent of the gross national product was earned in the agricultural sector while between 70 and 80 percent of the total labor force was employed there. Its importance is also underlined by the fact that it (agricultural sector) accounted for nearly 90 percent of the total Nigerian food consumption, and over 70 percent of total value of the Nigerian export earnings before 1965 when oil was not exported in huge quantities (26). By 1970, however, the value of the country's agricultural products had dropped to 44 percent of total export earnings, and in 1975 they accounted for less than 7 percent of the total (1). The commercial products in the agricultural sector include cocoa, groundnuts (peanuts) and groundnut oil, palm kernels and palm oil, rubber, cotton and cottonseed and timber.

Oil (petroleum) is an important resource endowment. Today, the country ranks as the world's seventh largest producer and sixth largest exporter of petroleum whose export value accounts for over 80 percent of total export earnings. Along with the petroleum industry are other mining industries such as coal, tin, iron, gold and zinc. Mineral products from these other industries include tin ore, iron ore, columbite, lead, gold, zinc, tungsten, marble, lignite and limestone.

Internationally, Nigeria enjoys membership in many organizations. These organizations are the Organization of African Unity (OAU), the United Nations (UN), the Commonwealth of Nations, the Organization of Petroleum Exporting Countries (OPEC), the Economic Community of West African States (ECOWAS), to mention a few.

The country's money is called Naira (₦), and the official exchange rate is 1 Naira to $1.50 US. Notwithstanding her nonalignment policies, Nigeria, by and large, is pro-west.

Composition and Growth of Gross National Product

The major components of Nigeria's gross national product are agriculture, mining and quarrying, manufacture, electricity and water, building and construction, distribution and transport and communication. These components (they can also be referred to as sectors) have to be examined in terms of their importance and growth of the national economy.

Except for two civil war years, 1967-68, the country's GNP showed an upward trend during the fifteen-year period, 1961-75. GNP increased from ₦ 2,373.6 million in 1961 to ₦ 15,259.0 million in 1975, an annual average growth rate of 15.4 percent (see Tables III and IV on pages 46 and 48). This, however, does not mean that the yearly rate of growth of GNP during the period was all positive. In fact, during the civil war years the annual rates of growth were negative.

Agriculture

This sector includes livestock, fishery and forestry, and should be considered to be the most important sector of the economy. Its importance is substantiated by the following reasons: (a) it employs the highest percentage of the country's total labor force and (b) it serves as the principal source of food and raw materials for the increasing population. In fact, about 90 percent of food production

for domestic consumption comes from this sector. Before the advent of oil production in the late 1950s, most of the country's foreign exchange earnings came from this sector. But today, oil exports have overtaken agricultural exports whose contribution is less than 15 percent of total exports.

The labor employment in this sector even though it has decreased in recent years, continues to be the highest. While the sector employed about 80 percent of total estimated labor in the 1960s, this percentage declined to about 63.9 in 1975. The sectoral distribution in terms of number and percentage of total gainfully employed in 1975 is shown in Table I.

TABLE I

SECTORAL DISTRIBUTION OF TOTAL GAINFUL EMPLOYMENT IN NIGERIA IN 1975

Sector	Estimated Number in Gainful Occupation (in millions)	Percent of Total
Agriculture	17.860	63.99
Mining and Quarrying	0.110	0.39
Manufacturing and Processing	4.690	16.80
Construction and Building	0.250	0.90
Electricity, Gas and Water	0.030	0.11
Distribution	3,400	12.18
Transport and Communication	0.170	0.61
Services	1.400	5.02
	27,910	100.00

Source: Federal Ministry of Economic Development, Third National Development Plan, 1975-80, Lagos, Nigeria, 1975, p. 370.

The estimated number in gainful employment in all sectors in 1975 stood at 27.910 million. Of this number, agriculture alone used 17.860 million, representing 63.9 percent of total estimated workforce.

In addition to producing some commercial products for export (these agricultural export products have already been listed), the agricultural sector handles a wide range of food crops produced for direct consumption. Among the major food crops are millet, rice, maize, cowpea, yam, cassava and sorghum. The minor products of this sector are melon, cocoyam, wheat, sweet potato and plantain. Some fruits and vegetables are also produced and they include banana, citrus fruits, mango, pawpaw, kola, carrots, cashew, cabbages, flutted pumpkin greens and a host of other vegetables and fruits.

In terms of the Nigerian Naira (see Table II) the contribution of agriculture to GNP climed from ₦ 1465.2 in 1961 to ₦ 3373.0 in 1975. It would be wrong to say that every year under this review recorded an increase or a jump in the contribution of agriculture to GNP. In some years (1967-70, 1973-74), due primarily to the primitive way of agriculture there was either a decrease in contribution or the increase was not big enough to justify the amount of labor used in this sector. The proportional contribution of agriculture is presented on Table III. Between 1961 and 1969, agriculture as a proportion of GNP was over 50 percent, and from 1970 to 1975 it was 30 percent on the average. No doubt, this sector constitutes a fairly significant but declining proportion of GNP, recording a high of 61.7 percent in 1961 and falling gradually to a low of 22.1 percent in 1975. The declining proportion of this sector is a clear indication that during the period both food and export crops production grew also at a declining rate. The reasons

TABLE II

MAJOR COMPONENTS OF GNP IN NIGERIA

Year	Agriculture	Mining and Quarrying	Manufacturing	Electricity and Water	Building and Construction	Distribution	Transport and Communications
1961	1465.2	34.0	88.2	8.2	77.2	231.8	109.0
62	1609.6	44.6	93.4	9.8	90.0	252.6	112.4
63	1675.0	58.8	151.8	10.1	115.0	322.2	121.8
64	1678.0	73.8	157.8	13.0	122.8	382.0	139.6
65	1691.8	81.6	164.8	15.2	126.4	416.4	143.2
66	1784.4	148.6	192.8	16.0	161.2	432.8	135.6
67	1613.0	163.4	196.0	16.8	165.4	432.2	131.0
68	1726.6	82.1	231.2	18.2	148.4	419.2	122.4
69	1743.8	111.2	370.4	21.0	147.1	382.0	115.5
70	1787.4	137.0	311.0	22.4	152.6	380.0	117.0
71	3399.4	3128.2	475.1	30.1	326.0	854.5	172.0
72	3575.0	4393.4	460.3	35.7	460.2	907.1	210.1
73	3352.0	5203.0	570.1	42.6	578.1	883.0	258.3
74	3246.5	5928.0	626.5	52.2	711.3	911.2	278.2
75	3373.0	6553.1	683.9	59.2	822.1	971.2	325.0

In Nigerian Million Nairas - One Naira = $1.50

Source:
1. F.O.S. Annual Abstract of Statistics, Lagos Nigeria.
2. International Financial Statistics (May 1978), IMF, Washington, D.C.
3. Olayide, S.O., Economic Survey of Nigeria, 1960-75, Ibadan, Nigeria: The Caxton Press Limited, 1976, pp. 12-13.

TABLE III

MAJOR COMPONENTS OF GNP IN NIGERIA

Year 1	Total GNP (Million Naira) 2	Agriculture 3	Mining and Quarrying 4	Manufacturing 5	Electricity and Water 6	Building and Construction 7	Distribution 8	Transport and Communications 9
1961	2373.6	61.7	1.4	3.7	0.3	3.3	9.8	4.6
62	2630.8	61.2	1.7	3.6	0.4	3.4	9.6	4.3
63	2806.4	59.7	2.1	5.8	0.5	4.4	12.2	4.6
64	2914.0	57.6	2.0	5.6	0.5	4.3	14.3	4.9
65	3080.6	54.9	2.8	5.6	0.5	4.3	14.3	4.9
66	3210.0	55.6	4.8	6.2	0.6	5.2	14.0	4.4
67	2869.0	59.7	5.6	6.8	0.5	5.7	15.1	4.5
68	2802.0	61.6	2.9	8.2	0.6	5.2	14.9	4.3
69	3482.0	50.1	3.1	7.7	0.6	4.2	10.9	3.3
70	4525.0	39.5	3.0	6.8	0.4	3.3	8.3	2.5
71	9018.0	37.6	34.7	5.3	0.3	3.6	9.4	1.9
72	9703.0	36.8	45.2	4.7	0.3	4.7	9.3	2.1
73	10178.0	32.9	51.0	5.6	0.4	5.5	8.6	2.5
74	14252.0	22.7	41.5	4.3	0.3	4.9	6.3	1.9
75	15259.0	22.1	42.9	4.4	0.3	5.3	6.3	2.1
Mean		47.6	16.3	5.6	0.4	4.5	10.8	3.5

In Percentages

Source: 1. International Financial Statistics for 1967-75 GNP data, see column 2 (May 1978), INF, Washington, D.C.
2. Olayide, S. O., Economic Survey of Nigeria - For the remaining GNP data.
3. Columns 3 to 9 computed from Table 2.

for the decline in agricultural production are many, but those advanced by Olayide (48) deserve mention. He points out that the livestock industry as well as the forestry and wildlife sub-sectors have not experienced any noticeable improvements during the period. The same is true of the fisheries where the modernization of the traditional canoe-fishing and expansion of fish farming have not yet been accomplished. In the case of major problems affecting primary production, he associates them with resource availability, soil constraints, pest and diseases, poor yields, inefficient distribution and marketing services, land-use limitations, research and extension constraints, manpower limitations, widening technological gap and planning problems of the small producer. The development programs implemented in the 1960s and 1970s failed to solve the above problems because the focus of the programs was not on small producers who supply well over 95 percent of primary production in Nigeria (48).

In growth terms (see Table IV), this sector's annual rates of growth were not as dramatic as those in mining and in other sectors. In fact, the agricultural sector enjoyed a mean annual growth rate of 7.4 percent in real terms during the period. This mean annual rate happens to be the lowest recorded for any sector of the economy. The relatively poor growth of this sector confirms the statement that since the civil war the primary production has not been able to keep pace with the increase in population of between 2.5 and 3.0 percent per annum. It should be noted that the growth in the Nigerian economy began to shift from agricultural sector to mining (especially petroleum production) in the 1960s.

TABLE IV

ACTUAL GROWTH RATES OF MAJOR COMPONENTS OF GNP IN NIGERIA

Year	Total GNP (% Growth Rate)	Agriculture	Mining and Quarrying	Manufacturing	Electricity and Water	Building and Construction	Distribution	Transport and Communications
1961								
62	10.8	9.9	31.2	5.9	19.5	15.7	9.0	3.1
63	6.7	4.1	31.8	62.5	3.1	27.8	27.6	8.4
64	3.8	1.8	25.5	4.0	28.7	6.8	18.6	14.6
65	5.7	0.8	10.6	4.4	16.9	2.8	9.0	2.6
66	4.2	5.5	82.1	17.0	5.3	27.5	3.9	-5.3
67	-10.6	-4.0	9.9	1.6	5.0	2.6	-0.2	-3.4
68	-2.3	0.7	-49.6	17.9	8.3	-10.3	-3.0	-6.6
69	24.2	0.9	35.4	17.0	15.4	-0.9	-8.9	-5.6
70	29.9	2.5	23.2	15.0	6.7	3.7	0.5	1.3
71	99.2	90.2	2183.4	52.8	34.4	113.6	124.9	47.1
72	7.5	5.2	40.4	-3.1	15.7	38.1	6.2	22.2
73	4.8	-6.2	18.4	23.9	19.3	23.2	-2.7	22.9
74	40.0	-3.1	13.9	9.9	22.5	25.4	3.2	7.7
75	7.1	3.8	10.5	9.2	13.4	15.6	6.6	16.8
Mean	15.4	7.4	164.4	15.9	14.3	19.4	13.1	8.4

In Percentages

Source: Computed from Tables II and III.

Mining and Quarrying

Essentially this is the mineral sector with petroleum playing a dominant role in changing the structure of the Nigerian economy. The dramatic increase in output and earnings from the petroleum industry is unrivaled by any other industry in the economy. In addition to petroleum are other minerals with declining output and earnings such as columbite, zinc, coal, lead, tin-ore and iron ore. The availability of these minerals has induced the establishment of integrated iron and steel plant. The Nigerian Steel Development Authority was commissioned under Decree #19 of April 14, 1971 to oversee the formation and growth of the steel complex (54). In terms of percentage contribution to GNP, this sector rose from 1.4 percent in 1961 to 5.6 percent in 1967, thereafter declined to an average of 3 percent between 1968 and 1970, (the civil war years) before bouncing up again to 34.7 percent in 1971, 51.1 percent in 1973 and declining quite a bit to 42.9 percent in 1975. The mean annual percentage contribution of this sector was 16.3, next to agriculture with 47.6 percent. In growth terms, the sector recorded a mean annual rate of growth of 164.4 percent.

Manufacturing

The manufacturing, otherwise industrial sector achieved a performance considered not very significant. Despite Nigeria's fundamental problems, the value contribution of this sector showed a moderately upward trend, rising from ₦ 88.2 million in 1961 to ₦ 475.1 million in 1971, then declining a little bit to ₦ 460.3 million in 1972 before

rising again to ₦ 683.9 million in 1975. The mean annual proportion of industrial sector was 5.6 percent, a performance stronger than each of the other three sectors, namely transport and communication, electricity and water, and building and construction. Also, in terms of growth rates, this sector achieved a mean annual growth rate of 15.9 percent. During the period, a number of factors restricted the overall development of this sector. As Tims (69) puts it, these factors include the fact that, at least before the Nigerian Enterprises Promotion (Indigenization) Decree of 1972, (1) the largest manufacturing groups were predominantly foreign-owned and controlled. The then industrial structure was not well diversified and there had been little increase in domestic value-added which amounted to only 26 percent of gross output in 1967 (2) backward and forward integration was not yet significant, although the government was promoting such development, particularly in textiles, and (3) export processing industries grew considerably slower than import-substitution industries, and the share of manufacturing value-added of the former declined from 50 percent in 1958 to 25 percent in 1967. Other constraints which worked against industrial growth during the period under review ranged from shortage of industrial manpower, the slow implementation of public sector manufacturing projects, restrictive industrial and administrative practice to inadequate infrastructure.

Electricity and Water

With the completion in 1968 of the multipurpose Kainji Dam whose planned hydroelectric capacity is 960 MW, Nigeria's reliance on thermal plants alone has been considerably relaxed. Of the country's total

generating capacity of 690 MW in 1975, 320 MW was provided by Kainji Dam, while, on the whole, 3,175 million kwh were generated (1). The National Electric Power Authority (NEPA), formerly called Electricity Corporation of Nigeria (ECN) has the statutory authority to control the generation of electricity in Nigeria. Notwithstanding the additional electric units from Kainji Dam and the new statutory body, that is, NEPA formed to supersede the old (ECN), the supply of electricity for both domestic and industry uses has, in several instances, been inadequate and unreliable. The same unsatisfactory situation holds in connection with rural and urban water supplies. To achieve a position acceptable to both residential and commercial users, there must be improvement of electrification and water supplies.

The mean annual contribution of this sector to GNP was 0.4 percent during the period, by far the smallest contribution of the sectors. In growth terms, this sector enjoyed a mean annual growth rate of 14.3 percent (see Tables III and IV).

Building and Construction

Minus the civil war years, especially 1968 and 1969, the trend in this sector continued to be upward during the period. As in Table II, its contribution to GNP rose from ₦ 77.8 million in 1961 to ₦ 822.1 million in 1975. In terms of percentages, the mean annual contribution was 4.5 percent. Despite technical problems as associated with scarcity of engineering skills, shortages in input materials and skilled workforce, the mean annual growth rate in this sector was 19.4 percent. Compared with other sectors' mean annual rates of growth, this sector came second with mining taking a distinct lead.

Distribution

The distribution sector was badly affected during the entire period of the civil war. Its contribution to GNP rose gradually from ₦ 231.8 million in 1961 to ₦ 432.8 million in 1966. Thereafter, it fell to ₦ 380.0 million in 1970 before rising rapidly a year after to ₦ 854.5 million in 1971, and then ₦ 971.2 million in 1975. As a service sector, it means that all the activities of the country's Commodity Marketing Boards (CMB) as well as those connected with local or domestic trade are handled by this sector. During the civil war time, all forms of internal distribution and trade between states in the country were badly interrupted, and this interruption seriously affected the contribution and growth of the sector's economy. Even though the mean annual growth rate for this sector was 13.1 percent during the entire period of study, there were consistently negative yearly rates of growth during the time of the civil war, 1967 and 1970 (see Table IV). While agriculture and manufacturing employed a workforce of 63.9 and 16.8 percent of the total workforce, respectively, the distribution sector was next with 12.18 percent. As shown in Table I, this suggests that the distribution of labor services in Nigeria is greater among the three sectors.

Transport and Communication

Like the distribution sector, the performance of this sector was rather poor during the civil war years. Negative yearly growth rates were reported between 1966 and 1969. However, the mean annual growth rate over the period was 8.4 percent. This rate was only higher than the mean rate (7.4 percent) in the agricultural sector. In percentage

terms, the contribution of this sector to GNP was 3.5 percent. Except for the electricity sector recording only 0.4 percent, this sector's contribution was the least.

A good transport system, it must be emphasized, is essential for industrial, commercial and agricultural growth and development of any country. Before Nigeria can achieve the desired growth of output, all her transport network in addition to other growth-limiting factors must be improved. For better understanding of this sector, there is need to examine the components of Nigeria's transport system. The country relies on rail, land (road), water and air transportations. Rail and road transportation mainly helps in bringing produce from the interior for distribution. In most cases, services, especially rail, are inefficient and slow. The losses sustained for many years, at least between 1963 and 1975, by the Nigerian Railway, underscore the inefficiency of this system. Road transportation, is the most important type of transportation. Despite some interruption during the civil war time, road transportation was most important to the growth of the overall transportation sector. Air transportation did not make a significant contribution during this review period. To improve the air traffic system, substantial amount of money was allocated in the Third National Plan (1975-80) (see Table VI).

Since 1970, the six water ports (Lagos-Apapa, Warri, Port Harcourt, Calabar, Bonny and Burutu) were sources of additional problems. The ports, especially Lagos-Apapa which alone accounted for about 75 percent of all imports, were subject to severe congestion. This congestion peaked in 1975 when the Nigerian government had to step in with special emergency measures to reduce the number of ships

waiting to berth from 400 to about 70 at the end of 1976 (1).

Regarding communication, total number of telephones in Nigeria rose from 38,690 in 1960 to 109,000 in 1974, representing a mean annual growth rate of 11.36 percent. Also, the number of postal establishments rose from 1,192 in 1960 to 1,730 in 1974 representing a mean annual rate of growth of 2.82 percent (48, p. 9). On the whole, the problems encountered by this service sector during the period included lack of effective management personnel, good traffic regulatory know-how and reasonable institutional reforms.

Investment Programs and Growth Through Development Plans

Like most developing economies, Nigeria implements investment programs within the framework of National Development Plans. Of the three National Development Plans conceived since independence in 1960, two have been fully executed and the one remaining terminates in 1980. A brief evaluation of the three plans follows after the examination of the relationship between GNP and gross investment.

Table V shows this relationship of Nigeria's gross investment to GNP in percentage terms. Much as the GNP was subject to rapid increases except for the civil war years so was gross investment. In fact the gross investment as a percentage of GNP rose from 12.8 percent in 1961 to 16.9 percent in 1965. Thereafter, it declined to an average of 15.6 percent during the civil war years before climbing up again to 19.5 percent in 1970. Between 1971 and 1974, it stood at an average of over 18.0 percent before rising dramatically to 31.5 percent in 1975 followed by 34.5 percent in 1976. This dramatic rise

TABLE V

GROSS INVESTMENT AS A PERCENTAGE OF GNP, 1961-76

Year	GNP (In Current Prices) (1)	Gross Investment (In Current Prices) (2)	Percentage of (2) on (1) (3)
1961	2373.0	304.6	12.8
1963	2806.4	367.0	13.1
1965	3080.6	522.6	16.9
1967	2869.0	446.8	15.5
1968	2802.0	438.0	15.6
1969	3482.0	550.0	15.8
1970	4525.0	883.0	19.5
1971	7098.0	1283.0	18.1
1972	7703.0	1401.0	18.2
1973	8626.0	1506.0	17.5
1974	14,252.0	2534.0	17.8
1975	15,259.0	4806.0	31.5
1976	19,368.0	6700.0	34.5
Mean			19.0

In Million Nairas - Except Col. 3

Source: 1. International Financial Statistics (May 1978), IMF, Washington D.C. - Columns 1 and 2.
2. Column 3 computed from 1 and 2.

TABLE VI

THIRD NATIONAL DEVELOPMENT PLAN*

Sector (1)	Allocation (2)	In Percent (3)	Sector (1)	Allocation (2)	In Percent (3)
Agriculture	1,400	3.90	Education	2,000	5.60
Industry	6,000	16.70	Teacher Training Institutions	200	0.60
Oil Refineries	100	0.30	Secondary Education	615	1.70
Liquefied Natural Gas Projects	2,100	5.80	Technical Education	202	0.56
Cement Plants	200	0.60	Scholarships	126	0.36
Power	n.a.	n.a.	Health	659	1.83
Electricity Distribution	163	0.5u	Malaria Eradication	30	0.08
Rural Electrification	30	0.08	Labour and Social Welfare	153	0.43
Transport	4,100	11.40	Information	201	0.60
Roads	3,400	9.40	Regional Development	3,200	8.90
Railways	400	1.10	Housing	2,000	5.60
Air Transport	390	1.08	Water Supply	521	1.45
Water Transport	387	1.07	Defense and Security	2,200	6.11
Communications	774	2.20	General Administration	854	2.40
Telecommunications	715	2.00	Public Sector Investment	20,000	
Postal Services	59	0.02	State Governments	6,500	
			Private Sector Investment	10,000	
				36,000	

Note: Under the Plan, Gross Domestic Product is expected to grow from ₦13.962 million in 1974-75 to ₦21,580.0 million in 1979-80 (at 1974-75 prices), giving a compound growth rate of 9.1 percent per annum. The revised target growth rate is now 9.5 percent per annum.

Col. 3 calculated from Col. 2 as a percentage of ₦36,000.

*The plan was reviewed by the Government early in 1977, when planned expenditure was increased to ₦43,000 million.

Source: Europa Year Book - Nigeria's Statistical Survey, London: Europa Publications Limited, 1977, p. 1233, Cols. 142 only.

in the last two years of the period might be associated with a number of factors. One of such factors was the gigantic Third National Plan (1975-80). The plan called for huge public and private investments which had to be spread over the five years of the plan period. Looking in terms of the study period (1961-76), the mean annual gross investment as a percentage of GNP was approximately 19.0 percent.

The First National Development Plan, 1962-68

Nigeria's First National Plan came into being two years after independence. To achieve an improved standard of living, the Nigerian planners realized that an increase in the growth rate of Gross Domestic Product (GDP) would be required. With this realization, the purpose of the First Plan was simply to raise the growth rate of GDP from 3.0 percent to 4.0 percent and to achieve this through the gross investment of 15 percent of GDP (26, p. 336). Of the ₦ 2,266.6 million projected investment, excluding defense, two thirds, that is ₦ 1,511.1 million was to be undertaken by the public sector, and the remainder (₦ 755.5 million) was to come from the private sector (43).

This plan failed to achieve its purpose. Contrary to predictions that the private sector might fail to produce the desired investment, the public sector failed as it went below the target established for it during the first two years of the Plan. Development economists blamed its failure on government's inability to generate the desired investment funds. It was observed that the public sector's capital expenditure expected in the first two years was $792 million, but only $450 million was spent (26, p. 342). The public sector's failure can

be blaimed in part upon the dependence on foreign aid to finance the government portion of investment. Ayida (6, p. 352), the then Permanent Secretary in the Ministry of Economic Development and Planning, noted that the flow of foreign aid was low due to stringent requirements of the donor nations, such as feasibility studies, and detailed negotiation for loan terms. These intermediate processes and delays limited the extent to which the foreign aid could be quickly utilized. Because the Plan had its early difficulties, it would be wrong to link its failure to the Nigerian civil war which actually started in 1967.

The Second National Development Plan, 1970-74

The civil war which ended in January 1970 made it impossible for the Second Plan to start at the termination of the First in 1968. With the need for reconstruction and rehabilitation, the Second Plan came into full effect in 1970. It emphasized rural improvement, unemployment, increasing agricultural output, greater industrial participation by the Nigerians and improvements in infrastructure. Originally, the projected investment under the Plan was ₦ 3191.6 million, of which ₦ 1,560 million was to come from the public sector and ₦ 1,631.6 million from the private sector (44). Allocation of Private sector investment was on the basis of projection. Because of increased oil revenue, the projected investment was raised to ₦ 5,300 million. Unlike the First Plan where reliance was mainly on foreign aid with only 20 percent of public investment financed from domestic sources, the Second relied more on oil revenue. In fact, under this Plan,

80 percent of the public investment was to come from domestic sources. A 7 percent annual growth rate was envisioned in the Plan, but it turned out that 8.2 percent was actually realized. By actual (rather than potential) standard, the Second Plan was considered successful.

The Third National Development Plan, 1975-80

With the size of capital investment of ₦ 30,000 million, which was later increased in 1977 to ₦ 43,000 million, the Third Plan was the biggest and most dynamic not only in Nigeria but in black Africa. Indeed, the Plan was developed to reflect oil affluence in Nigeria. Of the Plan's original investment proposal of ₦ 30,000 million, the public sector would be responsible for ₦ 20,000 million while the private sector would have to spend ₦ 10,000 million (45). The sectoral allocation of the investment funds under the Plan is set out on Table VI.

It is evident from the allocation that the Third Plan laid emphasis on industrial development, industrial infrastructure, agricultural development, increased federal aid for education and health, regional and housing development. Defense and security also had a good share of the allocation. This is not surprising given the size of the army which almost quadrupled after the civil war in 1970. The Plan's main objective was to increase GDP at an average rate of 9.1 percent annually with the original investment of ₦ 30,000 million and 9.5 percent with the revised investment of ₦ 43,000 million.

Even though the actual growths of GDP as expected in the Second and Third Plans were achieved, this does not mean that the maximum

growth of output was achieved under the two Plans. The bottlenecks of the economy, such as poor infrastructure, inadequate manpower, scarcity and/or unavailability of resources, inefficient distribution system and ineffective plan effectuation and monitoring were responsible for achieving less than maximum growth of output (48, p. 11).

Foreign Trade and Balance of Payments

Since 1900, following the imposition of the British Colonial rule, the growth of Nigerian exports has not been steady. Between 1900 and 1929, export value and volume grew at a compounded annual rate of 7.0 percent and 5 1/2 percent respectively (52). Because of the Great Depression which started in 1929, the apparently rapid growth in export value and volumn declined sharply between 1930 and 1945. The volume of imports during the period also declined. In spite of the depressed value and volume of both exports and imports during the period, the yearly trade balances were favorable. This period has been referred to as the stagnation period (26, 42). Between 1945 and 1965, the volume and value of exports grew steadily. Imports in the same period, especially from 1955, grew much more rapidly resulting in an adverse trade balance.[3] Part of the period of trade deficits, 1961-65, is covered by this study (see Table VII).

Total export earnings during our study period, 1961-76 (Table VII) rose from ₦ 346.9 million to ₦ 6,623.0 million in 1976. The only years that the export earnings sharply declined were the last two

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[3]See the author's work (42 , p. 45).

TABLE VII

NIGERIA'S EXPORT AND IMPORT PICTURE, 1961-76

Year	Exports			Percent of (3) on (1) (4)	Total Imports (5)	Trade Balance (6)
	Total (1)	Non-Oil (2)	Oil (3)			
1961	346.9	323.8	23.1	6.7	444.8	- 97.9
1962	337.2	303.7	33.5	9.9	406.5	- 69.3
1963	379.4	339.0	40.4	10.6	143.8	- 34.4
1964	429.3	365.2	64.1	14.9	507.8	- 78.5
1965	536.8	400.6	136.2	25.4	550.4	- 13.6
1966	568.2	384.3	183.9	32.4	512.7	+ 55.5
1967	483.6	338.8	144.8	39.9	447.1	+ 36.5
1968	422.2	348.2	74.9	17.5	385.2	+ 37.0
1969	636.3	274.4	261.9	41.2	497.4	+ 138.9
1970	885.7	376.1	509.6	57.5	756.4	+ 129.3
1971	1293.4	340.4	953.0	73.7	1079.0	+ 214.4
1972	1434.2	258.0	1176.2	82.1	990.1	+ 444.1
1973	2277.4	383.9	1893.5	83.1	1224.8	+1052.6
1974	5794.8	429.1	5365.7	92.6	1737.3	+4057.5
1975	4924.7	395.1	4629.6	94.0	3721.5	+1203.2
1976	6623.0	426.8	6196.2	93.5	5139.7	+1483.3

In Million Nairas Except Col. 4

Source:
1. International Financial Statistics (May 1978), IMF, Washington, D.C.
2. "Economic Survey of Nigeria" in African Development Magazine (March 1975), p. N5.
3. Col. 4, the percentage contribution of oil export to total exports, is calculated from cols. 1 and 3.
4. Col. 6 is calculated from cols. 1 and 5.
   - represents unfavorable Trade Balance.
   + represents favorable Trade Balance.

years of the civil war, 1967-68. The value of oil exports rose from ₦ 23.1 million in 1961 to ₦ 6,196.2 million in 1976. By 1965, the percentage contribution of oil export to total exports was 25.4 percent. This contribution increased to 41.2 percent in 1969. In the 1970s, oil exports have, by far, overtaken agricultural exports. In fact, its contribution to total exports rose very rapidly from 57.5 percent in 1970 to 94.0 percent in 1975, and fell slightly to 93.5 percent in 1976. The average percentage contribution of oil export between 1970 and 1976 was about 83.0 percent.[4] Total imports rose from ₦ 444.8 million in 1961 to ₦ 550.4 million in 1965 before dropping during the four years of the civil war, 1969-69. In 1970, total imports amounted to ₦ 756.4 million. The unprecedented rise in imports between 1970 and 1976 is expected in view of the two National Plans the economy accomodated within this time period. Much of import demand at this time was for capital goods. For example, of total imports of ₦ 990 million in 1972, ₦ 388 million went for consumer goods and ₦ 601 million went for capital goods. In 1974 imports of consumer goods climbed to ₦ 540 million, while capital goods imports jumped to ₦ 1197 million (20).

The only period of deficit trade balance was between 1955 and 1965. This was due to poor agricultural yields and market conditions. For instance, the world cocoa market in particular was in disarray at this time, resulting in depressed world price for cocoa. Other agricultural products also encountered fluctuating prices on the world

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[4]This percentage is calculated from the information on colum 4.

market. Another reason might be associated with the fact that crude oil production was low as was its price per barrel. As the production of oil increased, the balance of trade became more favorable. Between 1966 and 1969, despite the civil war, the country's trade balance remained favorable. The positive trade outlook continued into the 1970s with enormous trade surpluses, the biggest of which was ₦ 4,057 million in 1974.

In summary we can conclude the following with respect to the trade sector of Nigeria: (1) without increased oil production and export, Nigeria would not have escaped the danger of trade imbalance in the second half of the 1960s and the whole of the 1970s (2) agricultural export earnings declined in the 1960s, but the decline was worse in the 1970s with less than 20 percent contribution to total exports on the average (3) oil export rather than agricultural export during the period was Nigeria's main source of foreign exchange. The predominance of oil exports as a source of government revenue and foreign exchange may extend into the 1980s and possibly the 1990s, in spite of agricultural development.

Nigeria's revenue situation during the period deserves some comment. The expanding trade surpluses due to huge oil exports in the 1970s meant expanding revenue for the federal government. When the increases in the price of oil were not very rapid before 1971 (a barrel of Nigerian light "low sulphur"[5] oil cost only $2.42 in 1970), the

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[5]The Nigerian crude oil, considered light, has a low sulphur content which gives the refined oil a very high quality. Because of its high quality, Nigeria has been permitted by the oil cartel, the OPEC, in several occasions to charge a little in excess of the fixed prices per barrel.

contribution to revenue from the petroleum products was not great. The fluctuating rise in oil revenue between 1965 and 1970 can be seen in Table VIII. The decline in revenue especially in 1967 and 1968 is linked to the civil hostilities which disrupted oil production in some parts of the Eastern States of Nigeria. The increase in revenue in the 1970s was great. This was due to the jump in the price of crude oil from $3.20 per barrel in 1971 to $8.40 in 1973. Sporadic price hikes followed with the price rising to $11.66 per barrel in 1974, $14.00 in 1976, $15.50 in 1978, and over $24.00 in January 1979 (51). Revenue from petroleum overtook revenue from other sources rising from ₦ 603.0 million in 1971 to ₦ 4834.0 million in 1976. The contribution of oil revenue to total revenue in the 1970s in percentage terms shows that government revenue in some years, 1974 and 1975, depended almost completely upon petroleum. In these two years, the contribution of oil to total revenue was 99.8 percent and 96.9 percent respectively (Table VIII).

The trade surpluses shown in Table VIII do not, however, reflect the full amounts of foreign exchange remaining in Nigeria because a few of the import substituting industries have been financed, to some extent, by foreign capital. After deducting investment income accruing to non-Nigerians and adding factor payments abroad generated especially from the petroleum sector, the country's Balance of Payments showed an overall surplus of ₦ 3,102 million in 1974 and ₦ 215 million in 1975 (1)

In conclusion, it would be difficult to underestimate the importance to the Nigerian economy of the rapid oil price increases which resulted in expanded government revenue. The foreign exchange

TABLE VIII

RELATIONSHIP OF NIGERIA'S OIL REVENUE TO TOTAL REVENUE

Year (1)	Total Revenue (2)	Revenue From Oil (3)	Percent of (3) on (2) (4)
1965	189.2	29.2	15.4
1966	182.2	45.9	24.7
1967	167.9	41.8	24.9
1968	186.0	39.6	15.9
1969	245.7	75.4	30.7
1970	462.9	176.4	38.1
1971	968.5	603.9	62.3
1972	1022.6	735.0	71.9
1973	1768.9	1368.6	77.4
1974	4189.7	4184.0	99.8
1975	4712.4	4568.0	96.9
1976	5522.7	4834.0	87.5

In Million Nairas Except Col. 4

Source:
1. OPEC, Annual Statistical Bulletin, 1977, p. 160.
2. International Financial Statistics (May 1978), IMF, Washington, D.C.
3. Col. 4 is calculated from Cols. 2 and 3.

position during the period, especially in the 1970s, has been significantly strengthened, making the pursuit of the Second and Third National Plans possible. The economy has expanded at an annual rate of 8.0 percent in real terms since 1970. A large number of jobs were created and the need for foreign (financial) aid greatly reduced if not eliminated.

Education and Manpower

Among the earliest work done on the development of manpower in Nigeria was that by Harbison (13). He provided estimates for Nigeria's needs for high-level manpower by 1970. The ashby Commission in 1960 used Harbison's estimates or projections as the basis for recommending expansion of university education in Nigeria to meet the country's manpower needs up to 1980. The commission, among other things, called for (a) a substantial increase in both primary and secondary school enrollment throughout the country especially in the Muslim North of Nigeria to ensure an adequate flow of students for post secondary (university) education (b) the federal government to support the development of four new universities, by 1980 (5).

Undoubtedly, the Commission's report resulted in the acceleration of all levels of education in Nigeria since 1960. For instance, enrollment in primary schools jumped from about one million pupils in 1960 to almost 5 million in 1973. With the introduction of universal free primary education in 1976 followed by government order that free primary education be made compulsory for every pupil from 1980, the enrollment from 1980 would undoubtedly double the enrollment figure in

1973. Secondary school enrollment would also double, and this was why the Third National Plan, 1975-80 provided for at least 800 additional secondary schools to be built by 1980 (16). In the case of university education, the rise in student enrollment was from 1101 in 1959/60 to 39,888 in 1976/77, while the rise in graduate output was from over 300 in 1960/61 to 8,594 in 1976/77 (41). Since the university education system is the major source of manpower, the government hastened to build four new independent universities by 1963. Prior to the Nigerian independence in 1960, the country had only one university -- the University of Ibadan. In the 1960s, the demand for university education, even during the civil war years, continued to increase far more than the supply of places available in the five universities. A study done by Ojo (47) shows that the Nigerians potentially[6] qualified for university education in 1967 and 1968 were 11,154 and 8,361 respectively, but the supply of places available in the five universities then were 3,496 and 3,642

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[6]To be potentially qualified for the university admission, the prospective student applicant (for a 4-year university work) must pass the West African School Certificate (WASC) in grades one or two, getting "credit" or "distinction" in at least five subjects, or passes in the London General Certificate of Education - Ordinary Level. In terms of the American system, this is equal to making very high grades toward the high school diploma. For "direct" admission (for a 3-year university work), the applicant must have 3 principal passes at a sitting after at least 2 years of studies beyond secondary or high school level, or 3 principal passes at Advanced Level - see London General Certificate of Education (GCE). The "direct" admission procedure ceases to be used from 1980. Of the students passing the WASC examination yearly, close to one half of them are often found in grade 3, the last passing grade. Students in this grade are hardly considered for university admission in Nigeria. If they have a stake for university education, they could improve their grades by repeating the WASC examination or go ahead to do the Advanced Level of London GCE papers.

respectively. Due to both the expansion of the existing universities and the creation of three more university colleges (at Calabar, Port Harcourt and Jos), the supply of places in all the universities/ colleges, however, increased to 8,761 in 1974/75. The demand for university places did not shrink in the 1970s either. Based on Ojo's work, the demand was 13,186 in 1974 and 15,363 in 1975 quite in excess of supply. To increase the supply of places and improve the country's manpower position in the 1980s, the Third National Plan, 1975-80 provided for continued expansion of existing and creation of new universities. By 1977 a total of thirteen universities existed. The Third Plan anticipated that by having at least thirteen universities before 1980, the cumulative university enrollment would increase from a level of a little over 30,000 in 1975-76 to 53,000 in 1980 (45). In terms of all educational levels in Nigeria, the total enrollment level under the Third Plan was projected at about 14 million by 1980.

The financing as well as the administration of education in Nigeria has been the dual responsibility of the federal and state governments. In particular, the administration of primary and secondary education has been the responsibility of the state governments. The federal government, however, operates a few national secondary schools and assists the expansion of education in states with less well developed school systems (69, p. 179). Both the federal and state governments have the concurrent responsibility over universities.

The relationship of recurrent educational expenditure between the states and the federal governments in 1970/71 can be seen on Table IX. Callaway and Musore (9) are credited for work in connection with

financing of education in Nigeria. Total (that is, federal and state) recurrent expenditure rose from ₦ 63.88 million in 1965/66 to ₦ 129.10 million in 1970/71. As shown on Table IX, the states' recurrent expenditure was far more than the federal. In percentage terms, the emphasis of federal expenditure was on higher education with 81.9 percent, while that of the states was on primary education followed by secondary with 49.9 percent and 18.5 percent respectively. The combined federal and state recurrent expenditure shows that primary education in 1970 received 42.2 percent, followed by higher education with 20.5 percent and secondary education with 16.3 percent.

TABLE IX

COMPOSITION OF RECURRENT EDUCATION BUDGETS, 1970/71

	Federal	States	Total
Total	20.5	108.60	129.10
Percent	100.0	100.0	100.0
Primary Education		49.9	42.2
Secondary Education	5.0	18.5	16.3
Technical/Vocational	3.4	1.7	1.9
Teacher Training	1.1	7.7	6.7
Higher Education	81.9	8.9	20.5
Adult Education		0.2	0.2
Administration and Inspectorate	2.1	7.3	6.5
Other (Including Scholarships)	6.5	5.8	5.9

In Million Nairas - See First Row

Source: UNESCO, Education in Nigeria (Paris: 1968), Annex 85. Reflects Estimates for federal and state governments in 1970/71.

Planned capital expenditure between 1970/71 and 1973/74 shows the federal government leading in investment on university education (Table X).

TABLE X

PLANNED EDUCATION CAPITAL EXPENDITURE, 1970/71-1973/74

	Federal	States	Total
Total	98.2	179.6	277.8
Primary	13.0	55.0	67.8
Secondary	14.0	42.8	56.8
Technical	5.2	19.4	24.6
Teacher Training	4.0	22.4	26.4
University	51.0	31.0	82.0
Other	11.0	9.0	20.0

In Million Nairas

Source: Federal Ministry of Economic Development, Second National Plan, Lagos, Nigeria, 1970, p. 246.

While the highest capital expenditure of the federal government went for university education, ₦ 51.0 million followed by secondary education and primary education, ₦ 14.0 million and ₦ 13.0 million respectively, that of the states went for primary education (₦ 55.0 million), followed by secondary education (₦ 42.8 million), and university education (₦ 31.0 million). By far the federal government

spent about ₦ 20.0 million more than the combined state expenditures for university education. Looking at the total (combined federal and state) expenditure, university education received the highest (₦ 82.0 million) followed by primary education (₦ 67.8 million), and secondary education (₦ 56.8 million) (see Table X). With the expenditure pattern on higher (university) education since 1970, it is clear that the federal government has played more increasing role in the control of the nation's universities.

Technical and vocational education received little attention in the 1960s. This, however, changed in the 1970s with the sizeable capital investments under the Second and Third National Plans. Capital investments on technical education under the First and Second Plans were ₦ 24.6 million and ₦ 202 million respectively (see Tables X and VI). The same applies with regard to investment on teacher education which stood at ₦ 26.4 million under the Second Plan and ₦ 200 million under the Third Plan.

Despite efforts to improve all levels of education, Nigeria continues to suffer seriously from manpower shortages (63). How serious the manpower constraint is depends on both the vacancy rate in different skill categories and the country's dependence on expatriate manpower. This manpower constraint will be examined during our discussion on the determinants of growth in Nigeria.

Government Development Policies

The declining agricultural output has been a matter of grave concern to the governments (federal and state) of Nigeria. As we have seen, agriculture used to be the mainstay of the economy before 1965,

providing about 80 percent of total export earnings. Because of the vast growth in petroleum exports, agriculture's share dropped below 10 percent by 1975. In view of the poor performance of agriculture, the Third Plan, 1975-80, provided for substantial capital investment (₦ 1,400 million) for its improvement. The Plan called for vast increases in the production of food, tree crops, fruits and vegetables. To achieve these increases, the federal military government in Nigeria introduced an emergency program called "Operation Feed the Nation" in 1976 (18). The motivation for the federal government to establish the program resulted from a report by the National Agriculture Seminar organized in 1971 by the Ministry of Agriculture and Rural Development. It was reported that the deficiency in our total food supply (this includes all agricultural products) would be in the neighborhood of 5 million metric tonnes by 1975, and with no drastic action, the figure would rise to 16 million metric tonnes by 1985. It was also realized that, over the years, the rate of growth of agriculture has not been keeping up with the rate of population growth, resulting in the country's inability to produce enough agricultural products of various kinds. Finally the increase in food imports from ₦ 88 million in 1970 to ₦ 300 million in 1975, which resulted in a drain on the country's foreign exchange, was also given as a reason to start the emergency program (22).

As of then, the major aims of the program were:

(1) Total mobilization of the Nation towards self-reliance in food.
(2) Encouraging the sector of the population which relies on buying food to grow its own food, e.g. schools, universities, military establishments, etc.
(3) Encouraging general pride in agriculture through the realization that a nation which cannot feed itself cannot be proud.

(4) Encouraging balanced nutrition thereby producing a healthy nation (22).

The program, so far, has achieved little success. With the capital expenditure of ₦ 1,400 million going for the development of agriculture under the Third Plan, the problem has been how this amount could be absorbed productively. In the Second Plan, because of low absorptive capacity in the sector, ₦ 97 million out of ₦ 225 million was used (54). To achieve the maximum increase in food production, agriculture has to be improved. Traditional system of farming has to be replaced by mechanized system. Success of the mechanized system depends on sufficient manpower, education programs, adequate incentives and the willingness to work (66).

In the area of transport and communication government policy is to improve all the means of transport and communication discussed earlier. Since road transportation dominates inter-state trade, the allocation (₦ 3,400 million) for road expansion and improvement under the Third Plan was the highest in the transport sector. The government recognizes that with good roads food crops or produce could be transported conveniently from the farm to market centers within and outside the states in Nigeria. To relieve pressure on the Lagos port, which carried over 75 percent of the country's imports and non-oil exports by 1975, improvement of other ports (e.g. the ports of Calabar, Port Harcourt, Warri and Lagos itself) with additional berths has been directed. Sizeable allocations have also been made for the expansion of rail and air transport systems, and the communication system. Due to limited absorptive capacity, this sector has not been able to absorb the allocated funds productively.

The need for the Nigerians to be adequately involved with private sector manufacturing and industrialization gave rise to the Nigerian Enterprises Promotions Decree of 1972 by the federal military government (46). Under this decree which was strengthened and expanded in 1976, indigenization has been greatly pursued to ensure (1) the barring of alien participation in small businesses (2) the holding of over 40 percent shares by Nigerians in numerous larger firms. With the creation of development banks by the federal government to assist by way of making loans to and/or quaranteeing the potential indigenous investors or buyers of small and medium size businesses, this indigenization policy has been successful (1, 48, 54). The importance of this policy has been to increase the role of and actually enable Nigerians to dominate the private sector economy.

Government policies associated with the mineral and power sectors are considered good as long as they work in the interest of Nigerians. Because of the importance of oil as the major source of foreign exchange, Nigeria's effort to control her oil industry has been great. By forming the Nigerian National Oil Corporation (NNOC) before 1974, the government created a vehicle whose role has been to intervene directly in the exploration, production, refining, and transportation of oil either on its own or in collaboration with suitable partners (54). The formation of this government inspired oil corporation was also designed to help Nigerians acquire the technical knowledge required for running the oil industry. The NNOC controlled 55 percent of the assets in the five main producing foreign oil companies in Nigeria by 1975. It also owned 60 percent of the only refinery run by Shell BP near Port Harcourt. Up to 1964 when there

was no refinery, crude oil was exported to Europe and America for refining. The supply of the refined petroleum products was not adequate even after the construction of one refinery by Shell BP thereafter. In the 1970s, in particular, there were sporadic shortages of refined petroleum products. To insure a steady supply of these products to both residential and industrial users, the government directed the building of two more refineries at Warri and Kaduna, and the expanding of the old one at Port Harcourt under the Third Plan. The combined capacity of the three refineries today is 245,000 barrels per day (b/d) as compared with only 60 b/d refinery at Port Harcourt before its expansion. All three refineries are now controlled by NNOC, and the country's petroleum needs are likely to be met for a long time to come. In the case of power, there has been a program under the Third Plan for massive transmission and distribution of electricity to rural areas of the country.

A Macroeconometric Model of the Nigerian Economy

The concern of this section is to develop a macroeconometric model of Nigeria which will be used for projection of national output. This model will be estimated from annual data over the 1961-1976 time period. Basically the estimation will be that involving two methods -- ordinary least squares (OLS) and two stage least squares (2SLS). In models to simulate the economy such as this, there is always the presence of simultaneous equation system. It is important to note that 2SLS rather than OLS is capable of yielding consistent estimates in simultaneous equation situations (30). Alternative formulations of

functional relationships are considered. Final specification of the model will depend upon statistical considerations such as R^2 (coefficient of determination) and the "t" test. Where a serial correlation has been made, the value[7] of the first-order autocorrelation will be represented by (ρ).

Classification of Variables in the Model

This model like many other policy models has three types of variables. The three major variable classification groups are endogenous, exogenous and lagged endogenous. In line with Tinbergen's (61), classification scheme within these major groups are sub-classifications, target, intermediate, instrument and data variables. Target variables are those on whose behavior our interest lies. For example, per capita GNP, employment or Balance of Payments can all be target variables. The achievement or failure to achieve an objective can be indicated by the behavior of the specified target variables. Intermediate variables are those providing the theoretical link among various variables in the model, but actually are of no immediate interest by themselves. The variables in this category include government transfers to households, direct taxes and subsidies, transfers to abroad, etc. Instrument variables are those likely to be influenced especially by government. Intermediate factors to consumption such as imports are among the examples of instrument variables. Data variables are determined outside the model.

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[7]This value (ρ) may be computed thus:

$$\hat{\rho} = \frac{\Sigma \hat{U}_t \hat{U}_{t-1}}{\Sigma \hat{U}^2_{t-1}}$$

Basic Model Construction

Macroeconometric models often follow the design of the National Income and Product Accounts. This design is basically Keynesian in nature since aggregate supply must equal aggregate demand (67). A Keynesian basic income identity is, therefore, the point from which the macro modeling of Nigeria starts:

$$Y + M = C + I + X \quad (1)$$

Where:

Y = Gross National product (GNP)

M = Imports of goods and services.

C = Aggregate (public and private) consumption of goods and services.

I = Aggregate investment.

X = Export of goods and services.

The lefthand side of equation (1), (Y + M) represents aggregate supplies or total resources available for the economy at a given time period. The righthand side (C + I + X) represents aggregate demand, or the sum of claims on available resources at a given time period. Essentially, what equation (1) or the identity postulates is that supplies, ex post are by definition equal to aggregate demand.

By rearranging identity (1), we can derive (2), thus:

$$Y = C + I + (X - M) \quad (2)$$

Where:

(X - M) represents a summary of the balance of payments.

Consumption Function

A number of studies recognize the applicability of consumption

theories designed for developed economies to the economic structure of the developing countries, either by a comparative analysis or by applying a given theory to data derived from a developing economy (60). For our purpuse, it is useful to divide aggregate consumption into:

(1) Aggregate Private Consumption, Cp

(2) Aggregate Public consumption, Cg

Using simple Keynesian consumption hypothesis, aggregate private consumption, Cp can be assumed to depend on absolute level of personal disposable income, Ypd. In this respect, the disposable income is the sole explanatory variable of variations in consumption for time, t. Thus:

$$Cp_t = \alpha + B_1 Ypd_t + U_t \qquad (3)$$

Considerable economic literature relates public consumption to gross national product, Yn. Essentially public consumption consists of government purchases of goods and services for operational and administrative purposes. In most LDCs, this type of expenditure is often referred to as general budget. The general budget provides finance for government expenditure of general and concurrent nature such as wages, salaries, office furniture and equipment, etc. With respect to Nigeria, public consumption is assumed to be a function of GNP, Yn.

$$Cg_t = \alpha + B_1 Yn_t + U_t \qquad (4)$$

The result in equation (4) may not be very reliable if government relies mainly on taxes for consumption expenditures. It may, therefore, be reasonable to express public consumption as a function of total taxes, T (here T is the sum of direct and indirect taxes).

$$Cg_t = \alpha + B_1 T_t + U_t \qquad (5)$$

The reasoning in support of equation (5) is that the government often uses almost 100 percent of taxes to cover its general expenditures. The validity of this equation would, of course, depend on the estimated size of B_1, the tax coefficient. Usually the tax coefficient is expected to be less than unity. B_1 could be greater than one if government consumption was financed from taxes plus oil revenues or some other sources.

Investment Function

As in the case of consumption function, the investment function is disaggregated into private, Ip and public, Ig investment. What influences private may not necessarily influence public investment. Simple Keynesian theory holds that, given a state of expectation toward the future, investment is inversely related to current interest rates. Because of lack of information or data on profit expectations, interest rates, changes in income and inventories which all include in the factors affecting private investment, these variables cannot be used as determinants of Ip. Therefore, one of the likely variables to be used to explain private investment in Nigeria is the GNP. The reasoning is that the higher the GNP, or Yn, the higher the incentive to invest due, of course, to implied higher aggregate demand.

$$Ip_t = \alpha + B_1 Yn_t + U_t \qquad (6)$$

A lag in response is examined in equation (6').

$$Ip_t = \alpha + B_1 Yn_{t-1} + U_t \qquad (6')$$

Oil exports may not be ignored as a basis for private investment. The hypothesis that private investment depends on oil exports, OX is based on the understanding that the higher the level of oil exports, the higher the level of economic activities, and the better are the expectations for the future. With better expectations, private investments are bound to be induced.

$$Ip_t = \alpha + B_1 OX_t + U_t \qquad (7)$$

With a lag in response, we have;

$$Ip_t = \alpha + B_1 OX_{t-1} + U_t \qquad (7')$$

Public or Government Investment, Ig. In a developing economy like that of Nigeria, government investment expenditures are greater for social projects such as building of roads, bridges, water ports, airports, railway and communication systems as well as improving the conditions of health and education of the country. Increased government expenditures aimed at social improvement and sectoral transformation may depend on either GNP or oil revenue. With a lag in response, the following public investment equations will be investigated.

$$Ig_t = \alpha + B_1 Yn_t + U_t \qquad (8)$$

$$Ig_t = \alpha + B_1 Yn_{t-1} + U_t \qquad (8')$$

$$Ig_t = \alpha + B_1 OR_t + U_t \qquad (9)$$

$$Ig_t = \alpha + B_1 OR_{t-1} + U_t \qquad (9')$$

The rationale for equations (8) and 8') is that the higher the GNP, the greater the possibility of and need for government investment. The same rationale applies to equations (9) and (9') in the case of oil revenue. The lag responses to equations (8') and (9') are necessary

assuming some delay in making investment or that expectations are based on past growth of oil revenues.

Import Functions

In the Nigerian economy, imports play a crucial role. It is clear that without adequate importation of capital goods, growth and expansion would be impossible. Besides heavy machinery and equipment, consumer goods are imported to supplement local production. Imports are so important for most LDCs that some development economists refer to imports as an engine of growth. Chenery (10) and others even argue that imports of capital goods, in particular, should be included with the total capital stock in the production function. In this study imports of capital and consumption goods are considered separately.

Imports of Consumer Goods, Mc. Since some part of the consumer goods imports is demanded by the public sector, it is reasonable to functionally relate imports of consumer goods to gross national product rather than to disposable income. The implication of equation (10) is that the higher the level of GNP, the greater the need to import consumer goods. A lag in response of Yn to Mc is modeled in equation (10').

$$Mc_t = \alpha + B_1 Yn_t + U_t \qquad (10)$$

$$Mc_t = \alpha + B_1 Yn_{t-1} + U_t \qquad (10')$$

Imports of Capital Goods, Mk. There are different ways to specify this function; one of such ways is to relate Mk to oil

revenues, OR. This means that higher imports of capital goods are possible as long as oil revenues continue to increase.

$$Mk_t = \alpha + B_1 OR_t + U_t \quad (11)$$

For a country whose revenue reliance is not from a particular source (Nigeria's revenue mainly comes from oil sales), capital goods imports can be expressed as a function of gross national product, Yn.

$$Mk_t = \alpha + B_1 Yn_t + U_t \quad (12)$$

What equation (12) suggests is that the size of GNP determines the level of capital goods to be imported.

The hypothesis that import of capital goods depends on gross capital fixed formation (total investment), TI_t is expressed by equation (13).

$$Mk_t = \alpha + B_1 TI + U_t \quad (13)$$

The implication of equation (13) is that the demand for capital goods is based on decisions to undertake investments.

Oil Revenues, OR. Nigeria's ability to invest in various development programs since the 1970s can be linked to increased oil revenue. Therefore, oil revenue is functionally related to oil exports. This relationship means that the higher the oil exports, the greater the revenue from oil.

$$OR_t = \alpha + B_1 OX_t + U_t \quad (14)$$

Oil Exports, OX. Since oil exports dominate all other exports in the Nigerian economy, this model plans to handle oil exports as a policy variable, in which case, its treatment will be exogenous.

To be considered as an exogenous variable also is non-oil exports.

It should be noted that the value of this variable is small in relation to total exports (less than 15 percent of total exports in the 1970s) even though it can have some impact on the economy.

Summary of Stochastic Equations and Identities

$$Cp_t = \alpha + B_1 Ypd_t + U_t \quad (1)$$

$$Cg_t = \alpha + B_1 Yn_t + U_t \quad (2)$$

$$Cg_t = \alpha + B_1 T_t + U_t \quad (3)$$

$$Ip_t = \alpha + B_1 Yn_t + U_t \quad (4)$$

$$Ip_t = \alpha + B_1 Yn_{t-1} + U_t \quad (4')$$

$$Ip_t = \alpha + B_1 OX_t + U_t \quad (5)$$

$$Ip_t = \alpha + B_1 OX_{t-1} + U_t \quad (5')$$

$$Ig_t = \alpha + B_1 Yn_t + U_t \quad (6)$$

$$Ig_t = \alpha + B_1 Yn_{t-1} \quad (6')$$

$$Ig_t = \alpha + B_1 OR_t + U_t \quad (7)$$

$$Mc_t = \alpha + B_1 Yn_t + U_t \quad (8)$$

$$Mc_t = \alpha + B_1 Yn_{t-1} + U_t \quad (8')$$

$$Mk_t = \alpha + B_1 OR_t + U_t \quad (9)$$

$$Mk_t = \alpha + B_1 Yn_t + U_t \quad (10)$$

$$Mk_t = \alpha + B_1 TI_t + U_t \quad (11)$$

$$OR_t = \alpha + B_1 OX_t + U_t \quad (12)$$

Identities

$$Yn = Yp - Tr \quad (13)$$

$$Ypd = Yn - TD \quad (14)$$

$$TI = Ip + Ig \quad (15)$$

$$C = Cp + Cg \quad (16)$$

$$M = Mc + Mk \quad (17)$$

$$T = TD + TIN \quad (18)$$

Empirical Results of Estimated Equations

The estimates[8] of the following equations were obtained for the period 1961-76.

Private Consumption (Cp)

$$Cp = \underset{(1.98)}{1372.6} + \underset{(8.46)}{0.68}\ Ypd^{9} \quad (1)$$

$R^2 = 0.8363$ D-W = 1.4896

The coefficient associated with personal disposable income (Ypd) is different from zero at the 5 percent level of significance. With acceptable D-W statistics, the test of significance is not at all influenced by the existence of some autocorrelation. Therefore,

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[8]There was no change in the size of the estimates for any equation when the method of 2SLS was used in estimation.

[9](a) The variable, Ydp, is defined in national income accounts as GNP after deducting direct tax, government income from property and savings of corporation, while adding government subsidies to household and transfer from abroad to households.

(b) The "t" ratio is given in brackets from now hence.

equation (1) is statistically valid. Private consumption (C_p) is positively related to personal disposable income (Ydp). This positive influence demonstrates that as Ypd increases so does Cp.

Public Consumption (Cg)

The estimated equation derived by relating Cg to total taxes (T) is, thus:

$$Cg = \underset{(4.83)}{483.3} + \underset{(7.55)}{0.1338T} \qquad (2)$$

$R^2 = 0.8026$ D-W = 1.3533

The tax coefficient is different from zero at the 5 percent level of significance. Since the tax coefficient is not greater than unity, misspecification problem does not exist. This means that the tax variable does not reflect the effect of other variables, such as oil revenue. In other words, government consumption during the period was financed strictly from taxes. Therefore, equation (2) is satisfactory.

An alternative specification is one relating public consumption (Cg) to GNP (Yn):

$$Cg = \underset{(-1.69)}{-0.45} + \underset{(5.72)}{0.14\ Yn} \qquad (3)$$

$R^2 = 0.7008$ D-W = 1.2831

The coefficient associated with gross national product (Yn) is different from zero at the 5 percent level of significance. However, the goodness of fit as measured by R^2 is better for equation (2). It, therefore, appears that equation (2) is the better specification.

Private Investment (Ip)

Three estimated equations (4-6) are examined with respect to private investment (Ip).

$$Ip = \underset{(-2.875)}{-1561.7} + \underset{(6.045)}{0.3054\ Yn} \qquad (4)$$

$R^2 = 0.7230 \quad D\text{-}W = 1.061$

$$Ip = \underset{(-5.1356)}{-1901.5} + \underset{(9.8361)}{0.3592\ Yn_{t-1}} \qquad (5)$$

$R^2 = 0.8736 \quad D\text{-}W = 1.666$

$$Ip = \underset{(2.6010)}{616.2} + \underset{(6.1585)}{0.5454\ OX} \qquad R^2 = 0.7304 \quad D\text{-}W = 1.3630 \qquad (6)$$

What determines private investment in equation (4) is gross national product (Yn). The relationship has a positive influence indicating that as Yn increases so does Ip. Putting it differently, it could be said that the higher the Yn, the higher the incentive to invest due to implied higher aggregated demand. But equation (4) is not all that reliable in view of the low value of D-W statistics. It is known that low value of D-W statistics indicates presence of autocorrelation. This means that estimates or tests of significance badly influenced by autocorrelation are mostly unreliable.

The relationship between Ip and lagged gross national product (Yn_{t-1}) in equation (5) produces a much better result. The coefficient of the lagged variable is different from zero at the 5 percent level of significance. This coupled with a higher R^2 clearly demonstrates the strong positive influence this variable has on Ip. Because of improved D-W statistics, there is less autocorrelation indicated in equation (5).

In equation (6), Ip is dependent on oil exports (OX). As in the other two cases, the positive influence induced by this relationship indicates that when OX increases Ip will also increase. On the whole, OX in equation (6) considerably explains private investment (Ip), but not as much as Ip is explained by lagged Yn in equation (5). The choice of Yn_{t-1} as a determinant of Ip is purely based on the statistical considerations.

Public Government Investment (Ig)

Public Investment equation was related to the ratio of oil export to total export (ROX), and the estimated equation is depicted thus:

$$\begin{matrix} Ig = 365.4 + 160.3\ ROX \\ \quad\quad (8.0038)\ \ (4.0097) \end{matrix} \qquad (7)$$

$R^2 = 0.7317$ D-W = 0.9212 $\rho = 0.8065$

The positive influence of ROX on Ig means that as oil export increases relative to total export, so does government investment (Ig). In addition to the existence of autocorrelation signaled by the low D-W statistics, the coefficient of determination (R^2) is not high enough to justify any claim that there are no other influences on public investment. Effort to correct any autocorrelated error using Cochrane-Orcutt technique failed to improve equation (7) substantailly.

Other variables which were tried in different combinations and lags with the public investment equation, but were eliminated because of unsatisfactory results, were total taxes (T), gross national product (Yn), oil revenue (OR), and change in output (YNC).

Imports of Consumer Goods (Mc)

$$\begin{matrix} Mc = -185.3 & + & 0.8247\ Yn_{t-1} \\ (-1.6787) & & (7.5766) \end{matrix} \qquad (8)$$

$R^2 = 0.8019$ D-W = 1.3701

Equation (8) implies that lagged gross national product (Yn_{t-1}) solely determines imports of consumer goods (Mc). The lag in response is indicative of some delay toward importing consumer goods. The positive relationship shows that as Yn_{t-1} increases so will Mc. Since both the private and government sectors share in consumer goods imports, relating Mc to gross national product is justified. The much improved statstical results obtained in equation (8) by using the lagged gross national product provide some evidence of delays towards consumer goods imports in addition to the fact that this is a function which generates low expectation. Conservative attitude of government toward consumer goods imports can also be explained by this relationship. Other variables that were tried but excluded were the lagged effect of changes in output, gross disposable income and a combination of the two variables.

Imports of Capital Goods (Mk)

$$\begin{matrix} Mk = -646.1 & + & 0.1571\ Yn \\ (-2.3906) & & (6.2514) \end{matrix} \qquad (9)$$

$R^2 = 0.7362$ D-W = 1.2923

$$\begin{matrix} Mk = 0.5276 & + & 0.3397\ OR \\ (5.2037) & & (7.2344) \end{matrix} \qquad (10)$$

$R^2 = 0.7890$ D-W 1.5057

$$Mk = \underset{(-0.7066)}{-33.56} + \underset{(24.9370)}{0.4922\ TI} \qquad (11)$$

$R^2 = 0.9780$ D-W = 1.4192

Imports of capital goods (Mk) is positively related to gross national product in equation (9). This positive influence is interpreted to mean that as GNP increases so will imported capital goods. Alternatively, it could be said that the size of GNP determines the level of capital goods to be imported. But equation (9) is not free from the problem of autocorrelation considering the value of D-W statistics. Also, R^2, though tolerable, indicates that Mk is not only deterined by GNP.

In equation (10), capital goods import (Mk) depends on oil revenue (OR). The statistical results generated by this relationship are much better than those of equation (9).

Capital goods import (Mk) is determined by gross or total investment (TI) in equation (11). The gross investment variable has a strong, positive influence on MK. The implication is that most capital for development is imported. It further suggests that as the decisions to undertake investments increase, the demand for more capital goods will also increase. With the highest coefficient of determination, 97.8 percent, among the three estimated equations, it means that gross investment variable is the sole determinant of capital goods imports. Therefore, equation (11) is the most satisfactory in explaining capital goods imports.

Oil Revenue (OR)

$$OR = \underset{(-2.0343)}{-0.1822} + \underset{(25.1308)}{0.8414\ OX} \qquad (12)$$

$R^2 = 0.9783$ D-W = 2.1465

The oil revenue equation is determined solely by oil exports (OX). The strong, positive influence means that the higher the oil exports the greater the revenue from oil.

Summary of Estimated Stochastic Equations

The numbers in estimated equations marked with an asterisk are used for simulation purposes.

$$Cp = \underset{(1.9772)}{1372.6} + \underset{(8.4578)}{0.677\ Ypd} \qquad (1^*)$$

$R^2 = 0.8363$ D-W = 1.4896

$$Cg = \underset{(4.836)}{483.3} + \underset{(7.5451)}{0.1338\ T} \qquad (2^*)$$

$R^2 = 0.7008$ D-W = 1.3533

$$Cg = \underset{(-1.69)}{-0.45} + \underset{(5.72)}{0.14\ Yn} \qquad (3)$$

$R^2 = 0.7008$ D-W = 1.2831

$$Ip = \underset{(2.875)}{-1561.7} + \underset{(6.045)}{0.3054\ Yn} \qquad (4)$$

$R^2 = 0.7230$ D-W 1.061

$$Ip = \underset{(-5.1356)}{-1905.5} + \underset{(9.8361)}{0.3592\ Yn_{t-1}} \qquad (5^*)$$

$R^2 = 0.8736$ D-W = 1.666

$$Ip = \underset{(2.6010)}{616.2} + \underset{(6.1585)}{0.5454\ OX} \qquad (6)$$

$R^2 = 0.7304$ D-W=1.3630

$$Ig = \underset{(8.0033)}{365.4} + \underset{(4.0097)}{160.3\ ROX} \qquad (7^*)$$

$R^2 = 0.7317$ D-W = 0.9212 $\rho = 0.8065$

$$Mc = \underset{(-1.6787)}{-185.3} + \underset{(7.5766)}{0.8247\ Yn_{t-1}} \qquad (8^*)$$

$R^2 = 0.8019$ D-W 1.3701

$$Mk = \underset{(-2.3906)}{-646.1} + \underset{(6.2514)}{0.1571\ Yn} \qquad (9)$$

$R^2 = 0.7362$ D-W = 1.2923

$$Mk = \underset{(5.2037)}{0.5276} + \underset{(7.2344)}{0.3397\ OR} \qquad (10)$$

$R^2 = 0.7890$ D-W = 1.5057

$$Mk = \underset{(-0.7066)}{-33.56} + \underset{(24.9470)}{0.4922\ TI} \qquad (11^*)$$

$R^2 = 0.9780$ D-W=1.4192

$$OR = \underset{(-2.0343)}{-0.1822} + \underset{(25.1308)}{0.8414\ OX} \qquad (12)$$

$R^2 = 0.9783$ D-W = 2.1465

Output Projection, 1977-1983

One way to project the national output of any country is to use a macro model. Projections are obtained by finding the reduced form of the model when it is linear or by using Gauss-Seidel iterative technique if the model is nonlinear (64, 65). The process of simulation[10] in the case of a linear model can be denoted in matrix

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[10]By simulation it is meant the mathematical solution of a simultaneous set of difference equations (30, 65).

notation, thus

$$YB + X\alpha = C \qquad (1)$$

Where:

B is a t x t matrix of coefficients of the endogenous variables.

α is a t x k matrix of coefficients of the exogenous variables.

Y is a t x 1 column vector of t endogenous variables.

X is a k x 1 column vector of k exogenous variables.

C is a t x 1 column vector of t constants.

The compact matrix notation in equation (1) can be written in a general form using t endogenous and k predetermined variables, thus:

$$\begin{pmatrix} b_{11} & b_{12} \cdots b_{1t} \\ b_{21} & b_{22} \cdots b_{2t} \\ \vdots & \vdots \quad \cdots \quad \vdots \\ b_{t1} & b_{t2} \quad \cdots \quad b_{tt} \end{pmatrix} \begin{pmatrix} Y_1 \\ Y_2 \\ Y_t \end{pmatrix} + \begin{pmatrix} \alpha_{11} & \alpha_{12} \cdots \alpha_{1k} \\ \alpha_{21} & \alpha_{22} \cdots \alpha_{2k} \\ \vdots & \vdots \quad \vdots \\ \alpha_{t1} & \alpha_{t2} \quad \alpha_{tk} \end{pmatrix} \begin{pmatrix} X_1 \\ X_2 \\ X_k \end{pmatrix} = \begin{pmatrix} C_1 \\ C_2 \\ C_t \end{pmatrix}$$

If the matrix of coefficients for the endogenous variables (B) is nonsingular, an inverse matrix (B^{-1}) exists. Equation (1) can be rewritten, thus

$$YBB^{-1} + X\alpha B^{-1} = CB^{-1}$$

The final transformation of this equation into the reduced form notation is as follows:

$$Y = CB^{-1} - X\alpha B^{-1}$$

$$Y = X\pi + U$$

where $\pi = -\alpha B^{-1}$ and $U = CB^{-1}$

Equation (3), the reduced form equation states that all of the endogenous variables can be written as a function of all of the exogenous variables (64, 65).

The simulation needed for this study involves projecting output at least seven years beyond the sample period given projections of the exogenous variables. In the case of Nigeria, the procedure[11] involving systems of equation for output projection is outlined in the footnote. Using Gauss-Seidel iterative method, output (Yn) was projected beyond the sample period (see Table XI) subject to the following assumptions: (1) direct taxes (TD) will grow at an average annual rate of 20 percent, (2) total exports (TE) will grow at an average annual rate of 25 percent, (3) total taxes (T) will grow at an average rate of 22 percent, and (4) ratio of oil export to total export will grow at an average annual rate of one half percent. These rates agree with the growth rates of these variables in the previous period.

If the assumptions hold, output will grow from ₦ 16803.8 million in 1977 to ₦ 56331.7 million in 1983 during the projection period. This is a 20 percent mean average actual growth rate of output during the period (see Table XI , Col. 3). Looking at the past growth rates (see Table XII), the mean average actual growth rate between 1969 and 1976 in real terms was 18 percent. Therefore, the projected rate is

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[11]The following are systems of equation for projecting output.

$Cp = f(ypd)$
$Cg = f(T^*)$
$Ip = F(Yn_{t-1})$
$Ig = f(ROX^*)$
$Mc = f(Yn_{t-1})$
$Mk = f(TI)$
$Yn = Cp + Cg + Ip + Ig + TE^* - Mc - Mk$
$Ypd = Yn - TD^*$
$TI = Ip + Ig$

All variables marked with an asterisk are exogenous, and they are total taxes (T), ratio of oil export to total exports (ROX), total exports (TE), and direct taxes (TD).

not inconsistent with the past average rate given the above assumptions. In terms of absorptive capacity, more than the projected mean average growth rate can be achieved if the Nigerian economy is free from manpower and structural bottlenecks.

TABLE XI

OUTPUT PROJECTION, 1977-1983

Year 1	Output (Yn)* 2	Growth Rate*** (In Percent) 3
1975	15259.0	-
1976	15875.4	-
1977**	16803.8	5.8
1978	18706.2	11.3
1979	23082.2	23.2
1980	28699.4	24.3
1981	35879.9	25.0
1982	44668.6	24.4
1983	56331.7	26.1
Mean		20.02

*In million Nairas, 1 ₦ = $1.50

**Starting year for output projections.

***Growth rate calculated from column 2.

Summary

The constraint imposed by scarcity of financial resources in the 1960s has been relaxed by the rapid expansion in oil production and dramatic increases in oil prices in the 1970s. With increased oil revenue and its use in developing other sectors through different development plans, there was some improvement in the growth of output especially in the 1970s. Because of the amount of labor employed in addition to producing about 90 percent of total food consumption, agriculture continues to be the mainstay of the economy. But its growth was far less than actually expected during the period of our study, growing at a rate lower than the rate of population growth. This situation, if not checked, would drain Nigeria's foreign exchange by importing more food to feed the growing population.

Government policies to increase agricultural production, involve Nigerians in private sector manufacturing, and transfer control of the country's oil industry to government corporation have been implemented. As long as the economy is beset or confronted with apparently fundamental constraints, the achievement of maximum rate of growth would be unlikely.

For better understanding of the Nigerian economy, a macro-econometric model was developed. This model was further used to simulate the economy and its growth seven years beyond the sample period. It was found that the projected mean average growth rate of national output between 1977 and 1983 was consistent with the previous mean rate computed between 1969 and 1976.

CHAPTER IV

A MODEL OF GROWTH-DETERMINING ABSORPTIVE CAPACITY

This Chapter will discuss a model of growth-determining absorptive capacity. We will start with the calculation of the actual growth rate. Using a technique similar to Harrod-Domar growth model, potential or desired growth rate is determined. The difference between the actual and potential growth rates will then be statistically related to growth limiting factors using multiple regression (30). Furthermore, this chapter will explore the determinants of growth and potential bottlenecks and their measurement in Nigeria. Sources of data, model limitations and problems will also be discussed.

Calculation of the Actual Growth Rate

Different views have been expressed with respect to the term "rate of growth." Among such views is the one by Pesek (53). He points out that:

> . . . the term "rate of growth" is but the name given to average ratio of annual increments of outputs to the outputs produced in the preceding years, the average being calculated for a certain period of time. Wherefore, the minimum requirement which we must impose on any method of calculating the rate of growth must be that it faithfully measures the ratio of actual increments to actual outputs (p. 313).

Based on the above requirement, the arithmetic average of the percentage changes from year to year method envisaged is in line in so far as two periods are involved in the process of the yearly measurement. The actual growth rate of gross national product can be formulated, thus:

$$Ga = \frac{Yn_t - Yn_{t-1}}{Yn_{t-1}} \qquad (1)$$

where:

Ga = Actual growth rate of GNP

Yn_t = Gross national product for time period, t.

Determination of Potential or Desired Growth Rate

The actual growth rate as earlier defined is not necessarily the equilibrium growth rate (17). To be able to define the equilibrium or potential growth rate, we apply a familiar Harrod-Domar type of model (31).

The underlying assumptions are:

$$Y_t = \frac{1}{g} K_t, \text{ where "g" is the ICOR} \qquad (2)$$

Equation (2) means that full employment output (Y_t) is a constant proportion of capital stock (K). Equation (2) can be described as a production function where capital is the dominant constraint.

$$Y_{t+1} - Y_t = \frac{1}{g} (K_{t+1} - K_t) = \frac{1}{g} I_t \qquad (3)$$

$$\text{Therefore, } I_t = g(Y_{t+1} - Y_t) \qquad (3')$$

Assume saving is proportional to income, so that,

$$s_t = sY_t \tag{4}$$

In equilibrium, savings equal investment in time period, t, thus:

$$S_t = I_t \tag{5}$$

Substituting, we have

$$sY_t = g(Y_{t+1} - Y_t) \tag{6}$$

So that

$$\frac{Y_{t+1} - Y_t}{Y_t} = \frac{s}{g} = Gp \tag{7}$$

Gp is the potential or desired rate of growth. Gp by definition equals $\frac{s}{g}$, where g is ICOR, and s is the potential savings rate. This growth model assumes that capital, not labor is the scarce factor of production. Therefore, Gp can be defined as that rate of growth which could be obtained given the correct capital stock, and assuming no manpower or other structural bottlenecks.

It has now been possible to determine both the actual and potential (desired) rates of growth. By subtracting equation (1) from equation (7), the difference between actual and potential growth rates can be determined, thus:

$$Gd = Gp - Ga \tag{8}$$

Where Gd represents divergence between actual and potential rates of growth.

With the actual growth rates for a number of years falling below potential rates (see Table XII), it is evident that there are factors limiting Nigeria's economy from attaining the potential rate of growth.

TABLE XII

ACTUAL, POTENTIAL AND DIVERGENCE IN GROWTH RATES

Year	s	g = ICOR	Actual (Ga)	Potential (Gp = $\frac{s}{g^*}$)	Divergence (Gd)
1961	0.0527	-0.6731	0.0726	0.0321	0.1047
1962	0.0764	6.0147	0.0129	0.0465	0.0336
1963	0.0996	0.6438	0.1829	0.0606	-0.1223
1964	0.1154	1.8795	0.0655	0.0704	0.0049
1965	0.1484	10.9118	0.0138	0.0905	0.9767
1966	0.1356	-5.2559	-0.0252	0.0827	0.1079
1967	0.1053	-0.5738	-0.1551	0.0642	0.2193
1968	0.0953	-4.9895	-0.0198	0.0581	0.0768
1969	0.0981	0.6082	0.1923	0.0598	-0.1325
1970	0.0621	0.3403	0.2232	0.0379	-0.1853
1971	0.1780	1.1008	0.1929	0.1085	-0.0844
1972	0.1946	3.5706	0.0576	0.1187	0.0611
1973	0.2404	2.5252	0.1052	0.1465	0.0413
1974	0.4183	1.4032	0.4247	0.2551	-0.1696
1975	0.3412	-1.3747	-0.1989	0.2081	0.4070
1976	0.3719	10.1612	0.0380	0.2268	0.1888
Average		1.6443			

Where g* = 1.6433 = Constant (Average) ICOR

Source: Calculations are made from income and financial data (see Appendix).

Determinants of Growth in Nigeria

The availability of adequate manpower for all sectors of any economy implies that such an economy would have the ability to achieve maximum growth of output given adequate capital. If the manpower situation of any country is inadequate, given the financial resources, the growth of output will be limited.

Unlike many LDCs, Nigeria's leading growth determinant is the supply of manpower. Inadequacy of manpower in all skill categories in Nigeria has seriously restricted the rapid growth of output. The report by the Manpower Board indicates that the shortage in the country's manpower is evident from (1) its dependence on expatriate staff, and (2) the vacancy rate in the economy (19, 63). The report further states that the dependency rate in the case of expatriate manpower falls in the range of 20-33 percent, and is generally high in technical, scientific and professional manpower categories. Because of delays in finding suitable expatriate staff and negotiating employment contracts, the employment rate of expatriates has been far below the range of the dependency rate. It is important to note that the benefits from expatriate staff employment extend from strictly public and private sectors to secondary schools, polytechnics and universities. Using vacancy rates to assess the country's manpower constraint, the report by the Manpower Board shows that the vacancy rates have been very high in all manpower categories. For instance, in 1977, the vacancy rates for some selected positions were as follows - administrative officers in the public sector 35 percent, accountants and auditors 30 percent, economists 26 percent, general managers 22 percent, statisticians 48 percent, system analysts and programmers 42 percent, lawyers

and jurists 41 percent, senior technical, scientific and professional experts 30-55 percent, intermediate technical and scientific professionals 30 percent, medical manpower including intermediate staff 40-60 percent (19, 63). These high vacancy rates indicate how very critical the manpower shortage is. It also explains why services, over the years, have been so poor and unreliable, thereby causing an adverse impact on production.

Adequate manpower supply to meet the needs of all economic units is a necessary ingredient for increased productivity and growth. In the Nigerian economy where investment capital is no longer a constraint, manpower poses as a catch-all variable whose usefulness is not limited to one but all the nation's economic sectors.

"Infrastructure" is another determinant of growth in Nigeria. This term encompasses all the means of transport and communication earlier discussed. The state of services of Nigeria's infrastructure during the period of this study, 1961-76 was less than desired. In several occasions, there were delays, disruptions and congestion. The Second Plan, 1970-74, to some extent, tried to improve road transportation but the water ports received little attention. Because of the congestion in the 1970s at Lagos port, which peaked in 1975, the Third Plan allocated a large amount of money for ports development. But only the first two years of the Plan are included in this study. This work will attempt to examine the partial impact of capital investment in infrastructure on the growth of the country's output.

Investment management and priorities should not be ignored when considering elements likely to determine productivity and growth in Nigeria. Management of investment includes ability to determine the

adequacy of investment funds for particular projects. Often times, investments for some projects are either much below or above the required investment needs. If, for instance, investment is below the needed target, the result is shortage, and when this is combined with inadequate manpower, productivity of investment is limited. In the case of over investment, waste is likely to occur, and this, in the midst of inadequate manpower, also results in low productivity. Priority setting is necessary for certain classes of investment if the desired effect is to be achieved. It is futile and, of course, unproductive to talk of creating new water ports and/or improving on the existing ones without adequate and active communication systems between the ports. Proper sequencing of investment aimed at securing good and effective linkages can substantially improve its productivity, given sufficient manpower resources. It, therefore, holds that investment productivity depends not only on the size of funds available but the management skills as well as manpower resources. In Nigeria where the shortage of manpower has been shown to be rather acute, investment productivity is likely to be hampered. This, in turn, will restrict the growth rate of national output. As in the case of infrastructure, the partial impact of capital investments in education, health, agriculture, defense and internal security on output growth will be examined.

Rapid growth of the economy can be achieved in periods free from civil hostilities/war. Therefore, one of the factors determining growth in Nigeria is political and economic stability. An economic likewise political system of any country thrives well during peace time and suffers disruption and losses during war time. Nigeria is no

stranger to either peace or war experience. The 4-year civil war, January 1966 to January 1970, for instance, resulted in output losses in every sector of the economy.

Cultural factors also determine productivity and growth of output in Nigeria. In addition to the extended family practice already discussed in Chapter II, the communal land tenure system is a major factor affecting agricultural productivity and rapid growth of the Nigerian economy. The land tenure system, despite its modification, continues largely to be communally traditional in that ownership is vested with the family, village, or tribe. In the case of family ownership, land is shared among family members who must not alienate their individual parcels of land, say through sale, from the family or community. Oluwasanmi (50) observes that in addition to the communal (land) tenure system acting as a strong cohesive force in an agrarian society as well as affording the cultivator a stake in the major assets of, and a secure place in, the community, it also precludes the rise of a landed aristocracy as land sale is forbidden, and hence the source of unrest inherent in the landlord-tenant relations elsewhere. But rapid development and growth can hardly be achieved if a society or country strictly remains agrarian (in this case, production is strictly for comsumption, and nothing would be left for exports aimed at earning foreign exchange). Todaro (66) points out that one of the ways a society can succeed to meet beyond its subsistence food requirements is to have non-human productive inputs which will help to (1) solve the problem of labor scarcity especially at peak

periods of farming[1], and (2) cultivate more parcels of land to enable increased harvests. Todaro further observes that the transformation from low productivity agriculture to higher productivity farming can succeed through judicious land reforms accompanied by concomitant structural changes in socio-economic institutions.

Potential Bottlenecks and Their Measurement

Manpower

As far as this factor is concerned, Nigeria is in short supply of all kinds of skills especially technical skills. The shortage is not limited to one, but all the sectors of the economy. For our purpose, manpower is restricted to university graduates only. The prerequisite for different skills and manpower needs in a country is the secondary level of education. Secondary education alone cannot meet all of a country's manpower needs. Even for certain vocational skills which are very important to a country, training for at least two years after secondary education is necessary. Therefore, this study does not plan to include holders of secondary school certificates in the measurement of manpower. Also the inclusion of those who have some skills for intermediate level jobs such as nursing, technical and commercial, teaching, etc. is unlikely in view of the non-availability of data in these areas. However, it is recognized that output is likely to be affected by those intermediate professionals who have acquired their

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[1] In Africa the time of planting is determined by the onset of rains and much of Africa experiences only one extended rainy season. Therefore, the demand for workers at times of planting and weeding during the early weeks of the rainy season usually exceeds all available rural labor supplies (66).

skills through some sort of training in trade schools or polytechnics.

In terms of symbols, manpower (university graduate output) is represented by UGLA (university graduates lagged one year). It is necessary to disaggregate university graduates (UGLA) in terms of disciplines. For our purpose, the disciplines are grouped into four areas, and then three areas, namely:

Engineering and Technology	(MET)
Agriculture, Natural Sciences and Medicine	(MANSM)
Social Sciences	(MSS)
Arts, Humanities and Education	(MAHE)

By merging up engineering and technology with agriculture, natural sciences and medicine to form one area called natural sciences (MNS), we will be left with three discipline areas. University graduates in the groups of four and three discipline areas will be employed separately in our model.

Water Ports of Entry

In view of the congestion of the Nigerian ports in the 1970s, water port is treated separately in this model. Therefore, the measurement unit should not be in terms of capital investment flow as water ports is not under infrastructure here (roads and waterways). It should rather be in terms of utilization. Change in imports lagged one year (CMPTLA) and change in exports lagged one year (CXPTLA) will be used to measure ports utilization in Nigeria.

Infrastructure, (IKA)

No doubt, infrastructure plays an important role in the economy

provided it is sufficiently developed. To assess how lack of infrastructure in specific areas contributes to the loss in growth rate, this variable is disaggregated into two groups, namely, (1) transport, storage and communications, and (2) roads and waterways. The impact of a combined infrastructure is also examined.

The measurement of infrastructure is in terms of capital investment flow. The expenditure flow is lagged by one year for each group of infrastructure. IKA represents the combined flow of infrastructure capital and IKALA represents IKA lagged one year. Capital flows of the disaggregated infrastructure groups, (transport, storage and communications, and road and waterways) are represented by IKC and IKW respectively, and when in lag by one year they are IKCLA and IKWLA respectively.

Services

The fact that efficient services in a number of key economic areas contribute to the rapid growth of national output cannot be denied. If investments in these areas such as health, higher education, defense and internal security are productive, services are likely to improve substantially likewise output and its growth.

Like infrastructure, these three variables are measured in terms of capital flow. Capital flows associated with health, higher education, defense and internal security in the model are represented by HEA, HEC, DIS respectively. When in lag by one year, they are HEALA, HECLA, DISLA respectively.

Agriculture and Non-Mineral Resources

The traditional nature of agriculture in Nigeria does not allow for rapid increase in productivity and growth of output. This variable will be used in the model along with others. As in the case of health, higher education and defense, agriculture is measured in terms of capital investment flow and is represented by AG in the model. The lagged value associated with agriculture is represented by AGLA.

Foreign Exchange

To any country, trade is important to growth. It is extremely important to LDCs because capital goods have to be imported to ensure the success of planned development. Exports are equally important as a source of foreign exchange. Foreign exchange is earned when more exports than imports are made. To development efforts, the importance of foreign exchange can hardly be over emphasized.

For our model, foreign exchange is a flow variable represented by FEXC.

Political Stability

The disruption caused by the civil hostilities seriously dampened the growth of national output during the four years of civil unrest in Nigeria. The political stability is represented by a dummy variable, D.V, assigned as follows:

Peace time = 1.0

War time = 0.0

Having examined the country's bottlenecks and their respective

measurements, our final step is to functionally relate Gd (loss in growth rates) to the assumed growth limiting factors, thus:

$$Gd_t = \alpha + B_1CMPTLA_t + B_2CXPTLA_t + B_3UGLA_t + B_4IKCLA_t + B_5IKWLA_t + B_6HECLA_t + B_7HEALA_t + B_8DISLA_t + B_9AGLA_t + B_{10}FEXC_t + B_{11}DV_t + U_t \quad (9)$$

As already discussed, equation (9) considers the assumed growth limiting factors as independent variables, while loss in growth rate remains the dependent variable.

The contribution of this approach to absorptive capacity is relating the difference between actual and desired growth rates, Gd, to potential growth limiting factors in Nigeria. Other models associated with absorptive capacity are concerned with determining alternative investment policies.

To avoid the effects of price changes, and to capture the concern of Nigeria for the value of her oil exports in real terms, all variables measured in monetary value are expressed in terms of constant prices with 1975 as the base year.

Sources of Data, Model Limitations and Problems

In designing this model, particular attention was given to the characteristics of the Nigerian economy and the availability of some data. Basic sources of data include - Statistical Yearbook, National Accounts Statistics, International Financial Statistics, Publications by the Federal Department of Statistics, Lagos, Nigeria, Commonwealth Universities Journals, Nigeria's National Universities Commission,

Manpower Board Publications and other recent publications/books on Nigeria. These sources give time series statistics on Nigeria covering the 16-year period (1961-76) of our study. The variables and the sources of data are tabulated in Table XIII. Availability of different forms of systematic and reliable data to produce a much more comprehensive economic study of Nigeria is, indeed, a problem.

Another limitation concerns the measurement of the value of total output of the non-monetary sector. Errors in computing such values are likely to distort the rate of economic growth of Nigeria.

The proxy nature of calculating some variables such as capital stock constitute a third limitation. Since there is no reliable data on capital stock and the rate of its utilization, this study plans to use commulative investment lagged one year as proxy for capital stock.

Summary

A model of growth-determining absorptive capacity is developed by formulating equations to determine actual and potential growth rates of national output. The divergence between actual and potential growth rates is functionally related to growth-limiting factors by means of multiple regression technique. Growth limiting factors or bottlenecks discussed include inadequate manpower, insufficient infrastructure, poor health services, political instability, traditional agriculture, etc. The way these factors are measured for use in the model has also been discussed.

TABLE XIII

VARIABLES AND SOURCES OF DATA

Sources of Data	Variables
1. International Financial Statistics, 1953-77	GNP, GDP, Investment, Consumption, Imports, Exports, Foreign Exchange, Consumer Price Index (CPI)
2. National Accounts Statistics, 1962-77	All of the above except Foreign Exchange, and CPI; Taxes (direct and indirect)
3. Department of Statistics Publications, Lagos, Nigeria	Trade (imports and exports), cargo loaded and unloaded, tax information, investment information, university graduate output, high school graduate output
4. Statistical Year Book 1960-78.	Capital stock/flows for infrastructure, agriculture, health, defense and internal security, higher education
5. Manpower Board Publications Lagos, Nigeria	University graduate output, student enrollment in universities
6. Commonwealth Universities Journal	University graduate output only
7. National Universities Commission	Student enrollment in universities

CHAPTER V

ANALYSIS OF DATA

Introduction

The empirical results obtained by applying multiple regression to the model outlined in the preceding chapter will be discussed in this chapter. The analysis is designed to identify those variables which best explain variation in the deviation between actual and potential growth rates (Gd). Different forms of the equation will be briefly discussed along with information on other variables that were tried but found statistically insignificant or unacceptable. To be listed against every equation will be the statistical information involving the following: t-statistics for each variable (under each coefficient), coefficient of determination (R^2), Durbin-Watson statistics (D-W) and first-order autocorrelation values where a serial correlation correction has been made (ρ).

Different Forms of the Divergence in Growth Rate Equation

The different forms of the loss in the growth rate equation (Gd) are presented in Table XIV. As specified in the model in Chapter IV, equation one (EQ1) takes account of all the variables likely to explain variation in Gd. University graduates lagged one year (UGLA) is

TABLE XIV

SUMMARY OF ESTIMATED EQUATIONS

1 2

Variables	Equations (EQ) EQ1	EQ2	EQ3	EQ4	EQ5	EQ6	EQ7
Dependent Gd							
Independent UGLA	-0.8945 (-2.0287)	-1.6268 (-3.5064)	-1.4998 (-2.5896)	-1.6975 (-3.547)	-1.5941 (-6.1728)	-	-
FEXC	-0.0067 (-5.1271)	-0.0057 (-3.2198)	-0.0069 (-3.7864)	-0.0066 (-3.9081)	-0.0066 (-4.5836)	-0.0076 (-5.6922)	-0.0077 (-3.6611)
CMPTLA	0.0085 (3.9429)	0.0122 (5.3916)	0.0121 (4.5604)	0.0130 (5.7392)	0.0128 (8.2915)	0.0114 (5.4019)	0.1055 (3.9995)
CXPTLA	0.0011 (5.4461)	0.0094 (3.4479)	0.0012 (4.7649)	0.0011 (4.9225)	0.0012 (4.7469)	0.0012 (6.5286)	0.0012 (3.9725)
IKCLA	-0.0505 (-5.4861)	-0.0488 (-3.7411)	-	-	-	-	-
IKWLA	0.0308 (2.0439)	0.0227 (1.0856)	-	-	-	-	-
IKALA	-	-	-0.0374 (-3.0024)	-0.0390 (-3.3329)	-0.0381 (-4.5059)	-0.0353 (-4.4259)	-0.0359 (-3.0100)
HEALA	-0.0512 (-2.0898)	-0.0794 (-2.5788)	-0.0606 (-1.6413)	-0.0764 (-2.8382)	-0.0690 (-4.0557)	-0.0401 (-2.0451)	-0.0392 (-1.5719)
DISLA	-0.0054 (-0.8391)	0.0036 (0.4861)	0.0005 (0.0366)	0.0045 (0.6907)	-	-	-
HECLA	-0.0520 (-1.3379)	0.0092 (0.2160)	-	-	-	-	-
AGLA	0.03912 (1.4706)		0.0112 (0.6630)	-	-	-	-
DV	-0.1509 (-3.2967)	-0.1968 (-3.3092)	-0.2166 (-3.4807)	-0.2251 (-3.8523)	-0.2235 (-6.4145)	-0.1963 (-4.1043)	-0.1963 (-4.5767)
UGLA: MET	-	-	-	-	-	-	5.1349 (0.2749)
MANSM	-	-	-	-	-	-	6.9839 (0.7789)
MNS	-	-	-	-	-	-6.4145 (-1.8696)	-
MSS	-	-	-	-	-	-6.4947 (-0.9477)	-7.4882 (-0.4661)
MAHE	-	-	-	-	-	-6.2938 (-0.9725)	-5.7457 (-0.5438)
INTERCEPT (α)	0.2463 (4.3073)	0.3139 (4.3998)	0.3290 (4.3150)	0.3412 (4.8089)	0.3428 (7.4142)	0.4226 (5.7460)	0.4205 (4.8965)
	R^2=0.9700	R^2=0.9242	R^2=0.8949	R^2=0.8872	R^2=0.9056	R^2=0.9484	R^2=0.9484
	D-W=2.5034	D-W=2.5185	D-W=2.699	D-W=2.5376	D-W=2.5010	D-W=2.2892	D-W=2.2726

The "t" ratio is given in brackets.

negatively related to Gd. This negative relationship indicates that if the number of university graduates increases, the loss in growth rate (Gd) will decrease. Like UGLA coefficient, foreign exchange (FEXC) coefficient is different from zero at 0.05 level of significance. The negative relationship between FEXC and Gd implies that as FEXC increases, Gd will decrease. There is no doubt about this relationship in view of the fact that any developing country needs foreign exchange to buy capital goods for its development programs. With increased foreign exchange due mainly to oil exports, Nigeria's chance to decrease the loss in growth rate and move towards attaining the desired rate of growth is good.

Both the change in imports lagged one year (CMPTLA) and the change in exports lagged one year (CXPTLA) are used to measure ports utilization in our model. Postively related to Gd is the change in imports lagged one year (CMPTLA). This implies that as (CMPTLA) increases, the loss in growth rate (Gd) will also increase. The same positive relationship is observed with respect to the change in exports lagged one year (CXPTLA). Indeed, the strong positive influence of CMPTLA and CXPTLA on Gd suggests that the Nigerian ports were poorly utilized during our period of study due, of course, to inadequate ports facilities. This inadequacy further resulted in the loss of time between ordering and putting the capital goods to use. Nigeria's experience with regard to ports congestion especially in the 1970s cannot be forgotten. During this period, cargo ships meant for the Nigerian ports used to wait off shore for months before clearance. The waiting meant payment of penalty by the federal government to the owners of the cargo ships. On the whole, the ports congestion in the

1970s caused not only loss of time before the capital goods could actually be put to use but loss of funds through penalty which could have otherwise been put to more productive use. The combined effect of these losses as is evident from our empirical results produced a stress on the growth of the economy during the period.

The impact of the two parts of infrastructure lagged one year was also examined. The parts are (1) infrastructure associated with transport, storage and communication (IKCLA), and (2) infrastructure associated with roads and waterways (IKWLA). The negative relationship of Gd to IKCLA means that as improvement in this category of infrastructure increases, the loss in growth rate (Gd) will decrease. The coefficient of IKWLA like IKCLA is significantly different from zero at 0.05 level but its sign is wrong. Instead of having a negative influence on Gd to justify the expectation of this equation, IKWLA has a positive influence. The indication based on this positive relationship is that as improvement in IKWLA increases, the loss in growth rate will also increase. With Nigeria's infrastructural problems this situation is very unlikely. The existence of multicollinearities among the independent variables is, therefore, suspected, and will be investigated later.

The variable associated with health (HEALA) has a negative relationship to Gd, and its coefficient is significantly different from zero at 0.05 level. The implication is that increase in health services means decrease in Nigeria's loss in growth.

Political stability (DV) represented by a dummy variable with 1.0 for peace time and 0.0 for civil war time is negatively related to Gd. This negative influence demonstrates that with increased

political stability, Nigeria's loss in growth rate will decrease. Putting it differently, it could be said that without the civil war which caused tremendous disruption of services especially in the four eastern states of Nigeria, divergence in growth rates (Gd) could have decreased. As we can recall, output and its growth in all the sectors of the Nigerian economy depressed badly during the civil war years.

The coefficients associated with capital flows for defense and internal security lagged one year (DISLA), higher education lagged one year (HECLA) and agriculture lagged one year (AGLA) are statistically insignificant at 0.05 level. Like infrastructure associated with roads and waterways (IKWLA), capital flow for agriculture (AGLA) with a coefficient only significant at 0.10 level also shows a positive relationship. This positive influence is contrary to the expectation of this equation since increase in agricultural activities should in no way be expected to bring about an increase in the loss of growth. It was, however, found that these independent variables especially those with improper signs as well as those statistically insignificant exhibited high correlation with one another. For example, the simple correlation matrix showed evidence of high correlation between the following variables - AGLA and HECLA, HEALA and HECLA, IKWLA and HECLA, IKWLA and IKCLA.

To improve equation one (EQ1), it was, therefore necessary to drop and/or combine some variables. Equation two (EQ2) resulted from a drop of one variable (AGLA). The coefficients of all other variables except IKWLA, DISLA and HECLA were significantly different from zero at 0.05 level. The signs of the insignificant coefficients instead of being negative were all positive. In equation three (EQ3), the two parts of

of infrastructure (IKWLA and IKCLA) were combined into one (IKALA). Higher education variable (HECLA) was dropped in this equation while that of agriculture (AGLA) was reconsidered. The result showed a strong negative relationship of Gd to IKALA. The coefficient of HEALA was only significant at 0.10 level while those of DISLA and AGLA were insignificant even at 0.10 level. These two variables (DISLA and AGLA) also had positive rather than negative relationship to Gd.

A further improvement was necessary in equation four (EQ4). The two variables dropped in this equation were HECLA and AGLA. The combined infrastructure (IKALA) was retained. The result was much more optimistic as the coefficients of all the variables except that associated with defense and internal security (DISLA) was significant at 0.05 level. The relationships between the independent variables except DISLA, and the dependent variable (Gd) in terms of signs were also in order. The effect of dropping DISLA in addition to HECLA and AGLA was observed in equation five (EQ5). The coefficients of all the variables were significantly different from zero at 0.05 level, and this equation was considered to be much more reliable than any other so far. However, equation five (EQ5) was found to be suffering from serial correlation in its original form, and was corrected using Cochrane-Orcutt technique.

Judged by the coefficient size of manpower variable (UGLA) and its high level of significance, it was necessary to disaggregate this variable and use in the loss in growth rate equation (see EQ6). The coefficient associated with university graduates in arts, humanities and education (MAHE) is not significant neither is the coefficient associated with university graduates in social sciences (MSS).

Only the coefficient associated with those in natural sciences (MNS) is significantly different from zero at 0.05 level. University graduates in natural sciences (MNS) in our model include those in engineering, technology, agriculture, pure sciences and medicine. The negative relationship of this variable to Gd demonstrates that as natural science graduates increase, the loss in growth rate (Gd) will decrease. This result underlines the importance of manpower training in technical and scientific areas in Nigeria. When graduates in natural sciences area (MNS) were further grouped into two areas, namely graduates in engineering and technology (MET) and graduates in agriculture, pure science and medicine (MANSM), and employed in the model along with the other two manpower areas (MAHE and MSS), none of the coefficients was significantly different from zero at 0.05 level (see EQ7). It was seen that the more the manpower variable (UGLA) was disaggregated in the model, the higher the correlation. For example, the correlation matrix showed MET correlating with MANSM and MSS correlating with MAHE. A similar situation was observed when two parts of infrastructure was employed in the model. Like in equation six (EQ6), the coefficients of all other variables in equation seven (EQ7) when only manpower variable (UGLA) is disaggregated remain significantly different from zero at 0.05 level.

Summary

The modeled equations were estimated and tested in this chapter. Divergence between actual potential rates of growth (Gd) was jointly explained by university graduate output or manpower (UGLA), infrastructure (IKALA), foreign exchange (FEXC), health services (HEALA),

ports utilization represented by a change in imports (CMPTLA) and a change in exports (CXPTLA) and political stability represented by a dummy variable (DV). When manpower was disaggregated into three groups, only the coefficient of the group representing manpower in engineering, technology, agriculture, pure sciences and medicine (MNS) was significant at 0.05 level. Because of high correlation, the coefficients of the other two groups - social sciences (MSS), and arts, humanities and education (MAHE) were not significantly different from zero at 0.5 level.

CHAPTER VI

SUMMARY AND CONCLUSIONS

Summary

The main purpose of this study was to assess Nigeria's total absorptive capacity by investigating what factors contributed to the divergence between actual and potential growth rates of national output during the period, 1961-76. The study began with the statement of the problem which stressed the fact that the growth rate of output during the 16-year period was less than desired, even with financial capital no longer posing as a constraint. Inability of the country's economy to productively absorb capital or what should be termed "limited absorptive capacity" was assumed to be the major constraint on growth.

The second chapter examined literature on absorptive capacity and economic growth. Absorptive capacity was defined in different ways, but most economists defined it in terms of the productivity of capital investment. These economists believed that if, on the average, the investments in the economy were productive such an economy would have high absorptive capacity. Having surplus capital for investment purposes was considered insufficient to overcome limited absorptive capacity, if the constraints complementary to capital were not relaxed. Mentioned among the major constraints to capital were

manpower, work force with appropriate skills, adoption of more productive technology, substantial change in the composition of output and employment, infrastructure, development of new institutions, etc. Growth-determining absorptive capacity was the main thrust of this study. It was recognized that with investment becoming productive, the level and growth of output would substantially increase. Therefore, the emphasis assumed by growth-determining absorptive capacity was on factors responsible for the difference between actual and potential growth rates of national output. The three measurement approaches of absorptive capacity were given as (1) the Marginal Rate of Return approach (MRR), (2) the Historical Rate of Investment Approach (HRI), and (3) the Incremental Capital-Output Ration approach (ICOR). Of these three approaches, the ICOR approach was considered relevant to measuring growth-determining absorptive capacity. It was further shown that in addition to skill constraint to growth were cultural and attitudinal factors.

A careful examination of the Nigerian economy was done in Chapter III. Sectoral performance and government development policies were evaluated. It was shown that the constraint imposed by scarcity of financial resources in the 1960s was relaxed by the rapid expansion in oil production and the dramatic increases in oil prices in the 1970s. Substantial increase in government revenue due to high prices of oil enabled development of other sectors of the economy through the Second and Third Development Plans. For employing 60 percent of labor and producing about 90 percent of total food consumption, agriculture was considered the mainstay of the Nigerian economy. The rate of growth of

this sector was, however, lower than the population growth. The implication from this was that, if the situation continued unchecked, the country's foreign exchange would be drained through continued imports of food items to feed the growing population. To enable better understanding of the Nigerian economy, a macroeconometric model was developed. This model was also used to project the growth of output up to 1983.

In Chapter IV a model of growth-determining absorptive capacity was developed. The model specified ways to determine actual and potential growth rates of output. Divergence in growth rates was functionally related to growth-limiting factors, using a multiple regression technique. The determinants of and fundamental constraints to growth in Nigeria were discussed. Measurements of bottlenecks for use in the model were also discussed. Included also in this chapter were data sources, problems and limitations inherent in the study.

The modeled equations of Chapter IV were estimated and tested in Chapter V. The divergence between actual and potential growth rates was jointly explained by university graduate output or manpower (UGLA), infrastructure (IKALA), foreign exchange (FEXC), health services (HEALA), ports utilization represented by a change in imports (CMPTLA) and a change in exports (CXPTLA) and political stability represented by a dummy variable (DV). When manpower was disaggregated into three groups, only the coefficient of the group representing manpower in engineering, technology, agriculture, pure sciences and medicine (MNS) was significantly different from zero at 0.05 level. Because of high correlation, the coefficients of the other two groups -- social sciences (MSS), and arts, humanities and education (MAHE) were

not significant at 0.05 level. This did not mean that Nigeria was better off with manpower requirements of these two groups. She was, however, in a worse situation with graduates in engineering, technology, agriculture and medicine than with graduates in social sciences, arts, humanities and education.

Conclusion

Implications

From this study the following are implied:

1. Nigeria has limited absorptive capacity which has restricted the potential growth of national output.

2. Absorptive capacity problems affect not only one sector but all the sectors of the economy.

3. Inadequate manpower pervents the achievement of the desired growth of output more than any other single factor.

4. Skills of the labor force have direct positive impact on the growth of the economy.

5. Infrastructural improvements are necessary for the rapid growth of the economy. It must be noted that improvement here depends also on manpower availability.

6. Nigerian ports are inadequate to handle efficiently all imports and exports. This situation causes a stress on and prevents a movement of the economy to the desired growth level.

7. A movement towards maximum growth of national output can be achieved with less strain if Nigeria continues to have foreign exchange surplus.

8. Poor health services prevent the economy from moving toward the desired growth of output.

9. Political stability is necessary for increased productivity and growth of output.

Recommendations

In order to have a skilled workforce of adequate size, both the government and the private sectors must make conscious efforts aimed at developing the manpower needs of Nigeria. While expansion of the thirteen existing universities is necessary, the creation of at least ten more to bring the total number of universities to twenty-three by 1983 should be pursued. This recommendation is based on the ratio of demand to supply of places which runs almost 2:1 in the Nigerian universities. Since the insufficiency of manpower in engineering, technology, agriculture, pure sciences and medicine restricts the rapid growth of output, emphasis should be given to the training of manpower in these areas. Included in the number of additional universities recommended earlier should be colleges of technology. At least five of these colleges should be upgraded to the level of a university. It should be noted that while university graduates spend 3 to 4 years after high school to obtain their bachelor degrees, the college of technology graduates spend a minimum of 4 years after high school to obtain their trade or technical diplomas, commonly referred to as Higher National Diploma (HND). But the unfortunate thing is that government approved salary scales for university graduates are by far higher than those for the college of technology graduates (47). The net effect of this salary disparity

is dissatisfaction and a sense of frustration and neglect among graduates from the colleges of technology. It will be naive to think that productivity of this group of disgruntled graduates can substantially increase. Indeed, the action to convert the colleges of technology to the status of a university will not only eliminate the problems of salary inequality, lost identity, etc., but will help train out larger number of satisfied technologists. The present-day Nigeria suffers from acute shortage of technical and scientific personnel and adherence to this recommendation gradually eliminates this shortage.

Since the constraint imposed by manpower affects the growth of all the sectors of the Nigerian economy in this study, substantial increase in the production of manpower in all manpower categories will help to overcome other impediments to growth such as inadequate infrastructure, poor port facilities, poor health services, etc. Therefore, the key to achieving the maximum (potential) growth of output is to enormously increase the training of manpower especially for technical and scientific areas of the economy.

Suggestion for Further Research

This study considers investment strictly as a flow variable with no regard to its rate of return. A possible direction for further research is to look at the various investment flows or stocks in terms of their rates of return. The marginal rate of return (MRR) technique discussed earlier is relevant in this regard. By linking capital application to productivity, this technique usually tries to ensure

optimum allocation of capital. In addition to the fact that the MRR technique can successfully be applied to only small project evaluation, not at the aggregate or even sectoral level, the absence of comprehensive financial data in most less developing countries may considerably limit its application.

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APPENDIX

DATA USED

Year	CP	CG	YPD	CP-1	YN
1961	5610.7	415.2	6237.5	6105.7	6361.9
1962	5521.40	431.9	6318.5	5610.6	6443.8
1963	6432.0	431.9	7482.2	5521.4	7623.1
1964	6685.7	498.7	7954.6	6432.0	8122.1
1965	6458.9	553.6	8044.6	6685.7	8234.4
1966	6427.4	511.4	7847.1	6458.9	8027.3
1967	5560.3	508.3	6587.2	6427.4	6782.5
1968	5422.8	598.6	6450.6	5560.3	6655.60
1969	6252.1	905.2	7668.6	5422.8	7935.3
1970	8009.5	1094.7	8703.0	6252.1	9706.4
1971	8489.4	1029.4	9469.6	8009.5	10876.0
1972	8594.6	1268.7	9843.7	8489.4	11389.5
1973	9049.6	1231.6	9513.8	8594.6	12971.4
1974	9810.2	1406.4	13434.9	9049.6	19053.5
1975	8094.0	2084.0	9752.7	9810.2	15259.0
1976	7377.0	2695.1	10320.6	8094.0	15875.4

In Millions of Constant 1975 Nairas

IP	IG	YN-1	OR	OR-1
489.2	323.3	6860.0	45.6	6.9
486.7	329.1	6361.9	43.4	45.6
628.8	322.6	6443.8	26.2	43.4
763.6	353.2	7623.1	41.6	26.2
885.3	417.9	8122.1	72.8	41.6
825.9	413.2	8234.4	102.3	72.8
662.4	393.9	8027.3	98.8	102.3
710.2	407.1	6782.5	70.3	98.8
784.5	400.9	6655.6	162.5	70.3
1160.9	543.6	7935.3	334.1	162.5
1442.1	650.9	9706.4	983.7	334.1
1601.9	625.4	10876.0	1168.5	983.7
1605.7	568.9	11389.5	2058.1	1168.5
2800.0	587.7	12971.4	5593.6	2058.1
4324.5	481.5	19053.5	4568.0	5593.6
5107.4	384.4	15259.0	3962.3	4468.0

In Millions of Constant 1975 Nairas

MC	NK	OX	TI	IMPT	EXPT
499.7	483.4	61.9	816.6	983.0	856.0
414.0	441.3	85.5	815.8	855.4	794.4
419.4	474.1	105.8	960.7	893.5	905.6
309.6	774.3	166.5	1116.9	1083.9	1019.9
563.1	569.1	399.7	1303.2	1132.2	1233.5
492.1	492.1	418.0	1239.1	966.6	1195.5
386.8	489.6	342.3	1056.3	876.3	1054.4
326.1	445.1	175.8	1117.3	771.2	923.2
372.0	465.1	564.4	1185.3	837.6	1255.7
472.0	683.3	965.2	1704.5	1155.3	1575.8
605.5	879.4	1554.6	2092.9	1470.4	2054.4
609.9	954.5	1870.0	2227.3	1405.4	3214.8
660.6	1157.9	2847.4	2264.7	1668.2	3616.1
685.7	1592.4	7173.4	3387.7	2144.4	8643.5
1268.9	2430.4	4629.6	4806.0	3550.0	5552.7
1511.1	2677.2	5078.9	5491.8	3956.3	5531.1

In Millions of Constant 1975 Nairas

	T	TD	TE	ROX
1961	590.3	124.4	856.1	0.0723
1962	599.5	125.3	794.4	0.1076
1963	665.7	140.8	905.6	0.1168
1964	749.6	167.5	1019.9	0.1633
1965	819.5	189.8	1233.5	0.3240
1966	733.0	180.2	1195.5	0.3496
1967	671.9	195.3	1054.4	0.3246
1968	732.3	204.9	923.2	0.1904
1969	919.0	266.8	1255.7	0.4495
1970	2074.4	1003.4	1575.8	0.6125
1971	4037.0	2109.5	2054.4	0.7565
1972	4353.6	2402.7	3214.8	0.5817
1973	7213.5	4021.5	3616.1	0.7874
1974	12071.9	5850.5	8643.5	0.8299
1975	11351.1	5696.3	5552.7	0.8338
1976	11700.0	6462.7	5531.1	0.9182
1977	14274.0	7755.2	6913.9	0.9227
1978	17414.3	9306.2	8642.4	0.9273
1979	21245.4	11167.4	10802.9	0.9319
1980	25919.3	13400.9	13503.6	0.9365
1981	31621.5	16089.1	16879.5	0.9411
1982	37578.2	19306.9	21099.3	0.9457
1983	45845.4	23168.3	26374.1	0.9503
1984	55931.4	27801.9	32967.4	0.9549
1985	68236.3	33362.3	41209.2	0.9595
1986	83248.2	39034.8	51511.5	0.9643

In Millions of Constant 1975 Nairas

Year	CPI	s	g=ICOR	Actual (Ga)	Potential (Gp = $\frac{s}{g^*}$)	Divergence (Gd)
1961	37.3	0.0527	-0.6731	-0.0726	0.0321	0.1047
1962	39.2	0.0764	6.0147	0.0129	0.0465	0.0336
1963	38.2	0.0996	0.6438	0.1829	0.0606	-0.1223
1964	38.5	0.1154	1.8795	0.0655	0.0704	0.0049
1965	40.1	0.1484	10.9118	0.0138	0.0905	0.9767
1966	44.0	0.1356	-5.2559	-0.0252	0.0827	0.1079
1967	42.3	0.1053	-0.5738	-0.1551	0.0642	0.2193
1968	42.1	0.0953	-4.9895	-0.0198	0.0581	0.0768
1969	46.4	0.0981	0.6082	0.1923	0.0598	-0.1325
1970	52.8	0.0621	0.3403	0.2232	0.0379	-0.1853
1971	61.3	0.1780	1.1008	0.1929	0.1085	-0.0844
1972	62.9	0.1946	3.5706	0.0576	0.1187	0.0611
1973	66.5	0.2404	2.5252	0.1052	0.1465	0.0413
1974	74.8	0.4183	1.4032	0.4247	0.2551	-0.1696
1975	100.0	0.3412	-1.3747	-0.1989	0.2081	0.4070
1976	122.0	0.3719	10.1612	0.0380	0.2268	0.1888
Average			1.6443			

Where g* = 1.6433 = Constant (Average) ICOR

Source: Calculations are made from income and financial data.
Actual, potential and divergence in growth rates.

IKCLA	IKWLA	IKALA	DISLA	HECLA
13148.0	09207.0	22355.0	1118.6	0032.9
12495.2	05992.0	18487.2	- 0427.5	1770.8
-10542.1	15626.4	05084.3	5119.4	3047.6
-27387.2	-12390.0	-39777.2	1943.3	6816.1
-14791.8	-01794.6	-16586.4	22886.9	- 3592.9
00226.2	-04928.5	-04702.3	0486.2	7162.1
44169.9	-06500.1	37669.8	14767.1	1971.0
-33567.7	31798.0	-01769.7	13246.8	10344.6
04977.0	-30314.1	-25337.1	8658.6	-16741.2
-16063.3	-11419.6	-27482.9	159196.0	2993.2
-00020.3	15041.7	15021.4	79245.1	5237.5
-00076.7	-15676.5	-15753.2	166626.1	12912.6
14763.8	40953.4	55717.2	07456.2	27395.7
32744.8	119210.4	151955.2	-10663.9	44011.7
23114.0	03131.3	26245.3	81185.0	19176.7
27901.1	05034.5	32935.6	58198.1	-31947.6

In Thousands of Constant 1975 Nairas

DV	HEALA*	AGLA*	FEXC*	+ CMPTLA*	+ CXPTLA*
1.0	3316.7	-3890.9	1154200	-32200	-23968
1.0	5538.4	5541.9	1029300	-127600	-61632
1.0	-0136.3	5064.2	726400	38100	111200
1.0	14473.5	18476.6	790900	190400	114300
1.0	4872.5	5483.5	800500	48300	213600
0.0	-1695.1	14243.7	637500	-165600	-38000
0.0	3870.4	-4509.9	297900	-90300	-141100
0.0	12536.5	19894.8	317100	-105100	-131200
0.0	4802.6	-40658.5	326500	66400	332500
1.0	-14713.7	22453.4	494300	317700	320100
1.0	-19141.6	-21750.3	885800	315100	478600
1.0	6637.9	40828.1	696300	-065000	1160400
1.0	31309.2	02486.1	1046600	262800	398300
1.0	23241.7	35231.3	11035400	476200	5027400
1.0	18419.9	38223.6	7905000	1405600	-3090800
1.0	-47810.6	04672.1	5804500	406300	-0021600

*In Thousands of Constant 1975 Nairas

UGLA	MET	MANSM	MSS	MAHE
334	11	55	98	161
403	13	64	101	201
458	21	85	112	208
708	35	176	167	292
1044	52	200	264	453
1273	71	252	344	515
1037	64	256	249	411
925	48	214	215	376
1253	53	303	320	503
1674	97	378	435	644
2523	201	538	615	964
3058	281	761	669	1078
3205	302	734	679	1175
3937	386	987	795	1380
4004	467	933	747	1417
4998	597	1155	970	1783

Numbers in Hundreds

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