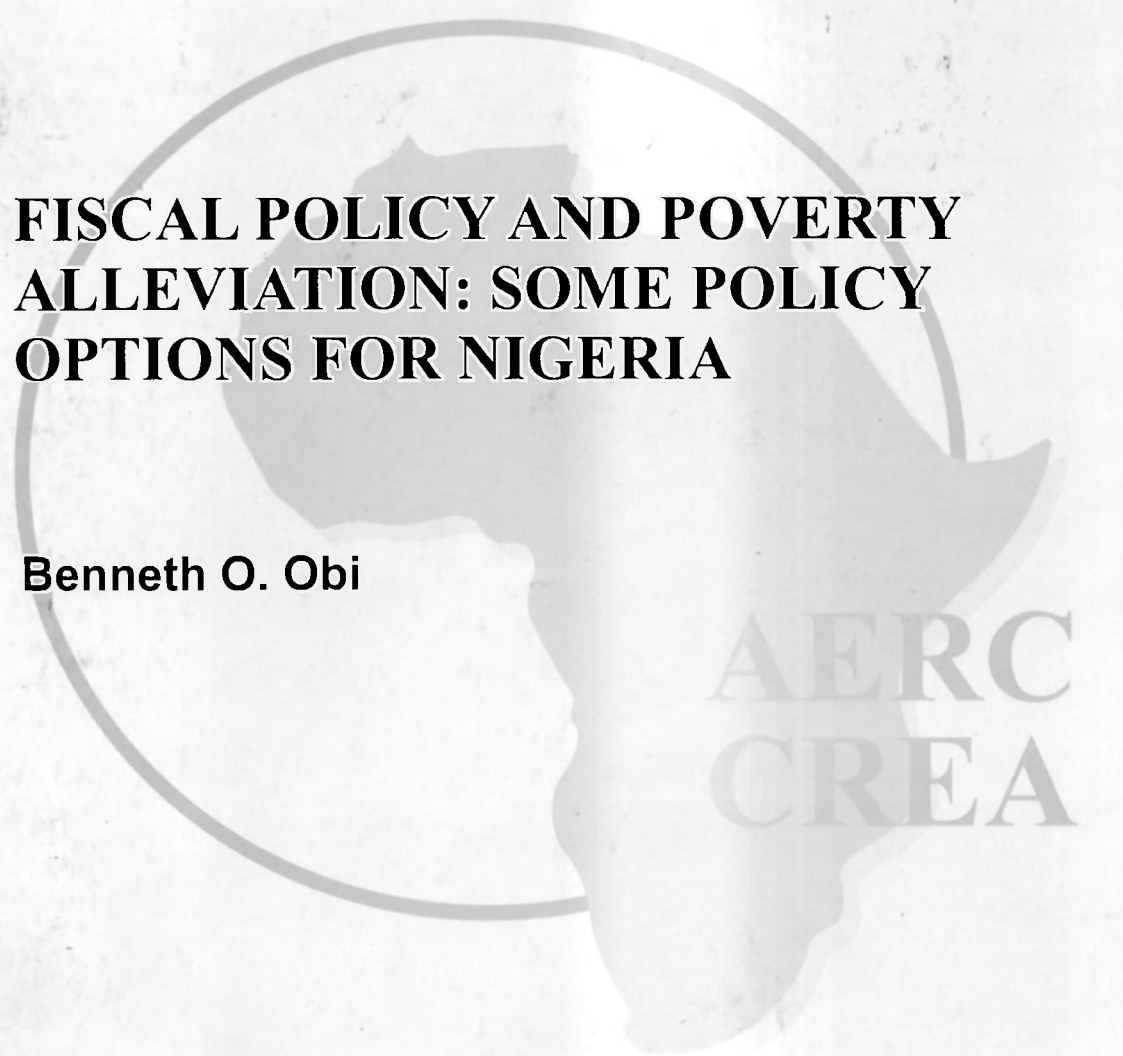


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FISCAL POLICY AND POVERTY ALLEVIATION: SOME POLICY OPTIONS FOR NIGERIA

Benneth O. Obi

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Fiscal policy and poverty alleviation: Some policy options for Nigeria

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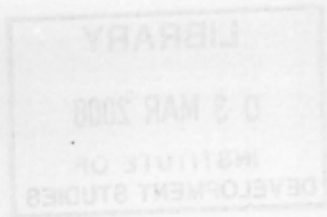
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AERC Research Paper 164
African Economic Research Consortium, Nairobi
February 2007



Fiscal policy and poverty alleviation: Some policy options for Nigeria

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THIS RESEARCH STUDY was supported by a grant from the African Economic Research Consortium. The findings, opinions and recommendations are those of the author, however, and do not necessarily reflect the views of the Consortium, its individual members or the AERC Secretariat.

Published by: The African Economic Research Consortium
P.O. Box 62882 - City Square
Nairobi 00200, Kenya

Printed by: Modern Lithographic (K) Ltd.
P.O. Box 52810-City Square
Nairobi 00200, Kenya

ISBN 9966-778-08-X

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Abstract

The rise in fiscal policy as a tool of macroeconomic management and the pervasive and widespread inequality in terms of income disparity has renewed interest in the use of fiscal policy in the alleviation of poverty and the reduction of income disparity. This study sets out to examine the potency of fiscal policy as a tool for poverty alleviation. The study uses a static real-side computable general equilibrium model as the framework. Three counterfactual scenarios were examined. These are transfers to the poor household, targeting of government expenditure and import tariff adjustment. The study observed that targeting of government expenditure seems to be the most potent tool for effective poverty reduction. Moreover, tariff adjustment tends to aggravate income disparity/poverty amongst households. In this light, the study proposes that in the quest for poverty reduction in Nigeria, fiscal policy should be designed so that government expenditure is properly focused to ensure that goods required by poor households are provided through public means.

Acknowledgements

The author gratefully acknowledges the financial and technical support of the management and staff of the African Economic Research Consortium (AERC), which facilitated the successful completion of this work. I sincerely acknowledge the comments of resource persons in Group A led by Prof. Eric Thorbecke. Comments of external reviewers are also acknowledged. However views and errors are purely mine.

1. Introduction

Since the late 1980s, fiscal (budget) policy¹ has become a major tool/instrument in Nigeria. The reasons for this are not inconsiderable. First is the dominant role of the public sector in major (formal) economic activities in Nigeria. This can be traced to several factors. Among them are the oil boom of the early 1970s, the need for reconstruction after the civil war, the industrialization strategy adopted at the time (import substitution industrialization policy) and the militarization of governance. The second reason for the increasing dominance of fiscal policy in the management of the economy is the fall in the international price of oil² in the late 1980s. Furthermore, the persistent fiscal deficit since the early 1970s (and given the decline in oil revenue) required a new fiscal focus that saw the emergence of the public sector in major economic activities.

The socioeconomic dimensions of the collapse of oil prices and the general mismanagement of the economy in the 1980s brought the issue of poverty alleviation to the fore. By the mid 1980s, it was observed that the formal private sector was going extinct, economic activities as measured by aggregate output, industrial production, non-oil exports, etc., were all showing distress signs. Above all, there was strong, widespread evidence of pervasive and massive poverty in the land in spite of growing public expenditure and fiscal deficit. By 1986 all major socioeconomic indicators were pointing downwards. The rate of unemployment was (and is still) high, purchasing power of the people was down, poverty was becoming entrenched and economic growth became negative. In sum, there was severe macroeconomic imbalance – domestically and externally. It was apparent that the economy required major adjustment.

The structural adjustment programme (SAP) was introduced in 1986 to correct the perceived imbalance in the economy. Just immediately after the introduction of the structural adjustment programme, it was observed that social indicators were not responding positively to the reform measures—they were getting worse. Hence, several measures were introduced to reduce the social cost of adjustment. In fact, it was a common feature of fiscal behaviour to observe that before the end of the second quarter of any particular year, actual fiscal activities of the government were totally at variance with budget proposals. The government regularly finds itself engaging in extra-budgetary expenditure that is occasioned, largely, by the observed suffering of the majority of the people.

Looking at various fiscal measures in the last two decades in Nigeria, one would observe that attention has been focused on the rural poor. Poverty is not an exclusively rural phenomenon, but it is a fact that it is largely rural in Nigeria, the majority of whose people are in the rural area engaging primarily in subsistence agricultural activities.

To reduce the poverty of the rural poor, the government introduced a variety of programmes, such as the Directorate of Food, Roads and Rural Infrastructure (DFRRI), the Better Life/Family Support Programmes, Family Economic Advancement Programme (FEAP), National Directorate of Employment (NDE), People's Bank, Community Banks, The Petroleum Trust Funds, and others.³

All these programmes involved some budget policy or the other. The concern of researchers now is why fiscal policy has failed to ameliorate poverty in Nigeria. There are two apparent reasons. The first encompasses factors associated with the policy itself (in terms of poor targeting, poor policy mix, poor implementation, etc). The second broad reason has to do with non-budget policy factors (such as institutional factors). We are not suggesting that these reasons are independent. Rather, they complement one another.

The problem

Despite the several fiscal measures introduced since 1986, and given the prominence of fiscal policy in macroeconomic management in Nigeria, growth has not accelerated and poverty remains widespread and pervasive, particularly in the rural areas. Fiscal policy is still widely recognized as a potent tool for enhancing growth, redistributing income and reducing poverty (though the Nigerian experience is tending to suggest otherwise). One could then ask, what is the role of fiscal policy in inducing growth, redistributing income and reducing poverty in Nigeria? Furthermore, could fiscal policy be designed so as to ensure growth and reduce poverty while maintaining macroeconomic stability? These are crucial questions to ask given the renewed interest of the current democratic structure in Nigeria in poverty alleviation and given that fiscal policy is the arrowhead of the policy package of the current policy framework in Nigeria.

Growth and poverty alleviation have received attention in Nigeria (see, for example, Aigbokhan, 1985, 1998; Obadan, 1997; Ogwumike and Ekpenyong, 1995; among several of such studies). However, none of these studies have attempted to examine our puzzle analytically. Furthermore, previous studies on Nigeria have relied on partial frameworks. The differential effects of fiscal policy on various productive sectors and on the different income groups are neither explored nor captured. Most of these studies have preoccupied themselves with presenting poverty profiles in Nigeria. Some of them have attempted to examine the impact of growth on inequality. But it is quite clear from the literature that growth, inequality and poverty can influence, and are in turn influenced by, fiscal policy. This is an important area neglected by previous studies and one that this study intends to capture.

Study objectives

The broad objective of this study is to examine the likely impact of fiscal policy on various productive sectors and on the different socioeconomic groups of the economy. In this respect, we will analyse and present a framework for the use of budget policy to improve income distribution and reduce poverty within a stable macro-framework.

Research justification

Nigeria now faces three inter-related development challenges that are key both to welfare improvements for the general population and to poverty reduction in particular. First, it has to establish a viable and stable macroeconomic framework and to streamline the incentive regime. Second, it needs to downsize the public sector and establish an enabling environment with accountability and transparency. Third, and most importantly, it really must adopt sectoral policies and rearrange priorities in public expenditures to promote efficient economic growth, increase productivity and target the poor. These challenges point to the need for Nigeria to make a fundamental shift away from policies and institutional arrangements that promote rent-seeking and towards policies, programmes and institutions that promote efficiency, sustainable, and broad-based growth and job creation. This research is an attempt to make realistic policy contributions in this direction.

2. Characterizing poverty in Nigeria

In Nigeria,⁴ the problem of poverty has for a long time been a cause for concern to the government. Initial attention focused on rural development and town and country planning as a practical means of dealing with the problem. Thus, the second and fourth national development plans contain both direct and indirect allusions to, as well as objectives of, policies and programmes aimed at minimizing the causes of poverty. These various causes of poverty, which include low productivity, market imperfections, structural shifts in the economy, inadequate commitment to programme implementation, political instability, etc., are complex and the consequences often reinforce the causes, further impoverishing the people. In a fairly recent survey,⁵ Nigeria's festering poverty profile was described as "widespread and severe". The report of comparative analysis of welfare ranked Nigeria below Kenya, Ghana and Zambia and expressed concern over the dwindling purchasing power of the people and the increasing income inequality in Nigeria, which have made life unbearable for the citizenry despite improved inflation rates.

Whether measured in absolute or relative terms, poverty is generally more prevalent in the rural communities of Nigeria. Although the population of urban dwellers in the total population has increased from 19.0% in 1963 to about 25.0% in 1990, both urban and rural areas share similar poverty characteristics even as certain peculiar features arise from either the relative intensity of socioeconomic deprivation in the rural areas or the problems of rapid urbanization. The sluggish growth and the low level of income coupled with inequality in income distribution – as well as lack of access to basic social amenities— have accentuated poverty levels across economic groupings and geo-political divisions. When the benchmark for the poverty line was estimated by the World Bank on the basis of two-thirds of the mean per capita household expenditure for 1985 (i.e., N395.00), about 43.0% of the entire population was considered poor. Using the same benchmark, 31.7% of urban population and 50.0% of the rural population lived below the poverty line (see note 5).

In most urban centres, poor wage incomes and high unemployment rates, in the absence of social security benefits, have reduced the capacity of most people to provide the basic needs of human existence. Similarly, the intensity of poverty among the rural dwellers is manifested not only in very low incomes (which provide barely half the nutritional requirements for healthy living), but also in poor living conditions with little or no access to potable water, electricity and modern health care facilities.

Indeed, in terms of quality of life, deterioration in income, unemployment and poor social infrastructures, the poor have become poorer between 1985 and 1997. Although

skill acquisition is a prerequisite for gainful employment, the high incidence of poverty among educated Nigerians reflects problems of unemployment and low wage levels. Even among people in regular or self-employment, those living below the poverty line account for about 30.0% and 25.0%, respectively. Another significant development is the redistribution of poverty among occupational categories. Even though poverty is more prevalent in the rural areas, the proportion of farmers in the population of those who live below poverty line has declined progressively from 86.6% in 1985 to 67.4% and 33.3% in 1992 and 1997, respectively. But the civil service, corporate establishment and trading (or informal) sector, which accounted for about 11.1% and 26.3% of the poor in 1985 and 1992, respectively, now harbour about 52.5%. This reflects the impact of falling real wages and inaccessibility of social services on the living standard of the people. With an adult literacy rate of 57% in 1997, education indexes show that about 43% of Nigerians are illiterates. The consequences are poor income, inadequate skilled manpower and low productivity – and hence the persisting high level of poverty in the country.

Poverty profile in Nigeria

The Nigerian economy is characterized by a large rural, mostly agriculture based, traditional sector, which is home to about three-fourths of the poor, and by a smaller urban capital intensive sector, which has benefited most from the exploitation of the country's resources and from the provision of services that successive governments have provided. This duality arose in large measures from domestic policies that steered most investment – physical, human and technological – into a few already capital-intensive sectors of the economy. A fundamental problem with Nigeria's past pattern of development has been that the incentive regimes that prevailed for most of the last two decades have tended to favour the urban modern sector to the detriment of the traditional rural sector, consistently worsening the domestic terms of trade of the latter.

Nevertheless, the poor in Nigeria are not a homogeneous group. They can be found among several social/occupational groups and can be distinguished by the nature of their poverty. For example, evidence from the World Bank poverty assessment on Nigeria using 1992/93 household survey data, shows that the nature of those in poverty can be distinguished by the following characteristics: sector, education, age, gender and employment status of the head of household (FOS, 1995). Other characteristics include household size and the share of food in total expenditure. Table I presents the percentage of persons and households below the poverty line in 1996/97 by some of these characteristics. The table shows that 67.1 million Nigerians were in poverty in 1996/97, out of which 23.3 million and 43.8 million were located in urban and rural areas, respectively (FOS, 1999). Thus about 65% of the poor live in the rural areas, indicating that poverty in Nigeria is largely a rural phenomenon. For example, in 1992, 46.4 million Nigerians were said to be living in absolute poverty, out of which 80.2% or 37.7 million are in the rural areas (Ogwumike, 1996). The marginalization of the rural areas through urban-biased development policies is largely responsible for the high poverty incidence in the rural areas.

Table 1: Poverty incidence by socioeconomic group, 1996/97

Socioeconomic groups	Extreme poor	Moderate poor	Non-poor
Urban	25.2	33.0	41.8
Rural	31.6	38.2	30.7
Male-headed	29.8	36.7	33.6
Female-headed	25.0	33.5	41.5
Age of head			
15-24	16.2	21.2	62.6
25-34	20.2	32.5	47.3
35-44	27.9	36.7	35.4
45-54	32.7	38.6	28.7
55-64	32.6	37.3	30.1
65 and above	33.5	34.6	32.0
Education of head			
Non	34.3	38.3	27.4
Primary	24.3	35.1	40.6
Secondary	21.2	30.8	48.0
Post-secondary	15.3	32.9	51.8

Source: FOS (1999).

The occupational dimension of the poverty incidence is reported in Table 2. Here we can see that the agricultural sector is most affected. Over 32% of the extremely poor were in this sector in 1996, against about 18% and 16% in 1985 and 1992, respectively. The percentage decline can be traced to some agricultural/rural policy measures introduced by the Babangida administration between 1987 and 1992 as an integral part of a larger adjustment programme. This reduction was absorbed by other occupational groups, however, which tended to eliminate the gains made in the agricultural sector. The rise in poverty in the agricultural sector in 1996 is explained by the abandonment of rural agricultural policies of the SAP period. Although there is relative decline in the percentage of poverty among people in the agricultural sector in 1996, there is still a concentration of poverty in the agricultural sector. The challenge for Nigeria is not to improve one sector or region at the expense of another, or to introduce policy distortions and inefficiencies in resource allocation to benefit one group, which in the past has led to increased poverty for others. The challenge is to adopt growth and social service oriented policies (i.e., public expenditure, revenue and investment – budget) that will enable all its inhabitants to improve their welfare.

Table 2: Distribution of poverty by occupation of household head

Occupation of head	Percentage of extreme poor		
	1985	1992	1996
Professional/tech.	4.0	13.5	25.5
Admin. manager	4.4	7.5	5.4
Clerical/related	2.4	10.6	26.3
Sales worker	3.3	8.7	24.1
Service industry	4.0	10.7	31.2
Agric. & forestry	18.0	16.4	32.2
Production & transport	8.0	12.4	36.1
Manufacturing & processing	5.3	5.8	23.9
Others	3.9	14.9	26.7
Student/apprentice	2.0	8.7	17.3

Source: FOS (1999).

Fiscal policy, growth and poverty alleviation in Nigeria

The formulation and proper implementation of appropriate macroeconomic policies and programmes targeted for economic growth, along with improved access to social services and infrastructure, are essential ingredients in any strategy for poverty alleviation in Nigeria. Such macroeconomic policies should involve the deliberate manipulation of policy instruments such as public expenditure to achieve basic macroeconomic objectives. Research highlighted in the World Bank Report on Poverty Assessment Document, Nigeria: *Poverty in the Midst of Plenty: The challenge of Growth with Inclusion* (The World Bank, 1996) showed “..... faster growth rates for countries with low inflation, low and manageable overall fiscal deficits, minimal price distortions, strong and efficient investment and open economies with large shares”.

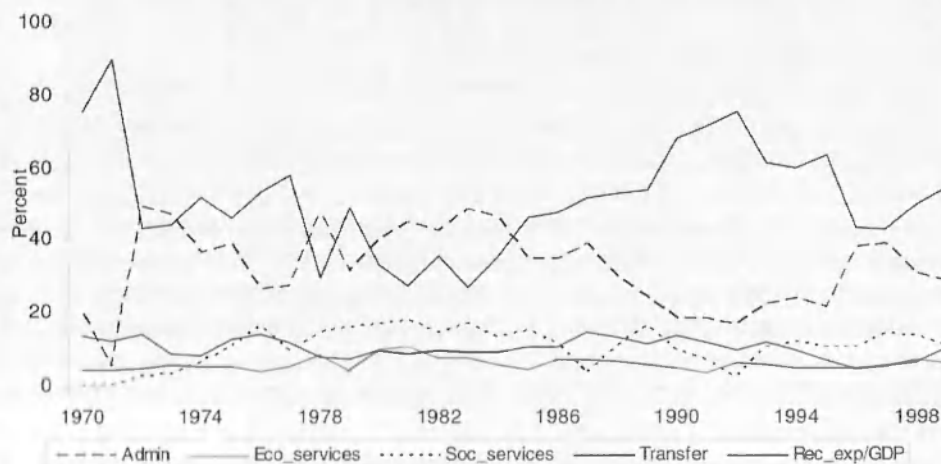
Nations with inflation rates of over 30% tend to have low per capita growth, whereas those with inflation rates above 70% tend to show negative growth. In addition, the economic performance of the higher per capita growth rate countries has been enhanced by stable exchange rates and moderate to low inflation. It follows that the achievement of price stability is a valuable poverty reduction goal by itself (World Bank, 1996). The report further emphasized that if there is to be a reduction of the number of people in poverty, there must be a growth rate of at least 5–7% per annum, growth that is employment generating and with an export base.

Apart from the violation of the requirement for the budget to be balanced or have a surplus as the key element of a sound fiscal policy to achieve sustainable economic growth or stabilization, the design and execution of other strategies such as public allocation policy, public debt management policy and tariff policy did not help to improve the performance of the economy over time. In the development experience of Nigeria, the emergence of oil in the 1970s and occasional sporadic booms associated with it led to extensive participation of the public sector in huge and expensive social, physical and economic infrastructure. The use of public expenditure policy to encourage import-oriented production and consumption patterns, with few incentives for the expansion of non-oil exports, adversely affected agricultural production —in which over 60% of the population are engaged — and deprived the sector of necessary resources for the needed growth and expansion of activities that would have redistributed income.

The nature of excessive government intervention in the economy led to the setting up of many parastatals and government owned companies, apart from colossal public sector investment undertakings in huge and expensive social, physical and economic infrastructure and industrial projects. Given the set up in these government establishments, the operations of many resulted in financial losses. Thus, rather than become avenues for equitable distribution of income these public enterprises degenerated into avenues for political compensation. It is quite obvious that previous and current development planning efforts have not successfully addressed the problem of poverty alleviation because the strategies adopted for economic growth have not been strong and well focused on income redistributed. Second, the massive effort to provide social services and infrastructure was not well implemented and not accessible to the generality of the populace. Third, there have been no well-targeted transfers and safety net mechanisms for the poor. Hence, to tackle the problem of poverty alleviation, a critical review and streamlining of fiscal policy for growth and income distribution needs to be undertaken.

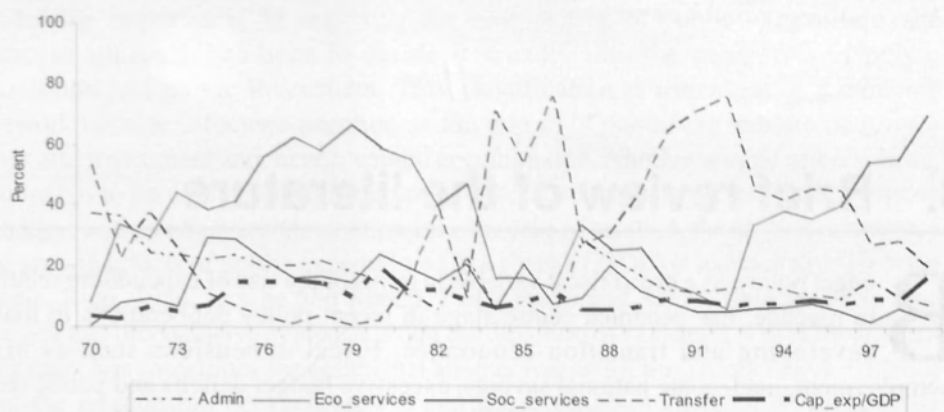
Figure 1 indicates that public recurrent expenditure on economic and social services has received the least attention amongst the various classifications of government expenditure. In fact, in no year is public recurrent spending on economic and social services up to 20% of total recurrent spending. The implication is straightforward. Public spending has not been geared towards supporting⁶ economic expansion and human development but towards such activities as transfers and administration. Transfers are dominated mainly by budgetary allocations to unproductive activities rather than income distribution and poverty alleviation. Since social services are made up of health, education and other social/community activities, we can observe that public spending on human development is still low in Nigeria. This could account in part for the rampant deprivation amongst the people. We observe that recurrent expenditure as a ratio of GDP is also largely below 20%. The tentative observation is that public recurrent spending may not have helped to alleviate poverty.

Figure 1: Functional classification of recurrent expenditure in Nigeria, 1970–1998



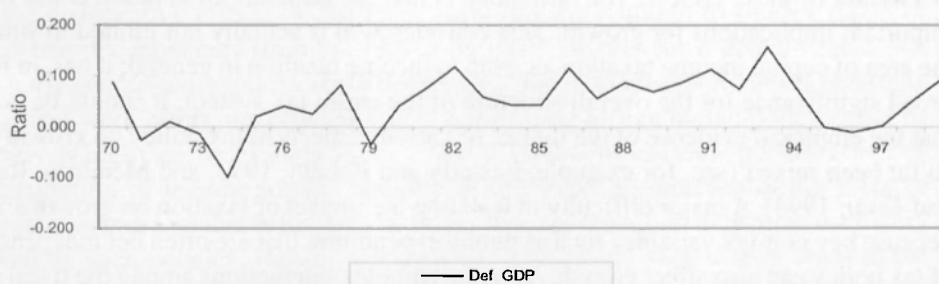
Source: CBN, Statistical Bulletin, Vol. 11, No. 2, December 2000.

In terms of government capital expenditure profile, the picture is not radically different (see Figure 2). Since the 1980s, economic and social services have received less and less of the share of public capital expenditure. It is interesting to note the rapid rise in capital expenditure on transfers since the mid 1980s with the attendant rise in poverty. Furthermore, since the early 1990s, capital expenditure on economic activities as a ratio of total capital expenditure increased tremendously without a corresponding decline in poverty, unemployment and so on. This calls for a thorough analysis of the effectiveness and productivity of public expenditure. The continued and persistent fall in capital allocation to administration could suggest that the mechanism for implementing and monitoring fiscal goals is not well developed. In general, capital expenditure as a percentage of GDP has always been below 25%.

Figure 2: Functional classification of capital expenditure in Nigeria, 1970-1997

Source: CBN, Statistical Bulletin, Vol. 11, No. 2, December 2000.

It could further be observed that fiscal deficit as a ratio of GDP has largely increased over time (see Figure 3). The question that readily comes to mind is why, despite increases in public spending and large fiscal deficits, growth is not accelerating and poverty is on the increase. This puzzle can be resolved by analysing the targeting structure and pattern of government expenditure. The macroeconomic implications of the fiscal stance could also give a good insight into why fiscal policy has not induced growth or reduced poverty.

Figure 3: Nigeria's debt/GDP ratio

Source: CBN, Statistical Bulletin, Vol. 11, No. 2, December 2000.

3. Brief review of the literature

Budget policy, as a broad fiscal variable in terms of the size of expenditure relative to revenue, has occupied centre stage in recent policy deliberations in many developing and transition economies. Fiscal dimensions such as high unemployment, inadequate national savings, excessive budget deficits and public debt burdens have intensified in many developing countries over the years. Hence, issues relating to the appropriate scope, nature and conduct of budget policy, in the context of both fostering growth and alleviating poverty (while ensuring macroeconomic stability) have naturally come to the fore in policy debates.

Of course the relevance of considering the growth effects of fiscal policy must be predicated on the basic proposition that policy matters for long-run growth. However, a clear and direct link between budget policy and growth has traditionally been associated with tax policy. One link is built on the idea that taxes are non-neutral (in terms of private economic agents' allocative decisions). Hence, distortions are introduced into the economy. A second link is via the impact of taxation on factor accumulation, particularly capital. It relates to the excess burden of taxation in a dynamic sense. Another channel usually suggested in the literature is the provision of tax incentives for promoting investment and research and development activities (see Tanzi and Zee, 1997 for a detailed discussion of these issues). The basic idea is that the structure of taxation could have important implications for growth. This consideration is actually not limited to simply the area of capital income taxation, or even to income taxation in general; it has, in fact, broad significance for the overall structure of the entire tax system. It should be noted that the empirical evidence of the impact of various aspects of tax policy on growth has so far been mixed (see, for example, Easterly and Rebelo, 1993, and Mendoza, Razin and Tesar, 1994). A major difficulty in isolating the impact of taxation on growth arises because key non-tax variables such as public expenditure that are often not independent of tax policy can also affect growth. Also, the complex interactions among the fiscal and other macroeconomic variables create difficulties.

On the expenditure side, it is usually suggested that the net impact on growth (as measured by aggregate output) of the crowding-out effect of public expenditure clearly depends on the relative marginal productivity of the public and private sectors. The externality effect of public expenditure enhances growth by raising private sector productivity. Here, a higher level of such expenditure could achieve a high growth rate. The opposing natures of the crowding-out and externality effects rest on the proposition

that the structure of public expenditure, rather than merely its level, would be of considerable importance. In analysing the composition of public expenditure, the traditional approach has been to divide it broadly into the categories of public consumption and public investment. This classification is important in a dynamic framework because it focuses attention on the impact of public expenditure on private savings and investment and, hence, capital accumulation. Another area of interest in the literature has to do with the complementarity or substitution between public and private expenditure as they affect private savings. Like the case of taxation, the empirical evidence of the growth effects of public expenditure (as a share of GDP) is inconclusive (see, for example, Ram, 1986; Levine and Renelt, 1992; Barro and Sala-i-Martin, 1995). One reason for this inconclusive evidence is that the direction of causation is usually difficult to ascertain. It is sometimes suggested that another reason for this inconclusive evidence is that the relationship between growth and fiscal variables may not be particularly monotonic over the levels of these variables or over income, or both. In fact, it can be argued that increasing levels of public expenditure would first raise and then reduce growth (see Tanzi and Zee, 1997).

The combined effect of taxation and expenditure (budget balance) is usually referred to as budget policy. It is usually argued that budget policy may have growth effects that are separate from those related to the absolute level of either taxation or public expenditure, as discussed above (Tanzi and Zee, 1997). This is usually the case if one considers the stability implications of budget imbalance.⁷ A related but distinct case is the possibility of behavioural response from the private sector based on such imbalances (irrespective of the mode of financing such imbalance). In other words, the issue is whether there is neutrality between debt and tax financing of budget imbalance.⁸

On the income distribution side, it is generally agreed that there seems to be a trade-off between the allocative and distributional roles of budget policy. The trade-off is seen from the disincentive effects of distortive taxes that are required to finance direct or indirect transfer payments from the rich to the poor. Studies have demonstrated that under fairly general assumptions about (heterogeneous) individual preferences regarding income and work effort, the efficiency cost of pursuing an egalitarian policy could be prohibitively high (see, for example, Sinn, 1996). In this traditional view, policies effecting a redistribution of income toward equality would exact an increase in the price of (aggregate) output loss that is likely to be larger than the reduction in income inequality achieved by such policies. Hence, in a dynamic framework, such a view leads to the conclusion that there is an increasing marginal cost, in terms of growth forgone, of income redistribution, on account of the saving-depression effect of taxation.

This view has been challenged by some strand of researches which argue that redistributive taxation and the expenditure that it finances are a form of social insurance over an economic agent's lifetime against certain types of risk for which private insurance may not be available. Consequently, redistribution policies could stimulate productive risk taking and output growth, although such behaviour does not necessarily result in greater equality in the after-tax distribution of income (see, for example, Sinn, 1995 and 1996). Another view emphasizes the importance of various aspects of financial market imperfections for growth. The point here is that the potential productivity of the poor cannot be fully realized unless they are given the opportunity to participate in financial

4. Methodology

A general equilibrium model (GEM) provides an analytical framework in which widely different policies can be examined. Once the basic model has been specified and implemented with actual data, various policies can be studied with only minor modifications. Budget policy will have different effects on the various productive sectors and on the different income groups of the economy. Only a general equilibrium framework makes it possible to capture these effects without ignoring the simultaneous adjustment of the main economic variables.

Applying the model to Nigeria

In Nigeria, a very substantial part of income inequality comes from “macroeconomic” sources. Almost 75% of total inequality is typically explained by the structure of earnings across sectors and occupational groups, the structure of employment, and the distribution of wealth (CBN, 1999). So a model able to explain the way in which all those parameters may change over time and react to exogenous shocks can definitely be of value to policy making in the field of development and income distribution. On the other hand, that part of growth, income inequality and poverty alleviation that cannot be so easily explained by macroeconomic structural parameters most probably escapes the control of policy makers and is therefore of less practical interest.¹⁰ GEM models permit a consistent endogenous representation of the complex structural circular relationship “production-distribution-consumption-investment-production”. This approach represents a major departure from previous studies on growth, inequality and poverty in Nigeria.

Model description

The economy is assumed to have five production sectors, two factors of production and six consumer groups. We assume the government does not produce goods and services.

Production activity

Production combines a fixed-coefficient, Leontief system for intermediate inputs and value-added with constant elasticity of substitution (CES) production function that generates value-added from the two factors. This permits us to utilize data from the

Nigerian input-output matrix without unduly restricting the range of substitution possibilities. Hence, the production function for sector j is

$$X_j^s = \min(A_j, VA_j), \quad j = 1, \dots, 5 \quad (1)$$

where A_j represents the intermediate input for sector J . X_j^s (VA_j) = gross output (value added) of sector j . Value-added in sector j is assumed produced from two factors according to a CES production function:

$$VA_j = c_j \left[\sum_{k=1}^2 \delta_{kj} L_{kj}^{-\rho_j} \right]^{-\frac{1}{\rho_j}}, \quad j = 1, \dots, 5 \quad (2)$$

where c_j is the efficiency parameter; δ_{kj} is the distribution, or input intensity, parameter of input k ; ρ_j is the substitution parameter; and L_{kj} is the use of factor k , all for sector j . Intermediate inputs are described by a fixed input-output matrix:

$$A_j = \min_{i=j} \left(\frac{x_{ij}}{|a_{ij}|} \right), \quad j = 1, \dots, 5 \quad (3)$$

a_{ij} = input-output coefficients and x_{ij} represents the physical quantities of input i used in the production of j (intermediate demands). Hence, intermediate demand for good i is given as

$$V_i = \sum_j a_{ij} X_j^s, \quad i = 1, \dots, 6, \quad j = 1, \dots, 5 \quad (4)$$

Sector i (as above) includes non-competitive (intermediate) imports. Since producers choose the combination that minimizes their after-tax cost of production, the following demand for factor k in sector j can be derived:

$$L_{kj} = \frac{VA_j}{c_j} \left[\sum_{i=1}^2 \delta_{ij} \left[\frac{q_k^* / \delta_{kj}}{q_i^* / \delta_{ij}} \right]^{-\rho_j / (1 + \rho_j)} \right]^{1/\rho_j}, \quad k = 1, 2, \quad j = 1, \dots, 5 \quad (5)$$

where q_k^* is the gross-of-tax factor cost. This implies that producers are required to pay ad valorem taxes at the rate m_{ki} on factor employed respectively which (may) differ by sector such that:

$$q_k^* = q_k (1 + m_{ki}), \quad k = 1, 2, \quad (6)$$

with q_k as the prevailing market price of factor k .

The production possibility frontier of the economy is defined by a constant elasticity of transformation (CET) function between domestic supply and export.

$$X_j^e = \alpha_j \left[\gamma_j E_j^{R_j} + (1 - \gamma_j) D_j^{sR_j} \right]^{\frac{1}{R_j}} \quad (7)$$

where E_j is export supply, D_j is domestic supply, α_j is CET function shift parameter, R_j is CET function exponent and γ_j is CET function share parameter.

We also define a composite commodity (Q_j^s), made up of domestic demand (D_j^d) and final imports (M_j^d), which is consumed by both the household and the government. We assume constant elasticity of substitution (CES) between domestic demand and final import demand.

$$Q_j^s = \alpha_c \left[\lambda_j M_j^{d-\mu_j} + (1 - \lambda_j) D_j^{d-\mu_j} \right]^{\frac{1}{\mu_j}} \quad (8)$$

where α_c is CES (constant elasticity of substitution) function shift parameter, M_j^d is import demand, D_j^d is domestic demand of domestic output, λ_j is CES share parameter and μ_j is CES function exponent.

Consumer demand

The demand side of the economy is represented by six groups of domestic consumers differentiated according to their average income, by the government, and by a foreign consumer that represents the rest of the world (see the Appendix). These consumers are differentiated because their initial endowment and their utility functions are different. The domestic consumers are described as follows. Prior to production each consumer group owns capital and labour that, when evaluated at market prices, produce the group's income. The consumer groups are assumed to maximize their utility functions subject to their income constraints. Assume w_{kh} is a non-negative endowment of factor k of group h . If the non-negative q_k represents the prevailing market price, then the income of group h is given as follows:

$$Y_h = \sum_{k=1}^2 q_k w_{kh}, \quad h=1, \dots, 6 \quad (9)$$

which is obtained by renting the group's endowment w_{kh} ($k=1,2$) at market price. Given Y_h , domestic consumer group h maximizes its utility function. We assume (for convenience and data constraints) that the utility function is of the Cobb–Douglas form:

$$U_h(Q) = \sum_{i=1}^5 b_{ih} \log Q_{ih} \quad (10)$$

Given the existence of taxes, as well as the possibility of transfers from the government, the following demand function can be derived:

$$C_{ih}^d = \frac{b_{ih}(1-sp_h) \left[\sum_{k=1}^2 q_k w_{kh} (1-t_h) + R_h \right]}{pd_i(1+t_{if})}, \quad h=1, \dots, 6 \quad i=1, \dots, 5. \quad (11)$$

which is a constant proportion (b_{ih}) of the real disposable income and transfers received by group h . This proportion is easily observed in the household survey information. C_{ih} is demand for good i by household h . tif is the ad valorem tax rate imposed on the purchase of final goods. Sp_h is the average marginal propensity to save of household h . Rh represents transfers or/and tax rebates received by each consumer group h (in lump-sum form). p_{di} is the domestic (producer) price of good i . Each consumer group h , with income Y_h , faces an income tax rate th . The group h is taxed on the value of its factor endowment (wh) prior to production and before payment of any taxes. The market demand for good i is given as:

$$C_i^d = \sum_{h=1}^6 C_{ih} \quad i=1,\dots,5. \quad (12)$$

The savings of household h is then given as

$$Sav_h = Y_h - \sum_i p_i C_{ih} \quad (13)$$

where p_i is the market price of good i .

Foreign sector

Exports can be represented as:

$$E_i = D_i^s \left[\frac{pe_i(1-\gamma_i)}{pd_i\gamma_i} \right]^{\frac{1}{R_i}} \quad (14)$$

while imports take the form:

$$M_i^d = D_i^d \left[\frac{p_i\lambda_i}{pm_i(1-\lambda_i)} \right]^{\frac{1}{1+\lambda_i}} \quad (15)$$

where pm_i is the domestic price of import good i , M_i^d is import of good i .

Savings investment and dynamic relations

Total savings, S , in the economy determines total investment, I . Nominal investment is allocated to each sector according to an exogenous (budget policy) rule, π_i , which is a policy instrument and serves for counterfactual analysis. Real investment in each sector then depends on the average price index of investment goods in each sector i , $p\pi_i$, which itself is a function of market prices.

Domestic savings:

$$S = \sum_j s_j Y_j \quad j \in (\{h\}, G) \quad (16)$$

where s_j is the average marginal propensity to save of domestic agent j , Y_j is disposable income of domestic agent j . G represents the government and h other domestic consuming groups.

Investment by sector:

$$I_i = \frac{\pi_i S}{p \pi_i} \quad (17)$$

$$p \pi_i = f(p) \quad (18)$$

$$Z_i = \sum_j \Gamma_{ij} I_j \quad (19)$$

Demand for investment goods i , Z_i , follows from the matrix, $\bar{\Gamma}_i$, which gives the composition of investment goods in each sector.

Note that I is investment by sector of destination while Z is investment by sector of origin. It follows that the dynamic relation of the model can be written as:

$$\Delta K_i = f(I_i) \quad (20)$$

Prices¹¹

Price of composite goods (PQ_i)

$$PQ_i = \frac{pm_i M_i^d + p_i D_i^d}{Q_i^s} \quad (21)$$

Price of aggregate output (PX_i)

$$PX_i = \frac{pe_i E_i + pd_i D_i^s}{X_i} \quad (22)$$

Import price (in domestic currency terms)

$$pm_i = \overline{pwm_i} (1 + tm_i). ER \quad (23)$$

$\overline{pwm_i}$ is the international price of imports and ER is the exchange rate. tm is import tariff.

Export price (in domestic currency terms)

$$pe_i = \overline{pwe_i} (1 + te_i). ER \quad (24)$$

$\overline{pwe_i}$ is the international price of exports. te is export tariff.

Market price of domestic goods (P_i)

$$p_i = pd_i(1+t_{if}) \quad (25)$$

Value-added price (P_i^v)

$$P_i^v = P_i - \sum_j P_j a_{ji} (1+t_{vat_j}) \quad (26)$$

where t_{vat} is ad valorem tax rate imposed on the purchase of intermediate goods.

Government

The government in this model collects taxes and purchases commodities. Because of our focus on budget policy, government's budget in this model is assumed to be balanced.

Government Revenue. The government collects tax revenue from the use of factors by producers, income taxes from consuming groups, ad valorem tax imposed on the purchase of final goods, tariffs and ad valorem tax imposed on the purchase of intermediate goods. This is expressed as follows:

$$\begin{aligned} T = & \sum_{i=1}^5 \sum_{k=1}^2 q_k t_{ki} L_{ki} + \sum_{h=1}^2 t_h \sum_{k=1}^2 q_k w_{kh} + \sum_i pd_i t_{if} C_i^d + \sum_i pe_i t_{e_i} E_i \\ & + \sum_i pm_i t_{m_i} M_i^d + \sum_i \sum_j a_{ji} X_j P_j t_{vat} \end{aligned} \quad (27)$$

In addition to tax collections, the model also incorporates transfers and tax rebates by having each consumer group receive, in lump-sum form, a fraction of government revenue such that:

$$R_h = \alpha_h T \quad (28)$$

where $\sum_h \alpha_h = 1 - \alpha_G$, and α_G (a policy parameter) is the share of the tax revenue that the government retains (α_G and $\alpha_h \geq 0$). We assume that government budget is always balanced such that:

$$Y_G = \alpha_G T \quad (29)$$

Y_G is government revenue.

Government Expenditure. The government is viewed as purchasing the various commodities of the model. The government is assumed to maximize a Cobb–Douglas utility function, subject to its income constraints. Government demand function for good i can then be written as:

$$C_{iG}^d = \frac{b_{iG}(1-s_G)Y_G}{pd_i} \quad (30)$$

s_G is government marginal propensity to save and b_{iG} is the demand share parameter.

Market clearing and macroeconomic closure

$$Q_i^s = V_i + \sum_{h=1}^6 C_{ih}^d + C_{iG}^d + Z_i \quad (31)$$

$$\sum_i L_{ki} - \bar{L}_k^s = 0 \quad (32)$$

$$S = I \quad (33)$$

$$\sum_i pm_i M_i - \sum_i pe_i E_i - \bar{F} = 0 \quad (34)$$

$$P = \sum_i \beta_i p_i \quad (35)$$

where F is exogenous foreign capital inflow. Equation 31 states that the sectoral supply of composite commodities must equal demand. Based on equations 14 and 15, we can easily see that if Equation 31 is satisfied, the market for domestic output (X) and domestic goods sold in the domestic market (D) will clear. Hence, no separate market clearing equations are required.

Equation 32 defines equilibrium in factor markets. The supplies of primary factors are fixed exogenously for any given year. Market clearing requires that total factor demand equal supply, and the equilibrating variables are the factor prices, q_{ki}^* . Equations 33 and 34 describe macroeconomic equilibrium conditions for saving-investment balance and the balance of payments. The equilibrating variable in the external market will be the exchange rate since foreign savings is fixed exogenously. Equation 35 describes the numeraire.

5. Structure of the SAM

On the basis of available data for Nigeria, the study uses a classification scheme for the social accounting matrix (SAM), which allows for overall consistency and adequate level of details. Hence, we employ a fairly aggregative SAM, which we believe will capture the essentials of the subject matter. We start by using the fairly disaggregated national accounts (1999) as reported by the Federal Office of Statistics (FOS) and then achieve a level of aggregation consistent with the objective of the study. In the classification of households, we try as much as possible to allow for homogeneity. Groups are identified not by income sources and expenditure patterns, but by location (rural/urban), asset ownership (landowners/landless) and level of education.

The socioeconomic groups used in the study are classified according to the criterion of recognition – the groups are recognizable for policy purposes and useful for socioeconomic analysis. The existing data sources of the FOS are also similar to this classification. Owing to the overriding objective of the study, we believe the labour-capital classification of factors of production will suffice. It should be observed that the issue of regionalization is not taken into consideration in this study. Hence, location-specific policy issues are not considered in the current study. The National Integrated Household Survey of the FOS provides the information on income and expenditure of households. The SAM ignores the financial sector of the economy. The input-output relation is based on the 1999 inter-industry survey of the FOS.

The data of the SAM

Data for the SAM were drawn from the 1999 input-output table, which was constructed from data contained in the national account 1999. The social and economic characteristics of the households and their income and expenditure patterns were obtained from the 1996 FOS household survey. The balancing of the SAM was accounted for by the residual between income and expenditure of individual household accounts and institutions in the capital account. The model is calibrated to a 1999 data set with these data coming from a variety of sources. Benchmark year (1999) data were obtained for income and expenditure for each of the consuming categories. Data for consumer expenditures on final goods by income category are from the FOS household survey and the *Annual Abstract of Statistics* published by FOS. Data on imports and exports are from *International Financial Statistics*, various editions, published by the International Monetary Fund (IMF), and *Statistical Bulletin*, published by the Central

Bank of Nigeria (CBN). Data on inputs, outputs and use of labour and capital by production sector come from data compiled by the FOS. This same source along with the CBN's annual reports and statements of accounts were used to calculate the transformation matrix as well as to find investment levels by sector. Tax levels and rates were calculated from the input-output tables. The CBN annual reports and statement of accounts were also used to obtain data on government expenditures and transfer payments, as well as on interest rates, capital earnings and depreciation.

Income distribution in the CGE model

Several researchers have used CGE models to analyse income distribution in developing countries (see, e.g., Thorbecke, 1991, for Indonesia; De Janvry et al., 1991, for Ecuador; Morrison, 1991). Generally, a CGE model is calibrated from the SAM developed from a consistent base-year data set, which gives the initial conditions. However, intra socioeconomic characteristics of the various households are hidden. For example, it is assumed in the CGE model that, say, poor rural household members have a zero income variance. Several approaches have been used in the literature to describe and define intra-group (or within group) distribution of income in a CGE framework. De Janvry et al. (1991) used both a lognormal and a Pareto distribution function to depict income distribution. Adelman and Robinson (1979), using statistical tests, found these functions not too satisfactory. Bordley et al. (1996) suggest that some other distribution functions might be appropriate. In a CGE framework, Decaluwe et al. (1999) suggest that a more flexible income distribution function can be proposed and adopted.

To actualize these considerations in our CGE model we proceed as follows: We aggregate households into six groups typical of the rural-urban dichotomy in Nigeria. The FOS national consumer survey of 1996 and the 1999 CBN national survey categorized households in terms of:

- a.) Income levels;
- b.) Location (rural or urban);
- c.) Employment status (self employed, wage earner, etc.);
- d.) Occupation (farming, trading, etc.); and
- e.) Educational attainment (low education, high education, etc.).

In this study we will use categories b and c (see the Appendix). To each of these six groups, we attribute income and demographic characteristics in accordance with available data and evidence in Nigeria (see Appendix Table A1). Population shares are also assigned to each group based on a simple head-count ratio (sourced from the household survey of the FOS and CBN national survey). The FOS household survey on income and expenditure gives us data on intra-group income distribution.

6. Model simulation and analysis

In this study we use a static general equilibrium model to examine the implications of alternative fiscal policy measures on income distribution. As discussed earlier, the model is calibrated to the 1999 data set. The replication exercise was generally successful with small discrepancies of less than 1.3% in the data set. In other words, the variable with the largest discrepancy has a deviation of just about 1.3% from the base case. The income distribution figures reported in Appendix Table A1 were used as the base case and it was generally assumed that the income levels of household as at the base case involves no transfers such that $a_G = 1$ in Equation 29. Since we are using a static model, we measure all the real variables in terms of index such that after any scenario we calculate the (percentage) change from the base year. Hence, all base year real variables are measured in terms of deviation from base value (= 100).

Variables of interest

In the study we have 30 variables. Since it will be laborious to report the behaviour of all the variables for each experiment, we decided to pick those that are directly relevant to the subject matter. These are:

- Sectoral and aggregate output and value added
- Sectoral and aggregate employment
- Household income
- Household consumption
- Inequality
- Employment structure

7. Scenario analysis

One reason for choosing a static general equilibrium model is the flexibility it affords. With basically the same data we were able to apply the model to three different policy scenarios for poverty reduction: Scenario 1 involves the use of transfers to increase household income, scenario 2 takes a sectoral approach in the targeting of public expenditure and scenario 3 assumes the application of tax measures. These are described in turn, with reference to the results, underlying assumptions and the equations/identities given earlier.

Scenario 1: Using transfers to increase household income

Hence, $\sum \alpha_h = 1 - \alpha_G$, where h represents households.¹² α_h is the share of tax revenue that is transferred to household h such that the monetary value is given by Equation 28. The proportions of tax revenue assumed to be transferred to households are shown in Table 3.

Table 3: Hypothesized distribution of transfers (proportion)

	RW	RSLO	RLLO	ULE	UHE	CAP
α_h	0.02	0.01	0.00	0.02	0.00	0.00

Key: RW = Rural workers; RSLO = rural small landowners; RLLO = Rural large landowners; ULE = Urban low educated; UHE = Urban high educated; CAP = Capitalists.

It should be stated that a different configuration could be hypothesized that could lead to another conclusion. However, Appendix Table A3 suggests that the households in columns (2), (3) and (5) of Table 3 (above) constitute the majority of the people below poverty line. Hence, we focus on this group. The table suggests that 5% of government tax revenue is assumed transferred to these groups.

The results from the scenario are reported in tables 4–5. The scenario shows that transfer is capable of increasing the income and consumption of the poor. We estimated that about 3.04% of the rural workers (RW), 1.21% of rural small landowners (RSLO) and about 2.17% of urban low educated (ULE) would move upwardly in terms of poverty reduction. By definition other households belong to the rich group. In terms of resource allocation, we observed that the agricultural and non-oil manufacturing sectors increased their employment of rural labour while other sectors reduced employment of rural workers.¹³ The non-oil and service sectors increased their employment of urban labour while other sectors reduced employment of urban labour. Only the agricultural sector

reduced its employment of capital. This could be attributed to the increased employment of labour outside the agricultural sector. In terms of sector output behaviour, we observed that only the construction sector had a reduction of about 3.21 in the value of output. In the aggregate, domestic output grew by about 2.52%.

Table 4: Percentage change in income/consumption from the base case (=100)

Variables	RW	RSLO	RLLO	ULE	UHE	CAP
Household Income	23.14	16.33	3.41	20.19	0.00	1.07
Household consumption.	19.62	13.06	2.10	17.15	0.00	0.00
Inequality*	-3.04	-1.21	0.00	-2.17	0.00	0.00

*Calculated as (negative of) percentage of the group that upwardly crossed the poverty line.

Table 5: Percentage change in employment from the base case (=100)

	Change in employment structure			Sectoral output
	RL	UL	Cap	
Agric.	5.71	-2.34	-1.09	3.41
Non-oil	2.32	1.43	0.08	2.53
Oil	-1.43	-1.01	0.02	0.01
Constr.	-4.26	-1.43	0.00	-3.21
Services	-2.34	3.35	1.01	2.51
Aggregate output:	2.52			

Scenario 2: Sectoral targeting of public expenditure

In scenario 1, we examined a situation where the government decides to transfer a proportion of its revenue to households. In the current scenario, we want to look at the implications of the expenditure side of fiscal policy on income distribution and poverty reduction. From the FOS survey of households we observed the distribution of b_{ih} in Equation 11, which represents the (constant) proportion of real disposable income of household h spent on good i . It will be observed that the poor spend a large proportion of their income on agriculture and services related activities. From the reported expenditure profile of the government for 1999, we observed (and hypothesized) the (sectoral) distribution for government expenditure summarized in Table 6.¹⁴

Table 6: Distribution of government expenditure (per cent)

	Agric	Non-oil	Oil	Constr.	Services
Observed	09.00	12.00	07.00	11.00	61.00
Hypothesized	15.00	04.00	05.00	11.00	65.00

The reduction of expenditure on non-oil manufacturing and the oil sector could be seen as a form of downsizing of the public sector, while the increase in other sectors could be seen as a form of increased expenditure on "development" activities.

The results from this scenario are shown in tables 7–8. It is interesting to observe that an increase in public expenditure on the goods and services consumed by the poor

greatly increased the income and consumption of the poor. We observed that about 5.63% of the rural workers crossed the poverty line while about 1% of the urban low education crossed the poverty line. However, about 4.09% of rural small landowners tend to cross the poverty line. This policy scenario tends to greatly favour rural households more than urban households. In this scenario, the rises in income and consumption are more than that in scenario 1. Also, more people tend to cross the poverty line under this scenario.

Table 7: Percentage change in income/consumption from the base case (=100)

Variables	RW	RSLO	RLLO	ULE	UHE	CAP
Household income	24.01	19.45	20.67	09.45	04.23	-3.42
Household consumption	21.61	14.60	10.43	08.13	02.05	-0.65
Inequality*	-5.63	-4.09	0.00	-0.87	0.00	0.00

*Calculated as (negative of) percentage of the group that upwardly crossed the poverty line.

Table 8: Percentage change in employment from the base case (=100)

	Change in employment structure			Sectoral output
	RL	UL	CAP	
Agric.	10.32	-0.32	-3.41	4.23
Non-oil	-4.53	-7.72	1.41	-2.61
Oil	-4.01	-4.32	0.69	-0.61
Constr.	-3.19	-2.87	0.31	-0.31
Services	1.41	15.23	1.21	6.34
Aggregate output:	3.2			

In terms of resource allocation, more rural labour moved into the agricultural sector and a small proportion moved into services. In the same manner, the service sector is the only sector that absorbs urban labour while other sectors discharged urban labour. However, it will be interesting to note that capital moved into agriculture despite the increase in labour employment. This was not the case in scenario 1, where the rise in rural labour employment led to capital movement out of the agricultural sector. With respect to sectoral output, the agricultural and service sectors witnessed increase in output while the output of other sectors reduced. Output increased by about 3.2% on the aggregate.

Scenario 3: Tax measures

Again, there are several combinations of tax arrangements that could be considered in this study. Income tax manipulation is like transfers discussed in scenario 1. The country does not charge export taxes on non-oil exports. Ad valorem tax on factor employment is generally absent. VAT (value added tax) has generally replaced sales tax, but selective (discriminatory) application of VAT may be difficult to implement empirically. Any change in the VAT rate is expected to produce an across board effect. Hence, the only tax that may be quite easy to experiment with is import tax. The (average) observed import tariff and the hypothesized values are given in Table 9.

Table 9: Tax regime (per cent)

	Agric	Non-oil	Oil	Constr.	Services*
Observed	24.00	33.00	30.00	30.00	0.00
Hypothesized	10.00	15.00	30.00	15.00	0.00

* This is assumed to be a non-tradeable sector. Hence, import tariff is set to zero.

The tax configuration produced an income-expenditure profile in which the capitalist household largely enjoys the benefit of the tariff reduction. Despite the huge reduction in import tariff of the agricultural sector, rural worker households had just a marginal increase in their income and almost an equivalent change in consumption. Again, it is worth noting that rural large landowners and urban high education had appreciable increase in income. This policy tends to favour the urban sector and net producers of agricultural output. In terms of poverty reduction, the rural small landowners had the greatest percentage (just above 1%) that crossed the poverty line. The income (re)distribution effect of this policy tends to be negligible. However, capital tends to reap significant reward under this arrangement.

In terms of resource allocation, it will be observed that there is an increase of about 3.32% in employment of rural workers in the agricultural sector. Also, capital moved into the agricultural sector. In this scenario, the oil sector tends to discharge a proportion of all the inputs. The non-oil sector recorded the highest positive change in output while the oil sector recorded the largest fall in output. Aggregate output tends to increase by about 2.9% compared to the base year value. Tables 10 and 11, respectively, illustrate the changes in income/consumption and employment.

Table 10: Percentage change in income/consumption from the base case (=100)

Variables	RW	RSLO	RLLO	ULE	UHE	CAP
Household Income	0.01	1.51	3.67	1.08	3.86	17.6
Household consumption.	0.01	0.90	1.89	0.89	1.65	6.31
Inequality*	-0.01	-1.01	0.00	-0.56	0.00	0.00

*Calculated as (negative of) percentage of the group that upwardly crossed the poverty line.

Table 11: Percentage change in employment from the base case (=100)

	Change in employment structure			Sectoral output
	RL	UL	CAP	
Agric.	3.32	1.05	1.31	3.16
Non-oil	2.09	3.61	9.40	7.51
Oil	-2.43	-3.58	-5.86	-3.42
Constr.	-2.20	1.21	2.41	2.41
Services	0.78	-2.29	-7.26	-1.42
Aggregate output: 2.87				

8. Main findings and policy implications

Three different fiscal policy scenarios were examined in this study. In the first scenario, we evaluate the likely impact of increased government transfers to poor households. Specifically, we assumed that the government transfers 5% of its revenue to the poor households. The direct impact is to increase the income, hence consumption, of the poor household. The simulation results show that about 6.42% of the poor household will be elevated above the poverty line, with the highest figure of 3.04% coming from the rural workers, followed by 2.17% of rural urban educated. In this scenario, the study observed that the agricultural and non-oil manufacturing sectors witnessed increased absorption of rural labour force while other sectors reduced employment. The service sector increased its absorption of the urban labour force.

In the second scenario, we focus on the expenditure side of fiscal policy and examine the likely income distribution/poverty implications of deliberately targeting of public expenditure. This scenario captured the implication of increasing public expenditure on the sectors in which the poor consume their output most. In this scenario, about 10.72% of the poor moved above the poverty line, with the highest figure of 5.63% coming from rural workers followed by 4.09% of rural small landowners. One interesting observation is that this scenario tends to favour the rural poor rather than the urban poor. Under this second scenario, a higher increase in income and consumption of the poor is witnessed than under the first scenario and more of the poor were moved above the poverty line than under the first scenario. Under this scenario, the agricultural sector is the largest net employer of rural labour while the services sector is a net employer of urban labour.

In the third scenario, we examined the implications of tariff cut on household poverty. It should be pointed out that the basic objective of tariff policy is not to alleviate poverty or to redistribute income. The question here is, could tariff reduction on the sector that employs the poor most have any impact on employment, income, and income distribution? Tariff reduction on agricultural imports was observed not to lead to an appreciable increase in income of the rural poor. In fact, the policy benefited the urban household more than the rural poor. This fiscal policy measure is observed not to have any significant impact on income redistribution, inequality, poverty and employment, particularly for the rural household. This result is not surprising since the objective of the policy has not been to influence inequality.

It is important to discuss the political and practical feasibilities of these scenarios for a country like Nigeria. The focus will be on the first two scenarios. Given the issue of administrative (in)efficiency and the macroeconomic implications of large transfers, such as inflation, the government might not be positively disposed to adopting the measure in the first scenario. Transfers are also not directly related to production and in the face

of mounting public debt, it might not be sustainable. Transfers and subsidies to firms are more productive than transfers to households. The administrative cost of transfers under an inefficient public service system is another issue that may make the measure unpopular. The second scenario, which is that of sectoral targeting of public expenditure, is more politically feasible and more practical in a country like Nigeria. This type of targeting can take various forms, but the benefit would largely be in the form of expanding productive capacity for more employment. The idea of sectoral targeting could involve public expenditure on infrastructure and other means of reducing cost of production such as granting credit at below market rates. The implementation of this policy is politically more acceptable, but will also require an effective public service to ensure that public expenditures are well targeted and effective. Experience over time in Nigeria has shown that huge expenditure made by the government can yield little or no return in the absence of effective management and proper monitoring of public funds. In fact, this is the main argument in favour of privatization. However, the simulation evidence suggests that the targeting policy has the potential to take more people out of poverty than the first scenario.

9. Conclusions

In this study, we experimented with three possible configurations of fiscal regimes and examined the implications of each on income distribution, poverty reduction, resource allocation and output response. It was observed that the use of public expenditure in terms of sectoral targeting tends to outperform other fiscal stances in terms of reduction in poverty and inequality. The use of import tariff to redistribute income was observed to be particularly biased against the poor as it increased in a greater proportion the reward to capital and other urban-based inputs. These results suggest that targeting of government expenditure tends to be a real and potent tool for income redistribution and poverty reduction. Direct transfer of a portion of government revenue is also a positive means of income redistribution, but it is less effective as targeting of expenditure. It should be observed that the results derived from this study are conditional on the structure of the model. It should also be observed that we did not take into account growth. Again, in the study, we did not consider changing technology and productivity growth. Furthermore, the model is essentially a real side model. Poverty alleviation will indeed require effective synchronization of other instruments such as monetary policy with fiscal policy.

Notes

1. We define fiscal (budget) policy in this study to include tax policy, expenditure policy and overall budget balance.
2. The fall in the international price of oil ushered in an era of budget deficits which was financed mainly through borrowing and drawings from the external reserve. This has been ascribed as the genesis of Nigeria's debt problem.
3. Our focus in this study is not to evaluate or assess these programmes individually, as this has been done exhaustively by other studies (see, for example, Central Bank of Nigeria (CBN, 1999).
4. Most of the materials used in this section are from CBN (1999).
5. It was conducted by the FOS in 1997, titled "Poverty and welfare in Nigeria: 1997". Published by the World Bank under the auspices of the National Planning Commission (NPC).
6. Recurrent expenditure can be used to support economic expansion through the maintenance of existing public assets.
7. This issue is central to this study. Previous studies have neglected this important issue.
8. Some important issues in this regard are the dynamic efficiency of the economy, i.e., the level of disparity between long-run real interest rate and long-run growth rate, which determines the solvency of the government and the sustainability of budget policy.
9. This is a relevant proposition for a developing economy like Nigeria with underdeveloped financial markets.
10. An important part of that "residual", for example, is to be found in the age structure of the population and may be of less interest if one has in mind lifecycle incomes. On the other hand, the statement in the text does not deny the general interest in analysing inequality and poverty factors of that type. It simply points out that they certainly are more difficult to control.
11. Note that equations 21 and 22 are actually identities.
12. Refer to the Appendix for a list of households.
13. In this and subsequent experiments, the available quantity of inputs (factors of production) remained unchanged. In other words, the issue of growth was not explicitly considered.
14. The aggregation used in this study is done by the author.

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Appendix

Factorial sources of income

We relate the composition of income of each household group to its social classification. For example, the incomes of rural workers, small rural landowners and urban low education groups consist mainly of labour receipts, while the other factors of production receive their income from capital (and rent).

Table A1: Factorial sources of household income (per cent)

	Labour	Capital	Transfers	Total
Rural workers	95.80	0	4.20	100
Rural landowners (small)	91.20	8.80	0	100
Rural landowners (large)	40.60	59.40	0	100
Urban low education	67.40	28.80	3.80	100
Urban high education	35.20	64.80	0	100
Capitalists	1.80	89.90	0	100

Sources: Calculated by author from FOS household survey.

Primary factors in value-added

From the national accounts we derived the share of our two primary factors in total value-added. It should be expected that the agricultural and service sectors are intensive in labour usage while other sectors are intensive in capital usage.

Table A2: Share of primary factors in value-added (per cent)

	Agric	Oil	Manuf	Const	Services
Labour	67	0.80	5.80	12.50	63
Capital	33	99.20	94.20	87.50	57
Total	100	100	100	100	100

Sources: Calculated by author from National Accounts.

Income and demographic characteristics of households

To each of the households, we attribute income and demographic parameters derived from various surveys to characterize the households for the beta distribution. These are just descriptive statistics that summarize the characteristics of the various households.

The intra-group income distribution data are derived from the income and expenditure profile contained in the household survey of the FOS.

Table A3: Income (naira) and demographic characteristics of households

	Rural workers	Small landowner	Large landowner	Urban low education	Urban high education	Capitalists
Mean income	15,750	42,660	78,540	36,870	300,000	1,800,000
Max. Income	36,000	60,000	240,000	84,000	1,500,000	6,000,000
Min. Income	7,820	20,000	36,000	24,000	40,000	60,000
Population share	0.24	0.22	0.12	0.29	0.09	0.04
% below poverty line	92%	40%	20%	60%	19%	0%

Source: computed by author from FOS household surveys.

List of sectors

Production

1. Agriculture
2. Manufacturing
3. Oil
4. Construction
5. Services

Non-consumption demand

1. Intermediate imports

Factors of production

1. Labour
2. Capital

Consumers

1. Government
2. Foreign sector
3. Rural household:
 - Rural workers
 - Rural small landowners
 - Rural large landowners
4. Urban household:
 - Urban low education (to include unskilled and semi skilled labour)
 - Urban high education (to include skilled workers)
 - Capitalists

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ISBN 9966-778-08-X

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