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The fluctuation of Federal Government expenditures: a statistical analysis.

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THE FLUCTUATION OF FEDERAL GOVERNMENT EXPENDITURES: A STATISTICAL ANALYSIS

BY
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Abstract

Many developing countries, incuding Nigeria are currently implementing IMF/World Bank-supported structural adjustment programmes, with varying degrees of success in achieving a turn-around of their economies. In many of the countries, a major difficulty has been cutting down on expenditures to the size required as a performance criterion under the programmes.

The purpose of this paper is to discuss the degree of variation in Federal government expenditures during 1970–86 period, which may be interpreted to indicate the range of choice facing policy makers in determining the categories of expenditures that are amenable to wide discretionary adjustments.

The analysis was done in terms of the simple coefficients of variation. The analysis of indices of predictability through Theil's coefficient of inequality was also undertaken to assess the predictive value of the various expenditure functions considered.

Results of analysis indicate that capital expenditures on administration were more volatile than the current expenditures on the same function especially in the 1982–86 sub-period. In that quinquennium, expenditure out-turn reflects government's determined efforts to prune expenditures and execute only very important core projects under the economic stabilization programme and immediately thereafter. Also recurrent expenditures on social and community services were the most stable in the period. However, within the social expenditure function, expenditures on education were the most volatile. With regard to transfer expenditures, the most volatile expenditures were the external financial obligations and internal and external public debt charges. Of all expenditure functions considered in the study, these two expenditures items had the highest coefficients of variation.

A major policy implication of the results has been that expenditures on public debt charges, both internal and external and loans-on-lent to parastatals are most amenable to wide discretionary adjustments by the fiscal authorities.

Introduction

Reflecting the operation of Wagner's law of increasing state activity, Federal government expenditures have grown tremendously in the post-civil war period, 1970–1986. The dimension of such growth has been such that many academic economists, social critics and commentators with varying academic background have decried the pervasiveness of government in economic activities. They have called for a reduction in government intervention in the economy.

A number of reasons have been advanced by commentators for a reduction in government activity. One such reason is the crowding out argument that government expenditures crowd out private expenditures. Of even greater importance is the recognition that government expenditures pose dangers to monetary stability and the price level. It is thus little wonder that under Nigeria's IMF/World Bank-supported Structural Adjustment Programme, a rein is placed on government expenditures such that government deficits do not exceed a given proportion of the Gross Domestic Product (GDP).

However, in many Fund-supported structural adjustment programmes, including that of Nigeria a major difficulty has been cutting down on expenditures to the size required as a performance criterion under the programme. There is a limit to which certain expenditures can be reduced if the economy is to be kept on an even keel.

The purpose of this paper is not so much to quantify the optimum degree of government involvement in the economy. The aim is to discuss the degree of variation in Federal government expenditures, which may be interpreted to indicate the range of choice facing policy makers in determining the categories of expenditures that are amenable to wide discretionary changes or revision. The analysis also goes to dwell on the theoretically determined predictive values of the expenditure functions regardless of the latter's varying degrees of fluctuation.

For purposes of easy exposition, the paper is divided into five parts. Part I outlines the review of literature. Part II highlights the trends in Federal government expenditures, including the composition of and shifts, if any, in such expenditures over time. Part III discusses the coefficients of variation of the expenditure functions while Part IV dwells on analysis of indices of predictability of the expenditure functions considered. Part V contains the summary and conclusion to the study.

PART I: REVIEW OF LITERATURE

The economic analysis of the public sector, especially the study of the size and control of government expenditures in relation to gross national product has attracted a considerable amount of attention again in recent years as in the past from development economists and experts in public finance.

Analysing fluctuations of public consumption expenditures of market and centrally planned economies in the period 1950 through 1962, Pryor, F.L.[1] maintains that fluctuations in total public expenditures are about the same as fluctuations in the GNP. Fluctuations of public expenditures excluding the military are somewhat lower than fluctuations of GNP or total public expenditures including the military. He also generalised about the relative fluctuations of individual types of public consumption expenditures as follows:

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1 Pryor, F.L. *Public Expenditures in Communist and Capitalist Nations*, London, George Allen & Union Ltd., 1968.

(i) That fluctuations are greatest for defence and non-military external security (including foreign aid) expenditures and least for health, education and welfare expenditures;

(ii) The least fluctuations also occur for internal security. This observation apparently derives from the fact that for police needs, short-run changes in demand and supply are probably not great.

In other words, the coefficients of variation of expenditure/GNP ratios are largest for public consumption expenditure and for non-military external security and defence; and are smallest for education, health, and internal security.

Reddy, K.N.[2] analyses the "secular growth" of government expenditure in India in the period 1872–1966. He observes that the elimination of influences of population growth and price changes does not negate the common belief about expenditure namely, that expenditure of government increases at a faster rate than national income. The income elasticity of demand for government expenditure was found to be far in excess of unity. In the period 1890 – 1955 Reddy also found that the proportion of government expenditure in national income witnessed similar fluctuations in Japan, the United Kingdom and Germany.

In a study of thirteen developed countries over the period 1950–1970, Beck[3] observes that, except for Finland, the elasticity of government consumption is less than that for all current expenditure of government. This means that the increase in transfer payments, subsidies, interest on public debt etc, exceeds that of government consumption, or purchases of goods and services. Except in France, Beck also finds that the percentage increase in government consumption exceeds that of GDP, before allowance for price changes. Beck's findings thus corroborate those of Pryor and Reddy who found the income elasticity of demand for government expenditure to be far in excess of unity for the sample of countries considered.

Musgrave, R.A.[4] examines the course of public expenditures in the United Kingdom, the United States and Germany over the period 1890 through 1963. In the study a fairly uniform pattern emerges. Expenditure on administration expanded at over twice the rate of growth of GNP but remained a small factor in the total picture. The ratio for expenditures on economic services showed a somewhat faster rise. For all three countries in the sample, however, the big factor of increase was in the social service category, defined for the study to include education, welfare programmes, social insurance and housing. Indeed expenditure on social services for the period as a whole accounted for 82 per cent of the increase in the total civilian expenditure to GNP ratio, for the United Kingdom. The corresponding figures for the United States and Germany were 66 and 72 per cent, respectively. Thus the welfare component of the expenditure structure remains the major driving force behind the fluctuation of the civilian expenditure ratio, pointing to change in social and political climate as a decisive causal factor in expenditure development. Again Musgrave finds that the fluctuation in the ratio of current expenditures to GNP is also related positively to per capita income, the openness of the economy as well as a tax revenue to GNP ratio.

Reviewing public expenditures of the United Kingdom over the period 1900 through 1959, Peacock, A.T. and Wiseman, J.[5] observe that GNP at factor cost rose at a much slower rate than public expenditures. This observation is similar to that of other researchers on the subject of fluctuation of public expenditure. Accordingly the proportion which government expenditure bears to national income has risen considerably: from about 9 per cent in 1890, reaching a peace-time peak of 42 per cent in 1952 and declining somewhat to 37 per cent in 1959. In terms of composition, Peacock and Wiseman also note the much faster secular rate of growth in transfers and subsidies after the second world war. Relatively slow rates of growth have been recorded for "economic" services – services to agriculture, industry and transport – and social and community services, since the world war.

In an extensive study of government expenditures of fifty–two countries, including both the developed and developing, over the period 1952–62, Thorn, R.S.[6] observes that thirty-three of those countries had expenditure elasticities greater than unity. The observed mean of the GNP elasticity of central government expenditures for the 52 countries was 1.22 which was also significantly different from unity at the 0.01 probability level; the median and mode were 1.1. These results are consistent with the proposition that government expenditures tend to rise at a faster rate than national product increases. Besides, Thorn's calculations yield an implicit GNP elasticity of social expenditures of 1.65, that is, a long-run annual rate of growth of 5 per cent would tend to be accompanied by approximately an 8 per cent annual rate of growth of social expenditures.

Analysing Nigeria's public consumption expenditure over the period 1953–1966, Phillips, A.O.[7] observes that the GDP elasticity of consumption expenditure is about 3. Phillips claims that this figure is close to the value obtainable by directly comparing the annual growth rate of GDP of about 4 per cent with the annual growth rate of expenditure of about 11 per cent in the review period, thus supporting the finding regarding a greater than unity, national income elasticity of consumption expenditure. He also finds that transfer expenditure unlike in the advanced economies, feature rather insignificantly in Nigeria's pattern of consumption expenditure in the period reviewed.

From these studies, some interesting results seem to be that:

(i) Government expenditures tend to rise at a faster rate than the Gross Domestic Product;

2 Reddy, K.N., "Growth of Government Expenditure and National Income in India: 1872–1966", Public Finance/Finances Publiques, The Hague, Vol. XXV, 1970.
3 Beck, M. "The Expanding Public Sector: some contrary evidence", National Tax Journal, Vol. 29, 1976.
4 Musgrave, R.A., Fiscal Systems, New Haven & London, Yale University Press, Feb. 1971.
5 Peacock, A.T. and Wiseman, J. "The Past and Future of Public Spending", Lloyds Bank Review, London, No. 60, April, 1961.
6. Thorn, R.S., "The Evolution of Public Finances during Economic Development", The Manchester School, January 1967, pp. 19–53.
7 Phillips, A.O. "Nigeria's Public Consumption Expenditure", The Nigerian-Journal of Econ. and Social Studies, Vol. 13, No. 3, Nov. 1971.

(ii) The proportion of total expenditures devoted to social expenditures tends to rise in the course of economic development which means that it grows at a faster rate than the average of other categories of government expenditures;

(iii) That the coefficients of variation are largest for public consumption expenditure, for non-military external security and defence and are smallest for education, health and internal security;

(iv) There exists a much faster secular rate of growth of transfers and subsidies compared with fluctuations recorded over the years for "economic" services.

PART II: TRENDS IN FEDERAL GOVERNMENT EXPENDITURE 1970-1986

In this section some detailed analysis of the observed profile of government expenditure over the 1970–1986 period is undertaken. The analysis is pursued along the following perspectives for purposes of clarity:

(i)   absolute expenditure growth;
(ii) expenditure growth in relation to GDP;
(iii) the structure of total expenditure; and
(iv) composition of recurrent and capital expenditure.

Absolute Expenditure Growth

The total expenditure (i.e. both recurrent and capital) of the Federal Government increased from ₦838.3 million in 1970 to ₦12,524.1 million in 1986, representing a compound annual growth rate of 18.4 per cent in the period under review. Between 1970 and 1980, expenditure was characterised by substantial increases which reached its peak in 1975 with 133.7 per cent increase over the 1984 level even though decreases of 23.7 and 13.1 per cent were recorded in 1971 and 1979. The jump in 1975 was explained by massive spending on the capital expenditure programme on transport and communication, and education sub-sectors, in the third National Development Plan, 1975–1980. In absolute terms, the total expenditure of ₦14,113.9 million in 1980 was the highest level of spending in the seventeen-year period. In that year of political transition, government spendings were heavily influenced by the demands of administration and transfer payments in the form of contingency funds and non-statutory transfers to state governments. The period 1981–1986, on the other hand, witnessed persistent decline from the 1980 expenditure level to ₦12,524.1 million in 1986, although increases of 13.1 and 38.4 per cent were recorded in 1982 and 1985 over the 1981 and 1984 levels, respectively (See Tables 1 & 2).

The observed pattern of growth in total expenditure in Nigeria during the 1970s reflected the abundance of financial resources resulting from the monetisation of the foreign exchange earnings from crude oil. The decreases recorded in expenditure levels in the 1980s showed the declining fortunes of the crude oil sector and, in fact, the levels of expenditures in those latter years resulted in increased overall deficits.

Expenditure Growth in relation to GDP

In 1970, total recurrent and capital expenditures, including transfer payments, amounted to 15.9 per cent of GDP but fell to 9.6 per cent in 1974, the end of the first quinquennium and lowest share in the 1970–86 review period. In the period 1975 through 1982, the expenditure/GDP ratio ranged between 21.9 and 28.4 per cent except in 1979 when the ratio stood at 17.2 per cent. There was a marked down-ward fluctuation in the ratio from 24.0 per cent in 1982 to 17.2 and 15.7 per cent in 1983 and 1984, respectively. It picked up again in 1985, rising to 19.7 per cent and dropped to an estimated 15.1 per cent in 1986.

The Structure of total expenditure

In this section the structure of total expenditure is examined from two points of view: (i) Recurrent and Capital expenditures, and (ii) Absorptive expenditure and transfer payments.

Recurrent expenditures are the outlays that are necessary to maintain existing levels of government services while capital expenditures are regarded as capital stock augmenting.

Between 1970 and 1973, the proportionate shares of recurrent and capital expenditures in the total were between 60.1 and 77.1 per cent and between 22.9 and 39.9 per cent, respectively. In the same period the current expenditure/GDP ratio fluctuated downward from 12.08 to 5.78 per cent. In the period 1974 to 1980, however, the share of recurrent expenditure in the total was below 50 per cent and in relation to GDP it rose from 4.63 to 12.10 per cent. As a proportion of total, the lowest share in the seventeen-year period was 31.0 per cent recorded in 1977.

This trend was, however, reversed in 1981 when the share of recurrent expenditure rose to 50.2 per cent or 10.98 per cent of GDP compared with capital expenditure's share of 49.8 per cent or 10.91 per cent of GDP. The trend had continued since then and the share of recurrent expenditure in the total was estimated at 61.0 per cent in 1985 or 10.77 per cent of GDP (See Tables 1 & 4).

The falling relative share of capital expenditure in the total reflected the emphasis laid by the 4th Development Plan on completion of on-going capital projects rather than the starting of new ones due to the financial constraints that were setting in at the eve of the plan.

An alternative characterisation of expenditures divides total expenditure into the absorptive and the transfer expenditures. Absorptive expenditures are those that involve the transfer of funds from government to the private sector in return for goods and services while transfer payments do not have such quid pro quo status. In the Nigerian context, transfer payments include debt service i.e. interest payment and capital repayments on internal and external debts, pensions and gratuities, external financial obligations such as annual subscription to international bodies, and others; absorptive expenditures are those on administration, economic, social and community services. Between 1970 and 1978, transfer payments as a proportion of total government expenditure was very small and averaged 18.2

per cent or 3.38 per cent of GDP while that of absorptive expenditures was 86.2 per cent or 13.61 per cent of GDP. Between 1980 and 1986, transfer payments share in total ranged between 18.8 (in 1981) and 50.1 per cent in 1986. The average shares of transfer payments and absorptive expenditures in total expenditure in this latter period were 30.4 and 68.9 per cent, respectively.

Composition of Recurrent and Capital Expenditure

Recurrent Expenditure

Total recurrent expenditure rose from ₦638.3 million or 12.08 per cent of GDP in 1970 to ₦6,022.0 and ₦7,641.5 million or 12.10 and 9.22 per cent GDP in 1980 and 1986, respectively, recording an average annual growth rate of 16.8 per cent in the seventeen-year period. In absolute terms, all the sectors had tremendous increases in their budgetary allocations. The increase in total recurrent expenditure in the period was explained largely by higher increases in transfer payments. In the review period, the relative share of administration fell from 71.9 per cent in 1970 or 8.68 per cent of GDP to 27.3 per cent in 1986 or 2.52 per cent of GDP while that of transfer payments rose from 21.7 per cent in 1970 or 2.63 per cent of GDP to 62.5 per cent in 1986 or 4.84 per cent of GDP. The largest share of economic services in total expenditure during the whole period was 8.5 per cent recorded in 1974 or 0.30 per cent of GDP while it was 23.7 per cent for social and community services recorded in 1976 or 2.30 per cent of GDP.

Expenditure on administration was dominated by defence and internal security. The disparity in the share of defence and internal security and that of general administration was, however, more pronounced between 1970 and 1980 than in the subsequent years of the review period. In 1970, defence and internal security spendings accounted for 63.1 per cent of total recurrent expenditure or 7.62 per cent of GDP while general administration accounted for only 8.8 per cent of total or 1.06 per cent of GDP. By 1975, the relative shares were 45.7 and 16.6 per cent for defence and general administration, or 3.56 and 1.29 per cent of GDP, respectively while the proportions were 21.7 and 10.1 per cent in 1980 or 2.62 and 1.23 per cent of GDP. In the period 1981 to 1986 the relative share of defence and internal security ranged between 14.5 and 24.5 per cent while it was between 12.8 and 22.0 per cent for general administration. The trend exhibited by defence and internal security spending in the period under review reflected the wearing out of the post-civil war effect on government spendings on this sector.

Expenditure on Social and Community Services grew from ₦16.5 million or 2.6 per cent of total recurrent expenditure or 0.31 per cent of GDP in 1970 to ₦807.7 million or 13.4 per cent in 1980 or 1.62 per cent of GDP and reached its peak, in absolute terms, at ₦1,132.2 million or 1.69 per cent of GDP in 1985. Education and Health are the major components in this sector. Their relative share rose from 2.4 per cent in 1970 to its peak at 22.7 per cent in 1976 and declined to 11.2 per cent in 1986.

Expenditure on economic services rose persistently from ₦24.3 million or 0.46 per cent of GDP in 1970 to ₦468.6 million or 0.94 per cent of GDP in 1980, reached its peak at ₦484.9 million in 1981 and fell thereafter to ₦315.4 million or 0.47 per cent of GDP in 1985. It rose to ₦556.4 or 0.67 per cent of GDP in 1986. In relative terms, the share of expenditure on economic service in total recurrent expenditure rose fairly persistently from 3.8 per cent in 1970 to 7.8 per cent in 1980 and fell to 7.3 per cent in 1986.

Transfer payments rose in absolute terms from ₦138.8 million or 2.63 per cent of GDP in 1970 to ₦4,012.2 million or 4.84 per cent of GDP in 1986. Its relative share of total recurrent expenditure also grew over the years from 21.7 in 1970 to 52.5 per cent in 1986. The main reason for this trend was the increasing public debt charges which comprise interest payments and principal repayments. From its modest ₦138.8 million or 21.7 per cent in 1970, debt service-charges rose to ₦3,783.6 million or 51.0 per cent in 1982. Its relative shares fell to 27.0 and 24.4 per cent in 1983 and 1984, respectively, but increased again to 40.0 and 40.8 per cent in 1985 and 1986, respectively (See Tables 1 & 4).

Thus, on the whole, there was a shift in emphasis from the administration sector in the period 1970–1978 to transfers sector from 1978–1986. The shift in emphasis was explained mainly by the declining relative share of defence and internal security and the increasing share of public debt charges in the total recurrent expenditure (See Table 4).

Capital Expenditure

Total capital expenditure rose from ₦200.5 million or 3.80 per cent of GDP in 1970 to ₦3,207.7 million or 14.73 per cent of GDP in 1975, ₦8,091.9 million or 16.26 per cent of GDP in 1980 and fell to ₦4,882.6 million or 5.89 per cent of GDP by 1986. This trend was largely explained by the pattern of expenditure on economic services sector in general but specifically on transport and communications, and manufacturing, craft, mining and quarrying sub-sectors.

In the period under review, three shifts in the relative shares of the various sectors of the capital programme were discernible. In 1970 and 1971, expenditure on administration accounted for 72.2 and 43.2 per cent, respectively and accounted for the largest sector in capital expenditure programme. This was followed by economic services, transfers and social and community services in that order. In these two years the relative shares of general administration were 4.7 and 18.8 per cent while it was 67.6 and 24.4 per cent for defence and internal security, respectively. Between 1972 and 1983, economic services became the largest sector with its relative share increasing from 44.9 per cent in 1972, reaching its peak at 67.4 per cent in 1980 and decreasing to 61.4 per cent in 1983. Within this period, expenditure on social and community services ranked second, followed by administration and transfers in that order. However, between 1984 and 1986, transfer payments became the largest sector accounting for 64.7, 54.1 and 32.3 per cent in the three years, respectively[8] (See Tables 2 & 5).

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8 It is worthy to note that capital repayment became regarded as a capital expenditure item from 1984. (See 1984 Budget Speech of the Minister of Finance).

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PART III: ANALYSIS OF COEFFICIENTS OF VARIATION

In previous comparative studies of economic fluctuations in various nations, analysis of fluctuations of public expenditures and of the GNP using both current and constant prices yielded about the same results[9]. Therefore it seems best to use the simplest type of measurements to ease problems of interpretation. In what follows is a brief analysis of the method of coefficient of variation and the results of application of the method to Federal government current and capital expenditures, as ratios of GDP in the 1970–86 period.

The coefficient of variation is a measure of relative dispersion defined as the ratio of absolute dispersion to the average:

$$\text{Relative Dispersion} = \frac{\text{Absolute Dispersion}}{\text{Average}} \quad \ldots\ldots\ldots (1)$$

If the absolute dispersion is the standard deviation, σ and the average is the mean $\bar{X}$, the relative dispersion is called the coefficient of variation given by V as follows:

$$V = \frac{\sigma}{\bar{X}} \quad \ldots\ldots\ldots\ldots\ldots (2)$$

where

$$\sigma = \sqrt{\frac{\Sigma (X - \bar{X})}{N}}$$

$$\bar{X} = \frac{\Sigma X}{N}$$

The application of this coefficient to government expenditures may take any of the following forms: The coefficient of variation may be calculated as the standard deviation of the annual growth rate of expenditures/GDP ratios divided by the average annual growth rate of expenditures/GDP ratios, with a slight modification to make the two parts of the fraction more comparable. Also, the coefficient of variation may alternatively be rendered as the standard deviation of the ratios of E_{t-1}/E_t divided by the mean of these ratios minus one.

$$V = \frac{E_{t+1}/E_t}{\bar{E}} - 1 \quad \ldots\ldots\ldots\ldots\ldots (3)$$

where

V = Coefficient of variation

E_t = Expenditures in year t

E_{t+1} = Expenditures in the following year

$\bar{E}$ = mean of E_{t+1}/E_t

The results of coefficient of variation of expenditure/GDP ratios were based on equation 2.

Results

In Tables (6 & 7) the coefficients of variation of Federal government recurrent and capital expenditures as ratios of GDP, respectively are presented. The coefficients of variation of expenditures/GDP ratios have also been calculated for three different periods, 1970–81, 1970–86 and 1982–86 in order to permit observation of the dynamic behaviour of such coefficients. If government expenditures grow at the same rate every year, the coefficient of variation is zero per cent. If, on the other hand, the standard deviation of the expenditures or their annual growth rate is twice as high as the mean expenditures or their average annual growth rates, the coefficient of variation is 2 or 200 per cent (in percentage terms).

Administration

Fluctuations of government expenditures were higher for capital expenditures on administration than fluctuations of recurrent expenditure on administration. In the quinquennium 1982–86, fluctuations of expenditure on administration (recurrent effects), were more stable and less volatile than fluctuations of such expenditures in the other sub-periods, 1970–81 and 1970–86. The reverse was, however, the case with capital expenditure. Under the capital programme, fluctuations of expenditure on administration were least in the 1970–81 period. The observation of greater volatility of capital expenditure on administration in the 1982–86 sub-period reflects government's determined efforts to prune expenditures and execute only very important core projects under the economic stabilisation programme of 1982 and immediately thereafter and Structural Adjustment Programme (SAP) embarked upon in the second half of 1986.

Social and Community Services

Under this expenditure function, fluctuations of expenditure (recurrent effects) were lower than fluctuations of expenditure (capital effects) in all the time scenarios. Besides, of all expenditure functions, results indicate that the recurrent expenditures on social and community services were the most stable and least subject to discretionary manipulation by the fiscal authorities in the quinquennium prior to the introduction of the SAP. However, within the social and community services function, fluctuations of expenditure on education were about the highest. This suggests that expenditure on education received about the heaviest discretionary manipulation by the authorities under the social and community services programme.

Economic Services

In the period 1982–86, recurrent expenditure on economic services showed marked stability compared with the capital expenditure component of the economic services function. This suggests that the capital expenditures component were more amenable to discretionary manipulation by the authorities than the recurrent expenditure component of the function.

9 See, for example, Coppock, J.D. *International Economic Instability*, New York, 1962.

Transfers

Under this function, the most volatile expenditures were the external financial obligations and internal public debt charges.

From the results of coefficients of variation of the expenditure/GDP ratios, it is clear, by and large, that the coefficients were largest for economic services and transfer expenditures, and were smallest for social and community services particularly education and health components. These findings corroborate those of Pryor for the sample of developed nations in both 1956 and 1962[10].

PART IV: ANALYSIS OF A MEASURE OF PREDICTABILITY

Having examined the coefficients of variation and made some observations regarding the pattern of fluctuations of the categories of expenditures, the paper seeks in this section to analyse the coefficients of predictability of each expenditure function. If the analysis of coefficients of variation of the expenditure/GDP ratios as conducted in Part III of this paper is useful to decision makers for expenditure planning purposes, a measure indicating the predictive value of the expenditure functions may help to widen the range of options open to them.

However, a necessary first step that must be taken before embarking on the calculation of this coefficient of predictability is to identify the determinants of expenditures in the context of a multiple regression model[11].

In evaluating the predictive accuracy of the model, Theil's coefficient of inequality has been used[12]. The inequality coefficient, U, is defined as

$$U = \frac{\sqrt{\dfrac{\sum\limits_{j=1}^{A}(P_i - A_i)^2}{n}}}{\sqrt{\dfrac{\sum\limits_{j=1}^{n}A_i^2}{n}}} \quad \ldots\ldots(4)$$

where

P_i = Predicted value of the variables in year i

A_i = Actual value of the variable in year i

n = Number of observations.

The coefficient is a measure of extent of error between the actual and the predicted values of an endogenous variable. Its value is confined to the INTERVAL between 0 and 1; with a value of 0 indicating perfect prediction and a value of 1 indicating poor prediction. The nearer this coefficient approaches zero the better the predictive ability of the model.

Results

RECURRENT EXPENDITURE FUNCTIONS

Social and Community Services (W/Y)

The coefficient of variation for this expenditure function in the 1970–86 period was 0.52. The most variable expenditure component under the function was expenditure on education with a coefficient of variation of 0.65. However, in the last five years of the review period, 1982–86, the social and community services function, with a coefficient of 0.14, was the most stable function of all expenditure categories. This suggests that the social and community services function consisting largely of expenditure on education and health, was at that period the least amenable to wide discretionary alteration by the fiscal authorities. (See Table 6).

Further experiments were conducted to isolate the major determinants of the social and community services function. The results of the model designed to achieve this together with an assessment of the predictive value of the model are presented as follows:

$$\ln(W/Y) = -8.10 + 0.807 \overset{**}{\ln}(Y_p)^{13} + 0.511 \ln(Exp/Y)$$
$$(6.85) \qquad\qquad (1.70)$$

$$-0.121\,D \qquad\qquad \ldots\ldots\ldots\ldots (5)$$
$$(0.35)$$

$\overline{R}^2 = 0.796$ DW 1.17 Sample : 1970–86

Theil's coefficient of inequality, U, = 0.3917 (See Table 8)

where

Y_p = per capita GDP

Exp/Y = total recurrent expenditure deflated by the GDP.

The important factors that influenced the level of social and community services function in the 1970–86 period were the level of per capita income and the extent of resource availability to government. At U = 0.3917, the function has a fair predictive value. Thus, wide variations can only be expected under the expenditure function if the country experiences hikes in economic development for which the per capita income variable has been used as proxy in the model.

Defence and Internal Security (D/Y)

The coefficients of variation for defence and internal security function were 0.51 and 0.21 for the 1970–86 and 1982–86 periods, respectively. The results thus indicate a greater degree of stability in the 1970–86 period than in

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[10] Pryor, F.L. op. cit, p. 301.

[11] The regression model is based on the following relationships:
$$E/Y = a(Y/P)^W (A)^X (b)^Z$$
where

E/Y = the ratio of the expenditure under consideration to the GDP at current prices.

Y/P = income per capita

A, B = other explanatory variables

a, w, x, z = the calculated regression coefficients.

[12] Theil, H. *Applied Economic Forecasting*, Amsterdam: North-Holland Publishing Company, 1966.

[13] The figures in parentheses in the equations are the T ratios. One asterisk in the equation indicates that the independent variables are significant at 0.05 probability level. Two asterisks indicate that the independent variables are highly significant at 0.01 level.

the 1982–86 periods. Indeed the defence function was among the substantially stable functions under the recurrent expenditure programme in the quinquennium ending 1986.

The results of fitting a function into defence expenditure over the 1970–86 period and assessing the predictive value of such a function are presented as follows:

$$\ln(D/Y) = 3.71 \underset{(8.93)}{-0.415} \overset{**}{\ln}(Y/P) + 0.717 \overset{**}{\underset{(1.96)}{\ln}}(Exp/Y - 0.278\,D)$$

$$\dots\dots\dots (6)$$

$$\overline{R}^2 = 0.886 \quad DW = 2.66 \quad Sample: 1970-1986$$

Theil's coefficient of inequality, U = 0.0854.

Again, like in the social and community services function, the determinants of defence spending in the review period were the per capita income and resource availability variables. Interestingly, the relatively stable defence expenditures also possess the function with the most predictive ability in the family of functions under the recurrent expenditure programme.

Economic Services (ES/Y)

In the entire period under review, spending on economic services such as agriculture, construction, transport and communication etc. was subject to least variation at a coefficient of variation of 0.31 compared to the fluctuations in spending on other expenditure functions in the recurrent programme.

Resource availability was a critical factor influencing spending on this function. The Theil's coefficient of inequality at U = 0.5578 indicates that the function has a fair predictive value. The results are as follows:

$$\ln(ES) = -3.39 + 0.0426 \ln(Edu/Y) + 0.646 \overset{*}{\underset{(2.32)}{\ln}}(Exp/Y)$$
$$\underset{(Y)}{} \quad \underset{(0.64)}{}$$

$$-0.008 \ln(EER)$$
$$\underset{(0.02)}{} \quad \dots\dots\dots (7)$$

$$\overline{R}^2 = 0.257 \quad DW = 2.11$$

Sample * 1970–86

Theil's coefficient of inequality, U = 0.5578

where

Edu/Y = recurrent expenditure on education deflated by the GDP.

EER = Effective exchange rate; other variables are as defined previously.

Capital Expenditure Functions

The coefficients of variation were much larger for capital expenditures than they were for recurrent expenditures in the 1970–86 period. This suggests in general that capital expenditures are much more amenable to wide discretionary review than recurrent expenditures. The analysis of component expenditure functions in the capital programme is as follows:

Social and Community Services

At the coefficient of variation of 0.71, the social and community services in the 1970–86 period were second only to administration in order of stability. Expenditure on education with a coefficient of variation of 1.02 was the most volatile among the component expenditures under this function (See Table 7).

The results of fitting a function into this category of expenditures indicate that in the sample period the decision to spend under the function depended largely on resource availability. With the Theil's coefficient of inequality estimated at U = 0.2747 the function had good predictive value:

$$\ln(W/Y) = -2.28 + 0.274 \ln(Y/P) + 1.48 \ln(Exp/Y)$$
$$\underset{(0.95)}{} \quad \underset{(4.25)}{}$$

$$+ 0.029\,D$$
$$\underset{(0.05)}{} \quad \dots\dots\dots (8)$$

$$\overline{R}^2 = 0.747 \quad DW = 1.43$$

Sample: 1970–86

Theil's coefficient of inequality, U = 0.2747

Defence and Internal Security

This function, with a coefficient of 0.56, represents the least volatile expenditure function in the capital expenditure programme during the 1970/86 period. However, in the more recent 1982–86 period, this pride of place was taken over by general administration with a coefficient of variation of 0.50 – the least in the period.

Further experimentation indicates that the level of defence spending is determined largely by increases in resource availability. The predictive value of the function is rather low at U = 0.7547:

$$\ln(D/Y) = 6.23 \underset{(3.83)}{-0.579} \ln(Y/P) + 1.080 \underset{(5.45)}{\ln}(Exp/Y)$$

$$-0.294\,D \quad \dots\dots\dots (9)$$
$$\underset{(0.77)}{}$$

$$\overline{R}^2 = 0.671 \quad DW = 1.28 \quad Sample: 1970-1986$$

Theil's coefficient of inequality, U, = 0.7547

Economic Services

The overall economic services function was fairly stable at a coefficient of variation of 0.7 in the 1970–86 period. However, wide fluctuations characterised the component expenditure profiles, the most volatile being expenditure on manufacturing, craft, mining and quarrying which recorded a coefficient of variation of 1.11.

Results of regressions on determinants of economic services function indicate that resource availability was a major constraint to the growth of this function. Predictably, the function had a good predictive value with the U statistic averaging U = 0.1003 in the entire review period. The results are as follows:

$$\ln (ES/Y) = -0.216 + 0.297 \ln (Edu/Y) + 0.731 \ln (Exp/P)^*$$
$$\qquad\quad (1.76)\quad (1.76)\qquad\qquad (2.28)$$

$$+ 0.836 \ln (EER) \qquad \ldots\ldots\ldots\ldots (10)$$
$$\quad (1.67)$$

$\overline{R}^2 = 0.822$ DW = 1.81 Sample: 1970–1988

Theil's coefficient of inequality, U, = 0.1003.

PART V: SUMMARY AND CONCLUSION

This paper has discussed the fluctuations of Federal government expenditures during 1970–1986 with a view to seeing if such fluctuations could provide a basis on which policy makers could determine categories of expenditures that are amenable to wide discretionary adjustments for purposes of the Structural Adjustment Programme (SAP).

The results of analysis of fluctuation indicate that fluctuations of government expenditures were more volatile for capital expenditures on administration (V = 0.54) than variations of administration expenditures (recurrent effects) (V = 0.36). The observation of greater volatility of capital expenditure on administration especially in the 1982–86 sub-period reflects government's determined efforts to prune expenditures and execute only very important core projects under the economic stabilisation programme of 1982 and immediately thereafter and the SAP embarked upon in the second half of 1986.

At V = 0.52, recurrent expenditures on social and community services were the most stable and least subject to discretionary manipulation by the fiscal authorities in the quinquennium prior to the introduction of the SAP. However, within the social expenditure function, expenditure on education (V = 0.65) were the most volatile. Recurrent expenditures on economic services with V = 0.31 showed marked stability compared with the capital expenditure component of the economic services function (V = 0.71). With regard to transfer expenditures, the most volatile expenditures were the external financial obligations (V = 0.98) and internal public debt charges (V = 0.93).

The analysis based on Theil's coefficient of inequality – the U statistics – presents interesting results. The social and community services function (recurrent effects) with U = 0.3917 had a lower predictive ability than the social and community services function (capital effects) which recorded 0.2747 for its U statistics. But the defence function (recurrent effects), at U = 0.0854, had greater predictive ability than the defence function (capital effects) with U = 0.7547. Economic services (capital effects) can be better predicted with U = 0.1003 than economic services (recurrent effects) with U = 0.5578. Of all the expenditure functions considered, the defence function (recurrent effects) had the greatest predictive ability.

The policy implications of the results are obvious. Given the greater coefficients of variation for capital expenditures than for recurrent expenditures, capital expenditures generally are more amenable to wide discretionary adjustments by the fiscal authorities than recurrent expenditures. In particular, results indicate that for purposes of the SAP, expenditures on public debt charges, both internal and external and loans-on-lent to parastatals – expenditure items with the highest coefficients of variation

– are most amenable to wide discretionary manipulation by the fiscal authorities.

It is important to stress, however, that in view of the usual limitations to data coupled with the characteristic least squares limitations of a single equation model used in the paper, the results from the study cannot be taken as more than tentative. It is believed, nevertheless, that these limitations are not such as to nullify the conclusions reached.

RECURRENT EXPENDITURES OF THE FEDERAL GOVERNMENT OF NIGERIA (ACTUAL)　　　Table 1

(₦' Million)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Administration	458.7	338.5	498.2	454.3	555.4	1,055.4	1,010.2	1,040.4	1,259.5	999.5	1,917.4	2,171.4	2,346.1	2,433.2	2,677.3	2,638.2	2,087.9
General Administration	56.1	60.3	105.5	124.6	159.0	281.0	320.2	275.9	352.0	327.6	611.0	766.6	1,068.7	1,176.1	1,381.2	1,001.5	982.7
Defence & Internal Security	402.6	278.2	392.7	329.7	396.4	774.4	690.0	764.5	907.5	671.9	1,306.4	1,404.8	1,277.4	1,257.1	1,296.1	1,636.7	1,105.2
Social & Community Services	16.5	20.4	29.4	31.1	94.9	287.5	634.6	368.4	529.6	511.0	807.7	984.9	787.0	828.5	768.0	1,132.2	985.0
Education	3.2	4.4	7.3	10.4	62.4	218.9	522.0	248.3	394.7	360.4	509.1	712.8	511.8	588.8	657.9	697.2	599.5
Health	11.9	14.1	19.9	18.3	29.1	62.4	83.5	85.1	95.5	36.5	172.5	111.5	145.6	161.5	87.0	164.3	253.0
Other Social & Comm. Services	1.4	1.9	2.2	2.4	3.4	6.2	29.1	35.0	39.4	114.1	126.1	160.6	129.6	78.2	23.1	270.7	132.5
Economic Services	24.3	31.4	46.2	52.3	74.3	131.8	141.8	191.8	206.3	113.4	468.6	484.9	415.1	412.8	326.9	315.4	556.4
Agriculture & Water Resources	4.4	4.3	12.4	13.4	24.6	38.8	18.5	42.0	20.5	21.8	56.0	32.1	31.3	42.7	41.7	41.1	30.5
Construction	13.2	17.4	20.8	21.9	30.7	55.3	73.7	73.0	79.3	4.5	237.2	276.6	228.0	211.2	202.5	184.9	304.6
Transport & Communication	4.0	5.8	7.4	9.8	9.8	20.0	27.3	27.1	41.7	33.4	83.0	58.3	55.3	52.2	46.1	57.7	118.2
Other Economic Services	2.7	3.9	5.6	7.2	9.2	17.7	22.3	49.7	64.8	53.7	92.4	117.9	100.5	106.7	36.6	31.7	103.1
Transfers	138.8	102.5	107.4	118.4	149.4	220.3	886.0	646.1	1,432.3	1,563.2	2,828.3	2,097.9	3,869.7	1,982.0	2,503.2	3,129.5	4,012.2
Public Debt Charges	138.0	101.3	104.5	93.2	133.5	187.9	341.8	191.6	729.6	546.8	839.6	818.0	3,783.6	1,525.8	1,528.9	2,883.6	3,120.6
Internal	*	*	*	(62.4)	(104.4)	(155.2)	(311.4)	(155.3)	(568.8)	(363.7)	(561.3)	(346.9)	(2,909.2)	(378.4)	(769.3)	(1,903.1)	(2,133.4)
External	*	*	*	(30.8)	(29.1)	(32.7)	(30.4)	(36.3)	(160.8)	(183.1)	(278.3)	(471.1)	(874.4)	(1,147.4)	(759.6)	(980.5)	(987.2)
Pensions & Gratuities	0.8	1.2	2.9	13.4	15.4	23.3	42.0	30.1	104.8	179.4	136.3	99.2	61.6	67.8	231.2	220.4	367.7
Other[2]	*	*	*	11.8	0.5	9.1	502.2	424.4	597.9	837.0	1,852.4	1,180.7[3]	24.5	388.4	743.1[3]	25.5	523.9[3]
TOTAL	638.3	492.8	681.2	656.1	874.0	1,695.0	2,672.6	2,246.7	3,427.7	3,187.1	6,022.0	5,739.1	7,417.9	5,656.5	6,275.4	7,215.3	7,641.5

Source: Official Gazettes of the Federal Government.

[1] Provisional
[2] Includes contingences fund and non-statutory appropriation to State Governments.
[3] Includes unclassified "CRF" Charges.
* Less than ₦0.5 million.

FEDERAL GOVERNMENT CAPITAL EXPENDITURE, 1970–1986

Table 2

(N' Million)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986[1]
Administration	145.1	63.1	108.8	133.8	268.3	747.8	795.4	1,013.4	989.9	769.5	1,288.5	720.1	763.2	801.8	262.7	459.5	457.6
General Administration	9.5	27.5	56.6	56.8	91.8	393.7	376.1	518.8	342.7	205.5	489.2	154.3	198.7	331.6	119.2	146.9	201.0
Defence & Int. Security	135.6	35.6	52.2	77.0	176.5	354.1	419.3	494.6	647.2	564.0	799.3	565.8	564.5	470.2	143.5	312.6	256.6
Social and Community Services	3.2	13.2	42.0	40.4	358.1	927.4	899.7	824.9	1,090.8	613.3	1,324.0	1,380.0	1,399.7	729.1	270.0	1,090.2	889.3
Education	3.0	4.1	21.3	16.3	134.4	631.1	529.2	255.8	431.9	306.7	729.4	217.2	412.4	246.4	87.6	126.2	399.5
Health	0.1	8.0	6.8	16.6	14.2	20.4	56.8	38.7	59.8	41.0	188.1	304.5	123.4	93.0	34.6	59.1	70.9
Other Social & Com. Services	0.1	1.1	13.9	7.5	209.5	275.9	313.7	530.4	599.1	265.6	406.5	858.3	863.9	389.7	147.8	904.9	418.9
Economic Services	43.3	58.2	132.9	249.5	466.1	1,315.2	2,231.4	3,124.6	2,949.9	2,812.1	5,448.7	3,548.4	3,036.4	2,475.1	623.9	956.6	1,957.6
Agriculture	5.6	8.4	20.7	35.4	87.4	211.7	129.2	113.7	125.0	98.3	856.1	1,024.8	615.6	724.6	284.6	198.8	384.4
Manufacturing & Craft, Mining & Quarrying	5.0	—	2.8	—	—	—	—	959.6	652.3	927.2	1,503.9	1,257.0	882.9	893.8	82.3	368.0	727.1
Transport & Communication	31.1	43.6	90.9	122.0	254.9	710.8	1,277.2	1,758.7	1,791.0	1,482.5	2,271.3	1,179.0	839.2	765.8	248.3	203.5	214.2
Other Economic Services	1.6	6.2	18.5	92.1	123.8	392.7	825.0	292.6	381.6	304.1	817.4	87.6	698.7	90.9	8.7	185.3	631.9
Transfers	29.3	39.3	167.6	142.0	456.9	528.3	315.4	479.4	166.4	642.6	334.4	48.4	2,751.0	1,862.6	4,254.4	5,647.5	1,696.0
External Fin. Obligations	8.9	11.7	12.2	11.4	131.0	217.8	114.8	41.7	61.7	24.7	30.7	50.8	323.2	27.7	25.9	26.4	63.0
Capital Repayments	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,598.8	2,737.5	515.1
Loans on lent to States	20.4	27.6	155.4	130.6	325.9	310.5	200.6	437.7	104.7	617.9	303.7	−2.4	2,427.8	1,834.9	2,133.1	2,148.6	117.9
Loans on lent to Parastatals and Govt-owned company	—	—	—	—	—	—	—	—	—	—	—	—	—	—	496.6	735.0	—
TOTAL	220.9	173.8	451.3	565.7	1,549.4	3,518.2	4,241.9	5,442.3	5,197.0	4,837.5	8,395.6	5,696.9	7,950.3	5,868.5	5,411.0	8,153.8	5,000.5
Less: Loans on lent to States	20.4	27.6	155.4	130.6	325.9	310.5	200.6	437.7	104.7	617.9	303.7	−2.4	2,427.8	1,834.9	2,133.1	2,148.6	117.9
Federal Government's Capital Expenditure	200.5	146.2	295.9	435.1	1,223.5	3,207.7	4,041.3	5,004.6	5,092.3	4,219.6	8,091.9	5,699.3	5,522.5	4,033.6	3,277.9	6,005.2	4,882.6

Source: Federal Government Official Gazettes

[1] Provisional

	GDP[1] (₦'M) (1)	Recurrent Expenditure (₦'M) (2)	Recurrent Expenditure As Percentage of GDP (%) (3)	Capital Expenditure (₦'M) (4)	Capital Expenditure As Percentage of GDP (%) (5)	Total Expenditure (2) + (4) (₦'M) (6)	Total Expenditure As Percentage of GDP (%) (7)
1970	5,281.1	638.3	12.1	200.5	3.8	838.8	15.9
1971	6,650.9	492.8	7.4	146.2	2.2	639.0	9.6
1972	7,187.5	681.2	9.5	295.9	4.1	977.1	13.6
1973	11,329.0	656.1	5.8	435.1	3.8	1,091.2	9.6
1974	18,811.0	874.0	4.6	1,223.5	6.5	2,097.5	11.1
1975	21,778.7	1,695.0	7.8	3,207.7	14.7	4,902.7	22.5
1976	27,571.5	2,672.6	9.7	4,041.3	14.7	6,713.9	24.4
1977	32,510.4	2,246.7	6.9	5,004.6	15.4	7,251.3	22.3
1978	35,545.7	3,427.7	9.6	5,092.3	14.3	8,520.0	24.0
1979	43,150.8	3,187.1	7.4	4,219.6	9.8	7,406.7	17.2
1980	49,754.9	6,022.0	12.1	8,091.9	16.3	14,113.9	28.4
1981	52,255.3	5,739.1	11.0	5,699.3	10.9	11,438.4	21.9
1982	53,847.5	7,417.9	13.8	5,522.5	10.3	12,940.4	24.0
1983	56,204.2	5,656.5	10.1	4,033.6	7.2	9,690.1	17.2
1984	60,797.7	6,275.4	10.3	3,277.9	5.4	9,553.3	15.7
1985	67,000.1	7,215.3	10.8	6,005.2	8.2	13,220.5	19.7
1986	82,928.8[2]	7,641.5	9.2	4,882.6	5.9	12,524.1	15.1

[1] At current purchases's value, extracted from *Annual Abstracts of Statistics*, 1973 and 1985 editions.

[2] F. O. S. estimates.

RECURRENT EXPENDITURE OF THE FEDERAL GOVERNMENT AS A PERCENTAGE OF GDP
AT CURRENT PURCHASER'S VALUE

Table 4

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Administration	**8.68**	**5.09**	**6.93**	**4.01**	**2.95**	**4.85**	**3.66**	**3.20**	**3.54**	**2.32**	**3.85**	**4.16**	**4.35**	**4.33**	**4.40**	**3.94**	**2.52**
General Administration	1.06	0.91	1.47	1.10	0.84	1.29	1.16	0.85	0.99	0.76	1.23	1.47	1.98	2.09	2.27	1.50	1.19
Defence & Inter. Security	7.62	4.18	5.46	2.91	2.11	3.56	2.50	2.35	2.55	1.56	2.62	2.69	2.37	2.24	2.13	2.44	1.33
Social & Community Services	**0.31**	**0.31**	**0.41**	**0.27**	**0.50**	**1.32**	**2.30**	**1.13**	**1.49**	**1.18**	**1.62**	**1.88**	**1.46**	**1.47**	**1.26**	**1.69**	**1.19**
Education	0.06	0.07	0.10	0.09	0.33	1.00	1.89	0.76	1.11	0.84	1.02	1.36	0.95	1.04	1.08	1.04	0.72
Health	0.22	0.21	0.28	0.16	0.15	0.29	0.30	0.26	0.27	0.08	0.35	0.21	0.27	0.29	0.14	0.25	0.31
Other Social & Comm. Services	0.03	0.03	0.03	0.02	0.02	0.03	0.11	0.11	0.11	0.26	0.25	0.31	0.24	0.14	0.04	0.40	0.16
Economic Services	**0.46**	**0.47**	**0.64**	**0.46**	**0.39**	**0.61**	**0.51**	**0.59**	**0.58**	**0.26**	**0.94**	**0.93**	**0.77**	**0.73**	**0.54**	**0.47**	**0.67**
Agric. & Water Resources	0.08	0.06	0.17	0.12	0.13	0.18	0.07	0.13	0.06	0.05	0.11	0.06	0.06	0.08	0.07	0.06	0.04
Construction	0.25	0.26	0.29	0.19	0.16	0.25	0.27	0.23	0.22	0.01	0.48	0.53	0.42	0.37	0.33	0.28	0.37
Transport & Communication	0.08	0.09	0.10	0.09	0.05	0.09	0.09	0.08	0.12	0.08	0.17	0.11	0.10	0.09	0.08	0.08	0.14
Other Economic Services	0.05	0.06	0.08	0.06	0.05	0.08	0.08	0.15	0.18	0.12	0.18	0.23	0.19	0.19	0.06	0.05	0.12
Transfers	**2.63**	**1.54**	**1.49**	**1.04**	**0.79**	**1.01**	**3.21**	**1.99**	**4.03**	**3.62**	**5.69**	**4.01**	**7.19**	**3.53**	**4.12**	**4.67**	**4.84**
Public debt charges	2.61	1.52	1.45	0.82	0.71	0.86	1.24	0.59	2.05	1.27	1.69	1.56	7.03	2.72	2.52	4.30	3.76
Internal	*	*	*	0.55	0.55	0.71	1.13	0.48	1.60	0.84	1.13	0.66	5.40	0.68	1.26	2.84	2.57
External	*	*	*	0.27	0.16	0.15	0.11	0.11	0.45	0.43	0.56	0.90	1.63	2.04	1.26	1.46	1.19
Pensions & Gratuities	**0.02**	**(0.20)**	**0.04**	**0.12**	**0.08**	**0.11**	**0.15**	**0.09**	**0.30**	**0.41**	**0.28**	**0.19**	**0.11**	**0.12**	**0.38**	**0.33**	**0.45**
Others	*	*	*	0.10	*	0.04	1.82	1.31	1.68	1.94	3.72	2.26	0.05	0.69	1.22	0.04	0.63
	12.08	7.41	9.47	5.78	4.63	7.79	9.68	6.91	9.64	7.38	12.10	10.98	13.77	10.06	(10.32)	10.77	9.22

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FEDERAL GOVERNMENT CAPITAL EXPENDITURE AS A PERCENTAGE OF GDP AT CURRENT PURCHASER'S VALUE   Table 5

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Administration	2.75	0.94	1.51	1.18	1.42	3.43	2.89	(3.12)	2.78	1.78	2.59	1.38	1.42	1.43	0.43	0.68	0.55
General Admin.	0.18	0.41	0.79	0.50	0.49	1.18	1.37	1.60	0.96	0.48	0.98	0.30	0.37	0.59	0.20	0.22	0.24
Defence & Inter. Security	2.57	0.53	0.72	0.68	0.93	1.62	1.52	1.52	1.82	1.30	1.61	1.08	1.05	0.84	0.23	0.46	0.31
Social & Comm. Services	0.06	0.20	0.59	0.36	1.90	4.26	3.26	2.54	3.07	1.42	2.66	2.64	2.60	1.30	0.44	1.63	1.07
Education	0.06	0.06	0.30	0.14	0.71	2.90	1.92	0.79	1.21	0.71	1.46	0.42	0.77	0.44	0.14	0.19	0.48
Health	*	0.12	0.10	0.15	0.08	0.09	0.20	0.12	0.17	0.10	0.38	0.58	0.23	0.17	0.06	0.09	0.09
Other Social & Comm. Services	*	0.02	0.19	0.07	1.11	1.27	1.14	1.63	1.69	0.61	0.82	1.64	1.60	0.69	0.24	1.35	0.50
Economic Services	0.82	0.88	1.85	2.20	2.48	6.03	8.09	9.61	8.30	6.52	10.95	6.79	5.64	4.40	1.03	1.43	2.36
Agric.	0.11	0.13	0.29	0.31	0.46	0.07	0.47	0.35	0.35	0.23	1.72	1.96	1.14	1.29	0.47	0.30	0.46
Manufacturing, Craft, Mining and Quarrying	0.09	*	0.04	*	*	*	*	2.95	1.84	2.15	3.02	2.40	1.64	1.59	0.14	0.55	0.88
Transport & Comm.	0.59	0.66	1.26	1.08	1.36	3.26	4.63	5.41	5.04	3.44	4.57	2.26	1.56	1.36	0.41	0.30	0.26
Other Economic Services	0.03	0.09	0.26	0.81	0.66	1.80	2.99	0.90	1.07	0.70	1.64	0.17	1.30	0.16	0.01	0.28	0.76
Transfers	0.55	0.59	2.33	1.25	2.43	2.43	1.15	1.47	0.47	1.49	0.67	0.10	5.10	3.31	7.00	8.43	2.05
External Fin. obligations	0.17	0.18	0.17	0.10	0.70	1.00	0.42	0.12	0.18	0.06	0.06	0.10	0.60	0.05	0.04	0.04	0.08
Capital Repayments	*	*	*	*	*	*	*	*	*	*	*	*	*	*	2.63	4.08	0.63
Loan on lent to States	0.38	0.41	2.16	1.15	1.73	1.43	0.73	1.35	0.29	1.43	0.61	*	4.50	3.26	3.51	3.21	0.14
Loan on lent to Parastatals	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0.82	1.10	*
TOTAL	4.18	2.61	6.28	4.99	8.23	16.15	15.39	16.74	14.62	11.21	16.87	10.91	14.76	10.44	8.90	12.17	6.03
Less: Loans on lent to States	0.38	0.41	2.16	1.15	1.73	1.43	0.73	1.35	0.29	1.43	0.61	*	4.50	3.26	3.51	3.21	0.14
Federal Govt's Capital Expenditure	3.80	2.20	4.12	3.84	6.50	14.73	14.66	15.39	14.33	9.78	16.26	10.91	10.26	7.18	5.39	8.96	5.89

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FLUCTUATIONS OF FEDERAL GOVERNMENT RECURRENT EXPENDITURES
1970 – 1986

Table 6

	Coefficients of Variation		
	1970 – 81	1970 – 86	1982 – 1986
Administration	**0.4**	**0.36**	**0.20**
General Administration	0.22	0.34	0.25
Defence & Internal Security	0.51	0.51	0.21
Social and Community Services	**0.65**	**0.52**	**0.14**
Education	0.83	0.65	0.15
Health	0.33	0.30	0.26
Other social and community Services	0.97	0.88	0.69
Economic Services	**0.35**	**0.31**	**0.20**
Agriculture & Water resources	0.44	0.47	0.24
Construction	0.52	0.43	0.15
Transport & Communication	0.30	0.28	0.25
Other Economic Services	0.55	0.54	0.55
Transfers	**0.59**	**0.55**	**0.29**
Public debt Charges	0.43	0.76	0.45
Internal	0.43	0.93	0.72
External	0.76	0.84	0.22
Pensions & Gratuities	0.81	0.75	0.56
Other	0.86	0.99	0.94
TOTAL	0.28	0.26	0.16

FLUCTUATIONS OF FEDERAL GOVERNMENT CAPITAL EXPENDITURES
1970 – 86

Table 7

	Coefficients of Variation		
	1970 1981	1970 - 1986	1982 – 1986
Administration	**0.40**	**0.54**	**0.54**
General Administration	0.65	0.75	0.50
Defence and Internal Security	0.44	0.56	0.61
Social And Community Services	**0.72**	**0.70**	**0.57**
Education	0.96	1.02	0.63
Health	0.81	0.79	0.55
Other Social & Community Services	0.68	0.65	0.66
Economic Services	**0.66**	**0.71**	**0.67**
Agriculture	1.16	0.96	0.61
Manufacturing, craft, mining and Quarring	1.25	1.11	0.68
Transport and Communication	0.65	0.82	0.81
Other Economic Services	0.93	0.98	1.05
Transfers	**0.65**	**0.98**	**0.50**
External Financial Obligations	1.08	1.16	1.51
Capital Repayments	*	*	0.71
Loans-on lent to States	0.68	0 87	0.56
Loans-on-lent to Parastatals	*	*	0.89
Less Loans-on-lent to States	0.68	0.87	0.56
TOTAL	0.55	0.51	0-27

Table 8

FORECASTING (EX-POST) PERFORMANCE
OF THE MODEL

Equation	(5)				(6)		
	Pi	Ai	Ei		Pi	Ai	Ei
1.	0.0035	0.0031	0.0004	1.	0.0723	0762	−.0039
2.	0.0037	0.0031	0.0001	2.	0.0459	'0418	.0041
3.	0.0038	0.0041	−0.0003	3.	0.0526	.0546	−.0020
4.	0.0042	0.0027	.0015	4.	0.0304	.0291	.0013
5.	0.0056	0.0050	.0006	5.	.0209	.0211	−.0002
6.	0.0080	0.0132	−.0052	6.	.0282	.0356	−.0074
7.	0.0106	0.0230	−.0124	7.	.0297	.0250	.0047
8.	0.0100	0.0113	−.0013	8.	.0216	'.0235	−.0019
9.	0.0125	0.0149	−.0024	9.	.0262	.0255	.0007
10.	0.0125	0.0118	0.0007	10.	.0199	.0156	.0043
11.	0.0177	0.0162	.0015	11.	.0265	.0263	.0002
12.	0.0172	0.0188	−.0016	12.	.0240	.0269	−.0029
13.	0.0194	0.0146	.0048	13.	.0277	0.2370	.0040
14.	0.0167	0.0147	.0020	14.	.0216	.0224	−.0008
15.	0.0177	0.0126	.0051	15.	0213	.0215	−.0002
16.	0.0192	0.0169	.0023	16.	0207	.0244	−.0037
17.	0.0166	0.0166	0.0000	17.	.0186	.0186	.0000

$$U = .3917 \qquad\qquad U = .0854$$

	(7)				(8)		
1.	0.0063	.0046	.0017	1.	.0027	.0006	.0011
2.	0.0046	.0047	−.0001	2.	.0012	.0020	−.0008
3.	.0055	.0064	−.0009	3.	.0032	.0058	−.0026
4.	.0040	.0046	−.0006	4.	0033	.0036	−.0003
5.	.0036	.0049	−.0013	5.	.0082	'0190	−.0108
6.	.0053	.0061	−.0008	6.	.0285	.0426	−.0141
7.	.0063	.0051	.0012	7.	.0300	.0325	−.0026
8.	.0049	.0059	−.0010	8.	.0335	.0254	−.0081
9.	.0061	.0058	.0003	9.	.0306	.0323	−.0017
10.	.0051	.0026	.0025	10.	.0181	.0141	.0040
11.	0071	.0094	−.0023	11.	.0400	.0266	.0134
12.	.0067	.0093	−.0026	12.	.0222	.0264	−.0042
13.	.0077	.0077	.0000	13.	.0203	.0260	−.0057
14.	.0063	.0073	−.0010	14.	.0120	.0130	−.0010
15.	.0064	.0054	.0010	15.	.0080	.0044	.0036
16.	.0066	.0047	.0019	16.	.0172	.0163	.0009
17.	.0074	.0094	−.0020	17.	.0150	.0150	.0000

$$U = .5578 \qquad\qquad U = .2747$$

	(9)				(10)		
1.	.0125	0.2570	−.0132	1.	.0106	.0082	.0024
2.	.0060	.0054	.0006	2.	.0073	.0088	−.0015
3.	.0111	.0071	.0040	3.	.0197	.0185	.0012
4.	.0078	.0068	.0010	4.	.0151	.0220	−.0069
5.	.0102	.0094	.0008	5.	.0371	.0248	.0123
6.	0.0224	.0163	.0061	6.	.0140	.0604	−.0464
7.	.0192	.0152	.0040	7.	.0904	.0809	.0095
8.	.0182	.0152	.0030	8.	.0701	.0961	−.0260
9.	0157	.0182	−.0025	9.	.0798	.0830	−.0032
10.	.0092	.0131	−.0039	10.	.0518	.0652	−.0134
11.	.0145	.0161	−.0016	11.	.1010	.1095	−.0085
12.	0090	.0108	−.0018	12.	.0471	.0679	−.0208
13.	.0082	.0105	−.0023	13.	.0499	.0564	−.0065
14.	.0054	.0084	−.0030	14.	.0307	.0440	−.0133
15.	.0037	.0024	.0013	15.	.0170	.0103	.0067
16.	.0060	.0047	.0013	16.	.0236	.0143	.0093
17.	.0043	.0043	.0000	17.	0239	.0329	.0000

$$U = .7547 \qquad\qquad U = .1003$$

REFERENCES

1. Pryor, F. L. *Public Expenditures in Communist and Capitalist Nations,* London, George Allen & Union Limited, 1968.

2. Reddy, K. N. "Growth of Government Expenditure and National Income in India: 1872 – 1966", *Public Finance/Finances Publiques,* The Hague. Vol XXV. 1970.

3. Beck, M. "The Expanding Public Sector: some contrary evidence," *National Tax Journal,* Vol. 29, 1976.

4. Musgrove, R. A., *Fiscal Systems,* New Haven & London, Yale University Press, Feb., 1971.

5. Peacock, A. T. and Wiseman, J, "The Past and Future of Public Spending", *Lloyds Bank Review,* London, No. 60 April, 1961.

6. Thorn, R. S., "The Evolution of Public Finances during Economic Development," *The Manchester School ,*Jan. 1967.

7. Phillips, A. O., "Nigeria's Public Consumption Expenditure," *The Nigerian Journal of Economic and Social Studies,* Vol. 13, No. 3 1971.

8. Sahn, B. S., *Public Expenditure Analysis, Netherlands,* Rotterdam University Press, 1972.

9. Coppock, J. D. *International Economic Instability.* New York, 1982.

10. Theil, H, *Applied Economic Forecasting, Amsterdam:* North-Holland Publishing Company, 1966.

11. Omoruyi, S. E., "Patterns of Current Expenditure in Nigeria, 1950/51 – 1974/75", Central Bank of Nigeria, *Economic and Financial Review,* Lagos, Vol. 17, No. 2, Dec. 1979.

12. Central Bank of Nigeria, *Annual Report and Statement of Accounts,* Lagos, various issues.

13. Central Bank of Nigeria, *Principal Economic and Financial Indicators, 1970–85,* Lagos.

14. Federal Republic of Nigeria, *Official Gazettes,* various issues.