GOVERNMENT EXPENDITURES, MONEY SUPPLY AND PRICES: 1970–80*

Between 1970 and 1980, the Federal Government actual aggregate expenditures (current and capital) grew at an average annual rate of 37.0 per cent. Phenomenal increases in expenditures occurred between 1973 and 1976 and these increases were 70 per cent in 1973, 92 per cent in 1974, and 134 per cent in 1975 and 47 per cent in 1976. The rapid growth in expenditures financed largely by petro-naira revenue exerted great upward pressure on money supply and the accompanying monetary growth during the period, 1973-76 were 17.7 per cent; 46.3 per cent; 74.7 per cent and 46.5 per cent, respectively. There were also in those four years corresponding high rates of inflation of 9.7 per cent, 14.1 per cent, 37.5 per cent and 16.3 per cent, respectively. These developments appeared to have led credence to the contention of the monetarist school of thought that inflation is a monetary phenomenon. In other words, inflation as a persistent increase in the general price level results solely from a sustained expansion of money stock at rates in excess of increases in the amount of money demanded in the economy.

The high rates of inflation experienced in Nigeria during the period could be linked with the oil boom. The oil boom, initially a monetary affair, created fundamental structural changes in both pattern of production and consumption within the Nigerian economy. The pattern of investment shifted to petroleum, construction and services industries; agriculture was neglected and this resulted in a drastic fall in food production and consequent high prices of food-stuffs. The oil boom also generated large emigration from rural to urban centres leading to overcrowding of urban centres with people who consumed but did not produce. The faulty distribution mechanism and the unprecedented wages awards of 1975 were superimposed upon an already explosive situation. Thus, there were monetary, structural as well as psychological factors - all unexpectedly having unity of purpose in the panorama of inflationary processes in Nigeria.

The main objectives of this paper are to ascertain the amount of the Federal Government expenditures which affected money supply, during the period 1970-80; to examine the movements of government expenditures, money supply and prices within the period 1970-80 and to investigate the empirical relationships between government spending and money supply, and money supply and prices. In order to achieve the above-named objectives, the paper is divided into four parts as follows: Part I deals with the estimates of government expenditures which affected money supply. Part II describes the movements of government expenditures, money supply and prices; Part III examines the empirical relationships between the three variables using quarterly and annual data while Part IV is the summary and conclusions.

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PART I

ESTIMATES OF GOVERNMENT EXPENDITURES AFFECTING MONEY SUPPLY[1] AND PRICES[2]

Unlike an earlier study[3] which estimated government monetization through balance sheet approach, this study attempts to estimate that aspect of government expenditures which affect money supply through a variant of CASH FLOW approach. The new approach takes into account all leakages arising from expenditures financed by monetized oil revenue as well as internal revenue sources. Like the earlier study however, it does not take into account the secondary monetary impact of government spending.

Estimates of government spending which affect money supply are shown in Table 1. Separate estimates are made for current and capital expenditures. Current expenditure which directly affects money supply otherwise defined here as "net" current expenditure is equal to total expenditure less that part of expenditure financed by internal revenue sources. It is assumed that government spending of this revenue will not affect money supply as long as revenue spent equals revenue collected within a given period. If government spending is less than internal revenue, the amount by which government spending is less than internal revenue will be reflected in a contraction of money supply but if spending is greater than internal revenue, the amount by which government spending is greater than internal revenue will be expansionary of money supply. There are leakages such as taxation, personal savings and imports which arise out of emoluments which do not affect money supply as would be operationally defined in this paper. It is, however, difficult to trace their origins from any particular revenue source. These leakages have been estimated but since the overall amount is much smaller than internal revenue, it is assumed that they are financed from the internal revenue sources. Consequently "net" current expenditure for a given period is the total expenditure less that part of expenditure financed by internal revenue.

Capital expenditure consists of two parts: First, capital outlay used directly for imports and second, the remaining capital outlay which is used to meet domestic commitments. The first category is estimated at 50 per cent of total capital expenditures[4]. Of the second category, leakages occurred in estimated 15 per cent of total capital expenditures[5]. This proportion was adjusted for the following leakages: First, taxation estimated as 6.4 per cent of personal income was applied to emoluments; second, saving rate of 26.6 per cent estimated from consumption function of the whole economy was applied to the disposable income, and personal imports estimated at 5.4 per cent from the import-function of the economy was also applied to the disposable income. Total leakages from capital expenditure consist of 50 per cent direct leakage for imports and leakages from personal and disposable incomes. "Net" capital expenditure is equal to total expenditure less leakages. The total government expenditures which directly affect money supply therefore consist of "net" current and capital expenditures.

PART II

MOVEMENT OF GOVERNMENT EXPENDITURES, CHANGES IN MONEY SUPPLY (M_1) AND PRICES (CPI): EVIDENCE FROM QUARTERLY DATA, 1970-80

Federal Government expenditures (E) which affected M_1

averaged 34.7 per cent of total expenditures between 1970 and 1980. It grew at an average quarterly rate of 26.5 per cent compared with 7.3 per cent for M_1 [6] while CPI increased by 3.5 per cent during the same period. The three variables, Government expenditures, changes in M_1 and CPI are shown in Chart I. From the chart it can be seen that the government spending which affected M_1 showed a fairly regular seasonal pattern. Between 1973 and 1975, there was a tendency for expenditures to rise in the first and third quarters and fall in the second and fourth quarters. This differs from the trend between 1976 and 1980 when expenditures rose in the first quarter, fell in the second quarter and rose from the third quarter attaining a peak in the fourth quarter.

Changes in M_1, on the other hand, showed consistent seasonal pattern from 1970 to 1980 with the exceptions of the last quarters of 1977 and 1980 when M_1 declined contrary to the usual experience. It is striking to observe that the seasonal pattern of government spending was similar to that observed for M_1 between 1976 and 1980. Further information on M_1, however, showed that it did not observe the usual seasonal pattern throughout 1981. The unusual pattern in 1981 was as a result of a decline in foreign assets (net) of the banking system.

Changes in the CPI did not appear to have manifested any regular seasonal pattern throughout the period under review. The only regularity in the pattern of price behaviour occurred in the second quarter when the CPI is generally known to register highest price increases. This development is explained by the fact that the CPI is heavily weighted with expenditure on food, and food prices are generally known to rise in this quarter, April-June when the previous harvest is known to have almost been exhausted. The pattern of price behaviour during the period as a whole may also have been greatly distorted by imports.

Table 2 summarises the degree of short-run variability of the three variables. The measure of variability used is the coefficient of variation, that is, standard deviation divided by the mean of the variable [8]. For analytical convenience, the period 1970-81 is arbitrarily divided into three as follows: 1970-73, 1974-77 and 1978-81. The overall period is also assessed. From the results shown in table 2, it can be shown that M_1 and CPI were highly volatile. Expenditures were also highly unstable for the overall period, 1970-80 and for the period 1970-73. The fluctuations were relatively less severe for the three variables for the period 1974-77 although the coefficients of variation which ranged from 72 to 85 per cent cannot be regarded as reflecting stable movements in the three variables. The implication of these results is that the unpredictability of these variables create big problems for monetary authorities in devising short-term solutions for controlling them.

Table 3 shows log-trend equations for M_1 and CPI indices. The slope of each equation is a measure of systematic changes in money and prices. The anti-logs are the compound growth rates of each of the variables from one quarter to the next. Also in the table a linear trend equation is used for analysing trend in the government expenditures. The period is arbitrarily divided into three for convenience as follows: 1970-73; 1974-77 and 1978-81. Another trend equation is fitted for the whole period 1970-81. With the exception of net expenditures, all the equations recorded significant trends. With regard to expenditures the trends were significant for 1974-77 and 1970-80; for the other periods the trends were not significantly different from zero.

Evidence from Annual Data

Table 4 gives the annual movement in expenditures, changes in M_1 and CPI. Between 1970 and 1980, Federal Government expenditures which affected M_1 increased by an average annual rate of 84.9 per cent. This compared with the growth rate of 32 per cent in M_1 and an average annual inflation rate of 15 per cent during the period 1970-80. Phenomenal changes occurred in government expenditures between 1973 and 1976. This period also corresponded to the period of rapid growth of M_1 and high rate of inflation. During that period government spending greatly affected money supply and as observed earlier, exerted direct impact on prices. This appeared to have been confirmed in the observed perfect rank correlation coefficient (+1) between monetary growth and rates of inflation for the four-year period, 1973-76.

The changes in the annual rate of growth of M_1 and CPI were more relatively stable than the growth in the quarterly series although the changes still appeared far from being stable or systematic. The actual movement of expenditures is equally relatively more stable than the quarterly series. The results are however not unexpected since most of the seasonal fluctuations have been averaged out.

PART III

EMPIRICAL RELATIONSHIPS BETWEEN GOVERNMENT EXPENDITURES (En) CHANGES IN MONEY SUPPLY (M_1) AND PRICES (CPI)

The Model

The relationships between government spending, changes in money supply and prices are investigated using quarterly and annual data. In constructing the quarterly models, data constraints made it impossible to go beyond money supply and price variables. However, for the annual models it was possible to include those variables which are not available on quarterly basis.

Models Based on Quarterly Data

The analysis of quarterly data has three major steps: first, the assumption that increased government spending exerts upward pressure on money supply. This is expressed in a simple functional relationship between the two variables, M_1 and E_n. Secondly, we postulate a simple functional relationship between government spending and changes in consumer prices and, thirdly, we examine various functional relationships between changes in money supply and prices.

The above notions can be summarised in simple notational forms as follows:

(1) $D.M_t = f(E_{nt})$
(2) $d.P_t = f(E_{nt})$
(3) $d.P_t = f(d.M_t)$
(4) $d.P_t = f(d.M_t, d.M_{t-1})$
(5) $d.P_t = f(d.M_t, d.M_{t-1}, D_t)$
(6) $d.P_t = f(d.M_t, d.M_{t-1}, d.M_{t-2}, d.M_{t-3})$

Where $D.M_t$ represents absolute first differences in money supply, $d.M_t$ is percentage change in money supply (M_1) in the present quarter, E_n represents government spending

which affects M_1 as defined in Part I; $d.M_{t-1}$ is the percentage change in M_1 in the previous quarter, $d.M_{t-2}$ is the percentage change in the preceding second quarter and so on; $d.P_t$ is percentage change in the national CPI; and D_t is a dummy variable representing periods of control and decontrol of prices. It has the value of unity during the control period, 1972-78 and zero in other periods. This variable has been included to capture some of the effects of the control on prices during the period.

The inclusion of a lagged or lagged values of explanatory variables in equations (4) - (6) can be explained in terms of delayed response, the assumption being that changes in M_1 affect prices through some kind of adjustment process through time. Each of the lagged variables in M_1 is also considered separately with changes in CPI for assessment of individual effect. Where the relationships are completely expressed in percentages, the coefficient of the variables are elasticities. These models also tend to minimise the problems of auto-correlated disturbance terms.

Models Based on Annual Data

The analysis of annual data proceeded as in quarterly data except that more variables were included and M_1 was not lagged. The relationships may be summarised in notational forms as follws:

(7) $D.M_t = f(E_{nt})$
(8) $d.P_t = f(E_{nt})$
(9) $d.P_t = f(d.M_t)$
(10) $d.P_t = f(d.M_t, d.W_t)$
(11) $d.P_t = f(d.M_t, d.Y_t, d.F_t, d.W_t, D_t)$
(12) $d.P_t = f(d.M_t, d.W_t, D_t)$

Equation (10) contains two explanatory variables, viz. percentage changes in M_1 and money wage index; equation (11) consists of 5 explanatory variables, viz percentage changes in money supply (M_1), aggregate income ($d.Y_t$), aggregate food production index ($d.F_t$), money wage index ($d.W_t$), and a dummy variable (D_t). Aggregate income is introduced to measure the effect of aggregate demand on prices. The index of monetaery wage growth is also expected to capture the effects of growth of wages on prices. Moreover, since changes in CPI are greatly affected by changes in food prices, changes in food production index are introduced as another explanatory variable to measure the impact of food production on prices. The dummy variable is assigned the same function as in the quarterly model.

The Empirical Results - Quarterly Data

The empirical results are summarised in Table 5 below. Except for relationships with expenditures (1970-80), the period of coverage is 1970-1981.

In equations (1a) to (1c) the coefficients of expenditures are positive and highly significant at 1 per cent probability level. The results suggest that there is a strong relationship between government expenditures and changes in M_1. However, the low D.W. statistic suggests that there are variables other than expenditures which affect M_1. In equation (2) the simple functional relationship between prices and expenditures did not produce a satisfactory result. The coefficient of expenditures is not significant and the equation is poorly fit. Equations(3a) to (3d) show functional relationships between changes in M_1 and changes in prices (CPI). Equation (3a) shows direct relationship between changes in M_1 and CPI. The coefficient of M_1 has a right sign and also significant at 5 per cent probability level but the goodness of fit is not very satisfactory. In equation (3b) money stock is lagged by one quarter. The coefficient of money stock is positive, significant at 1 per cent probability level and satisfactory in all respects. For equations (3c) and (3d) where M_1 is lagged by two and three quarters, respectively the results are correctly signed but not significant even at 10 per cent probability levels. The fits are also poor. Equation (4) combines equations (3a) and (3b). The coefficients of current and lagged values of M_1 are positive and significant at 10 per cent and 5 per cent probability levels, respectively. In equation (5) a dummy variable is introduced. Both current and lagged values of M_1 are correctly signed, t-ratios improved although still within 5-10 per cent probability limits. The coefficient of the dummy variable is negative and correctly signed but it is not significantly different from zero. Equation (6) combines equations (3a) to (3d). The coefficients of all the variables in the equation are correctly signed but that of the lagged values of the first quarter change in the monetary stock is significant at 5 per cent probability level.

The empirical results based on quarterly data showed a positive relationship between money supply and prices. In all the cases considered, the empirical results showed that the preceding quarter value of monetary stock played a more important role than the current and the preceding values of the two and the three last quarters. The results conform to other empirical findings that money affects prices with a lag [9]. In case of Nigeria the most important lag is the first preceding quarter lag. Therefore in formulating short-run policies to combat inflation, policy makers must take cognisance of the historical presence of such lags between money and prices.

Empirical Results: Annual Data

The empirical results based on annual data are summarised in Table 6. In the table, equations (1a) - (1c) describe the relationship between expenditures and absolute changes in M_1. Expenditure coefficients are positive and significant at 1 per cent probability level. Thus, the empirical results obtained from the annual data confirmed positive relationship between government spending and money supply established for quarterly data. The result of equation (2) shows very poor relationship between expenditures and changes in price index. It would be recalled that a similar result was obtained when quarterly data were used. Equation (3) describes the relationship between changes in CPI and M_1. The coefficient of M_1 is highly significant even at 1 per cent probability level. In equation (4) changes in index of wage rate is included as an additional explanatory variable. Although the coefficient of M_1 is correctly signed it is no longer as significant as in equation (4) while the coefficient of wages is significant at 5 per cent level. The correlation matrix (see Table 7) also confirms that there is a strong correlation between changes in the CPI and growth in money wages. Equation (5) considers all possible variables that can affect prices - growth in aggregate output ($d.Y_t$), money supply ($d.M_t$), wages ($d.W_t$), food production ($d.F_t$) and government control of prices (D_t). The result showed that all regression coefficients are positive. Changes in aggregate income, money supply and money wages were correctly signed; food production was wrongly signed but with the exception of the

coefficient of wages which is significant at 10 per cent probability level, none of the other regression coefficients was significant even at 25 per cent probability level. Equation (6) was formulated based on experience gained from equation (5). It took account of only the most important variables which affected changes in prices during the period under review. In this equation, all the regression coefficients had the correct signs; coefficient of changes in M_1 and wages index were highly significant at 5 per cent probability level while the dummy variable also correctly signed was significant at 10 per cent probability level. The "goodness of fit" adjusted for degrees of freedom also improved.

The empirical results based on annual data showed that the two most important variables which affected prices were changes in money supply and wages. Of the two factors, wages appeared to have exerted a greater impact on prices. This is borne out by the fact that various wages awards have sent prices sky-rocketing- the award of Salaries and Wages Review Commission (otherwise known as "Adebo" award), 1970-71 increased consumer price index from an average of 2 per cent in the ten year period, 1961-70 to 15 per cent in 1971 while the Public Service Review Commission award (popularly known as "Udoji"), 1974 jacked up consumer price index from 14 per cent in 1974 to 37.5 per cent in 1975. It has been observed that the economy usually experiences several rounds of price increases before the completion of any wages review exercise [10]. There are announcements as well as payments effects. To quote Mr. S. B. Falegan, "If 'Udoji' appears in the paper of Nigerian market woman five times, her prices will go up five times". This element of psychological factor has therefore become an important determinant of inflationary pressures in Nigeria [11].

On the other hand rising food prices which has been a dominant factor pushing up the CPI, did not, during the review period, generate significant or corresponding increases in food production. Contrary to the conventional economic theory, food production per capita has been falling in spite of rising food prices. Perhaps one of the major explanations was that the oil boom has generated massive investment on petroleum and construction industries and services to the detriment of agriculture. Moreover the rush to earn the high urban wages engendered by the oil boom has left the rural areas depopulated by farmers [12]. The government control of prices however, did have some slight moderating impact on prices during the review period.

PART IV

SUMMARY AND CONCLUSIONS

There has been a tendency in the recent years to attribute the rapid expansion of monetary stock and high rates of inflation in the Nigerian economy mainly to huge government spending financed by the monetization of oil revenue. This impression appeared to have been reinforced largely by the fact that the period of high price increases such as in 1973-76 corresponded to the period when monetary stock and government spending increased most rapidly. This paper examined this contentious issue by investigating the empirical relationships between government expenditures and money supply and also between the growth of money supply and changes in prices. The study was conducted on both quarterly and on annual data.

Evidence from quarterly data showed that there is a strong relationship between government spending and changes in money supply and also between changes in M_1 and CPI. In the later case, the preceding quarterly values of M_1 appeared to have been more important in explaining price behaviour than the current and other past values. The lesson from the empirical results is that a short-run policy designed to control inflation should take cognisance of the slow and cumulative impact of changes in money supply on price level noting in particular that the preceding first quarter lag may play a dominant role. The large "unexplained" variance in the price monetary equation suggests that there were non-monetary factors which significantly affected prices during the period and government's policy measures should also take them into account.

Evidence from the annual data confirmed strong relationship between government spending and growth of monetary stock on the one hand, and the growth of monetary stock and prices on the other. Changes in money wage rates and money supply were identified as the two most important factors which influenced the movement of prices between 1970 and 1981. Government price controls did however, have some minimal dampening effects on prices.

While government spending, changes in M_1 and wages were identified as among the important factors that influenced the movement of prices, the study based on annual data did suggest that there were non-monetary factors as well, some of which were beyond the scope of the present study. The factors which might have affected prices but not covered by the study included poor distribution and storage facilities for existing supplies, rural-urban income imbalance and psychological reactions of distributors and retailers to government changes of policy and more specifically to wages awards. Government policy for control of inflation should aim, first, at checking its own spending for the effective control of money supply and secondly, should take full cognisance of existence of large non-monetary factors.

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* Govt spending manifests itself in increased money supply, which on the other hand leads to increases in prices.

TABLE 1

FEDERAL GOVERNMENT EXPENDITURES AND MONEY SUPPLY, 1970-80

(₦ million)

		Change in Money Supply (M_1) (1)	Total Expenditure (TE) (2)	Domestic Resources and Total Leakages (3)	Estimate of Expend. that affects M_1 (EE) (2) − (3) = (4)	$\frac{EE}{TE} \times 100$ (4) ÷ (2) = (5)
1970	I					
	II	20.5	67.2	47.1	20.1	29.9
	III	28.0	203.9	147.8	56.1	27.5
	IV	60.6	148.2	105.4	42.8	28.9
1971	I	44.9	184.2	237.1	−52.9	−28.7
	II	−15.9	98.7	122.8	−24.1	−24.4
	III	−11.0	113.6	129.3	−15.7	−13.8
	IV	11.5	242.5	297.4	−54.9	−22.6
1972	I	23.0	200.0	253.4	−53.4	−26.7
	II	−24.8	101.3	141.2	−39.9	−39.4
	III	28.9	179.8	257.0	−77.2	−42.9
	IV	53.7	161.5	207.3	−45.8	−28.4
1973	I	43.2	315.5	293.2	22.3	7.1
	II	−1.4	219.2	217.3	1.9	9.0
	III	20.7	325.8	284.8	41.0	12.6
	IV	32.4	230.8	210.0	20.8	9.0
1974	I	81.4	551.3	464.7	86.6	15.7
	II	76.0	411.4	290.0	121.4	29.5
	III	89.3	612.1	420.5	191.6	31.3
	IV	107.1	522.9	370.2	152.7	29.2
1975	I	344.1	1,219.3	803.5	415.8	34.1
	II	282.8	983.2	601.3	381.9	38.8
	III	117.6	1,081.5	701.6	379.9	35.1
	IV	112.7	1,620.2	957.8	662.4	40.9
1976	I	374.5	3,148.6	1,638.1	1,510.5	48.0
	II	158.2	890.4	462.3	428.1	48.1
	III	197.1	1,589.7	807.8	781.9	49.2
	IV	408.7	1,684.3	858.9	825.4	49.0
1977	I	469.8	3,066.0	1,946.1	1,119.9	36.5
	II	217.3	1,128.5	790.5	338.0	30.0
	III	700.1	1,249.7	836.6	413.1	33.1
	IV	99.4	1,908.5	1,184.2	724.3	38.0
1978	I	330.5	4,375.0	2,806.9	1,568.1	35.8
	II	−114.3	1,215.6	805.1	410.5	33.8
	III	−5.9	1,310.7	884.7	426.0	32.5
	IV	143.3	1,618.6	1,104.0	514.6	31.8
1979	I	510.7	1,805.2	1,015.8	789.4	43.7
	II	337.2	1,331.4	864.2	467.2	35.1
	III	625.7	2,240.5	1,464.9	775.6	34.1
	IV	45.7	1,671.9	1,059.6	612.3	36.6
1980	I	424.6	4,298.1	2,427.2	1,870.9	43.5
	II	−122.5	1,047.3	594.6	452.7	43.2
	III	302.8	2,314.7	1,320.9	993.8	42.9
	IV	1,664.0	2,852.1	1,649.3	1,202.8	42.2

Sources: [1] Central Bank of Nigeria Economic and Financial Review, various years.
[2] Federal Republic of Nigeria, Official Gazette, various months.

TABLE 1.1

ESTIMATES OF LEAKAGES IN GOVERNMENT EXPENDITURES 1970-80

(₦ million)

		Total Expenditures	Domestic Leakages	External Leakages	Total Leakages	(2) ÷ (1)	(3) ÷ (1)	(4) ÷ (1)
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
1970	I	419.5	16.5	66.3	82.8	0.039	0.158	0.197
	II	67.2	2.6	10.1	12.7	0.039	0.150	0.189
	III	203.9	7.7	21.3	29.0	0.038	0.104	0.142
	IV	148.2	5.8	19.4	25.2	0.039	0.131	0.170
1971	I	184.2	20.0	22.7	42.7	0.109	0.123	0.232
	II	98.7	10.4	14.3	24.7	0.105	0.145	0.250
	III	113.6	11.2	22.2	33.4	0.099	0.195	0.294
	IV	242.5	26.1	31.2	57.3	0.108	0.128	0.236
1972	I	200.0	23.4	55.3	78.7	0.117	0.277	0.394
	II	101.3	12.9	24.1	37.0	0.127	0.238	0.365
	III	179.8	23.5	40.8	64.3	0.131	0.227	0.358
	IV	161.5	19.2	43.6	62.8	0.119	0.270	0.389
1973	I	315.5	35.2	68.9	104.1	0.112	0.218	0.330
	II	219.2	26.3	38.7	65.0	0.120	0.177	0.297
	III	325.8	33.7	83.3	117.0	0.103	0.256	0.359
	IV	230.8	25.2	53.4	78.6	0.109	0.231	0.340
1974	I	551.3	53.4	122.1	175.5	0.097	0.221	0.318
	II	411.4	32.1	138.6	170.7	0.078	0.337	0.415
	III	612.1	46.2	215.4	261.6	0.075	0.352	0.427
	IV	522.9	40.9	174.8	215.7	0.078	0.334	0.412
1975	I	1,219.3	96.4	363.7	460.1	0.079	0.298	0.377
	II	983.2	69.1	354.8	423.9	0.070	0.361	0.431
	III	1,081.5	83.4	337.4	420.8	0.077	0.312	0.389
	IV	1,620.2	107.9	628.1	736.0	0.067	0.388	0.455
1976	I	3,148.6	225.8	712.6	938.4	0.072	0.226	0.298
	II	890.4	62.8	213.3	276.1	0.071	0.239	0.310
	III	1,589.7	93.1	628.6	721.7	0.059	0.395	0.454
	IV	1,684.3	101.3	630.9	732.2	0.060	0.375	0.435
1977	I	3,066.0	209.4	1,130.4	1,339.8	0.068	0.369	0.437
	II	1,128.5	87.3	339.3	426.6	0.077	0.301	0.378
	III	1,249.7	91.3	415.9	507.2	0.073	0.333	0.406
	IV	1,908.5	126.6	731.9	858.5	0.066	0.384	0.450
1978	I	4,375.0	254.3	1,462.0	1,716.3	0.058	0.334	0.392
	II	1,215.6	72.0	375.4	447.4	0.059	0.309	0.368
	III	1,310.7	78.8	384.1	462.9	0.060	0.293	0.353
	IV	1,618.6	97.9	460.3	558.2	0.061	0.284	0.345
1979	I	1,805.2	102.4	742.7	845.1	0.057	0.411	0.468
	II	1,331.4	84.5	370.4	454.9	0.064	0.278	0.342
	III	2,240.5	149.8	607.1	756.9	0.067	0.271	0.338
	IV	1,671.9	108.1	504.7	612.8	0.065	0.302	0.367
1980	I	4,298.1	220.1	1,419.2	1,639.3	0.051	0.330	0.381
	II	1,047.3	53.6	336.3	389.9	0.051	0.321	0.372
	III	2,314.7	121.2	726.5	847.7	0.052	0.314	0.366
	IV	2,852.1	147.0	835.1	982.1	0.052	0.293	0.345

Source: Federal Republic of Nigeria
Official gazettes, various months

TABLE 2

MEASURE OF SHORT-RUN VARIABILITY

	Period	Mean	Standard Deviation	Co-efficient of Variation
Government Expenditures	1970-73	31.00	63.62	2.05
	1974-77	956.96	628.03	0.66
	1978-80	1,568.59	892.57	0.57
	1970-80	787.05	858.31	1.09
		Mean (%)[2]		
Changes in Money Supply (M_1)	1970-73	3.62	4.22	1.17
	1974-77	11.94	7.08	0.59
	1978-81	4.51	6.56	1.45
	1970-80	7.28	7.17	0.98
	1970-81	6.74	7.11	1.05
Changes in Composite Consumer Price Index (CPI)	1970-73	2.17	3.37	1.55
		Mean (%)[2]		
	1974-77	5.30	4.50	0.85
	1978-81	3.23	3.43	1.06
	1970-80	3.54	4.07	1.15
	1970-81	3.60	3.95	1.10

[1] Government expenditures are expressed in absolute figures.
[2] Represents quarterly average growth rate.

TABLE 3

TREND EQUATIONS FOR GOVERNMENT EXPENDITURES (E) MONEY SUPPLY (M_1) AND PRICES (P) 1970-1981

Period	Equations	r^2
1970-73	$E_G = 171.08 + 3.489t_1$ (0.68)	0.032
	$E_L = 147.60 - 0.694t_1$ (0.17)	0.002
	$E_N = 40.82 - 1.156t_1$ (0.32)	0.008
	$M_1 = 1.63 + 0.183t_1$ (10.96)	0.896
	$P = 1.69 + 0.115t_1$ (11.14)	0.891
1974-77	$E_G = 515.89 + 98.628t_2$ (2.64)	0.332
	$E_L = 347.46 + 54.244t_2$ (2.18)	0.254
	$E_N = 278.42 + 79.828t_2$ (2.84)	0.366
	$M_1 = 2.76 + 0.666t_2$ (11.92)	0.910
	$P = 1.77 + 0.309t_2$ (10.60)	0.889
1978-81	$E_G = 2055.17 + 18.192t_3$ (0.18)	0.003
	$E_L = 1239.35 + 18.199t_3$ (0.30)	0.009
	$E_N = 22.03 + 1.369t_3$ (0.29)	0.009
	$M_1 = 3.39 + 0.276t_3$ (8.00)	0.820
	$P = 2.15 + 0.174t_3$ (7.34)	0.794
1970-81	$E_G = -278.35 + 63.846t_4$ (7.27)	0.557
	$E_L = -158.22 + 38.845t_4$ (7.08)	0.544
	$E_N = 185.68 + 8.168t_4$ (1.18)	0.032
	$M_1 = 2.01 + 1.019t_4$ (11.89)	0.754
	$P = 1.39 + 0.512t_4$ (11.96)	0.757

Note: The trend equations for M_1 and CPI are based on double-logarithmic function while expenditures are based on a linear function.

E_G = Total Government Expenditures (Gross).

E_L = Expenditure less leakages.

E_N = Total Expenditures (net) less domestic resources and leakages from capital outlay.

M_1 = Money Supply i.e. private sector demand deposits in the banking system + currency with the non-bank public.

P = Composite consumer price index.

TABLE 4

ANNUAL MOVEMENT IN GOVERNMENT EXPENDITURE, MONEY SUPPLY AND COMPOSITE CONSUMER PRICE INDEX (1970-1980)

Variables		Mean(%)[1]	Standard Deviation	Coefficient of Variation
Net Federal Government Expenditure	(1970-1980)	84.9	193.6	228.3
Money Supply	(1970-1980)	32.0	21.6	67.7
	(1970-1981)	30.4	21.1	69.4
Composite Consumer Price Index	(1970-1980)	15.0	9.5	63.3
	(1970-1981)	15.3	9.0	58.8

[1] Represents annual growth rate.

Source: As in Table I.

TABLE 5

GOVERNMENT EXPENDITURES[1] (E_G, E_L, E_N)*, MONEY SUPPLY (M_1) AND PRICES QUARTERLY DATA (1970-81)

		Variables	a	b_1	b_2	b_3	b_4	N	R^2	$\bar{R}^2$	F-Ratio	D.W
1.	a.	DM_t^2	37.212	$0.363E_N$ (4.654)	—	—	—	43	0.346	0.330	21.664	1.214
	b.	DM_t^2	7.207	$0.158E_G$ (4.575)	—	—	—	43	0.338	0.322	20.932	1.198
	c.	DM_t^2	4.555	$0.259E_L$ (4.675)	—	—	—	43	0.348	0.332	21.857	1.202
2.		dP_t^3	3.004	$0.002E_N$ (1.286)	—	—	—	43	0.039	0.015	1.653	1.905
3.	a.	dP_t^3	2.495	$0.149dM_t$ (1.821)	—	—	—	44	0.069	0.060	3.317	1.935
	b.	dP_t^3	1.595	$0.250dM_{t-1}$ (3.401)	—	—	—	44	0.208	0.116	11.565	1.932
	c.	dP_t^3	2.821	$0.096dM_{t-2}$ (1.121)	—	—	—	44	0.028	0.092	1.257	1.865
	d.	dP_t^3	2.658	$0.128dM_{t-3}$ (1.489)	—	—	—	44	0.050	0.072	2.217	1.756
4.		dP_t^3	1.389	$0.124dM_t$ (1.592)	$0.193dM_{t-1}$ (2.458)	—	—	44	0.207	0.170	5.601	1.967
5.		dP_t^3	1.530	$0.136dM_t$ (1.645)	$0.204dM_{t-1}$ (2.469)	$-0.566D_t$ (−0.468)		44	0.211	0.154	3.739	1.987
6.		dP_t^3	0.752	$0.122dM_t$ (1.52)	$0.164dM_{t-1}$ (2.02)	$0.094dM_{t-2}$ (1.15)	$0.043dM_{t-3}$ (0.53)	44	0.250	0.173	3.246	1.988

[1] Expenditures relate to 1970-1980.
[2] DM_t = Absolute first difference in money supply. dM = changes in money supply.
[3] dP_t = Percentage changes in composite consumer price index.
* See Table 3
T-Ratio in brackets.

TABLE 6

GOVERNMENT EXPENDITURES[1] (E_G, E_L, E_N)* MONEY SUPPLY (M_t) AND PRICES (P_t)

ANNUAL DATA (1970-1980)

		Variables	a	b_1	b_2	b_3	b_4	b_5	N	R^2	$\bar{R}^2$	F-Ratio	D.W
1.	a.	DM_t	188.481	$0.294E_N$ (5.222)	—	—	—	—	10	0.773	0.744	27.274	3.576
	b.	DM_t	43.846	$0.137E_G$ (5.377)	—	—	-	—	10	0.783	0.756	28.912	3.412
	c.	DM_t	65.418	$0.215E_L$ (4.826)	—	—	—	—	10	0.744	0.712	23.289	3.376
2.		dP_t	12.266	$0.001E_N$ (0.778)	—	—	—	—	10	0.0704	0.0458	0.606	1.875
3.		dP_t	3.652	$0.355dM_t$ (3.901)	—	—	—	—	10	0.656	0.612	15.223	2.936
4.		dP_t	6.252	$0.170dM_t$ (1.665)	$0.245dW_t$ (2.519)	—	—	—	10	0.820	0.768	15.904	2.525
5.		dP_t	1.224	$0.191dM_t$ (1.168)	$0.799dY_t$ (0.749)	$0.111dF_t$ (0.479)	$0.258dW_t$ (2.187)	$5.098D_t$ (1.109)	10	0.894	0.762	6.772	2.396
6.		dP_t	6.945	$0.246dM_t$ (2.485)	$0.211dW_t$ (2.385)	$-5.365D_t$ (1.699)	—	—	10	0.878	0.817	14.420	2.484

*See Table 3

TABLE 7

CORRELATION MATRIX

CPI, M_1 AND WAGES

	CPI	M_1	Wages
CPI	1.0000		
M_1	0.80999	1.0000	
Wages	,0.86498	0.72294	1.0000

CHART I

FEDERAL GOVERNMENT NET EXPENDITURES, PERCENTAGE CHANGES IN MONEY SUPPLY AND COMPOSITE CONSUMER PRICE INDEX 1970-1980

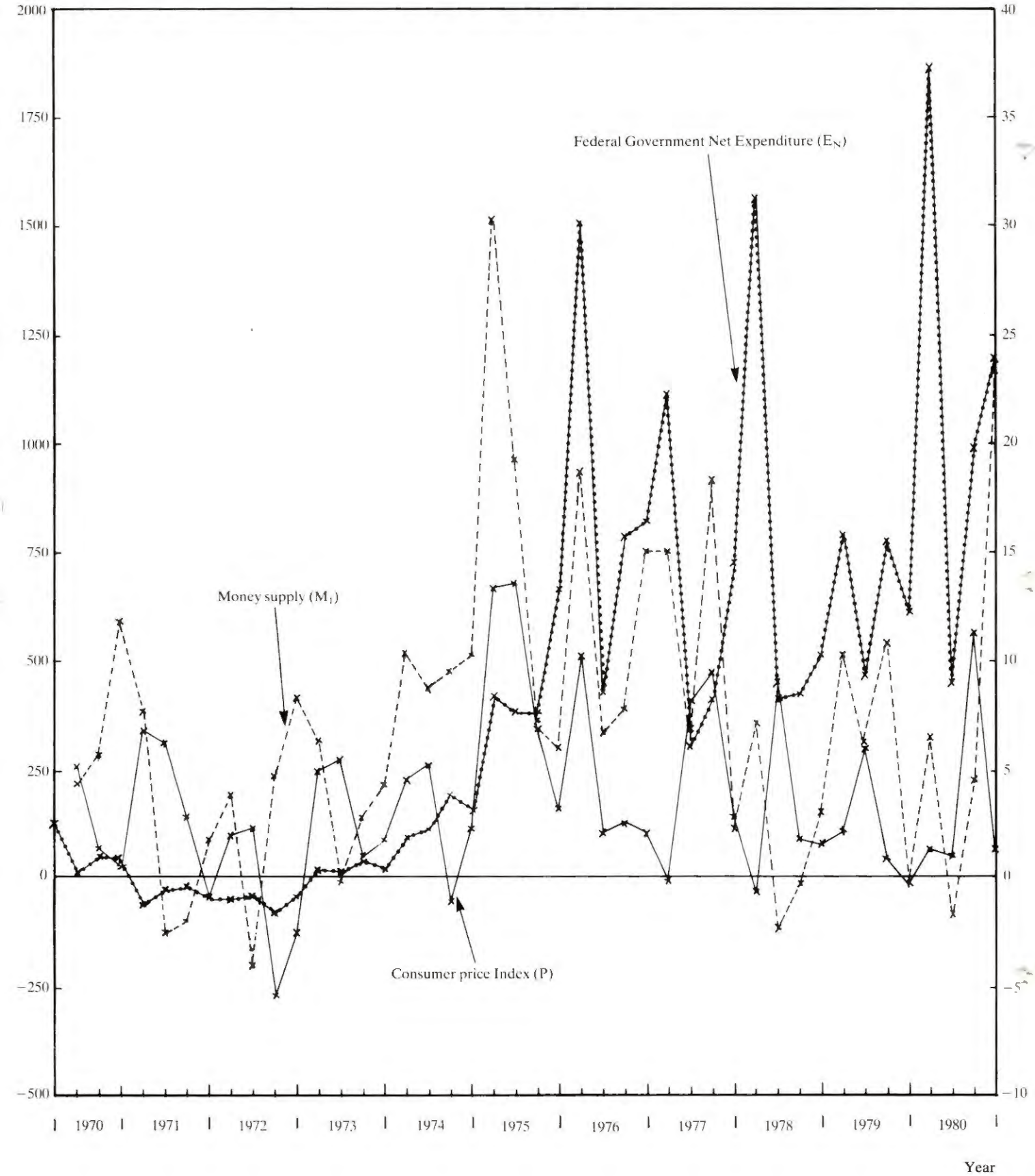


CHART II

FEDERAL GOVERNMENT NET EXPENDITURES AND THE TREND

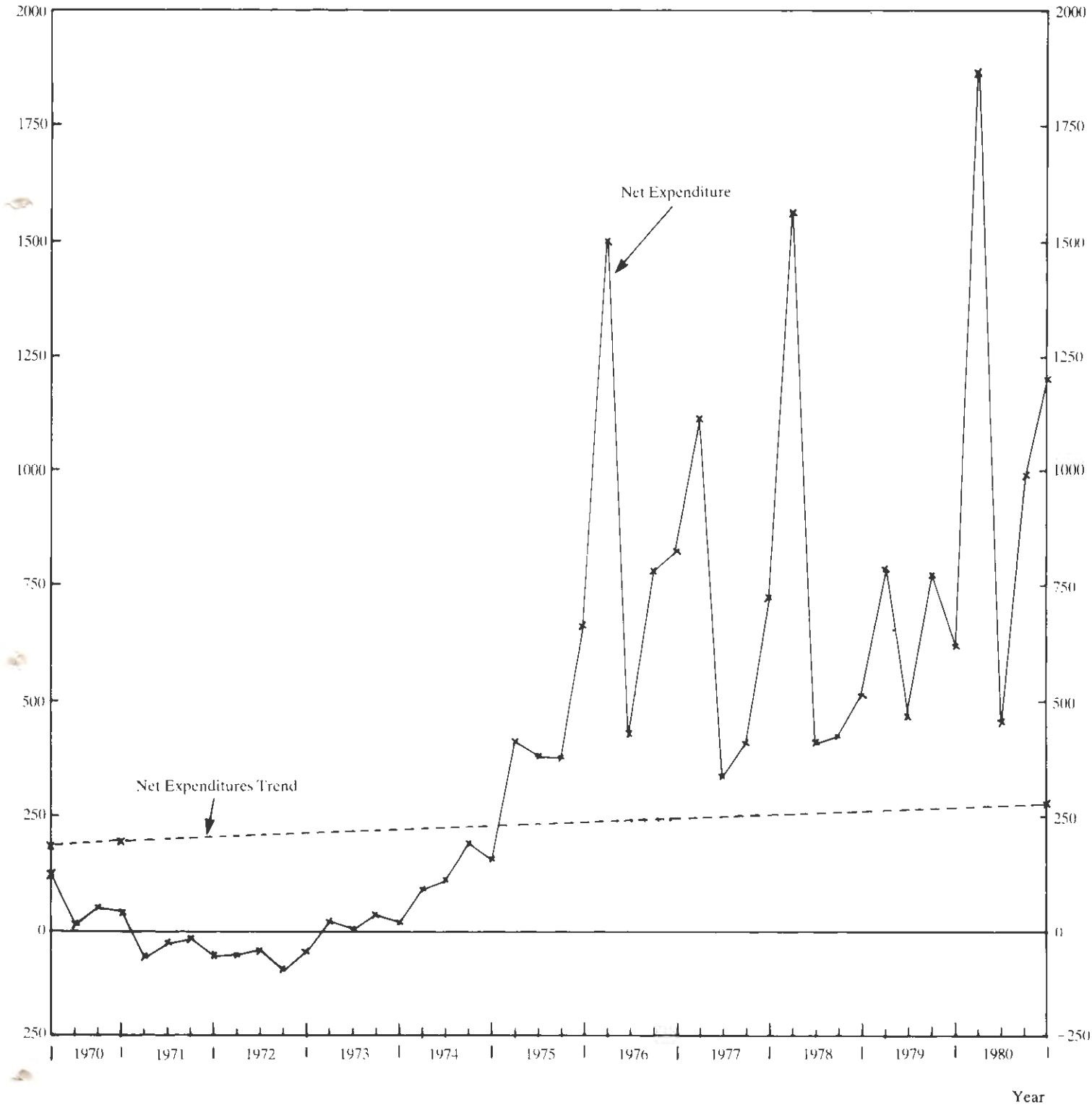


CHART III

PERCENTAGE CHANGES IN MONEY SUPPLY (M_1) AND THE TREND

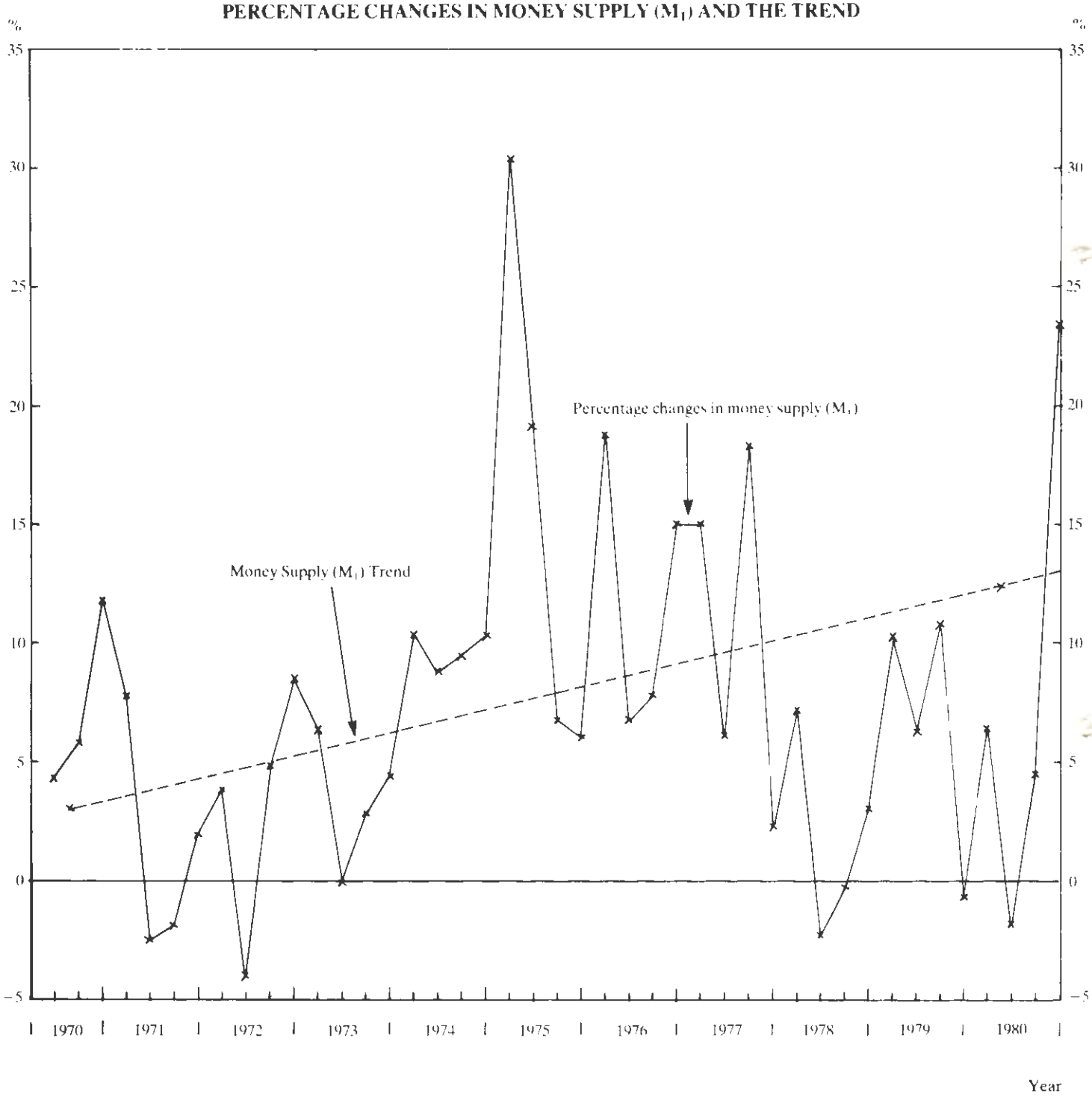
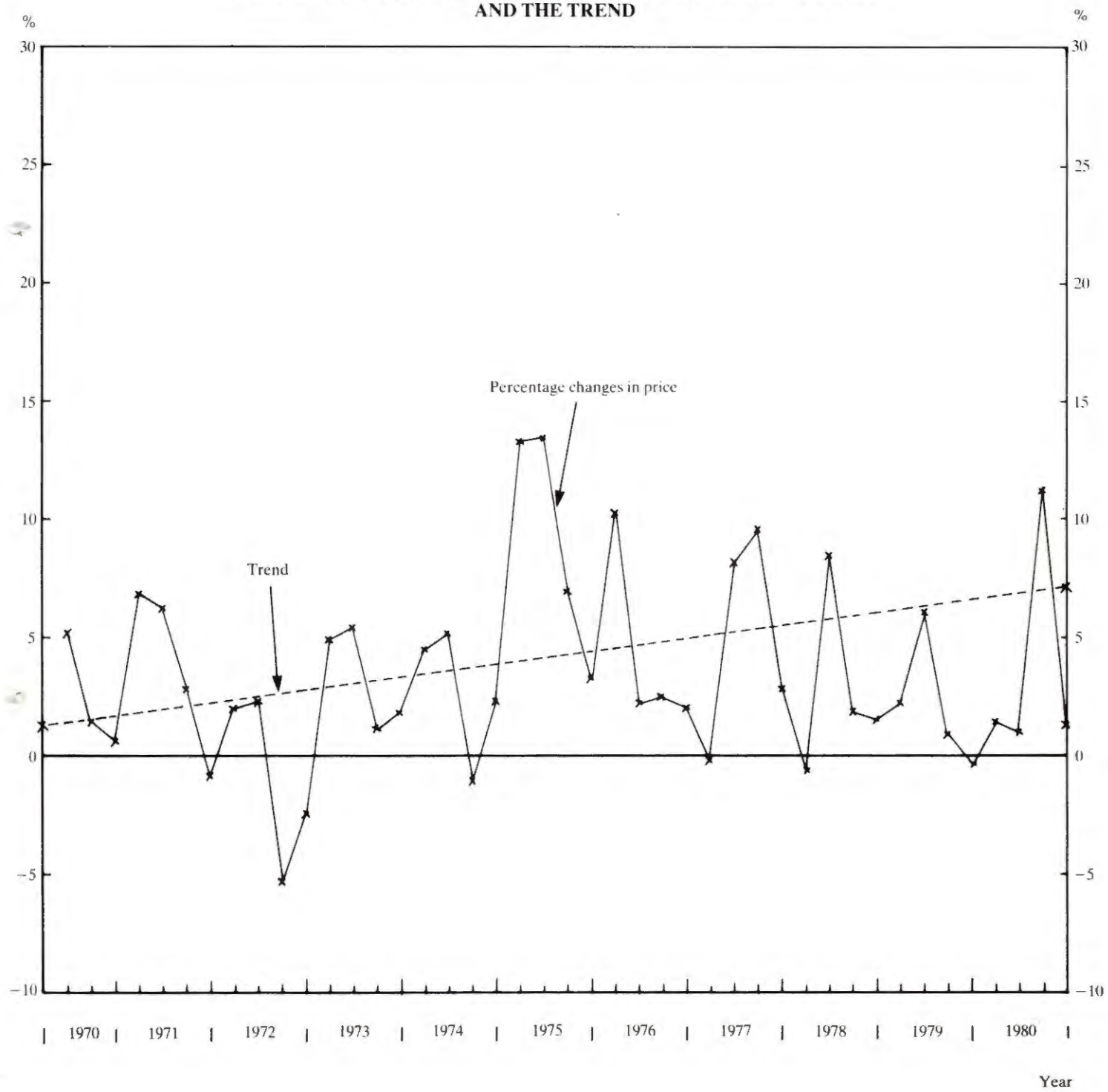


CHART IV

PERCENTAGE CHANGES IN COMPOSITE CONSUMER PRICE INDEX AND THE TREND



FOOTNOTES

1. Money Supply has been variously defined. Money Supply known as M_1 is defined in Nigeria as the currency with the non-bank public (C) plus private sector demand deposits in the banking system (DD). This definition of money is based mainly on transactions demand for money. The other definition of money supply is that which includes both precaution demand and store of value. This is called M_2 and is technically defined as $M_2 = M_1$ + Savings Deposits (SD) + Time Deposits (TD). Throughout this paper our analysis will focus on M_1 as narrowly defined. If the control of government expenditures is a major policy option, this definition of money supply (M_1) most adequately fits into the framework of our subsequent analysis.
2. The price variable used in this paper is the national composite consumer price index (CPI). This index covers both prices in urban and rural areas as well as all classes of income earners.
3. Oke, B. A. and Nwade, T. E., "Growth in the Money Stock" 1973-77, Central Bank of Nigeria Economic and Financial Review, Vol. 15, No. 2, December 1977, pp. 5-9.
4. Approximates the figure generally used by the Federal Ministry of National Planning for evaluation of projects.
5. Derived from the Central Bank of Nigeria Foreign Investment Survey for the section on Building and Construction.
6. Based on the average quarterly figures.
7. Central Bank of Nigeria, Annual Report 1981, page 35.
8. This coefficient measures the dispersion of a variable as a percentage of the mean $\frac{\propto}{m} \times \frac{100}{1}$, where m is the mean and $\propto$ is the standard deviation of the variable.
9. Carlson, K. M., "The Lag from Money to Prices", *Federal Reserve Bank of St. Louis Review, Vol. 62, No. 8, Oct. 1980,* pp. 1-10. See also References 2, 4 and 7.
10. Second Report of Technical Committee set up by Salaries and Wages Review Commission, 1970-71 (Adebo Commission) (unpublished).
11. Inflation in Nigeria – Conference Proceedings – Edited by Onitiri, H.M.A. and Awosika Kesiah, NISER, 1982, p.41.

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