Macro Behaviour of Indian Economy With Reference to GDP, NDP, Saving and Investment

By

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Chapter - I

Introduction

I. INTRODUCTION

In the thirties the advanced countries were caught up in the great depression and were struggling to get out of it. In the fourties they were fighting world war and had no time to think of economic development. The economically backward countries are yet caught up in the slumber of stagnation. It is only recently that the Keynesian analysis had been interowen into an analysis of economic growth. The survey of the theories of economic growth throws light on the nature of economic development and the causes contributing to economic growth.

The classical economists were living in the age of growing population and believed that economic development springing out of some spontaneous urge, proceeded by leaps and bounds and the process was discontinuous. The neoclassicals lived in better time when the outlook was more optimistic. In the neo classical view, the process of economic growth is gradual continuous and also harmoneous. Keynes gave a new turn to this, and his theory explains that factor determines national income and the level of national income is an index of a country's economic growth. In Keyne's view, the key to economic progress lies in savings and investment. So, the causal relationship was emphasized by Keynes and the post keynesians(Higgins).

Economic development indicates a process of development where an economy's real national income increases over a long period of time. A short period expansion such as takes place within a trade cycle is no economic development. A simple measure of economic development is the trend of real national income(i.e.) national product corrected for price changes(Baldwin). Though national income is conceptually simple, the measurement is not that simple. It is subject to oonceptual limitations by the fact that it can only be expressed in money terms(Rao, 1980).

The degree of development of a country is often judged by relative shares of primary, secondary and tertiary sectors in its total income. Historically economic growth has been associated with a progressive decline in the share of primary sector and simultaneously the siphoning off of labour force from primary to other sectors. In India, while the share of primary sector in the national income is steadily dropping, the proportion of labour force remained the same over the last three decades. India has a low income status in comparison to other developing and developed countries. Neverthless, it has shown a markedly high propensity to save - a status attained in this respect by very few countries in the world. The net capital formation in India is touching the rate of around 20 per cent of the national income. Compared

with under 10 per cent of the early 50s there has been no acceleration in the rate of growth of NDP over the period(Working Group on Savings Report, 1981). Raj(1984) also observed that the rate of geowth of GDP has decelerated since the middle of 60s and that the rate of domestic investment has evidently gone up significantly over the last decade. According to Kainth(1980), the change in the sectoral contribution ofincome, distribution of income, composition of investment and capital consumption allowances, are the important determinants of resource allocation of an economy. In the opinion of Pillai (1986), the study of Macro behaviour of aggregates and the interrelation between them are very important for structural analysis and planning.

In India, the growth rate of GNP is at 5.2 per cent and the percapita income grows at 3.3 per cent. The acceleration of investment in the economy is 21.8 per cent of gross domestic product(GDP) at market prices and also the domestic savings rate is 21.2 per cent. The gross capital formation has risen from 23.8 per cent in 1980-81 to 25.3 per cent in 1981-82. As such it has already crossed the target for 1984-85 at 25.1 per cent(Economic Survey, 1984).

Historically it is difficult to say when the systematic analysis of periodically recurring flucutations

began. The clasists firmly believed in the full employment equilibrium in the long run. The keynesians and the post keynesians discribed expansion, recession, contraction and depression as recurrent and regular. Keynes(1936) observed that as the economy progresses, there is some recognisable degree of regularity in the sequence of upward and downward movement in the economic activity.

In India, the nominal and real GDP, and NDP grow steadily. There was 732 per cent increase in money national income and the growth in real terms was 159 per cent. But there are fluctuations in saving and investment, and so the desirable indicators of the occurance of peaks and troughs are saving and investment broadly correspond with each other.

In this context, the present study endeavours to analyse the behaviour of GDP, saying and investment and accertain if fluctuations do in fact show a regular occurance and if they do whether this can be explained in terms of economic factors.

While analysing the various aspects of the Macro behaviour of the Indian economy, the GDP and NDP are dealt rather than GNP and NNP as it is difficult to identify income from abroad. Moreover, in India this factor constitutes a negligeble portion of national income(Rao, 1986). The

nominal values of the aggregates are considered for the analysis as there are problems in using the price deflactors. The study does not concentrate on the consumption behaviour as the extent of variations is less and the expenditure of government sector is also not studied separately perhaps, because of lack of data. The current study explores the possibility of building up, the estimates of Saving Investment GDP and NDP. The objectives of the study were to,

i) assess the growth and change of Indian economy in terms of GDP, NDP, sectoral contribution and sectoral change in the share of NDP;

ii) estimate the trends in the rate of saving, investment and capital formation;

iii) identify the periods od depression and boom in terms of saving and investment and

iv) to examine the extent of fluctuations in saving and investment.

The analysis relates to the estimation of central pre budget economic surveys. The accuracy of the results of the analysis depends on the statistical and conceptual reliability of the estimates. The working group on savings (1981) itself has recognised the possible errors in the

estimates of aggregates. It says "..... consequently the possible errors in the estimation of aggregates are not sizeable but in the present state of our statistical data base quite indeterminate".

REVIEW OF LITERATURE

The review relating to the study on the "Macro behaviour of Indian economy with reference to GDP saving and investment", is described under the following heads:

1. Theories on economic growth;
2. Theories on saving and investment and
3. Related studies

A. THEORIES ON ECONOMIC GROWTH:

The Classical Model:

The economists of the late 18th and early nineteenth century were very much concerned with the condition for economic progress. The classical economists and Karlmarx lived through the period of take-off into sustained growth. Marx and Mill saw peak rates of growth attained in Europe. For the classical economists, the development of capitalist economies was a race in which technological progress could be in the lead for some time but which would end in a dead heat, or stagnation. Technological progress, in turn, depend on capital accumulation, which would permit increasing mechanization and greater division of labour. And the rate of accumulation depended on the level and trend of profits.

Smith, Malthus and Mill all had it quite clearly in mind that total output, O, depend on the size of labour force, L, the stock of capital, Q, the amount of land available - K, to mean supply of known resources and the level of technique T. Using the common symbol 'f' to mean "function of". This classical growth model is given as

$$O = F(L, K, Q, T)$$

The classical economists seemed to think that there was always a plentiful supply of better techniques and new commodities to be introduced, but they considered that the rate at which these opportunities could be exploited was limited by the flow of capital for new investment. For them, the whole process of technological progress was capital absorbing, whatever may have been the nature of inventions.

$$T = T(I)$$

They stressed the need for capital accumulation and saving rather than technological progress as an independent factor.

Classists took it for granted that capitalists make investments because they expect to earn profits on them.

$$I + DQ = I(R)$$

Most of the classicists felt that technological progress was winning for the time being, but that it could not win for very much longer.

$$R = R(T, L)$$

The general idea is that the rate of population growth depends on how much money is available to pay wages. An increase in wages paid may bring a temporary improvement in living standards, but this improvement will soon be swamped in an increased rate of population growth.

$$L = L(W)$$

Wage fund was build up by saving and put into effective use through investment. The wage bill could be increased only by net investment.

$$W = W(I)$$

The system is closed by adding an identity, total output equals profits plus wages.

$$O = R + W$$

Marxist Model: Growth and Collapse:

Marx never underestimated the capacity of the capitalist system for economic expansion. The Marxist ideas about the production function were the same as those of the classical school.

$$O = f(L, K, Q, T)$$

Technological Progress depends on Investment:

$$T = T(I)$$

Investment depends on the Rate of Profits:

Marx thought of investment as depending, not merely on the size of capitalist's income, but on the rate of return on capital. Using 'R' to mean this rate of return,

$$I = I (R')$$

The rate of profit is the ratio of profits to pay rolls puls capital costs.

$$R' = \frac{O - W}{W + Q^1} = \frac{R}{W + Q^1}$$

Wages depend on the level of investment:

In Marxist system, the wages, will depend on the level of employment as well as on the wage rate

$$W = W (I)$$

Employment depends on the level of investment:

Employment rises only if investment goes up relative to the existing stock of capital.

$$L + L(I/Q)$$

Consumption depends on the wage Bill:

Marx argued that investment cannot be profitable unless consumption increases enough to absorb the increased

output of final products, and that however luxuriously capitalists may live, it is the owrkers who provide most of the market for consumer's good.

$$C = C(W)$$

Profits depend on the level of technolgy and the level of consumer spending for workers do most of the consuming and reducing labour costs ofproduction will not raise profits if it lowers workers' spending; the output must be sold if profits are to be made. So the profits determining equation in the Marxist system takes the form,

$$R = R(T, C)$$

He stressed only the rate of profit rather than the aggregate amount of profit.

Cumulative movement away from equilibrium: Harrod

Harrod considers both the rate of population growth and the rate of technological progress as independent variables in advanced countries. The three "fundamental" elements in his system are, manpower, output per head and quantity of capital available.

$$\frac{Y}{Y} \cdot \frac{I}{Y} = \frac{S}{Y} \text{ or } \frac{I}{Y} = \frac{S}{Y} \text{ or } I = S$$

His fundamental equation is, GwCr = S, expresses the equilibrium conditions for a steady advance. Harrod argued that, saving and investment are always equal; if entrepeneurs consider their investment too low, they also consider their saving too low.

His equation is GnCr may or may not be equal to S; here Gn is the "natural rate of growth". Harrod contrives to get a skeletan theory of economic fluctuations, as well as a theory of trend, out of his analysis. In the recovery phase, G Gn. When full employment is reached, G = Gn. If Gw Gn, then at full employment Gw G, Cr C, and a lump is inevitable.

Harrod nowhere presents an analysis of the determinants of Gw, but in the course of his discussion he does indicate the following relationships:

Gw varies (1) inversely with Cn; (2) directly with S. (3) inversely with the volume ofpublic works; (4) inversely with the volume of investment and (5) directly with the rate of interest r.

2. THEORIES ON SAVING AND INVESTMENT:

Not every dollar of income earned in the course of production is spent for consumption goods; some part of this income is withheld from consumption, that is, a portion of income is saved. Clearly, unless there is a dollar of planned investment spending for every dollar" of income saved, there is a deficiency of aggregate spending. Another part of classical theory provides the mechanism that presumably ensures that planned saving will not exceed planned investment. This mechanism is the interest rate.

Classical theory treats investment as an inverse function of the interest rate. Other things being equal, the lower the rate of interest, the greater will be the amount of investment spending. With a relatively high rate of interest, relatively few of the available projects promise a rate of return equal to or greater than the interest rate. Consequently relatively few projects are undertaken and there is relatively little investment. With a relatively low rate of interest, the opposite result is found.

Keynes accepted the "investment as a function of the interest rate" part of the classical theory. But he rejected that saving as a direct function of the interest rate. In Keynesian theory, saving is a direct function of the level of income. In that scheme, the interest rate may influence saving, but it is of minor importance. In classical theory, the interest rate is all-important, and the level of income is of minor importance. Because the classical model argues that full employment is the normal state of the economy, the level of income is in effect ruled out as a variable in the short run. Consequently, it cannot influence the amount of saving. The problem in classical economics is to explain how saving will vary at the full employment level of income. The solution is provided by the interest rate. The higher the interest rate, the greater will be the amount of full employment income that is devoted to saving.

Competition between savers and investors would move the interest rate to the level that equated saving and investment. The transfer of money from savers to investors also involve a transfer of resources. When income recipients decide to save part of current income, they are deciding not to excercise their claims to full amount of output that results from their productive services. The excess of S over I also means that there is an excess of labour available over labour employed. In a word, there is unemployment. In the classical system, if the interest rate fails to equate saving and investment, it also fails in its assigned task of promptly of consumption goods to the production of capital goods; unemployed resources are the result.

As long as the interest rate adjusts upward and downward to correct any disequilibrium, shifts in the saving and investment functions will lead to the establishment of new equilibrium positions. If the interest rate did not adjust promptly there would be an excess either of planned saving over planned investment or planned investment over planned saving. An excess of saving over investment would mean a deficiency of aggregate demand at the existing price level. Conversely, an excess of planned investment over planned saving would mean an excess of aggregate demand at the existing price level.

3. RELATED STUDIES:

a) Studies on Growth:

1. Structural Changes Sectoral Performance and Inter-Sectoral Linkages in Andra Pradesh Economy:

A study on structural changesin Andhra Pradesh economy was conducted by Rao in 1986. The period under this study was 1960-61 to 1978-79. The specific objectives of the study were to

1. study the changes in the structure of income in the states.
2. work out the rates of growth registered by the three sectors.
3. to analyse the income inequalities between regions and districts of the state and
4. to analyse the interrelationships between the growth patterns of the three sectors.

The data were collected from the records of the State Income Unit of the Bureau of Economics and Statistics. Annual compound growth rates, coefficient of variation, standard deviation of logrithmic values, multi regression analysis were used to analyse the data. The following were the major findings of this study:

1. There was 53 per cent increase in the States' income at constant prices
2. The increase in real per capita income was only 15 per cent.

3. There was a marginal reduction in the variation of income in the case of primary sector and a marginal increase in variation in total income.

4. The poorer districts fared better in material sector while the richer districts did slightly better in the tertiary sector.

5. The population growth and investment in the autonomous sectors were the major determinants of income increases in the induces sectors.

2. Macro Economic Behaviour of Kerala Economy:

A study on the Macro Behaviour of Kerala Economy was conducted in 1986 by Pillai. The period covered in this study was six years from 1975-76 to 1980-81. The data were collected from NSS Reports, the Economic Reviews published by the State Planning Board and the functional classification of Budgets by the Directorate of Economics and Statistics. The macro behaviour of Kerala economy revealed the following facts:

1. There has been an increase in the NSDP at an annual compound rate of 8.99 per cent. The NDP in the private sector recorded 8.48 per cent and that of public sector 12 per cent.

2. The aggregate consumption expenditure formed 91.97 per cent of SNDP and registered a growth rate of 6.06 per cent.

3. The aggregate savings recorded a growth rate of 24.54 per cent, almost doubled during the period under study.

4. The rate of savings was 30.1 per cent.

5. The share of public savings to total saving was 7.56. per cent in 1975-76 and there was a steep rise to 19.36 per cent in 1980-81.

6. The public consumption registered an increase of 9.26 per cent as against 5.75 per cent of the private consumption.

3. Changing Pattern of Sectoral Distribution of Income in Indian Economy 1960-61 - 1977-78:

The study on the changingpattern of sectoral distribution of income in India was conducted by Kainth in 1980. The study analysed the changes in income distribution between agricultural and non agricultural sectors due to changes in sectoral terms. The data for the study were collected from CSO. The share of each sector in national income and the difference between the current price income and constant price income of both the sectors were worked out.

The product contribution of agriculture sector to economic growth was computed by using the following equation:

$$\frac{P_a r_b}{\Delta P} = \frac{1}{1 + \left\{ \frac{P_b r_b}{P_a r_a} \right\}} \quad \text{where}$$

P_a - product of the agricultural sector

r_a - Rate of Growth in agricultural sector

P_b - Product of the non agricultural sector

r_b - Rate of growth in non agricultural sector

$\triangle P$ - Incremental total product

The following were the findings of the study:

1) The share of agricultural sector to National Income declined by 18.22 per cent at current price and 12.87 per cent at constant price. The share of non agricultural sector increased by 11.04 per cent at current price and 17.32 per cent at constant price.

2) A large part of the increase of the non agricultural sector has been shifted to the agricultural sector due to the movements of the terms of trade in favour of agricultural sector.

3) The annual growth of agricultural product during the study period was 1.85 per cent and that of non agricultural product was 4.05per cent.

4) The short run and long run income and investment elasticities of savings were worked out as 0.9758, 0.0983 and 0.3584 and 0.7301 respectively.

5) The high dependence of savings on net income indicated that tax policy does exert a significant influence on saving decisions.

b) Studies on Savings:

4. The Determinants of Corporate Saving Behaviour:

Rao and Vivekananda have conducted a study on the determinants of corporate saving behaviour in India in 1980. The analysis was confined to manufacturing sector. The major findings of the study were

1) The most important determinant of corporate savings was corporate income.

2) Savings were particularly related to investment demand and liquidity position.

3) In comparison to income and investment demand liquidity position had relatively lesser impact.

4) Current profits, lagged dividend payments were some of the other factors influenced saving.

5) The product contribution of the agricultural sector to economic growth was 30.27 per cent.

6) The improvement in the agricultural terms of trade tend to increase the inequalities of income distribution both in the rural and urban sectors.

7) The benefits of the terms of trade in favour of agriculture remained confined to the big farmers.

Chapter - III

Methodology

METHODOLOGY

The methodology adopted in the study on "Macro behaviour of Indian Economy with reference to GDP, Saving and Investment" is described under the following heads:

1. Selection of the problem;
2. Data sources;
3. Methods and techniques of analysis and
4. Definition of the terms.

1. SELECTION OF THE PROBLEM:

Economic analysts use some estimates of aggregates such as GDP, NDP, disposable income, employment, saving, investment, capital formation, money supply, etc. to represent the economic activity of an economy. In India, GDP and NDP are consistently increasing both in terms of constant and current prices. Saving and Investment aggregates show fluctuations. These fluctuations are obviously due to various factors. However, the rate of saving and investment have definite trend of change and a secular pattern. So,the behaviour of GDP, NDP, Saving and Investment is taken up for indepth analysis. The time reference of the analysis is 1950-51 to 1979-80.

2. DATA SOURCES:

Data on GDP, NDP, gross capital stock, Savings, Investment were collected from Secondary Sources. Pre budget economic surveys, CSO reports, RBI Bulletin reports, Tamil Nadu Economic appraisals, and relevant journals, books, research reports of the individuals were referred, to collect information on the estimates of the relevant aggregates. Many estimates used in this study are the ones made by Rao*.

3. METHODS AND TECHNIQUES OF ANALYSIS:

The percentage sectoral contribution of NDP, percentage composition of savings, rate of saving and rate of investment were worked out. The annual compound growth rate of the aggregates were calculated with the following formula:

$Z = Zoe^{rt}$ where r is the compound growth rate. t - time and Z the relevant variable. A time series model for estimating the trend and the cyclical fluctuations in saving and investments was adopted from Barish Kaplan(1975).

a) Time Series Analysis:

The time series model used in the relevant variables, is given by a nonlinear multiplicative model.

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*Rao, V.K.R.V. - India's National Income 1950-1980, Sage Publications, New Delhi - 1983.

A = TCSR where

T - the long trend representing the consistent pattern of the changes in the variable over a period of time.

C - Cyclical variation representing the wave like short term fluctuations in the variable around the trend line.

S - Seasonal variations representing changes which occur during changes in seasons and

R - Irregular fluctuations representing variations which are not explained by trend, cyclical and seasonal factors. This model will assist in forecasting the future behaviour of the variables.

ii) Estimation of Long Trend:

The long trend is estimated by using the least square polynomial. The degree of the polynomial is determined by the value of coefficient of determination, R^2. This method will minimise the value of the random component R.

iii) Estimation of cyclical variations:

The cyclical fluctuations are determined in terms of cyclical residual index and defined by

$$\text{Cyclical Residual Index} = \frac{\text{Actual Value}}{\text{Trend Value}}$$

This method will explain the size, length and pattern of oscillations in the variables due to economic and non economic factors.

iv) Sesonal Variations:

To estimate monthly and periodical variations, the following values are used:

a) From the trend line the monthly values are determined.

b) By using 12 months and 24 months moving totals, moving average values are determined.

c) From the moving averages and actual values the seasonal indices are determined.

d) From the monthly index values, the seasonal indices are determined.

4. DEFINITION OF THE TERMS:

1. GDP - GNP minus the net inflow of income earned on labour and property supplied by residents abroad

2. NDP - NNP minus net income from abroad
GDP minus capital consumption allowance

3. Saving - Current income which is not consumed

4. Investment - Additions made to gross capital stock

5. GDCF - Investment in the construction Machinary and changes in stocks

6. NDCF - GDCF minus capital consumption

7. Investment productivity - $\frac{\text{The money value of GDP}}{\text{Investment}}$

8. Capital produvtivity - $\frac{\text{The money value of GDP}}{\text{Capital}}$

9. Capital output ratio - $\frac{\text{The value of gross capital stock}}{\text{The value of GDP}}$

IV. RESULTS AND DISCUSSION

The results of the analysis are presented and discussed as follows:

I. Growth of Indian Economy
   1. Growth of GDP and NDP
   2. Sectoral share of NDP
   3. Savings - growth and structure
   4. Capital formation
   5. Productivity of Capital and investment
   6. Compound Growth rate analysis

II. Fluctuations
   i) Long trend
   ii) Cyclical fluctuations
   iii) Seasonal fluctuations and
   iv) Forecasting.

I. GROWTH OF GDP AND NDP:

The growth of the domestic economy is generally reflected in the growth of gross domestic product and net domestic product rather than gross national product and net national product. It is difficult to identify income from abroad and in India this factor constitutes a negligibleportion of national income. The growth of NDP, its distribution among different categories of

economic activity and its trend refledt the growth of the economy. Growth is measured in two alternate forms in this analysis. First,growth is measured in terms of constant price time series and second in terms of current price time series. Whenever growth rates are compared, compound growth rates and average annual growth rates are considered.

The details of GDP, both in terms of current and constant price are presented in Table 4.1.

TABLE 4.1

DETAILS OF GDP - 1951-80

Rs. in crores

Year	GDP constant		GDP Current	Percentage annual change
1951 - 52	9784	6.45	10343.54	..
1952 - 53	10108	3.31	10113.9	1.15
1953 - 54	10730	6.15	10866.31	6.28
1954 - 55	11053	3.01	10044.38	1.65
1955 - 56	11433	3.44	10427.67	3.82
1956 - 57	12066	5.54	11785.49	13.00
1957 - 58	11908	1.31	11929.44	1.22
1958 - 59	12881	8.17	13234.9	10.9
1959 - 60	13160	2.17	13633.97	2.97
1960 - 61	14071	6.92	14072.68	3.2
1961 - 62	14609	3.82	14858.05	5.6
1962 - 63	14990	2.61	15835.47	6.6
1963 - 64	15797	5.38	18089.01	14.2
1964 - 65	17013	7.70	21261.4	17.5
1965 - 66	18265	4.40	22024.45	3.6
1966 - 67	16472	1.27	25488.69	15.7
1967 - 68	17821	8.19	29872.07	17.2
1968 - 69	18357	3.01	30554.65	2.3
1969 - 70	19536	6.42	33799.17	10.6
1970 - 71	20244	3.62	36729.47	8.7
1971 - 72	20562	1.57	39268.13	6.9
1972 - 73	20340	1.08	43241.79	10.1
1973 -.74	21296	4.70	53774.97	24.3
1974 - 75	21480	0.86	63257.68	17.6
1975 - 76	23510	9.45	66365.68	4.9
1976 - 77	23811	1.28	71805.97	8.2
1977 - 78	25870	8.65	81197.39	13.1
1978 - 79	27225	5.24	86927.62	7.0
1979 - 80	25872	4.97	93974.03	8.1
Growth rate	1.4 per cent		1.5 per cent	

The table reveals that the average annual growth rate of GDP both at current and constant price is more or less the same(1.4 and 1.5). The annual change in percentage figures show that in terms of constant price, the variations are not much and in terms of constant price, the variations are not much and in terms of current price, the figures are on the higher side in 1956, during 1960-65 and in 1974. This is illusory in the sense, that this increase is mainly due to inflationary effect of the price rise during these years.

The details of NDP are given in Table 4.2.

TABLE 4.2

GROWTH OF NOMINAL NDP - 1951-80

Rs. in crores

Year	NDP	Percentage of annual change
1951 - 52	9984.54	..
1952 - 53	9834.90	1.50
1953 - 54	10474.31	6.50
1954 - 55	9615.38	8.20
1955 - 56	9977.67	3.79
1956 - 57	11299.49	13.23
1957 - 58	11393.44	0.83
1958 - 59	12612.90	10.70
1959 - 60	12972.97	2.85
1960 - 61	13336.68	2.8
1961 - 62	14046.05	5.3
1962 - 63	14903.47	6.1
1963 - 64	17088.01	14.6
1964 - 65	20149.40	17.9
1965 - 66	20795.45	3.2
1966 - 67	24086.69	15.8
1967 - 68	28314.07	17.5
1968 - 69	28868.65	1.9
1969 - 70	31884.17	10.4
1970 - 71	34512.47	8.2
1971 - 72	36869.13	6.8
1972 - 73	40572.79	10.0
1973 - 74	50751.97	25.0
1974 - 75	59731.68	17.6
1975 - 76	62319.68	4.3
1976 - 77	67313.97	8.0
1977 - 78	76186.39	13.2
1978 - 79	81165.62	6.5
1979 - 80	87175.03	7.4

I decade	-	2.46 per cent
II decade	-	3.00 per cent
III decade	-	3.86 per cent
Overall growth rate	-	1.47 per cent

The analysis of the Table reveals the following facts:

1. In the first decade of the period under study the average annual growth rate is 2.46 per cent.

2. In the second and third decades the growth rates are higher (3 per cent and 3.86 per cent).

3. The overall average growth rate is only 0.147 per cent.

In the second and third decades the growth in NDP is higher as the inflationary effect of the price rise has been sharpest in the post 1960 period. This may be partly because of the secular rise in demand due to the increase in the population and also due to rise in money demand resulting from inflationary financing.

2. Sectoral Share of NDP:

The change in the structure of the economy can be assessed from the secotral shares in NDP. The Table 4.3 presents the composition of NDP by functional sectors.

TABLE 4.3

SECTORAL SHARES OF NDP - AT CURRENT PRICES - 1950-79

Rs. in Crores

Year	Primary	Secondary	Tertiary	Total
1950 - 52	16523.623 (56.27)	4953.8569 (10.87)	7887.4094 (26.86)	29364.89
1953 - 55	16829.82 (55.97)	5226.0547 (17.38)	8013.4844 (26.65)	30069.36
1956 - 58	18807.415 (53.27)	6683.3936 (18.93)	9815.0207 (27.80)	35305.83
1959 - 61	20528.944 (50.87)	8159.9225 (20.22)	11666.832 (28.91)	40355.7
1962 - 64	24464.5 (46.92)	11710.841 (22.46)	15965.537 (30.62)	52140.88
1965 - 67	31386.534 (42.88)	17698.843 (24.18)	24110.831 (32.94)	73196.21
1968 - 70	41707.143 (43.78)	22501.661 (23.62)	31056.484 (32.60)	95265.29
1971 - 73	54354.124 (42.40)	30266.53 (23.61)	43573.035 (33.99)	128193.69
1974 - 76	76920.197 (40.62)	45296.186 (23.92)	67148.946 (35.46)	189365.33
1977 - 79	93409.329 (38.20)	61254.023 (25.05)	89863.687 (36.75)	244527.04
Growth rate	1.49 per cent	1.45 per cent	1.49 per cent	

Figures in brackets show the percentages to row totals

The growth described in the nominal NDP is not uniformly transmitted over all the functional sectors of the economy. While the overall NDP has an average growth rate of 1.47 per cent it is 1.49 per cent for the primary and teritiary sectors and 1.45 per cent for the secondary sector. This means, the money value of output as compared to its quantum grew fastest for the primary and tertiary sectors.

The degree of development of a country is often judged by the relative shares of the functional sectors in the total income. This is also an important determinant of resource allocation in terms of sectoral priorities and hence of distribution of income. The growth rate of the economy is also affected by the inter sectoral distribution of income.

It is evident from the Table that the percentage share of the secondary sector in NDP shows a consistent increase. The primary sectors' share has fallen from 56 per cent to 35 per cent. The share of the tertiary sector is 39 per cent as against 27 per cent in 1950. One can find evidence of structural retrogression of the Indian economy from the facts presented in the table.

In general, over the thirty years, the agricultural sector is dominent in the income generation. But there is relative shrinkage in its share and this is what expected from a growing economy in terms of structural transformation. The share of industrial sector is not substantial inspite of the vastly increased rate of industrialisation. This is a clear indication of the slackening of the rate of industrial growth in the second half of the thirty year period.

3. Growth and Structure of Savings:

The growth of an economy can be analysed from two angles. The last section dealt with growth of Indian economy from the output angle. In this section, the growth is analysed from the aspect of expenditure. The variations in consumption expenditure are less when compared to savings and the government expenditure is autonomously determined. So, the variability and growth rates of savings are considered to analyse the growth and change of Indian economy.

The details of savings and the rates of saving are presented in Table 4.4.

TABLE 4.4

THE DETAILS OF SAVINGS, RATE OF SAVINGS - 1951-80

Rs. in crores

Year	Savings	NDP	GDP	Savings as Percentage of NDP	Savings as percentage of GD-
1951 - 52	646	9984.54	10343.54	6.47	6.25
1952 - 53	417	9834.90	10223.9	4.24	4.08
1953 - 54	530	10474.31	10866.31	5.06	4.88
1954 - 55	625	9651.38	10044.38	6.48	6.22
1955 - 56	982	9979.67	10427.67	9.84	9.41
1956 - 57	1113	11299.49	11785.49	9.85	4.44
1957 - 58	834	11393.44	11929.44	7.32	6.99
1958 - 59	782	12612.90	13239.9	6.20	5.91
1959 - 60	1104	12972.97	13633.97	8.51	8.09
1960 - 61	1327	13336.68	14072.68	9.95	9.43
1961 - 62	1281	14046.05	14858.05	9.12	8.62
1962 - 63	1544	14903.47	15835.47	10.36	9.75
1963 - 64	1825	17088.01	18089.01	10.68	10.08
1964 - 65	2023	20149.40	21261.40	10.04	9.51
1965 - 66	2562	20795.45	22024.45	12.32	11.63
1966 -.67	3112	24086.69	25488.69	12.92	12.21
1967 - 68	2939	28314.07	29872.07	10.38	9.84
1968 - 69	3011	28868.65	30554.65	10.43	9.85
1969 - 70	4129	31884.17	33799.17	12.95	12.22
1970 - 71	4566	34512.47	36729.47	13.23	12.43
1971 - 72	5099	36869.13	39268.13	13.83	12.98
1972 - 73	5100	40572.79	43241.79	12.57	11.79
1973 - 74	8369	50751.97	53774.97	16.49	15.56
1974 - 75	9127	59731.68	63257.68	15.28	14.43
1975 - 76	10800	62319.68	66365.68	17.33	16.27
1976 - 77	13207	67313.97	71805.97	19.62	18.39
1977 - 78	14224	76186.39	81197.39	18.67	17.52
1978 - 79	18035	81165.62	86927.62	22.22	20.72
1979 - 80	17034	87175.03	93974.03	19.54	18.13

I Decade growth rate in savings - 1.98 per cent
II Decade growth rate in savings - 2.42 per cent
III Decade growth rate in savings - 2.85 per cent
Overall growth rate - 1.4 per cent

The table certainly confirms the existence of a secular trend in the growth of savings and the rates of saving during the period under review. There is a conspicuous rise in the rate of saving as percentage of NDP(from 6.47 per cent 19.54 per cent), and there are considerable fluctuations in its growth. The rate of growth is much higher in the second and third decades when compared to first decade and the overall growth rate of 1.4 per cent. The high growth rates in saving can be associated with agricultural development, industrial development and increasing quantum of remittances from Indian nationals abroad. The peaks and troughs in savings are dealt separately.

The aggregate savings are drawn from three sources, the public sector, the private corporate sector and the household sector. Table 4.5 gives data on the composition of savings for the six quinquennial sub periods in the period under review.

TABLE 4.5

COMPOSITION OF SAVINGS - 1950 - 80

Rs. in crores

Year	Household Savings	Corporate Savings	Public sector savings	Total
1950-51 to 1954 - 55	2034(70.8958)	227(7.9122)	608(21.1921)	2869
1955-56 to 1959 - 60	3775(78.4008)	268(5.9813)	752(15.6179)	4815
1960-61 to 1964 - 65	5123(64.0375)	647(8.0875)	2230(27.875)	8000
1965-66 to 1969 - 70	12732(80.8227)	500(3.1740)	2521(16.0033)	15753
1975-76 to 1979 - 80	55929(76.3015)	2391(3.2619)	14980(20.4366)	73300
Total	104483(76.26)	6067(4.43)	26448(19.31)	136998

(Figures in brackets show the percentages)

Of the total savings of the whole period, household savings account for 76 per cent. During the third sub period the percentage is less and in the other periods, the share is same. It appears that household savings will stabilise at 76 per cent unless the share of public sector undergoes a change as a matter of policy. The public sector accounts for 19.31 per cent and shown a decline marginally from 21.19 per cent. The corporate sector's share is 4.43 per cent. It also shows a decline from 7.91 per cent. The perfoemance of corporate sector is disappointing, inspite of the development within the secondary and tertiary sectors of the economy. Another factor is our taxation policy which discourages the accumulation of undistributed profits in companies and corporations. The largest contributor to savings is the household sector.

Household savings is obviously connected with personal disposable income. The details of rate of household savings from disposable income are presented in Table 4.6.

TABLE 4.6

SAVINGS AND DISPOSABLE INCOME - 1950-79

Rs. in Crores

Period	Savings	Disposable income	Average rate of savings from Disposable income
1950 - 52	1151	28305	4.07
1953 - 55	1701	29177	5.83
1956 - 58	2092	44220	4.73
1959 - 61	2550	38660	6.6
1962 - 64	3439	49187	6.99
1965 - 67	6983	70249	9.94
1968 - 70	9288	91410	10.16
1971 - 73	14967	123498	12.12
1974 - 76	24097	181660	13.26
1977 - 79	38216	237768	16.07
Growth rate	1.46 per cent	1.55 per cent	

The average household savings rate shows an increase from 4.07 per cent in the first subperiod to 16.07 per cent in the last period. During the first decade the rate of increase is very marginal, but in the second and third decades there is a remarkable increase in the rate of domestic savings. But the annual average growth rate of savings is less than the growth rate of disposable income. The savings of household are generally in the form of physical and financial assets. This behaviour of saving is an indication of the redistribution of income in favour of savers. This explanation seems consistent with the observed phenomenon of the existence of a large proportion of the population below poverty line.

The rural urban composition of household savings is given in Table 4.7.

TABLE 4.7

RURAL/URBAN SAVINGS 1950-79 + HOUSEHOLD

(Rs. in crores)

	Percentage of rural to total savings		Percentage of urban to total savings		Total	Percentage of household savings to total
1951-52	220(61.2813)	34.06	139(38.7187)	21.52	359	55.57
1952-53	165(54.4554)	39.57	143(46.4286)	34.29	303	72.66
1953-54	169(40.4306)	31.89	249(59.5694)	46.98	418	78.87
1954-55	111(23.8197)	17.76	355(76.1803)	56.8	466	74.56
1955-56	157(19.2166)	15.99	660(80.7834)	67.21	817	83.20
1956-57	196(22.3489)	17.61	681(77.6511)	61.19	877	78.80
1957-58	182(28.7520)	21.82	451(71.2480)	54.08	633	75.90
1958-59	162(27.8351)	20.72	420(72.1640)	53.71	582	74.42
1959-60	219(25.2887)	19.84	647(74.7113)	58.61	866	78.44
1960-61	206(22.8635)	15.52	695(77.1365)	52.37	901	67.90
1961-62	201(25.6705)	15.69	582(74.3295)	45.43	783	61.12
1962-63	240(24.1206)	15.54	755(75.8794)	48.90	995	64.44
1963-64	363(31.9261)	19.89	774(68.0739)	42.41	1137	62.30
1964-65	418(31.9816)	20.66	889(68.0184)	43.94	1307	64.61
1965-66	598(31.9615)	23.34	1273(68.0385)	49.69	1871	73.03
1966-67	832(31.9508)	26.74	1772(68.0492)	56.94	2604	83.68
1967-68	832(31.9754)	28.31	1770(68.0246)	60.22	2602	88.53
1968-69	810(31.9527)	26.90	1725(68.0473)	57.29	2535	84.19
1969-70	1033(31.9814)	25.02	2197(68.0186)	53.21	3230	78.23
1970-71	1131(31.9581)	24.77	2408(68.0418)	52.74	3539	77.51
1971-72	1295(31.9674)	25.40	2756(68.0326)	54.05	4051	79.45
1972-73	1314(31.9786)	25.76	2795(68.0214)	54.80	4109	80.57
1973-74	2176(31.9706)	26.00	4631(68.0294)	55.34	6809	81.36
1974-75	2041(31.9706)	22.36	4343(68.0294)	47.58	6384	69.95
1975-76	2544(31.9598)	23.56	5416(68.0402)	50.15	7960	73.70
1976-77	3118(31.9697)	23.61	6635(68.0303)	50.24	9753	73.85
1977-78	3481(31.9621)	24.47	7410(68.0378)	52.10	10891	76.57
1978-79	4539(31.9693)	24.17	9659(68.0307)	53.56	14198	78.72
1979-80	4197(31.9623)	24.64	8930(68.0277)	52.42	13127	77.06
Growth rate	1.34 per cent		1.38 per cent		1.40 per cent	

Figures in brackets show the percentages.

The analysis of table 4.7 reveals the following facts.

1. The share of rural savings goes down from 61 per cent to 31 per cent and the urban household saving percentages show an increase from 38 per cent to 68 per cent. The fall in the rural share of savings may be due to the rise in the rural per capita consumption expenditure. The rise in the urban share of savings may be due to the conversion of non currency ~~from~~ form to currency and bank deposits because of the growing commercialisation and monentaisation of the economy. It may also due to the expanded infrastructure of banking and other facilities for financial savings which must have provided motivation and access for an increase in the rate of savings.

ii. The percentages of urban household savings to total savings are also on the higher side. The constancy in the percentages of rural savings to total savings may be due to the aggressive policy of expanding rural bank offices which followed bank nationalisation.

iii. The average annual growth rate of urban savings ~~is~~ us higher than the rural side(1.34 per cent).

4. Capital formation:

Capital is considered to be the crucial factor in

determining economic growth. The functional concept of capital includes residential construction, machinery and changes in stocks. The gross capital stock, capital output ratio and incremental capital output ratio represent the potential production in the economy. The effeciency of utilisation of capital will be reflected in the capital output - ratios and incremental output ratios.

Table 4.8 provides data for the gross domestic capital stock andinvestment(additions to capital stock).

TABLE 4.8

GROWTH OF GROSS DOMESTIC CAPITAL FORMATION - 1950-80
(REAL)

Rs. in crores

Year	Gross capital stock	Annual additions to Gross capital stock (Investment)	Investment as percentage of Gross capital stock	Investment as percentage of GDP
1951-52	25620	1549	6.05	15.93
1952-53	26640	1020	3.83	10.09
1953-54	27830	1190	4.28	11.09
1954-55	29158	1328	4.55	12.01
1955-56	31022	1864	6.01	16.30
1956-57	33414	2392	7.16	19.82
1957-58	35661	2247	6.30	18.87
1958-59	37562	1901	5.06	14.76
1959-60	39654	1092	5.26	15.90
1960-61	42918	2544	6.04	18.08
1960-62	44547	2349	5.27	16.08
1962-63	47279	2732	5.78	18.23
1963-64	50194	2915	5.61	18.45
1964-65	56400	3206	6.00	18.84
1965-66	56937	3537	6.21	21.74
1966-67	60847	3910	6.43	23.74
1967-68	64487	3640	5.64	20.43
1968-69	67901	3414	5.03	18.60
1969-70	71881	3980	5.54	20.37
1970-71	76136	4255	5.59	21.02
1971-72	80613	4477	5.55	21.77
1972-73	84795	4182	4.93	20.56
1973-74	90172	5377	5.96	25.25
1974-75	95058	4886	5.14	22.75
1975-76	100103	5045	5.04	21.46
1976-77	105530	5427	5.14	22.79
1977-78	111258	5728	5.15	22.14
1978-79	118437	7179	6.06	26.37
1979-80	124718	6281	5.04	24.28
Growth rate	1.5 per cent	1.35 per cent		
I Decade	2.80 per cent		I Decade	2.01 per cent
II Decade	3.68 per cent		II Decade	2.29 per cent
III Decade	3.18 per cent		III Decade	2.33 per cent

There is a continuous rise in the rate of growth of gross domestic capital stock. The growth rates in first and second decades show a higher increase than the third decade. Inflation has brought down the rate of growth in the country's real capital formation. The role of capital in the generation of income is determined by the capital stock and additions to capital stock. The percentages of additions to capital stock are more or less constant except during the first decade. The percentages of investment to GDP show wide fluctuations. These fluctuations are obviously due to the influence of variations in agricultural output, the extent of capacity utilisation of capital stock and varying composition of capital stock. However, a definite trend of change is existing.

The details ofGDCF, NDCF and capital consumption are presented in Table 4.9.

TABLE 4.9

CAPITAL CONSUMPTION - AT CURRENT PRICES
1950-80

Year	GDCF	NDCF	Capital Consumption	Percentage of capital consumption to GDCF
1951-52	1188	829	359	30.22
1952-53	772	383	389	50.39
1953-54	909	517	392	43.12
1954-55	1070	641	429	40.09
1955-56	1469	1021	448	30.50
1956-57	1959	1473	486	24.81
1957-58	1843	1307	536	29.08
1958-59	1785	1158	627	35.13
1959-60	1996	1335	661	33.12
1960-61	2544	1808	736	28.93
1961-62	2438	1626	812	33.31
1962-63	2916	1984	932	31.96
1963-64	3266	2265	1001	30.65
1964-65	3735	2623	1112	29.77
1965-66	4390	3161	1229	28.00
1966-67	5437	4035	1402	25.79
1967-68	5334	3776	1558	29.21
1968-69	5113	3427	1686	32.97
1969-70	6285	4370	1915	30.47
1970-71	7177	4960	2217	30.89
1971-72	7976	5577	2399	30.08
1972-73	8066	5397	2669	83009
1973-74	11784	8761	3023	25.65
1974-75	13306	9780	3526	26.50
1975-76	14729	10683	4046	27.47
1976-77	16390	11898	4492	27.41
1977-78	17770	12759	5011	28.20
1978-79	23925	18163	5762	24.08
1979-80	24294	17495	6799	27.99
	1.4 per cent	1.4 per cent	1.37 per cent	

The table indicates a steady increase in capital consumption every year with annual additions to capital stock. Nearly 30 per cent of GDCF goes into meeting capital consumption requirements. That is why NDCF and NDP are considered more relevant as determinants of economic growth. Capital consumption figures show a large proportion of GDCF in earlier years than later years because there would be less capital consumption or depreciation in the case of more recent additions to the capital stock than earlier additions. The growth rates of GDCF and NDCF are more or less same, at 1.4 per cent.

Table 4.10 provides data on capital output ratios and incremental capital output ratios. The capital output ratios (c/y) are generally used for making projections, and the degree of utilisation of capital will also be reflected in these ratios.

TABLE 4.10

DETAILS OF CAPITAL OUTPUT RATIOS - 1951-80

Year	Gross capital stock	GDP (Y)	Addition ($\triangle$ Y)	Capital output ratio	
				Average	Incremental
1951-52	25620	9784	..	..	..
1952-53	26640	10108	593	2.62	2.61
1953-54	27830	10730	324	2.64	3.15
1954-55	29158	11053	622	2.59	1.91
1955-56	31022	11433	323	2.64	4.11
1956-57	33414	12066	380	2.71	4.91
1957-58	35661	11908	633	2.77	3.78
1958-59	37562	12881	158	2.99	14.22
1959-60	39564	13160	973	2.92	1.95
1960-61	42198	14071	279	3.01	7.50
1961-62	44547	14609	911	3.00	2.79
1962-63	47279	14990	538	3.05	4.37
1963-64	50194	15797	381	3.15	7.17
1964-65	53400	17013	1216	3.14	2.64
1965-66	56937	16265	748	3.50	4.73
1966-67	60847	16472	207	3.69	18.89
1967-68	64487	17821	1349	3.67	2.70
1968-69	67901	18357	536	3.70	6.37
1969-70	71881	19536	1176	3.68	3.38
1970-71	76136	20244	708	3.76	6.01
1971-72	80163	20562	318	3.92	14.08
1972-73	84795	20340	222	4.17	18.84
1973-74	90172	21296	956	4.23	5.62
1974-75	95058	21480	184	4.43	26.55
1975-76	100103	23510	2030	4.26	2.49
1976-77	105530	23811	301	4.43	18.03
1977-78	111258	25870	2054	4.40	2.78
1978-79	118437	27225	1355	4.35	5.20
1979-80	124718	25872	1353	4.82	4.64

It is evident from the table that the capital requirements to generate income is consistently increasing. The high capital output ratio in the third decade is an indication of the development of industrial sector with capital intensive technology. If GDP grows at the present rate the capital requirements are estimated to be still higher in the future.

The increase in the incremental capital output ratio is still sharper during the period and also show very wide fluctuations. One of the reasons for this is that the public sector management is less efficient than the private sector management. The high rate of growth of stocks in the public sector can also be a reason for the rise in the incremental capital output ratio not only because stocks do not have the same functional role but also because their accumulations are determined more by national security and public policy than by economic returns.

5. Productivity of Capital and Investment:

The productivity coefficients will reflect how efficiently the resources, particularly the scarce resource of capital is used. Since the analysis is

confined to savings and investment, to assess the growth of the economy the capital and investment productivities are related with GDP.

TABLE 4.11

PRODUCTIVITY COEFFICIENTS - 1951-81

Year	Annual additions to Gross capital stock I 1	Gross capital stock C 2	GDF Y 3	Rate of investment ~~percentage of~~ 1 as per centage of 3	Y/C	Y/I
1951-52	1549	25620	9784	0.16	0.38	6.31
1952-53	1020	26640	10108	0.18	0.38	9.91
1953-54	1190	27830	10730	0.11	0.38	9.02
1954-55	1328	29158	11053	0.12	0.38	8.32
1955-56	1864	31022	11433	0.16	0.37	6.13
1956-57	2392	33414	12066	0.20	0.36	5.04
1957-58	2247	35661	11908	0.19	0.33	5.30
1958-59	1901	37562	12881	0.15	0.34	6.78
1959-60	2092	39564	13160	0.16	0.33	6.29
1960-61	2544	42198	14071	0.18	0.33	5.53
1961-62	2349	44547	14609	0.16	0.33	6.22
1962-63	2732	47279	14990	0.18	0.32	5.49
1963-64	2915	50194	15747	0.18	0.31	5.41
1964-65	3206	53400	17013	0.19	0.32	5.31
1965-66	3537	56937	16265	0.22	0.29	4.60
1966-67	3910	60847	16472	0.24	0.27	4.21
1967-68	3640	64487	17821	0.20	0.28	4.90
1968-69	3414	67901	18457	0.19	0.27	5.38
1969-70	3980	71881	19536	0.20	0.27	4.9
1970-71	4255	76136	20244	0.21	0.27	4.76
1971-72	4477	80613	20562	0.22	0.26	4.59
1972-73	4182	84795	20340	0.21	0.24	4.86
1973-74	5377	90172	21296	0.25	0.24	4.86
1974-75	4886	95058	21480	0.23	0.23	4.40
1975-76	5427	100103	28510	0.21	0.23	4.60
1976-77	5427	105530	23811	0.23	0.23	4.39
1977-78	5728	111258	25870	0.22	0.23	4.5
1978-79	7179	111843	27225	0.26	0.02	3.7
1979-80	6271	124718	25872	0.24	0.01	4.1

It is clear from the table that the capital productivity is steadily declining indicating more of capital requirements for production. The investment productivity also shows a decline. This may be due to high cost, poor technical and managerial efficiency.

6. Compound Growth Rate Analysis:

The growth rates in savings, investment NDP, NDCF and GDCF where estimated by using an exponential trend line(as given in methodology). The estimated growth functions of the aggregates are given in Table. 4.12

TABLE 4.12

COMPOUND GROWTH RATE FUNCTIONS

Variables	Initial co-efficient	Growth rate
Savings (Nominal)	2602.55	0.021
NDP (Nominal)	23883.6	0.013
NDCF (Nominal)	2973.035	0.019
Investment(Nominal)	6683.44	0.023

It is evident from the table that the nominal savings had increased at a compound rate of 2.1 per cent during the three decades. The monetary policy and the growth in NDP might have led to this substantial growth

in savings. Major part of saving(70 per cent) is from the household sector, the determinant of household saving is the disposable income. The tax policy of the government class exert an influence on the growth of savings.

Investment(nominal) had increased at a rate of 2.3 per cent which is higher than the growth rate in saving. This is mainly due to the autonomous component in the total investment.

The growth rate of capital formation is 1.8 per cent which is lower than the growth rate of saving and investment because a part of capital is consumed in the process of capital formation itself.

The growth rate of NDP is 1.3 per cent which is lower than all the other growth rates as the variations in the sectoral shares of NDP are reflected in this lower growth rate.

II. FLUCTUATIONS:

i) Trend Analysis:

Indian economy had faced its booms and depressions during the last three decades. To find out the exact extent of the fluctuations, a long term trend analysis using twenty nine years data in investment savings, GDP, and NDP for India has been done. The non linear trend analysis is carried out using different degrees of polynomial. The details of the estimated trend lines are presented in Table 4.12 and the estimated trend equations are given below:

$$\text{GDP } (Y_1) = 16588.88 + 562.88X + 8.466\ X^2 + 0.2683\ X^3$$

$$\text{NDP } (Y_2) = 21098.58 + 2186.74X + 140.029X^2 + 3.332\ X^3$$

$$\text{Savings } (S) = 2078.42 + 313.40\ X + 34.47\ X^2 + 1.74\ X^3$$

$$\text{Investment } (I) = 3254.22 + 165.51\ X + 3.09\ X^2 + 0.1515\ X^3$$

These trend lines are of the form

$$Y = B_0 + B_1X + B_2X^2 + B_3X^3$$

The coefficients Bs are determined such that the particular trend line is the most exact one, that is the trend line which has the highest possible R^2 value (Vide Appendices I, II, III and IV).

TABLE 4.13

TIME SERIES TRENDS ANALYSIS

Variable	B_0	B_1	B_2	B_3	R^2	SE of the estimate	t	DW
GDP(Real)	16588.8	562.88	8.466	0.2683	0.988	532.78	48.97*	1.737
NDP	21098.58	2186.74	146.029	3.332	0.9953	1617.11	76.1*	1.1732
Savings	2078.42	313.40	34.47	1.74	0.9859	608.38	43.53*	2.1044
Investment (Real)	3254.22	165.51	3.09	0.1515	0.9583	324.66	24.93*	2.1371

*Highly significant

i) Y_1 - GDP (real):

The estimated trend line for the GDP of India shows that the average rate of growth is 562 per cent. The Government of India is taking concerted efforts to increase GDP and the remarkable growth rate in GDP is an indication of the development of the economy. The growth is also consistent.

ii) Y_2 - NDP(Nominal):

Growth of NDP also shows a definite secular trend since the trend is estimated for the nominal NDP, the growth rate is four times higher than the growth rate of GDP(2186 per cent). This trend also reflects the growth of Indian economy.

iii) S - Savings(Nominal):

The Keynesian theory of saving conforms to the saving behaviour in India in relation to NDP. The estimated average growth rate is 313 per cent which could rarely be found in any other developing economy. The growth in GDP and NDP is reflected in the high growth rate of saving in India.

iv) I - Investment(real):

The growth rate of investment is an indication of the degree of acceleration of the growth of the economy. The estimated trend line shows 165 per cent growth rate in

Fig 1. TREND VALUES OF GDP 1951-1980

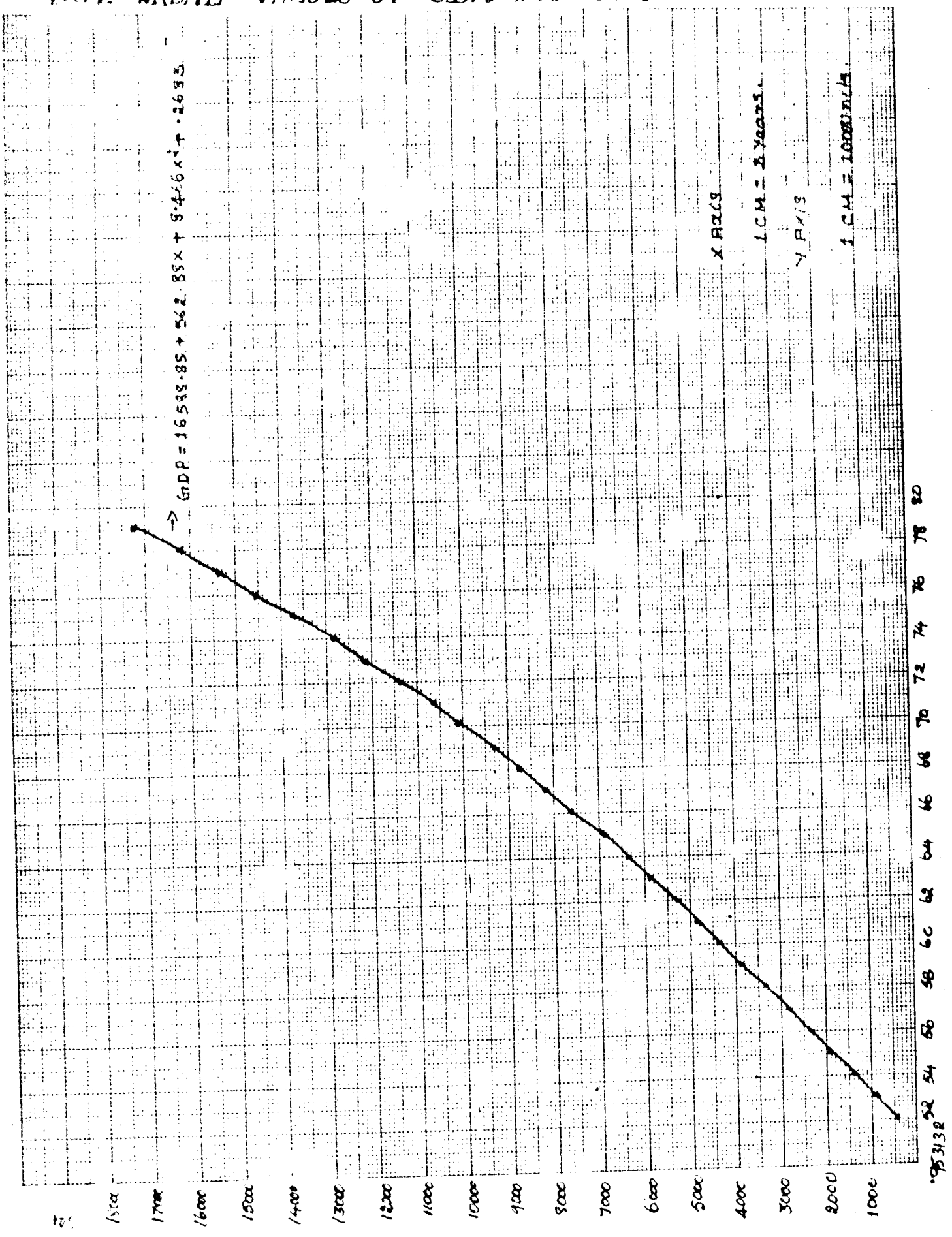
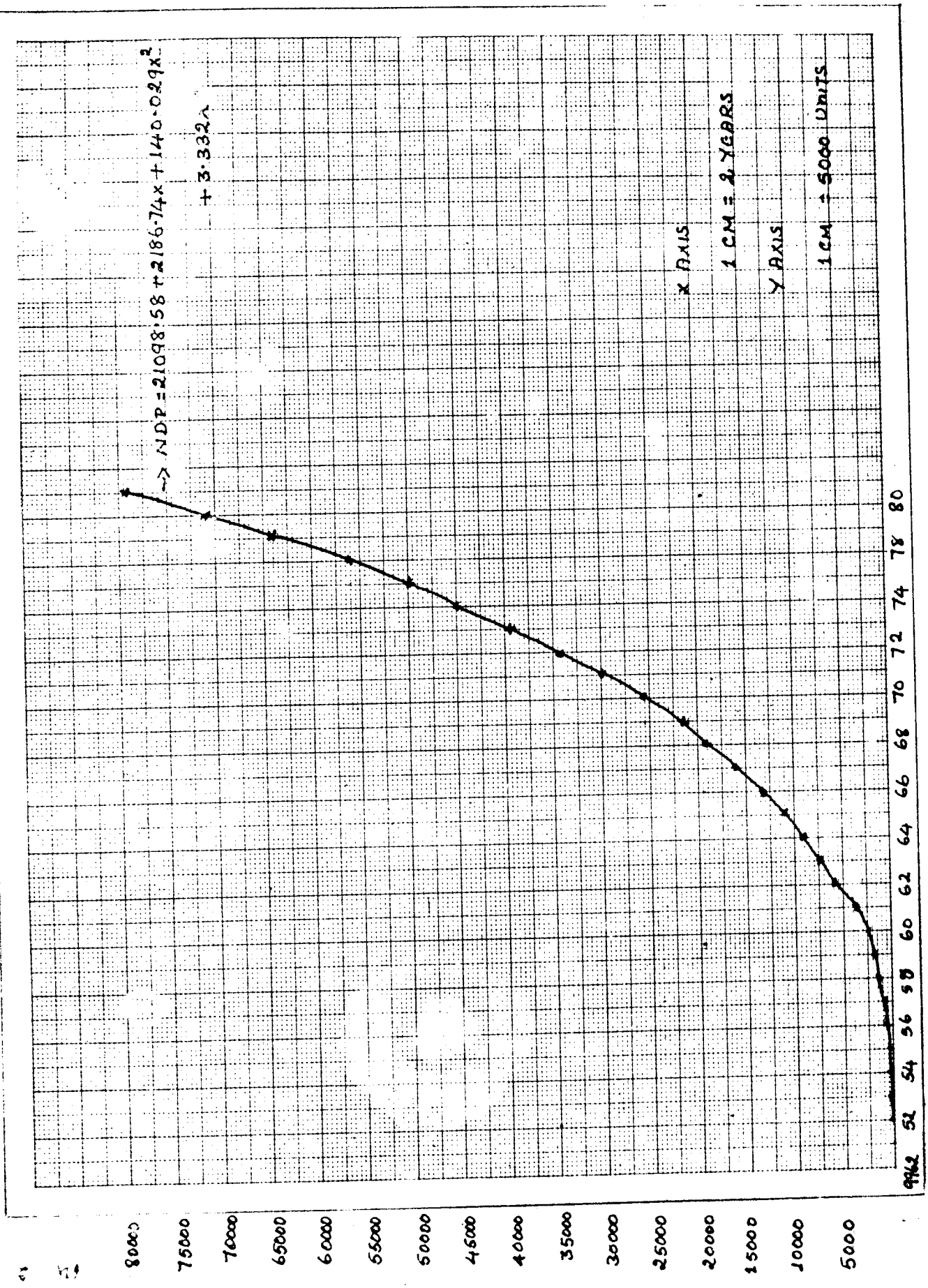


FIG. 2. TREND VALUES OF NDP (NOMINAL) 1952-1980



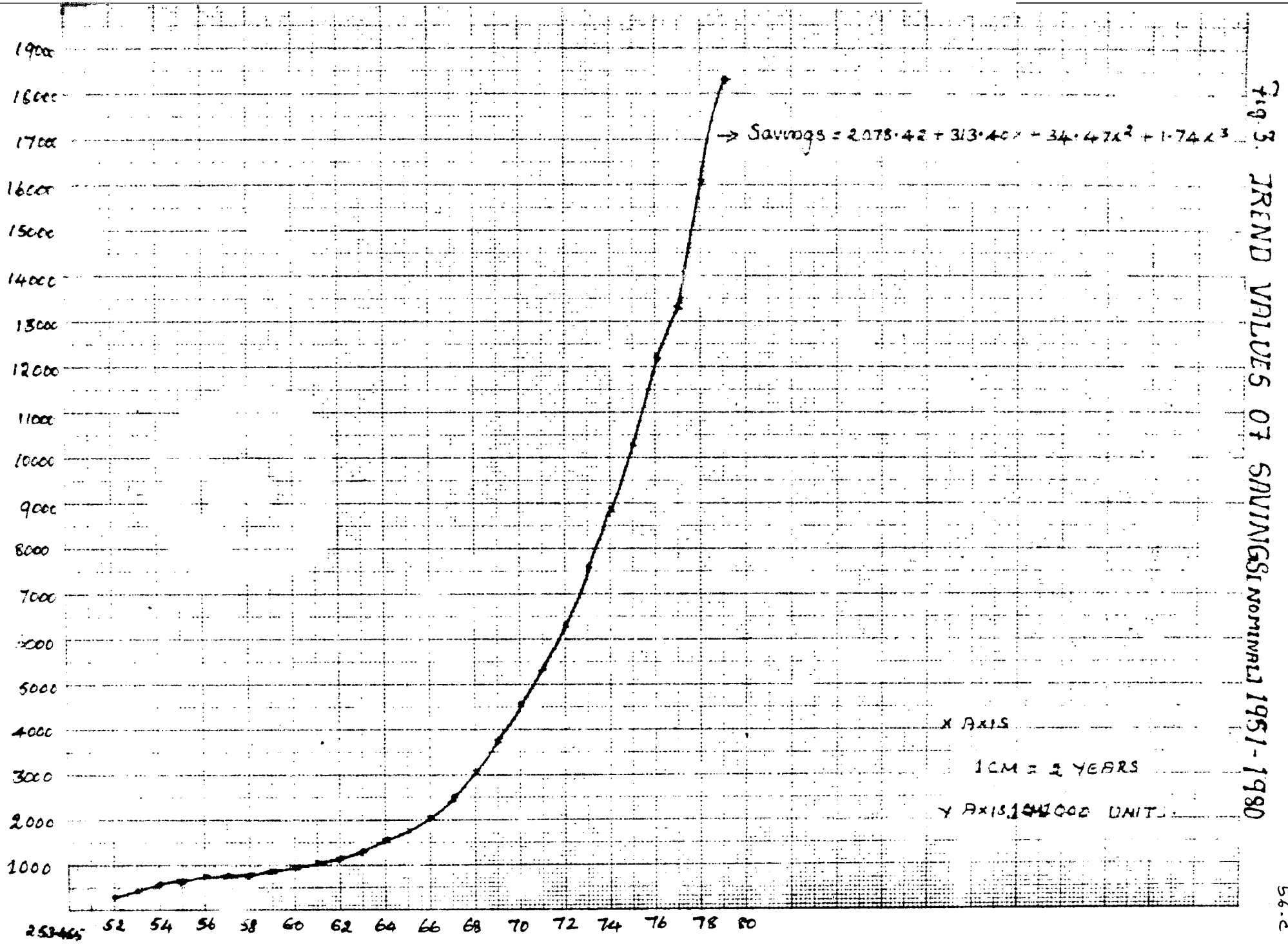
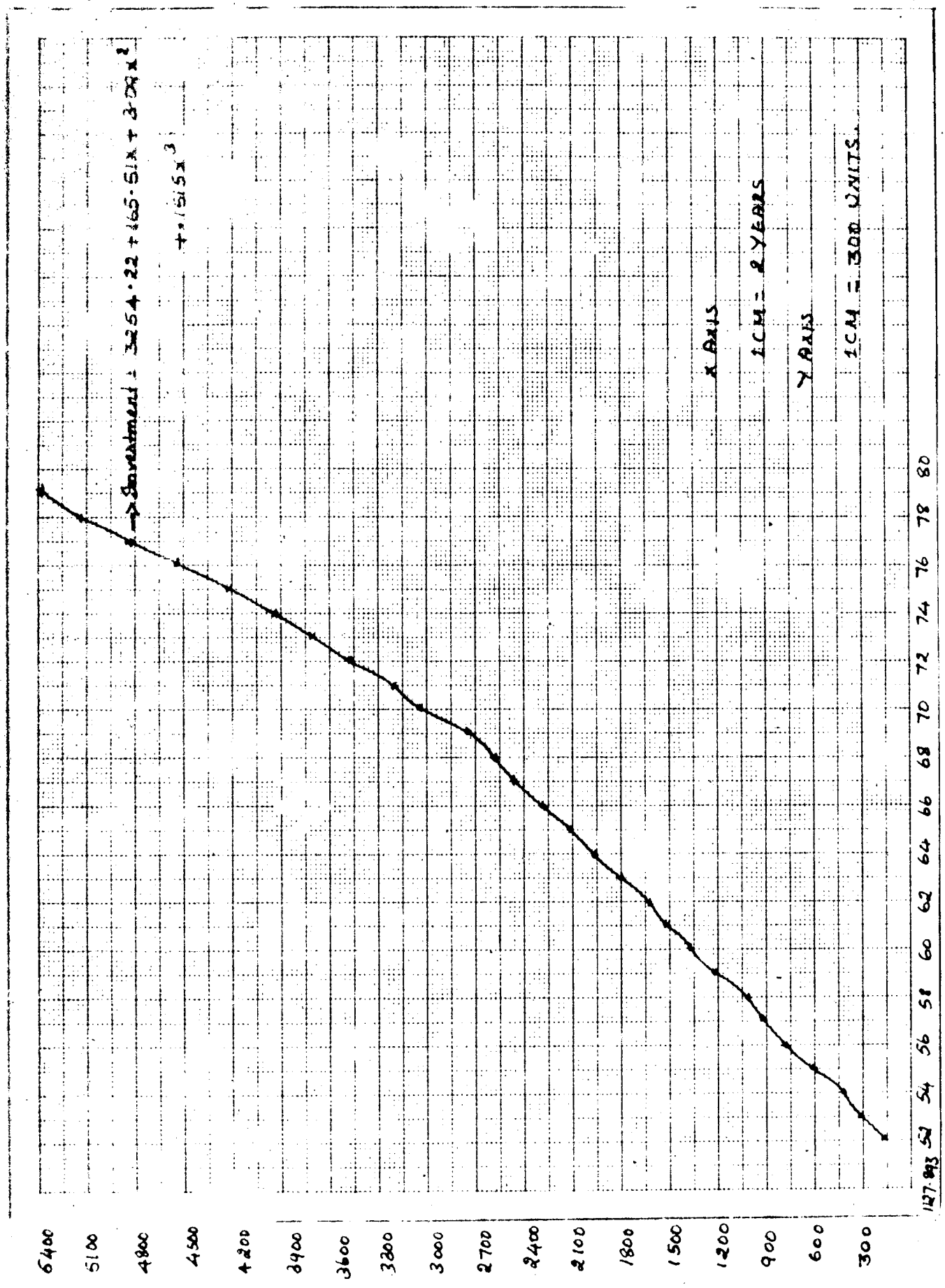


Fig. 5.2. TREND VALUES OF SAVINGS (NOMINAL) 1951-1980

Fig 4. TREND VALUES OF INVESTMENT (REAL) 1951-1980



investment which is lower than the other growth rates of aggregates. Because a part of investment is exogenously determined and there are other factors influencing the behaviour of investment in an economy.

The general conclusion of the above analysis is that the performance of the economy in terms of specific aggregates(GDP, NDP, Saving and Investment) is efficient, perhaps with relative difference in the behaviour.

The estimated long trend equations in GDP, NDP savings and investment are illustrated(I, II, III, IV).

ii) Cyclical Fluctuations:

In any economy cyclical fluctuations do occur in a regular or irregular manner. Generally, the length and period of cycles are not uniform due to economic and non economic factors. The behaviour of aggregates, the government policy, monetary policy and other macro economic policies have their bearing on the macro behaviour of the economy. Economic theoricians have identified many causes both economic and non-economic for the occurance of cyclical fluctuations such as deficiency in aggregate demand, variations in investment and price level. Price level as an indicator of fluctuations has certain limitations. It is very difficult to use price deflators to find out the behaviour of the real sector. Government

uses administered prices as deflators and the private sector uses different type of price. The flexibility in interest rate and the intervention of banking sector also affect the working of the economy. So, the economy had to face ups and downs during the last three decades. To identify the possible causes for the occurance of fluctuations and the short term actual fluctuations of GDP, NDP saving and investment, the cyclical residual indices of all the variables are determined(vide appendixes I, II, III, IV). The cyclical residual pattern of GDP, NDP saving and investment are graphically shown (V, VI, VII, VIII). Saving and investment are not influenced by time(it is evident from the higher values of DW statistics) but GDP and NDP are influenced by time as the values DW statistics are less than two.

Indian economy faced the depression during (1952, 1960, 1962, 1970, 1972, 1974 and 1980). All the variables have their troughs(from the low cyclical residual index values) during these years. One of the major economic causes for this is that the steep increase in food prices followed by a decline in the food production. The public sector in India concentrated in strengthening the industrial base during the second plan period, so the benefits of industrialisation were reaped by the economy only during seventees. In the early 70s Indian economy was disturbed by external aggressions.

Fig. 5

CYCLICAL AND RESIDUAL VALUES OF GDP [REAL] 1951-1980

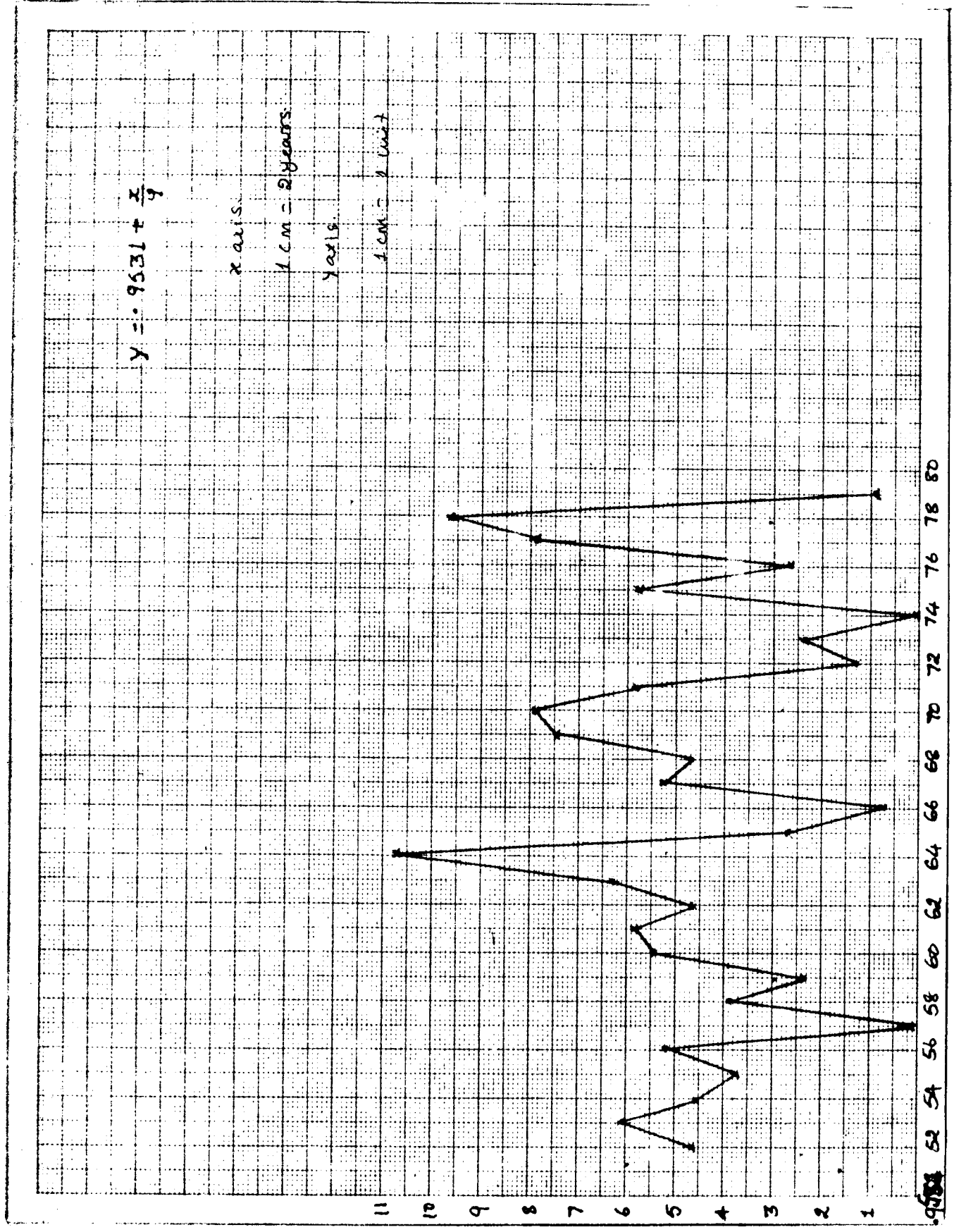


Fig 6

CYCLICAL AND RESIDUAL INDEX VALUES OF GDP 1951-1980

$Y = .8941 + \frac{\Sigma y}{N}$

x axis Σ

1cm = 2 years

Y axis

1cm = 1 unit

19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 .8941

51 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80

Fig. 7

CYCLICAL AND RESIDUAL VALUES OF SAVINGS (NOMINAL) 1951-1980

Fig. 8

CYCLICAL AND RESIDUAL VALUES OF INVESTMENT (REAL) 1951-1980

Indian economy faced its boom during 1955, 1967, 1978, and 1979. Due to plan efforts there was an improvement in the agricultural front which became the base for industrialisation in the second plan period. The terms of trade became favourable for the primary sector. There has been the acceleration of industrial development and in the late seventies emergency had been declared and that period witnessed a tremedous growth. These are the possible explanations one can give for the occurance of fluctuations in an economy. In general cyclical fluctuations do not exhibit any uniformity.

iii) Seasonal Fluctuations:

In order to find out the seasonal effect on the behaviour of GDP, NDP, saving and investment, the average seasonal indices for the twelve months(January to December) for the twenty nine years are determined by a method described in the methodology. The calculated seasonal indices are given in Tables 4.14, 4.15, 4.16 and 4.17.

TABLE - 4.14.

SEASONAL INDICES OF GDP

MONTH	SEASONAL INDEX
1	.99991170E+02
2	.99991110E+02
3	.9999107CE+02
4	.9999102CE+02
5	.99990970E+02
6	.9999093CE+02
7	.9999087CE+02
8	.99990800E+02
9	.99990750E+02
10	.99990700E+02
11	.9999064CE+02
12	.99990600E+02

TABLE - 4.15

SEASONAL INDICES OF NDP

MONTH	SEASONAL INDEX
1	.9999541CE+02
2	.9999541CE+02
3	.99995390E+02
4	.9999536CE+02
5	.99995330E+02
6	.99995320E+02
7	.99995290E+02
8	.99995270E+02
9	.99995260E+02
10	.99995250E+02
11	.99995230E+02
12	.99995210E+02

(2)

TABLE - 4.16.

SEASONAL INDICES OF SAVINGS

MONTH	SEASONAL INDEX
1	.99852300E+02
2	.99852820E+02
3	.99853370E+02
4	.99853920E+02
5	.99854500E+02
6	.99855090E+02
7	.99855710E+02
8	.99856360E+02
9	.99857010E+02
10	.99857670E+02
11	.99858360E+02
12	.99859060E+02

(3)

TABLE - 4.17

SEASONAL INDICES OF INVESTMENT

MONTH	SEASONAL INDEX
1	.9994398OE+02
2	.9994418OE+02
3	.9994439OE+02
4	.9994458OE+02
5	.9994478OE+02
6	.9994499OE+02
7	.9994521OE+02
8	.9994541OE+02
9	.9994563OE+02
10	.9994583OE+02
11	.9994604OE+02
12	.9994624OE+02

There are no variations in the seasonal indices for all the months, indicating the seasonal independence of the trends.

iv) Forecasting:

Using the estimated trendlines, the values of GDP, NDP, Saving and Investment are determined for the year 2000 A.D. and are given in Table 4.18.

TABLE 4.18

PROJECTED VALUES OF GDP, NDP, SAVING AND INVESTMENT IN 2000 A.D.

Rs. in crores

Variables	Values
GDP	56059.26
NDP	395232.18
Saving	124553.03
Investment	18417.48

It is clear from the table that India will enter into the stage of self sustained growth particularly with reference to Saving and Investment in 2000 A.D. at a rate of 32 per cent and 33 per cent respectively.

Areas for further Research:

1. The behaviour of household consumption and the government sector
2. The determinants of saving and investment
3. The contribution of foreign sector to GNP
4. The impact of government policies and monetary policies on the growth of the economy
5. Price variations and economic growth.

Chapter - V

Summary and Conclusion

V. SUMMARY AND CONCLUSION

The data collected for the study on the "Macro Behaviour of Indian Economy with reference to saving, Investment, NDP and GDP" were analysed with ratios, percentages, compound growth rates and time series analysis. The findings that emerged from the analysis and the summary are given as follows:

I. Growth of Indian Economy:

i) Growth of GDP and NDP

1. The GDP at current and constant prices increased at a rate of 1.4 per cent and 1.5 per cent respectively.

2. The geowth rate of NDP during the first decade was 2.46 per cent and 3 per cent and 3.86 per cent during the second and third decades.

3. The overall growth rate was 1.47 per cent.

ii) Sectoral contribution:

4. The percentage share of primary sector decreased from 56 in 1951 to 35 in 1980 and that of tertiary sector increased from 27 to 39 per cent. The share of secondary sector increased from 11 per cent in 1951 to 25 per cent in 1980.

iii) Savings:

5. The rate of saving increased from 6.47 per cent in 1951 to 19.54 per cent in 1980.

6. The annual average growth rate was 1.4 per cent.

7. The rates of growth were higher in the second and third decades than the first decade.

8. The household saving accounted for 76 per cent and the public sector's share showed a decline from 21 per cent in 1951 to 19 per cent in 1980.

9. The corporate sector's share also declined from 7.9 per cent in 1951 to 4.43 per cent in 1980.

10. The growth rate in household savings was 1.46 per cent during the period as against the growth rate of disposable income of 1.55 per cent.

11. The rural-urban composition of savings was transformed from 51:39 to 32:68 during the period under study.

12. The average annual growth rate of urban savings was 1.38 per cent and that of rural was 1.34 per cent.

iv) Capital formation:

13. The average annual growth rate of GDCF was 1.5 per cent and that of additions to capital stock was 1.35 per cent.

14. The percentage of investment to gross capital decreased from 6 per cent in 1951 to 5 per cent in 1980 and that of the percentage of GDP increased from 15.8 per cent in 1951 to 24 per cent in 1980.

15. The GDCF increased at a rate of 1.4per cent and the percentage of capital consumption to GDCF declined from 34 per cent in 1951 to 28 per cent in 1980.

16. The average capital output ratios was transformed from 2.62:1 in 1951 to 4.82:1 in 1980 and the incremental capital output ratio increased from 2:61 in 1951 to 4.64 in 1980.

v) Productivity:

Investment productivity also declined from 6.31 in 1981 to 4.12 in 1980.

vi) Compound Growth Rates:

18. The compound growth rate of savings was 2.1 per cent and that of investment was 2.3 per cent.

19. The NDP increased at a rate of 1.3 per cent and that of NDCF at 1.9 per cent.

II. Fluctuations:

vii) Trend Analysis:

20. The trend lines estimated were

GDP = $16588.88 + 562.88X + 8.466X^2 + 0.2683X^3$

NDP = $21098.58 + 2186.74X + 140.029X^2 + 3.332X^3$

Savings = $2078.42 + 313.40X + 34.47X^2 + 1.74X^3$

Investment = $3254.22 + 165.51X + 3.09X^2 + 0.1515X^3$

21. The economy faced depression during 1952, 1960, 1962, 1970, 1972, 197 and 1980.

22. The boom periods in the economy were 1967, 1978 and 1979.

23. The projected value of GDP in 2000 A.D. was Rs 56059.26

24. The projected value of NDP in 2000 A.D. was Rs 395232.18

25. The projected values of saving and investment in 2000 A.D. were Rs 124553.03 and 18417.48 respectively.

Conclusion:

To conclude, there is a significant change in the structure of the economy in terms of the increased importance of GDP, NDP, Saving and Investment in domestic activity. It may be observed that important structural changes have taken place in the Indian economy during the last three decades. These changes are in the direction of modernisation and an increasing role for the

secondary and tertiary sectors. Nevertheless, the Indian economy continues to be dominated by the primary sector and unorganised enterprises.

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THE COEFFICIENTS OF THE LEAST SQUARES POLYNOMINAL OF

BETA(0)=17181.520000
BETA(1)= 596.638900

CMSSQ= 621747.20000000

THE COEFFICIENTS OF THE LEAST SQUARES POLYNOMINAL OFDEGREE 2 ARE

BETA(0)=16588.880000
BETA(1)= 596.638900
BETA(2)= 8.466197

CMSSQ= 333391.70000000

THE COEFFICIENTS OF THE LEAST SQUARES POLYNOMINAL OFDEGREE 3 ARE

BETA(0)=16588.880000
BETA(1)= 562.886600
BETA(2)= 8.466197
BETA(3)= .268302

CMSSQ= 329282.20000000

THE POLYNOMIAL OF DEGREE 3 ADEQUATELY REPRESENTS THE DATA

X	Y	Y FITT	(Y-Y FITT)	CR
-14.000000	9784.001000	9631.628000	152.373000	1.015820
-13.000000	10108.000000	10112.690000	-4.687500	.999536
-12.000000	10730.000000	10589.750000	140.247100	1.013244
-11.000000	11053.000000	11064.430000	-11.432620	.998967
-10.000000	11433.000000	11538.340000	-105.336900	.990871
-9.000000	12066.000000	12013.080000	52.924800	1.004406
-8.000000	11908.000000	12490.260000	-582.258800	.953383
-7.000000	12881.000000	12971.500000	-90.495120	.993023
-6.000000	13160.000000	13458.390000	-298.395500	.977828
-5.000000	14071.000000	13952.570000	118.430700	1.008488
-4.000000	14609.000000	14455.630000	153.374000	1.010610
-3.000000	14990.000000	14969.180000	20.823240	1.001391
-2.000000	15797.000000	15494.830000	302.169900	1.019501
-1.000000	17013.000000	16034.200000	978.803800	1.061045
.000000	16265.000000	16588.880000	-323.884800	.980476
1.000000	16472.000000	17160.510000	-688.505800	.959878
2.000000	17821.000000	17750.670000	70.330080	1.003962
3.000000	18357.000000	18360.980000	-3.984375	.999783
4.000000	19536.000000	18993.060000	542.937500	1.028586
5.000000	20244.000000	19648.510000	595.490200	1.030307
6.000000	20562.000000	20328.940000	233.058600	1.011464
7.000000	20340.000000	21035.960000	-695.962900	.966915
8.000000	21296.000000	21771.190000	-475.185500	.978174
9.000000	21480.000000	22536.220000	-1056.219000	.953132
10.000000	23510.000000	23332.670000	177.328100	1.007600
11.000000	23811.000000	24162.160000	-351.156300	.985467
12.000000	25870.000000	25026.280000	843.718800	1.033713
13.000000	27225.000000	25926.660000	1298.342000	1.050077
14.000000	25872.000000	26864.890000	-992.892600	.963041

APPENDIX-1 TREND AND CYCLICAL RESIDUAL INDEX VALUES OF GDP

X	Y	Y FITT	ERR	ETD	ERR**2	ETD*
-14.00	9784.001000	9631.628000	152.373000	.000000	.23217540E+05	.00000000
-13.0010	108.0000010	112.690000	-4.687500	-157.060500	.21972660E+02	.24668020
-12.0010	730.0000010	589.750000	140.247100	144.934600	.19669240E+05	.21006030
-11.0011	053.0000011	064.430000	-11.432620	-151.679700	.13070470E+03	.23006730
-10.0011	433.0000011	538.340000	-105.336900	-93.904300	.11095860E+05	.88180170
-9.0012	066.0000012	013.080000	52.924800	158.261700	.28010350E+04	.25046770
-8.0011	908.0000012	490.260000	-582.258800	-635.183600	.33902530E+06	.40345820
-7.0012	881.0000012	971.500000	-90.495120	491.763700	.81893670E+04	.24183150
-6.0013	160.0000013	456.390000	-296.395500	-207.900400	.89039880E+05	.43222570
-5.0014	071.0000013	952.570000	118.430700	416.826200	.14025820E+05	.17374410
-4.0014	609.0000014	455.630000	153.374000	34.943360	.23523590E+05	.12210380
-3.0014	990.0000014	969.180000	20.823240	-132.550800	.43360740E+03	.17569710
-2.0015	797.0000015	494.830000	302.169900	281.346700	.91306670E+05	.79155960
-1.0017	013.0000016	034.200000	978.803800	676.633800	.95805670E+06	.45783330
.0016	265.0000016	588.880000	-323.884800	-1302.688000	.10490130E+06	.16969970
1.0016	472.0000017	160.510000	-688.505800	-364.621100	.47404030E+06	.13294850
2.0017	821.0000017	750.670000	70.330080	758.835900	.49463200E+04	.57583200
3.0018	357.0000018	360.980000	-3.984375	-74.314450	.15875240E+02	.55226380
4.0019	536.0000018	993.060000	542.937500	546.921900	.29478110E+06	.29912350
5.0020	244.0000019	648.510000	595.490200	52.552730	.35460860E+06	.27617900
6.0020	562.0000020	328.940000	233.058600	-362.431600	.54316310E+05	.13135670
7.0020	340.0000021	035.960000	-695.962900	-929.021500	.48436440E+06	.86308100
8.0021	296.0000021	771.190000	-475.185500	220.777300	.22580130E+06	.48742640
9.0021	480.0000022	536.220000	-1056.219000	-581.033200	.11155980E+07	.33759960
10.0023	510.0000023	332.670000	177.328100	1233.547000	.31445260E+05	.15216380
11.0023	811.0000024	162.160000	-351.156300	-528.484400	.12331070E+06	.27929580
12.0025	370.0000025	026.280000	843.718800	1194.875000	.71186130E+06	.14277260
13.0027	225.0000025	926.660000	1298.342000	454.623000	.16856910E+07	.20668210
14.0025	872.0000026	864.890000	-992.892600	-2291.234000	.98583570E+06	.52497550

DW VALUE = 1.737069

STD.ERROR OF ESTIMATE= 532.788900

STD.DEVIATION= 5049.486000

COEFFICIENT OF DETERMINATION= .988367

COEFFICIENT OF CORRELATION= .994418

T VALUE = 48.971490

THE COEFFICIENTS OF THE LEAST SQUARES

BETA(0)=31320.660000
BETA(1)= 2605.954000

CMSSQ= 94764490.00000000

THE COEFFICIENTS OF THE LEAST SQUARES POLYNOMINAL OFDEGREE 2 ARE

BETA(0)=21098.580000
BETA(1)= 2605.954000
BETA(2)= 146.029600

CMSSQ= 5504382.00000000

THE COEFFICIENTS OF THE LEAST SQUARES POLYNOMINAL OFDEGREE 3 ARE

BETA(0)=21098.580000
BETA(1)= 2186.746000
BETA(2)= 146.029600
BETA(3)= 3.332333

CMSSQ= 3033480.00000000

THE POLYNOMIAL OF DEGREE 3 ADEQUATELY REPRESENTS THE DATA

X	Y	Y FITT	(Y-Y FITT)	CR
-14.000000	9984.540000	9962.008000	22.532230	1.002262
-13.000000	9834.901000	10028.740000	-193.840800	.980671
-12.000000	10474.310000	10127.610000	346.696300	1.034233
-11.000000	9615.381000	10278.620000	-663.237300	.935474
-10.000000	9979.670000	10501.750000	-522.076200	.950287
-9.000000	11299.490000	10816.990000	482.497100	1.044605
-8.000000	11393.440000	11244.350000	149.087900	1.013259
-7.000000	12612.900000	11803.820000	809.081100	1.068544
-6.000000	12972.970000	12515.390000	457.582000	1.036562
-5.000000	13336.680000	13399.050000	-62.372070	.995345
-4.000000	14046.050000	14474.800000	-428.753900	.970379
-3.000000	14903.470000	15762.640000	-859.170000	.945493
-2.000000	17088.010000	17282.550000	-194.543000	.988743
-1.000000	20149.400000	19054.540000	1094.863000	1.057459
.000000	20795.450000	21098.580000	-303.136700	.985632
1.000000	24086.690000	23434.690000	651.996100	1.027822
2.000000	28374.070000	26082.860000	2291.215000	1.087844
3.000000	28868.650000	29063.070000	-194.414100	.993311
4.000000	31884.170000	32395.310000	-511.144500	.984222
5.000000	34512.470000	36099.600000	-1587.129000	.956035
6.000000	36869.130000	40195.910000	-3326.785000	.917236
7.000000	40572.790000	44704.250000	-4131.461000	.907582
8.000000	50751.970000	49644.600000	1107.363000	1.022306
9.000000	59731.680000	55036.970000	4694.711000	1.085301
10.000000	62319.680000	60901.340000	1418.344000	1.023289
11.000000	67313.970000	67257.710000	56.257810	1.000836
12.000000	76186.90000	74126.080000	2060.312000	1.027795
13.000000	81165.620000	81526.430000	-360.804700	.995574
14.000000	87175.040000	89478.750000	-2303.719000	.974254

APPENDIX-2. TREND AND CYCLICAL RESIDUAL INDEX VALUES OF NDP

X	Y	Y FITT	ERR	ETD	ERR**2	ETD*
-14.00	9984.540000	9962.008000	22.532230	.000000	.50770130E+03	.00000000
-13.00	9834.900000	10028.740000	-193.840800	-216.373000	.37574260E+05	.46817300
-12.00	10474.310000	10127.610000	346.696300	540.537100	.12019830E+06	.29218040
-11.00	9615.381000	10278.620000	-663.237300	-1009.934000	.43988370E+06	.10199660
-10.00	9979.670000	10501.750000	-522.076200	141.161100	.27256350E+06	.19926460
-9.00	11299.490000	10816.990000	482.497100	1004.573000	.23280340E+06	.10091670
-8.00	11393.440000	11244.350000	149.087900	-333.409200	.22227200E+05	.11116170
-7.00	12612.900000	11803.820000	809.081100	659.993200	.65461210E+06	.43559100
-6.00	12972.970000	12515.390000	457.582000	-351.499000	.20938130E+06	.12355160
-5.00	13336.680000	13399.050000	-62.372070	-519.954100	.38902750E+04	.27035230
-4.00	14046.050000	14474.800000	-428.753900	-366.381800	.18382990E+06	.13423570
-3.00	14903.470000	15762.640000	-859.170000	-430.416000	.73817300E+06	.18525790
-2.00	17088.010000	17282.550000	-194.543000	664.626900	.37846970E+05	.44172900
-1.00	20149.400000	19054.540000	1094.863000	1289.406000	.11987260E+07	.16625680
.00	20795.450000	21098.580000	-303.136700	-1398.000000	.91891880E+05	.19544040
1.00	24086.690000	23434.690000	651.996100	955.132800	.42509890E+06	.91227870
2.00	28374.070000	26082.860000	2291.215000	1639.219000	.52496660E+07	.26870380
3.00	28868.650000	29063.070000	-194.414100	-2485.629000	.37796830E+05	.61783510
4.00	31884.170000	32395.310000	-511.144500	-316.730500	.26126870E+06	.10031820
5.00	34512.470000	36099.600000	-1587.129000	-1075.984000	.25189780E+07	.11577420
6.00	36869.130000	40195.910000	-3326.785000	-1739.656000	.11067500E+08	.30264040
7.00	40572.790000	44704.250000	-4131.461000	-804.675800	.17068970E+08	.64750310
8.00	50751.970000	49644.600000	1107.363000	5238.824000	.12262530E+07	.27445280
9.00	59731.680000	55036.970000	4694.711000	3587.348000	.22040310E+08	.12869060
10.00	62319.680000	60901.340000	1418.344000	-3276.367000	.20116990E+07	.10734580
11.00	67313.970000	67257.710000	56.257810	-1362.086000	.31649410E+04	.18552780
12.00	76186.390000	74126.080000	2060.312000	2004.055000	.42448870E+07	.40162350
13.00	81165.620000	81526.430000	-360.804700	-2421.117000	.13018000E+06	.58618080
14.00	87175.040000	89478.750000	-2303.719000	-1942.914000	.53071200E+07	.37749150

DW VALUE = 1.173223

STD.ERROR OF ESTIMATE= 1617.118000

STD.DEVIATION=23740.240000

COEFFICIENT OF DETERMINATION= .995360

COEFFICIENT OF CORRELATION= .997677

T VALUE = 76.105600

THE COEFFICIENTS OF THE LEAST

BETA(0)= 4701.621000
BETA(1)= 532.651700

CMSSQ= 6970678.00000000

THE COEFFICIENTS OF THE LEAST SQUARES POLYNOMINAL OFDEGREE 2 ARE

BETA(0)= 2078.425000
BETA(1)= 532.651700
BETA(2)= 37.474220

CMSSQ= 1120602.00000000

THE COEFFICIENTS OF THE LEAST SQUARES POLYNOMINAL OFDEGREE 3 ARE

BETA(0)= 2078.425000
BETA(1)= 313.409100
BETA(2)= 37.474220
BETA(3)= 1.742787

CMSSQ= 429357.50000000

THE POLYNOMIAL OF DEGREE 3 ADEQUATELY REPRESENTS THE DATA

X	Y	Y FITT	(Y-Y FITT)	CR
-14.000000	646.000000	253.437500	392.562500	2.548952
-13.000000	417.000000	508.346900	-91.346930	.820306
-12.000000	530.000000	702.267300	-172.267300	.754698
-11.000000	625.000000	845.656200	-220.656200	.739071
-10.000000	982.000000	948.969100	33.030880	1.034807
-9.000000	1113.000000	1022.663000	90.336790	1.088335
-8.000000	834.000100	1077.195000	-243.195400	.774233
-7.000000	782.000000	1123.022000	-341.022200	.696335
-6.000000	1104.000000	1170.600000	-66.600340	.943106
-5.000000	1327.000000	1230.387000	96.613290	1.078523
-4.000000	1281.000000	1312.833000	-31.837890	.975749
-3.000000	1544.000000	1428.411000	115.589500	1.080922
-2.000000	1825.000000	1587.562000	237.438300	1.149562
-1.000000	2023.000000	1800.747000	222.252400	1.123422
.000000	2562.000000	2078.425000	483.574700	1.232664
1.000000	3112.000000	2431.051000	680.948500	1.280104
2.000000	2939.000000	2869.083000	69.917240	1.024369
3.000000	3011.000000	3402.976000	-391.976100	.884814
4.000000	4129.000000	4043.188000	85.812260	1.021224
5.000000	4566.000000	4800.175000	-234.175300	.951215
6.000000	5099.000000	5684.394000	-585.394000	.897017
7.000000	5100.000000	6706.302000	-1606.302000	.760479
8.000000	8369.001000	7876.356000	492.644500	1.062547
9.000000	9127.000000	9205.012000	-78.011720	.991525
10.000000	10800.000000	10702.730000	97.273440	1.009089
11.000000	13207.000000	12379.960000	827.043000	1.066805
12.000000	14224.000000	14247.160000	-23.159180	.998374
13.000000	18035.000000	16314.790000	1720.210000	1.105439
14.000000	17034.000000	18593.310000	-1559.309000	.916136

APPENDIX-3 TREND AND CYCLICAL RESIDUAL INDEX VALUES OF SAVINGS

X	Y	Y FITT	ERR	ETD	ERR**2	ETD*
-14.00	646.000000	253.437500	392.562500	.000000	.1541053E+06	.00000000
-13.00	417.000000	508.346900	-91.346930	-483.909400	.8344262E+04	.23416830
-12.00	530.000000	702.267300	-172.267300	-80.920410	.2967603E+05	.65481130
-11.00	625.000000	845.656200	-220.656200	-48.388910	.4868918E+05	.23414870
-10.00	982.000000	948.969100	33.030880	253.687100	.1091039E+04	.64357160
-9.00	1113.000000	1022.663000	90.336790	57.305910	.8160737E+04	.32839670
-8.00	834.000100	1077.195000	-243.195400	-333.532200	.5914402E+05	.11124370
-7.00	782.000000	1123.022000	-341.022200	-97.826790	.1162961E+06	.95700790
-6.00	1104.000000	1170.600000	-66.600340	274.421900	.4435606E+04	.75307370
-5.00	1327.000000	1230.387000	96.613290	163.213600	.9334126E+04	.26638690
-4.00	1281.000000	1312.833000	-31.837890	-128.451200	.1013651E+04	.16499700
-3.00	1544.000000	1428.411000	115.589500	147.427400	.1336093E+05	.21734830
-2.00	1825.000000	1587.562000	237.438300	121.848900	.5637697E+05	.14847150
-1.00	2023.000000	1800.747000	222.252400	-15.185910	.4939615E+05	.23061190
.00	2562.000000	2078.425000	483.574700	261.322300	.2338445E+06	.68289330
1.00	3112.000000	2431.051000	680.948500	197.373800	.4636909E+06	.38956410
2.00	2939.000000	2869.083000	69.917240	-611.031200	.4888420E+04	.37335920
3.00	3011.000000	3402.976000	-391.976100	-461.893300	.1536453E+06	.21334540
4.00	4129.000000	4043.188000	85.812260	477.788400	.7363743E+04	.22828170
5.00	4566.000000	4800.175000	-234.175300	-319.987600	.5483807E+05	.10239200
6.00	5099.000000	5684.394000	-585.394000	-351.218700	.3426862E+06	.12335460
7.00	5100.000000	6706.302000	-1606.302000	-1020.908000	.2580207E+07	.10422540
8.00	8369.000100	7876.356000	492.644500	2098.947000	.2426986E+06	.44055780
9.00	9127.000000	9205.012000	-78.011720	-570.656200	.6085828E+04	.32564860
10.00	10300.000000	10702.730000	97.273440	175.285200	.9462122E+04	.30724890
11.00	13207.000000	12379.960000	827.043000	729.769500	.6840001E+06	.53256350
12.00	14224.000000	14247.160000	-23.159180	-850.202200	.5363476E+03	.72284370
13.00	18035.000000	16314.790000	1720.210000	1743.369000	.2959122E+07	.30393360
14.00	17034.000000	18593.310000	-1559.309000	-3279.519000	.2431443E+07	.10755240

DW VALUE = 2.104441

STD.ERROR OF ESTIMATE= 608.387800

STD.DEVIATION= 5133.244000

COEFFICIENT OF DETERMINATION= .985953

COEFFICIENT OF CORRELATION= .992952

T VALUE = 43.533300

THE COEFFICIENTS OF THE LEAST SQUARES POLYNOMINAL OFDEGREE 1 ARE

BETA(0)= 3470.931000
BETA(1)= 184.582300

CMSSQ= 158574.80000000

THE COEFFICIENTS OF THE LEAST SQUARES POLYNOMINAL OFDEGREE 2 ARE

BETA(0)= 3254.226000
BETA(1)= 184.582300
BETA(2)= 3.095785

CMSSQ= 122919.80000000

THE COEFFICIENTS OF THE LEAST SQUARES POLYNOMINAL OFDEGREE 3 ARE

BETA(0)= 3254.226000
BETA(1)= 165.515700
BETA(2)= 3.095785
BETA(3)= .151562

CMSSQ= 122269.70000000

THE POLYNOMIAL OF DEGREE 3 ADEQUATELY REPRESENTS THE DATA

X	Y	Y FITT	(Y-Y FITT)	CR
-14.000000	1549.000000	1127.893000	421.106900	1.373357
-13.000000	1020.000000	1292.727000	-272.726900	.789030
-12.000000	1190.000000	1451.931000	-261.930800	.819598
-11.000000	1328.000000	1606.414000	-278.413600	.826686
-10.000000	1864.000000	1757.085000	106.915000	1.060848
-9.000000	2392.000000	1904.854000	487.145800	1.255739
-8.000000	2247.000000	2050.631000	196.369400	1.095760
-7.000000	1901.000000	2195.324000	-294.323700	.865931
-6.000000	2092.000000	2339.843000	-247.842500	.894077
-5.000000	2544.000000	2485.097000	58.903070	1.023702
-4.000000	2349.000000	2631.996000	-282.995800	.892479
-3.000000	2732.000000	2781.449000	-49.448730	.982222
-2.000000	2915.000000	2934.365000	-19.365230	.993400
-1.000000	3216.000000	3091.655000	124.345500	1.040220
.000000	3537.000000	3254.226000	282.773900	1.086894
1.000000	3910.000000	3422.989000	487.010800	1.142276
2.000000	3640.000000	3598.853000	41.146730	1.011433
3.000000	3414.000000	3782.727000	-368.727500	.902523
4.000000	3980.000000	3975.522000	4.478271	1.001126
5.000000	4255.000000	4178.144000	76.855470	1.018395
6.000000	4477.000000	4391.506000	85.493650	1.019468
7.000000	4182.000000	4616.516000	-434.515600	.905878
8.000000	5377.000000	4854.082000	522.918000	1.107728
9.000000	4886.000000	5105.115000	-219.115200	.957079
10.000000	5045.000000	5370.524000	-325.524400	.939387
11.000000	5427.000000	5651.219000	-224.218700	.960324
12.000000	5728.000000	5948.108000	-220.107900	.962995
13.000000	7179.000000	6262.101000	916.899400	1.146420
14.000000	6281.000000	6594.107000	-313.106900	.952517

APPENDIX-4. TREND AND CYCLICAL RESIDUAL INDEX VALUES OF INVESTMENT

X	Y	Y FITT	ERR	ETD	ERR**2	ETD*
-14.00	1549.000000	1127.893000	421.106900	.000000	.17733100E+06	.00000000
-13.00	1020.000000	1292.727000	-272.726900	-693.833900	.7437998DE+05	.48140540
-12.00	1190.000000	1451.931000	-261.930800	10.796140	.68607740E+05	.11655670
-11.00	1328.000000	1606.414000	-278.413600	-16.482790	.77514120E+05	.27168230
-10.00	1864.000000	1757.085000	106.915000	385.328600	.11430820E+05	.1484781C
-9.00	2392.000000	1904.854000	487.145800	380.230700	.23731100E+06	.14457540
-8.00	2247.000000	2050.631000	196.369400	-290.776400	.38560930E+05	.84550900
-7.00	1901.000000	2195.324000	-294.323700	-490.693100	.86626470E+05	.24077970
-6.00	2092.000000	2339.843000	-247.842500	46.481200	.61425920E+05	.21605020
-5.00	2544.000000	2485.097000	58.902307	306.745600	.34695720E+04	.94092870.
-4.00	2349.000000	2631.996000	-282.995800	-341.893900	.80086660E+05	.11689490
-3.00	2732.000000	2781.449000	-49.448730	233.547100	.24451770E+04	.54544260
-2.00	2915.000000	2934.365000	-19.365230	30.083500	.37501230E+03	.90501680
-1.00	3216.000000	3091.655000	124.345500	143.710700	.15461790E+05	.2065276C
.00	3537.000000	3254.226000	282.773900	158.428500	.79961090E+05	.25099580
1.00	3910.000000	3422.989000	487.010800	204.236800	.23717950E+06	.41712670
2.00	3640.000000	3598.853000	41.146730	-445.864000	.16930530E+04	.19879470
3.00	3414.000000	3782.727000	-368.727500	-409.874200	.13596000E+06	.16799690
4.00	3980.000000	3975.522000	4.478271	373.205800	.20054920E+02	.13928260
5.00	4255.000000	4178.144000	76.855470	72.377200	.59067630E+04	.52384590
6.00	4477.000000	4391.506000	85.493650	8.638184	.73091650E+04	.7461822C
7.00	4182.000000	4616.516000	-434.515600	-520.009300	.18880380E+06	.27040970
8.00	5377.000000	4854.082000	522.918000	957.433700	.27344320E+06	.91667910
9.00	4886.000000	5105.115000	-219.115200	-742.033200	.48011480E+05	.55061330
10.00	5045.000000	5370.524000	-325.524400	-106.409200	.10596610E+06	.11322910
11.00	5427.000000	5651.219000	-224.218700	101.305700	.50274050E+05	.10262840
12.00	5728.000000	5948.108000	-220.107900	4.110840	.48447490E+05	.16899000
13.00	7179.000000	6262.101000	916.899400	1137.007000	.84070460E+06	.1292786C
14.00	6281.000000	6594.107000	-313.106900	-1230.006000	.9803596DE+05	.1512916C

DW VALUE = 2.137123

STD.ERROR OF ESTIMATE= 324.661200

STD.DEVIATION= 1591.409000

COEFFICIENT OF DETERMINATION= .958380

COEFFICIENT OF CORRELATION= .978969

T VALUE = 24.934590