TITLE

COMPUTER APPLICATIONS TO THE THEORY OF SHORT RUN DETERMINATION OF NATIONAL INCOME EQUILIBRIUM

BY

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PGD\MCS\236\96

A PROJECT SUBMITTED TO THE DEPARTMENT OF MATHS\COMPUTER SCIENCE FEDERAL UNIVERSITY OF TECHNOLOGY MINNA; IN PARTIAL FULFILMENT OF THE REQUIRMENT FOR THE AWARD OF POST GRADUATE DIPLOMA IN COMPUTER SCIENCE (PGD COMPUTER SCIENCE)

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ABSTRACT

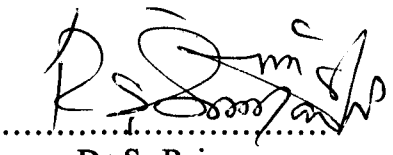
It is hard to imagine a household that would not keep tract of its income and expenditure. It is even harder to imagine a business that would not keep an account of its revenues and expenses since its primary aim as assumed by Economist generally, is to maximize profit.

Also, it is difficult to imagine a nation that would not keep track of the output produced within its boarder and the income generated by and for its people, and also, the spendings made on purchase of goods and services from other countries by and for her domestic residencts since it is pressumably more interested in the well-being of its citizens. So the firm and the nation wish to be aware of the progress made toward achieving their respective goals through the balance between the operating forces of the economy i.e Aggregate Supply and Aggregate Demand.

A computerized information model is designed and aimed at using generated Aggregate demand components and Aggregate supply income data to solve problems on the theory of short run determination of national income equilibrium using developed modules. Hence, answering the Fiscal Policy decision makers' "what if" question about the generated data on Aggregate demand components.

CERTIFICATION

This is to certify that this work carried out by Mr Uchegbu Henry of the Department of Maths\Computer Science, Federal University of Technology Minna; meets the requirement for the award of Post Graduate Diploma in Computer Science.



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DEDICATION

This project is dedicated to my beloved widow mother Mrs Eunice Onyemaechi Uchegbu, whose love, care and prayers contributed immensely to my success.

ACKNOWLEDGEMENT

The successful completion of this project agrees with the popular slogan; " With God nothing is impossible." It is in realisation of this that I give thanks to Almight God for his guidance and favour throughout my course of study.

I also record my heart felt appreciation and specific indebtedness to my Project Supervisor, Dr. S.A. Reju. He was brotherly, accessible at all time and he deligently guided the sucessful completion of this project.

I am also grateful to the Head of Department (Maths\Computer Science), Prof. K.R. Adeboye. He was fatherly and ready to assist whenever needed.

I also express my profound gratitude to Prince R.O Badamosi, Dr. Aiyesimi Yomi and other lecturers in the Department who contributed immensely toward the successful completion of this course.

Finally, my special thanks goes to the family of Mr. and Mrs. Gerald C.Ogazi for their love and selfless sacrifices in undertaking the sponsorship of this course. May God bless them and all who contributed in any quota toward the success of this work in Jesus name. Amen.

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CHAPTER ONE

INTRODUCTION TO NATIONAL INCOME DETERMINATION

1.1 NATIONAL INCOME ACCOUNTING:

This is an important aspect of macroeconomics - the working of a particular nations's economy. Or the behaviour of a nation's economic system. It is defined as a deliberate attempt to measure economic activities that has taken place in an economy over a period of time in a quantitative term. But, it provides no answer as to how the national income is determined and how it changes.

National income is the monetary value of all goods and services produced in a country during a given period usually a year. Or the sum total of all income earned by owners of the various productive factors: wages of workers, plus net interest on capital loans and securities, plus net rents and royalties, plus corporate or company profits, plus net income of unincorporated enterprises. The former definition viewed national income as a money output and the later, as money income. However, it does not matter whether we measure national income in the aspect of people's earned income or the value of goods and services, the answer will be the same. It becomes little more complicated on the introduction of savings, investment and Government into the measuring model.

1.2 CONCEPTS OF NATIONAL INCOME ACCOUNTING

In measuring national income, we make distinctions among such concepts as Gross National Product (GNP), National Net Production (NNP) and Gross Domestic Product (GDP).

However the total value of finished goods and services of an economy in a given year is referred to as the Gross National Product (GNP). This total value is obtained

before any allowance is made for depreciation of capital goods. For a closed economy (an economy with no trade transaction with others), the GNP is given as

$$GNP = C + 1 + G \text{ - - - } 1.2:1$$

Where C = Consumption, 1 = Investment and G = Government Expenditure while for an open econmy (an economy with import and export trade), the GNP is given as $GNP = C + 1 + G + X - M$ - - - 1.2:2

where C, I and G means the same as in above while X = Export and M = Import.

The Net National Product (NNP) on the other hand is the total value obtained or finished goods and services of an economy after making allowance for depreciation or capital consumption. Or the deduction of capital consumption allowance from the economy's total output.

Finally, the Gross Domestic Product of any economy is viewed as its national total output. It is loosely described as the national product or national income which may be valued at current market price or constant prices. When viewed at current price changes in national product are as a result of changes both in the quantities produced and prices at which the goods are sold. While when valued at constant price we mean that output for each year is valued at the prices ruling in one particular year. National income can therefore be used interchangeably with the constant - price GNP - total real output, and is seen as the constant price GDP i.e total real income earned in the economy.

1.3 THEORY OF SHORTRUN DETERMINATION OF NATIONAL INCOME

As earlier stated, National income accounting does not give answer as to how national income is determined. A contrast to this, is the theory of shortrun determination of national income. This will be the area of focus in this study. The theory tells us how the level of income changes until planned and desired savings and investment are brought into equality. This is based on the fact that either planned savings or investment are related to the level of income. So, a change in income induces a change in planned or desired savings and investment. Hence, if income is at a level in which the amount people wish to save is not equal to the amount which they wish to invest, the income level will change until the two are much more brought into equality. At this level of income a state of rest is achieved brought about by a balance between the opposing forces (savings and investment). National income is said to be at equilibrium when there is no inherent tendency for it to change (decrease or increase).

The theory of shortrun in the determination of national income is important as it tells us the limit of an economy's productive capacity. It is also concerned with the causes of fluctuation in the level of output in the shortrun i.e taking the capacity of the economy or its productive potentials as something that can not vary significantly within the period concerned.

In working with this shortrun, we make some assumptions. Such assumptions are designed to isolate the main forces that determine national income over short period of time. The basic assumptions are made given a closed or an open economy.

In a closed economy, the determination of national income is made on some assumptions. Such includes:

(i) There is less than full employment i.e there is unemployed supplies of factors of production (Aggregate demand is insufficient to draw all the economy's resources into full employment).

(ii) Firm adjust their output in period t + 1 to equal aggregate demand in period t.

(iii) The general price level is constant.

(iv) Money wage rate remains constant

(v) It is assumed that there is no government spending

(vi) It is assumed that there is no savings by firm and all retention for depreciation are actually spend on replacement.

(vii) The relative distribution of income among people with different propensity to consume remains constant.

(viii) Investment spending is autonomous.

Note: Assumption 5 & 6 means that income is received as disposable income.

1.4 IMPORTANT CONCEPTS OF NATIONAL INCOME DETERMINATION

1.4.1 CONSUMPTION FUNCTION:

This concept depends on the assumption that there exist a sort of relationship between consumption and income. This is because, although many possible influence on

consumption spending can be identified. One great simplification of keynesian economics was to place central importance on the level of real income as key variable determining consumer's spending in real terms. This relationship between consumption and income is known according to keynes as the propensity to consume schedule or the consumption function.

However, the relationship is a behavioural one telling us both at the household and national level what will be spent on consumption if income is at a certain level. This means that as national income changes so will consumption (C) spending change in the same direction.

Symbolically, $C = f(Yd)$ - - - - - - - - - - 1.4.1.1

where C = amount of consumption expenditure

Yd = Disposable income (Y) after tax deduction

The relationship can be further elaborated by assuming it to be a linear functional relationship. Thus;

$C = Ca + cY$ - - - - - - - 1.4.1.2

Meaning that real consumption spending is a linear function of disposable income (Y). The linear equation is expressed as a straight line and mathematically, Ca is the Y intercept in the positive quatrant. While economically, it is autonomous consumption. This means that in the shortrun we are working with, there is some minimum amount of consumption (from past savings) even when there is no income (Y) and this consumption C never falls to zero. This amount of consumption C is called autonomous consumption

since it is independent of the level of Y and it is constant.

Mathematically, small c is the slope of the line (Slope = $\frac{\text{vertical interesect}}{\text{Horizontal equivalent}}$)

and economically, it measures the extend of the change in consumption ($\blacktriangle c$) with respect to change in income ($\blacktriangle Y$). Keynes called it the MARGINAL PROPENSITY TO CONSUME (MPC). Also, it is called Tendency to Consume from extra income as it is seen as the ratio between extra consumption and extra income that makes extra consumption possible.

Symbolically MPC or c = $\frac{\blacktriangle c}{\blacktriangle Y}$

TABLE 1.4.1.1: MARGINAL PROPENSITY TO CONSUME (MPC) ₦m

C	EXTRA C	Y	EXTRA Y	$\frac{\text{EXTRA C}}{\text{EXTRA Y}}$ $\frac{\blacktriangle C}{\blacktriangle Y}$
10	-	15	-	-
20	10	30	15	$^2/_3$
30	10	45	15	$^2/_3$
40	10	60	15	$^2/_3$
50	10	75	15	$^2/_3$

Source: Basic Economics by Arnold etal P.59

To Keynes, MPC or c is positive, constant and less than one(1) i.e $O < MPC < 1$.

Furthermore, Keynes explained in his consumption function that a given level of income is alotted to consumption. In otherword, he seek to find out what proportion of a given level of income (Y) is devoted or directed to consumption C. He called this AVERAGE PROPENSITY TO CONSUME (APC)

Symbolically, APC = $c/_Y$

It is derived by dividing consumption Linear equation by Y

$$C = Ca + cY$$

$$c/Y = Ca/Y + cY/Y$$

$$c/Y = Ca/Y + c$$

$$APC = \frac{Ca}{Y} + c \text{ -------- } 1.4.1.3$$

Since small c (MPC) is constant some relationship holds between APC and MPC. Such includes;

(i) APC > MPC since Ca/Y + c > c

(ii) As income Y increases APC decreases but MPC is constant.

1.4.2: SAVINGS FUNCTION

This is another important concept of national income determination. Savings is that part of a given disposable income that is not spent on consumption . Or it may be defined as the difference; positive or negative between income and consumption (i.e S = Y - c). Thus, whatever relationship are summarized in consumption function can be summarized equally well in a saving function. This is because household does two things with their income - consume and save. Therefore, the savings function equations are complements of the consumption equations. The saving functions is written thus;

$$S = sY \text{ --------- } 1.4.2.1$$

In a linear form, we have it as

$$\dot{S} = -Sa + sY \text{ ---------- } 1.4.2.2.$$

Where -Sa as in consumption is the autonomous savings and measures the amount of dissaving. As in consumption function, the small s is the MARGINAL PROPENSITY TO SAVE (MPS) and measured the amount of change in Y which is saved. It is also a positive constant which measures the slope of the savings function.

The MPS, as the MPC is positive, constant and lies between 0 and 1 i.e less than 1 (i.e $0 < MPS < 1$).

The savings function is derived from consumption function as follows:

$$S = Yd - C$$

$$= Yd - Ca + cYd$$

$$= -Ca + Y(1-c)$$

NOTE: -Ca is the same as -Sa and 1-c (1 = MPC + MPS, 1-MPC = MPS)

is s

$$\therefore \quad S = -Sa + sY$$

In the savings function, the AVERAGE PROPENSITY TO SAVE (APS) as in APC is that proportion of income that is saved.

Symbolically, APS = s/Y

A relationship between APS and MPS holds since small s (MPS) is constant. Such include:

(i) MPS > APS Since $s > \frac{-Sa}{Y} + sY$

(ii) As Ý increases APS increases but MPS remains constant since $\frac{-Sa}{Y}$ increase as Y rises

Now given that household consume part of their income and save some, the following relationship holds between income savings and consumption.

$$Y = c + s \text{ ----- } 1.4.2.3.$$

$$\blacktriangle Y = \blacktriangle c + \blacktriangle s$$

(i.e Any ▲ in Y is accompanied by ▲ in consumption C and in savings S).

$$\frac{\blacktriangle Y}{\blacktriangle Y} = \frac{\blacktriangle c}{\blacktriangle Y} + \frac{\blacktriangle s}{\blacktriangle Y}$$

$$1 = MPC + MPS \text{ ----- } 1.4.2.4$$

Similarly for APC and APS

$$\frac{Y}{Y} = \frac{c}{Y} + \frac{s}{Y}$$

$$1 = APC + APS \text{ ----- } 1.4.2.5$$

The consumption function in which c is a constnat proportion of income Y at all level written as C = cY can be represented graphically using the table below.

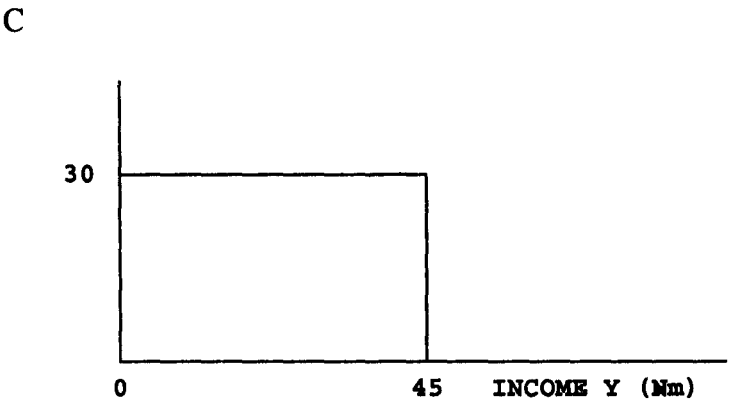
TABLE 1.4.1:2: CONSUMPTION FUNCTION

INCOME Y	CONSUMPTION
Y	C
15	10
30	20
45	30
60	40
75	50

Source: Basic Economics by Arnold et al.

Below is the graphical representation of the above table with the national income Y plotted along the horizontal axis and the consumption C along the vertical axis.

FIG. 1.4.1:1: **GRAPHICAL REPRESENTATION OF CONSUMPTION FUNCTION**



The C function, C = cY is a straight line that run from the origin 0. The graph is constructed by taking two values. When Y = 0, C = 0 so that the origin 0 is a point on the graph. When Y = 45, C = 30. This gives second point to form the line. Thus, we can read from the graph the value of C corresponding to any value of Y. For example the point at which the horizontal line of Y = 45 intercept with the vertical line of C = 30 on the graph line gives the corresponding value of C to the value of Y.

The simple linear function for consumption and savings, written thus, C = Ca + cY and S = -Sa + sY can also be represented graphically using the table below to derive the propensity to consume and save. We then assign value for autonomous C and MPC (c) to construct such schedule.

TABLE 1.4.1:3 LINEAR CONSUMPTION FUNCTION AND SAVING FUNCTION

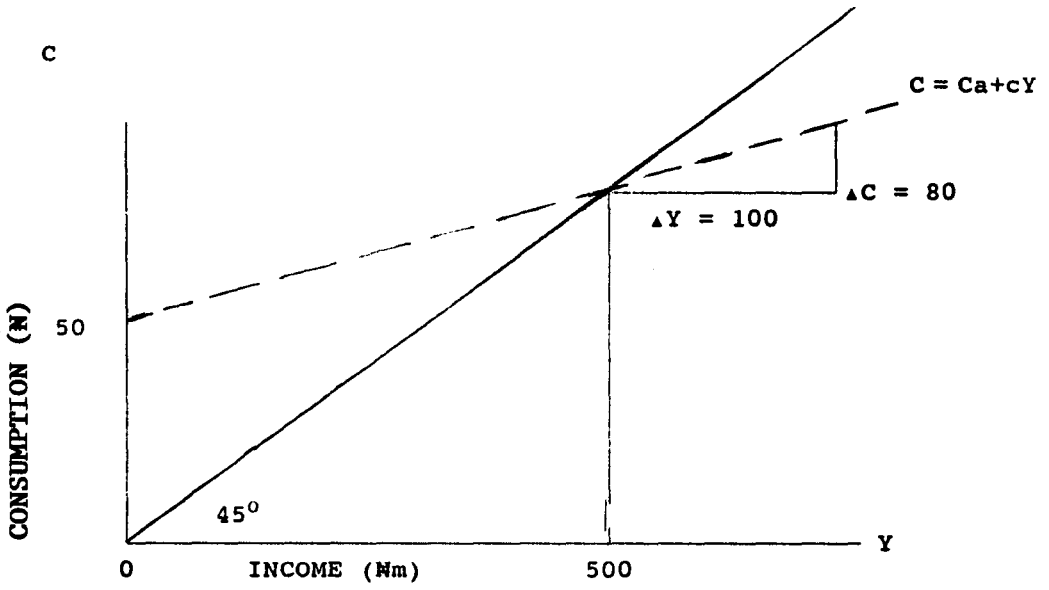
INCOME Y	CONSUMPTION C	APC c/Y	MPC $\frac{\triangle c}{\triangle Y}$ or c	SAVINGS S	APS s/Y	MPS s or $\frac{\triangle s}{\triangle Y}$
100	130	1.30	-	-10	-0.70	-
200	210	1.05	0.8	-70	-0.05	0.2
300	290	0.967	0.8	10	0.033	0.2
400	370	0.925	0.8	10	0.075	0.2
500	450	0.900	0.8	30	0.100	0.2
600	530	0.883	0.8	50	0.117	0.2
				70		0.2

From the table,

$$Ca = Ca + cY$$
$$450 = Ca + 0.8y$$
$$450 = Ca + 0.8(500)$$
$$450 = Ca + 400$$
$$450 - 400 = Ca$$
$$\therefore Ca = 50$$

Substituting Ca = 50 and MPC or c = 0.8 into linear consumption function $C = Ca + cY$, we have $C = 50 + 0.8Y$. This equation is illustrated in the graph below with vertical axis measuring real consumption and horizontal axis measuring real disposable income.

FIG. 1.4.1.2 LINEAR CONSUMPTION FUNCTION GRAPH



The Y interception shows autonomous consumption at N50m and MPC is shown as $\blacktriangle c/\blacktriangle Y = {}^{80}/_{100}$ which is equal to 0.8. This is the slope of the consumption schedule.

For savings function we have,

$$S = -Sa + sY$$

where -Sa represent the same amount as autonomous consumption i.e -50. The small s, is 1-c i.e 1 - MPC. Thus

$$S = Y - C$$

$$= Y - (Ca + cY)$$

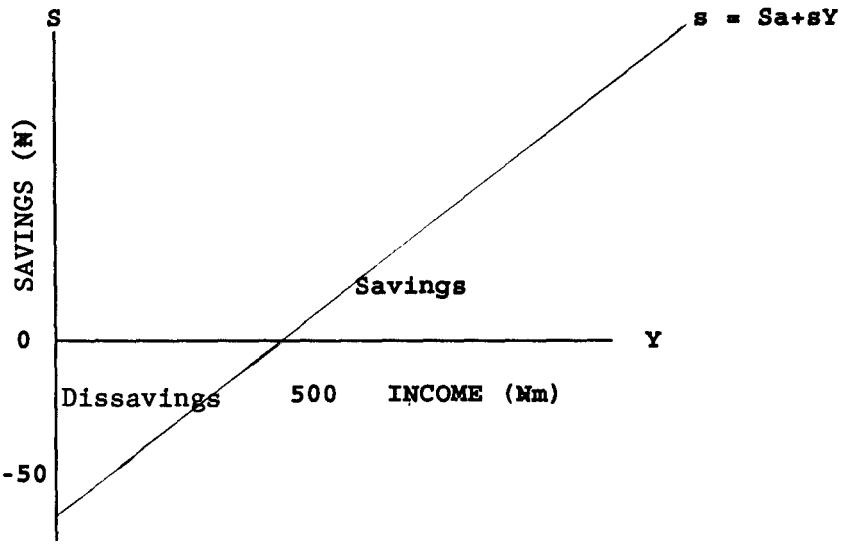
$$Y - 50 - 0.8Y$$

$$-50 + Y - 0.8Y$$

$$-50 + (1 - 0.8)Y$$

$$\therefore \quad S = -50 + 0.2Y \text{ or } -Sa + sY$$

FIG 1.4.3 LINEAR SAVINGS FUNCTION



At the breakeven point or equilibrium level ie N500m, the level of savings is negative to the left and to the right, savings is positive. The slope of the line is MPS and can be determined directly from the graph as $\frac{\triangle S}{\triangle Y}$

The 45° line in the consumption function graphical representation in Fig 1.4.1.2 has some economic significance. In economic term, it represents the Aggregate Supply (Ag SS) function. Showing in hypothetical term the amount of output (SS) that producers are ready to supply under the assumption that all will be bought or demanded (dd) ie Aggregate Supply (Ag SS), (Y) equal to Aggregate Demand (Ag dd) C.

$$AgSS\ (Y) \quad = \quad AgDD(C)$$

The 45° line therefore indicate the fact governing Aggregate Supply. At any point in it, Aggregate Demand (C) is equal to Aggregate Supply and therefore, sales proceeds (revenue) equal to cost of production.

In FIG 1.4.1.2: the Aggregate supply and Aggregate demand intersect at only one point representing an equilibrium level of income Y. i.e N500. At this point, there is a breakeven and all the income is consumed. At the left of this point, C is more than Y (C > Y) and a dissavings occurs equal to the gab between C and Y. To the right of the breakeven point, income is more than consumption (Y > C) and savings occurs. Here, cost of production (AgSS) is more than sales of proceeds (Agdd) so producers will reduce output.

1.4.3 INVESTMENT FUNCTION:

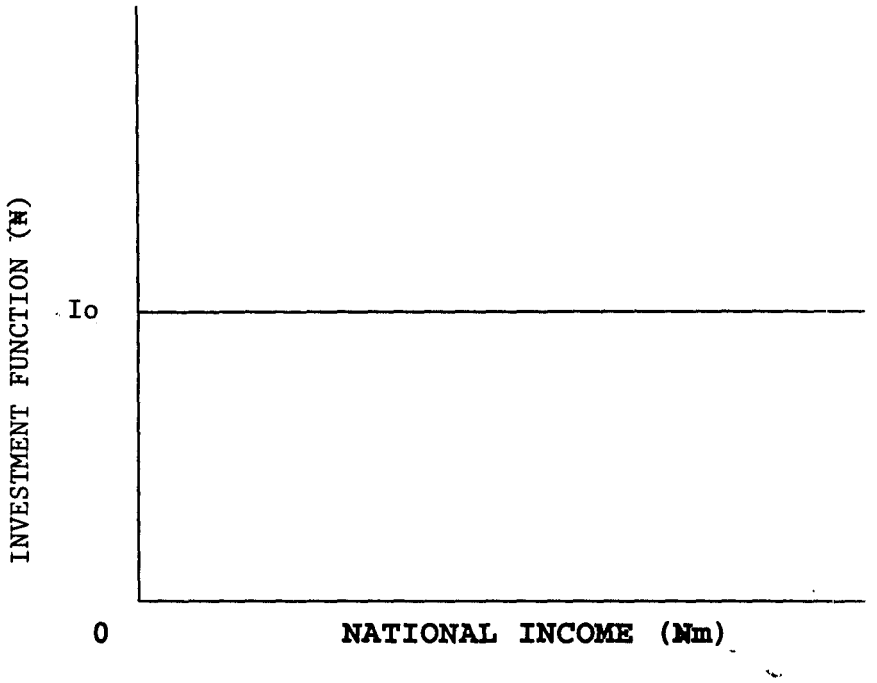
Another important concept in national income determination that needs emphasis is the investment function.

However, firms demand capital goods and hold stock for them just as household do. An increase in the stock of capital goods in the firm is investment. Here, we assume that firms make autonomous investment irrespective of the level of national income. Symbolically, autonomous investment is;

$$I = Io \quad \text{-------} \quad 1.4.3.1$$

The investment function is a straight line runing parallel to the horizontal axis since I is constant for all values of income.

FIG 1.4.3a INVESTMENT FUNCTION



1.5. SIMPLE MODELS OF NATIONAL INCOME DETERMINATION

Based on our assumptions, we shall concentrate on developing models for national income determination from the Demand side of the economic process using Keynes theory.

There are two methods. One, is to compare the economy's Aggregate Demand Schedule with its Aggregate Supply Schedule. The equilibrium level of output is that output which will generate sufficient income to purchase the exact level of total spending needed to purchase all available goods and service. In other words, it occurs when the quantity of all goods and services demanded is equal to the quantity supplied (i.e AggSS = AggDD).

The demand (Aggregate demand) is made up of C and I. While the Aggregate Supply is made up of C and S.

The other method is to calculate the amount of investment and to balance it against the amount of savings. The level of output and income where savings equal to investment is the point of equilibrium. Either of the two used, we will arrive at the equilibrium level.

$$C + S = C + 1 \text{ ------ } 1.5.1$$

$$S = I \text{ ------ } 1.5.2$$

This method is used if and only if the national income level is a true equilibrium. our simple model is being developed in different sectors of the economy using the first method.

1.5.1 TWO SECTOR ECONOMY

We simplify this model by omitting the role of government and assuming that national income is not subject to taxes but is all classified as disposable income. Given a level of income, what household does not consume, is saved written as

$$Y = C + S \text{ ------ } 1.5.1.1.$$

If savings are used for investment, it implies that our simple model becomes

$$Y = C + I \text{ ----- } 1.5.1.2$$

The introduction of Investment expenditure means that we have admitted the business sector in our simple model. Thus, expanding it to two sector economy (Household - Consuming economy and Investment - Producing economy). Investment is autonomous

and constant (Io). Therefore, aggregate demand component is made up of consumption expenditure and investment expenditure. Where,

$$C = Ca + cY \text{ ------ } 1.5.1.3$$

$$I = Ia \text{ ------ } 1.5.1.4$$

Calculating for the equilibrium, we substitute equations 1.5.1.3 and 1.5.1.4 into equation 1.5.1.2.

$$Y = Ca + cY + I \text{ ------ } 1.5.1.5$$

$$Y - cY = Ca + I$$

$$Y(1-c) = Ca + I$$

$$Y = {}^{1}/_{1-c} (Ca + I) \text{ ------ } 1.5.1.6$$

The equation 1.5.1.6 (Y = 1/1-c(Ca + I) is the equilibrium condition where. AgDD. is equal to AgSS in a two sector economy. It shows how the autonomous variables generate spending and income created by production through the multiplier process (${}^{1}/_{1-c}$)

The multiplier 'K' is defined as a change in national income brought about by a change in investment. Derived thus;

$$\triangle Y = c\triangle Y + \triangle I \text{ ------ } 1.5.1.7$$

$$\triangle Y - c\triangle Y = \triangle I$$

$$\triangle Y(1-c) = \triangle I$$

$$\triangle Y = {}^{1}/_{1-c} \triangle I$$

$${}^{\triangle Y}/_{\triangle I} = {}^{1}/_{1-c} \text{ or } {}^{1}/_{1-MPS} \text{ ------ } 1.5.1.8$$

The multiplier "K" $^{1}/_{1-c}$ or receiprocal of MPS i.e $^{1}/_{5}$ is then multiplied by the given increase in investment to get the effect on income.

TABLE 1.5.1.1: SIMPLE INCOME DETERMINATION (Nm)

OUTPUT Y	CONSUMPTION C	SAVINGS S	INVESTMENT I	AGGDD C+1		EMPLOYMENT LEVEL
750	760	-10	25	785	EXPAND	50
770	775	-5	25	800	"	55
790	790	0	25	815	"	60
810	805	5	25	830	"	65
830	820	10	25	845	"	70
850	835	15	25	860	"	75
870	850	20	25	875	"	80
890	865	25	25	890	Equilibrium	850
910	880	30	25	905	Contract	90
930	895	35	25	920	"	95

Source: MACRO ECONOMICS BY SOLOMON pg. 190.

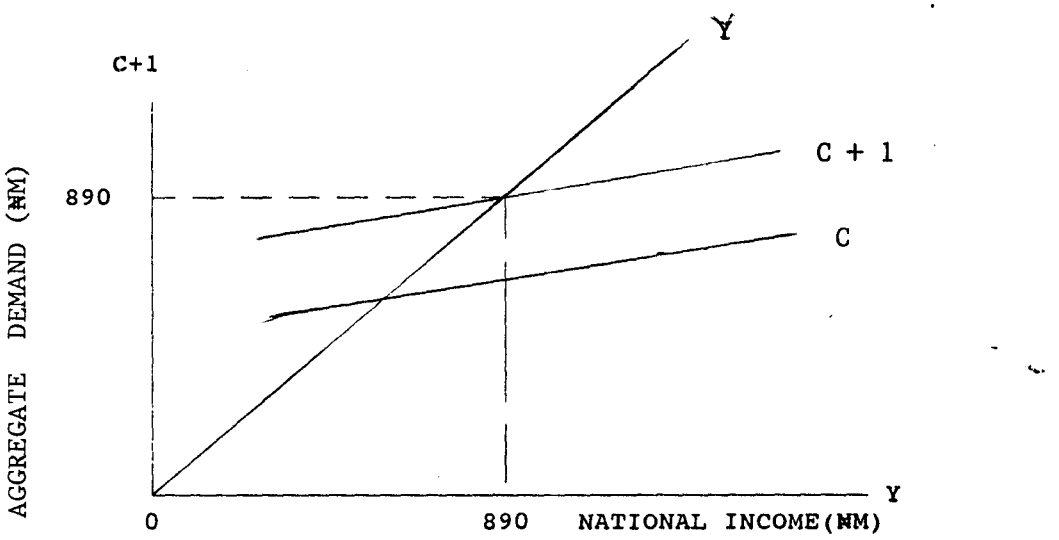
From the table, at the national outputs/income before N890m, the Aggregate demand of the economy exceeds the national income/output. So employment, income and output will all increase as business firms attempt to meet the excess demand. This continues until an equilibrium is reached where AggDD is equal to AgSS and it is at the income level of N890m.

Conversely, after the equilibrium (i.e at higher level of income), Aggregate supply (output/income) exceeds expected level of spending (AggDD) and will not be able to absorb all that is produced. This results to firms being forced to stockpile their goods i.e have stocks of unsold goods. At this level of output or AgSS the economy must

contract and employment, output and income must fall until the Equilibrium level is reached. However, no mechanism ensures that at this level, there is full employment.

Graphically, we plot $Y = C + I$ as a condition for equilibrium using the above table. The national income Y is plotted along the horizontal axis against $C + I$ on the vertical axis.

FIG. 1.5.1.1: DETERMINED INCOME EQUILIBRIUM GRAPH



In the graph above, the equilibrium level is the output/income of N890m. Here suppose the business sector believes that during a given period of time he can sell N890m worth of goods. He then produces this amount of goods and the disposable income turns out to be N890m. With the disposable income, the 'C' function in this graph indicates that consumers will spend N865m. This will be added to N25m that business men will spend to give an aggregate demand of N890m. So business men produced N890m worth of output in expectation that sales would total N890m and it turned out to be exactly. Thus, the plan of both the seller and buyer were realised.

1.5.2 THREE (3) SECTOR ECONOMY

In this model, the assumption of no government expenditure does not hold. It is assumed that all government spendings (G) is autonomous and constant.

$$\text{Symbolically, } G = \bar{G} \text{ - - - - - - - - - - - - - - } 1.5.2.1$$

With this, government expenditure is included as a component of Aggregate demand and our model becomes;

$$Y = C + I + G \text{ - - - - - - } 1.5.2.2$$

where;

$$C = Ca + cY \text{ - - - - - - - - } 1.5.2.3$$

$$I = Io \text{ - - - - - - - - - - } 1.5.2.4$$

$$G = Go \text{ - - - - - - - - - - } 1.5.2.5$$

Solving for equilibrium we substitute equations 1.5.2.3, 1.5.2.4 and 1.5.2.5 into equation 1.5.2.2.

$$Y = Ca + cY + I + G \text{ - - - - - } 1.5.2.6$$

$$Y - cY = Ca + I + G$$

$$Y = 1/1\text{-}c \ (Ca + I + G) \text{ - - - - - } 1.5.2.7$$

Since government spending is autonomous and the same to autonomous investment obviously, the multiplier 'K' (1/1 - c) outlines the effect of government spending on the national income

$$\text{i.e } \blacktriangle Y = 1/1\text{-}c \ \blacktriangle G \text{ - - - - - - - - - - } 1.5.2.8$$

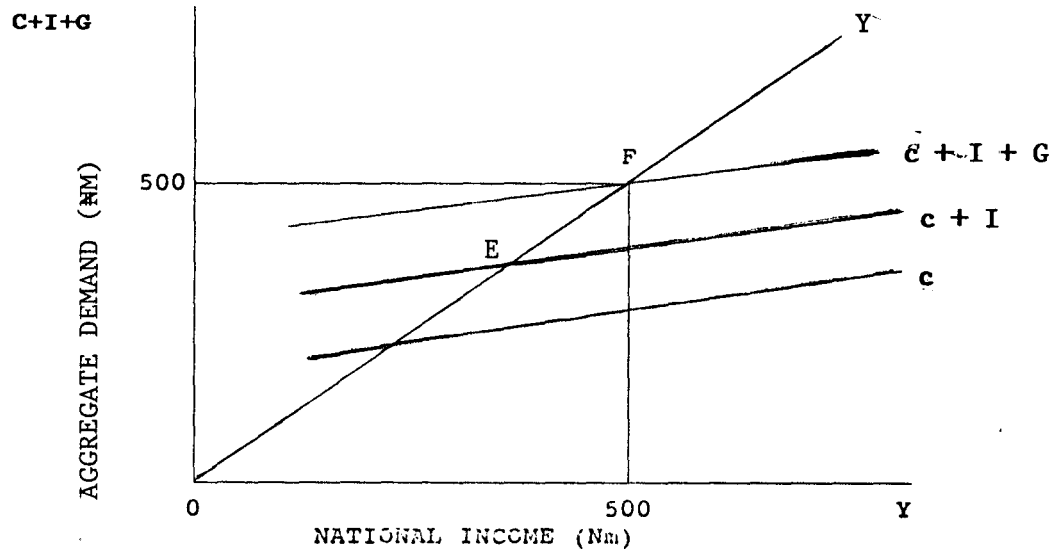
$$\text{or } {}^{\blacktriangle Y}/_{\blacktriangle G} = {}^{1}/_{1-c}$$

The multiplier shows an increase in the national income.

TABLE 1.5.2.1: THREE SECTOR ECONOMY WITH GOVERNMENT SPENDING AS AGGREGATE DEMAND COMPONENT

OUTPUT Y	CONSUMPTION C	SAVINGS S	INVESTMENT I	GOVT. EXPENDITURE G
200	180	20	60	20
300	260	40	60	20
400	340	60	60	20
500	420	80	60	20
600	500	100	60	20
700	580	120	60	20
800	660	140	60	20

FIG 1.5.2.1: GRAPH REPRESENTATION OF THREE SECTOR ECONOMY



In figure 1.5.2.1, autonomous government expenditure (G) is added to the old Aggregate demand, C+1 shedule which shift the AggDD curve upward parallel by the amount of G. The equilibrium level of national income moves from point E to F which

is G multiplying the multiplier ($^{1}/_{1-c}$) i.e G x $^{1}/_{1-c}$.

1.5.2.1: TAX INCLUSION.

The Government spending model is extended to include TAXES raised to pay for the government spending/expenditure. It is assumed to be autonomous Tax, since government spending is autonomous. The new model becomes.

$$Y = C + I + G \quad \text{----} \quad 1.5.2.1.1$$

where $C = Ca + c\,(Y-T)$, ---------- 1.5.2.1.2

$$I = \bar{I}o \quad \text{----------} \quad 1.5.2.1.3$$

$$G = \bar{G} \quad \text{----------} \quad 1.5.2.1.4$$

$$T = \bar{T} \quad \text{----------} \quad 1.5.2.1.5$$

Note: C function is altered to reflect the dependence of C on disposable income (Yd).

Substituting equations 1.5.2.1.2, 1.5.2.1.3, 1.5.2.1.4, and 1.5.2.1.5 into 1.5.2.1.1 we have

$$Y = Ca + c(Y - T) + I + G \quad \text{-----} \quad 1.5.2.1.6$$

$$Y - cY = Ca - cT + I + G$$

$$Y(1-c) = Ca - cT + I + G$$

$$Y = {}^{1}/_{1-c}\,(Ca - cTa + I + G) \quad \text{----} \quad 1.5.2.1.7$$

The multiplier effect of Tax inclusion on the level of national income is,

$$\blacktriangle Y = C\blacktriangle Y - C\blacktriangle Y$$

$$\blacktriangle Y - C\blacktriangle Y = -C\blacktriangle T$$

$$\blacktriangle Y(1-c) = -C\blacktriangle Y$$

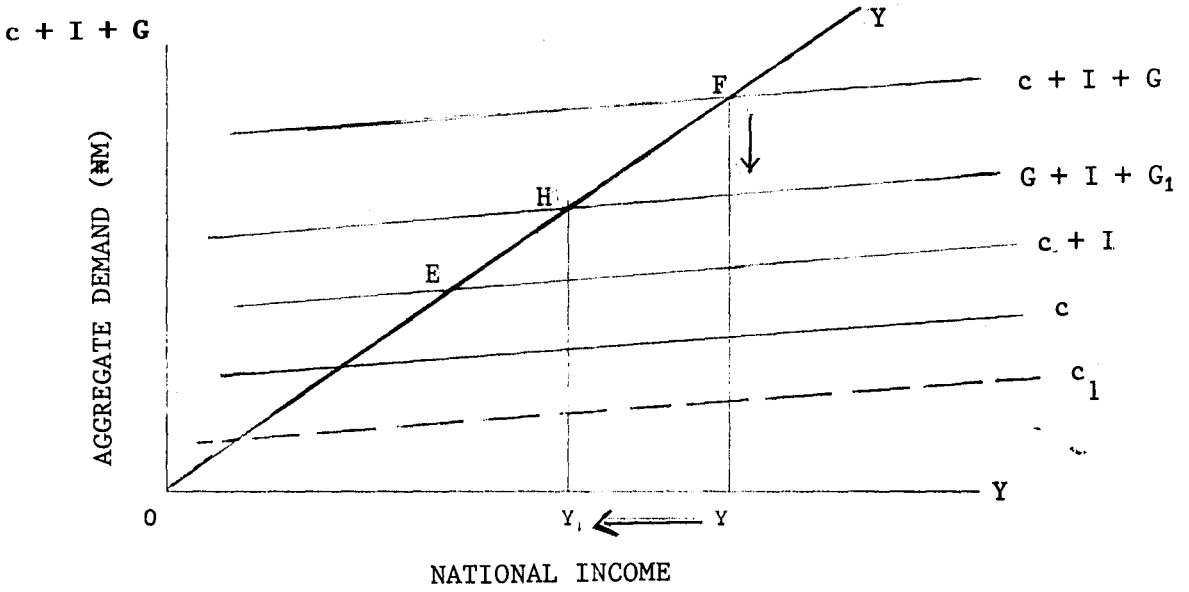
$$\blacktriangle Y = {}^{-c}/_{1-c} \blacktriangle T$$

$$\text{or } K = {}^{-c}/_{1-c} \blacktriangle T \text{ - - - - - - - } 1.5.2.1.8$$

-c is a fraction meaning that tax multiplier is less than others hence reduces the national income.

The effect of the inclusion of the Tax in the 3 sector economy model can be seen graphically.

FIG 1.5.2.1a: EFFECT OF TAX INCLUSION IN THE MODEL



In fig. 1.5.2.1a, the equilibrium level of income before taxes was at point F. As tax is imposed, the consumption function falls by MPC (-T). The parallel downward shift is shown by the 'C' function C_1. The downward shift, shifts the entire Agg dd. schedule down by the same amount shown as $C_1 + I + G$. The new equilibrium occurs at point H where Y (income) now is nearer to zero and Agg.dd. interects the Agg. SS schedule.

1.5.2.2 TRANSFER PAYMENT INCLUSION

Transfer payment (TP) is included in the government expenditure model for further expansion. Transfer payment is another means by which a society may choose to re-distribute income. It is referred to as negative taxes.

Poverty Programmes, welfare scheme, Society Security Programmes, and unemployment conpensation are some examples of the T.P.

Transfer payment (TP) just like Tax is not included in the GNP but in personel income. It affects the level of spending and income. In the shortrun, it is assumed to be autonomous and independent of the level of Y. Hence, our model becomes

$$Y = C + I + G \text{ - - - - - - -} \quad 1.5.2.2.1$$

where $$C = Ca + c(Y-T+R) \text{ - - - - - -} \quad 1.5.2.2.2$$

$$I = \bar{I} \text{ - - - - - - - - - - -} \quad 1.5.2.2.3$$

$$G = \bar{G} \text{ - - - - - - - - - - -} \quad 1.5.2.2.4$$

$$T = \bar{T} \text{ - - - - - - - - - - - - -} \quad 1.5.2.2.5$$

$$R = Ro \text{ - - - - - - - - - - - - -} \quad 1.5.2.2.6$$

Note: R is the Autonomous Transfer Payment. Above only consumption function is altered to include additional source of Y.

Substituting equations 1.5.2.2.2,: 3,: 4,: 5, and :6 into equation 1.5.2.2.1 and solving for the equilibrium we have.

$$Y = Ca+cY-cT+cR+I+G \quad \text{- - - - - - - - - -} \quad 1.5.2.2.7$$

$$Y-cY = Ca-cT+cR+I+G$$

$$Y(1-c) = Ca-cT+cR+I+G$$

$$Y = {}^{1}/_{1-c}\ (Ca-cT+cR+I+G) \quad \text{- - - - - - - -} \quad 1.5.2.2.8$$

The multiplier effect of new source of income (TP) is an increase in the national income shown thus

$$Y = cY + cR \quad \text{- - - - - - - -} \quad 1.5.2.2:9$$

$$\blacktriangle Y = \blacktriangle Y = c\blacktriangle R$$

$$\blacktriangle Y - c\blacktriangle Y = c\blacktriangle R$$

$$\blacktriangle Y(1-C) = c\blacktriangle R$$

$$\blacktriangle Y = {}^{c}/_{1-c}\blacktriangle R \quad \text{- - - - - - -} \quad 1.5.2.2:10$$

1.5.2:3 INCOME TAX INCLUSION

In the 3 sector economy model, we introduce the income Tax. This tax varies with the level of income and it gives a more realistic Tax Function than the assumed autonomous tax. The tax has a linear relationship with income expressed thus,

$$T = Ta + tY \quad \text{- - - - - - -} \quad 1.5.2.3:1$$

where Ta = autonomous tax and t = Marginal Propensity to spend on Tax (MPT) or $({}^{\blacktriangle T}/_{\blacktriangle Y})$

In developing the model we have

$$Y = C + I + G \quad \text{- - - - - - - - -} \quad 1.5.2.3:2$$

where $C = Ca + c(Y-Ta+tY+R)$ ------ 1.5.2.3:3

$I = \bar{I}$ ---------- 1.5.2.3:4

$G = \bar{G}$ ---------- 1.5.2.3:5

$T = Ta + tY$ ---------- 1.5.2.3:6

$R = \bar{R}$ ---------- 1.5.2.3:7

Substituting equations 1.5.2.3:3, 4, 5, 6 and 7 into equation 1.5.2.3.2 and solving for equalibrium, we have

$$Y = Ca + cY - cTa + ctY + cR + I + G$$

$$Y - (cY + ctY) = Ca - cTa + cR + I + G$$

$$Y(1-c+ct) = Ca - cTa + cR + I + G$$

$$Y = {}^{1}/_{1-c} + ct\,(Ca - cTa + cR + I + G)$$

The multiplier (1/1-c + ct) is reduced by the addition of ct because as income increases so do tax collection.

1.5.3. FOUR SECTOR ECONOMY

In this economy, we assume it to be an open one and its effect on the economic model we are developing will be explored. Therefore, we include export and import trades as components of our Aggregate Demand.

i.e $C + I + G + (X-M)$

1.5.3.1 EXPORT MODEL

To develop an export model, we assume in the short-run that export is autonomous and therefore constant thus;

$$Y = C + I + G + x \quad \text{----- 1.5.3.1:1}$$

$$\text{where } C = Ca + c(Y - T + R) \quad \text{---------- 1.5.3.1:2}$$

$$I = \bar{I} \quad \text{---------- 1.5.3.1:3}$$

$$G = \bar{G} \quad \text{---------- 1.5.3.1:4}$$

$$T = \bar{T} \quad \text{---------- 1.5.2.3:5}$$

$$R = \bar{R} \quad \text{---------- 1.5.3.1:6}$$

Substituting equations 1.5.3.1:2,: 3,: 4,: 5, and :6 into equation 1.5.3.1:1 and solving for equilibrium income level.

Note: X is used to represent Export trade.

$$Y = Ca+c(Y - T + R) + I + G + X$$

$$Y - cY = Ca-cT+cR+I+G+X$$

$$Y(1-c) = Ca-cT+cR+I+G+X$$

$$Y = 1/1-c\ (Ca-cT+cR+T+G+X)$$

Exports are also subject to multiplier effect in the same manner as Investment expenditure. Thus, it multiplier effect on the national income is

$$\blacktriangle Y = {}^{1}/_{1-c}\ (X)$$

This means that exports (X) creates domestic income causing the level of national income to rise by the multiplier ${}^{1}/_{1-c}$.

1.5.3.2 IMPORT MODEL

In our model, we now include import in our Aggregate demand components. Import is seen as purchase of goods and services from other countries by domestic residence (Linkage from the income) and income earned accrue to foreigners. Also, the sale receipts flow not to domestic producers but abroad. Therefore, Aggregate demand function becomes

$$Y = C + I + G + (X - M) \text{ - - - - - - - } \quad 1.5.3.2:1$$

Here, we assume some of our imports to be autonomous while many depends on the level of national income such that as income rises, taste for foreign goods increases. Hence, import function is a linear function given as

$$M = Ma + mY \text{ - - - - - - - - - - - - - } \quad 1.5.3.2:2$$

where Ma = autonomous import and m= Marginal propensity to import ($\Delta m \backslash \Delta Y$)

$$Y = C + I + G + (X-M)$$

where $C = Ca + c(Y-T+R)$ - 1.5.3.2:3

$$I = \bar{I} \text{ - } \quad 1.5.3.2:4$$

$$G = \bar{G} \text{ - } \quad 1.5.3.2:5$$

$$T = \bar{T} \text{ - } \quad 1.5.2.2:6$$

$$R = \bar{R} \text{ - } \quad 1.5.3.2:7$$

$$X = \bar{X} \text{ - } \quad 1.5.3.2.8$$

Substituting equations 1.5.3.2:3,: 4.: 5,: 6,: 7, and :8 into equation 1.5.3.2.1 and solving for equilibrium we have;

$$Y - cY + mY = Ca - cT + cR + I + G + X - Ma$$

$$Y(1 - c + m) = Ca - cT + cR + I + G + X - Ma$$

$$Y = 1/1 - c + m\ (Ca - cT + cR + I + G + X - Ma)$$

The multiplier effect of import on the level of national will be a reduction since the multliplier value is reduced by the addition of m. Thus

$$\blacktriangle Y = 1/\ 1 - c + m\ *\ \blacktriangle M$$

This reduction is due to the fact that as income rises a proportion of the rised income is spent on foreign goods and services.

1.5.3.3 FOREIGN TRADE MODEL

The foreign trade model is further expanded to produce a comprehensive model to include Tax as a function of income. Thus,

$$Y = C + I + G + (X - M) \quad \text{1.5.3.3.1}$$

where $C = Ca + c(Y - T + R)$ 1.5.3.3:2

$$I = \bar{I} \quad \text{1.5.3.3:3}$$

$$G = \bar{G} \quad \text{1.5.3.3:4}$$

$$T = Ta + tY \quad \text{1.5.3.3:5}$$

$$R = \bar{R} \quad \text{1.5.3.3:6}$$

$$X = \bar{X} \quad \text{1.5.3.3.7}$$

$$M = Ma + mY \quad \text{1.5.3.3.8}$$

Substituting equation 1.5.3.3:2,: 3.: 4,: 5,: 6,: 7,: and :8 into equation 1.5.3.3.1

we have;

$$Y = Ca+c(Y-Ta+tY+R) + I + G + X - Ma + mY$$

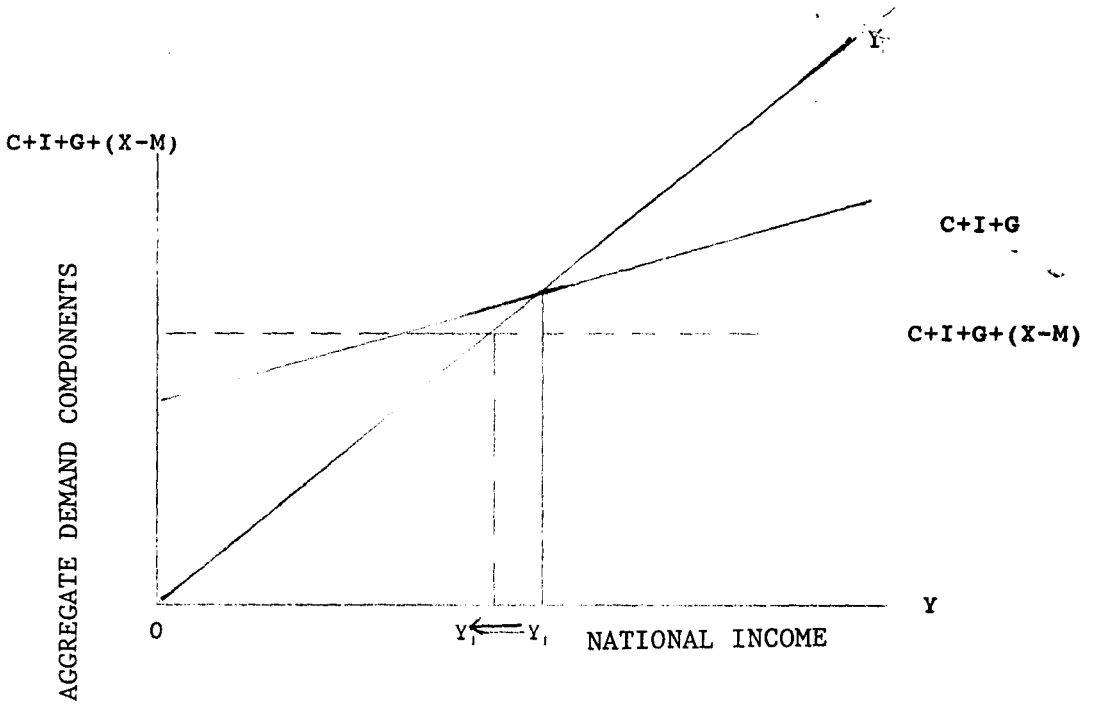
$$Y-cY+ctY+mY = Ca-cTa+cR+I+G+X - Ma$$

$$Y(1-c+ct+m) = Ca-cTa+cR+I+G+X - Ma$$

$$Y = 1/1-c + ct+m (Ca-cTa+cR+I+G+X -Ma)$$

The multiplier here is further reduced because of the inclusion of tax function.

However, a Foreign trade sector when added to our model i.e C + I + G +(X-M) reduces national income. This can be shown hypothetically.



In the above developed models, a computer designed programme is to be developed to computerise the equilibrium income determination in each sector of economy using the aggregate demand components.

1.6 METHODOLOGY

In sourcing the data for this work, the Federal Office of Statistics Minna formed the major source of data collection. Other sources include Libraries.

In collecting data from the sources, the researcher adopted both primary and secondary method of data collection. The primary method, involved the use of oral interview. While in the secondary method, the researcher resorted to selected readings from the Federal Office of Statistics internal records and publications, and related texts.

In analysing data, the researcher made reference to the replies during interviews and information from publications. These information supplied is analysed with the objective of the study in mind by the use of statistical tools such as tables, diagrams Histogram etc.

CHAPTER TWO

ON NATIONAL INCOME ACCOUNTING

2.1 INTRODUCTION

The Federal Office of Statistics (FOS) Minna was the source for data collection and therefore formed the case study.

The Federal Office of Statistics is a parastatal with the National Plannining Commission and has its headquarters at Lagos. It collects, compiles data and analyses data for the government and private users. It is the only recognized body for the dissemination of information on statistical data in the country.

The Federal office of Statistics collects its data by Primary method (i.e by interviewing) and by secondary method i.e from Company's or Establishment's stock extracted from their laydown data.

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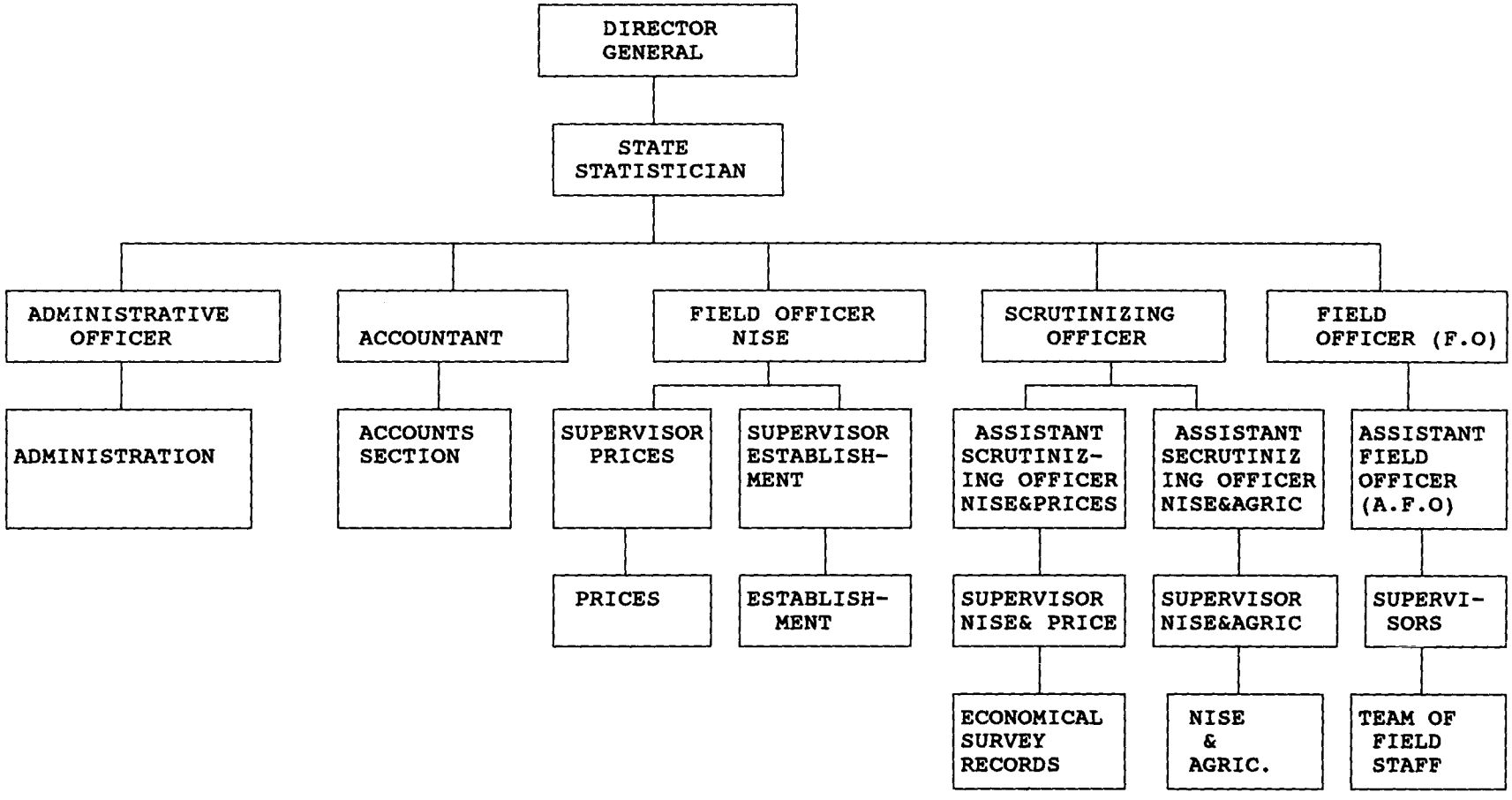
2.2 ORGANISATIONAL STRUCTURE OF FEDERAL OFFICE OF STATISTICS (F.O.S) MINNA.



NOTE: N.I.S.E means National Integrated Survey Establishment.

1. **THE MINISTER:** The Minister for National Planning stands at the apex of the F.O.S Organizational structure and serves as the link between the Government and the Parastatal.

2. **DIRECTOR GENERAL:** The Director General is the Chief Executive of the F.O.S. nation wide and he is responsible to the Minister for National Planning.

3. **THE STATE STATISTICIAN:** Each of the state branch of the F.O.S is headed by a state statistician or State Officer who serves as the Chief Executive in the State. He is responsible to the Director General and he is charged with the responsibility of directing and coordinating the day-to-day activities of the various Sections/Departments in the state branch.

However, the State branch office of the F.O.S Minna is divided into different sections and each has a head with a number of subordinate staff. They are as follow.

4. **ADMINISTRATION:** This section is headed by an Administration officer with a number of subordinate staff. He is responsible for the general administration of the state office and gives feedback of his section to the state statistician.

5. **ACCOUNTS SECTION:** The Account Section is headed by the State Chief Accountant and has a number of staffs responsible to him. The Accountant is directly responsible to the State Statistician.

6. THE FIELD SECTION FOR NATIONAL INTEGRATED SURVEY ESTABLISHMENT (N.I.S.E):

This section is headed by a Field Officer who is directly subject to the State Statistician. Under him are two Supervisors for Price and Establishments respectively. The Supervisors have team of data collecting staff. The Supervisor for Price and his team of Staff are responsible for collecting data for retail, wholesale, and querry survey periodically. While the supervisor for Establishment does establishment services by collecting data for establishment survey.

7. THE SCRUTINIZING SECTION:

Is controlled and headed by a Scrutinizing Officer who is responsible to the State Officer. Under him are two assistants - Assistant Scrutinizing Officer (A.S.O) for Price and NISE, and Assistant Scrutinizing Officer (ASO) for NISE, and Agriculture. Each A.S.O. has a Supervisor that supervises the team of staff under him and he (the Supervisor) is responsible to the A.S.O. The section edit and Scrutinize all records or data collected in the State.

8. THE FIELD SECTION: The field section has a Field Officer as its head. The Field Officer (F.O) as in other sections has an Assistant Field Officer (A.FO). Under the A.S.O. are a number of supervisors in the enumerating areas. In Niger State, the enumerating areas are one hundred and twenty apart from the urban areas. Each Supervisor in an enumerating area has a team of working staff as fieldmen for the collection of raw data.

2.3 VARIOUS TYPES OF DATA COLLECTED BY F.O.S

As the only recognized body for collecting, compiling and analysing data, and for dissemination of information on Statistical data, the F.O.S deals with various data collection. Some of the various data it collects and disseminates information on them are discussed below:

2.3.1 POPULATION

The population of Nigeria is made up of many ethnic groups and it is the largest population in Africa.

The nations current census was taken in November, 1991. Although the results are still awaited by the time of this report but the figures already released shows the population figure by state.

TABLE 2.3.1.1.: PROJECTED POPULATION OF NIGERIA BY STATES

States	Base Year 1991 Provisional Population	Projections (Estimates) 1992	1993	1994
ABIA	2,297,978	2,352,670	2,408,663	2,465.990
ADAMAWA	2,124,049	2,174,601	2,226,357	2,279,344
AKWA IBOM	2,359,736	2,415,898	2,473,396	2,532,263
ANAMBRA	2,767,903	2,833,779	2,901,223	2,970,272
BAUCHI	4,294,413	4,396,620	4,501,259	4,608,390
BENUE	2,780,398	2,846,572	2,914,320	2,983,681
BORNO	2,596,590	2,658,388	2,721,657	2,786,433
CROSS RIVER	1,910,005	1,955,463	2,002,004	2,002,004
DELTA	2,570,181	2,631,351	2,693,977	2,758,094
EDO	2,159,848	2,211,252	2,263,880	2,317,793
ENUGU	3,161,295	3,236,534	3,313,563	3,392,426
IMO	2,485,499	2,544,654	2,605,217	2,667,221
JIGAWA	2,829,929	2,897,281	2,966,237	3,036,833
KADUNA	3,969,252	4,063,720	4,160,437	4,259,455
KANO	5,632,040	5,766,083	5,903,315	6,043,814
KATSINA	3,878,344	3,970,649	4,065,150	4,161,901
KEBBI	2,062,226	2,111,307	2,161,556	2,213,001
KOGI	2,099,046	2,149,003	2,200,150	2,252,513
KWARA	1,566,469	1,603,751	1,641,920	1,680,998
LAGOS	5,685,781	5,821,103	5,959,645	6,101,485
NIGER	2,482,367	2,541,447	2,601,934	2,663,860
OGUN	2,338,570	2,394,228	2,451,211	2,509,549
ONDO	3,884,485	3,976,936	4,071,587	4,168,491
OSUN	2,203,016	2,255,448	2,309,127	2,364,085
OYO	3,488,789	3,571,822	3,656,831	3,743,864
PLATEAU	3,283,704	3,361,856	3,441,868	3,523,785
RIVERS	3,983,857	4,078,673	4,175,745	4,275,128
SOKOTO	4,392,391	4,496,930	4,603,957	4,713,531
TARABA	1,480,590	1,515,828	1,551,905	1,588,840
YOBE	1,411,481	1,445,074	1,479,467	1,514,678
ABUJA	378,671	287,683	396,910	406,357
TOTAL	88,514,501	90,621,146	92,777,926	94,986,044

NOTE: Estimates based on 1991 provisional figures.
Source: Federal Office of Statistic. Digest of Statistics Dec. 1994 p.1

TABLE 2.3.1.2: POPULATION TREND

YEAR	MALE	FEMALE	BOTH SEXES
1990	43,318,608	42,759,864	86,078,480
1991	44,544,531	43,969,970	88,514,501
1992	45,805,000	45,214,000	91,019,000
1993	47,101,000	46,494,000	93,595,000
1994	48,434,000	47,810,000	96,244,000

Source: Federal Office of Statistics Digest of Statistics P.43.

2.3.2 MIGRATION

This covers the movement of people into and out of Nigeration, A movement can be presented in tabular form.

Table 2.3.2.1: PERSONS ARRIVING IN NIGERIA BY NATIONALITY

NATIONALITY	1986	1987	1988	1989	1990
AMERICAN	12,788	6,851	7,882	22,004	15,040
BRITISH	29,054	14,545	12,384	9,346	22,397
BELGIUM	1,857	944	1,041	1,832	3,412
BRAZILIAN	1,048	436	556	898	2,199
CANADIAN	1,853	1,121	1,152	2,051	1,897
CHINA	1,756	1,065	1,206	2,138	1,830
DANISH	1,286	521	652	2,176	850
DUTCH	4,193	2,488	2,645	3,794	3,964
ECOWAS*	485,089	102,487	51,064	98,506	79,211
FEDERAL REPUBLIC OF GERMANY	12,093	5,827	6,176	10,855	3,668
FRENCH	12,298	6,445	7,260	10,462	9,654
INDIAN	16,428	6,969	7,681	12,830	11,240
IRISH	1,683	910	1,018	1,509	12,266
ISRAELI	2,082	929	1,482	2,019	1,940
ITALIAN	8,883	4,314	4,974	6,996	5,475
JAPANESE	2,171	1,254	1,318	1,801	1,681
LEBANESE	6,575	2,602	3,531	5,958	5,144
RUSSIA	1,432	1,377	2,408	1,924	48
SWISS	2,189	1,109	1,291	1,810	503
OTHER AFRICANS	22,018	14,393	13,584	31,709	16,805
OTHERS	20,987	9,759	18,505	44,302	9,519
TOTAL	647,763	186,346	147,810	275,264	208,743

Source: Federal Office of Statistics: Annual Abstract of Statistics 1995 Edition p.45.

Table 2.3.2.2. PERSONS DEPARTING FROM NIGERIA BY NATIONALITY

NATIONALITY	1986	1987	1988	1989	1990
AMERICAN	11,102	4,507	8,136	20,939	16,599
BRITISH	25,594	10,054	13,811	11,602	25,511
BELGIUM	1,546	626	1,066	2,332	3,848
BRAZILIAN	750	270	463	932	2,122
CANADIAN	1,585	702	1,107	2,728	2,081
CHINA	1,611	610	1,285	2,926	1,951
DANISH	1,050	379	884	2,563	820
DUTCH	3,545	1,591	2,149	4,789	4,096
ECOWAS*	488,002	217,992	275,056	470,767	257,738
FED. REP. OF GERMANY	10,236	3,690	6,025	13,982	6,367
FRENCH	11,029	4,237	6,351	15,150	10,199
INDIAN	16,056	4,499	8,108	18,501	11,093
IRISH	1,573	595	1,129	1,537	13,103
ISRAELI	1,656	526	1,554	3,236	2,016
ITALIAN	7,633	2,665	5,107	10,436	5,705
JAPANESE	2,200	765	1,374	3,066	1,615
LABANESE	5,948	1,691	4,907	6,694	5,717
RUSSIAN	1,114	620	2,788	4,188	58
SWISS	1,783	724	1,399	2,021	405
OTHER AFRICANS	20,204	7,570	13,276	35,915	16,200
OTHERS	21,180	6,734	20,265	53,385	7,832
TOTAL	**635,397**	**271,047**	**376,240**	**687,689**	**395,076**

Source: Federal Office of Statistics: Annual Abstract of Statistics 1995 Edition. p.46.

2.3.3 HEALTH

Health services in the country are provided by both the Government and Private Agencies. Among the various data or figures on health services collected by the F.O.S, a table for health establishment in Nigeria by ownership is highlighted below.

TABLE 2.3.3. HEALTH ESTABLISHMENTS IN NIGERIA, 1991.

	Fed.	State	Local	Community	Mission	Joint tion	Corpora- rial	Indust.	Private	Total
Akwa-Ibom	2	222	-	-	8	1	1	-	38	276
Anambra	10	103	140	25	56	2	9	14	240	599
Bauchi	4	76	657	5	38	-	-	7	35	822
Bendel	13	641	-	-	32	-	2	3	155	846
Benue	6	65	655	20	140	-	1	-	70	957
Borno	10	251	268	-	-	-	1	-	12	542
C\River	13	303	290	41	42	3	17	3	17	729
Gongola	8	294	303	-	2	-	-	-	12	619
Imo	5	36	198	24	54	3	-	90	757	1,086
Kaduna	16	79	524	-	57	-	1	2	41	720
Kano	7	68	738	-	14	-	-	-	20	847
Katsina	3	9	279	-	4	-	-	-	23	318
Kwara	9	185	316	20	54	1	2	1	70	658
Lagos	44	32	288	-	-	-	4	-	168	536
Niger	7	311	187	-	-	-	-	-	3	568
Ogun	6	95	379	5	12	-	-	1	184	528
Ondo	4	83	612	-	14	-	-	-	277	990
Oyo	8	59	369	-	19	-	-	-	69	524
Plateau	9	30	436	-	64	-	-	-	64	603
Rivers	10	280	-	-	-	-	1	2	36	329
Sokoto	10	130	701	-	-	-	-	-	4	845
All States	204	3,355	7,186	140	610	10	39	42	2,295	13,882
FCT ABUJA	1		81			-	-	-	-	82
TOTAL	**205**	**3,355**	**7,267**	**140**	**610**	**10**	**39**	**42**	**2,295**	**13,964**

Source: Fed. Office of Statistics (FOS) Annual Abstract of Statistic P.82

2.3.4 EMPLOYMENT

Employment rate measures the number of persons among the labour force who were available for work and were employed to work in the period of measurement. This employment section gives a breakdown of this employment statistics of some establishments in the country. It deals with labour force, employment and related subjects. Among such breakdown of employment statistics include; the manufacturing industry, Nigerian Railway Corporation, Nigeria Coal Corporation, and the Federal Government.

TABLE 2:3.4.1: EMPLOYMENT BY THE NIGERIAN COAL CORPORATION

	Surface	Underground	Total
1988	903	673	1,576
1989	1,081	580	1,661
1990	942	503	1,445
1991	874	465	1,339
1992	780	289	1,069

Source: Fed. Office of Statistics: Annual Abstract of Statistics p.199

TABLE 2:3.4.2. NUMBER EMPLOYED BY THE NIGERIA RAILWAY CORPORATION

	Civil Engineering	Mech. Engineering	Operation & Commercial	Adminis. tration	Total All Departs.
1990	9,859	6,094	5,163	4,384	25,500
1991	9,076	5,683	4,790	4,210	23,759
1992	7,020	4,686	3,925	4,492	20,123
1993	4,002	2,644	2,146	2,554	11,346
1994	3,973	2,599	2,114	2,664	11,355

Source: Federal Office of Statistics: Annual Abstract of Statistics p.200.

TABLE 2.3.4.3: FEDERAL CIVIL SERVICE ESTABLISHED STAFF IN STATES AS AT 31ST DECEMBER

State	1988		1989		1990		1991	
	M	F	M	F	M	F	M	F
ABUJA	-	-	-	-	-	-	6,944	1,948
Adamawa\Taraba	6,960	324	7,255	390	8,331	729	3,671	727
Akwa Ibom+	-	-	-	-	-	-	2,333	263
Anambra\Enugu	1 1,801	1,207	10,444	1,370	11,247	1,432	5,471	1,338
Bauchi	7,317	339	7,956	448	8,785	700	3,132	664
Edo\Delta	10,218	1,039	11,296	1,129	11,729	1,334	5,898	1,233
Borno\Yobe	7,113	378	7,963	444	8,406	8,760	3,705	668
Cross River	9,886	776	10,443	1,014	12,620	1,405	4,433	659
Imo\Abia	10,494	1,056	19,759	1,001	9,582	1,486	4,007	1,094
Kaduna	11,437	933	12,480	1,150	13,497	2,326	5,672	1,430
Katsina+	-	-	-	-	-	-	1,803	1,717
Kano\Jigawa	9,091	719	9,126	828	9,050	1,397	4,064	522
Kwara	7,148	605	9,204	746	9,087	1,033	4,064	973
Lagos	75,860	20,941	72,636	22,186	71,759	3,659	51,618	22,555
Niger	5,117	229	5,973	335	6,649	691	2,720	655
Ogun	6,819	519	8,678	670	8,307	1,033	3,438	1,533
Ondo	5,524	494	7,698	621	7,749	1,518	2,740	952
Oyo\Oshun	8,229	1,087	9,404	1,338	9,463	1,885	5,271	1,816
Plateau	7,839	656	8,799	717	9,117	992	3,948	903
Rivers	6,849	715	7,929	794	9,052	1,123	4,489	1,047
Sokoto\Kebbi	7,605	398	8,557	451	8,975	716	3,944	1,948
Benue	7,495	362	9,078	433	9,256	705	3,821	1,233
TOTAL	222,802	32,777	234,678	36,067	242,661	44,872	137,486	44,768

Source: Federal Office of Statistics: Annual Abstract of Statistics P. 202.

Note: + Data for Akwa-Ibom and Katsina States were not available.

2.3.5 PUBLIC ORDER

TABLE 2.3.5.1: CRIMES\OFFENCES REPORTED TO THE POLICE

	Cases Reported	Cases Prosecuted	Cases Pending Investigation	Cases Closed
1990	291,472	144,864	128,174	15,720
1991	251,055	123,030	124,999	15,449
1992	285,810	129,858	140,999	32,546
1993	297,478	114,814	136,771	15,204
1994	279,910	117,948	117,267	15,366

Source: F.O.S: Annual Abstract of Statistics p.141.

However, there are also many other collected data by F.O.S in the area of climate, Household statistics, Justice and Security, Education, Agriculture etc. which are not emphasised here. The few emphasised ones are one among the many in the different areas.

2.4 SOME NATIONAL ACCOUNTS DATA

Data on national account aggregate will be analysed here. The data will show the principal aggregate of the whole economy with particular reference to the Gross Domestic Products (GDP) in Nigeria based on current and 1984 constant price.

The Gross Domestic Product is a concept that values the total economic activities taking place in Nigeria. It can be viewed as income earned, as expenditures incurred or as production output.

National output/Gross Domestic Product may be viewed at current markets price or at constant price. When viewed at current market price change in national product are as a result of changes both in the quantities produced and prices at which the goods

and services are sold. On the other hand, when valued at constant price output for each year is valued at the price ruling in a particular year.

TABLE 2.4.1 GROSS DOMESTIC PRODUCT AT CURRENT FACTOR COST

ACTIVITY SECTOR	1990	1991	1992	1993	1994
1. Agriculture	84,344.61	97,464.06	145,225.25	231,832.67	345,009.87
2. Mining & Guarrying	86,853.59	120,848.78	255,776.89	246,790.56	240,480.12
3. Manufacturing	14,296.64	18,892.08	26,348.53	34,430.82	57,195.37
4. Utilities	1,177.99	1,297.44	1,405.19	1,600.77	1,757.89
5. Building & Construction	4,350.75	4,900.33	6,109.72	8,019.10	9,911.70
6. Transport	5,254.86	5,939.12	8,752.27	14,573.86	27,840.72
7. Communication	407.23	449.21	550.72	723.36	737.76
8. Wholesale & Ret.Trade	35,837.66	41,792.20	62,296.25	100,848.89	152,018.68
9. Hotels & Restaurants	552.34	593.29	756.43	1,217.14	1,988.62
10 Finance & Insurance	11,642.44	12,979.01	15,124.95	16,276.44	12,554.50
11 Real Estate & Business Services	396.92	468.02	577.96	695.70	920.78
12 Housing (Dwelling)	3,872.42	4,751.29	5,923.39	9,275.30	16,046.10
13 Community, Social & Personal Services	932.25	1,072.15	1,313.70	2,194.03	3,476.72
14 Producer of Government Services	7,953.33	8,799.56	14,169.43	19,129.76	22,050.9
GRAND TOTAL	**257,873.03**	**321,115.75**	**544,330.68**	**691,608.40**	**691,789.78**

Source: Federal Office of Statistic: Annual Abstract of Statistics

The above table shows the GNP at current factor cost of the various sectors of economic activities in Nigeria. Below is the Histogram representation of the total GNP in each of the stipulat years.

FIG (2.4.1) GROSS DOMESTIC PRODUCT AT CURRENT FACTOR COST

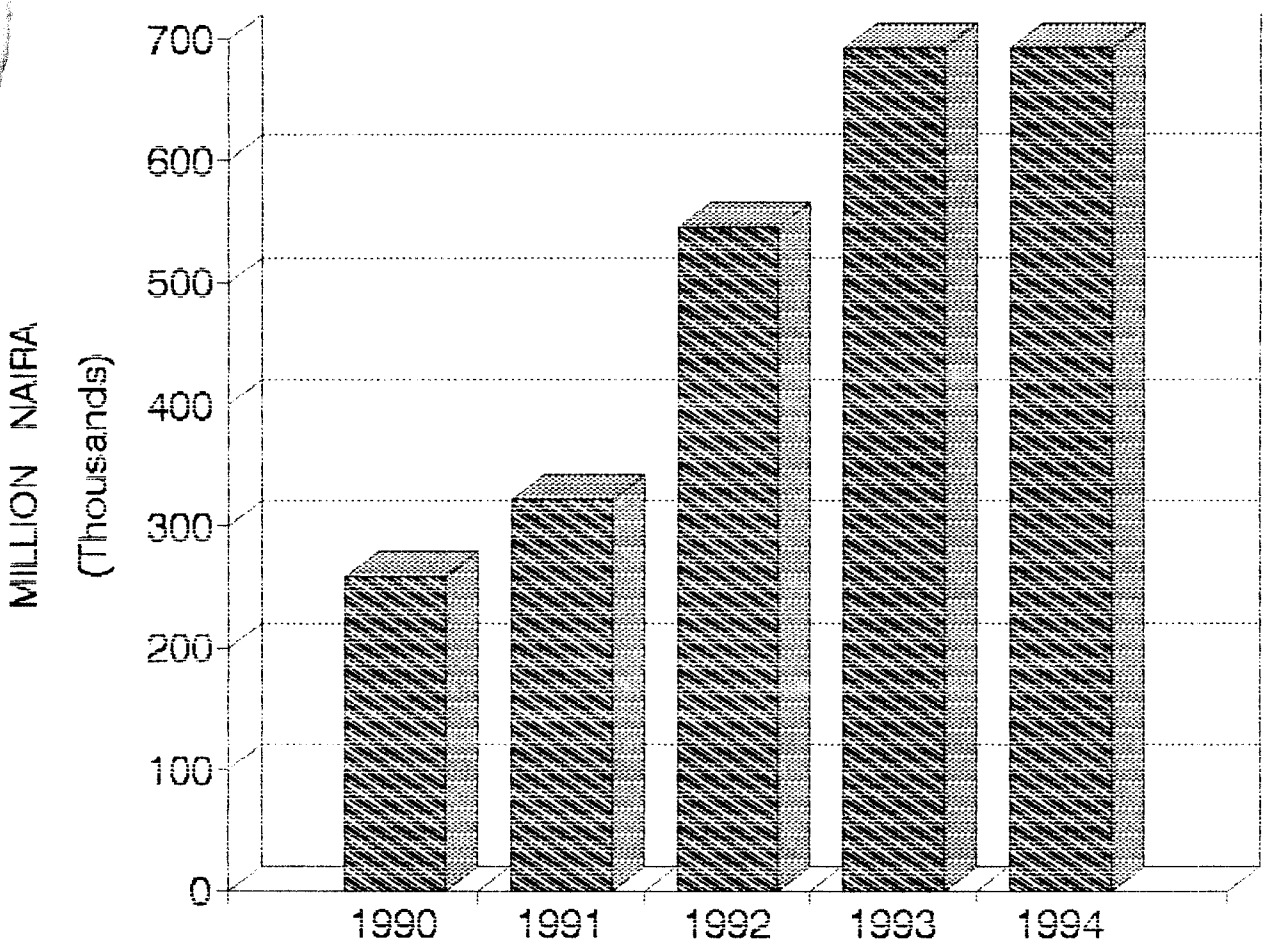


TABLE 2.4.2: GROSS DOMESTIC PRODUCT AT 1994 CONSTANT FACTOR COST

ACTIVITY SECTOR	1990	1991	1992	1993	1994
1. Agriculture	35,277.26	36,522.63	37,273.04	37,780.75	38,689.78
2. Mining & Guarrying	11,911.14	12,991.80	13,343.58	13,017.29	12,262.77
3. Manufacturing	7,361.42	8,046.03	7,657.23	7,340.99	6,973.97
4. Utilities	500.56	509.95	555.88	580.30	614.81
5. Building & Construction	1,726.90	1,795.98	1,866.02	1,959.32	2,018.10
6. Transport	2,853.63	2,950.47	3,083.74	3,215.84	3,242.29
7. Communication	256.25	240.61	268.70	279.40	281.42
8. Wholesale & Retail Trade	11,488.64	11,856.28	12,223.82	12,590.53	12,592.98
9. Hotels & Restaurants	477.88	482.66	492.31	499.69	502.19
10 Finance & Insurance	7,884.63	8,200.02	8,523.98	8,845.41	9,109.35
11 Real Estate & Business Services	259.36	263.25	270.96	281.51	290.97
12 Housing (Dwelling)	2,080.49	2,163.71	2,247.88	2,342.07	2,412.33
13 Community, Social and Personal Services	667.57	678.14	723.31	795.19	874.26
14 Producers of Government Services	7,596.31	7,912.54	8,900.84	10,120.93	11,117.19
TOTAL	**90,342.04**	**94,614.07**	**97,431.39**	**99,649.22**	**100,982.41**

Source: Federal Office of Statistics: Annual Abstract of Statistics.

FIG (2.4.2) GROSS DOMESTIC PRODUCT AT 1984 CONSTANT FACTOR COST

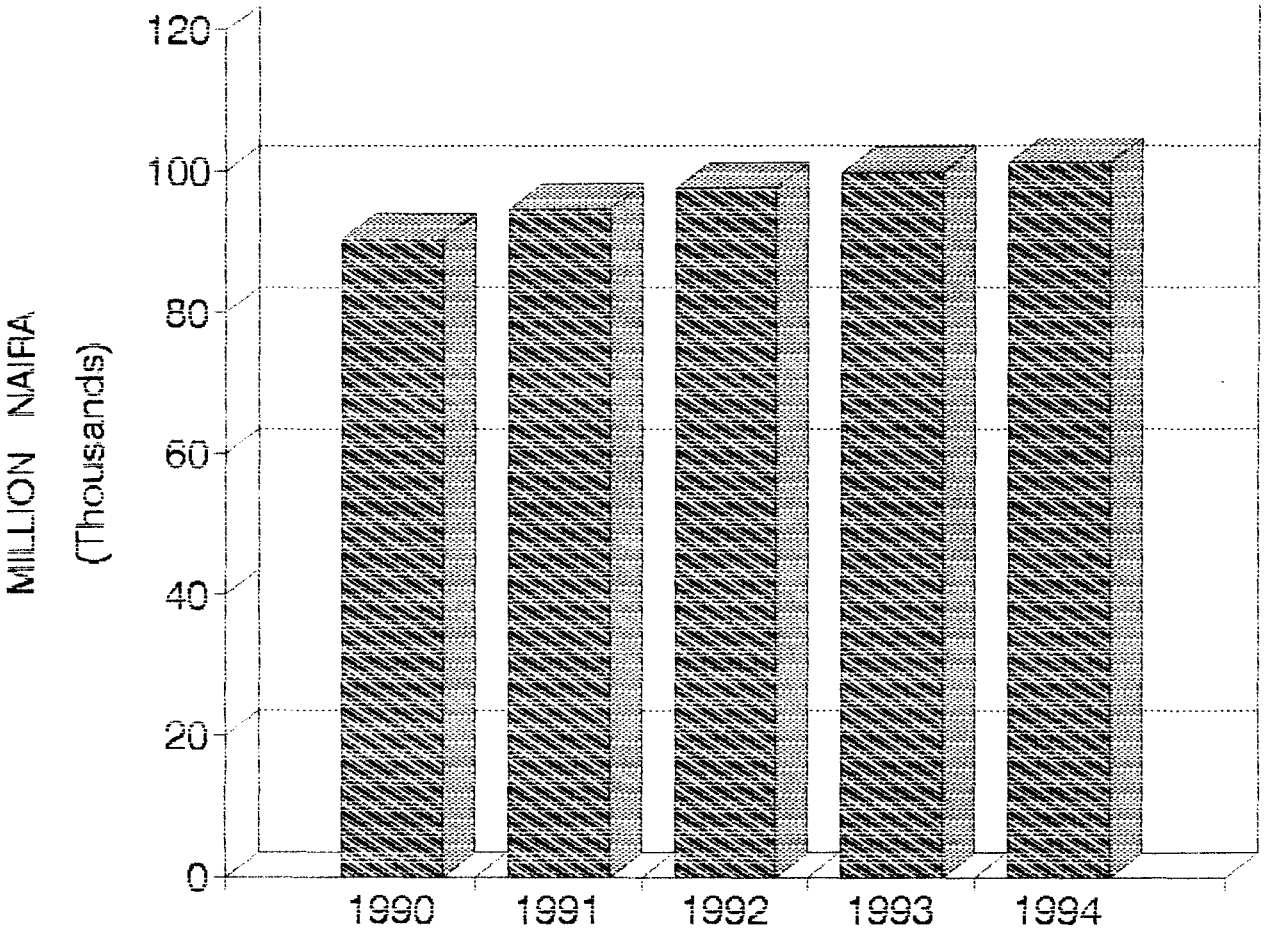


TABLE 2.4.3. GROSS DOMESTIC PRODUCT AND EXPENDITURE AT CURRENT PURCHASERS' VALUE

N MILLION

CATEGORY	1990	1991	1992	1993	1994
Govt. Final Consumpt. Expenditure	11,468.73	12,680.00	20,431.83	27,582.97	31,720.42
Private Final Consumpt. Expenditure	155,273.79	222,269.86	404,182.06	569,793.15	766,671.07
Increase in Stock	500.00	200.00	300.00	450.00	315.07
Gross Fixed Capital Formation	30,626.83	35,423.85	58,640.28	80,948.07	84,127.04
Export of goods and Services	112,562.25	129,691.18	196,904.28	191,981.67	190,061.85
Less Imports of Goods and Services	49,794.90	76,263.85	130,649.65	173,660.63	175,397.24
Expenditure on the Gross Domestic Products	**260,636.70**	**324,010.04**	**549,808.80**	**697,095.23**	**897,498.14**
Compensation of employees	41,050.14	46,869.22	59,099.49	74,546.18	80,900.91
Operating surplus	203,465.87	258,110.89	468,880.15	599,822.49	793,111.98
Consumption on fixed capital	13,357.02	15,267.23	16,351.04	17,239.73	17,778.95
Indirect taxes	3,219.60	4,270.84	5,762.12	5,688.54	5,900.78
Less subsidies	455.93	508.14	284.00	201.71	192.38
GROSS DOMESTIC PRODUCT	**260,636.70**	**324,010.04**	**549,808.80**	**697,095.23**	**897,498.14**

Source: Federal Office of Statistics: Annual Abstract of Statistics.

In the above table the government consumption expenditure private consumption expenditure, increase in stock and capital formation, export of goods and services and less imports gives us the Aggregate Demand (AD) of our economy's national product in the stipulated years. While the compensation of employees, operating surplus, consumption of field capital, indirect tax and less subsidies indicates our Aggregate Supply (AS) components and represents the national income generated from such supply. The figure in naira million for GDP shows that the value of income earned from output is equal to the demand expenditure on the National product each year i.e N260,636.70.

The same analysis is true on GDP and Expenditure at 1984 constant purchases value.

FIG (2.4.3) GROSS DOMESTIC PRODUCT AND EXPENDITURE AT CURRENT PURCHASERS VALUE

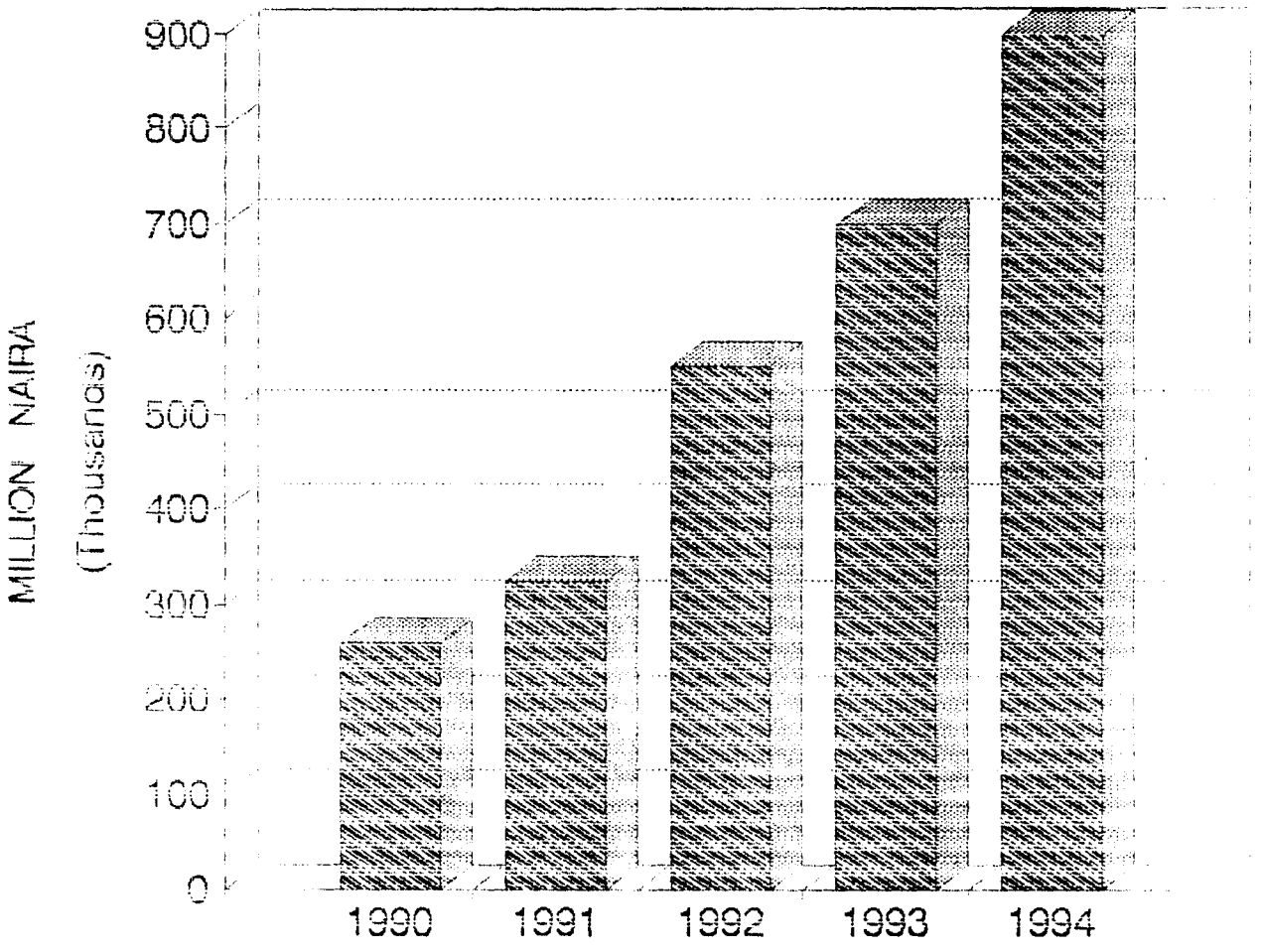
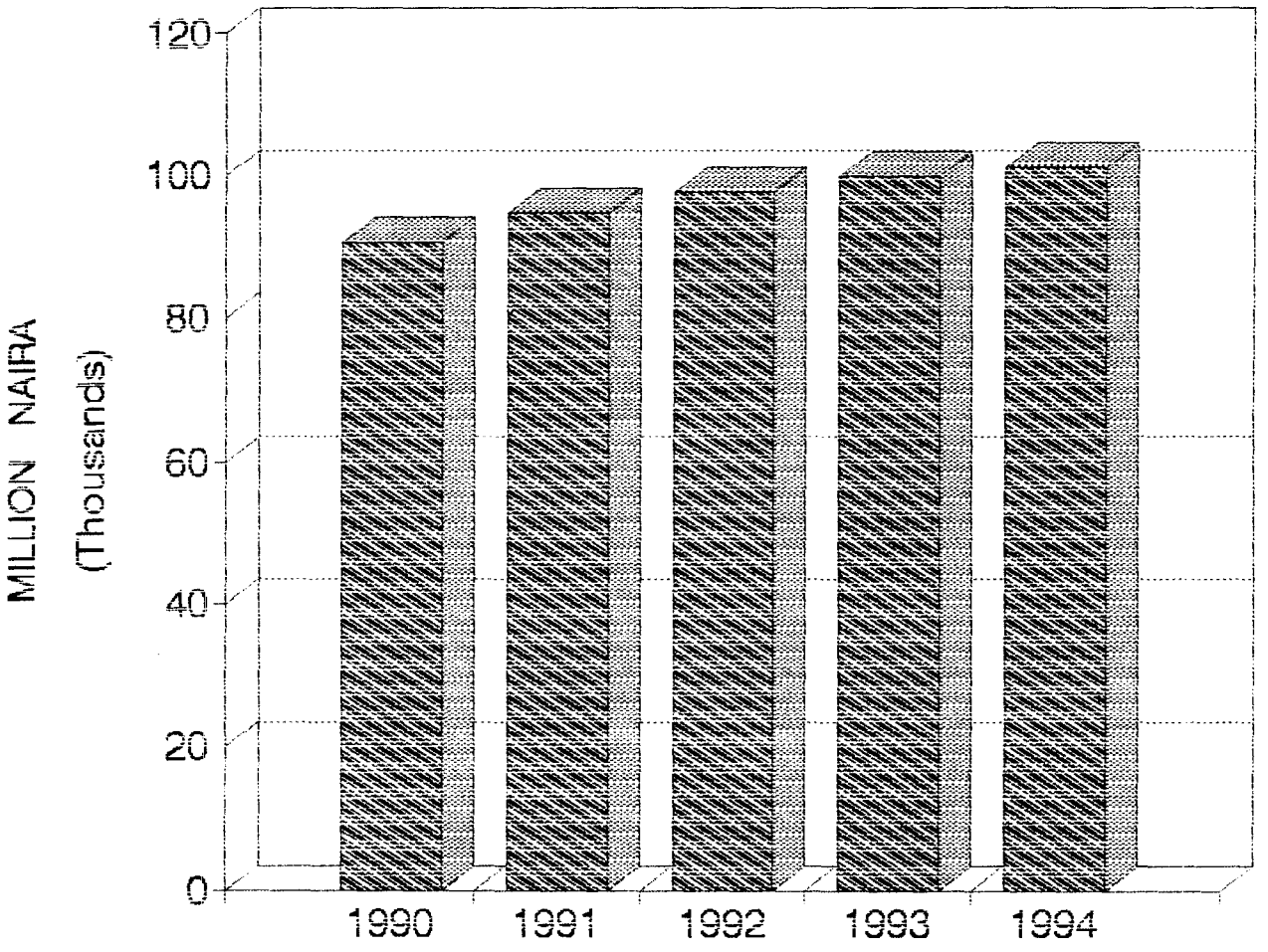


FIG (2.4.4) GROSS DOMESTIC PRODUCT AND EXPENDITURE AT 1984 PURCHASERS' VALUE



However, the data plotted above shows the equality of the naira amount of the national aggregate demand components to the naira amount of the national aggregate supply components. In other words income generated on national outputs from the aggregate demand of the economy is equal in naira amount. Hence, telling us that the nation's aggregate economic forces are working at an equilibrium.

The determination of the equilibrium amount and the various income level generated by the manipulation of the national aggregate forces' components has been an important issue in every nations macro economy. Hence, a mechine designed program is being worked upon to be applied in the determination of national income.

2.5 SCOPE AND LIMITATION OF STUDY

The software development is limited in scope. It is a system designed to determine the national income equilibrium in the short-run using the components of an economy's aggregate demand. However, the system is designed to make computation by upholding some theoritical assumptions.

Finally just as in an other study/research work, time and lack of adequate fund imposed serious limitation to the work.

CHAPTER THREE

NATIONAL INCOME DETERMINATION PROGRAM MODEL

3.1 INTRODUCTION

The system is designed based on some problems inherent in the current system. Such problems include: lack of mechine for fast and accurate data processing, and inadequate information system to provide users required information for decision making. This yields inaccurate information that is not best funted for users and therefore leads to wrong manipulation of fiscal aggregates ending up in wrong fiscal policy.

In view of these weaknesses, a new system of national income determination program is designed to give an efficient and effective system to determine national income level and the equilibrium through the multiplier process by the use of mechine. Thus, conforming a standard of measure which simplifies the complex process involved in such determination.

As a system design, by which other things are judged or as a standard system, it is aimed at;

(i) Providing accurate and faster processing of large volume of data by simplification, specialization and standardisation to generate or determine national income equilibrium.

(ii) Providing efficient storing and retrieving of data involving fiscal aggregates in the economy.

(iii) Providing information in the form best funted by decision Makers in the economy.

With the above objectives in mind, a number of possible atternative designs are

considered and each with its own requirement specification. Such alternatives which involve different combinations of manual and computerized elements are; the savings equal to Investment (S = I) design, Aggregate Supply Components design, and Aggregate demand components design. The selection of the Aggregate demand components design for determination of national income equilibrium proceeds work from its requirement specification to produce system specification.

3.2 SYSTEM SPECIFICATIONS

At this stage, with good judgement, skill and knowledge, the requirement specification is interprented to produce the desired system specification of the new system.

The system specification for the national income determination provides detailed documentation of the entire system, communicating means with the management, Programmers, Operating staff and Users, and a complete record for modification, evaluation and training purpose. Such specification of the system is designed using Data Base Management System.

3.2.1 INPUT SPECIFICATION

The input for the system is specified here and is aimed at obtaining the desired Output. The input is designed into an input Layout according to each sector economy and hence serves as source document.

TWO SECTOR ECONOMY MODEL INPUT FILE STRUCTURE (TSE.DBF)

S/NO	FIELDNAME	FIELDTYPE	WIDTH	DEC
1	SNO	NUMERIC	2	
2	YEAR	N	4	
3	OUTPUT	N	10	
4	CONSUMPTION	N	10	
5	INVESTMENT	N	10	

THREE SECTOR ECONOMY MODEL INPUT FILE STRUCTURE (GXP.DBF)

S/NO	FIELDNAME	FIELDTYPE	WIDTH	DEC
1	SNO	N	2	
2	YEAR	N	4	
3	OUTPUT	N	10	
4	CONSUMPTION	N	10	
5	INVESTMENT	N	10	
6	GOVT.EXPEND	N	10	

(i) The Autonomous tax model has the 3 sector model input layout and the To (autonomous Tax) as additional input.

(ii) In addition to the 3 sector input layout and the To as input, is the Transfer

Payment. The Transfer Payment model has an additional input R.

(iii) For the income tax, the inputs are the 3 sector model layout, and the T = Ta + tY, and R.

Note: The Tax and Transfer Payment (T and R) are not included in the input layout as aggregate demand compoinents (i.e C+I+G) because the only affect consumption thereby altering consumption linear function (C = Ca + cY).

FOUR SECTOR ECONOMY MODEL INPUT FILE STRUCTURES

EXPORT MODEL INPUT FILE STRUCTURE (EXP. DBF) ₦m

S/NO	FIELDNAME	FIELDTYPE	WIDTH	DEC
1	SNO	N	2	
2	YEAR	N	4	
3	OUTPUT	N	10	
4	CONSUMPTN	N	10	
5	INVESTMENT	N	10	
6	GOVT.EXPENDITURE	N	10	
7	EXPORT	N	10	

IMPORT MODEL INPUT LAYOUT (IMP. DBF) ₦m

S/NO	FIELDNAME	FIELDTYPE	WIDTH	DEC
1	SNO	N	2	
2	YEAR	N	4	
3	OUTPUT	N	10	
4	CONSUMPTION	N	10	
5	INVESTMENT	N	10	
6	GOVT.EXPENDT	N	10	
7	EXPORT	N	10	
8	IMPORT	N	10	

OTHER FILES INCLUDES: AUTONOMOUS CONSUMPTION DBF (AU-C.DBF)

S\NO	FIELDNAME	FIELDTYPE	WIDTH	DEC
1	SNO	N	2	
2	YEAR	N	4	
3	OUTPUT	N	10	
4	CONSUMPTION	N	10	
5	MPC	N	3	1

MARGINAL PROPENSITY TO SPEND ON TAX DBF (M-PTX.DBF)

S\NO	FIELDNAME	FIELDTYPE	WIDTH	DEC
1	SNO	N	2	
2	YEAR	N	4	
3	OUTPUT	N	10	
4	TAX	N	10	

AUTONOMOUS TAX FILE STRUCTURE (AU-TX.DBF)

S\NO	FIELDNAME	FIELDTYPE	WIDTH	DEC
1	SNO	N	2	
2	YEAR	N	4	
3	OUTPUT	N	10	
4	TAX	N	10	
5	MPT	N	5	2

AUTONOMOUS IMPORT FILE STRUCTURE (AU-M.DBF)

S\NO	FIELDNAME	FIELDTYPE	WIDTH	DEC
1	SNO	N	2	
2	YEAR	N	4	
3	OUTPUT	N	10	
4	IMPORT	N	10	
5	MPM	N	5	2

3.2.2 OUTPUT SPECIFICATION

The output will be naira amount of the equilibrium amount of the national income generated by the mechine computation of the aggregate demand components through the multiplier process. However, the output is designed to lay emphasis on the naira amount of the national output that is at equilibrium with the naira amount of the computed aggregate demand components as well as the multiplier effect of each component on the national income level.

An output layout is designed for each sector with different file structures as shown below.

TWO SECTOR ECONOMY MODEL OUTPUT FILE STRUCTURE

S\NO	FIELDNAME	FIELDTYPE	WIDTH	DEC
1	SNO	N	2	
2	YEAR	N	4	
3	OUTPUT	N	10	
4	CONSUMPTION	N	10	
5	INVESTMENT	N	10	
6	AGGDEMAND	N	10	

THREE SECTOR ECONOMY MODEL OUTPUT FILE STRUCTURE
(GOUTPUT.DBF)

S\NO	FIELDNAME	FIELDTYPE	WIDTH	DEC
1	SNO	N	2	
2	YEAR	N	4	
3	OUTPUT	N	10	
4	CONSUMPTION	N	10	
5	INVESTMENT	N	10	
6	GOVTEXPEDT	N	10	
7	AGGDEMAND	N	10	

EXPORT MODEL OUTPUT FILE STRRUCTURE (XOUTPUT. DBF)

S\NO	FIELDNAME	FIELDTYPE	WIDTH	DEC
1	SNO	N	2	
2	YEAR	N	3	
3	OUTPUT	N	10	
4	CONSUMPTION	N	10	
5	INVESTMENT	N	10	
6	GOVTEXPEDT	N	10	
7	EXPORT	N	10	
8	AGGDEMAND	N	10	

IMPORT MODEL OUTPUT FILE STRUCTURE (MOUTPUT.DBF)

S\NO	FIELDNAME	FIELDTYPE	WIDTH	DEC
1	SNO	N	2	
2	YEAR	N	3	
3	OUTPUT	N	10	
4	CONSUMPTION	N	10	
5	INVESTMENT	N	10	
6	GOVTEXPEDT	N	10	
7	EXPORT	N	10	
8	IMPORT	N	10	
9	AGGDEMAND	N	10	

3.3 SOFTWARE PROGRAM DEVELOPMENT

As the problems has been identified and clearly understood, a formulation requirement that will place the task on the computer by an outlined set of rules of successive steps to obtain desired result is developed.

Software is a set of programs used to direct the affair of the computer. Hence, for computer to be controlled it requires writing a program. The program for the National income equilibrium determination is therefore, a set or sequence of instructions which informs the computer the steps required for achieving the defined task. Each instruction of the program defines a basic operation to be performed, identifies the address of the data to be processed, and the peripheral device (input or output device) to be used. This process of preparing program of instruction for the stated task is referred to as programming National income equilibrium determination.

The programmed instructions are written in a programming language (Database) which perform the act of giving the instructions to the computer for onward execution of inputted data. The programming language is in the form of artificially defined set of characters, symbols and words; plus the rules that combines these characters, symbols, and words to give meaningful communication so designed to be conviniently used in developing the program for the system.

3.3.1 DATABASE MANGEMENT SYSTEM

A database management system is a software that construct, expands and maintain the data contained in database. It also provide the interface between the user and the data in such a way that it enables the user to record, organise, select, summarise extract,

report on and manage data. However, it organises data in the database file in the form of tables.

Database perform the following important functions.

(i) Reduces data duplication and inconsistency

(ii) Coordinates, access, and operates on several files of information as if it is in a single file.

(iii) Provides shareability of data to users

(iv) Generates reports from database

(v) Provides for a centrally controlled data and operation on data.

The database provides the system with some specialised modules to carry out the desired operation.

3.3.1(a) DATA EDITION

This is used to enter data to be processed into the database file through a created formatted screen display by the use of Append blank command.

3.3.1(b) DATA EDITION

This routine allows for the retrieval of particular records for the purpose of modification. It avoid going through the **EDIT** and **BROWSE** Modes in the **UPDATE** menu of the Assistant mode. Therefore provides tools for finding, displaying and editiing records.

3.3.1(c) DATA DELETING ROUTINE

As the data to be processed are entered, the need for the deletion of any record of interest may arise. This routine therefore, provide the designed system with the

deleting facility using Delete and Pack Commands.

3.4 PROCESSING SPECIFICATION AND FLOW CHART

Here, the processing steps needed to produce the design output is designed. This involves the Organisation of ideas in an algorithm representation. The common tool or form of Algorithm representaion used here is the flow chart.

The flow chart shows the relationship between inputs, processing and output according to sectors' menu. It makes it easy for the system to be viewed and gives a clear insight of each sector menu and sub-menu of the modular program structure

FIGURE3:4:1 FLOWCHART FOR INTRODUCTION PROGRAM.

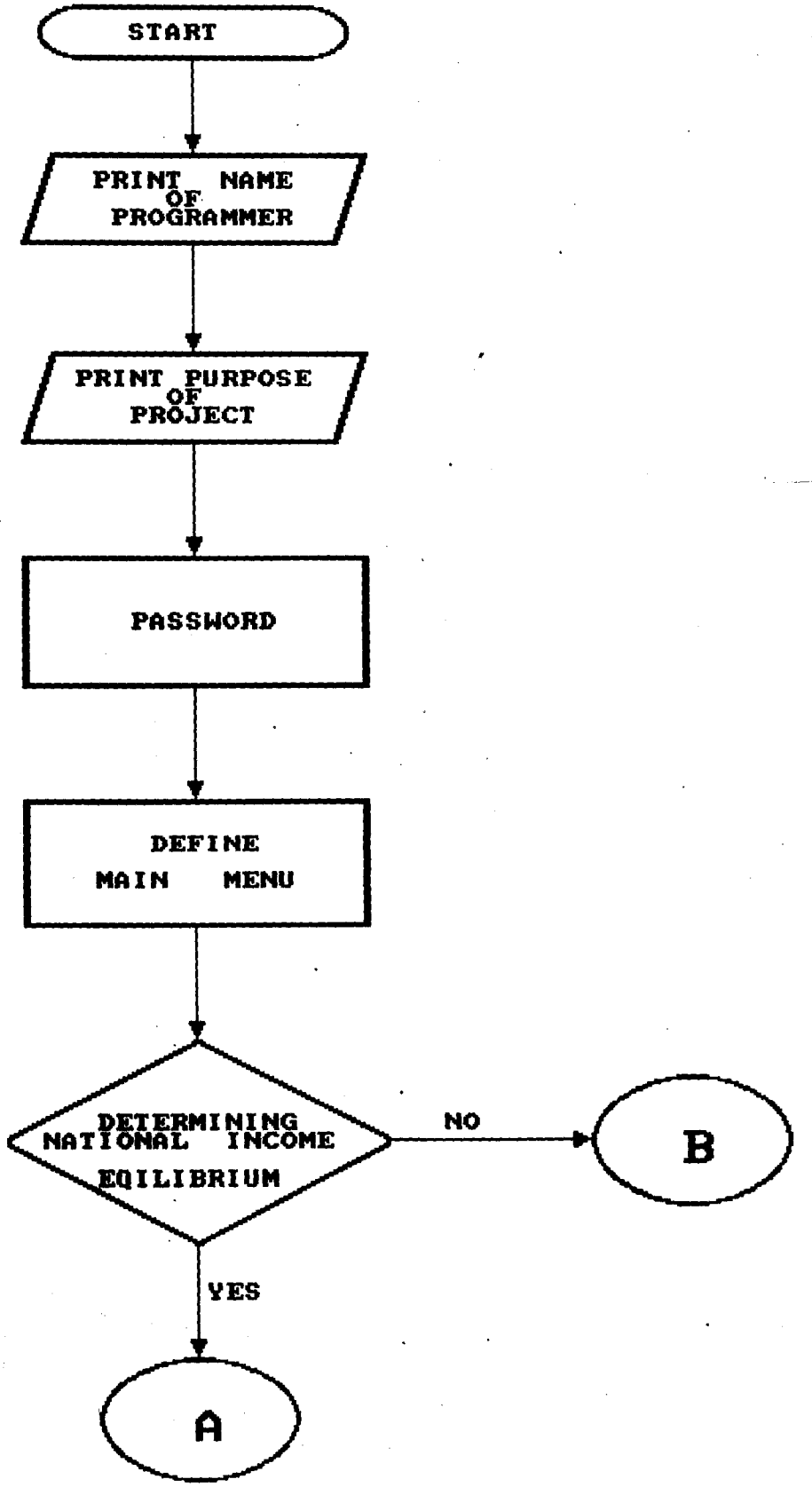
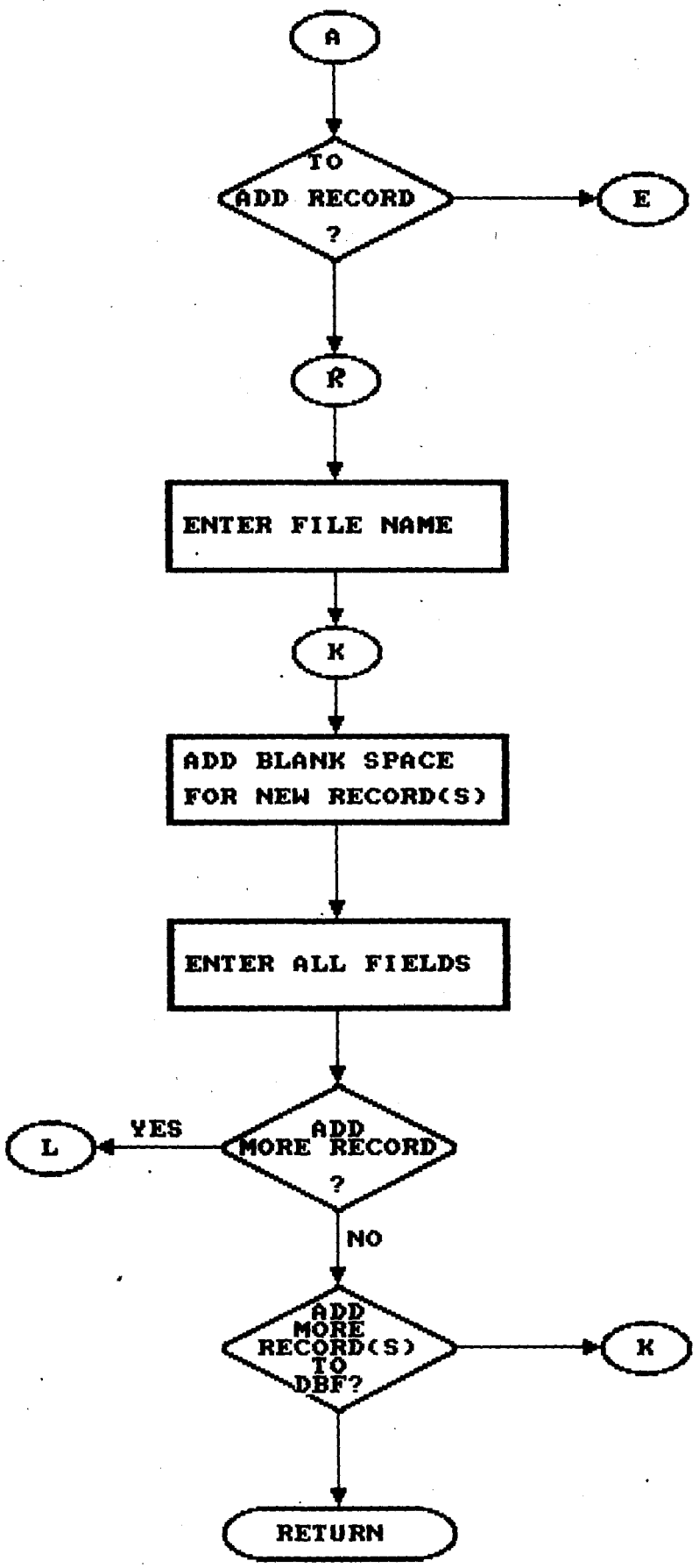


FIGURE 3:4:2 FLOWCHART FOR DATA ADDITION PROGRAM.



URE 3:4:3 FLOWCHART FOR VIEWING PROGRAM.

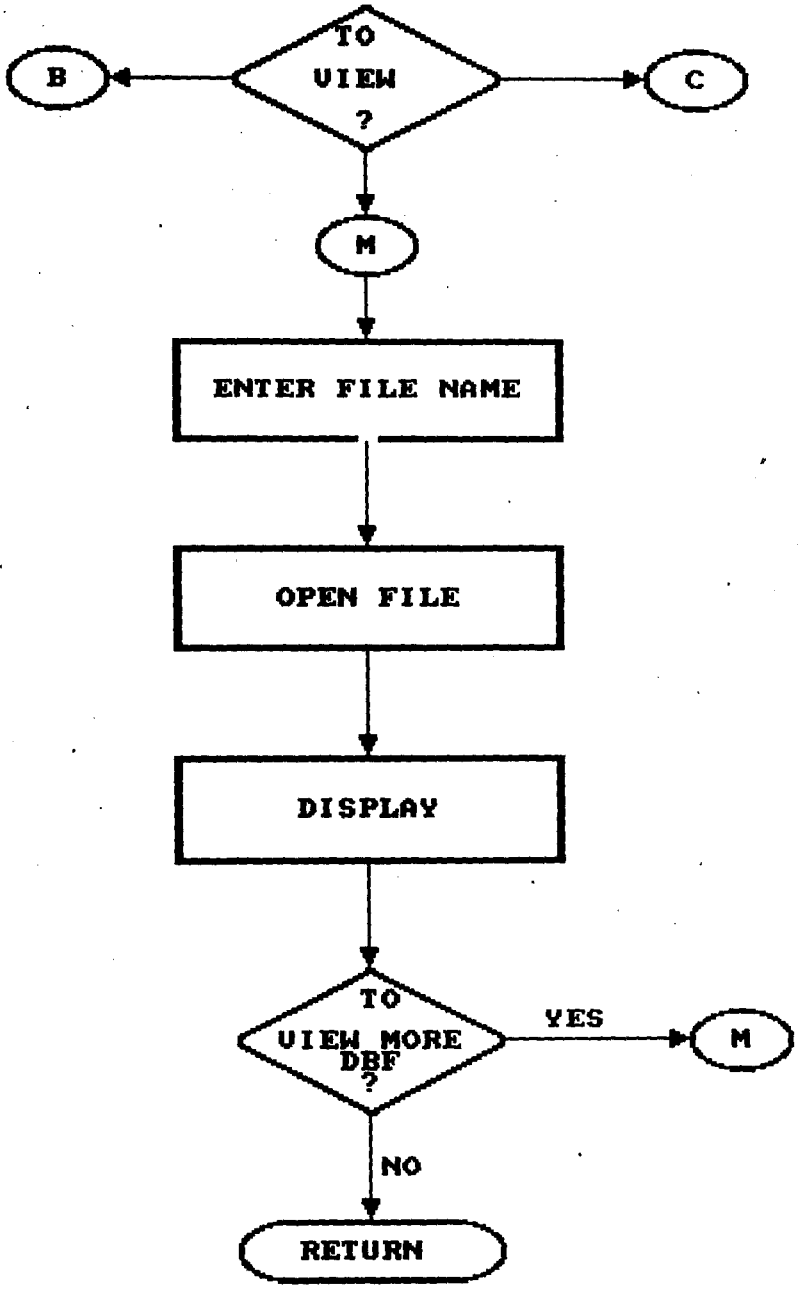
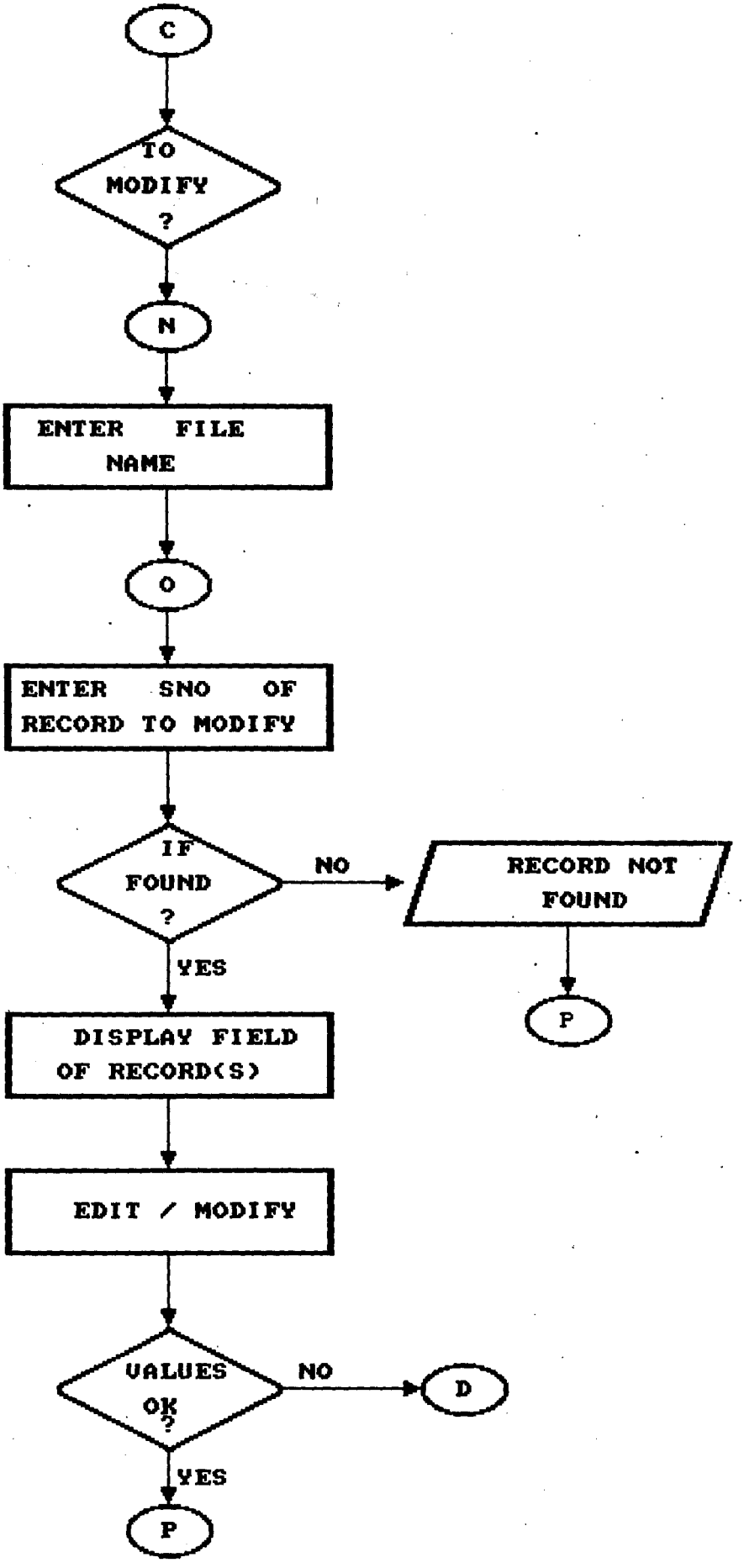
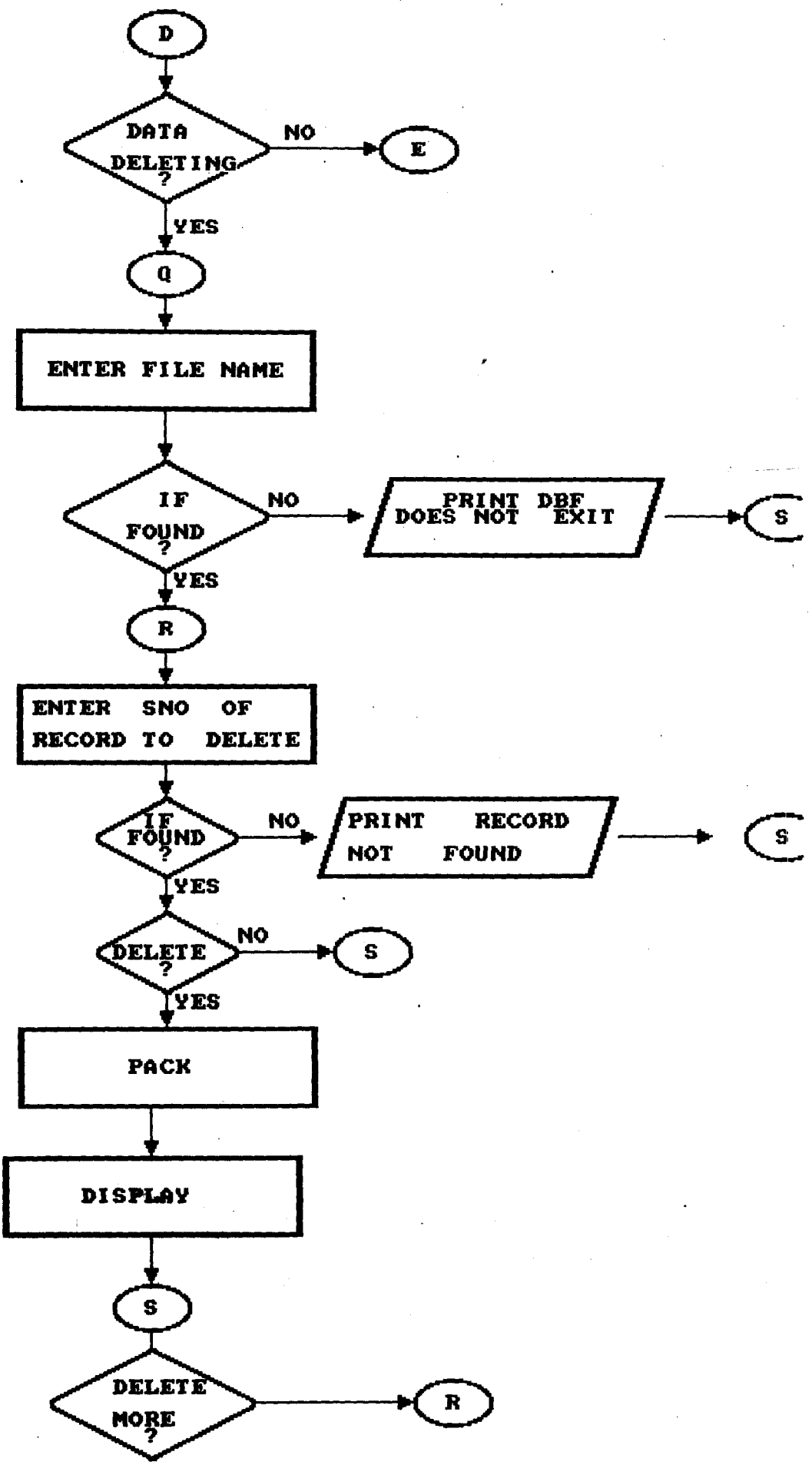


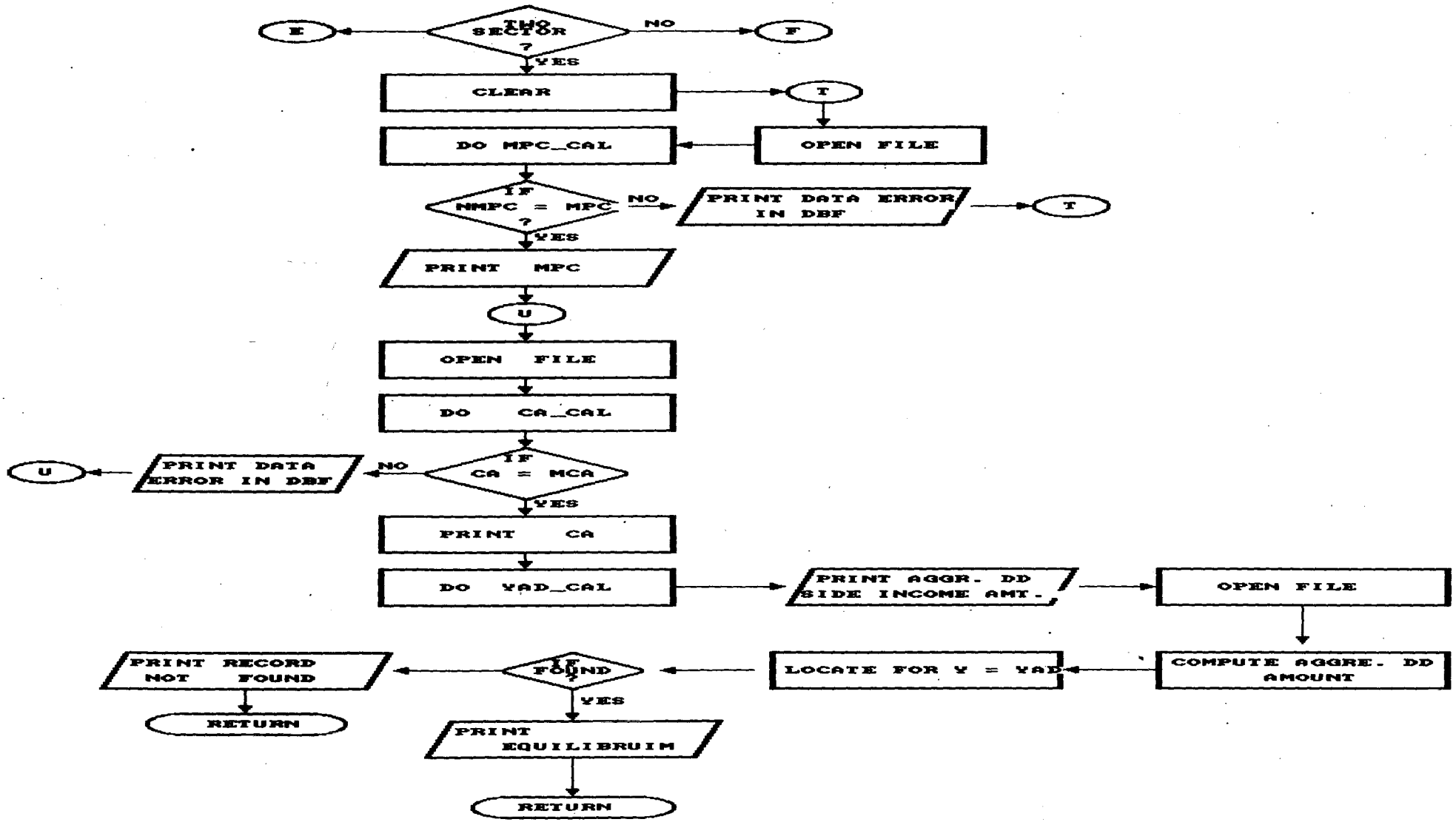
FIGURE 3: 4:4 FLOWCHART FOR EDITING / MODIFYING



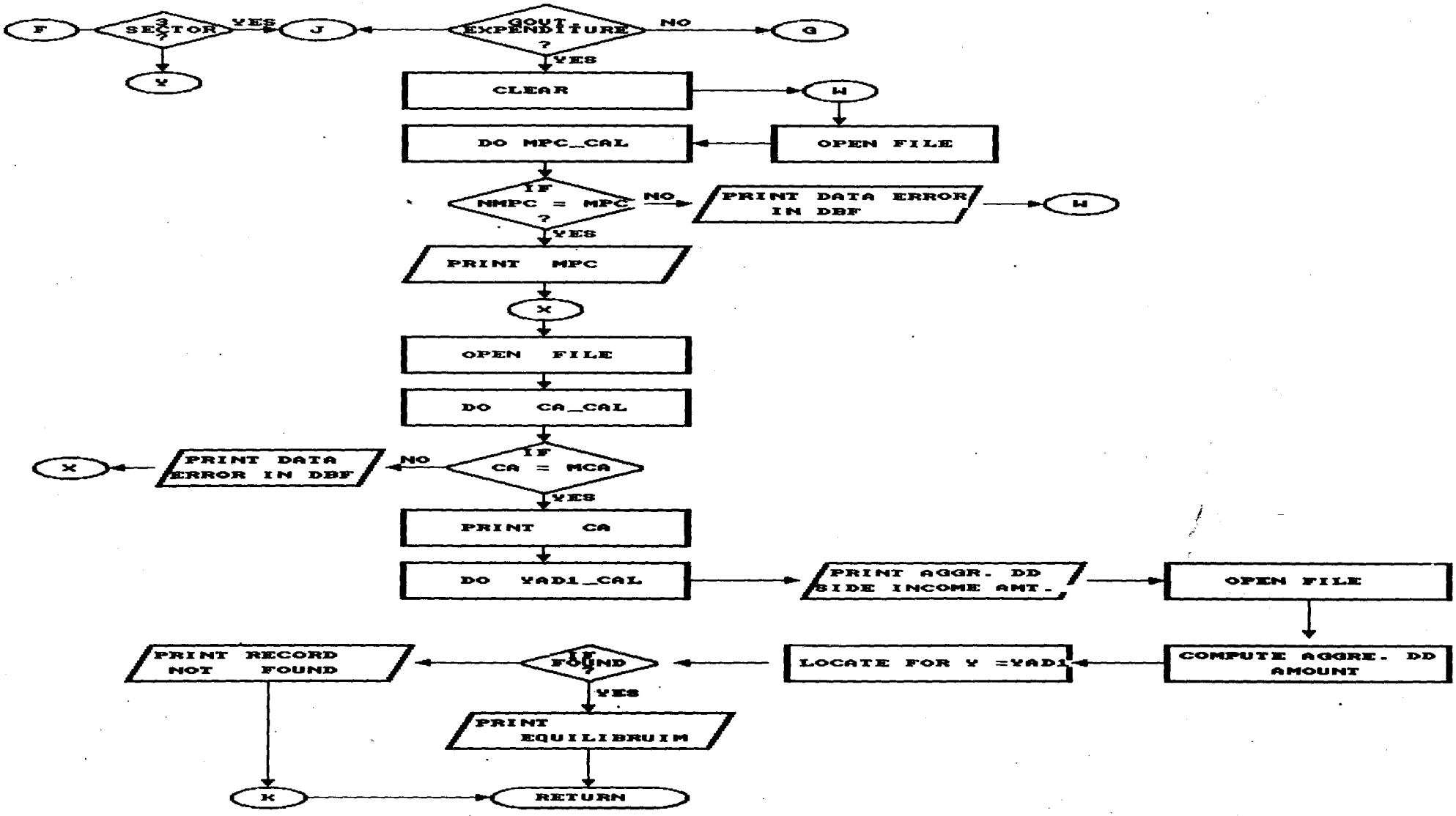
IGURE 3:4:5 FLOWCHART FOR DELETING PROGRAM.



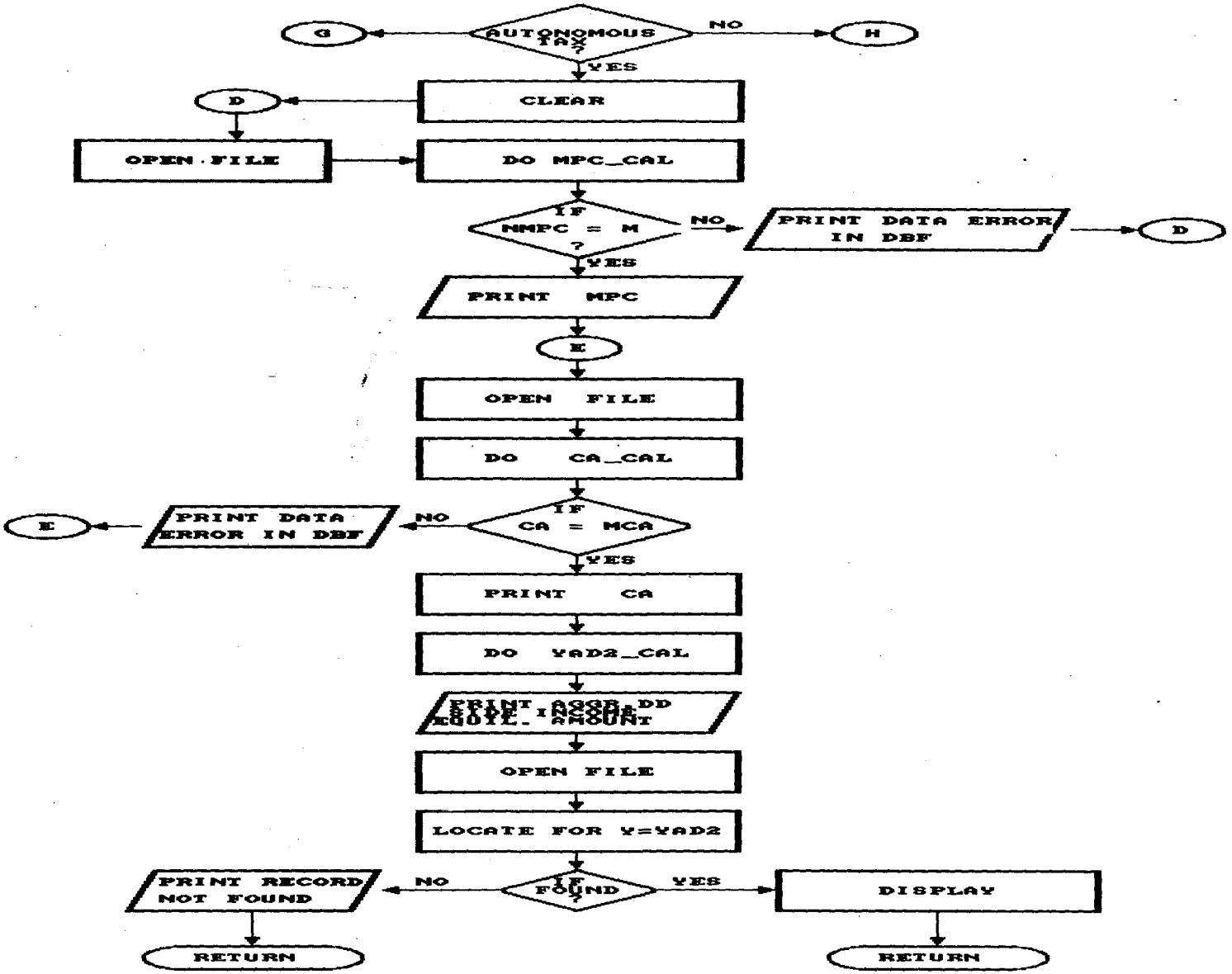
FFIGURE 3:4:6 FLOWCHART FOR TWO SECTOR ECONOMY PROGRAM.



FFIGURE 3:4:7 FLOWCHART FOR GOUERNMENT EXPENDITURE PROGRAM.



FFIGURE 3:4:7:1 FLOWCHART FOR AUTONOMOUS TAX PROGRAM.



FFIGURE 3:4:7:2 FLOWCHART FOR TRANSFER PAYMENT PROGRAM.

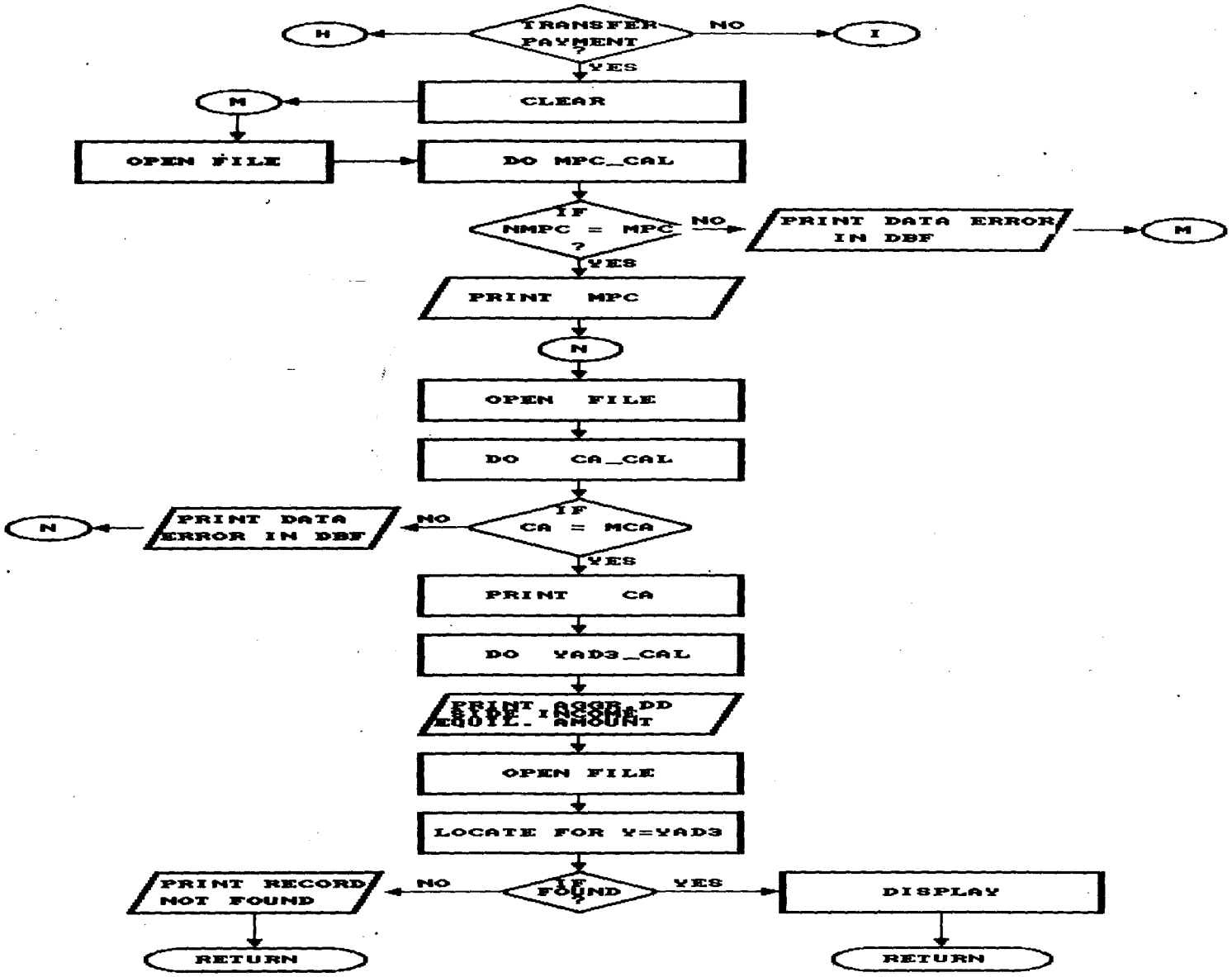
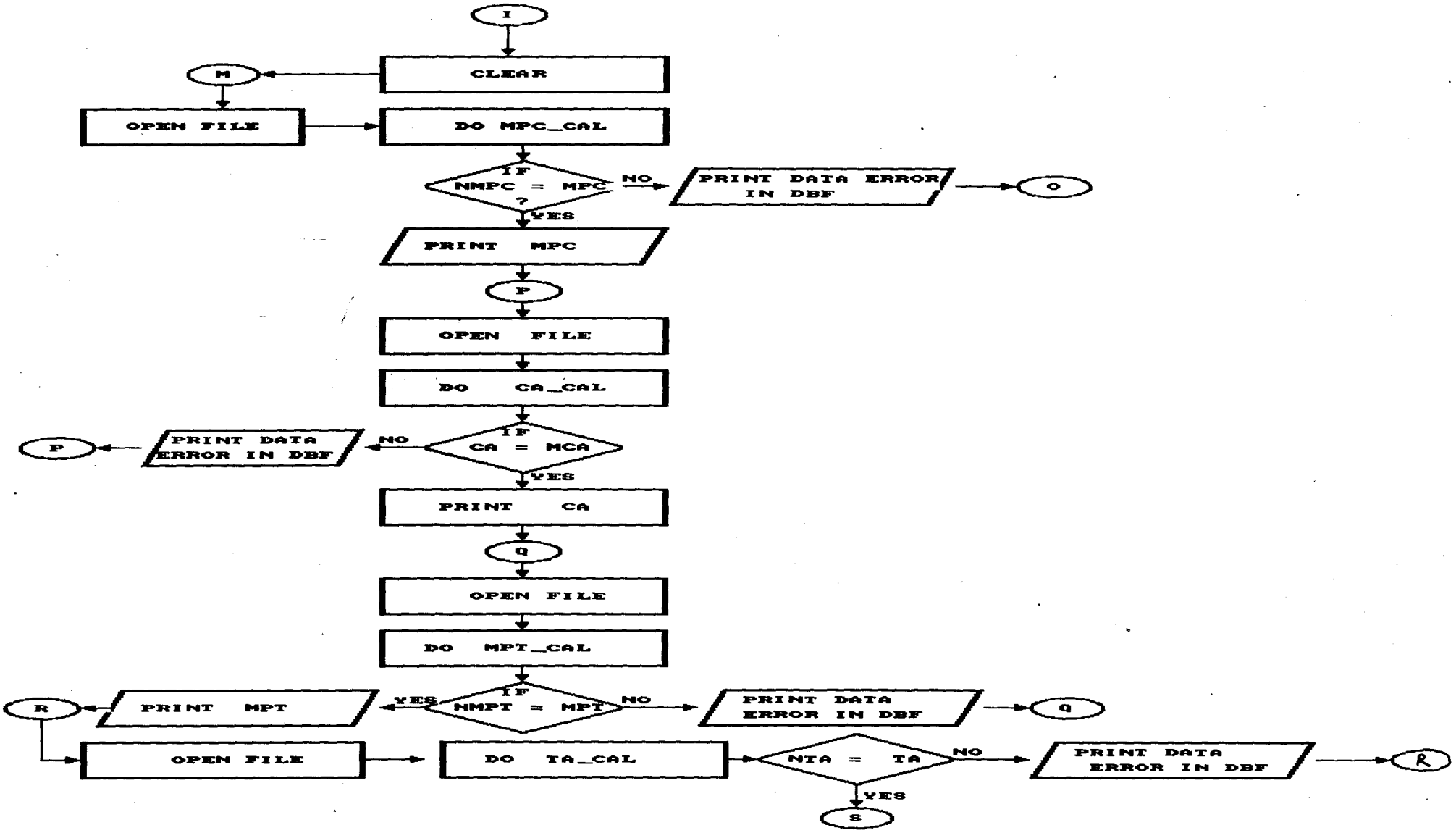


FIGURE 3:4:7:3 FLOWCHART FOR INCOME TAX PROGRAM.



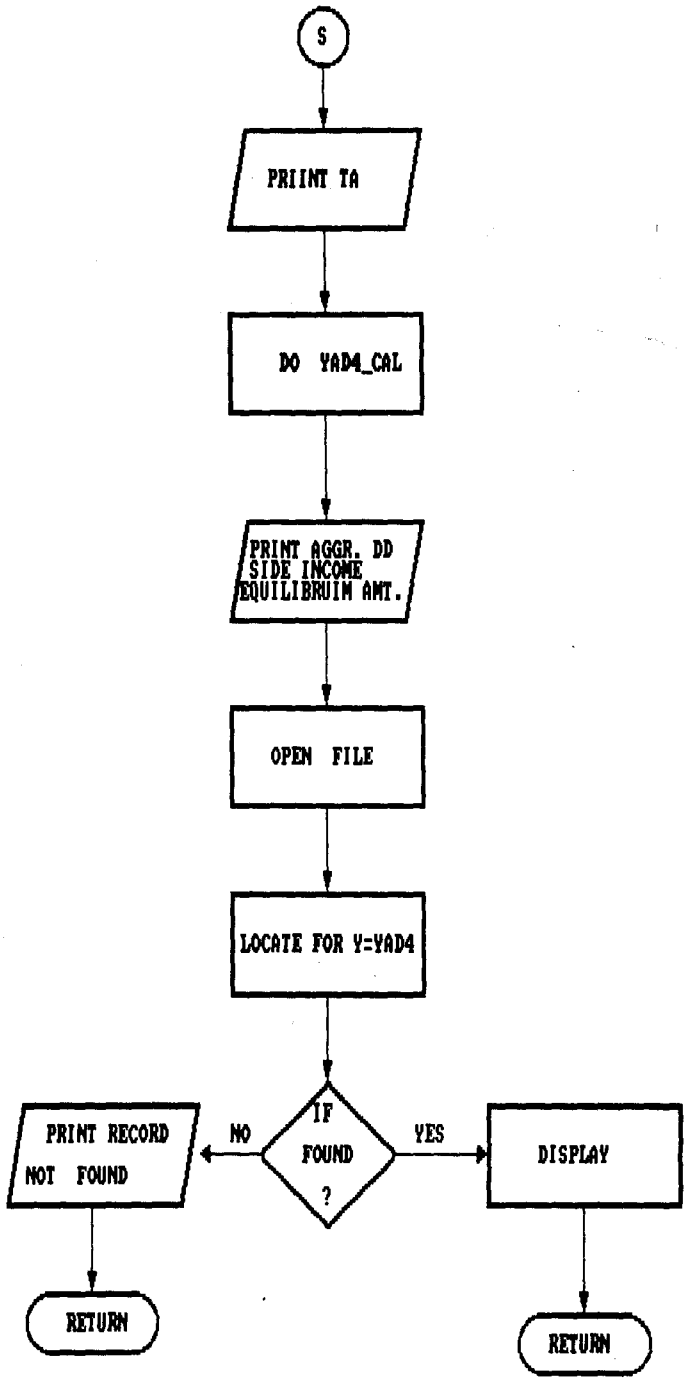

S
PRIINT TA
DO YAD4_CAL
PRINT AGGR. DD SIDE INCOME EQUILIBRUIM AMT.
OPEN FILE
LOCATE FOR Y=YAD4
IF FOUND ?
NO
YES
PRINT RECORD NOT FOUND
DISPLAY
RETURN
RETURN

FIGURE 3:4:8 FLOWCHART FOR EXPORT PROGRAM (OPEN ECONOMY)

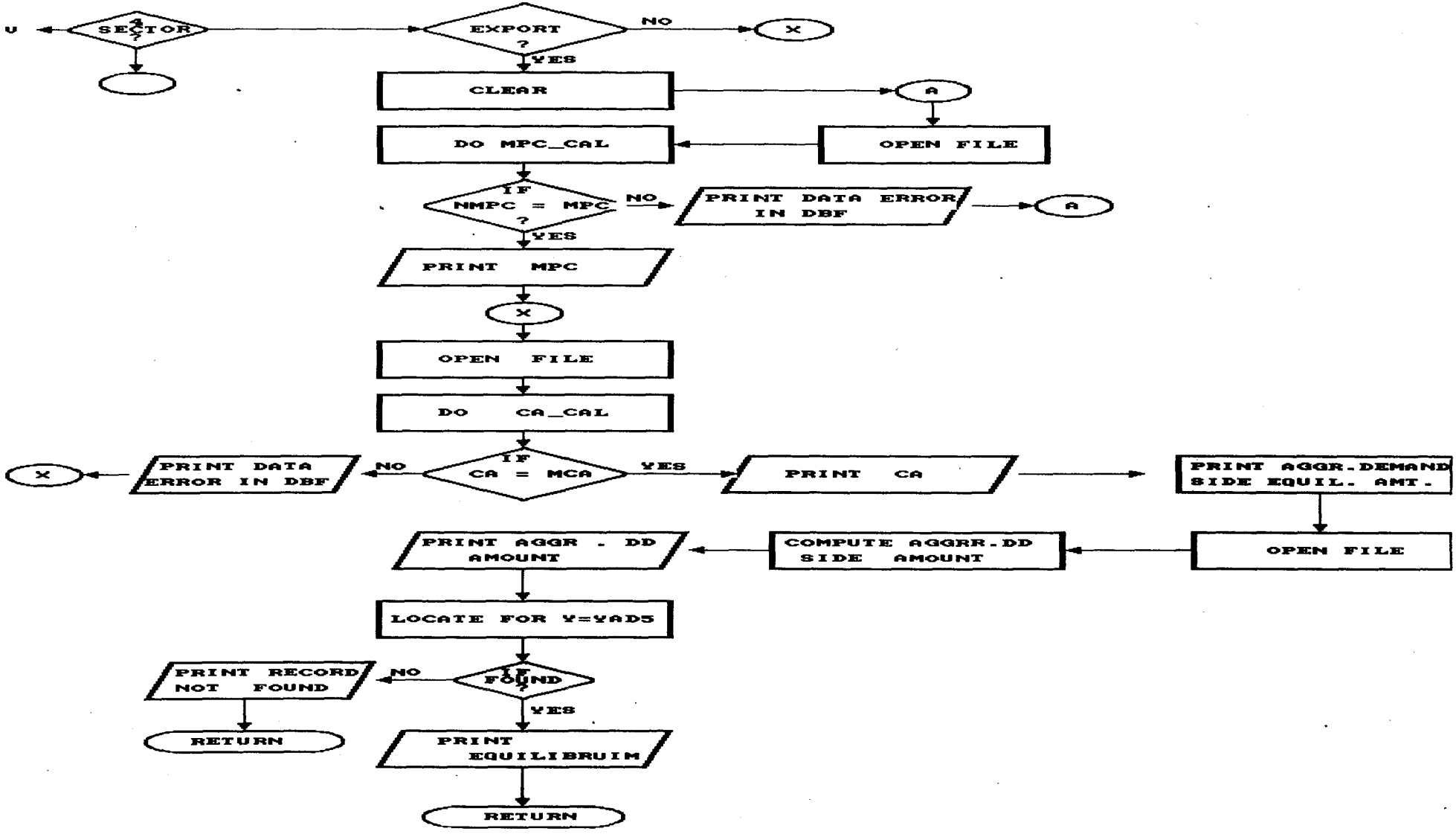


FIGURE 3:4:8:1 FLOWCHART FOR IMPORT PROGRAM (OPEN ECONOMY)

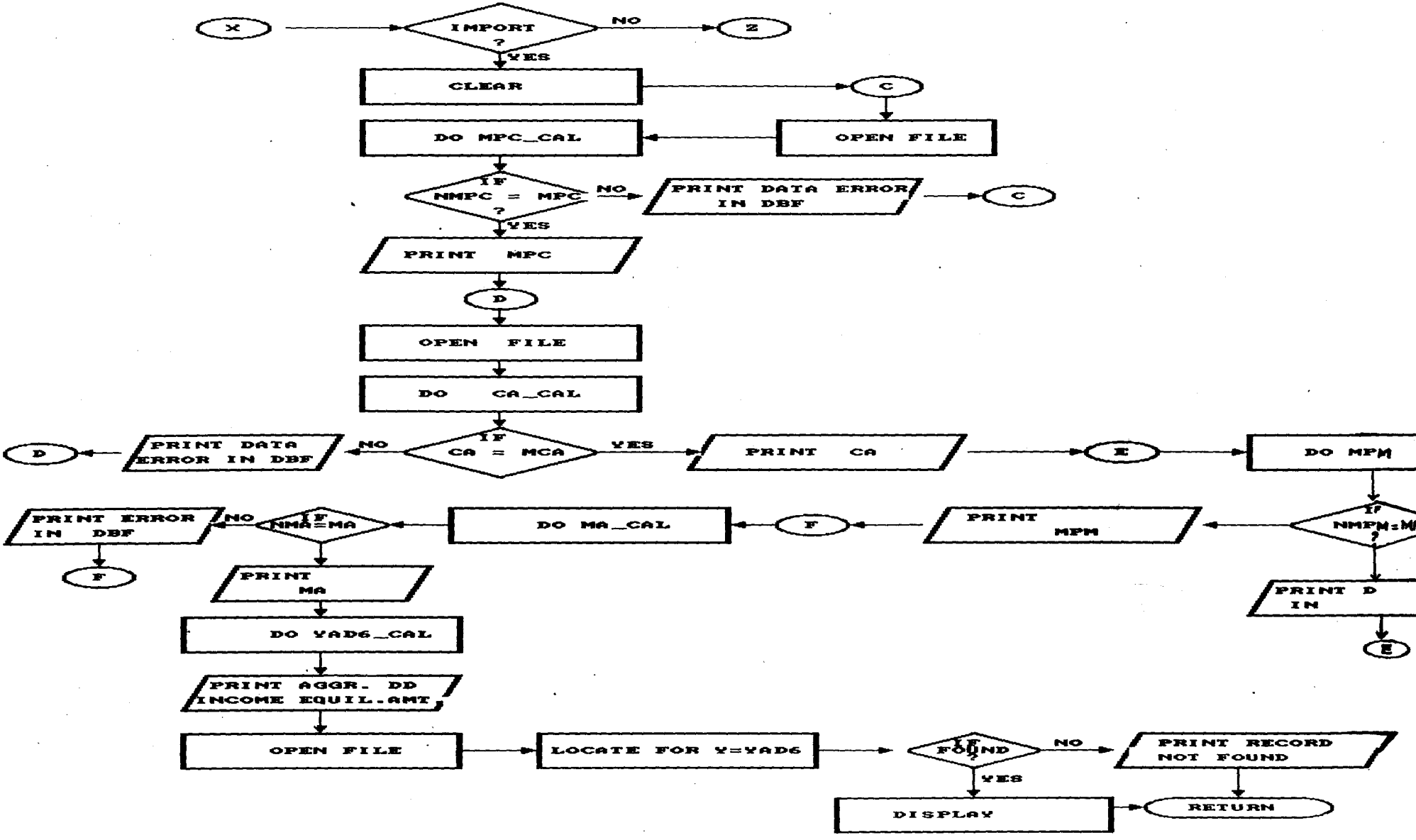
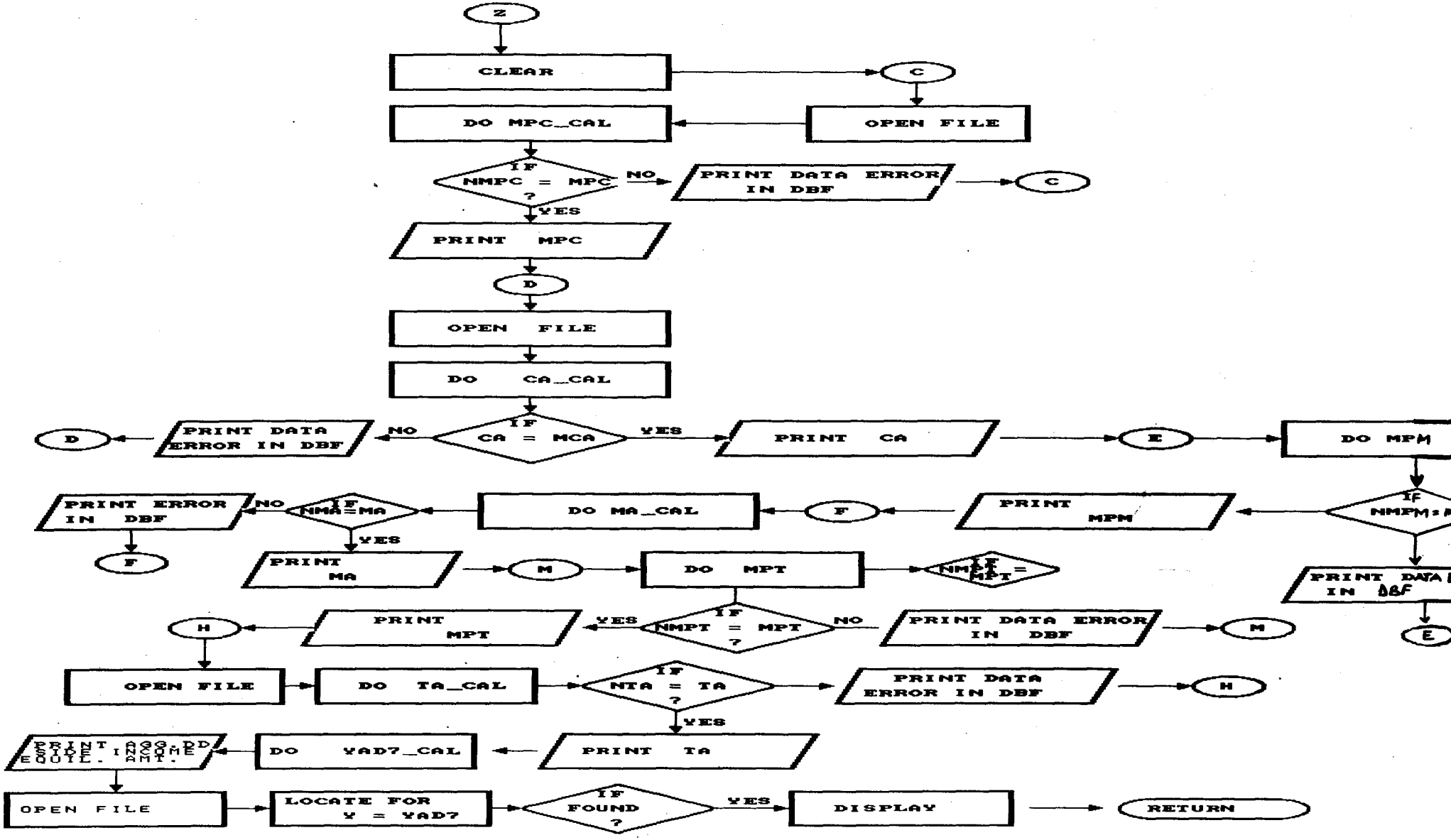
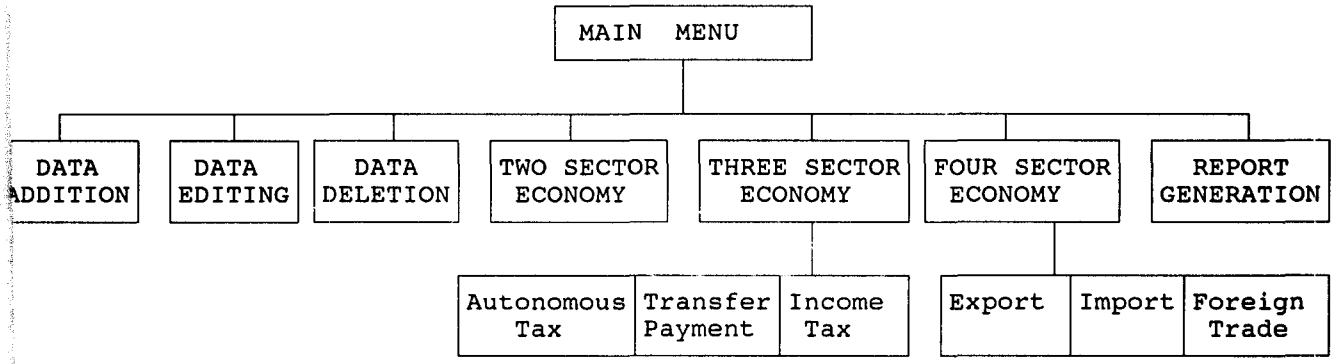
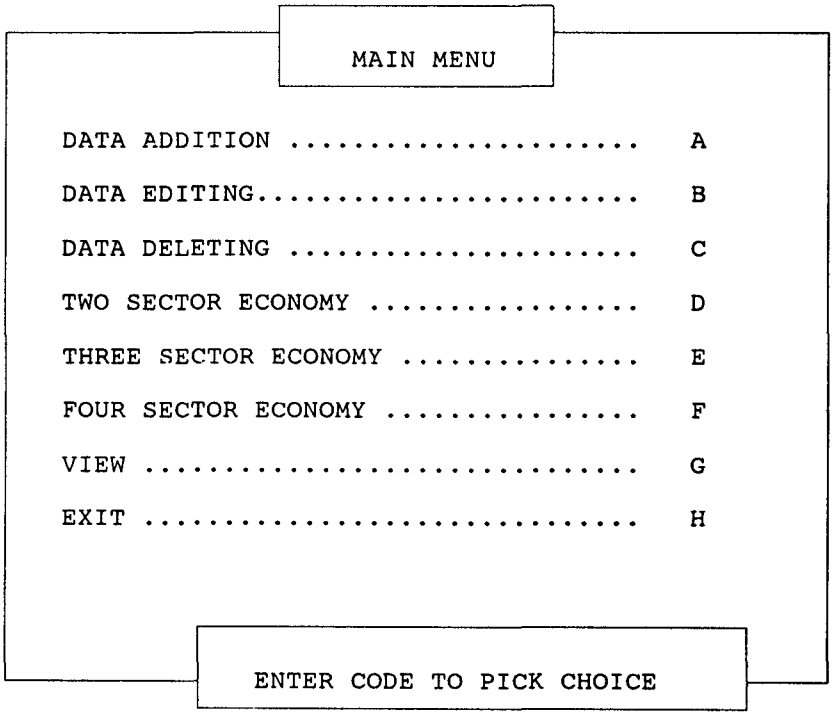


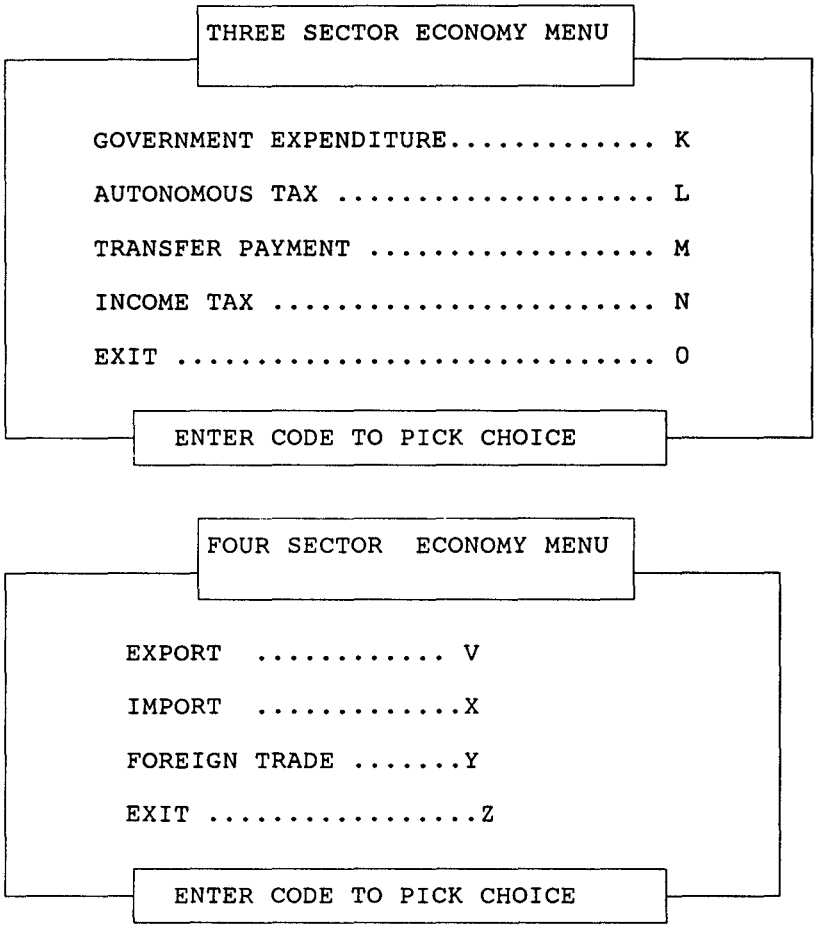
FIGURE 3:4:8:2 FLOWCHART FOR FRGNTRAD PROGRAM



5MODULAR PROGRAM STRUCTURE







The modular programm structure above shows the logical relationship between the processes and the way in which data is moused to support the activities involved in the execution of the various task of natural income equilibrium determination. The task/duties to perform as stated earlier include;

(i) MAIN MENU;

This displays the main menu of the system showing different sub-programs for implementation.

(ii) DATA ADDITION:

This shows the sub-programm that allows for the addition of records into the

Database file.

(iii) DATA EDITING

This displays the sub-program for modifying or editing data items.

(iv) DATA DELETING

The data deleting sub-program provides facility for the marking and deletion of unwanted record.

(v) TWO SECTOR ECONOMY

This sub-program of the main menu shows the program for the performance of the task of determining income equilibrium in Two Sector Economy.

(vi) THREE SECTOR ECONOMY MENU

This displays a sub-program of the main menu with a sub-menu that shows the various sub-programs involved in the task in three sector economy.

(vii) FOUR SECTOR ECONOMY MENU

As a sub-program of the main menu, it is a sub-menu that displays the different sub-programs involved in the determination of national income equilibrium in an open economy.

(viii) VIEW

This is a sub-program that view all data inputted in the Database files.

CHAPTER FOUR

NATIONAL INCOME EQUILIBRIUM DETERMINATION EXPERIMENTATION

4.1 CODING AND DEBUGGING OF THE PROGRAMM:

For the programmed instructions to undergo any experimentation, they are coded into the computer or mechine for use. After the coding, the entire instructions are subjected to debugging. The essence of which is to correct errors.

4.2 HOW TO RUN THE PROGRAMM

The entire program is a menu driven type and is runned as thus:

At the DOS (Disk Operating System) prompt, change directorate to DBASEIV Sub-directory or set DOS path to the DBASEIV directory if it is not already set in your AUTO. EXE BAT File.

(a) At the DOS prompt,
type **DBASE** and press the **ENTER** key.
Wait for sometime (secons), **DBASEIV**
will be loaded and present you with the dot prompt.

Insert the diskette in either drive A: or B: and change default to the drive where your programm disk resides by typing the following command at the dot prompt.

SET DEFAULT TO A: OR B: and press ENTER key

or

SET DEFA TO A: OR B: and press ENTER

(b) At the Dot prompt;
Type DO PROJ and press **ENTER** key
DBASEIV will execute the program
file called PROJ . PRG

However, the PROJ . PRG introduces the user to the project topic, Name of Programmer, and school.

At the press of any key the screen is cleared and you are asked to enter the current **PASSWORD**. At the enter of the correct password (HENSTAN), the user gains access to eight menu options in a box at the centre of the screen. This displayed options are sub-programs to the main menu program which are executed at the choice of a desired option.

4.3 TESTING THE PROGRAM

The developed software is experimented with, by testing its mode of operation. The essence of this test by experimentation is to determine whether any error still remains or whether the desired objective is achieved. The experimentation is carried out by test running the program with various sets of input data values with known results so as to determine the validity of the obtained output.

CHAPTER FIVE

IMPLEMENTATION, RECOMMENDATION AND CONCLUSION

5.1 IMPLEMENTATION

As the program has began working as required, it will now be implemented. This implementation is to make the program full operational by applying it to solve the problem of determining national income equilibrium. However, in implementing the system, some activities have to be covered. Such includes;

5.1.1 TRAINING:

Adequate training time is allowed for in-house training to enable users to have basic knowledge on how to operate the system with much emphasis on data entry.

5.1.2 SYSTEM CHANGEOVER:

The system conversion or changeover as an important activity in implementing the system is made clear. Since the system is such that performs the whole work of the old system of manual computation of income determination (i.e determination of income equilibrium), the system conversion is not a whole scale one. It will be such that the new and old system will be running side-by-side and the result of the part of the old system compared with the new developed system. Hence, using the pilot running system changeover.

5.1.3. MAINTENANCE:

The computer system as other mechine systems should be periodically maintained. As an implementation activity, it involves the process of checking the mechine to ensure that everything is working as intended and taking corrective action when necessary.

5.2 RECOMMENDATION

The use of computer for accurate, speedy processing of data, storage and retrieval of information can not be overemphasised.

In realisation of this, a computerised system for the processing of data, storage, and retrieval of information when needed is recommended especially in dealing with national economic variables.

The system is therefore, recommended to work side-by-side with the old system (manual system) to overcome the errors involve in determining National income equilibrium.

5.3 CONCLUSION

The prospect of this system changing the pattern or mode of operation in the manipulation of nation economic variables in determining income equilibrium in the short run is very bright. There is no doubt that given long history of errors in manipulating these variables, the developed system for the short-run determination of national income equilibrium is bound to become a research work that will benefit the fiscal policy makers.

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Appendix 1. Program Listing

```
SET TALK OFF
SET ECHO OFF
SET PROCEDURE TO
SET CONFIRM OFF
SET COLOR TO W/B
SET STAT OFF
SET ESCAPE ON
CLEAR
SET COLOR TO R+/b
@ 2,18 TO 23,55 DOUB
@ 4,23 SAY "INTRODUCTION     TO     USERS."
@ 5,24 SAY "COMPUTER APPLICATION TO THE"
@ 6,25 SAY "THEORY   OF   SHORT   RUN"
@ 7,26 SAY "DETERMINATION OF NATIONAL"
@ 8,20 SAY "INCOME EQUILIBRIUM"
SET COLOR TO R*/B
@10,35 SAY "BY"
SET COLOR TO R+/B
@10,30 SAY "UCHEGBU     HENRY"
@14,30 SAY "PGD/MCS/236/96"
@17,24 SAY "MATHS/COMPUTER  DEPARTMENT"
@18,24 SAY "SCH. OF POST GRADUATE STUDIES"
@19,24 SAY "FED. UNIVERSITY OF TECHNOLOGY,"
@20,28 SAY "MINNA,NIGER STATE"
@24,5
WAIT
CLEAR
MPASS = SPACE(7)
DO WHILE .T.
CLEAR
@11,20 TO 15,60 DOUB
@13,25 SAY "ENTER CURRENT PASSWORD :"
SET COLOR TO R/B, N
@13,48 GET MPASS PICT "@!"
READ
SET COLOR TO R+/B
YN = " "
IF MPASS <>  'HENSTAN'
@18,28 CLEAR TO 14,59
@18,25 SAY "ACCESS DENIED TO TRY AGAIN(Y/N)?:" GET YN PICT "!"
READ
IF UPPER(YN) $ 'Y'
CLEAR
LOOP
ENDIF
IF UPPER(YN) $ 'N'
CLEAR
QUIT
ENDIF
ELSE
IF MPASS = 'HENSTAN'
@18,28 CLEAR TO 14,59
EXIT
ENDIF
ENDIF
ENDDO
SET COLOR TO G*/B
```

```
@13,23 SAY "YOU'RE ACCESSED TO MAIN MENU"
SET COLOR TO G/B
@20,20
WAIT
CLEAR
@10,20 SAY "*****************************************"
@11,20 SAY "*                  NOTE                 *"

@12,20 SAY "*                                       *"
@13,20 SAY "*  THIS  PROJECT IS LIMITED TO COMPUTER  *"
@14,20 SAY "*                                       *"
@15,20 SAY "*  DETERMINATION  OF  NATIONAL  INCOME   *"
@16,20 SAY "*                                       *"
@17,20 SAY "*  BASED   ON    SOME    SHORT    RUN    *"
@18,20 SAY "*                                       *"
@19,20 SAY "*  THEORITICAL      ASSUMPTIONS         *"
@20,20 SAY "*****************************************"
@22,15
WAIT
CLEAR
DO WHILE .T.
 CLEAR
 SET COLOR TO G/B
 @ 3,33 TO 4,44
 @ 4,34 SAY "MAIN  MENU"
 @ 5,23 TO 20,57 DOUB
 @ 8,26 SAY "TASK CODE"
 @ 8,45 SAY "TASK"
 @ 9,26 TO 9,34
 @ 9,45 TO 9,48
 @11,29 SAY "[A]       ===   ADD RECORD"
 @12,29 SAY "[B]       ===   MODIFY RECORD"
 @13,29 SAY "[C]       ===   DELETE RECORD"
 @14,29 SAY "[D]       ===   TWO SECTOR"
 @15,29 SAY "[E]       ===   THREE SECTOR"
 @16,29 SAY "[F]       ===   FOUR SECTOR"
 @17,29 SAY "[G]       ===   VIEW"
 @18,29 SAY "[H]       ===   EXIT"
 CHOICE = SPACE(1)
 @21,30 SAY "ENTER CODE FOR CHOICE:" GET CHOICE PICT "!"
 READ
 DO CASE
  CASE CHOICE = 'A'
    DO ADD
  CASE CHOICE = 'B'
    DO MODIFY
  CASE CHOICE = 'C'
    DO DELETE
  CASE CHOICE = 'D'
    DO TWO_SECT
  CASE CHOICE = 'E'
    DO THREE_SECT
  CASE CHOICE = 'F'
    DO FOUR_SECT
  CASE CHOICE = 'G'
    DO VIEW
  CASE CHOICE = 'H'
    EXIT
  OTHERWISE
```

```
    @15,27 TO 19,54 DOUB
    SET COLOR TO R*/B
    @17,28 SAY "ILLEGAL CHOICE TRY AGAIN"
    SET COLOR TO G/B
    @23,15
    WAIT
    CLEAR
  ENDCASE
ENDDO
SET TALK ON
SET STAT ON
*SET ECHO ON
SET CONFIRM ON
CLEAR
RETURN



PROCEDURE ADD RECORD
*-----ADD RECORD PROGRAM
SET TALK OFF
SET CONFIRM OFF
SET STAT OFF
SET ECHO OFF
CLEAR
*SET COLOR TO W/B
@13,24 SAY "PRESS ENTER KEY TO START THE PROGRAM"
SET CONS OFF
WAIT
SET CONS ON
CLEA
DO WHILE .T.
STORE " " TO DECIS
@ 2,12 TO 4,68 PANEL COLOR GR+/B
@ 3,15 SAY "(T)SE,(G)XP, (E)XP, (I)MP, M_P(C), M_PT(X), M_P(M)"
COLOR R/GR+
@ 14,15 TO 15,64 PANEL COLOR G+/B
@ 13,30 SAY "ENTER DECISION:" GET DECIS PICT "!"
READ
DO CASE
 CASE DECIS = 'T'
   DO ADDTSE
 CASE DECIS = 'G'
   DO ADDGXP
 CASE DECIS = 'E'
   DO ADDEXP
 CASE DECIS = 'I'
   DO ADDIMP
 CASE DECIS = 'C'
   DO ADDMPC
 CASE DECIS = 'X'
   DO ADDMPTX
 CASE DECIS = 'M'
   DO ADDMPM
 OTHERWISE
   @8,29 CLEAR TO 13,60
   @13,27 SAY "ILLEGAL DECISION TRY AGAIN:"
   @20,15
   WAIT
   CLEAR
```

```
ENDCASE
STORE " " TO YN
@ 8,29 CLEAR TO 13,60
@ 11,15 TO 12,64 DOUB
@ 10,23 SAY "TO ADD MORE RECORDS TO DBF(Y/N)?:" GET YN PICT "!"
READ
IF UPPER(YN) $ 'Y'
  CLEAR
  LOOP
ENDIF
IF UPPER(YN) $ 'N'
  CLEA
ENDIF
EXIT
ENDDO
CLEAR
RETURN


PROCEDURE ADDTSE
*---TSE,DBF ADD RECORD PROGRAM
SET TALK OFF
SET ECHO OFF
SET CONFIRM OFF
SET COLOR TO
USE TSE.DBF
DO WHILE .T.
SET COLOR TO W/B
APPEND BLANK
SET FORMAT TO TSE
SET COLOR TO W/B
READ
STORE " " TO YN
@18,23 SAY ""
WAIT "ARE THERE MORE RECORDS(Y/N)?:" TO YN
IF UPPER(YN) $ 'Y'
 LOOP
ELSE
 CLEAR
 EXIT
 CLEAR
ENDIF
ENDDO
CLOSE DATABASE
RETURN


PROCEDURE ADDGXP
SET TALK OFF
CLEAR
DO WHILE .T.
SET COLOR TO
USE GXP.DBF
CLEAR
APPEND BLANK
SET FORMAT TO GXP
SET COLOR TO W/B
READ
STORE " " TO ANS
@18,29
```

```
WAIT "ARE THERE MORE RECORDS(Y/N)?:" TO ANS
IF UPPER(ANS) $ 'Y'
  LOOP
ENDIF
IF UPPER(ANS) $ 'N'
  CLEAR .
  EXIT
ENDIF
ENDDO
SET TALK ON
CLOSE DATABASE
RETURN


PROCEDURE ADDEXP
SET TALK OFF
*----EXP.DBF ADD RECORD PROGRAM
CLEAR
DO WHILE .T.
USE EXP.DBF
CLEAR
SET COLOR TO
APPEND BLANK
SET FORMAT TO EXP
SET COLOR TO W/B
READ
STORE " " TO ANS
@18,25
WAIT "ARE THERE MORE RECORDs(Y/N)?:" TO ANS
IF UPPER(ANS) $ 'Y'
   LOOP
ELSE
  CLEAR
  EXIT
ENDIF
ENDDO
CLOSE DATABASE
RETURN


PROCEDURE ADDIMP
*--IMP.DBF ADD RECORD PROGRAM
SET TALK OFF
CLEAR
SET COLOR TO
DO WHILE .T.
USE IMP.DBF
APPEND BLANK
SET FORMAT TO IMP
SET COLOR TO W/B
READ
STORE " " TO ANS
@20,15
WAIT "ARE THERE MORE RECORDs TO ADD(Y/N)?:" TO ANS
IF UPPER(ANS) $ 'Y'
LOOP
ELSE
CLEAR
EXIT
ENDIF
```

```
ENDDO
SET TALK ON
RETURN

PROCEDURE ADDAUC
*--AU_C.DBF ADD RECORD PROGRAM
SET TALK OFF
SET STAT OFF
SET CONFIRM OFF
SET ECHO OFF
CLEAR
STORE 0 TO SNO,YEAR,CONSUMPTN,OUTPUT
DO WHILE .T.
USE AU_C
CLEAR
APPEND BLANK
SET FORMAT TO AU_C
READ
STORE " " TO YN
@18,28
WAIT "TO ADD MORE RECORDS(Y/N)?:" TO YN
IF UPPER(YN) $ 'Y'
LOOP
ELSE
CLEAR
EXIT
ENDIF
ENDDO
CLOSE DATABASE
SET TALK ON
SET STAT ON
SET CONFIRM ON
RETURN

PROCEDURE ADDAUM
*--AU_M.DBF ADD RECORD PROGRAM
SET TALK OFF
SET STAT OFF
SET CONFIRM OFF
SET ECHO OFF
CLEAR
STORE 0 TO SNO,YEAR,OUTPUT,IMPORT
DO WHILE .T.
USE AU_M
APPEND BLANK
SET FORMAT TO AU_M
READ
STORE " " TO YN
@18,28
WAIT "TO ADD MORE RECORDS(Y/N)?:" TO YN
IF UPPER(YN)  $ 'Y'
LOOP
ELSE
CLEAR
EXIT
ENDIF
ENDDO
CLOSE DATABASE
SET TALK ON
SET STAT ON
```

```
SET CONFIRM ON
*SET ECHO ON
RETURN


PROCEDURE ADDAUTX
*---TSE,DBF ADD RECORD PROGRAM
SET TALK OFF
SET ECHO OFF
SET CONFIRM OFF
SET COLOR TO
USE AU_TX.DBF
DO WHILE .T.
SET COLOR TO W/B
APPEND BLANK
SET FORMAT TO AU_TX
SET COLOR TO W/B
READ
STORE " " TO YN
@18,23 SAY ""
WAIT "ARE THERE MORE RECORDS(Y/N)?:" TO YN
IF UPPER(YN) $ 'Y'
 LOOP
ELSE
 CLEAR
 EXIT
 CLEAR
ENDIF
ENDDO
CLOSE DATABASE
RETURN

PROCEDURE ADDMPC
*--M_PC.DBF ADD RECORD PROGRAM
SET TALK OFF
CLEAR
DO WHILE .T.
USE M_PC.DBF
CLEAR
APPEND BLANK
SET FORMAT TO M_PC
READ
STORE " " TO CHOICE
@18,23
WAIT "TO ADD MORE RECORDs(Y/N)?:" TO CHOICE
IF UPPER(CHOICE) $ 'Y'
  LOOP
ELSE
  CLEAR
  EXIT
ENDIF
ENDDO
RETURN

PROCEDURE ADDMPTX
*---M_PTX,DBF ADD RECORD PROGRAM
SET TALK OFF
SET ECHO OFF
SET CONFIRM OFF
```

```
USE M_PTX.DBF
DO WHILE .T.
SET COLOR TO W/B
APPEND BLANK
SET FORMAT TO M_PTX
SET COLOR TO W/B
READ
clear
STORE " " TO YN
@18,23 SAY ""
WAIT "ARE THERE MORE RECORDS(Y/N)?:" TO YN
IF UPPER(YN) $ 'Y'
 LOOP
ELSE
 CLEAR
 EXIT
 CLEAR
ENDIF
ENDDO
CLOSE DATABASE
RETURN


PROCEDURE ADDMPM
*--M_PM ADD RECORD PROGRAM
SET TALK OFF
CLEAR
DO WHILE .T.
USE M_PM.DBF
CLEAR
APPEND BLANK
SET FORMAT TO M_PM
READ
STORE " " TO ANS
@18,21
WAIT "TO ADD MORE RECORDs(Y/N)?;" TO ANS
IF UPPER(ANS) $ 'Y'
  LOOP
ELSE
  CLEAR
  EXIT
ENDIF
ENDDO
RETURN

PROCEDURE MODIFY
SET TALK OFF
SET STAT OFF
set echo off
CLEAR
DO WHILE .T.
SET COLOR TO R/B+
@ 2,12 TO 4,68 DOUB
SET COLOR TO G/B+
@ 3,18 SAY "Tse,Gxp,Imp,Exp,m_P*M,m_pC,M_pm,AU_s,aU_m,aU_Y"
CHOICE = SPACE(1)
@ 6,15 TO 18,65 DOUB
SET COLOR TO W/B+
@12,22 SAY "FOR DBF CHOICE,PRESS UPPERCASE KEY" GET CHOICE PICT "!"
READ
```

```
SET COLOR TO W/B+
DO CASE
  CASE UPPER(CHOICE) $ 'T'
     DO MODTSE
  CASE UPPER(CHOICE) $ 'G'
     DO MODGXP
  CASE UPPER(CHOICE) $ 'E'
     DO MODEXP
  CASE UPPER(CHOICE) $ 'I'
     DO MODIMP
  CASE UPPER(CHOICE) $ 'M'
     DO MODMPM
  CASE UPPER(CHOICE) $ 'C'
     DO MODIMPC
  CASE UPPER(CHOICE) $ 'P'
     DO MODMPTX
  CASE UPPER(CHOICE) $ 'A'
     DO MODAUC
  CASE UPPER(CHOICE) $ 'U'
     DO MODAUM
  CASE UPPER(CHOICE) $ 'X'
     DO MODAUTX
  OTHERWISE
    @ 8,20 CLEAR TO 12,60
    SET COLOR TO R/B+
    @12,27 SAY "ILLEGAL CHOICE TRY AGAIN"
    SET COLOR TO W/B+
    @22,15
    WAIT
   @ 9,22 CLEAR to 13,62
 ENDCASE
STORE " " TO ANS
@10,20 CLEAR TO 12,60
@ 6,15 TO 18,65
@13,23 SAY "TO MODIFY MORE RECORDS IN DBF(Y/N)?:" GET ANS PICT "!"
READ
IF UPPER(ANS) $ 'Y'
 @ 9,20 CLEAR TO 13,62
 LOOP
ELSE
 EXIT
ENDIF
ENDDO
SET TALK ON
SET STAT ON
RETURN
PROCEDURE MODTSE
SET TALK OFF
SET STAT OFF
SET ECHO OFF
SET CONFIRM OFF
*SET COLOR TO
CLEAR
SET COLOR TO W/B
DO WHILE .T.
USE TSE.DBF
STORE 0 TO MY,MYR,M_SNO
 STORE 0 TO MC,MS,MI
@13,25 TO 14,60 panel color G
```

```
READ
LOCATE FOR SNO = M_SNO
 IF FOUND ()
  CLEAR
SET FORMAT TO TSE
READ
CLEAR

@12,33 SAY "RECORD MODIFIED"
*SET COLOR TO G/N*
@20,18
 WAIT
CLEAR
ENDIF
IF .NOT. FOUND ()
  CLEAR
  *SET COLOR TO R/N*
  @11,35 SAY "RECORD NOT FOUND"
 *SET COLOR TO G/N*
@20,15
WAIT
ENDIF
 CLEAR
 STORE " " TO YN
 @20,25
 WAIT "TO SEARCH FOR MORE RECORDS(Y/N)?:" TO YN
  IF UPPER(YN) $ 'Y'
 CLEA
 LOOP
ELSE
CLEAR
EXIT
ENDIF
ENDDO
CLOSE ALL
SET STAT ON
SET TALK ON
*SET ECHO ON
*SET CONFIRM ON
RETURN


PROCEDURE MODGXP
SET TALK OFF
SET STAT OFF
SET ECHO OFF
SET CONFIRM OFF
*SET COLOR TO
CLEAR
SET COLOR TO W/B
DO WHILE .T.
USE GXP.DBF
STORE 0 TO MY,MYR,M_SNO
 STORE 0 TO MC,MS,MI
@13,25 TO 14,90 panel color G
@12,26 SAY "ENTER SNO OF RECORD TO MODIFY:" GET M_SNO PICT "99"
READ
LOCATE FOR SNO = M_SNO
 IF FOUND ()
```

```
SET FORMAT TO EXP
READ
CLEAR

@12,30 SAY "RECORD MODIFIED"
*SET COLOR TO G/N+
@20,10
 WAIT
CLEAR
ENDIF
IF .NOT. FOUND ()
  CLEAR
  *SET COLOR TO R/N*
  @11,35 SAY "RECORD NOT FOUND"
 *SET COLOR TO G/N+
@20,15
WAIT
ENDIF
 CLEAR
 STORE " " TO YN
 @20,25
 WAIT "TO SEARCH FOR MORE RECORDS(Y/N)?:" TO YN
  IF UPPER(YN) $ 'Y'
 CLEA
 LOOP
ELSE
CLEAR
EXIT
ENDIF
ENDDO
CLOSE ALL
SET STAT ON
SET TALK ON
*SET ECHO ON
*SET CONFIRM ON
RETURN


PROCEDURE MODEXP
SET TALK OFF
SET STAT OFF
SET ECHO OFF
SET CONFIRM OFF
*SET COLOR TO
CLEAR
SET COLOR TO W/B
DO WHILE .T.
USE EXP.DBF
STORE 0 TO MY,MYR,M_SNO
 STORE 0 TO MC,MS,MI
@13,25 TO 14,60 panel color G
@12,26 SAY "ENTER SNO OF RECORD TO MODIFY:" GET M_SNO PICT "99"
READ
LOCATE FOR SNO = M_SNO
 IF FOUND ()
  CLEAR
SET FORMAT TO EXP
READ
CLEAR
```

```
@12,33 SAY "RECORD MODIFIED"
*SET COLOR TO G/N+
@20,18
 WAIT
CLEAR
ENDIF
IF .NOT. FOUND ()
  CLEAR
  *SET COLOR TO R/N*
  @11,35 SAY "RECORD NOT FOUND"
 *SET COLOR TO G/N+
@20,15
WAIT
ENDIF
 CLEAR
 STORE " " TO YN
 @20,25
 WAIT "TO SEARCH FOR MORE RECORDS(Y/N)?:" TO YN
  IF UPPER(YN) $ 'Y'
 CLEA
 LOOP
ELSE
CLEAR
EXIT
ENDIF
ENDDO
CLOSE ALL
SET STAT ON
SET TALK ON
*SET ECHO ON
*SET CONFIRM ON
RETURN

PROCEDURE MODIMP
SET TALK OFF
SET STAT OFF
SET ECHO OFF
SET CONFIRM OFF
*SET COLOR TO
CLEAR
SET COLOR TO W/B
DO WHILE .T.
USE IMP.DBF
STORE 0 TO MY,MYR,M_SNO
 STORE 0 TO MC,MS,MI
@13,25 TO 14,60 panel color G
@12,26 SAY "ENTER SNO OF RECORD TO MODIFY:" GET M_SNO PICT "99"
READ
LOCATE FOR SNO = M_SNO
 IF FOUND ()
  CLEAR
SET FORMAT TO IMP
READ
CLEAR

@12,33 SAY "RECORD MODIFIED"
*SET COLOR TO G/N+
@20,18
 WAIT
CLEAR
```

```
ENDIF
IF .NOT. FOUND ()
  CLEAR
  *SET COLOR TO R/N
  @11,25 SAY "RECORD NOT FOUND"
 *SET COLOR TO G/N+
@20,15
WAIT
ENDIF
 CLEAR
 STORE " " TO YN
 @20,25
 WAIT "TO SEARCH FOR MORE RECORDS(Y/N)?:" TO YN
  IF UPPER(YN) $ 'Y'
 CLEA
 LOOP
ELSE
CLEAR
EXIT
ENDIF
ENDDO
CLOSE ALL
SET STAT ON
SET TALK ON
*SET ECHO ON
*SET CONFIRM ON
RETURN

PROCEDURE MODAUC
*--AU_C.DBF MODIFY RECORD PROGRAM
SET TALK OFF
SET STAT OFF
SET ECHO OFF
SET CONFIRM OFF
*SET COLOR TO
CLEAR
SET COLOR TO W/B
DO WHILE .T.
USE AU_C.DBF
STORE 0 TO MY,MYR,M_SNO
 STORE 0 TO MC,MS,MI
@13,25 TO 14,60 panel color G
@12,26 SAY "ENTER SNO OF RECORD TO MODIFY:" GET M_SNO PICT "99"
READ
LOCATE FOR SNO = M_SNO
 IF FOUND ()
  CLEAR
SET FORMAT TO AU_C
READ
CLEAR

@12,33 SAY "RECORD MODIFIED"
*SET COLOR TO G/N+
@20,18
 WAIT
CLEAR
ENDIF
IF .NOT. FOUND ()
  CLEAR
  *SET COLOR TO R/N
```

```
  @11,35 SAY "RECORD NOT FOUND"
 *SET COLOR TO G/N+
@20,15
WAIT
ENDIF
 CLEAR
 STORE " " TO YN
 @20,25
 WAIT "TO SEARCH FOR MORE RECORDS(Y/N)?:" TO YN
  IF UPPER(YN) $ 'Y'
 CLEA
 LOOP
ELSE
CLEAR
EXIT
ENDIF
ENDDO
CLOSE ALL
SET STAT ON
SET TALK ON
*SET ECHO ON
*SET CONFIRM ON
RETURN



PROCEDURE MODAUM
*--AU_M.DBF MODIFY RECORD PROGRAM
SET TALK OFF
SET STAT OFF
SET ECHO OFF
SET CONFIRM OFF
*SET COLOR TO
CLEAR
SET COLOR TO W/B
DO WHILE .T.
USE AU_M.DBF
STORE 0 TO MY,MYR,M_SNO
 STORE 0 TO MC,MS,MI
@10,25 TO 14,60 panel color G
@12,26 SAY "ENTER SNO OF RECORD TO MODIFY:" GET M_SNO PICT "99"
READ
LOCATE FOR SNO = M_SNO
 IF FOUND ()
  CLEAR
SET FORMAT TO AU_M
READ
CLEAR

@12,33 SAY "RECORD MODIFIED"
*SET COLOR TO G/N+
@20,15
 WAIT
CLEAR
ENDIF
IF .NOT. FOUND ()
  CLEAR
  *SET COLOR TO R/N+
  @11,35 SAY "RECORD NOT FOUND"
```

```
@10,10
WAIT
ENDIF
 CLEAR
 STORE " " TO YN
 @20,25
 WAIT "TO SEARCH FOR MORE RECORDS(Y/N)?." TO YN
  IF UPPER(YN) $ 'Y'
 CLEA
 LOOP
ELSE
CLEAR
EXIT
ENDIF
ENDDO
CLOSE ALL
SET STAT ON
SET TALK ON
*SET ECHO ON
*SET CONFIRM ON
RETURN


PROCEDURE MODAUTX
*--AU_TX MODIFY RECORD PROGRAM
SET TALK OFF
SET STAT OFF
SET ECHO OFF
SET CONFIRM OFF
*SET COLOR TO
CLEAR
SET COLOR TO W/B
DO WHILE .T.
USE TSE.DBF
STORE 0 TO MY,MYR,M_SNO
 STORE 0 TO M3,M3,MI
@10,25 TO 14,60 panel color 6
@12,26 SAY "ENTER SNO OF RECORD TO MODIFY:" GET M_SNO PICT "99"
READ
LOCATE FOR SNO = M_SNO
 IF FOUND ()
  CLEAR
SET FORMAT TO AU_TX
READ
CLEAR

@12,30 SAY "RECORD MODIFIED"
*SET COLOR TO G/N
@20,10
 WAIT
CLEAR
ENDIF
IF .NOT. FOUND ()
  CLEAR
  *SET COLOR TO R/N
  @11,35 SAY "RECORD NOT FOUND"
 *SET COLOR TO G/N
@10,10
WAIT
ENDIF
```

```
 CLEAR
 STORE " " TO YN
 @20,25
 WAIT "TO SEARCH FOR MORE RECORDS(Y/N)?:" TO YN
  IF UPPER(YN) # 'Y'
 CLEA
 LOOP
ELSE
CLEAR
EXIT
ENDIF
ENDDO
CLOSE ALL
SET STAT ON
SET TALK ON
*SET ECHO ON
*SET CONFIRM ON
RETURN



PROCEDURE MODMPTX
SET TALK OFF
SET STAT OFF
SET ECHO OFF
SET CONFIRM OFF
*SET COLOR TO
CLEAR
SET COLOR TO W/B
DO WHILE .T.
USE M_PTX.DBF
STORE 0 TO MY,MYR,M_SNO
 STORE 0 TO MC,MS,MI
@13,25 TO 14,60 panel color G
@12,26 SAY "ENTER SNO OF RECORD TO MODIFY:" GET M_SNO PICT "99"
READ
LOCATE FOR SNO = M_SNO
 IF FOUND ()
  CLEAR
SET FORMAT TO M_PTX
READ
CLEAR

@12,33 SAY "RECORD MODIFIED"
*SET COLOR TO G/N+
@20,13
 WAIT
CLEAR
ENDIF
IF .NOT. FOUND ()
  CLEAR
  *SET COLOR TO R/N+
  @11,35 SAY "RECORD NOT FOUND"
 *SET COLOR TO G/N+
@20,15
WAIT
ENDIF
 CLEAR
 STORE " " TO YN
```

```
 WAIT "TO SEARCH FOR MORE RECORDS(Y/N):" TO YN
  IF UPPER(YN) # 'Y'
 CLEA
 LOOP
ELSE
CLEAR
EXIT
ENDIF
ENDDO
CLOSE ALL
SET STAT ON
SET TALK ON
*SET ECHO ON
*SET CONFIRM ON
RETURN


PROCEDURE MODMPM
*--M_PM.DBF MODIFY RECORD PROGRAM
SET TALK OFF
SET STAT OFF
SET ECHO OFF
SET CONFIRM OFF
*SET COLOR TO
CLEAR
SET COLOR TO W/B
DO WHILE .T.
USE MP_M.DBF
STORE 0 TO MY,MYP,M_SNO
 STORE 0 TO MC,MS,MI
@10,25 TO 14,60 panel color G
@12,26 SAY "ENTER SNO OF RECORD TO MODIFY:" GET M_SNO PICT "99"
READ
LOCATE FOR SNO = M_SNO
 IF FOUND ()
  CLEAR
SET FORMAT TO M_PM
READ
CLEAR

@12,33 SAY "RECORD MODIFIED"
*SET COLOR TO G/N+
@20,10
 WAIT
CLEAR
ENDIF
IF .NOT. FOUND ()
  CLEAR
  *SET COLOR TO R/N+
  @11,35 SAY "RECORD NOT FOUND"
 *SET COLOR TO G/N+
@20,10
WAIT
ENDIF
 CLEAR
 STORE " " TO YN
 @20,25
 WAIT "TO SEARCH FOR MORE RECORDS(Y/N):" TO YN
  IF UPPER(YN) # 'Y'
```

```
 LOOP
ELSE
CLEAR
EXIT
ENDIF
ENDDO
CLOSE ALL
SET STAT ON
SET TALK ON
*SET ECHO ON
*SET CONFIRM ON
RETURN

PROCEDURE MODIMPC
*--M_PC.DBF MODIFY RECORD PROGRAM
SET TALK OFF
SET STAT OFF
SET ECHO OFF
SET CONFIRM OFF
CLEAR
DO WHILE .T.
USE M_PC.DBF
STORE 0 TO M_SNO,MYR,MY,MC
@ 8,25 TO 15,60 DOUB
@12,27 SAY "ENTER SNO OF RECORD TO MODIFY:" GET M_SNO PICT "9"
READ
@10,26 CLEAR TO 13,59
LOCATE FOR SNO = M_SNO
IF FOUND ()
CLEAR
SET FORMAT TO M_PC
READ
SET COLOR TO R/W*
@12,33 SAY "RECORD MODIFIED"
SET COLOR TO W/B+
@20,15
WAIT
CLEAR
ENDIF
IF .NOT. FOUND ()
@11,26 CLEAR TO 13,59
SET COLOR TO R/B*
@11,32 SAY "RECORD NOT FOUND"
SET COLOR TO W/B+
@20,15
WAIT
CLEAR
ENDIF
CH =  " "
@20,25
WAIT "TO SEARCH FOR MORE RECORDS(Y/N)?:" TO CH
IF UPPER(CH) $ 'Y'
CLEAR
LOOP
ELSE
CLEAR
EXIT
ENDIF
ENDDO
CLOSE DATABASE
```

```
SET TALK ON
SET STAT ON
SET CONFIRM ON
RETURN


PROCEDURE VIEWPRG
SET TALK OFF
SET STAT OFF
SET ECHO OFF
SET CONFIRM OFF
CLEAR
DO WHILE .T.
MFNAME = SPACE(5)
@8,25 TO 15,50 DOUB
@12,28 SAY "ENTER FILENAME:" GET MFNAME PICT "@!"
READ
DO CASE
CASE MFNAME = 'TSE'
USE TSE
@2,1
LIST
CASE MFNAME = 'GXP'
USE GXP
@2,1
LIST
CASE MFNAME = 'EXP'
USE EXP
@2,1
LIST
CASE MFNAME = 'IMP'
USE IMP
@2,1
LIST
CASE MFNAME = 'M_PC'
USE M_PC
@2,1
LIST
CASE MFNAME = 'AU_C'
USE AU_C
@2,1
LIST
CASE MFNAME = 'M_PM'
USE M_PM
@2,1
LIST
CASE MFNAME = 'AU_M'
USE AU_M
@2,1
LIST
CASE MFNAME = 'M_PTX'
USE M_PTX
@2,1
LIST
CASE MFNAME = 'AU_TX'
USE AU_TX
@2,1
LIST
OTHERWISE
CLEAR
```

```
EXIT
ENDCASE
@20,15
WAIT
ENDDO
SET TALK ON
SET STAT ON
RETURN

PROCEDURE DELETE
SET TALK OFF
CLEAR
DO WHILE .T.
SET COLOR TO W/B+
@ 2,12 TO 4,68 DOUB
@ 3,17 SAY "TSE,GXP,IMP,EXP,AU_C,M_PC,M_PM,M_PTX,AU_M,AU_TX"
MFNAME =SPACE(5)
SET COLOR TO W/B+
@ 6,15 TO 18,64 DOUB
@12,27 SAY "ENTER FILENAME:" GET MFNAME PICT "@!"
READ
@10,10 CLEAR TO 14,48
DO CASE
 CASE MFNAME = 'TSE'
   USE TSE
   DO DELET
 CASE MFNAME = 'GXP'
   USE GXP
   DO DELET
 CASE MFNAME = 'EXP'
   USE EXP
   DO DELET
 CASE MFNAME = 'IMP'
   USE EXP
   DO DELET
 CASE MFNAME = 'M_PTX'
   USE M_PTX
   DO DELET
 CASE MFNAME = 'M_PC'
   USE M_PC
   DO DELET
 CASE MFNAME = 'M_PM'
   USE M_PM
   DO DELET
 CASE MFNAME = 'AU_C'
   USE AU_C
   DO DELET
 CASE MFNAME = 'AU_TX'
   USE AU_TX
   DO DELET
 CASE MFNAME = 'AU_M'
   USE AU_M
   DO DELET
 OTHERWISE
   SET COLOR TO R/B*
   @12,27 SAY "ILLEGAL FILENAME TRY AGAIN"
   SET COLOR TO W/B+
   @20,15
   WAIT
   @20,15 CLEAR TO 12,60
```

```
   @12,25 CLEAR TO 12,60
ENDCASE
SET COLOR TO W/B+
STORE " " TO ANS
@9,26 CLEAR TO 12,60
@9,22 SAY "TO DELETE MORE DBF RECORDs(Y/N)?:" GET ANS PICT "!"
READ
IF UPPER(ANS) $ 'Y'
 CLEAR
 LOOP
ELSE
 CLEAR
 EXIT
ENDIF
ENDDO
RETURN


 PROCEDURE DELET
SET TALK OFF
FNAME = SPACE(5)
 GO TOP
 CLEAR
 DO WHILE .T.
 STORE " " TO YN
 STORE 0 TO M_SNO
 @ 3,15 TO 15,64 DOUB
 @11,23 SAY "ENTER SNO OF RECORD TO DELETE:" GET M_SNO PICT "9"
 READ
 @10,20 CLEAR TO 12,60
 LOCATE FOR SNO = M_SNO
 IF FOUND ()
 @11,22 SAY "ARE YOU SURE YOU WANT TO DELETE(Y/N)?:" GET YN PICT "!"
 READ
 IF UPPER(YN) $ 'N'
 @10,20 CLEAR TO 11,60
 EXIT
 ELSE
 DELETE
 @10,20 CLEAR TO 11,60
 SET COLOR TO R/N*
 @10,22 SAY "RECORD HAS BEEN MARKED FOR DELETING"
 SET COLOR TO W/B+
 @18,15
 WAIT
 @ 9,18 CLEAR TO 11,56
 SET COLOR TO R/G*
 @10,30 SAY "PLEASE WAIT..."
 SET COLOR TO W/B+
 PACK
 @ 7,17 CLEAR TO 11,58
 ENDIF
 ELSE
 IF .NOT. FOUND ()
  SET COLOR TO GB*
  @10,30 SAY "RECORD DOES NOT EXIST"
  SET COLOR TO W/B+
  @18,15
  WAIT
*  CLEAR
```

```
  @16,0 CLEAR TO 20,60
  @9,28 CLEAR TO 11,60
  ENDIF
  ENDIF
  STORE " " TO YN
  @11,22 SAY "TO SEARCH FOR MORE RECORDs(Y/N)?:" GET YN PICT "!"
  READ
  IF UPPER(YN) $ 'Y'
    @ 10,20 CLEAR TO 12,60
    LOOP
  ELSE
   @10,21 CLEAR TO 12,60
    EXIT
  ENDIF
ENDDO
CLOSE DATABASE
RETURN



PROCEDURE TWO_SECT
SET TALK OFF
SET ECHO OFF
CLEAR
@20,18 SAY "PRESS ENTER KEY TO START THE PROGRAM"
SET CONS OFF
WAIT
*SET CONS ON
CLEA
@4,25 TO 5,56 PANEL COLOR R
@3,28 SAY "  TWO SECTOR ECONOMY  " COLOR RB+/B
@9,20 SAY "  WE      SHALL       FIRST         COMPUTE  " COLOR N/G
@10,20 SAY "  THE      AGGREGATE      DEMAND       SIDE  " COLOR N/G
@11,20 SAY "  EQUILIBRUIM          AMOUNT         USING  " COLOR N/G
@12,20 SAY "  THE          MULTIPLIER           PROCESS  " COLOR N/G
@18,23 SAY "*" COLOR R*
@18,25 SAY "PLEASE NOTE  ALL  CALCULATED VALVES" COLOR R+
@18,61 SAY "*" COLOR R*
@20,20
WAIT
CLEA
@9,14 TO 10,74 PANEL COLOR G+
@13,14 TO 14,74 PANEL COLOR G+
@11,16 TO 12,68 DOUB COLOR GB
@12,18 SAY "LET'S COMPUTE MARGINAL PROPENSITY TO CONSUME(MPC)" COLOR
GB+/G
@17,16
WAIT
SET ESCAPE ON
DO MPC_CAL

SET ECHO OFF
CLEA
@10,18 TO 11,68 PANEL COLOR GR+
@12,20 TO 13,66
@15,18 TO 16,68 PANEL COLOR RB
@13,26 SAY "LET'S COMPUTE AUTONOMOUS CONSUMPTION" COLO GB+/G
@18,18
WAIT
CLEA
```

```
CH = " "
DO WHILE .T.
@15,13 SAY "TO ADD RECORD INTO AU-S.DBF(Y/N)?:" GET CH PICT "@!"
READ
CLEA
IF CH = " "
 DO ADDAUC
 SET ECHO OFF
 CLEA
ELSE
 CLEA
ENDIF
EXIT
ENDDO

SET ECHO OFF
CLEA
DO CA_CAL
CLEAR
@10,14 TO 11,74 PANEL COLOR G+
@15,14 TO 16,74 PANEL COLOR G+
@12,16 TO 13,68 DOUB COLOR GB+/B
@13,19 SAY "LET'S COMPUTE AGGREGATE DEMAND SIDE EQUILIBRUIM" COLOR
R+/N
@18,18
WAIT
CLEA
DO YAD_CAL
CLEA
*@11,14 TO 12,74 PANEL COLOR G+
*@16,14 TO 17,74 PANEL COLOR G+
*@13,16 TO 14,68 DOUB COLOR GB+/B
*@14,20 SAY "LET'S COMPUTE MULTIPLIER EFFECT OF INVESTMENT"  COLOR
R+/N
*@18,18
*WAIT
*CLEA
*DO IN_MULTP
SET ECHO OFF
CLEA
@12,25 TO 13,55 PANEL COLOR G
@14,27 TO 15,53 DOUB COLOR R/B+
@15,31 SAY "  END  OF  OUTPUT  " COLOR RB/N+
@17,25 TO 18,55 PANEL COLOR R
@20,20
WAIT
CLEA
SET STAT ON
RETURN

PROCEDURE MPC_CAL
SET TALK OFF
*PUBLIC Z
CLEAR
USE TEMP
DELE ALL
PACK
CLOSE ALL

SELECT 1
```

```
USE M_PC.DBF
SELECT 2
USE TEMP.DBF
DO WHILE .T.
SELECT 1
STORE 0 TO Z,T,OUTPUT,CONSUMPTN,A,B,C,D
DO WHILE .NOT. EOF ()
A = OUTPUT
B = CONSUMPTN
SKIP
 C = OUTPUT
 D = CONSUMPTN
 E = (D -B) / (C -A)
IF EOF ()
EXIT
ENDIF
  SELECT 2
 APPEND BLANK
 REPL MPC WITH E
SELECT 1
ENDDO
CH = " "
@20,24 SAY "TO VIEW THE COMPUTED OUTPUT(Y/N)?:" GET CH PICT "@!"
READ
IF CH = "Y"
 CLEA
 @20,25 SAY "PRESS V TO VIEW THE OUTPUT"
 SET CONS OFF
 WAIT
 SET CONS ON
 SELECT 2
  CLEA
  @9,15
  DISPLAY
  @21,20
  WAIT
  CLEA
ELSE
  CLEA
ENDIF
EXIT
ENDDO

SELECT 2
Z = MPC
CLOSE ALL
USE TEMP
DO WHILE .NOT. EOF ()
 SKIP
 T = MPC
IF EOF ()
 EXIT
ENDIF
IF Z = T
LOOP
ENDIF
IF Z <> T
  CLEAR
  @13,25 SAY "ERROR IN YOUR DATABASE FILE(M_PC)" COLOR RB/GR
@23,15
```

```
WAIT "PRESS Y TO CROSSCHECK YOUR DATA"
CLEAR
CH = " "
@11,30 SAY "NOTE"
@13,23 say "SAVE WITH CTRL-W/END AFTER CHANGES "
@14,23 SAY "PRESS ALT-E TO EXIT FROM BROWSE"
@23,15
WAIT
CLEAR
@14,25 SAY "TO EFFECT CHANGE(Y/N)?:" GET CH PICT "@!"
READ
IF CH = 'Y'
 CLEAR
USE M_PC
BROWSE
ENDIF
@20,15
WAIT "PRESS D TO DELETE ERROR(S) IN RESULT"
USE TEMP
DELE ALL
PACK
DO MPC_CAL
ELSE
CLEAR
EXIT
ENDIF
ENDDO
CLEAR
@8,22 SAY "TWO SECTOR ECONOMY OUTPUTS" COLOR GB/G+
@9,10 TO 10,60 PANEL
@11,13 TO 12,59 DOUB
@12,15 SAY "COMPUTED MARGINAL PROPENSITY TO CONSUME(MPC)" COLOR
GB/R+
@14,24 SAY "MPC      =    "
@14,33 SAY Z
@17,18 TO 18,54 DOUB
@18,25 SAY " MPC  IS  CONSTANT  " COLOR G/RB+
@16,10 TO 17,60 PANEL
@20,20
WAIT
CLEAR
RETURN


PROCEDURE CA_CAL
SET TALK OFF
SET ECHO OFF
CLEAR
USE AUTOC
DELE ALL
PACK

CLEAR
SELECT 1
USE AU_C.DBF
SELECT 2
USE AUTOC.DBF
SELECT 1
STORE 0 TO OUTPUT,CONSUMPTN,MPC
STORE 0 TO C_1,C_MP,CA_W,T3
```

```
DO WHILE .NOT. EOF ()
 Q = OUTPUT
 J = CONSUMPTN
 MP = MPC
IF EOF ()
EXIT
ELSE
Q = J - (MP * S)
SKIP
ENDIF

SELECT 2
APPEND BLANK
REPL AUCA WITH Q
SELECT 1
ENDDO

SELECT 2
W = AUCA
CLOSE ALL
USE AUTOC
DO WHILE .NOT. EOF ()
CA = AUCA
SKIP
 IF EOF ()
 EXIT
ENDIF
IF W = CA
 LOOP
ENDIF
IF W <> CA
 CLEAR
 @13,23 SAY " ERROR IN YOUR DBF(AU_C)" COLOR GB/R+
 @23,15
 WAIT "PRESS Y TO CROSSCHECK YOUR DATA"
 CLEAR
 CH = " "
 @11,35 SAY " NOTE " COLOR W/R+
 SET COLOR TO GB/G+
 @12,20 SAY "TAKE CURSOR TO PLACE OF CORRECTION"
 @13,20 SAY "SAVE WITH CTRL-W/END AFTER CHANGES"
 @14,20 SAY "PRESS ALT - E TO EXIT FROM  BROWSE"
 SET COLOR TO GB/B+
 @20,15
 WAIT
 CLEAR
 @14,25 SAY "TO EFFECT A CHANGES(Y/N)?:" GET CH PICT "@!"
 READ
 IF CH = 'Y'
  CLEAR
  USE AU_C
  BROWSE
ELSE
EXIT
 ENDIF
@20,15
 WAIT "PRESS D TO DELETE ERROR(S) IN RESULT"
CLEAR
USE AUTOC
DELE ALL
```

```
PACK
 DO CA_CAL
ENDIF
EXIT
ENDDO
*CLOSE ALL
CLEAR
@9,10 TO 10,60 PANEL
@11,13 TO 12,59 DOUB
@12,18 SAY "COMPUTED AUTONOMOUS CONSUMPTION(CA)" COLOR GB/R+
@14,26 SAY "CA      =   "
@14,35 SAY W
@17,18 TO 18,54 DOUB
@18,25 SAY " CA    IS    CONSTANT" COLOR G/RB+
@16,10 TO 17,60 PANEL
@20,20
WAIT
CLEAR
RETURN

PROCEDURE YAD_CAL
SET ECHO OFF
SET TALK OFF
CLEAR
DO WHILE .T.
CLEA
USE TOUTPUT
DELE ALL
PACK
CLEA
STORE 0 TO CA,I,MPC,NUM,MY,MC,MI,MYAD
@4,13 TO 5,67 PANEL COLOR RB
@18,13 TO 19,67 PANEL COLOR RB
@6,15 TO 18,65 DOUB COLOR R+/B
@8,17 TO 16,63 DOUB COLOR R+/B
@10,27 SAY "ENTER AUTO.CONSUMPTION:" GET CA PICT "999999999"
@12,27 SAY "ENTER INVESTMENT      :" GET I  PICT "9999999999"
@14,27 SAY "ENTER MPC             :" GET MPC PICT "9.9"
READ
@20,20
WAIT
CLEAR
YAD = 1 / (1 - MPC) * (CA + I)
MYAD = YAD
@6,1 TO 7,75 PANEL COLOR RB+
@8,6 TO 9,72 DOUB
@9,13 SAY "COMPUTED AGGREGATE DEMAND SIDE EXPENDITURE AMOUNT(YAD)"
COLOR GB/R+
@13,26 SAY " YAD  =  "
@13,33 SAY MYAD
@15,4 TO 16,69 COLOR G+/GB
@20,20
WAIT
CLEAR
*******TO DETERMINE THE AGGREGATE DEMAND*************
DO DET_EQ2
 CLEA
DO DET_EQ3
set echo off
do output
```

```
GARBA = " "
CLEAR
@13,18 SAY "TO CONTINUE AGGREGATE DEMAND COMPUTE? Y/N" GET GARBA
PICT "@!"
READ
IF GARBA = "Y"
  LOOP
ELSE
 CLEA
 EXIT
ENDIF
ENDDO
RETURN

**************THE AGGREGATE DEMAND PROGRAM**************

PROCEDURE DET_EQ3
SET TALK OFF
SET ECHO OFF
YN  = " "
DO WHILE .T.
  CLEAR
  YN = " "
  @11,13 TO 13,68 PANEL COLOR RB+
  @14,14 TO 15,67 DOUB
  @15,15 SAY "TO VIEW ALL COMPUTED AGGREGATE DEMAND RECORDS(Y\N)?:"
COLOR GB/R+
  @15,67 GET YN PICT "@!"
  READ
  IF UPPER(YN) $ 'Y'
    CLEAR
    USE TOUTPUT
    @12,15
    LIST
    @23,15
    WAIT
    EXIT
   ELSE
     CLEAR
    ENDIF
exit
ENDDO
CLOSE ALL
*DO OUTPUT
CLEAR
RETURN

PROCEDURE OUTPUT
SET TALK OFF
SET ESCAPE ON
SET ECHO OFF
CLEAR
*public myad
STORE 0 TO RECAMONT
DO WHILE .T.
  USE TOUTPUT
  CLEAR
  @13,14 SAY " ENTER SELECTED AGGREGATE DEMAND RECORD AMOUNT:  "
COLOR W/G+
  @13,54 GET RECAMONT PICT "9999999999"
```

```
  READ
  CLEAR
  @2,4 TO 3,70 PANEL COLOR G
  @4,6 to 5,68 DOUB COLOR GB+
  @5,9 SAY "COMPUTED AGGREGATE DEMAND AND EQIULIBRIUM NATIONAL
INCOME " COLOR W/R+
  @6,8 TO 6,64 COLOR GR+
  SET COLOR TO R/B+
  @7,9 SAY "SNO"
  @7,13 SAY "YEAR"
  @7,18 SAY "OUTPUT"
  @7,25 SAY "CONSUMPTION"
  @7,37 SAY "INVESTMENT"
  @7,48 SAY "AGGREGATE DEMAND"
  @ 8,9 TO 8,64 COLOR GR+
  DO WHILE .NOT. EOF ()
    B = RECNO()
    B = B + 9
    @B,9 SAY SNO
    @B,13 SAY YEAR
    @B,19 SAY OUTPUT
    @B,27 SAY CONSUMPTN
    @B,39 SAY INVESTMENT
    @B,53 SAY AGGDEMAND
    IF EOF ()
      EXIT
    ENDIF
    SKIP
  ENDDO
  *USE TOUTPUT
locate for output = myad
LOCATE FOR OUTPUT = RECAMONT
  IF FOUND ()
    A = RECNO()
    A = A + 9
    @A,64 SAY "*" COLOR R*/B
    @A,66 SAY "EQUILIBRIUM" COLOR GB+/R
    @A,79 SAY "*" COLOR R*/B
   @23,15
  WAIT
  EXIT
  ENDIF
ENDDO
SET COLOR TO W+/B
CLEAR
RETURN

PROCEDURE DET_EQ2
SET TALK OFF
SET ECHO OFF
CLEAR
SELECT 1
USE TSE.DBF
SELECT 2
USE TOUTPUT.DBF

SELECT 1
STORE 0 TO M_SNO,MG,MYR,MC,MOUTPUT,MI,MAGGDD
DO WHILE .NOT. EOF ()
  M_SNO = SNO
```

```
  MYR = YEAR
  MOUTPUT = OUTPUT
  MC  =  CONSUMPTN
  MI  =  INVESTMENT
   MAGDD  = MC + MI
  IF EOF ()
    EXIT
  ENDIF

  SELECT 2
  APPEND BLANK
  REPL SNO WITH M_SNO
  REPL YEAR WITH MYR
  REPL OUTPUT WITH MOUTPUT
  REPL CONSUMPTN WITH MC
  REPL INVESTMENT WITH MI
  REPL AGGDEMAND WITH MAGDD
  SELECT 1
  SKIP
ENDDO
CLOSE ALL
*DO DET_EQ3
RETURN

PROCEDURE THREE_SECT
SET TALK OFF
SET STAT OFF
SET CONFIRM OFF
SET SCOREBOARD OFF
SET ECHO OFF
CLEAR
DO WHILE .T.
SET COLOR TO R/B+
@ 8,31 TO 9,49
@ 9,32 SAY "THREE SECTOR MENU"
@10,21 TO 20,62 DOUB
@12,23 SAY "TASK CODE"
@12,49 SAY "TASK"
@13,23 TO 13,31
@13,49 TO 13,52
@14,26 SAY "[K]          ====    GOVT.EXPEDITURE"
@15,26 SAY "[L]          ====    AUTONOMOUS TAX"
@16,26 SAY "[M]          ====    TRANSFER PAYMENT"
@17,26 SAY "[N]          ====    INCOME TAX"
@18,26 SAY "[O]          ====    EXIT"
CHOICE = " "
@21,30 SAY "ENTER CODE FOR CHOICE:" GET CHOICE PICT "!"
READ
DO CASE
 CASE CHOICE = 'K'
   DO GOVT_EXP
 CASE CHOICE = 'L'
   DO AUTO_TAX
 CASE CHOICE = 'M'
   DO TRANSPAY
 CASE CHOICE = 'N'
   DO INCOMTAX
 CASE CHOICE = 'O'
   EXIT
   CLEA
```

```
 OTHERWISE
  CLEAR
  @13,10 TO 17,56 DOUB
  SET COLOR TO W/R*
  @15,25 SAY "ILLEGAL CHOICE TRY AGAIN"
  SET COLOR TO R/B*
  @20,10
  WAIT
  CLEAR
ENDCASE
ENDDO
CLEA
RETURN

PROCEDURE GOVT_EXP
SET TALK OFF
SET ECHO OFF
CLEAR
@4,25 TO 5,56 PANEL COLOR R
@6,29 SAY "4, GOVERNMENT EXPENDITURE"
@8,28 SAY "  THREE SECTOR ECONOMY  " COLOR RB+/B
@9,20 SAY "  WE      SHALL       FIRST         COMPUTE  " COLOR N/G
@10,20 SAY "  THE      AGGREGATE      DEMAND       SIDE  " COLOR N/G
@11,20 SAY "  EQUILIBRUIM          AMOUNT         USING  " COLOR N/G
@12,20 SAY "  THE          MULTIPLIER           PROCESS  " COLOR N/G
@18,23 SAY "*" COLOR R+
@18,25 SAY "PLEASE NOTE  ALL  CALCULATED VALVES" COLOR R+
@18,61 SAY "*" COLOR R+
@20,20
WAIT
CLEA
@9,14 TO 10,71 PANEL COLOR GR
@13,14 TO 14,71 PANEL COLOR G+
@11,16 TO 12,68 DOUB COLOR GB
@12,18 SAY "LET'S COMPUTE MARGINAL PROPENSITY TO CONSUME(MPC)" COLOR
GB+/G
@17,18
WAIT
SET ESCAPE ON
DO MPC_CAL2

SET ECHO OFF
CLEA
@10,18 TO 11,68 PANEL COLOR GR+
@12,20 TO 13,66
@15,18 TO 16,68 PANEL COLOR RB
@18,26 SAY "LET'S COMPUTE AUTONOMOUS CONSUMPTION" COLO GB+/G
@18,18
WAIT
CLEA
CH = " "
DO WHILE .T.
@15,20 SAY "TO ADD RECORD INTO AU_C.DBF(Y/N)?:" GET CH PICT "@!"
READ
CLEA
IF CH = 'Y'
 DO ADDAUC
 SET ECHO OFF
 CLEA
 EXIT
```

```
CLOSE
 CLEA
 EXIT
ENDIF
ENDDO

DO CA_CAL
CLEAR
@10,14 TO 11,74 PANEL COLOR G+
@15,14 TO 16,74 PANEL COLOR G+
@12,16 TO 13,68 DOUB COLOR GB+/B
@13,19 SAY "LET'S COMPUTE AGGREGATE DEMAND SIDE EQUILIBRUIM" COLOR
R+/N
@18,18
WAIT
CLEA
DO YADI_CAL
CLEA
@11,14 TO 12,74 PANEL COLOR G+
@16,14 TO 17,74 PANEL COLOR G+
@13,16 TO 14,68 DOUB COLOR GB+/B
@14,17 SAY "LET'S COMPUTE MULTIPLIER EFFECT OF GOVT.EXPENDITURE"
COLOR R+/N
@18,18
WAIT
CLEA
DO G_MULTPL
SET ECHO OFF
CLEA
@12,25 TO 13,55 PANEL COLOR G
@11,27 TO 15,53 DOUB COLOR B/B+
@15,31 SAY "  END  OF  OUTPUT  " COLOR BB/N
@17,25 TO 18,55 PANEL COLOR B
@20,20
WAIT
CLEA
RETURN

PROCEDURE MPC_CAL2
SET TALK OFF
*PUBLIC Z
CLEAR
USE TEMP
DELE ALL
PACK
CLOSE ALL

SELECT 1
USE M_PC.DBF
SELECT 2
USE TEMP.DBF
DO WHILE .T.
SELECT 1
STORE 0 TO Z,T,OUTPUT,CONSUMPTN,A,B,C,D
DO WHILE .NOT. EOF ()
A = OUTPUT
B = CONSUMPTN
SKIP
 C = OUTPUT
 D = CONSUMPTN
```

```
 E = (D -B) / (C -A)
IF EOF ()
EXIT
ENDIF
  SELECT 2
 APPEND BLANK
 REPL MPC WITH E
SELECT 1
ENDDO
CH = " "
@20,24 SAY "TO VIEW COMPUTED OUTPUT(Y/N)?:" GET CH PICT "@!"
READ
IF CH = "Y"
CLEA
@20,25 SAY "PRESS V TO VIEW THE OUTPUT"
SET CONS OFF
 WAIT
 SET CONS ON
 SELECT 2
 CLEA
 @9,15
 DISPLAY
 @21,20
 WAIT
 CLEA
ELSE
 CLEA
ENDIF
EXIT
ENDDO

SELECT 2
Z = MPC
CLOSE ALL
USE TEMP
DO WHILE .NOT. EOF ()
 SKIP
 T = MPC
IF EOF ()
 EXIT
ENDIF
IF Z = T
LOOP
ENDIF
IF Z <> T
  CLEAR
  @13,25 SAY "ERROR IN YOUR DATABASE FILE(M_PC)" COLOR RB/G+
@23,15
WAIT "PRESS Y TO CROSSCHECK YOUR DATA"
CLEAR
CH = " "
@11,30 SAY "NOTE"
@13,23 say "SAVE WITH CTRL-W/END AFTER CHANGES "
@14,23 SAY "PRESS ALT-E TO EXIT FROM BROWSE"
@23,15
WAIT
CLEAR
@14,25 SAY "TO EFFECT CHANGE(Y/N)?:" GET CH PICT "@!"
READ
IF CH = 'Y'
```

```
 CLEAR
USE M_PC
BROWSE
ENDIF
@20,15
WAIT "PRESS D TO DELETE ERROR(S) IN RESULT"
USE TEMP
DELE ALL
PACK
DO MPC_CAL2
ELSE
CLEAR
EXIT
ENDIF
ENDDO
CLEAR
@8,20 SAY "THREE SECTOR ECONOMY OUTPUTS" COLOR GB/G+
@9,10 TO 10,60 PANEL
@11,13 TO 12,59 DOUB
@12,15 SAY "COMPUTED MARGINAL PROPENSITY TO CONSUME(MPC)" COLOR
GB/R+
@14,24 SAY "MPC      =    "
@14,33 SAY Z
@17,18 TO 18,54 DOUB
@18,25 SAY " MPC  IS  CONSTANT  " COLOR G/RB+
@16,10 TO 17,60 PANEL
@20,20
WAIT
CLEAR
RETURN

PROCEDURE YAD1_CAL
SET ECHO OFF
SET TALK OFF
PUBLIC G
DO WHILE .T.
CLEA
@20,15 SAY "PRESS ENTER KEY TO START PROGRAM"
SET CONS OFF
WAIT
SET CONS ON
USE GOUTPUT
DELE ALL
PACK

CLEAR
STORE 0 TO CA,I,MPC,G,MYADD
@4,13 TO 5,67 PANEL COLOR RB
@18,13 TO 19,67 PANEL COLOR RB
@6,15 TO 18,65 DOUB COLOR R+/B
@8,17 TO 16,63 DOUB COLOR R+/B
@11,25 SAY "ENTER AUTO.CONSUMPTION:" GET CA PICT "9999999999"
@12,25 SAY "ENTER GOVT.EXPENDITURE:" GET G  PICT "9999999999"
@13,25 SAY "ENTER INVESTMENT      :" GET I  PICT "9999999999"
@14,25 SAY "ENTER MPC             :" GET MPC PICT "9.9"
READ
@20,20
WAIT
CLEAR
YAD1 = 1 / (1 - MPC) * (CA + I + G)
```

```
MYADD = YAD1
@6,4 TO 7,75 PANEL COLOR RB+
@8,6 TO 9,72 DOUB
@9,13 SAY "COMPUTED AGGREGATE DEMAND SIDE EXPENDITURE AMOUNT(YAD)"
COLOR GB/R+
@13,26 SAY " YAD1  =  "
@13,36 SAY MYADD
@15,4 TO 16,69 COLOR G+/GB
@20,20
WAIT
CLEAR
*******TO DETERMINE THE AGGREGATE DEMAND**************

DO DET_EQ
 CLEA
DO DET_EQ1
set echo off
CLEA
DO OUTPUT
MUSA = " "
CLEAR
@14,18 SAY " TO CONTINUE AGGREGATE DEMAND COMPUTE?:(Y\N)" GET MUSA
PICT "@!"
READ
IF MUSA = "Y"
  LOOP
ELSE
CLEAR
  EXIT
ENDIF
ENDDO
 RETURN

***************THE AGGREGATE DEMAND PROGRAM**************
PROCEDURE DET_EQ1
SET TALK OFF
SET ECHO OFF
YN  = " "
DO WHILE .T.
  CLEAR
  CH = " "
  @11,13 TO 13,68 PANEL COLOR RB+
  @14,14 TO 15,67 DOUB
  @15,15 SAY "TO VIEW ALL COMPUTED AGGREGATE DEMAND RECORDS(Y\N)?:"
COLOR GB/R+
  @15,67 GET YN PICT "@!"
  READ
  IF UPPER(YN) $ 'Y'
    CLEAR
    USE GOUTPUT
    @12,15
    LIST
    @23,15
    WAIT
    EXIT
   ELSE
     CLEAR
     @12,13 TO 13,67 PANEL COLOR RB+
     @13,15 TO 15,65 DOUB COLOR G+
     @15,17 SAY "PRESS Y TO VIEW ONLY COMPUTED EQILIBRIUM RECORDS"
```

```
COLOR GB/R+
     @10,30 GET CH PICT "@!"
     READ
     CLEAR
     USE GOUTPUT
     STORE 0 TO AGDD
     @13,25 SAY "ENTER AGGREGATE DEMAND RECORD AMOUNT" COLOR GR/BG+
     @13,62 GET AGDD PICT "999999"
     READ
     DO WHILE .NOT. EOF ()
       LOCATE FOR OUTPUT = AGDD
       IF .NOT. FOUND ()
         CLEA
         @10,30 SAY "RECORD DOES NOT EXIT" COLOR RB/GB+
         @20,20
         WAIT
         CLEA
         EXIT
        ELSE
          @13,23
           DISPLAY
           @20,20
           WAIT
           CLEA
           EXIT
         ENDIF
      ENDDO
      EXIT
    ENDIF
ENDDO
CLOSE ALL
*DO OUTPUT
CLEAR
RETURN

PROCEDURE OUTPUT
SET TALK OFF
SET ESCAPE ON
SET ECHO OFF
CLEAR
STORE 0 TO RECAMONT
DO WHILE .T.
  USE GOUTPUT
  CLEAR
  @13,14 SAY " ENTER SELECTED AGGREGATE DEMAND RECORD AMOUNT: "
COLOR W/G+
  @13,61 GET RECAMONT PICT "9999999999"
  READ
  CLEAR
  @2,1 TO 3,79 PANEL COLOR G
  @4,6 to 5,68 DOUB COLOR GB+
 @5,9 SAY "COMPUTED AGGREGATE DEMAND AND EQUILIBRIUM NATIONAL INCOME
" COLOR W/R+
  @6,2 TO 9,77 COLOR GR+
  SET COLOR TO R/B+
  @7,3 SAY "SNO"
  @7,7 SAY "YEAR"
  @7,12 SAY "OUTPUT"
  @7,19 SAY "CONSUMPTION"
  @7,31 SAY "INVESTMENT"
```

```
  @7,12 SAY "GOVT.EXPENDT."
  @7,50 SAY "AGGR.DEMAND"
  @ 9,2 TO 3,77 COLOR GR+
  DO WHILE .NOT. EOF ()
    B = RECNO()
    B = B + 9
    @B,2 SAY SNO
    @B,7 SAY YEAR
    @B,11 SAY OUTPUT
    @B,18 SAY CONSUMPTN
    @B,29 SAY INVESTMENT
    @B,41 SAY GOVTEXPEDT
    @B,55 SAY AGGDEMAND
    IF EOF ()
      EXIT
    ENDIF
    SKIP
  ENDDO

*  USE GOUTPUT
  LOCATE FOR OUTPUT = RECAMONT
  IF FOUND ()
    A = RECNO()
    A = A + 9
    @A,36 SAY "*" COLOR W*/B
    @A,67 SAY "EQUILIBRIUM" COLOR GB+/R
    @A,78 SAY "*" COLOR W*/B
   @23,15
  WAIT
  EXIT
  ENDIF
ENDDO
SET COLOR TO W+/B
CLEAR
RETURN

PROCEDURE DET_EQ
SET TALK OFF
SET ECHO OFF
CLEAR
SELECT 1
USE GXP.DBF
SELECT 2
USE GOUTPUT.DBF

SELECT 1
STORE 0 TO M_SNO,MG,MYR,MC,MOUTPUT,MI,MAGGDD
DO WHILE .NOT. EOF ()
  M_SNO = SNO
  MYR = YEAR
  MOUTPUT = OUTPUT
  MC  =  CONSUMPTN
  MI  =  INVESTMENT
  MG  =  GOVTEXPEDT
  MAGGDD  = MC  MI + MG
  IF EOF ()
    EXIT
  ENDIF
  SELECT 2
  APPEND BLANK
```

```
  REPL SAVG WITH M_SAVG
  REPL YEAR WITH MYR
  REPL OUTPUT WITH MOUTPUT
  REPL CONSUMPTN WITH MC
  REPL INVESTMENT WITH MI
  REPL GOVTEXPEDT WITH MG
  REPL AGGDEMAND WITH MAGGDD
  SELECT 1
  SKIP
ENDDO
CLOSE ALL
*DO DET_EQ1
RETURN


PROCEDURE AUTO_TAX
SET TALK OFF
SET ECHO OFF
CLEAR
@1,20 TO 3,58 PANEL COLOR R
@2,28 SAY "11, TAX AS AUTONOMOUS TAX"
@0,20 SAY "  THREE SECTOR ECONOMY  " COLOR RB+/B
@9,20 SAY "  WE      SHALL       FIRST         COMPUTE  " COLOR N/G
@10,20 SAY "  THE      AGGREGATE      DEMAND       SIDE  " COLOR N/G
@11,20 SAY "  EQUILIBRUIM          AMOUNT        USING  " COLOR N/G
@12,20 SAY "  THE          MULTIPLIER          PROCESS  " COLOR N/G
@18,20 SAY "*" COLOR R+
@18,25 SAY "PLEASE NOTE  ALL  CALCULATED VALUES" COLOR R+
@18,61 SAY "*" COLOR R+
@20,20
WAIT
CLEA
@9,14 TO 10,74 PANEL COLOR G+
@13,14 TO 14,74 PANEL COLOR G+
@11,16 TO 12,68 DOUB COLOR GB
@12,18 SAY "LET'S COMPUTE MARGINAL PROPENSITY TO CONSUME(MPC)" COLOR
GB+/G
@17,18
WAIT
SET ESCAPE ON
DO MPC_CAL

SET ECHO OFF
CLEA
@10,18 TO 11,68 PANEL COLOR GR+
@12,20 TO 13,69
@15,18 TO 16,68 PANEL COLOR RB
@13,26 SAY "LET'S COMPUTE AUTONOMOUS CONSUMPTION" COLO GR+/G
@18,18
WAIT
CLEA
CH = " "
DO WHILE .T.
@15,20 SAY "TO ADD RECORD INTO AU_C.DBF(Y/N)?." GET CH PICT "@!"
READ
CLEA
IF CH = 'Y'
 DO ADDAUC
 SET ECHO OFF
 CLEA
```

```
 EXIT
ELSE
 CLEA
 EXIT
ENDIF
ENDDO

DO CA_CAL
CLEAR
@10,11 TO 11,71 PANEL COLOR G+
@15,14 TO 16,71 PANEL COLOR G+
@12,16 TO 13,68 DOUB COLOR GB+/B
@13,16 SAY "LET'S COMPUTE AGGREGATE DEMAND SIDE EQUILIBRUIM" COLOR
R+/N
@18,18
WAIT
CLEA
DO YADS_CAL
CLEA
@11,14 TO 12,71 PANEL COLOR G+
@16,14 TO 17,71 PANEL COLOR G+
@13,16 TO 11,69 DOUB COLOR GB+/B
@14,17 SAY "LET'S COMPUTE MULTIPLIER EFFECT OF  AUTONOMOUS  TAX"
COLOR R+/N
@18,18
WAIT
CLEA
DO TO_MULTP
SET ECHO OFF
CLEA
@12,25 TO 13,55 PANEL COLOR G
@14,27 TO 15,53 DOUB COLOR R/B+
@15,31 SAY "  END  OF  OUTPUT  " COLOR RB/N
@17,25 TO 18,55 PANEL COLOR R
@20,29
WAIT
CLEA
RETURN


PROCEDURE YADS_CAL
SET ECHO OFF
SET TALK OFF
PUBLIC G,MPC,MYADD

CLEAR
DO WHILE .T.
CLEAR
  USE GOUTPUT2
   DELE ALL
   PACK
USE GXP
DO WHILE .T.
CLEAR
STORE 0 TO GA,I,MPC,G,MYADD,TO
31,12 TO 5,67 PANEL COLOR RB
@18,13 TO 16,67 PANEL COLOR RB
@6,15 TO 18,65 DOUB COLOR RL/B
@8,17 TO 16,63 DOUB COLOR RL/B
@19,29 SAY "ENTER AUTO.CONSUMPTION:" GET GA PICT "9999999999"
```

```
@11,22 SAY "ENTER GOVT.EXPENDITURE:" GET G  PICT "9999999999"
@12,22 SAY "ENTER INVESTMENT       :" GET I  PICT "9999999999"
@13,22 SAY "ENTER AUTONOMOUS TAX   :" GET TO PICT "9999999999"
@14,22 SAY "ENTER MPC              :" GET MPC PICT "9.9"
READ
@20,20
WAIT
CLEAR
YAD2 = 1 / (1 - MPC) * (CA - (MPC*TO)+ I + G)
MYADD = YAD2

  @8,1 TO 7,75 PANEL COLOR RB+
   @9,9 TO 9,72 DOUB
  @8,13 SAY "COMPUTED AGGREGATE DEMAND GIDI EXPENDITURE AMOUNT(YAD)"
COLOR GB/R+
  @10,26 SAY " YAD2     "
  @13,36 SAY MYADD
  @15,4 TO 16,69 PANEL COLOR G+/GB
  @17,20 SAY " TAX AS A LINKAGE REDUCES NATIONAL " COLOR W/R
  @18,20 SAY " INCOME TO A  NEW EQIULIBRUIM YAD2 " COLOR W/R
  @20,20
  WAIT
CLEA
EXIT
ENDDO
*USE GXP
DO WHILE .NOT. EOF ()
 LOCATE FOR OUTPUT = MYADD
 IF .NOT. FOUND ()
 CLEAR
@10,30 SAY "EQUILIBRIUM RECORD NOT FOUND"
@20,20
WAIT
EXIT
ELSE
  CLEAR
@13,33 SAY "EQUILIBRIUM RECORD FOUND"
@20,20
WAIT
CLEA
DO DET_EQT
DO DET1_EQ
EXIT
ENDIF
*******TO DETERMINE THE AGGREGATE DEMAND*************
  CLEA
ENDDO
UCHE = " "
CLEAR
@15,18 SAY "DO YOU WANT TO CONTINUE EQUILIBRIUM COMPUTE? Y\N" GET
UCHE PICT "@!"
READ
IF UCHE = "Y"
  USE GOUTPUT2
   DELE ALL
   PACK
  LOOP
ELSE
EXIT
ENDIF
```

```
ENDDO
CLEAR
RETURN

**********THE AGGREGATE DEMAND PROGRAM**********
PROCEDURE DET1_EQ
SET TALK OFF
SET ECHO OFF
**PUBLIC  MYADD
YN  = " "
DO WHILE .T.
  CLEAR
  YN = " "
  @11,13 TO 13,68 PANEL COLOR RB+
  @14,14 TO 15,67 DOUB
  @15,15 SAY "TO VIEW ALL COMPUTED AGGREGATE DEMAND RECORDS(Y/N)?:"
COLOR GB/R+
  @15,67 GET YN PICT "@!"
  READ
  IF UPPER(YN) $ 'Y'
    CLEAR
    USE GOUTPUT2
    @12,15
    LIST
    @23,15
    WAIT
    EXIT
   ELSE
     CLEAR
    ENDIF
      EXIT
ENDDO
CLOSE ALL
DO OUTPUT
CLEAR
RETURN

PROCEDURE OUTPUT
SET TALK OFF
SET ESCAPE ON
SET ECHO OFF
PUBLIC MYADD
CLEAR
STORE 0 TO RECAMONT
DO WHILE .T.
  USE GOUTPUT2
  CLEAR
  @13,18 SAY " ENTER SELECTED AGGREGATE DEMAND RECORD AMOUNT: "
COLOR W/G+
  @13,69 GET RECAMONT PICT "999999"
  READ
  CLEAR
  @2,1 TO 3,78 PANEL COLOR G
  @4,6 to 5,69 DOUB COLOR GB+
 @3,9 SAY "COMPUTED AGGREGATE DEMAND AND EQIULIBRIUM NATIONAL INCOME
" COLOR W/R+
  @6,2 TO 6,77 COLOR GR+
  SET COLOR TO R/B+
  @7,2 SAY "SNO"
  @7,7 SAY "YEAR"
```

```
  @7,12 SAY "OUTPUT"
  @7,19 SAY "CONSUMPTION"
  @7,31 SAY "INVESTMENT"
  @7,42 SAY "GOVT.EXPENDT."
  @7,56 SAY "AGGR.DEMAND"
  @ 8,2 TO 8,77 COLOR GR+
  DO WHILE .NOT. EOF ()
    B = RECNO()
    B = B + 9
    @B,2 SAY SNO
    @B,7 SAY YEAR
    @B,11 SAY OUTPUT
    @B,18 SAY CONSUMPTN
    @B,29 SAY INVESTMENT
    @B,41 SAY GOVTEXPEDT
    @B,55 SAY AGGDEMAND
    IF EOF ()
      EXIT
    ENDIF
    SKIP
  ENDDO

*  USE GOUTPUT
  LOCATE FOR OUTPUT = RECAMONT
  IF FOUND ()
    A = RECNO()
    A = A + 9
    @A,66 SAY "*" COLOR W*/B
    @A,67 SAY "EQUILIBRIUM" COLOR GB+/R
    @A,78 SAY "*" COLOR W*/B
   @23,15
  WAIT
  EXIT
  ENDIF
ENDDO
SET COLOR TO W+/B
CLEAR
RETURN


PROCEDURE DET_EQT
SET TALK OFF
SET ECHO OFF
CLEAR
PUBLIC MYADD
SELECT 1
USE GXP.DBF
SELECT 2
USE GOUTPUT2.DBF

SELECT 1
STORE 0 TO MYADD,M_SNO,MG,MYR,MC,MOUTPUT,MI,MAGGDD
DO WHILE .NOT. EOF ()
  M_SNO = SNO
  MYR = YEAR
  MOUTPUT = OUTPUT
  MC  =  CONSUMPTN
  MI  =  INVESTMENT
  MG  =  GOVTEXPEDT
  MAGGDD  = MC + MI + MG
```

```
  IF EOF ()
    EXIT
  ENDIF
  SELECT 2
  APPEND BLANK
  REPL SNO WITH M_SNO
  REPL YEAR WITH MYR
  REPL OUTPUT WITH MOUTPUT
  REPL CONSUMPTN WITH MC
  REPL INVESTMENT WITH MI
  REPL GOVTEXPEDT WITH MG
  REPL AGGDEMAND WITH MAGGDD
  SELECT 1
  SKIP
ENDDO
CLOSE ALL
*DO DET_EQ1
*USE GOUTPUT2
*DO WHILE .NOT. EOF ()
*LOCATE FOR OUTPUT = MYADD
*IF FOUND ()
* CLEAR
* RETURN
*ELSE
* CLEAR
* @10,33 SAY " RECORD NOT FOUND "
* @20,20
* WAIT
 CLEA
*ENDIF
*EXIT
*ENDDO
RETURN


PROCEDURE TRANSPAY
SET TALK OFF
SET ECHO OFF
CLEAR
@4,25 TO 5,56 PANEL COLOR R
@6,30 SAY "iii, TRANSFER  PAYMENT "
@3,28 SAY "  THREE SECTOR ECONOMY  " COLOR RB+/B
@9,20 SAY "  WE      SHALL       FIRST         COMPUTE  " COLOR N/G
@10,20 SAY "  THE      AGGREGATE      DEMAND       SIDE  " COLOR N/G
@11,20 SAY "  EQUILIBRUIM          AMOUNT         USING  " COLOR N/G
@12,20 SAY "  THE          MULTIPLIER           PROCESS  " COLOR N/G
@18,20 SAY "*" COLOR R*
@18,25 SAY "PLEASE NOTE  ALL  CALCULATED VALVES" COLOR R+
@18,61 SAY "*" COLOR R*
@20,20
WAIT
CLEA
@9,11 TO 10,74 PANEL COLOR G+
@13,14 TO 14,74 PANEL COLOR G+
@11,16 TO 12,69 DOUB COLOR GB
@12,18 SAY "LET'S COMPUTE MARGINAL PROPENSITY TO CONSUME(MPC)" COLOR
GB+/G
@17,18
WAIT
SET ESCAPE ON
```

```
DO MPC_CAL2

SET ECHO OFF
CLEA
@10,10 TO 11,62 PANEL COLOR GR+
@12,22 TO 13,66
@15,10 TO 16,62 PANEL COLOR RB
@12,26 SAY "LET'S COMPUTE AUTONOMOUS CONSUMPTION" COLO GR+/G
@18,10
WAIT
CLEA
ON E " "
DO WHILE .T.
@15,22 SAY "TO ADD RECORD INTO AU_C.DBF(Y/N)?:" GET CH PICT "@!"
READ
CLEA
IF CH = 'Y'
 DO ADDAUC
 SET ECHO OFF
 CLEA
 EXIT
ELSE
 CLEA
 EXIT
ENDIF
ENDDO

DO CA_CAL
CLEAR
@10,14 TO 11,71 PANEL COLOR G+
@15,11 TO 16,74 PANEL COLOR G+
@12,16 TO 13,68 DOUB COLOR GR+/B
@12,19 SAY "LET'S COMPUTE AGGREGATE DEMAND SIDE EQUILIBRUIM" COLOR
R+/N
@18,18
WAIT
CLEA
DO YADC_CAL
CLEA
SET ECHO OFF
CLEA
@12,26 TO 13,55 PANEL COLOR G
@14,27 TO 15,53 DOUB COLOR R/B+
@15,31 SAY "  END  OF  OUTPUT  " COLOR RB/N+
@17,25 TO 18,55 PANEL COLOR R
@20,20
WAIT
CLEA
RETURN
PROCEDURE YADC_CAL
SET ECHO OFF
SET TALK OFF
PUBLIC G,MPC,MYAGDD
USE GXP
CLEAR
DO WHILE .T.
CLEA
@20,15 SAY "PRESS ENTER KEY TO START PROGRAM"
SET CONS OFF
```

```
CLEA
SET CONS ON
 USE GOUTPUT3
 DELE ALL
 PACK
DO WHILE .T.
STORE 0 TO R,CA,I,MPC,G,MYAGDD,TO
@1,12 TO 5,67 PANEL COLOR RB
@12,13 TO 19,67 PANEL COLOR RB
@6,15 TO 18,65 DOUB COLOR R+/B
@7,17 TO 17,64 DOUB COLOR R+/B
@ 9,22 SAY "ENTER TRANSFER PAYMENT." GET R  PICT "9999999999"
@10,22 SAY "ENTER AUTO.CONSUMPTION:" GET CA PICT "9999999999"
@11,22 SAY "ENTER GOVT.EXPENDITURE:" GET G  PICT "9999999999"
@12,22 SAY "ENTER INVESTMENT       :" GET I  PICT "9999999999"
@13,22 SAY "ENTER AUTONOMOUS TAX   :" GET TO PICT "9999999999"
@14,22 SAY "ENTER MPC              :" GET MPC PICT "9.9"
READ
WAIT
CLEAR
YAD3 = 1 / (1 - MPC) * (CA -(TO*TC)+ (MPC*R)+I + G)
MYAGDD = YAD3

  @5,4 TO 7,75 PANEL COLOR RB+
   @8,6 TO 9,72 DOUB
  @9,1* SAY "COMPUTED AGGREGATE DEMAND SIDE EXPENDITURE AMOUNT(YAD)
COLOR GB/R+
  @13,20 SAY " YAD3  =  "
  @13,36 SAY MYAGDD
  @15,4 TO 16,69 PANEL COLOR G+/GB
  *@17,20 SAY " TAX AS A LINKAGE REDUCES NATIONAL " COLOR W/R
  *@18,20 SAY " INCOME TO A  NEW EQUILIBRUIM YAD2 " COLOR W/R
  @21,21
  WAIT
CLEA
EXIT
ENDDO
DO DET_EQR
USE GOUTPUT3
DO WHILE .NOT. EOF ()
 LOCATE FOR OUTPUT =  AGGDEMAND
 IF .NOT. FOUND ()
  CLEAR
  @10,30 SAY "RECORD NOT FOUND"
  @20,20
  WAIT
ELSE
  CLEAR
*  DO DET_EQR
*******TO DETERMINE THE AGGREGATE DEMAND**********
  DO DET2_EQ
  CLEA
 ENDIF
EXIT
ENDDO
*ENDDO
YH = " "
CLEA
@20,00 SAY " TO CONTIN E AGGREGATE DEMAND COMPUTED (Y/N)"
```

```
PICT "@!"
READ
IF YN = "Y"
LOOP
ELSE
CLEA
EXIT
ENDIF
ENDDO
RETURN

*****PROCEDURE TITLE AGGREGATE DEMAND PROGRAM*****
PROCEDURE DETQ_EQ
SET TALK OFF
SET ECHO OFF
PUBLIC  MYAGDD
STORE 0 TO MYAGDD
YN  = " "
DO WHILE .T.
  CLEAR
  CH = " "
  @11,10 TO 13,60 PANEL COLOR RB+
  @11,14 TO 15,67 DOUE
  @12,15 SAY "TO VIEW ALL COMPUTED AGGREGATE DEMAND RECORDS(Y\N)?."
COLOR GR/R
  @12,67 GET YN PICT "@!"
  READ
  IF UPPER(YN) # 'Y'
    CLEAR
    USE OUTPUT3
    @12,15
    LIST
    @23,15
    WAIT
    EXIT
  ELSE
    CLEAR
        EXIT
  ENDIF
ENDDO
CLOSE ALL
DO OUTPUT3
CLEAR
RETURN

PROCEDURE OUTPUT3
SET TALK OFF
SET ESCAPE ON
SET ECHO OFF
PUBLIC MYAGDD
CLEAR
STORE 0 TO REGAMOUNT
STORE 0 TO MYAGDD,ONE,YEAR
DO WHILE .T.
  USE OUTPUT3
  CLEAR
  @10,10 SAY " ENTER SELECTED AGGREGATE DEMAND RECORD AMOUNT. "
COLOR R/G
  @10,61 GET REGAMOUNT PICT "99999999.99"
```

```
   CLEAR
   GET COLOR TO W,B
   SET COLOR TO W/B
   @1,0 SAY "CONTRIBUTED AGGREGATE DEMAND AND EQUILIBRIUM NATIONAL INCOME
" SET COLOR W/B
   @3,2 TO 5,77 COLOR GR+
   SET COLOR TO W/B
   @7,0 SAY "ENC"
   @7,5 SAY "YEAR"
   @7,12 SAY "OUTPUT"
   @7,22 SAY "CONSUMPTION"
   @7,34 SAY "INVESTMENT"
   @7,46 SAY "GOVT EXPEND."
   @7,58 SAY "AGGR DEMAND"
   @ 8,2 TO 8,77 COLOR GR+

   DO WHILE .NOT. EOF ()
      A = RECNO()
      @ A,0 SAY ENC
      @ A,5 SAY YEAR
      @ A,12 SAY OUTPUT
      @ A,22 SAY CONSUMPTN
      @ A,34 SAY INVESTMENT
      @ A,46 SAY GOVTEXPEND
      @ A,58 SAY AGGDEMAND
      IF EOF ()
         EXIT
      ENDIF
      SKIP
   ENDDO
 CLOSE ALL
 USE EQUITRTA
DO WHILE .NOT. EOF ()
   LOCATE FOR AGGDEMAND    MYAGDD
   IF FOUND ()
      A = RECNO()
      @ A,0 SAY "*" COLOR W*/B
      @ A,37 SAY "EQUILIBRIUM" COLOR GR+/B
      @ A,76 SAY "*" COLOR W*/B
      SKIP
   ENDIF
   WAIT
   CLEAR
 ENDIF
ENDDO
SKIP
EXIT


@20,20
WAIT
ENDDO
SKIP
WAIT
SET COLOR TO W/B
CLEAR
RETURN

PROCEDURE GET_EQU
```

```
CLEAR
PUBLIC MYAGDD
SELECT 1
USE GXP.DBF
SELECT 2
USE GOUTPUT2.DBF

SELECT 1
STORE 0 TO MYAGDD,M_SNO,MG,MYR,MC,MOUTPUT,MI,MAGGDD
DO WHILE .NOT. EOF ()
  M_SNO = SNO
  MYR = YEAR
  MOUTPUT = OUTPUT
  MC  =  CONSUMPTN
  MI  =  INVESTMENT
  MG  =  GOVTEXPEDT
  MAGGDD  = MC + MI + MG
  IF EOF ()
    EXIT
  ENDIF
  SELECT 2
  APPEND BLANK
  REPL SNO WITH M_SNO
  REPL YEAR WITH MYR
  REPL OUTPUT WITH MOUTPUT
  REPL CONSUMPTN WITH MC
  REPL INVESTMENT WITH MI
  REPL GOVTEXPEDT WITH MG
  REPL AGGDEMAND WITH MAGGDD
  SELECT 1
  SKIP
ENDDO
CLOSE ALL
*SELECT 2
*GO BOT_EC1
*USE GOUTPUT2
*DO WHILE .NOT. EOF ()
*LOCATE FOR OUTPUT = MYAGDD
*IF FOUND ()
* CLEAR
* RETURN
*ELSE
* CLEAR
* @10,30 SAY " RECORD NOT FOUND "
* @20,20
* WAIT
 CLEA
*ENDIF
*EXIT
*ENDDO
RETURN

PROCEDURE INCOMTAX
SET TALK OFF
SET ECHO OFF
CLEAR
@4,25 TO 5,50 PANEL COLOR R
@6,20 SAY "*,      INCOMETAX           "
@8,20 SAY "  FOUR SECTOR ECONOMY  " COLOR RB*/5
```

```
@10,20 SAY "  THE      AGGREGATE      DEMAND       SIDE  " COLOR N/G
@11,20 SAY "  EQUILIBRIUM          AMOUNT         USING  " COLOR N/G
@12,20 SAY "  THE          MULTIPLIER          PROCESS  " COLOR N/G
@13,20 SAY "}" COLOR R+
@13,25 SAY "PLEASE NOTE  ALL  CALCULATED VALUES" COLOR R+
@13,61 SAY "{" COLOR R+
@20,20
WAIT
CLEA
@9,14 TO 10,71 PANEL COLOR G
@10,14 TO 14,74 PANEL COLOR G+
@11,16 TO 12,68 DOUB COLOR GB
@12,16 SAY "LET'S COMPUTE MARGINAL PROPENSITY TO CONSUME(MPC)" COLOR
GB+/G
@17,13
WAIT
SET ESCAPE ON
DO MPC_CAL

SET ECHO OFF
CLEA
@10,10 TO 11,68 PANEL COLOR GR+
@12,20 TO 15,60
@10,19 TO 10,60 PANEL COLOR RB
@18,20 SAY "LET'S COMPUTE AUTONOMOUS CONSUMPTION" COLO GB+/G
@18,10
WAIT
CLEA
ON E " "
DO WHILE .T.
@15,20 SAY "TO ADD RECORD INTO AD_CONF(Y/N)?:" GET ON PICT "@!"
READ
CLEA
IF ON = "Y"
 DO ADDAUS
 SET ECHO OFF
 CLEA
 EXIT
ELSE
 CLEA
 EXIT
ENDIF
ENDDO
DO CA_CAL

CLEA
@9,14 TO 10,74 PANEL COLOR G+
@10,14 TO 14,74 PANEL COLOR G+
@11,16 TO 12,68 DOUB COLOR GB
@12,16 SAY "LET'S COMPUTE MARGINAL PROPENSITY TO SPEND ON   TAX "
COLOR GB+/G
@17,13
WAIT
SET ESCAPE ON
DO MPT_CAL

SET ECHO OFF
CLEA
@10,10 TO 11,68 PANEL COLOR GR+
```

```
@10,11 TO 13,69 PANEL COLOR RB
@12,20 SAY "LET'S COMPUTE AUTONOMOUS INCOME TAX  " COLO GB+/G
@18,19
WAIT
CLEA
CH = " "
DO WHILE .T.
@15,20 SAY "TO ADD RECORD INTO AU_TX.DBF(Y/N)?" GET CH PICT "@!"
READ
CLEA
IF CH = 'Y'
 DO ADDAUTX
 SET ECHO OFF
 CLEA
 EXIT
ELSE
 CLEA
 EXIT
ENDIF
ENDDO
DO TA_CAL
CLEAR
@10,14 TO 11,71 PANEL COLOR G+
@15,14 TO 16,71 PANEL COLOR G+
@12,16 TO 13,69 DOUB COLOR GB+/B
@13,19 SAY "LET'S COMPUTE AGGREGATE DEMAND SIDE EQUILIBRUIM" COLOR
R+/N
@18,18
WAIT
CLEA
DO YAD4_CAL
CLEA
SET ECHO OFF
CLEA
@12,25 TO 13,55 PANEL COLOR G
@14,27 TO 15,53 DOUB COLOR R/B+
@15,31 SAY "  END  OF  OUTPUT  " COLOR RB/N+
@17,25 TO 18,55 PANEL COLOR R
@20,20
WAIT
CLEA
RETURN

PROCEDURE MPT_CAL
SET TALK OFF
CLEAR
USE TEMPT
DELE ALL
PACK
CLOSE ALL

SELECT 1
USE M_PTX.DBF
SELECT 2
USE TEMPT.DBF
DO WHILE .T.
SELECT 1
STORE 0 TO MPT,NY,NT,YM,NE,YE,YA,OUTPUT,TAX
DO WHILE .NOT. EOF ()
NY = OUTPUT
```

```
MT = TAX
SKIP
 YN = OUTPUT
 MT = TAX
TX = (NT * NT) / (YN * NY)
IF EOF ()
EXIT
ENDIF
  SELECT 2
 APPEND BLANK
 REPL MPT WITH TX
SELECT 1
ENDDO
CH = " "
@20,24 SAY "TO VIEW THE COMPUTED OUTPUT(Y/N)?:" GET CH PICT "@!"
READ
IF CH = "Y"
 CLEA
 @20,25 SAY "PRESS Y TO VIEW THE OUTPUT"
 SET CONS OFF
 WAIT
 SET CONS ON
 SELECT 2
  CLEA
  @9,15
  DISPLAY
  @21,20
  WAIT
  CLEA
ELSE
  CLEA
ENDIF
EXIT
ENDDO

SELECT 2
XT = MPT
CLOSE ALL
USE TEMPT
DO WHILE .NOT. EOF ()
 SKIP
XA = MPT
IF EOF ()
 EXIT
ENDIF
IF XT = XA
LOOP
ENDIF
IF XT <> XA
  CLEAR
  @13,25 SAY "ERROR IN YOUR DATABASE FILE(M_PTX)" COLOR BR/B
@23,15
WAIT "PRESS Y TO CROSSCHECK YOUR DATA"
CLEAR
CH = " "
@11,30 SAY "NOTE"
@13,23 say "SAVE WITH CTRL-W/END AFTER CHANGES "
@14,23 SAY "PRESS ALT E TO EXIT FROM BROWSE"
@23,15
WAIT
```

```
CLEAR
@1,15 SAY "TO EFFECT CHANGE(Y/N)?:" GET CH PICT "@!"
READ
IF CH = 'Y'
 CLEAR
USE M_PTX
BROWSE
ENDIF
@20,15
WAIT "PRESS D TO DELETE ERROR(S) IN RESULT"
USE TEMPT
DELE ALL
PACK
DO MPT_CAL
ELSE
CLEAR
EXIT
ENDIF
ENDDO
CLEAR
@2,22 SAY "TWO SECTOR ECONOMY OUTPUTS" COLOR GR/G+
@3,0 TO 10,62  PANEL
@11,10 TO 12,61 DOUB
@12,10 SAY "COMPUTED MARGINAL PROPENSITY TO SPEND ON IMPORT (MPM)"
COLOR GR/R+
@14,21 SAY "MPT          "
@14,33 SAY XT
@17,10 TO 19,51 DOUB
@18,25 SAY " MPT  IS  CONSTANT  " COLOR G/RB+
@16,10 TO 17,60 PANEL
@20,20
WAIT
CLEAR
RETURN

PROCEDURE TA_CAL
SET TALK OFF
SET ECHO OFF
CLEAR
USE AUTOT
DELE ALL
PACK
CLOSE ALL


CLEAR
SELECT 1
USE AU_TX.DBF
SELECT 2
USE AUTOT.DBF
DO WHILE .T.
SELECT 1
STORE 0 TO AUTA,OUTPUT,CONSUMPTN,MPC
STORE 0 TO Y3,TA,H,NMP,AT,JX,T3
DO WHILE .NOT. EOF ()
Y3 = OUTPUT
T3 = TAX
NMP = MPT
IF EOF ()
EXIT
```

```
ELSE
H = T2 - (NMP * Y3)
SKIP
ENDIF

SELECT 2
APPEND BLANK
REPL AUTA WITH H
SELECT 1
ENDDO
CH = " "
@20,24 SAY "TO VIEW THE COMPUTED OUTPUT(Y/N)?:" GET CH PICT "@!"
READ
IF CH = "Y"
 CLEA
 @20,25 SAY "PRESS V TO VIEW THE OUTPUT"
 SET CONS OFF
 WAIT
 SET CONS ON
 SELECT 2
 CLEA
 @9,15
 DISPLAY
 @21,20
 WAIT
 CLEA
ELSE
 CLEA
ENDIF
EXIT
ENDDO

SELECT 2
AT = AUTA
CLOSE ALL

USE AUTOT
DO WHILE .NOT. EOF ()
TA = AUTA
SKIP
 IF EOF ()
 EXIT
ENDIF
IF AT = TA
 LOOP
ENDIF
IF AT <> TA
 CLEAR
 @13,23 SAY " ERROR IN YOUR DBF(ALL_IX)" COLOR GR/B+
 @20,15
 WAIT "PRESS Y TO CROSSCHECK YOUR DATA"
 CLEAR
 CH = " "
 @11,33 SAY " NOTE " COLOR W/R
 SET COLOR TO GR/G+
 @12,20 SAY "TAKE CURSOR TO PLACE OF CORRECTION"
 @13,20 SAY "SAVE WITH CTRL-W/END AFTER CHANGES"
 @14,20 SAY "PRESS ALT - E TO EXIT FROM BROWSE"
 SET COLOR TO GR/B+
 @20,15
```

```
 WAIT
 CLEAR
 @11,25 SAY "TO EFFECT A CHANGES(Y/N)?:" GET CH PICT "@!"
 READ
 IF CH = 'Y'
  CLEAR
  USE AU_TX
  BROWSE
 ENDIF
@20,15
 WAIT "PRESS D TO DELETE ERROR(S) IN RESULT"
CLEAR
USE AUTOT
DELE ALL
PACK
 DO TA_CAL
ENDIF
EXIT
ENDDO
CLOSE ALL
CLEAR
@9,10 TO 19,69 PANEL
@11,13 TO 13,59 DOUB
@12,18 SAY "COMPUTED     AUTONOMOUS    TAX     (CA)" COLOR GB/R+
@14,26 SAY "TA          "
@14,35 SAY AT
@17,18 TO 18,54 DOUB
@18,25 SAY " TA     IS     CONSTANT" COLOR G/RB+
@16,10 TO 17,60 PANEL
@20,20
WAIT
CLEAR
RETURN

PROCEDURE YADM_CAL
SET ECHO OFF
SET TALK OFF
*PUBLIC G,MPC,YADD

CLEAR
DO WHILE .T.
CLEAR
@20,10 SAY "PRESS ENTER KEY TO START PROGRAM"
SET CONS OFF
WAIT
SET CONS ON
  USE GOUTPUT4
   DELE ALL
   PACK
USE GXP
DO WHILE .T.
CLEAR
STORE 0 TO R,CA,I,MPC,G,MYADD,TC,TA,MPT
@4,13 TO 5,67 PANEL COLOR RB
@18,13 TO 19,67 PANEL COLOR RB
@6,15 TO 18,65 DOUB COLOR R+/B
@8,17 TO 16,63 DOUB COLOR R+/B
@9,23 SAY "ENTER TRANSFER PAYMENT:" GET R PICT "9999999999"
@10,23 SAY "ENTER AUTO.CONSUMPTION:" GET CA PICT "9999999999"
@11,23 SAY "ENTER GOVT.EXPENDITURE:" GET G  PICT "9999999999"
```

```
@12,22 SAY "ENTER INVESTMENT          " GET I  PICT "9999999999"
@13,22 SAY "ENTER AUTONOMOUS TAX   ." GET TA PICT "9999999999"
@14,22 SAY "ENTER MPC              :" GET MPC PICT "9.9"
@15,22 SAY "ENTER MPT              :" GET MPT PICT "99.99"
READ
@20,20
WAIT
CLEAR
YAD1 = 1 / (1 - MPC)*(MPC*MPT)  * (CA -(MPC*TA)+ (MPC*R)+I + G)
MYADD = YAD1

  @6,4 TO 7,75 PANEL COLOR RB+
   @8,6 TO 8,72 DOUB
  @9,19 SAY "COMPUTED AGGREGATE DEMAND SIDE EXPENDITURE AMOUNT(YAD)"
COLOR GB/R+
  @12,26 SAY " YAD1   =  "
  @12,36 SAY MYADD
  @15,4 TO 18,69 PANEL COLOR G+/GB
  @17,20 SAY " TAX AS A LINKAGE REDUCES NATIONAL " COLOR W/R
  @18,20 SAY " INCOME TO A  NEW EQIULIBRUIM YAD4 " COLOR W/R
  @20,20
  WAIT
CLEA
EXIT
ENDDO
do det_eqtx
USE GOUTPUT4
DO WHILE .NOT. EOF ()
 LOCATE FOR OUTPUT = MYADD
 IF .NOT. FOUND ()
 CLEAR
@13,33 SAY "RECORD NOT FOUND"
@20,20
WAIT
EXIT
ELSE
  CLEAR
*DO DET_EQTX
DO DET4_EQ
EXIT
ENDIF
*******TO DETERMINE THE AGGREGATE DEMAND************
  CLEA
ENDDO
UCHE = " "
CLEAR
@15,18 SAY "DO YOU WANT TO CONTINUE EQUILIBRIUM COMPUTES Y\N" GET
UCHE PICT "@!"
READ
IF UCHE = "Y"
  USE GOUTPUT4
   DELE ALL
   PACK
  LOOP
ELSE
EXIT
ENDIF
ENDDO
CLEAR
RETURN
```

```
*********THE AGGREGATE DEMAND PROGRAM**********
PROCEDURE DET4_EQ
SET TALK OFF
SET ECHO OFF
PUBLIC  MYADD
YN  = " "
DO WHILE .T.
  CLEAR
  CH = " "
  @11,13 TO 13,68 PANEL COLOR RB+
  @14,14 TO 15,67 DOUB
  @15,15 SAY "TO VIEW ALL COMPUTED AGGREGATE DEMAND RECORDS(Y/N)? "
COLOR GB/R+
  @15,67 GET YN PICT "@!"
  READ
  IF UPPER(YN) $ 'Y'
    CLEAR
    USE GOUTPUT4
    @12,15
    LIST
    @23,15
    WAIT
    EXIT
   ELSE
     CLEAR
      EXIT
    ENDIF
ENDDO
CLOSE ALL
DO OUTPUT4
CLEAR
RETURN

PROCEDURE OUTPUT4
SET TALK OFF
SET ESCAPE ON
SET ECHO OFF
PUBLIC MYADD
CLEAR
STORE 0 TO RECAMONT
DO WHILE .T.
  USE GOUTPUT4
  CLEAR
*  @10,10 SAY " ENTER SELECTED AGGREGATE DEMAND RECORD AMOUNT: "
COLOR W/B+
*  @10,60 GET RECAMONT PICT "999999"
*  READ
  CLEAR
  @2,1 TO 3,78 PANEL COLOR G
  @4,6 to 5,68 DOUB COLOR GB+
 @5,9 SAY "COMPUTED AGGREGATE DEMAND AND EQUILIBRIUM NATIONAL INCOME
" COLOR W/R+
  @6,2 TO 8,77 COLOR GR+
  SET COLOR TO R/B+
  @7,2 SAY "GNO"
  @7,7 SAY "YEAR"
  @7,12 SAY "OUTPUT"
  @7,19 SAY "CONSUMPTION"
  @7,31 SAY "INVESTMENT"
  @7,43 SAY "GOVT.EXPENDT."
```

```
  @7,50 SAY "AGGR.DEMAND"
  @ 8,2 TO 8,77 COLOR GR+
  DO WHILE .NOT. EOF ()
    B = RECNO()
    B = B + 9
    @B,2 SAY SNO
    @B,7 SAY YEAR
    @B,11 SAY OUTPUT
    @B,18 SAY CONSUMPTN
    @B,29 SAY INVESTMENT
    @B,41 SAY GOVTEXPEDT
    @B,55 SAY AGGDEMAND
    IF EOF ()
      EXIT
    ENDIF
    SKIP
  ENDDO

*  USE GOUTPUT
  LOCATE FOR OUTPUT = MYABD
  IF FOUND ()
    A = RECNO()
    A = A + 9
    @A,66 SAY "*" COLOR W*/B
    @A,67 SAY "EQUILIBRIUM" COLOR GB+/R
    @A,78 SAY "*" COLOR W*/B
   @22,15
  WAIT
  EXIT
  ENDIF
ENDDO
SET COLOR TO W+/B
CLEAR
RETURN


PROCEDURE FOUR_SECT
SET TALK OFF
SET STAT OFF
SET CONFIRM OFF
SET SCOREBOARD OFF
SET ECHO OFF
CLEAR
DO WHILE .T.
SET COLOR TO R/B+
@ 8,31 TO 9,49
@ 9,32 SAY "FOUR SECTOR MENU"
@10,21 TO 20,62 DOUB
@12,23 SAY "TASK CODE"
@12,40 SAY "TASK"
@13,23 TO 13,31
@13,40 TO 13,52
@15,26 SAY "[V]          ****       EXPORT"
@16,26 SAY "[X]          ****       IMPORT"
@17,26 SAY "[Y]          ****       FOREIGN TRADE"
@18,26 SAY "[Z]          ****       EXIT"
CHOICE = " "
@21,30 SAY "ENTER CODE FOR CHOICE:" GET CHOICE PICT "!"
READ
DO CASE
```

```
 CASE CHOICE = 'W'
   DO EXPORT
 CASE CHOICE = 'X'
   DO IMPORT
 CASE CHOICE = 'Y'
   DO FRGNTRAD
 CASE CHOICE = 'Z'
   EXIT
 OTHERWISE
  CLEAR
  @10,19 TO 17,56 DOUB
  SET COLOR TO W/R*
  @15,25 SAY "ILLEGAL CHOICE TRY AGAIN"
  SET COLOR TO R/B+
  @20,15
  WAIT
  CLEAR
ENDCASE
ENDDO
CLEA
RETURN


PROCEDURE YAD5_CAL
SET ECHO OFF
SET TALK OFF
PUBLIC X
DO WHILE .T.
CLEA
@20,15 SAY "PRESS ENTER KEY TO START PROGRAM"
SET CONS OFF
WAIT
SET CONS ON
USE XOUTPUT
DELE ALL
PACK

CLEAR
DO DET_EQX
CLEAR
STORE 0 TO CA,I,MPC,G,MADD,X,TO,R
@4,13 TO 5,67 PANEL COLOR RB
@18,13 TO 19,67 PANEL COLOR RB
@6,15 TO 18,65 DOUB COLOR R+/B
@7,17 TO 17,63 DOUB COLOR R+/B
@ 8,23 SAY "ENTER AUTONOMOUS TAX :" GET TO PICT "9999999999"
@9,23 SAY "EXPORT                :" GET X PICT "9999999999"
@10,23 SAY "ENTER TRANSFER PAYNENT:" GET R PICT "9999999999"
@11,23 SAY "ENTER AUTO.CONSUMPTION:" GET CA PICT "9999999999"
@12,23 SAY "ENTER GOVT.EXPENDITURE:" GET G  PICT "9999999999"
@13,23 SAY "ENTER INVESTMENT       :" GET I  PICT "9999999999"
@14,23 SAY "ENTER MPC              :" GET MPC PICT "9.9"
READ
@20,20
WAIT
CLEAR
YAD5 = 1 / (1 - MPC) * (CA + (MPC*TO)+(MPC*R)+I + G + X)
MADD = YAD5
@6,4 TO 7,75 PANEL COLOR RB+
@8,6 TO 9,73 DOUB
```

```
@8,13 SAY "COMPUTED AGGREGATE DEMAND SIDE EXPENDITURE AMOUNT(YAD)"
COLOR GB/R+
@10,26 SAY " YADS  :  "
@13,36 SAY MADD
@15,1 TO 16,69 COLOR G+/GB
@20,20
WAIT
CLEAR
*******TO DETERMINE THE AGGREGATE DEMAND*************

*DO DET_EQ
 CLEA
DO DET_EQ5
CLEA
MUSA = " "
CLEAR
@14,18 SAY " TO CONTINUE AGGREGATE DEMAND COMPUTED:(Y\N)" GET MUSA
PICT "@!"
READ
IF MUSA = "Y"
  LOOP
ELSE
CLEA
  EXIT
ENDIF
ENDDO
 RETURN

*************THE AGGREGATE DEMAND PROGRAM*************
PROCEDURE DET_EQ5
SET TALK OFF
SET ECHO OFF
YN  = " "
DO WHILE .T.
  CLEAR
  ON = " "
  @11,13 TO 13,68 PANEL COLOR RB+
  @14,14 TO 15,67 DOUB
  @15,15 SAY "TO VIEW ALL COMPUTED AGGREGATE DEMAND RECORDS(Y\N)?."
COLOR GB/R+
  @15,67 GET YN PICT "@!"
  READ
  IF UPPER(YN) $ 'Y'
    CLEAR
    USE XOUTPUT
    @12,15
    LIST
    @23,15
    WAIT
    EXIT
   ELSE
     CLEAR
      EXIT
    ENDIF
ENDDO
CLOSE ALL
DO OUTPUTS
CLEAR
RETURN
```

```
PROCEDURE OUTPUT5
SET TALK OFF
SET ESCAPE ON
SET ECHO OFF
CLEAR
STORE 0 TO RECAMONT
DO WHILE .T.
  USE XOUTPUT
  CLEAR
  @13,13 SAY " ENTER SELECTED AGGREGATE DEMAND RECORD AMOUNT: "
COLOR W/B+
  @13,61 GET RECAMONT PICT "9999999999"
  READ
  CLEAR
  @2,1 TO 9,78 PANEL COLOR 3
  @1,6 to 5,68 DOUB COLOR GB+
 @5,9 SAY "COMPUTED AGGREGATE DEMAND AND EQUILIBRIUM NATIONAL INCOME
" COLOR W/B+
  @6,2 TO 6,77 COLOR GR+
  SET COLOR TO R/B+
  @7,1 SAY "SNO"
  @7,5 SAY "YEAR"
  @7,10 SAY "OUTPUT"
  @7,17 SAY "CONSUMPTION"
  @7,29 SAY "INVESTMENT"
  @7,40 SAY "GOVT.EXPENDT"
 @7,52 SAY "EXPORT"
  @7,61 SAY "AGG.DEMAND"
  @ 8,2 TO 8,77 COLOR GR+
  DO WHILE .NOT. EOF ()
    B = RECNO()
    B = B + 9
    @B,1 SAY SNO
    @B,5 SAY YEAR
    @B,9 SAY OUTPUT
    @B,18 SAY CONSUMPTN
    @B,27 SAY INVESTMENT
    @B,39 SAY GOVTEXPEDT
    @B,49 SAY EXPORT
    @B,59 SAY AGGDEMAND
    IF EOF ()
      EXIT
    ENDIF
    SKIP
  ENDDO

*  USE GOUTPUT
  LOCATE FOR OUTPUT = RECAMONT
  IF FOUND ()
    A = RECNO()
    A = A + 9
*    @A,38 SAY "*" COLOR W*/B
    @A,69 SAY "EQUILIBRIUM" COLOR GB+/R
 *   @A,78 SAY "*" COLOR W*/B
   @20,15
  WAIT
  EXIT
  ENDIF
ENDDO
SET COLOR TO W+/B
```

```
CLEAR
RETURN

PROCEDURE DET_EQX
SET TALK OFF
SET ECHO OFF
CLEAR
PUBLIC MYAGDD
SELECT 1
USE EXP.DBF
SELECT 2
USE XOUTPUT.DBF

SELECT 1
STORE 0 TO MYAGDD,M_SNO,MG,MYR,MC,MOUTPUT,MI,MGDD
DO WHILE .NOT. EOF ()
  M_SNO = SNO
  MYR = YEAR
  MOUTPUT = OUTPUT
  MC  =  CONSUMPTN
  MI  =  INVESTMENT
  MG  =  GOVTEXPEDT
  MX  =  EXPORT
MGDD  = MC + MI + MG + MX
  IF EOF ()
    EXIT
  ENDIF
  SELECT 2
  APPEND BLANK
  REPL SNO WITH M_SNO
  REPL YEAR WITH MYR
  REPL OUTPUT WITH MOUTPUT
  REPL CONSUMPTN WITH MC
  REPL INVESTMENT WITH MI
  REPL GOVTEXPEDT WITH MG
  REPL EXPORT WITH MX
REPL AGGDEMAND WITH MGDD
  SELECT 1
  SKIP
ENDDO
CLOSE ALL
RETURN

PROCEDURE IMPORT
SET TALK OFF
SET ECHO OFF
CLEAR
@4,25 TO 5,56 PANEL COLOR R
@6,29 SAY "ii,        IMPORT            "
@8,28 SAY "  FOUR SECTOR ECONOMY  " COLOR RB+/B
@9,20 SAY "  WE      SHALL       FIRST          COMPUTE  " COLOR N/G
@10,20 SAY "  THE      AGGREGATE      DEMAND       SIDE  " COLOR N/G
@11,20 SAY "  EQUILIBRUIM          AMOUNT         USING  " COLOR N/G
@12,20 SAY "  THE          MULTIPLIER           PROCESS  " COLOR N/G
@18,23 SAY "*" COLOR R+
@18,25 SAY "PLEASE NOTE  ALL  CALCULATED VALVES" COLOR R+
@18,57 SAY "*" COLOR R+
@20,10
WAIT
CLEA
```

```
@9,14 TO 10,74 PANEL COLOR G+
@13,14 TO 14,74 PANEL COLOR G+
@11,16 TO 12,68 DOUB COLOR GB
@12,18 SAY "LET'S COMPUTE MARGINAL PROPENSITY TO CONSUME(MPC)" COLOR
GB+/G
@17,18
WAIT
SET ESCAPE ON
DO MPC_CAL

SET ECHO OFF
CLEA
@10,18 TO 11,68 PANEL COLOR GR+
@12,20 TO 13,66
@15,18 TO 16,68 PANEL COLOR RB
@13,26 SAY "LET'S COMPUTE AUTONOMOUS CONSUMPTION" COLO GB+/G
@13,18
WAIT
CLEA
CH = " "
DO WHILE .T.
@15,23 SAY "TO ADD RECORD INTO AU_C.DBF(Y/N)?:" GET CH PICT "@!"
READ
CLEA
IF CH = 'Y'
 DO ADDAUC
 SET ECHO OFF
 CLEA
 EXIT
ELSE
 CLEA
 EXIT
ENDIF
ENDDO
DO CA_CAL

CLEA
@9,14 TO 10,74 PANEL COLOR G+
@13,14 TO 14,74 PANEL COLOR G+
@11,16 TO 12,68 DOUB COLOR GB
@12,16 SAY "LET'S COMPUTE MARGINAL PROPENSITY TO SPEND ON IMPORT"
COLOR GB+/G
@17,18
WAIT
SET ESCAPE ON
DO MPM_CAL

SET ECHO OFF
CLEA
@10,18 TO 11,68 PANEL COLOR GR+
@12,20 TO 13,66
@15,18 TO 16,68 PANEL COLOR RB
@12,26 SAY "LET'S COMPUTE AUTONOMOUS    IMPORT  " COLO GB+/G
@18,18
WAIT
CLEA
CH = " "
DO WHILE .T.
@15,23 SAY "TO ADD RECORD INTO AU_M.DBF(Y/N)?:" GET CH PICT "@!"
READ
```

```
CLEA
IF CH = 'Y'
 DO ADDAUM
 SET ECHO OFF
 CLEA
 EXIT
ELSE
 CLEA
 EXIT
ENDIF
ENDDO
DO MA_CAL
CLEAR
@10,14 TO 11,74 PANEL COLOR G+
@15,14 TO 16,74 PANEL COLOR G+
@12,16 TO 13,68 DOUB COLOR GB+/B
@13,19 SAY "LET'S COMPUTE AGGREGATE DEMAND SIDE EQUILIBRUIM" COLOR
R+/N
@18,18
WAIT
CLEA
DO YADS_CAL
CLEA
@11,14 TO 12,74 PANEL COLOR G+
@16,14 TO 17,74 PANEL COLOR G+
@13,16 TO 14,68 DOUB COLOR GB+/B
@14,17 SAY "LET'S COMPUTE MULTIPLIER EFFECT OF GOVERNMENT IMPORT"
COLOR R+/N
@18,18
WAIT
CLEA
DO M_MULTPL
SET ECHO OFF
CLEA
@12,25 TO 13,55 PANEL COLOR G
@14,27 TO 15,53 DOUB COLOR R/B+
@15,31 SAY "  END  OF  OUTPUT  " COLOR RB/N+
@17,25 TO 18,55 PANEL COLOR R
@20,20
WAIT
CLEA
RETURN

PROCEDURE MPM_CAL
SET TALK OFF
CLEAR
USE TEMPM
DELE ALL
PACK
CLOSE ALL


SELECT 1
USE M_PM.DBF
SELECT 2
USE TEMPM.DBF
DO WHILE .T.
SELECT 1
STORE 0 TO MPM,E,Y1,M1,Y2,M2,OUTPUT,IMPORT
DO WHILE .NOT. EOF ()
```

```
Y1 = OUTPUT
M1 = IMPORT
SKIP
 Y2 = OUTPUT
 M2 = IMPORT
F = (M2 - M1) / (Y2 - Y1)
IF EOF ()
EXIT
ENDIF
  SELECT 2
 APPEND BLANK
 REPL MPM WITH F
SELECT 1
ENDDO
CH = " "
@20,23 SAY "TO VIEW COMPUTED OUTPUT(Y/N)?:" GET CH PICT "@!"
READ
IF CH = "Y"
 CLEA
 @20,25 SAY 'PRESS V TO VIEW THE OUTPUT"
 SET CONS OFF
 WAIT
 SET CONS ON
 SELECT 2
 CLEA
 @9,15
 DISPLAY
 @21,20
 WAIT
 CLEA
ELSE
 CLEA
ENDIF
EXIT
ENDDO
RETURN
PROCEDURE MA_CAL
SET TALK OFF
SET ECHO OFF
CLEAR
*PUBLIC W
SELECT 1
USE AU_M.DBF
SELECT 2
USE AUTOM.DBF

SELECT 1
STORE 0 TO OUTPUT,CONSUMPTN,MPC
STORE 0 TO M,O,P,MPN,MA,U,V
DO WHILE .NOT. EOF ()
 O = OUTPUT
 M = IMPORT
 MPN = MPM
MA = M - (MPN * O)
IF EOF ()
EXIT
ELSE

SKIP
ENDIF
```

```
SELECT 2
APPEND BLANK
REPL AUMA WITH MA
SELECT 1
ENDDO

SELECT 2
U = AUMA
CLOSE ALL
USE AUTOM
DO WHILE .NOT. EOF ()
V = AUMA
SKIP

IF EOF ()
 EXIT
ENDIF
IF U = V
 LOOP
ENDIF
IF U <> V
 CLEAR
 @13,23 SAY " ERROR IN YOUR DBF(AU_M)" COLOR GB/R+
 @23,15
 WAIT "PRESS Y TO CROSSCHECK YOUR DATA"
 CLEAR
 CH = " "
 @11,35 SAY " NOTE " COLOR W/R+
 SET COLOR TO GB/G
 @12,20 SAY "TAKE CURSOR TO PLACE OF CORRECTION"
 @13,20 SAY "SAVE WITH CTRL-W/END AFTER CHANGES"
 @14,20 SAY "PRESS ALT - E TO EXIT FROM  BROWSE"
 SET COLOR TO GB/B+
 @20,15
 WAIT
 CLEAR
 @14,25 SAY "TO EFFECT A CHANGES(Y/N)?:" GET CH PICT "@!"
 READ
 IF CH = 'Y'
  CLEAR
  USE AU_M
  BROWSE
 ENDIF
@20,15
 WAIT "PRESS D TO DELETE ERROR(S) IN RESULT"
CLEAR
USE AUTOM
DELE ALL
PACK
 DO MA_CAL
ENDIF
EXIT
ENDDO
CLOSE ALL
CLEAR
@9,10 TO 10,60 PANEL
@11,13 TO 12,59 DOUB
@12,18 SAY "COMPUTED   AUTONOMOUS     IMPORT  (MA)" COLOR GB/R+
@11,22 SAY "MA          "
@14,25 SAY U
```

```
@17,19 TO 19,54 DOUB
@18,25 SAY " MA     IS     CONSTANT" COLOR G/RB+
@16,19 TO 17,60 PANEL
@20,20
WAIT
CLEAR
RETURN

SELECT 2
G = MPM
CLOSE ALL

USE TEMPM
DO WHILE .NOT. EOF ()
 SKIP
L = MPM
IF EOF ()
 EXIT
ENDIF
IF G = L
LOOP
ENDIF
IF G <> L
  CLEAR
  @13,25 SAY "ERROR IN YOUR DATABASE FILE(M_PTX)" COLOR BR/G+
@23,15
WAIT "PRESS Y TO CROSSCHECK YOUR DATA"
CLEAR
CH = " "
@11,34 SAY "NOTE" COLOR GB/R+
@13,23 say "SAVE WITH CTRL-W/END AFTER CHANGES "
@14,23 SAY "PRESS ALT-E TO EXIT FROM BROWSE"
@23,15
WAIT
CLEAR
@14,25 SAY "TO EFFECT CHANGE(Y/N)?:" GET CH PICT "@!"
READ
IF CH = 'Y'
 CLEAR
USE M_PM
BROWSE
ENDIF
@20,15
WAIT "PRESS D TO DELETE ERROR(S) IN RESULT"
USE TEMPM
DELE ALL
PACK
DO MPM_CAL
ELSE
CLEAR
EXIT
ENDIF
ENDDO
CLEAR
*@8,22 SAY "TWO SECTOR ECONOMY OUTPUTS" COLOR GB/G+
@9,9 TO 10,62  PANEL
@11,10 TO 12,61 DOUB
@12,10 SAY "COMPUTED MARGINAL PROPENSITY TO SPEND ON IMPORT (MPM)"
COLOR GB/R+
@14,24 SAY "MPM = "
```

```
@14,33 SAY G
@17,18 TO 18,54 DOUB
@18,25 SAY " MPM  IS  CONSTANT  " COLOR G/RB+
@16,10 TO 17,60 PANEL
@20,20
WAIT
CLEAR
RETURN

PROCEDURE YAD6_CAL
SET ECHO OFF
SET TALK OFF
PUBLIC MGADD
DO WHILE .T.
CLEA
@20,15 SAY "PRESS ENTER KEY TO START PROGRAM"
SET CONS OFF
WAIT
SET CONS ON
USE MOUTPUT
DELE ALL
PACK
DO WHILE .T.
CLEAR
use imp
*DO DET_EQM
CLEAR
STORE 0 TO CA,I,MPC,G,MGADD,X,TO,R,MA,MPM
@4,13 TO 5,67 PANEL COLOR RB
@18,13 TO 19,67 PANEL COLOR RB
@5,15 TO 18,65 DOUB COLOR R+/B
@6,17 TO 17,63 DOUB COLOR R+/B
@ 7,23 SAY "ENTER AUTONOMOUS IMPORT:"GET MA PICT "9999999999"
@ 8,23 SAY "ENTER AUTONOMOUS TAX :" GET TO PICT "9999999999"
@9,23 SAY "EXPORT                 :" GET X PICT "9999999999"
@10,23 SAY "ENTER TRANSFER PAYNENT:" GET R PICT "9999999999"
@11,23 SAY "ENTER AUTO.CONSUMPTION:" GET CA PICT "9999999999"
@12,23 SAY "ENTER GOVT.EXPENDITURE:" GET G  PICT "9999999999"
@13,23 SAY "ENTER INVESTMENT       :" GET I  PICT "9999999999"
@14,23 SAY "ENTER MPC              :" GET MPC PICT "9.9"
@15,23 SAY "ENTER MPM              :" GET MPM PICT "9.99"
READ
@20,20
WAIT
CLEAR
YAD6 = 1 / (1 - MPC+MPM) * (CA - (MPC*TO)+(MPC*R)+I + G + X - MA)
MGADD = YAD6
@6,4 TO 7,75 PANEL COLOR RB+
@8,6 TO 9,72 DOUB
@9,13 SAY "COMPUTED AGGREGATE DEMAND SIDE EXPENDITURE AMOUNT(YAD)"
COLOR GB/R+
@13,26 SAY " YAD6  -  "
@13,36 SAY MGADD
@15,4 TO 16,69 COLOR G+/GB
@20,20
WAIT
CLEAR
EXIT
ENDDO
DO WHILE .NOT. EOF ()
```

```
@6,2 TO 1,71 COLOR GR+
SET COLOR TO R/B+
@7,1 SAY "SNO"
@7,5 SAY "YEAR"
@7,10 SAY "OUTPUT"
@7,17 SAY "CONSUMPTION"
@7,29 SAY "INVESTMENT"
@7,40 SAY "GOVT.EXPENDT."
@7,53 SAY "EXPORT"
@7,61 SAY "IMPORT"
@7,70 SAY "AGG.DEMAND"
@ 9,2 TO 8,77 COLOR GR+
DO WHILE .NOT. EOF ()
  B = RECNO()
  B = B + 9
  @B,1 SAY SNO
  @B,5 SAY YEAR
  @B,9 SAY OUTPUT
  @B,19 SAY CONSUMPTN
  @B,27 SAY INVESTMENT
  @B,39 SAY GOVTEXPEDT
  @B,49 SAY EXPORT
  @B,59 SAY IMPORT
  @B,69 SAY AGGDEMAND
  IF EOF ()
    EXIT
  ENDIF
  SKIP
 ENDDO
 LOCATE FOR OUTPUT = MQADD
 IF FOUND ()
   A = RECNO()
   A = A + 9
   @A,66 SAY "*" COLOR W+/B
   @A,67 SAY "EQUILIBRIUM" COLOR GB+/R
   @A,78 SAY "*" COLOR W+/B
  @23,15
  WAIT
  CLEA
 ELSE
  @20,29
  WAIT
  EXIT
  CLEA
 ENDIF
ENDDO
SET COLOR TO W+/B
CLEAR
RETURN

PROCEDURE DET_EQM
SET TALK OFF
SET ECHO OFF
CLEAR
PUBLIC MYAGDD
SELECT 1
USE IMP.DBF
SELECT 2
USE MOUTPUT.DBF
```

```
 LOCATE FOR OUTPUT = MGADD
  IF .NOT. FOUND ()
   CLEAR
   @10,10 SAY "EQUILIBRIUM RECORD NOT FOUND"
   @20,20
   WAIT
*   DO DET_EQM
*  DO OUTOUT
*  EXIT
  ELSE
   CLEAR
   @13,10 SAY "EQILIBRIUM RECORD FOUND"
   @20,20
    WAIT
   CLEAR
*   EXIT
  ENDIF
    DO DET_EQM


*******TO DETERMINE THE AGGREGATE DEMAND**********

   DO DET_EQ
   CLEA
   DO OUTPUT0
    CLEA
   EXIT
* ENDIF
 CLEA
ENDDO
MUSA = " "
CLEAR
@14,18 SAY " TO CONTINUE AGGREGATE DEMAND COMPUTE?:(Y\N)" GET MUSA
PICT "@!"
READ
IF MUSA = "Y"
  LOOP
ELSE
CLEA
  EXIT
ENDIF
ENDDO
 RETURN

**********THE AGGREGATE DEMAND PROGRAM**********

PROCEDURE OUTPUT0
SET TALK OFF
SET ESCAPE ON
SET ECHO OFF
CLEAR
STORE 0 TO RECAMONT
STORE 0 TO MGADD
DO WHILE .T.
  USE MOUTPUT
  CLEAR
  @2,1 TO 3,78 PANEL COLOR 0
  @4,6 to 5,68 DOUB COLOR GB+
 @5,0 SAY "COMPUTED AGGREGATE DEMAND AND EQUILIBRIUM NATIONAL INCOME
```

```
SELECT 1
STORE 0 TO M_AGGDD,M_SNO,MG,MYR,MC,MOUTPUT,MI,MGGDD
DO WHILE .NOT. EOF ()
  M_SNO = SNO
  MYR = YEAR
  MOUTPUT = OUTPUT
  MC  =  CONSUMPTN
  MI  =  INVESTMENT
  MG  =  GOVTEXPEDT
  MX  =  EXPORT
MGGDD  = MC + MI + MG + MX
  IF EOF ()
    EXIT
  ENDIF
  SELECT 2
  APPEND BLANK
  REPL SNO WITH M_SNO
  REPL YEAR WITH MYR
  REPL OUTPUT WITH MOUTPUT
  REPL CONSUMPTN WITH MC
  REPL INVESTMENT WITH MI
  REPL GOVTEXPEDT WITH MG
  REPL EXPORT WITH MX
REPL AGGDEMAND WITH MGGDD
  SELECT 1
  SKIP
ENDDO
CLOSE ALL
 CLEA
RETURN

PROCEDURE FRGNTRAD
SET TALK OFF
SET ECHO OFF
CLEAR
@4,25 TO 6,56 PANEL COLOR R
@5,29 SAY "iii,  FOREIGN TRADE          "
@3,28 SAY "  FOUR SECTOR ECONOMY  " COLOR BR+/B
@9,20 SAY "  WE      SHALL       FIRST          COMPUTE  " COLOR N/G
@10,20 SAY "  THE      AGGREGATE      DEMAND       SIDE  " COLOR N/G
@11,20 SAY "  EQUILIBRUIM          AMOUNT         USING  " COLOR N/G
@12,20 SAY "  THE          MULTIPLIER          PROCESS  " COLOR N/G
@18,23 SAY "*" COLOR R*
@18,25 SAY "PLEASE NOTE  ALL  CALCULATED VALVES" COLOR R*
@18,61 SAY "*" COLOR R*
@20,20
WAIT
CLEA
@9,14 TO 10,74 PANEL COLOR G*
@13,14 TO 14,74 PANEL COLOR G*
@11,16 TO 12,68 DOUB COLOR GB
@12,18 SAY "LET'S COMPUTE MARGINAL PROPENSITY TO CONSUME(MPC)" COLOR
G2*/G
@17,19
WAIT
SET ESCAPE ON
DO MPC_CAL

SET ECHO OFF
CLEA
```

```
@10,10 TO 11,68 PANEL COLOR GR+
@12,20 TO 13,60
@15,18 TO 16,68 PANEL COLOR RB
@13,26 SAY "LET'S COMPUTE AUTONOMOUS CONSUMPTION" COLO GB+/G
@18,18
WAIT
CLEA
CH = " "
DO WHILE .T.
@15,23 SAY "TO ADD RECORD INTO AU_C.DBF(Y/N)?:" GET CH PICT "@!"
READ
CLEA
IF CH = 'Y'
 DO ADDAUC
 SET ECHO OFF
 CLEA
 EXIT
ELSE
 CLEA
 EXIT
ENDIF
ENDDO
DO CA_CAL

CLEA
@9,14 TO 10,74 PANEL COLOR G+
@12,14 TO 14,74 PANEL COLOR G+
@11,16 TO 12,68 DOUB COLOR GB
@12,19 SAY "LET'S COMPUTE MARGINAL PROPENSITY TO SPEND ON IMPORT"
COLOR GB+/G
@17,18
WAIT
SET ESCAPE ON
DO MPM_CAL

SET ECHO OFF
CLEA
@10,10 TO 11,68 PANEL COLOR GR+
@12,20 TO 13,60
@15,18 TO 16,68 PANEL COLOR RB
@13,26 SAY "LET'S COMPUTE AUTONOMOUS    IMPORT  " COLO GB+/G
@18,18
WAIT
CLEA
CH = " "
DO WHILE .T.
@15,23 SAY "TO ADD RECORD INTO AU_M.DBF(Y/N)?:" GET CH PICT "@!"
READ
CLEA
IF CH = 'Y'
 DO ADDAUM
 SET ECHO OFF
 CLEA
 EXIT
ELSE
 CLEA
 EXIT
ENDIF
ENDDO
DO MA_CAL
```

```
CLEAR


@9,14 TO 10,74 PANEL COLOR G+
@13,14 TO 14,71 PANEL COLOR G+
@11,16 TO 12,68 DOUB COLOR GB
@12,18 SAY "LET'S COMPUTE MARGINAL PROPENSITY TO SPEND ON   TAX "
COLOR GB+/G
@17,18
WAIT
SET ESCAPE ON
DO MPT_CAL

SET ECHO OFF
CLEA
@10,18 TO 11,68 PANEL COLOR GR+
@12,20 TO 13,63
@15,18 TO 16,68 PANEL COLOR RB
@13,26 SAY "LET'S COMPUTE   AUTONOMOUS    TAX    " COLO GB+/G
@18,18
WAIT
CLEA
CH = " "
DO WHILE .T.
@15,23 SAY "TO ADD RECORD INTO AU_TX.DBF(Y/N)?:" GET CH PICT "@!"
READ
CLEA
IF CH = 'Y'
 DO ADDAUTX
 SET ECHO OFF
 CLEA
 EXIT
ELSE
 CLEA
 EXIT
ENDIF
ENDDO
DO TA_CAL
CLEAR
@10,14 TO 11,74 PANEL COLOR G+
@15,14 TO 16,74 PANEL COLOR G+
@12,16 TO 13,68 DOUB COLOR GB+/B
@13,19 SAY "LET'S COMPUTE AGGREGATE DEMAND SIDE EQUILIBRUIM" COLOR
R+/N
@18,18
WAIT
CLEA
DO YAD7_CAL
CLEA
SET ECHO OFF
CLEA
@12,25 TO 13,55 PANEL COLOR G
@14,27 TO 15,53 DOUB COLOR R/B+
@15,31 SAY "  END  OF  OUTPUT  " COLOR RB/N+
@17,25 TO 18,55 PANEL COLOR R
@20,20
WAIT
CLEA
RETURN
```

```
PROCEDURE YAD7_CAL
SET ECHO OFF
SET TALK OFF
PUBLIC M,MGAD
DO WHILE .T.
CLEA
@20,15 SAY "PRESS ENTER KEY TO START PROGRAM"
SET CONS OFF
WAIT
SET CONS ON
USE FOUTPUT
DELE ALL
PACK
USE IMP
DO WHILE .T.
CLEAR
*DO DET_EQF
CLEAR
STORE 0 TO CA,I,MPC,G,MGAD,X,TO,R,MA,MPM,MPT
@4,13 TO 5,67 PANEL COLOR RB
@18,13 TO 19,67 PANEL COLOR RB
@5,15 TO 18,65 DOUB COLOR R+/B
@6,17 TO 17,63 DOUB COLOR R+/B
@ 7,23 SAY "ENTER AUTONOMOUS IMPORT:"GET MA PICT "9999999999"
@ 8,23 SAY "ENTER AUTONOMOUS TAX :" GET TO PICT "9999999999"
@9,23 SAY "EXPORT                 :" GET X PICT "9999999999"
@10,23 SAY "ENTER TRANSFER PAYNENT:" GET R PICT "9999999999"
@11,23 SAY "ENTER AUTO.CONSUMPTION:" GET CA PICT "9999999999"
@12,23 SAY "ENTER GOVT.EXPENDITURE:" GET G  PICT "9999999999"
@13,23 SAY "ENTER INVESTMENT      :" GET I  PICT "9999999999"
@14,23 SAY "ENTER MPC             :" GET MPC PICT "9.9"
@15,23 SAY "ENTER MPM             :" GET MPM PICT "9.99"
@16,23 SAY "ENTER MPT             :" GET MPT PICT "9.999"
READ
@20,20
WAIT
CLEAR
YAD7 = 1 / (1 - MPC+(MPC*MPT)+MPM) * (CA -- (MPC*TO)+(MPC*R)+I + G +
X - MA)
MGAD = YAD7
@6,4 TO 7,75 PANEL COLOR RB+
@8,6 TO 9,72 DOUB
@9,13 SAY "COMPUTED AGGREGATE DEMAND SIDE EXPENDITURE AMOUNT(YAD)"
COLOR GB/R+
@13,26 SAY " YAD7  =  "
@13,36 SAY MGAD
@15,4 TO 16,69 COLOR G+/GB
@20,20
WAIT
CLEAR
EXIT
ENDDO
DO WHILE .NOT. EOF ()
 LOCATE FOR OUTPUT = MGAD
  IF .NOT. FOUND ()
   CLEA
   @13,18 SAY "EQILIBRUIM RECORD NOT FOUND"
    @20,20
    WAIT
    EXIT
```

```
  ELSE
    CLEA
    @13,13 SAY "EQILIBRUIM RECORD FOUND"
    @20,20
     WAIT
     DO DET_EQF
*******TO DETERMINE THE AGGREGATE DEMAND**************
   CLEA
   DO DET_EQ7
   EXIT
 ENDIF
 CLEA
ENDDO
MUSA = " "
CLEAR
@14,18 SAY " TO CONTINUE AGGREGATE DEMAND COMPUTE?:(Y\N)" GET MUSA
PICT "@!"
READ
IF MUSA = "Y"
  LOOP
ELSE
CLEA
  EXIT
ENDIF
ENDDO
 RETURN

*************THE AGGREGATE DEMAND PROGRAM**************
PROCEDURE DET_EQ7
SET TALK OFF
SET ECHO OFF
YN = " "
DO WHILE .T.
  CLEAR
  CH = " "
  @11,13 TO 13,68 PANEL COLOR RB+
  @11,14 TO 15,67 DOUB
  @15,15 SAY "TO VIEW ALL COMPUTED AGGREGATE DEMAND RECORDS(Y\N)?:"
COLOR GB/R+
  @15,67 GET YN PICT "@!"
  READ
  IF UPPER(YN) $ 'Y'
    CLEAR
    USE FOUTPUT
    @12,15
    LIST
    @23,15
    WAIT
    EXIT
   ELSE
     CLEAR
     @12,13 TO 13,67 PANEL COLOR RB+
     @13,15 TO 15,65 DOUB COLOR G+
     @15,17 SAY "PRESS Y TO VIEW ONLY COMPUTED EQILIBRIUM RECORDS"
COLOR GB/R+
     @15,66 GET CH PICT "@!"
     READ
     CLEAR
     USE FOUTPUT
     STORE 0 TO MGAD
```

```
      @13,25 SAY "ENTER AGGREGATE DEMAND RECORD AMOUNT" COLOR GR/BG+
      @13,62 GET MGADD PICT "999999"
      READ
      DO WHILE .NOT. EOF ()
        LOCATE FOR OUTPUT = MGAD
        IF .NOT. FOUND ()
          CLEA
          @13,33 SAY "RECORD DOES NOT EXIT" COLOR RB/GB+
          @20,20
          WAIT
          CLEA
          EXIT
        ELSE
          @13,23
           DISPLAY
           @20,20
           WAIT
           CLEA
           EXIT
         ENDIF
       ENDDO
       EXIT
     ENDIF
ENDDO
CLOSE ALL
DO OUTPUT7
CLEAR
RETURN

PROCEDURE OUTPUT7
SET TALK OFF
SET ESCAPE ON
SET ECHO OFF
CLEAR
STORE 0 TO RECAMONT
DO WHILE .T.
  USE FOUTPUT
  CLEAR
  @13,18 SAY " ENTER SELECTED AGGREGATE DEMAND RECORD AMOUNT: "
COLOR W/G+
  @13,66 GET RECAMONT PICT "999999"
  READ
  CLEAR
  @2,4 TO 3,78 PANEL COLOR G
  @4,6 to 5,68 DOUB COLOR GB+
 @5,9 SAY "COMPUTED AGGREGATE DEMAND AND EQIULIBRIUM NATIONAL INCOME
" COLOR W/B+
  @8,2 TO 8,77 COLOR GR+
  SET COLOR TO W/B+
  @7,3 SAY "YEAR"
  @7,7 SAY "YEAR"
  @7,12 SAY "OUTPUT"
  @7,19 SAY "CONSUMPTION"
  @7,   SAY "INVESTMENT"
  @7,42 SAY "GOVT.EXPENDT."
  @ ,56 SAY "AGGR.DEMAND"
  @ 8,2 TO 8,77 COLOR GR+
  DO WHILE .NOT. EOF ()
    B = RECNO()
    B = B + 9
```

```
    @B,2 SAY SNO
    @B,7 SAY YEAR
    @B,11 SAY OUTPUT
    @B,18 SAY CONSUMPTN
    @B,29 SAY INVESTMENT
    @B,41 SAY GOVTEXPEDT
    @B,55 SAY AGGDEMAND
    IF EOF ()
      EXIT
    ENDIF
    SKIP
  ENDDO

  LOCATE FOR OUTPUT = RECAMONT
  IF FOUND ()
    A = RECNO()
    A = A + 9
    @A,66 SAY "*" COLOR W*/B
    @A,67 SAY "EQUILIBRIUM" COLOR GB+/R
    @A,78 SAY "*" COLOR W*/B
   @23,15
  WAIT
  EXIT
  ENDIF
ENDDO
SET COLOR TO W+/B
CLEAR
RETURN

PROCEDURE DET_EQF
SET TALK OFF
SET ECHO OFF
CLEAR
PUBLIC MGGDD
SELECT 1
USE IMP.DBF
SELECT 2
USE FOUTPUT.DBF

SELECT 1
STORE 0 TO NM,M_SNO,MG,MYR,MC,MOUTPUT,MI,MGGDD
DO WHILE .NOT. EOF ()
  M_SNO = SNO
  MYR = YEAR
  MOUTPUT = OUTPUT
  MC  =  CONSUMPTN
  MI  =  INVESTMENT
  MG  =  GOVTEXPEDT
  MX  =  EXPORT
  NM  =  IMPORT
MGGDD  = MC + MI + MG + MX - NM
  IF EOF ()
    EXIT
  ENDIF
  SELECT 2
  APPEND BLANK
  REPL SNO WITH M_SNO
  REPL YEAR WITH MYR
  REPL OUTPUT WITH MOUTPUT
  REPL CONSUMPTN WITH MC
```

```
   REPL INVESTMENT WITH MI
   REPL GOVTEXPEDT WITH MG
   REPL EXPORT WITH MX
   REPL IMPORT WITH NM
   REPL AGGDEMAND WITH MGGDP
   SELECT 1
   SKIP
ENDDO

CLOSE ALL
 CLEA
RETURN
```

EXPERIMENTAL OUTPUTS

TWO SECTOR OUTPUTS

COMPUTED MARGINAL PROPENSITY TO CONSUME (MPC)

SNO	YEAR	OUTPUT	CONSUMPTNN	MPC
1	1981	150000000	170000000	0.8
2	1982	250000000	250000000	0.8
3	1983	350000000	330000000	0.8
4	1984	450000000	410000000	0.8
5	1985	550000000	490000000	0.8
6	1986	650000000	570000000	0.8
7	1987	750000000	650000000	0.8
8	1988	850000000	730000000	0.8

MPC = 0.8

MPC IS CONSTANT

COMPUTED AUTONOMOUS CONSUMPTION (CA)

SNO	YEAR	OUTPUT	CONSUMPTN	MPC	AUTO.CONSUMPTN
1	1981	150000000	170000000	0.8	50000000
2	1982	250000000	250000000	0.8	50000000
3	1983	350000000	330000000	0.8	50000000
4	1984	450000000	410000000	0.8	50000000
5	1985	550000000	490000000	0.8	50000000
6	1986	650000000	570000000	0.8	50000000
7	1987	750000000	650000000	0.8	50000000
8	1988	850000000	730000000	0.8	50000000

CA = 50000000

CA is CONSTANT

COMPUTED AGGREGATE DEMAND SIDE INCOME EQUILIBRUIM (YAD)

YAD = 550000000

COMPUTED AGGREGATE DEMAND INCOME AMOUNT

SNO	YEAR	OUTPUT	CONSUMPTION	INVESTMENT	AGGREDEMAND
1	1981	150000000	170000000	60000000	23000000
2	1982	250000000	250000000	60000000	31000000
3	1983	350000000	330000000	60000000	39000000
4	1984	450000000	410000000	60000000	47000000
5	1985	550000000	490000000	60000000	55000000*EQUIL.*
6	1986	650000000	570000000	60000000	63000000
7	1987	750000000	650000000	60000000	71000000
8	1988	850000000	730000000	60000000	79000000

THREE SECTOR OUTPUTS

i. GOVERNMENT EXPENDITURE MODEL

COMPUTED AGGREGATE DEMAND SIDE INCOME EQUILIBRUIM (YAD1)

YAD1 = 650000000

COMPUTED AGGREATE DEMAND INCOME AMOUNT

SNO	YEAR	OUTPUT	CONSUMPTN	INVESTMENT	GOVTEXPDT	AGGREDEMAND
1	1981	150000000	170000000	60000000	20000000	250000000
2	1982	250000000	250000000	60000000	20000000	330000000
3	1983	350000000	330000000	60000000	20000000	410000000
4	1984	450000000	410000000	60000000	20000000	490000000
5	1985	550000000	490000000	60000000	20000000	570000000
6	1986	650000000	570000000	60000000	20000000	650000000*EQUIL.*
7	1987	750000000	650000000	60000000	20000000	730000000
8	1988	850000000	730000000	60000000	20000000	810000000

ii. AUTONOMOUS TAX MODEL

COMPUTED AGGREGATE DEMAND SIDE INCOME EQUILIBRUIM (YAD2)

YAD2 = 520000000

iii. TRANSFER PAYMENT MODEL

COMPUTED AGGREGATE DEMAND SIDE INCOME EQUILIBRUIM (YAD3)

YAD3 = 650000000

iv. INCOME TAX MODEL

COMPUTED MARGINAL PROPENSITY TO SPEND ON TAX

SNO	OUTPUT	CONSUMPTION	MPT
1	150000000	25000000	0.25
2	250000000	50000000	0.25
3	350000000	75000000	0.25
4	450000000	100000000	0.25
5	550000000	125000000	0.25
6	650000000	150000000	0.25
7	750000000	175000000	0.25
8	850000000	100000000	0.25

MPT = 0.25

MPT IS CONSTANT

COMPUTED AUTONOMOUS TAXATION (TA)

SNO	OUTPUT	TAXATION	MPT	AUT.TAX(TA)
1	150000000	250000000	0.25	-12500000
2	250000000	500000000	0.25	-12500000
3	350000000	750000000	0.25	-12500000
4	450000000	100000000	0.25	-12500000
5	550000000	125000000	0.25	-12500000
6	650000000	150000000	0.25	-12500000
7	750000000	175000000	0.25	-12500000
8	850000000	200000000	0.25	-12500000

TA = -12500000

TA IS CONSTANT

COMPUTED AGGREATE DEMAND SIDE INCOME EQUILIBRIUM AMOUNT(YAD4

YAD4 = 390000000

FOUR SECTOR ECONOMY

EXPORT MODEL

COMPUTED AGGREGATE DEMAND SIDE INCOME EQUILIBRUIM AMOUNT(YAD5)

YAD5 = 750000000

COMPUTED AGGREGATE DEMAND INCOME AMOUNT

SNO	YEAR	OUTPUT	CONSUMPTN	INVESTMENT	GOVTEXPDT	EXPORT	AGGREDEMAND
1	1981	150000000	170000000	60000000	20000000	20000000	270000000
2	1982	250000000	250000000	60000000	20000000	20000000	350000000
3	1983	350000000	330000000	60000000	20000000	20000000	430000000
4	1984	450000000	410000000	60000000	20000000	20000000	510000000
5	1985	550000000	490000000	60000000	20000000	20000000	590000000
6	1986	65000000	570000000	60000000	20000000	20000000	670000000
7	1987	750000000	650000000	60000000	20000000	20000000	750000000
8	1988	850000000	730000000	60000000	20000000	20000000	830000000

IMPORT MODEL

COMPUTED MARGINAL PROPENSITY TO SPEND ON IMPORT (MPM)

SNO	YEAR	OUTPUT	CONSUMPTION	MPM
1	1981	150000000	50000000	0.05
2	1982	250000000	10000000	0.05
3	1983	350000000	15000000	0.05
4	1984	450000000	20000000	0.05
5	1985	550000000	25000000	0.05
6	1986	650000000	30000000	0.05
7	1987	750000000	35000000	0.05
8	1988	850000000	40000000	0.05

MPM = 0.05

MPM IS CONSTANT

COMPUTED AGGREGATE DEMAND INCOME AMOUNT

NO	YEAR	OUTPUT	IMPORT	MPM	AUTO.IMPORT
1	1981	150000000	50000000	0.05	-2500000
2	1982	250000000	10000000	0.05	-2500000
3	1983	350000000	15000000	0.05	-2500000
4	1984	450000000	20000000	0.05	-2500000
5	1985	550000000	25000000	0.05	-2500000
6	1986	650000000	30000000	0.05	-2500000
7	1987	750000000	35000000	0.05	-2500000
8	1988	850000000	40000000	0.05	-2500000

MA = -2500000

MA IS CONSTANT

COMPUTED AGGREGATE DEMAND SIDE INCOME EQUILIBRUIM AMOUNT(YAD6

YAD6 = 610000000

COMPUTED AGGREGATE DEMAND INCOME AMOUNTS

O	YEAR	OUTPUT	CONSUMPTN	INVESTMENT	GOVTEXPDT	EXPORT	IMPORT	AGGREDEMAN
	1981	150000000	170000000	60000000	20000000	20000000	5000000	220000000
	1982	250000000	250000000	60000000	20000000	20000000	10000000	340000000
	1983	350000000	330000000	60000000	20000000	20000000	15000000	415000000
	1984	450000000	410000000	60000000	20000000	20000000	20000000	490000000
	1985	550000000	490000000	60000000	20000000	20000000	25000000	565000000
	1986	65000000	570000000	60000000	20000000	20000000	30000000	640000000
	1987	750000000	650000000	60000000	20000000	20000000	35000000	715000000
	1988	850000000	730000000	60000000	20000000	20000000	40000000	790000000

COMPUTED AGGREGATE DEMAND SIDE INCOME EQUILIBRUIM AMOUNT(YAD6)

YAD 7 = 396666667