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NATIONAL ACCOUNTS AND POLICY MODELS

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I. INTRODUCTION

ACCOUNTING is often recommended as a tool of business management and in the same way national accounts can be considered as a tool of economic policy. There are, however, essential differences between firms and national economies in so far as their objectives are concerned and, as accounting systems ought to be closely related to objectives, it is obvious that it would not be correct to construct a system of national accounts precisely on the lines generally adopted for private accounting. In the first place, therefore, national accounts should describe to what extent the *objectives* pursued by the economic policy of the nation were realized in the past.

A knowledge concerning the realization of past objectives is not sufficient to judge whether the economic policy was successful or not. For that purpose it ought at least to be known to what extent the various *instruments* of economic policy were used. The measures of the governing agencies should therefore be explicitly reflected in the national accounts. This implies that in recording the economic process a clear distinction should be made between flows that are under the direct control of the government and those which are not.

The third aim of national accounts as a tool of management is to provide the user with information which clarifies the *causality* between the various flows, so that the indirect effects of economic policy can be analysed. National accounts consist of a number of identities only. An efficient definition of the transactors and transactions may, however, be of great use in the determination of the causal relations. In other words, the description of the economic events should be adapted to the needs of economic analysis, and it certainly should not give the result only of the economic mechanism in terms of aggregate money flows.

These three criteria will be somewhat more elaborated in the following sections. Section II is devoted to the objectives of the economic policy. In section III some attention is paid to the instruments, and the causal relations are dealt with in section IV.

Only macro-economic accounting will be discussed; inter-industry models are not considered.

II. OBJECTIVES OF GENERAL ECONOMIC POLICY

Formulated in its most general sense the nation's economy has for its object the realization of as high a level of welfare as possible. This does not differ from the object that is generally pursued by individuals.

As the relative well-being of an individual can be expressed by means of his income it seems at first sight to be admissible to totalize all individual incomes and to consider the national income as a standard for the nation's welfare. In this train of thought as high a national income as possible would be the quantitative expression of the principal aim of the nation's economic policy. Consequently the national income should be the principal information to be drawn from the national accounts.

If this kind of information is available for one period only, its value is, however, very questionable, because there is no meaningful standard of comparison as there is for the income of an individual or a business enterprise. A comparison of the country's own national income with that of other countries does not make much sense because of structural differences which exist from country to country. Apart from that, the way to correct results is strewn with technical difficulties which are practically insoluble.

Suppose, however, that one could overcome the technical difficulties, then one could establish only a fact that in general does not play a part in the country's economic policy, because the structural differences over space remain.

Individuals have a great interest in the absolute size of their income in comparison with that of their fellow-citizens. The governing agencies of a nation have a different setting of the problem. They are primarily interested in the over-all development over time, rather than in a comparison over space. Furthermore they pay special attention to the economic position of various social groups in the past and their economic possibilities in the future.

A nation generally has a great number of social groups with their own specific functions in total economic activity: farmers,

industrialists, professions, shareholders, wage-earners, etc. They often behave as pressure groups in so far as the distribution of the national income is concerned. Two of them, the wage-earning and the entrepreneurial classes should at least be distinguished, because their share in national income constitutes a current subject of political discussion. In order to arrive at an indication of the relative growth over time of the income of these two groups information on the *rate of wage-income and that of entrepreneurial income* should be available.

As it does not make sense to pursue a higher money income if at the same time prices are increasing just as much, the collection of price indices seems to be an obvious need. The *price level* takes on the character of an objective in a national economic sense if the stability of the national currency is aimed at by the governing agencies.

Not only the rate of real income but also the spending of income by the various social groups is the concern of the policy-making agencies, this in view of a reasonable distribution of capital formation. Furthermore the nation's economy has for its object not only a fair income distribution, which is directed towards a reasonable level of consumption in the present for the various social groups, but also a rate of saving which ensures the maintenance or even the extension of the productive capacity *per capita* in the future. In other words it is of great interest to analyse the quantitative growth of consumption and investment over time and this should be done for relevant sectors. It is obvious that for the present purpose not only the activity of the private sectors but also government activity comes into the picture, as nowadays the rôle of the government as a collective provider of goods and services is considerable. It may be concluded that the level of the following aggregates may also be considered as objectives of general economic policy:

private consumption and saving of various social groups (e.g. wage-earners and entrepreneurs);

public consumption;

private investment;

public investment.

The ex-post figures should be compared with the desired levels, if formulated.

The aggregate objectives discussed so far do not provide a complete picture of what is generally aimed at for a nation's economy. In spite of a reasonable income distribution and a reasonable distribution of expenditure, welfare may be relatively low if production has not reached a level at which all technical possibilties and manpower are sufficiently utilized. A reasonable *level of employment*, especially for the wage-earners, and a reasonable *level of production* are therefore targets which have high priority. They ought to be included in the information which the national accounts should provide.

If the economy is an open one the stock of gold and foreign currency should be sufficiently big to guarantee a smooth functioning of the economy. In that case the recording of transactions in foreign trade is required, although in fact only *the balance of payments surplus or deficit* is the objective of economic policy.

Apart from the balance of payments surplus, it is the deviations from the past of the aggregates and magnitudes mentioned above that are of interest rather than their absolute size. Absolute figures have some use if they have a meaning as such, as is the case with the balance of payments surplus or deficit. Without such a meaning only an inter-temporal comparison of the extent to which the objectives have been realized is possible. To that end, time series are required which show the relative changes from year to year.

On the basis of the objectives previously discussed it is easy to name the time series that should be available:

Income distribution:

k_l rate of wages per unit of output
k_z rate of profits per unit of output

Real income and stability of national currency:

p domestic price level

Distribution of national expenditure:

c_l consumption volume of wage-earners
c_z consumption volume of non wage-earners
c_o consumption volume of the government
i_z investment volume of the private sector
i_o investment volume of the public sector

Production and employment level:

v total output

a_L employment level

Stock of foreign currency and gold:

S_F balance of payments surplus.

The answer to the question how the figures here expressed as symbols should be presented is in fact dictated by the relationships which exist between them. These relationships follow from two identities, viz:

(a) value in period (1) x volume index x price index=value in period (2);
(b) value of national input=value of national output.

With these two identities in mind one automatically arrives at a national operating account on which an essential part of the process of economic circulation is recorded. Such an operating account is given in Table I. In this presentation capital letters relate to values at current prices; lower case letters refer to relative changes in volume except p and k by which relative changes in prices and 'cost' respectively are indicated.

The costs of wages per unit of output can be written as:

$$\frac{(1+p_L)(1+a_L)}{(1+v)}=1+k_L$$

where

p_L=relative change in the wage level
a_L=relative change in employment.

In the same way the costs of imports can be expressed as

$$\frac{(1+p_M)(1+m)}{(1+v)}=1+k_M$$

where

p_m=relative changes in import prices
m =relative change in the volume of imports.

It is rather difficult to arrive at an analogous formula for other income (Z) as the relative changes in volume and in prices for this component of income are concepts that are barely intelligible and have no practical meaning at all. This is due to the fact that the main part of it consists of entrepreneurial

TABLE I

National Operating Account

Costs	Value in period 1	Volume indices	Cost indices	Value in period 2		Value in period 1	Volume indices	Price indices	Value in period 2	*Output*
Wage income	$\bar{L}$	$(1+a_L)$	$(1+p_L) =$	$\bar{\bar{L}}$	Consumption by wage-earners	$\bar{C}_L$	$(1+c_L)$	$(1+p_C) =$	$\bar{\bar{C}}_L$	
Other income	$\bar{Z}$	$(1+v)$	$(1+k_Z) =$	$\bar{\bar{Z}}$	Consumption by entrepreneurs, etc.	$\bar{C}_Z$	$(1+c_Z)$	$(1+p_C) =$	$\bar{\bar{C}}_Z$	
Indirect taxes minus subsidies	$\bar{O}$	$(1+v)$	$(1+k_O) =$	$\bar{\bar{A}}$	Government consumption	$\bar{C}_O$	$(1+c_O)$	$(1+p_O) =$	$\bar{\bar{C}}_O$	
Depreciation allowances	$\bar{D}$	$(1+d)$	$(1+p_D) =$	$\bar{\bar{D}}$	Private gross investment	$\bar{I}_Z$	$(1+i_Z)$	$(1+p_I) =$	$\bar{\bar{I}}_Z$	
Imports of goods and services	$\bar{M}$	$(1+m)$	$(1+p_M) =$	$\bar{\bar{M}}$	Public gross investment	$\bar{I}_O$	$(1+i_O)$	$(1+p_I) =$	$\bar{\bar{I}}_O$	
					Exports of goods and services	$\bar{\bar{E}}$	$(1+e)$	$(1+p_E) =$	$\bar{\bar{E}}$	
	$\bar{V}$	$(1+v)$	$(1+p) =$	$\bar{\bar{V}}$		$\bar{V}$	$(1+v)$	$(1+p) =$	$\bar{\bar{V}}$	

income which is a residual in the process of income generation.

Similarly for indirect taxes minus subsidies, it is difficult to understand what a volume index means in this context since there is no relation between the money value and the amount of government services.

III. INSTRUMENTS OF GENERAL ECONOMIC POLICY

The measures taken by the central government in the past with a view to directing economic development towards certain targets may be broadly arranged in two classes:

(1) instruments of direct control;
(2) instruments which have an indirect effect only.

The recent past and in some countries even present experience have shown that wages, prices, imports and great parts of domestic expenditure are well suited to direct control. In a society of free enterprise direct controls are dropped as far as possible, but even then public consumption, and the investments of the government proper and the public enterprises remain under the control of the governing authorities.

Monetary and fiscal measures belong to the instruments of indirect control.

It will be clear that all these instruments may take different forms and it is hardly possible to express the qualitative side of the measures in a system of national accounts. The need for a quantitative impression of what is under control of the government and what is not seems to be evident; otherwise one will never be able to trace the interrelationships of the various economic magnitudes. In so far as the direct measures are concerned, prices and volumes of the controlled part should be clearly distinguished from the free part of economic circulation. In this way one arrives at two series of index numbers, one for that part of the flows which is under the control of the government and another one which is not.

Suppose for example that the wages which are not under control increase by 10 per cent and the rise of those which are under control amounts to 7½ per cent, and that in the base period the controlled part constitutes 40 per cent of the total wage bill. Then it is useful to record in the national accounts, that of the average wage increase of 9 per cent, 3 per cent was directly due to a government decision and 6 per cent was a result of the

economic mechanism. All direct controls of the government should be expressed in this same way.

The objectives of a nation's economic policy discussed in the previous section are a good guide in recognizing the tools of direct control which the government could possibly handle. In principle one could think of wages, profits, employment, production, imports, rate of exchange, all in so far as the level or the size of these magnitudes depends on government decisions. A more systematic specification of the magnitudes that could be *directly* influenced by the government follows below:

(1)	p_M	import prices; by means of the rate of exchange
(2)	m	volume of imports; by means of restrictions
(3)	p_E	export prices; by means of the rate of exchange
(4)	e	volume of exports; by means of restrictions
(5)	p_l	wages; by means of a wage stop
(6)	a_L	number of wage-earners; by means of direct employment
(7)	v	volume of production; by means of production plans
(8)	k_Z	rate of profits per unit of output; by means of assessing margins
(9)	k_D	depreciation allowances; by means of regulations for cost calculation
(10)	p_X	domestic prices; by means of price control
(11)	c_L	volume of consumption by wage-earners; by means of rationing
(12)	c_Z	volume of consumption by non wage-earners; by means of rationing
(13)	c_O	volume of public consumption; by means of public spending
(14)	i_O	volume of public investment; by means of public spending
(15)	i_Z	volume of private investment; by means of licences, participations, etc.

Practically all the magnitudes enumerated above may be used as an instrument, but at the same time the economic policy may have them for its objective. The first four of them are only of interest in connection with the balance of payments objective; depreciation allowances per unit of output (k_D) is an instrument only.

In a free society in times of peace, objective and instrument are generally not the same. In such a society those instruments are used which leave to the economic subjects freedom in choice of occupation and freedom in the management of personal income. This means in our symbols that in a peace-time economy a_L, c_L, c_Z and i_Z can hardly be used as instruments. As to each of the other objectives part of it may be used as a direct instrument whereas another part is generally induced.

Therefore the quantitative expression of the objectives can be subdivided into direct instruments (i.e. the controlled part of the objectives) and the indirect results (i.e. the uncontrolled part of the objectives). In the conventional presentation of national accounts this distinction is never made, although it seems to be a valuable contribution to the understanding of the economic development of the country.

The *indirect measures* of the government are mainly in the field of monetary and fiscal policy. This policy affects the financial position of the various social groups. As in a free society the government relies on this policy to a considerable extent, a good proportion of national accounts should be devoted to financial surveys. They should pay attention to:

(i) the way in which the various sectors have financed their expenditure;
(ii) the influence of government policy on financial resources.

The various financial resources which a sector can in principle dispose of are the following:

(1) Primary net income
(2) Depreciation allowances
(3) Direct taxes
(4) Income transfers
(5) Long-term capital transactions:
  (a) determined in advance
  (b) not determined in advance
(6) Change in the stock of money and 'near money':
  (a) active
  (b) idle
(7) Other short-term capital transactions with:
  (a) non-banks
  (b) banks.

It is possible to derive from the various financial resources

and the expenditure flows a number of balances that are used in monetary analyses. Some attention may be paid to these balances and also to the distinction between long-term capital transactions determined in advance and those not determined in advance.

A financial account should show to what extent a given sector has used financial means which neither originate from its own current income nor from that of other sectors. In so far as this happens one could say that the sector under review has used inflationary financial means, and this has significance for the monetary policy.

As to the definition of inflationary financial means more than one suggestion has been made:

(i) Income deficit, which equals the excess of expenditure over disposable income, that is consumption plus investment minus the items 1, 2, 3 and 4 enumerated above.
(ii) Finance deficit, which equals the income deficit plus the long-term capital transfers determined in advance;
(iii) Decrease in the stock of liquidities and/or increase in short-term debts, that is the items 6 plus 7 enumerated above and that equals the finance deficit plus the long-term capital transfers not determined in advance.

It cannot be denied that the balances (i) and (ii) may be considered as starting points in discussions concerning the question whether a sector has contributed to a monetary development towards inflation or deflation.

The income deficit does not, however, seem a good criterion for the purpose of answering this question. It would be unreasonable to say that a country is in an inflationary position if it has an excess of expenditure over income, and if at the same time its expenditure policy is based on the promise of foreign aid. The same reasoning can be applied to a sector within a nation's economy.

As long as a sector has an equilibrium between its own expenditure and the total of its own current earnings plus the amount of current income 'receivable' from other sectors (long-term capital receipts) it cannot be held responsible for any inflationary or deflationary development.

The change in liquidities cannot serve as a criterion either, since such a change may be caused by the fact that a given

sector has substituted short-term claims for long-term ones; the reverse may occur as well. Such a change in liquidities may take place, without any disturbance of the equilibrium between expenditure and total non-inflationary resources.

A better criterion seems the financial deficit, that is, the difference between total expenditure on the one hand and the total of disposable and 'receivable' income on the other hand.

In practice, 'receivable' income is defined as the long-term capital receipts from other sectors that are determined in advance. A few examples may be given in order to make clear where the borderline between 'determined in advance' and 'not determined in advance' is drawn.

All investments of enterprises are generally looked upon as investments of the private sector, although part of them is financed by long-term capital transfers from the government sector. Therefore one may say that the private sector has taken account of these financial resources in advance, at the time when it determines the level of its investments.

The same is true with regard to war-damage payments and similar capital transfers from the government to enterprises that are not owned by the State. Redemptions of the long-term debt of the government that are normally made according to a fixed plan are also treated as long-term capital transactions determined in advance.

According to the last criterion one could say that hoarding occurs when a given sector has a finance surplus, even if this hoarding takes the form of long-term and short-term credits to other sectors not determined in advance. In the case of a finance deficit there is dishoarding, even if this dishoarding has been offset by an unplanned long-term capital flow from other sectors. Likewise, the liquidation of long-term financial assets with a view to covering the finance deficit may be regarded as a kind of dishoarding.

Since economic theory pays such great attention to hoarding and dishoarding an interpretation of these phenomena is necessary.

Besides the information on total hoarding and dishoarding, it is of interest to separate that part of hoarding (dishoarding) that has been affected by increasing (diminishing) the amount of idle money. If this amount of idle money is too big, it may become a danger in times when world market prices suddenly rise

and the propensity to spend increases rapidly. Under such circumstances the government policy will be directed towards a reduction of the potential inflation by reducing the idle cash balances. If the situation is exceptionally serious, blocking may be applied as an instrument of policy.

In Table II the financial resources and the expenditure flows are presented in a combined appropriation and capital account for various sectors. The statistical information in the Netherlands is sufficiently developed to permit the completion of this table for the recent past so far as the money values are concerned. The following indirect instruments of economic policy can be derived from it:

(1) k_o indirect taxes
(2) t_L direct taxes on wages
(3) t_Z direct taxes on other income
(4) u_L income transfers to wage-earners
(5) u_Z income transfers to non wage-earners
(6) g_B credits and grants to foreign countries (net)
(7) g_L credits and grants to wage-earners
(8) g_Z credits and grants to non wage-earners
(9) m_L blocking or deblocking of money assets of wage-earners
(10) m_Z blocking or deblocking of money assets of non wage-earners
(11) b_L bank credits to wage-earners
(12) b_Z bank credits to non wage-earners.

As the flows enumerated above may contain a part that is induced as well, the autonomous part of them should be well distinguished in the national accounts.

IV. CAUSAL RELATIONSHIPS

The effects of certain government measures can only be fully analysed if the causal relationships are known. As said before, national accounts cannot provide this information, as economic behaviour cannot explicitly be expressed by means of accounts. By recording those aggregates which are relevant to the understanding of the economic mechanism, the analysis becomes, however, easier.

Theoretical and practical considerations provide the reason

TAB

Combined Appropriation and Capi

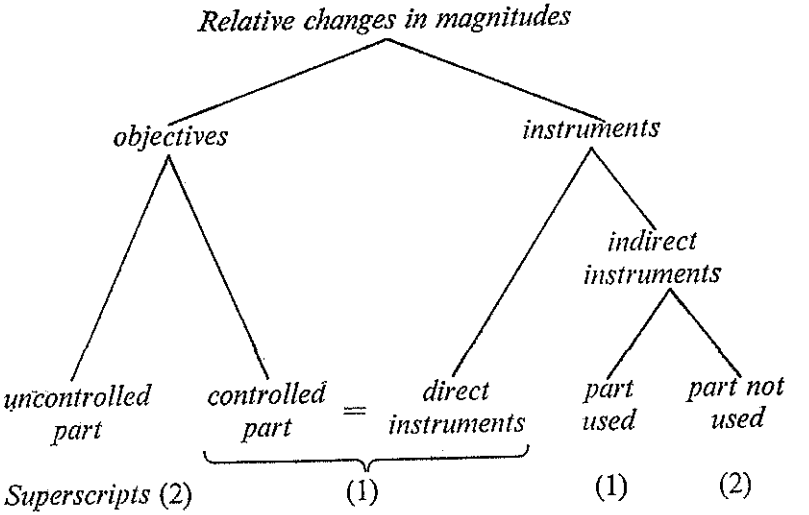
Item	Description	Defi-nition	Money Creating Banks			Foreign Countries (consolidated)		
1	Primary income		x	x	x	$\overline{M}$	$(p^1+m^1)+(p_M^2+m^2)$	=
2	Depreciation allowances		x	x	x	x	x	x
3	Direct taxes and premiums		x	x	x	x	x	x
			x	x	x	x	x	x
4	Other income transfers		x	x	x	x	x	x
			x	x	x	x	x	x
5	Gross disposable income	1+2+3+4	x	x	x			
6	Consumption		x	x	x	$\overline{E}$	$(p_E^1+e^1)+(p_E^2+e^2)$	=
7	Gross investment		x	x	x			
8	Gross expenditure	6+7						
9	Net saving	5−2−6	x	x	x			
10	Net investment	7−2	x	x	x			
11	Income surplus	5−8= 9−10						
12	Long-term capital transfers (determined in advance)		x	x	x	$\overline{G}_F$	g_F^1	=
			x	x	x	x	x	
			x	x	x	x	x	
13	Finance surplus	11+12	x	x	x			
14	Long-term capital transfers (not determined in advance)		x	x	x	$-\overline{H}_F$	h_F^2	=
			x		x	x	x	
			x	x	x	x	x	
15	Gross increase in liquidities	13+14	x	x	x			
16	Increase in active money		$-\overline{N}$	n^2	$=-N$	x	x	
17	Net increase in liquidities	15−16						
18	*Expressing itself in:* Increase in idle cash balances and time deposits.		$-\overline{W}$	(w^1+w^2)	$=-W$	x	x	
19	Increase in short-term claims resp. decrease in short-term debts (banks excluded).		x	x	x	x	x	
			x	x	x	$-\overline{B}_F$	b_F^2	=
20	Increase in gold and foreign currency in hands of banks.		$\overline{Q}$	q^2	$=Q$	$-\overline{Q}$	q^2	=
21	Redemption of bank credits		$-\overline{R}$	(r^1+r^2)	$=-R$			

:counts of a Nation's Economy

Government, Social and Insurance Funds included		Wage-earners and Pensioners			Other Income Recipients		
$(v^1+k_O^1)+(v^2+k_O^2)$	$=O$	$\overline{L}$	$(p_L^1+a_L^1)+(p_L^2+a_L^2)$	$=L$	$\overline{Z}$	$(v^1+k_Z^1)+(v^2+k_Z^2)$	$=Z$
x	x	x	x	x	$\overline{D}_Z$	$(d^1+p_D^1)+(d^2+p_D^2)$	$=D$
$(t_L^1+t_L^2)$	$=T_L$	$-\overline{T}$	$(t_L^1+t_L^2)$	$=-T_L$	x	x	x
$(t_Z^1+t_Z^2)$	$=T_Z$	x	x	x	$-\overline{T}_Z$	$(t_Z^1+t_Z^2)$	$=-T_Z$
$(u_L^1+u_L^2)$	$=-U_L$	$\overline{U}_L$	$(u_L^1+u_L^2)$	$=U_L$	x	x	x
$(u_Z^1+u_Z^2)$	$=-U_Z$	x	x	x	$\overline{U}_Z$	$(u_Z^1+u_Z^2)$	$=U_Z$
$(p_O^1+c_O^1)+p_O^2$	$=C_O$	$\overline{C}_L$	$(p_C^1+c_L^1)+(p_C^2+c_L^2)$	$=C_L$	$\overline{C}_Z$	$(p_C^1+c_Z^1)+(p_C^2+c_Z^2)$	$=C_Z$
$(p_I^1+i_O^1)+p_I^2$	$=I_O$	x	x	x	$\overline{I}_Z$	$(p_I^1+i_Z^1)+(p_I^2+i_Z^2)$	$=I_Z$
g_F^1	$=-G_F$	x	x	x	x	x	x
g_L^1	$=-G_L$	$\overline{G}_L$	g_L^1	$=G_L$	x	x	x
g_Z^1	$=-G_Z$	x	x	x	$\overline{G}_Z$	g_Z^1	$=G_Z$
h_F^2	$=H_F$	x	x	x	x	x	x
$(h_L^1+h_L^2)$	$=H_L$	$-\overline{H}_L$	$(h_L^1+h_L^2)$	$=-H_L$	x	x	x
$(h_Z^1+h_Z^2)$	$=H_Z$	x	x	x	$-\overline{H}_Z$	$(h_Z^1+h_Z^2)$	$=-H_Z$
x	x	$\overline{N}_L$	n_L^2	$=N_L$	$\overline{N}_Z$	n_Z^2	$=N_Z$
x	x	$\overline{W}_L$	$(w_L^1+w_L^2)$	$=W_L$	$\overline{W}_Z$	$(w_Z^1+w_Z^2)$	$=W_Z$
b_L^2	$=-B_L$	$\overline{B}_L$	b_L^2	$=B_L$	x	x	x
b_Z^2	$=-B_Z$	x	x	x	$\overline{B}_Z$	b_Z^2	$=B_Z$
x	x	x	x	x	$\overline{B}_F$	b_F^2	$=B_F$
x	x	x	x	x	x	x	x
r_O^2	$=R_O$	$\overline{R}_L$	$(r_L^1+r_L^2)$	$=R_L$	$\overline{R}_Z$	$(r_Z^1+r_Z^2)$	$=R_Z$

why the behaviouristic relations are generally expressed by means of marginal coefficients, flexibilities or elasticities. This implies that there is a need to record absolute and relative changes rather than absolute magnitudes. In this connection the question arises whether a system of accounts can be constructed that provides such changes for homogenous sectors and at the same time shows which part of the relative changes was a direct result of government action and which part was not.

The combined appropriation and capital account presented in Table II is meant as a provisional answer to this question. In that table the relative changes that are a direct result of government action are indicated by superscript (1) and in so far as they are due to other causes they have superscript (2). The notation by means of superscripts for objectives and instruments is consequently as follows:



A knowledge of the relative changes from the value in the base period to the next period may be of greater help in tracing the causal relationships if they are classified in this way. Table II shows explicitly the activity of the government by direct controls and by indirect instruments as well.

This valuable information is generally not given in the conventional presentation of national accounts. Sometimes one finds a few qualitative remarks in the explanatory text to the accounts, but what in fact are needed are quantifications.

This seems to be the appropriate place to take up the discussion of a budgeting model which is very similar to that used by the Central Planning Bureau in the Netherlands for short-term forecasts.

In preparing national budgets for the Netherlands account is taken of the fact that relationships exist between the following *variables* appearing in this table:

(1) v volume of production of enterprises
(2) k_o indirect taxes minus subsidies per unit of output
(3) k_M costs of imports per unit of output
(4) k_L labour costs per unit of output
(5) t_L direct taxes on wages
(6) t_Z direct taxes on other income
(7) u_L unemployment allowances
(8) a_L employment in enterprises
(9) p_X domestic price level
(10) p_E price level of exports
(11) c_L consumption volume of wage-earners
(12) c_Z consumption volume of non wage-earners
(13) e volume of exports
(14) m volume of imports
(15) Z entrepreneurial income.

The principal *data* in the Dutch model are:

p_W world market prices of commodities competing with Dutch exports, measured in national currency
e_W volume of world trade
p_M price level of imports
i_Z volume of gross private investment
d volume of depreciation allowances
a' number of wage-earners available for enterprises.

The *direct instruments* of government policy are:

p_L wage level
c_o volume of government consumption
i_o volume of gross government investment.

The *indirect instruments* of government policy are mainly in the field of taxes:

t_L direct taxes and premiums on wages
t_Z direct taxes and premiums on other income
k_o indirect taxes.

Variables, data and instruments are measured as deviations from a base period. Lower case letters stand for relative changes and capitals indicate absolute changes in money values at current prices.

The classification of the magnitudes according to the use and non-use of direct and indirect instruments is also applied in planning work. It has seemed useful to prepare two budgets, one of which refers to the situation that would occur if the economic policy remained unchanged (prognosis) while the other characterizes the situation that would come into existence if the government introduced any new measures of policy (plan).

The prognosis is made with the aid of the following model, where all changes have superscript (2) as none of the instruments is assumed to be used. Values in the base period have a bar over the symbol.

The model is claimed to have validity for short-run analyses only, so that all kinds of relationships which may be relevant in long-run problems could be ignored. The character of the various supply and demand functions could, therefore, be very simple.

Four kinds of markets are distinguished, viz:

(1) Home market for goods and services;
(2) Export market;
(3) Import market;
(4) Labour market.

The supply equation takes the form of a price-setting equation, which, in fact, assumes a strongly monopolistic competition. It runs:

$$p_x^2=\eta k_o^2+\mu k_M^2+\lambda k_L^2+\pi_1(c_L^2+c_z^2)+\pi_2 i_z \qquad (1)$$

where

η, μ and λ=the coefficients of the cost components (indirect taxes, imports costs and labour costs respectively) and

π_1 and π_2=the price flexibility of domestic output.

The demand equation is based on two simple Keynesian functions, viz: a consumption for wage-earners and one for non wage-earners:

$$c_L^2=\gamma\frac{(\bar{L}a_L^2+\bar{U}u_L^2-\bar{T}t_L^2)}{\bar{C}_L}-p_x^2 \text{ wage-earners demand} \qquad (2)$$

$$c_z^2 = \gamma^1 \frac{(Z^2 - \overline{T}_z t_z^2)}{\overline{C}_z} - p_x^2 \text{ non wage-earners demand} \qquad (3)$$

where

γ and γ^1 = marginal propensity to consume for wage-earners and non wage-earners.

As said before, the demand for capital goods in the short-run is considered as 'given', so that it does not appear as a structural relationship in this model.

The supply equation for exports has the same structure as that for domestic output, with the understanding, however, that the cost coefficients have different numerical values and that account is taken of the fact that the prices for export commodities depend directly upon the competitive prices in the world market.

$$p_E^2 = \eta^1 k_O^2 + \mu^1 k_M^2 + \lambda^1 k_L^2 + \pi_3 e^2 + \psi p_w \qquad (4)$$

where

ψ = the direct relationship between world market prices and export prices.

The demand for exported commodities is expressed by an ordinary demand equation, where the quantity demanded is considered to be a function of the relative changes in the price levels of competitors and domestic exporters.

$$e^2 = \epsilon(p_w - p_E^2) + e_w \qquad (5)$$

where

ϵ = competition elasticity.

The supply of imported commodities is considered to be infinitely elastic, which implies that the price of imported commodities is a datum that makes unnecessary a separate supply equation for this market.

As regards the demand equation for imported commodities, it should be noted that the major part of the Dutch imports consists of raw materials and semi-finished products and that competitive production hardly exists in the Netherlands. This is the reason why, in this demand equation, the relative price ratios do not play a part. In the Netherlands an increase of production is only possible if there is at least a corresponding expansion in the volume of imports of complementary raw materials and their finished products, or, to put it in other words,

the relationship between the changes in the volume of imports and production respectively is at least equal to 1. If, however, the production increase is substantial the relationship – in the equation below indicated by k – may easily be higher than 1, since some trades, such as agriculture and mining, reach their maximum production very soon. There is no need to emphasize disturbances of this relationship arising from changes in stocks may sometimes occur.

The equation is obviously very simple:

$$m^2 = \kappa v^2 \qquad (6)$$

The labour market is very much the same as the import market, in so far as there is an almost infinitely elastic supply in both markets. Post-war experience has shown that so long as the official labour regulations are observed the wage-earners are willing to offer their productive services at any level of wages that has been agreed upon by the government, the trade unions and the employers' organizations.

On the assumption that present conditions are continued, there seems to be no need, therefore, for a labour supply equation.

The comparison between the labour market and the import market also holds good in so far as demand for labour is concerned. In the short-run labour does not experience competition from other factors of production so that the demand for labour depends exclusively upon the volume of production. Nevertheless there is a difference between the demand for imports and the demand for labour. The demand for labour as a function of production is less than 1, contrary to that of imports, since increases in production are accompanied by rises in productivity. The exact numerical value of this coefficient will vary according to the amount of spare capacity available. If the increases in production start in a period when there is much spare capacity, demand for labour will be comparatively low and the rise in productivity substantial. This will go on until the existing equipment is fully utilized. At that point there may still be a number of unemployed. From then on, any increase in production will reflect a rise in employment which is almost equally high.

Should a position be reached where there is spare capacity and labour available to meet a further increase of demand for

goods and services, the balance of payments will be badly affected by increasing imports.

The equation by itself does not give rise to difficulties:

$$a_L^2=\alpha v^2 \tag{7}$$

where

α=the technical relationship discussed above.

It will, however, be clear that much depends on the coefficient α.

So far argument has concentrated on the various relationships determining supply and demand on the four markets.

It remains, however, to explain some important 'institutional' relationships and some identities.

In the first place the various taxes deserve attention in so far as they depend on the other economic variables. In the short-run, the rates of various kinds of taxes constitute data resulting from the institutional structure. This is particularly true in forecasting where no change in the government economic policy is assumed. The prognosis made has therefore to contain a number of equations that reflect the induced changes in the tax revenues.

As regards the direct taxes on income, two equations are used:

$$t_L^2=\frac{\vartheta(\bar{L}a_L^2+\bar{U}u_L^2)}{\bar{T}_L} \tag{8}$$

$$t_2^z=\frac{\tau Z^2}{\bar{T}_z} \tag{9}$$

where

ϑ=marginal tax rate for wages.

τ=marginal tax rate for other income.

The indirect taxes follow not only the changes in the volume of output, but also to a considerable extent the changes in the price level, as a substantial part of them consist of purchase tax. This implies that individual taxes per unit of output are directly proportional to the price movements. This is expressed in the following way:

$$k_o^2=\beta_1 p_x^2+\beta_2 p_e^2 \tag{10}$$

where

β_1 and β_2=the weighted averages of the coefficients for *ad valorem* taxes in the various components of domestic output and exports.

The last institutional equation expresses the relationship between the unemployment allowances and the level of unemployment. In the Netherlands all workers receive a certain percentage of their wage income as an unemployment allowance in case they lose their jobs. It is therefore clear that the change in the level of employment (a_L) affects the amount of unemployment allowances. The change in the number of labourers available for enterprises ($a_L^!$), resulting from the increase in total labour force, has however also its influence. The equation runs as follows:

$$\mu_L^2 = \psi \frac{\bar{L}(a_L' - a_L^2)}{\bar{U}_L} \tag{11}$$

where ψ indicates the average percentage of the unemployment allowance. This percentage is generally lower than the legal one since a number of unemployed do not claim any disbursement.

Finally, four identities remain to be discussed.

In the first place, the identity of labour cost. This is proportionate to the wage rate and inversely proportionate to the output per labourer or labour productivity. In the prognosis it is assumed that the government does not use any economic instrument and therefore the wage level, being under control, remains unchanged. As for sake of simplicity second order effects are neglected in the model, the relative change in the labour cost, resulting from the change in the output per worker, can be expressed as the difference between the relative changes in employment and volume of output respectively. Thus:

$$k_L^2 = \frac{1+a_L^2}{1+v^2} - 1$$

is written as

$$k_L^2 = a_L^2 - v^2 \tag{12}$$

In equation (12) v^2 represents the weighted average of exports and domestic output. Thus:

$$v^2 = \frac{\bar{E}e^2 + \bar{C}_L c_L^2 + \bar{C}_z c_z^2 + \bar{I}_z i_z}{\bar{E} + \bar{C}_L + \bar{C}_z + \bar{I}_z + \bar{C}_o + \bar{I}_o} \tag{13}$$

As to the definition of the cost of imports, a formula analogous to that of labour cost can be applied, with the understanding that in the prognosis account should be taken of possible

changes in prices of imports. In theory, the equation should be written as:

$$k_M^2 = m^2 - v^2 + p_M^2 \tag{14}$$

If, however, the percentage increase of imports equals about the percentage increase of output, which is possible when the production increase is moderate, the equation may conveniently be written as:

$$k_M^2 = p_M^2 \tag{14}$$

The last magnitude that has to be defined is the entrepreneurial income, that is treated in this model as a residual. The necessary equation can also be written as the general equilibrium between total resources and uses:

$$\begin{aligned} &Z^2 + \bar{L}a_L^2 + \bar{O}(k_o^2 + v^2) + \bar{M}(k_M^2 + v^2) + \bar{D}(p_x^2 + d) \\ &= \bar{C}_L(c_L^2 + p_x^2) + \bar{C}_Z(c_Z^2 + p_x^2) + \bar{I}_Z(i_Z + p_x^2) + \bar{E}(e^2 + p_E^2) \end{aligned} \tag{15}$$

After what has been said about second order effects this identity needs no further explanation.

The same system can be used for planning purposes on the understanding that account must be taken of the instruments. Although the incorporation of the instruments (see pp. 92 and 93) does not offer special difficulties, it may be useful to summarize the model, now adapted to planning purposes, once more. It may be noted that the instruments:

$$p_L^I,\ c_o^I,\ i_o^I,\ t_L^I,\ t_Z^I \text{ and } k_o^I$$

appear as data in this revised model so that no new equations are required.

$$p_x^2 = \eta(k_o^I + k_o^2) + \mu k_M^2 + \lambda k_L^2 + \pi_1(c_L^2 + c_Z^2) + \pi_2(i_Z + i_o^I) + \pi_4 c_o^I \tag{1}$$

$$c_L^2 = \gamma \frac{[\bar{L}(a_L^2 + p_L^I) + \bar{U}u_L^2 - \bar{T}(t_L^2 \pm t^I)]}{\bar{C}} - p_x^2 \tag{2}$$

$$c_Z^2 = \gamma' \frac{[Z^2 - \bar{T}_Z(t_Z^2 \pm t_Z^I)]}{\bar{C}_Z} - p_x^2 \tag{3}$$

$$p_E^2 = \eta'(k_o^I + k_o^2) + \mu' k_M^2 + \lambda' k_L^2 + \pi_3 e^2 + \psi p_W \tag{4}$$

$$e^2 = \epsilon(p_W - p_E^2) + e_W \tag{5}$$

$$m^2 = \kappa v^2 \tag{6}$$

$$a_L^2 = \alpha v^2 \tag{7}$$

$$t^2 = \frac{\partial[\bar{L}(a_L^2 + p_L^I) + \bar{U}u^2]}{\bar{T}^L} \tag{8}$$

$$t_z^2 = \frac{tZ^2}{\overline{T}_z} \tag{9}$$

$$k_o^2 = \beta_1 p_x^2 + \beta_2 p_E^2 \tag{10}$$

$$u_L^2 = \frac{\psi \overline{L}(a_L' - a_L^2)(1+p_L^1)}{\overline{U}_L} \tag{11}$$

$$k_L^2 \equiv a_L^2 - v^2 + p_L^1 \tag{12}$$

$$v^2 \equiv \frac{\overline{E}e^2 + \overline{C}_L c_L^2 + \overline{C}_z c_z^2 + \overline{C}_o c_o^2 + \overline{I}_z i_z + \overline{I}_o i_o^1}{\overline{E} + \overline{C}_L + \overline{C}_z + \overline{C}_o + \overline{I}_z + \overline{I}_o} \tag{13}$$

$$k_M^2 \equiv m^2 - v^2 + p_M^2 \tag{14}$$

$$\begin{aligned} &Z^2 + \overline{L}(a_L^2 + p_L^1) + \overline{O}(k_o^1 + k_o^2 + v^2) + \overline{M}(k_M^2 + v^2) + \overline{D}(p_x + d) \\ &\equiv \overline{C}_L(c_L^2 + p_x^2) + \overline{C}_z(c_z^2 + p_x^2) + \overline{C}_o(c_o^1 + p_x^2) + \overline{I}_z(i_z + p_E^2) + \\ &\quad \overline{I}_o(i_o^1 + p_x^2) + \overline{E}(e^2 + p_E^2) \end{aligned} \tag{15}$$

It has been proved that this simple macro-economic model is an efficient tool for general economic policy, because it ensures consistency of thinking. Nevertheless it should be emphasized that in practice considerable disturbances may occur. This is mainly due to the fact that:

(i) it is difficult to keep the margins of error of some of the parameters within a reasonable range;

(ii) in the model the relationships are restricted to the current flows only, although it is a well-known fact that capital transactions and some monetary balances, such as idle money may have their influence.

As to point (i), it is hoped that as soon as national accounts are available for a sufficiently great number of years the situation will improve.

As to point (ii) it may be noted that Table II of this paper can be completed up to item 11 (income surplus) with the results obtained from the budget model. By a fair estimate of the capital transactions it is possible to judge whether the monetary balances are plausible or not. It must, however, be admitted that in the recent past these balances have shown heavy fluctuations, but if, on the other hand, the estimates of the current flows and long-term capital transactions result in unacceptable changes in the liquid assets a revision of the current flows seems necessary.