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THE INTEGRATION OF SEERS' MODIFIED INPUT-OUTPUT TABLE WITH NATIONAL ACCOUNTS FOR UNDER DEVELOPED COUNTRIES

D IFFERENT branches of social accounting, developed as separate disciplines, focus on different aspects of an economy. The lack of an omnibus accounting framework makes it necessary to study each of them separately when the need to obtain a complete picture of the economy arises. Therefore, the tendency nowadays is toward integration of national accounts with the other systems of social accounts namely, input-output, flow of funds, balance sheet, etc. The numerous conceptual differences among these systems have forced economic accountants to think of partial integration *i.e.* the integration of national accounts either with the flow of funds accounts or with input-output accounts. A attempt is made in this paper to solve the conceptual problems which debar the integration of the latter. Since such an integration has a special significance for planning in underdeveloped countries we have taken Seers' modified Input-Output Table [1] and the national accounts [2] oriented to accomplish the analytical and institutional requirements of underdeveloped countries. Part one of the paper discusses the importance of integrating both the systems from the less developed world; the two systems are discussed in the second part before their similarities and the way out to solve the problems of integration are discussed in the part third. The final part of our paper presents 'an integrated framework of accounts.

I

NEED

The objectives of the integration can broadly be classified under

two headings : (1) its practical significance and (2) its role in promoting the theory of social accounting. Its practical significance is to be found in planning which involves a systematic and coordinated effort to improve the performance of an economy. This qualitative statement is to be expressed in numerical targets. Fixation of target, first step in economic planning, requires information of the past achievements in aggregate, as is recorded in national accounts and in intensive sector breakdowns which is replete in the input-output tables. Moreover, different categories of investment bring about different rates of growth. For planning of economic development, therefore, it is necessary to estimate the impact of different investment choices on income, employment, consumption, savings etc.; and choose from among these paths the most desired one. The task is facilitated by an integrated accounting framework which provides the information of industrial linkages and aggregate results.

The integrated accounts are not only significant for planning but are also a considerable step forward in the theory of social accounting, which has two aspects: an economic aspect and an accounting or statistical aspect. Social accounting is a science of preparing systematic records of economic activities. The theory of social accounting attempts to describe the functioning of an economy as clearly as possible, its economic aspect and provides crosscheck for testing consistency of data recorded in the accounts from its statistical aspects, the integrated accounts, considering their economic aspect first, provide knowledge of relationships of gross aggregates such as consumption, saving, income and investment, along with their sector relationships incorporated in an input-output table. These relatiohships are important, according to E. Eleish in the study of—

(a) the degree of dependence of individual industries on others, and

(b) the weight of different sectors in the rest of the economy.

The integrated accounts which provide data in aggregate form a nd in intensive sector breakdowns are amenable to any test of consistency and are a hallmark in the theory of social accounting.

II

Let us briefly discuss the two systems of accounts before we proceed to discuss their similarities and contrasts. It would be our worth while to mention at the outset that the integration would affect only the production account while the other accounts of the national accounting system would maintain their former identity. The gross domestic product account is presented below :

TABLE 1.

Gross Domestic Product Account

1.1 Gross Domestic Product at Factor Cost	1.4 Sales of Consumer Goods to : (*a*) Urban Households (*b*) Rural Households (*c*) Government
1.2 Indirect Taxes	1.5 Imputed Consumption of : (*a*) Urban Households (*b*) Rural Households
1.3 (Less) Subsidies	1.6 Gross Domestic Fixed Capital Formation 1.7 Increase in Stocks 1.8 Exports 1.9 (Minus) Imports
Gross Domestic Product at Market Prices	Expenditure on Gross Domestic Product

The deconsolidation of the households' consumption expenditure into urban and rural on one hand and the estimated and the imported consumption on the other is carried out in order to make it useful to estimate elasticities of consumption in rural and urban areas and to distinguish reliable estimates from the unreliable ones. The former is used to forecast demand and the latter, it is generally believed, represents the impact of economic growth on monetization of an economy. Moreover, it is simpler than any other production account because it values domestic product in gross terms and avoids all complications connected with the estimation and reliability of the provision for depreciation.

The input-output model developed by Prof. Dudley Seers is spe-

cially adopted to the requirements of an underdeveloped country in general and African countries in particular. In nutshell, his input-output model incorporates more industrial rows than industrial columns because of the prevalence of simple industrial structure and relations in major part of an underdeveloped country. The output of most of the industries is oriented to meet the final demand and their input basket contains primary inputs and imports to a large extent and there are a few inter-industry relations. Finally, the nonexistence and the unreliability of statistics stand in the way of a comprehensive input-output model.

Not all the industries are assigned rows. Only those industries are allocated rows which either because of their size or type of activity play an important role in formulating public policy or which are major source of revenue. The number of industries using its output as input is the main criterion for allocating column to an industry. The larger the number industries dependent on it, the stronger would be the case for assigning a column to it. Imports are categorized into those which form raw materials for domestic industries and those directly meant for consumption in order to bring out the impact of import substitution programme when the accounts are available for the two time periods. The former is assigned column in the inter industry section while the latter is assigned column in the final demand part of the input-output table. Indirect taxes and distribution are assigned separate columns and are added to the gross output which is the sum of value added and intermediate supply of products in order to obtain the total supply of goods and services in the economy. The resultant national output is valued at market prices and is equal to the total demand for output.

Seers' modified input-output table is divided into four parts vis. inter industry section, the composition of demand and supply section, the value added section and the balancing section. In the inter industry section there are twelve rows and six columns representing imports, import duties, electricity and water, transport and communication, distribution, and other inputs.

In the value added section are represented employees income dis-aggregated into non-African and African, subsistence income, direct taxes, mixed incomes with the African and non-African divisions, income payments divided into home and abroad, transfers, savings and depreciation, these items sum up to gross value added, shown in

another column.

The composition of demand and supply section includes the vector of final bill of goods, constituted by exports, consumption disaggregated into non-African, African and subsistence, government consumption, capital formation divided into government and others, and finally, change in stocks and on the demand side and the total output on the supply side. Sales to other sectors, *i.e.* intermediate demand is added to final demand in order to derive total demand for output in the economy.

The balancing section of the input-output table represents government account, household account (divided into African and non-African), and the saving and investment account. The Seers' input-output table thus amounts to the social accounting matrix. It has the merit of depicting the whole information only in one table. On the other side, it has the defect of being too brief and does not record complete data recorded in national accounts since only the production account is affected by the integration of national and input-output accounts, it would be advisable to ignore other accounts in our present study.

III

The two social accounting systems discussed above are similar in many respects. Both the systems are based on the functional sectoring, which classifies an economy into sectors according to the difference in the activities they carry out (*i.e.* consumption, production, saving and investment) as against institutional sectoring which identifies various institutions, carrying out these activities, as sectors. The Gross Domestic Product Account which we have discussed above incorporates the production activity of all the institutions irrespective of whether it is performed by business, households or government. Similarly, the act of saving of all the institutions would figure in the saving and investment account.

Input-output accounts distinguish sectors according to activity and emphasise particularly that activity for which a stable relation between inputs and outputs can be established. The indigenous part of the inter industry section of the input-ouput table is not shown to carry investment activity. Analogous to its treatment in the national

accounts the home owning activity is recorded in the inter industrial section. The recording of transactions on the same basis simplifies, to a considerable extent, the task of integration.

Moreover, corresponding to the final bill of goods in the exogenous part of the input-output table is the expenditure on gross domestic product deconsolidated into its various components; and, the correlate of the gross domestic product in the national accounts is value added in the input-output table. Finally, both the systems are based on the same accounting principles of recording transactions on the accrual basis and double entry system (in the input-output table each transaction is recorded once in the square but is read twice— once as input and another as output).

These similarities are no doubt hopes of achieving an integrated accounting framework. Yet, many obstacles are to be side stepped before arriving at any practical solution. First of all, there is difference in orientation. Both the systems under consideration are tailored to accomplish different objective which demand different data and different accounting frames. The focus in national accounting centres round the value added and its distribution among factors of production as a reward for their contribution to the productive process. Input-output tables mainly focus on inter industry transactions. Copeland[3] rightly says that it is more than a social accounting system because of its emphasis on behaviouristic equations bringing out the relationship between inputs and outputs. In the national accounts transactions are recorded on the net basis because orientation is to find out value added; but in the input-output accounting, gross flows are of prime interest.[4] Thus the difference in orientation causes difference in netness in the two systems.

Not only the degree of netness differs but even the concept of the net output used in the two systems is different. In the national accounting jargon it is derived after cancelling out the inter industry or the intra sector transactions. Thus, the net output equals gross output minus the cost of raw materials. But in the input-output terminology, it refers to the gross output minus the industry's own inputs *i.e.,* only intra industry transactions are cancelled.

The problem, however, is not intractable and can usefully be overcome by adopting the concept of net output as used in the input-output accounting and by representing separately the net value added which

is equal to the net national product in national accounts. To this net value added we add the total intermediate demand in order to arrive at the total output.

The problem of difference in the transaction coverage, which also stems from the difference in orientations can be overcome easily by deconsolidating the vector of final demand by assigning different columns to the items represented on the credit side of the production account.

Another hindrance in the way of integration is that the method of valuation of transactions in the input-output table is inconsistent with that of production account. The former values transactions at the producer's prices while the latter at the purchaser's prices. To solve the problem B. Horvat [5] suggests that indirect taxes and subsidies are to be computed separately, the latter being deducted from the value added in the input-output table. Kurabayashi[6] strongly pleads for market valuation of transactions on the ground that such a valuation is significant for analysis of production activity by sector apart from its usefulness in integrating the two systems. He invalidates the argument that the adoption of factor cost valuation would usher in the fixity of factor proportions and argues that "business enterprises recognize their production decisions when a new tax system is introduced and factor incomes of each enterprise are necessarily subject to change owing to factor substitution."

For the purpose of integration of the two systems the procedure adopted by us to overcome this problem involves valuation of the vector of final demand in the input-output table at the market prices and addition of net indirect taxes (net of subsidies) to the value added, which constitutes the supply side. The reconciliation of the valuation procedure makes the integration of the two systems possible.

Connected with the above problem is the valuation of exports and imports. The full formal consistency can be achieved if both of them are valued at the uniform world market prices. But the operational significance of input-output analysis according to Horvat requires stable input-output coefficients and the proportional relation between value of the output and its physical content. For maintaining operational efficiency the valuation of foreign transactions at uniform domestic prices is desired, which can be achieved by the inclusion of transaction equations for transforming the values of one scheme into

another. "Thus exports subsidies yields exports expressed in domestic prices. Similarly, imports plus custom duties and indirect taxes yields domestically priced inputs in the input-output table. Finally, the value added in an input-output table increased for various export taxes and reduced for net export subsidies yields the correct value added of the production account."

A conceptual problem still remains to be tackled. Liebling contends that the determination of final demand is crucial problem for national income statisticians but in the inter industry analysis this is a part of the general problem of allocating the total output. Further more, he says, the equivalent of nation income final demand sector may be treated as non-autonomous, depending upon the model formulation[7]. It is a doubtful proposition. For, the importance of final demand depends on the use of which it is put (*e.g.* planning, forecasting etc.) and not on whether it forms an indigenous or exogenous part of the modelor whether it figures in national accounts or input-output accounts. The problem of allocation of total output to final demand is itself not so important if it is not used for policy formulations.

IV

The integrated production account is divided into three parts *i.e.*, 'basic inputs', 'final demand composition', and the 'composition of supply.' There are n industrial rows and n* industrial columns such as that n> n*. Out puts are represented in rows and inputs are allocated in columns on the basis of some tests discussed above. The outputs of these n* industries which form inputs of other industries is represented in columns 1 through n*. The inputs purchased by n industries from other than n* industries (*i.e.* n*+1...n) are aggregated in the column labelled O.

The 'basic inputs' part of the consolidated production account represents that part of imports used as inputs in the process of production, import duties, all other inputs (designated by the columns labelled 0) and industries are denoted by 1 through n. The last column of this section represents total intermediate output.

All the items on the right hand side of the production account of the national accounting systems are allocated columns in the 'final

demand' sector of the integrated production account. Thus, final demand is composed of consumption expenditure of urban and rural households, government consumption, imputed consumption of urban and rural households, exports, gross domestic fixed capital formation and change in stocks in the latter. Exports are however, not net of imports which are represented in the composition of supply section.[8]

The composition of supply section includes distribution margins, indirect taxes (net of subsidies), gross value added and imports of final products; the total of which is equal to the gross national product at market prices. To this is added the intermediate outputs in order to derive the total supply of output.

The total supply of output is matched by its total demand as constituted by the demand for basic inputs and the final demand.

The integrated production account is shown in table-2.

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[8] This includes imports of final goods. The imports of intermediate goods has been allocated column in the basic input section.

		Basic Inputs							Composition	
					Basic Inputs					
	M	Mt	0	1	2	3	..	n*	I.I	Cuh	Crh
1.	M_1	Mt_1	x01	x11	x21	x31	..	$xn^*{}_1$	II_1	Cuh_1	Crh_1
2.	M_2	Mt_2	x02	x12	x22	x32	..	xn_2	II_2	- Cuh_2	Crh_2
3.	M_3	Mt_3	x03	x13	x23	x33	..	$xn^*{}_3$	II_2	Cuh_3	Crh_3
..	..	..	..	..	..	..	..	..	..	..	..
n*	Mtn*	Mtn	X0n	x1n	x2n*	x3n*	..	xn*n*	IIn*	Cuhn*	Crhn*
..	..	..	..	..	..	..	..	..	..	..	..
n	Mn	Mtn	x0n	x1n	x2n	x3n	..	xn*n	IIn	Cuhn	Crhn

2

Production Account For Underdeveloped Countries

of Demand							Composition of Supply					Total Output
C_g	Cuh (i)	Crh(i)	X	G.D.F.K.	ΔS	F.D.	Mf	Net It	D	G.V.A.	GNP mp	
C_{g_1}	$Cuh(i)_1$	$Crh(i)_1$	X_1	$GDFK_1$	ΔS_1	$F.D._1$	Mf_1	It_1	D_1	GVA_1	GNP_1	p_1
C_{g2}	$Cuh(i)_2$	$Crh(i)_2$	X_2	$GDFK_2$	ΔS_2	FD_2	Mf_2	It_2	D_2	GVA_3	GNP_2	p_2
C_{g3}	$Cuh(i)_3$	$Crh(i)_3$	X_3	$GDFK_3$	ΔS_3	FD_3	Mf_3	It_3	D_3	GVA_3	GNP_3	p
..	..	..	..	..	..	..	..	..	..	..	..	..
C_{g*}	$Cuh(i)_{n*}$	$Crh(i)_{n*}$	X_{n*}	$GDFK_{n*}$	ΔS_{n*}	FD_{n*}	Mf_{n*}	It_{n*}	D_{n*}	GVA_{n*}	GNP_{n*}	p_{n*}
..	..	..	..	..	..	..	..	..	..	..	..	..
C_{gn}	$Crh(i)_n$	$Crh(i)_n$	X_n	$GDFK_n$	ΔS_n	FD_n	Mf_n	It_n	D_n	GVA_n	GNP_n	P_n