SOCIAL ACCOUNTING MATRIX (SAM)
AND
ITS IMPLICATIONS FOR MACROECONOMIC PLANNING

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I. Introduction:

Social accounting matrix (SAM) is a technique related to national income accounting, providing a conceptual basis for examining both growth and distributional issues within a single analytical framework in an economy. It can be seen a means of presenting in a single matrix the interaction between production, income, consumption and capital accumulation. Although a number of SAMs were developed for a number of developing countries in the 1970s, since the 1980, there has been a increasingly growing interest in the designing, constructing and use of SAM in these countries.

This study describes the basic structure of social accounting matrix and investigates how a SAM is used in macroeconomic planning. The plan of study is:Section II defines the social accounting matrix; Section III looks into the basic structure of SAM; Section IV explores the uses of SAM for macroeconmic planning; and the final section provides a summary and conclusion remarks.

II. What is Social Accounting Matrix (SAM) ?:

"A social accounting matrix is simply defined as a single entry accounting system whereby each macroeconomic account is represented by a column for outgoings and a row for incomings" (Round, 1981a:5). It is represented in the form of a square matrix with rows and columns, which brings together data on production and income generation as generated by different institutional groups and classes, on the one hand, and data about expenditure of these incomes by them on the other. In a SAM, incomings are indicated as receipts for the row accounts in which they are located and outgoings are indicated as expenditure for their column accounts. Since all incomings must be, in a SAM, accounted for by total outgoings, the total of rows and columns must be equal for a given account. Taylor (1983) sees the SAM as a tabular presentation of the

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accounting identities, stating that incomings must be equal to outgoings for all sectors of the economy.

SAM is a data system, including both social and economic data for an economy. The data sources for a SAM come from input-output tables, national income statistics, and household income and expenditure statistics. Therefore, a SAM is broader than an input-output table and typical national account, showing more detail about all kinds of transactions within an economy. However, an input-output table records economic transactions alone irrespective of the social background of the transactors. A SAM, on the contrary the national accounts, "... attempts to classify various institutions to their socio-economic backgrounds instead of their economic or functional activities" (Chowdhury & Kirkpatrick, 1994:58).

A SAM is a way of logical arrangement of statistical information, concerning income flows in a country's economy within a particular time period (usually a year). It can provide a conceptual basis to analyse both distributional and growth issues within a single framework. For instance, a SAM shows the distribution of factor incomes of both domestic and foreign origin, over institutional classes and re-distribution of income over these classes. In addition, it shows the expenditure of these classes on consumption, investment and savings made by them. King (1988) points out that a SAM has two main objectives: first, organising information about the economic and social structure of a country over a period of time and second, providing statistical basis for the creation of a plausible model capable of presenting a static image of the economy along with simulating the effects of policy interventions in the economy.

III. The Basic Structure of SAM:

A SAM is a single accounting framework which arranges income flows to the institutions and sectors into a equal number of rows and columns. The number of rows and columns is flexible, changing in accordance with the nature of an economy and the purpose for which the SAM is required. This determines the degree of disaggregation and subsequent number of rows and columns in the SAM respectively. In a SAM, the rows and columns identify different accounts in the economic system, while the elements of the SAM itself refer to the value of transactions between these accounts for a given time and place. For any given account, and therefore for each particular row and column pair, the entries in the row express receipts or revenue for that

account whereas the entries in the corresponding column represent outgoings or the expenditure side of the account.

In aggregate, within any economic system, all incomings must be matched by corresponding outgoings. Thus, the totals for all corresponding row and column pairs must be equal. Any element of the SAM is a incoming (or receipt) for the account specified by the row in which the item is located, and it is an outgoings (or expenditure) for the account identified by its column location. An item in row-i-, column-j- is therefore an outgoings by account-j- which is received by account-i-.

The major components of the basic social accounting matrix is shown in Table 1. It recognises 4 types of accounts, covering factors of production account (account 1), institution accounts (2 to 5), account for production activities (account 6) and account for rest of the world (account 7).

The first account is for the factors of production. The factors of production receive income from various production activities. Their income is shown at the intersection of first row and column 6. This gives total value added (or GDP). However, the net factor income which was received from abroad (the intersection with column 7) should be added and then the total incomes of the domestic factors of production can be obtained. It is also possible here to obtain easily the factorial distribution of value-added between the factors of production. The process is that "the stream of value added, from the production side, rewards the factors of production, with wages going to different types of labour, rent going to land and other resources, and profits to capital" (Pyatt & Thorbecke, 1976:26). On the other hand, column 1 shows that the factor incomes are paid out to the providers of factor services. Agricultural wages, for instance, will be received by rural households if they are one of the sub-groups in the classification of institutions.

Accounts 2 to 5 are the accounts for domestic institutions. As shown in Table 1, there are three separate current accounts for institutions, including two accounts for private sector (which are households (account 2) and private corporate sector (account 3)), and one account for government (account 4). In addition, there is only one (shared) capital account for the domestic institutions, (account 5). Households have their own labour and capital, which they sell to the production sector (privately or publicly owned) and obtain factor income (wages and surplus). This income is used by households for consumption, saving and /or investment. The private corporate sector receives surplus income: it invests, but does not consume and has transactions

with the rest of world. The public sector levies direct and indirect taxes, and consumes and invests on behalf of society. The combined capital account (account 5) is a 'residual' account. This means that savings are equal to investment (by definition) and these are determined after the sectors have consumed from their disposable incomes.

Entries at the intersection of rows and columns 2 and 4 are current domestic transfers, such as direct taxes on income which are paid to government (intersection of row 4 and column 2), dividends paid to domestic shareholders (intersection of row 2 and column 3). Households and companies are shown as receiving (net non-factor) transfer income from abroad (intersection of row 2-3 and column 7).

Table 1: A Basic Social Accounting Matrix (SAM)

		Expenditure							
		1	2	3	4	5	6	7	Totals
			Institutions						
		Factors of production	Current accounts			Combined capital account	Production activities	Rest of the world combined account	Totals
			Households	Companies	Government				
1	Factors of production						Value added payments to factors	Net factor income received from abroad	Incomes of the domestics factors of production
2	Households	Allocation of labour income to households	Current transfers between households	Profits distributed to domestic households	Current transfers to domestic households				Incomes of the domestic institutions after transfers
3	Companies	Allocation of operating surplus to companies			Current transfers to domestic companies			Net non-factor incomes received from abroad	
4	Government		Direct taxes on income and indirect taxes on current expenditure	Direct taxes on companies plus operating surplus of state enterprise		Indirect taxes on capital goods	Indirect taxes on inputs	Net non-factor incomes received plus indirect taxes on exports	
5	Combined capital account		Household savings	Undistributed profits after tax	Government current account surplus			Net capital received from abroad	Aggregate savings
6	Production activities		Household consumption expenditure on domestic goods		Government current expenditure	Investment expenditure on domestic goods	Raw material purchases of domestic goods	Exports	Aggregate demand = gross outputs
7	Rest of the world combined account		Household consumption expenditure on imported goods			Imports of capital goods	Imports of raw materials		Imports
	Totals	Incomes of the domestic factors of production	Total outlay of households	Total outlay of companies	Total outlay of government	Aggregate investment	Total cost	Total foreign exchange receipts	

Source: Pyatt & Thorbecke (1976: 27)

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The total current income of domestic institutions is shown in row 2 and 4 and their savings in row 5. Savings are shown in row 5 as transfers from the current accounts of institutions to their combined capital account. For instance, domestic savings are shown in the intersection of row 5 and column 2 for households. Aggregate savings, in Table 1, consist of households savings, undistributed profits after tax, government current account surplus and net capital received from abroad. This is spent in column 5 to finance investment in the economy.

The step of accounts is for production activities (account 6). As shown in Table 1, after subtracting raw material purchases of domestic goods (intersection of row 6 and column 6), the total of row 6 gives us aggregate demand or gross output.

The final account to consider is the external account, number 7. It does not invest (by definition). This is included as a part of investment by the private corporate sector, but it is a competitive source of inputs into the domestic production process.

IV. SAM and Macroeconomic Planning:

The SAM is an approach for data organisation, reconciliation, and descriptive analysis of the structure of the economy. "The most important feature of a social accounting matrix is that it provides a consistent and convenient approach to organising economic data for a country and it can provide a basis for descriptive analysis and economic modelling in order to answer various economic policy questions" (Pleskovic & Trevino, 1985:13). A SAM can be used for macroeconomic planning in two ways: first, a SAM can provide a framework for the organisation of information related to economic and social structures of a country's economy. Second, a SAM can serve as a database for a model of the economy under consideration.

A SAM provides comprehensive one-period information on variables, such as the structure, composition and the level of production, the distribution of income among households, and the factorial value-added. Similarly it can provide statistical information on consumption and production pattern of the economy, imports, exports, investment and so on. Moreover, it may have more detailed information, depending on the data availability and particular interest, on income distribution, tax structure and monetary variables. Therefore, SAMs can be used to improve the capabilities of countries to obtain descriptive analysis of the economy, indicating its income distribution picture, institutional and industrial structure. In a SAM, the information

which takes place in public sector statistics is represented as a component of whole economy. A SAM can thus provide a comparison opportunity the public sector with either the private sector or the economy as a whole.

A SAM can also be used as a database for macroeconomic policy modelling in developing countries. Its framework may contribute to arrangement of different sources of data in a consistent manner. Different sources of data, such as national accounts, taxation data, household surveys, input-output tables, can be arranged into an economy-wide data framework. In most LDCs economic planning suffers from a number of problems such as insufficient, unreliable and poor quality of data. Therefore, the best use of available information becomes increasingly important. King (1988) argues that the logical consistency in a SAM is useful in improving the quality of available data in LDCs.

It is possible to build more than one macroeconomic model on the basis of a SAM. For instance, the multiplier analysis[1] can be considered as a policy modelling application of a SAM. Multiplier analysis estimates the effects of one-time increases in exogenous variables on endogenous variables in the accounting framework and it is used for short-term policy analysis (Pleskovic & Trevino, 1985). Such a analysis is very useful in estimating the effects of exogenous variables, such as increases in exports, on outputs, employment and incomes, with each of these being disaggregated in relation to the classification system embodied in the social accounts (Round 1981b; Pleskovic & Trevino, 1985). The ripple effects, for instance, of an exogenous increase in the autonomous investment on household sector, public sector, production account and combined capital accounts can be seen easily through SAMs. The resultant flow of income in the SAM captures the dynamics of the impact of a single exogenous change throughout the entire economy.

A SAM by its disaggregation to lower levels ensures consistency between information at all levels and from different sources (Hayden & Round, 1982). By this way any inconsistencies in presented data can be obtained and can be corrected. This consistency allows a SAM to be used in filling the gaps in data. On the other hand, behavioural assumptions of institutions and sectors within an economy tend to be relatively stable, and are therefore predictable with respect to exogenous changes in the short-term. Therefore, the coefficients of a SAM (which reflect these behavioural assumptions) would also be relevant in a similar time period. If some coefficients

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[1] It "shows how changes in one or more elements of a SAM generate changes elsewhere in the matrix" (King, 1988:45).

change, these are consistent with economic theory, the SAM would still be effective. Here a SAM would therefore be useful in making predictions about the way economy is evolving due to the effects of exogenous changes. It is therefore useful in updating economic statistics in a fairly consistent manner.

Pyatt & Round (1988) argue that a SAM informs the economic policy debate and should not be seen as a 'once and for all effort'. This is because, underlying each macro-economic model, there is assumed to be a SAM. They suggest that the coefficients of its rows and columns, and consistency of the same are essential to testing the validity of macro-economic models. For instance, if the model assumes certain relationships between sectors or institutions, the SAM could be used to test the validity of these based on the coefficient relationships which must hold ex post. That is the sum of the resultant proportional distribution of the coefficients in the rows and columns must be equalled to one.

Let us suppose that there is an exogenous increase in external demand. This would first have an impact on the production account. This would result in the need for more factors of production from the household and private corporate sectors who own them. Their sale to the productive process would result in more income accruing to, and subsequently more demand from, the owners of the these factors. This would generate additional demand from the productive process; more direct and indirect taxes would accrue to the government; there may be more demand for imported inputs into the production process or for general consumption. One may see a whole chain of events 'rippling' through the economy, each change generating further changes, and so on. These are adequately captured by a SAM because of its consistency requirements. The end result of all these changes, which have less impact in later rounds, is to produce a new SAM for the economy.

Since a SAM is concerned with basic needs[2], it is important to distinguish the impact of exogenous changes due to public sector activities on functional and institutional disposable income. This will 'shed' light on how progressive or regressive the tax system is. This could be done with aid of a SAM by looking at the net of all interactions between the public sector and other sectors. So one would be able to tell the impact of policy changes on income distribution.

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[2] See e.g. Hayden & Round (1982); Chowdhury & Kirkpatrick (1994).

LDCs deal frequently with the external sector for a number of reasons, which are adequately captured in a SAM. LDCs generally experience unsustainable balance of payments equilibrium with external sector; a SAM, by distributing dealings with external sector to the various sectors and institutions, would tell which sectors are contributing the most to LDCs unsustainable balance of payments (BOP) position. When used in the context of the 'multiplier' we can see how BOP could change over time. This would then inform policy responses to improve BOP positions.

V. Summary and Conclusion Remarks:

A SAM is a single accounting framework with the rows and columns, arranging income and expenditure accounts of various economic agents in a country. Its data source include input-output tables, national income statistics, and household income and expenditure statistics. A SAM framework is not only a statistical tool but also a framework for macroeconomic analysis. It provides a framework for the organisation of information about economic and social structure of a country and serves as a database for a model of the economy.

It may be concluded that "... the case for constructing SAMs ought not to be narrowly judged, or even viewed, in the context of a particular branch of methodology but rather than in the wider perspective of representing data in a more informative and useful way than statistical practices currently permit" (Hayden & Round, 1982:464).

References:

Chowdhury, A & Kirkpatrick, C.(1994), 'Development Policy and Planning: An Introduction to Models and Techniques', London and New York:Routledge

Hayden, C. & Round, J. I.(1982), 'Developments in Social Accounting Methods as Applied to the Analysis of Income Distribution and Employment Issues', World Development, Vol: 10, No: 6.

King, B. B.(1988), 'What is SAM?' in Pyatt, G. and Round, J. I. (ed.), Social Accounting Matrix:A Basis for Planning, Washington D.C: The World Bank.

Pleskovic, B. & Trevino, G.(1985), 'The Use of A Social Accounting Matrix Framework for Public Sector Analysis: The Case Study of Mexico' ICPE Monograph Series, No: 17.

Pyatt, G. & Thorbecke, E. (1976), 'Planning Techniques for A Better Future', Geneva: International Labour Office.

Pyat, G. & Round, J. I. (1988), 'Social Accounting Matrices: A Basis for Planning', A World Bank Symposium, Washington D.C: The World Bank.

Round, J. I.(1981a), 'Income Distribution within A Social Accounting Matrix: A Review of Some Experience in Malaysia and Other L.D.C.'s', Development Economics Research Centre-University of Warwick, Discussion Paper No: 3, March 1981.

Round, J. I.(1981b), 'Social Accounting Matrices and Development Planning: A Fixed-Price Multiplier Model', Development Economics Research Centre-University of Warwick, Discussion Paper No: 11, November 1981.

Taylor, L.(1983), 'Structuralist Macroeconomics:Applicable Models for the Third World', New York:Basic Books Inc.