



Munich Personal RePEc Archive

**Financial social accounting matrix:
concepts, constructions and theoretical
framework**

Wong, Kai Seng Kelly and M., Azali and Lee, Chin

Universiti Putra Malaysia

2009

Online at <https://mpra.ub.uni-muenchen.de/14641/>
MPRA Paper No. 14641, posted 21 Apr 2009 13:55 UTC

FINANCIAL SOCIAL ACCOUNTING MATRIX: CONCEPTS, CONSTRUCTIONS AND THEORETICAL FRAMEWORK

BY KELLY WONG KAI SENG*, M. AZALI AND LEE CHIN

*Department of Economics, Faculty of Economics and Management, Universiti Putra Malaysia, Serdang
43400 UPM Selangor, Malaysia*

ABSTRACT

A Social Accounting Matrix (hereafter, SAM) is a particular tool to represent that whole economic activities incomes and expenditures flows accounts through a socio-economic system, which captures the transactions and transfers between all economic agents and institutions in the system. During the last two decades, the financial market are well developed and significantly impacts the economic growth, it will be more worthy to move from a real SAM to a Financial SAM, containing the details of the financial institutions and transaction of agents' assets and liabilities. Therefore, this paper will discuss the outlines and constructions framework for the aggregate Financial SAM. The understanding of the structure of Financial SAM can be a database for a financial Computed General Equilibrium (CGE) model and can be used to analyze the behavior of national's public debt.

Keyword: Social Accounting Matrix (SAM), financial, flow-of-funds.

JEL code: A13, G29

1. INTRODUCTION

According to Pyatt and Round (1985), a Social Accounting Matrix (hereafter, SAM) is a particular representation of the macro, meso, and micro economic accounts of a socio-economic system, which capture the transactions and transfers between all economic agents and institutions in the system¹. However, a complete SAMs also can provide both descriptive and prescriptive analysis of a regional economy. In common with other economic accounting systems, it records transactions taking place during an accounting period, usually one year. Since 1960s, the initial SAM is proposed by Sir Richard Stone based on the United Kingdom and some other industrialized countries². Where it's further developed by the economists and policymakers from early 1970s

¹ See also Reinert and Roland-Holst (1997).

² Refer to http://en.wikipedia.org/wiki/Social_accounting_matrix.

* Correspondence to: Kelly Wong Kai Seng, Department of Economics, Faculty of Economics and Management, Universiti Putra Malaysia, Serdang 43400 UPM Selangor, Malaysia. (kswong83@hotmail.com)

onward and employed to analyze the poverty and income distribution issues in developing countries (Pyatt and Thorbecke, 1976).

The construction and use of SAMs was closely related to the growing dissatisfaction with the results of growth policies in developing countries (Jan, 1991). To examine these problems of government policies distributional impact, data would be required that would enable a comprehensive analysis of these aspects of the economic process. Therefore, SAMs applies together the standard macro-economic data sets summarized in the national accounts and data systems that have been designed to analyze production relations (such as Input-output tables) and income and consumption patterns (household income and expenditure surveys). On the other hand, a solid accounting and data compilation methodology to underlie both macro- and micro-economic analyses were proposed by the quality of social accounting framework (Jan, 1991). Hence, SAM was designed to combines successfully indicators of growth, income distribution and poverty into one coherent accounting framework.

Although, the previous SAM is widely used by policymakers to analyze the national circular flow of income, however, there still need of some improvement such as the transactions of financial assets. This paper will present the outlines of the constructions framework for the aggregate Financial SAM, which can improve the insufficient information in the previous matrices. The financial SAM refers to the flow of funds between institutions in the national economy activities, which construct a complete SAM to shows a detailed capital account in the matrices. In addition, the financial SAM able to show the performance of financial market and the relatives of financial market contributed to the national income distribution. On the other hand, the understanding of

the structure of financial SAM can be a database for a financial computed general equilibrium (CGE) model and can be used to analyze the behavior of national's public debt. In addition, the financial SAM are also significant for the policy makers to analyze what policies will significantly promote the nationals' economic growth and without harmful to the others sectors. For instance, this study will allow the policy makers to apply that Financial SAM to assess whether the nationals' financial market is effective to narrow up the poverty gap.

This study is organized as follow. Section 2 discusses the relationships between Input-Output system and SAM construction process. The section 3 briefly discusses the structure of aggregate financial SAM by included the details of national capital account. Follow by the schematic of aggregate financial SAM constructs to explain that a detail of incomes and expenditure flows. The last section is conclusion.

2. THE INPUT-OUTPUT SYSTEM AND THE SOCIAL ACCOUNTING MATRIX

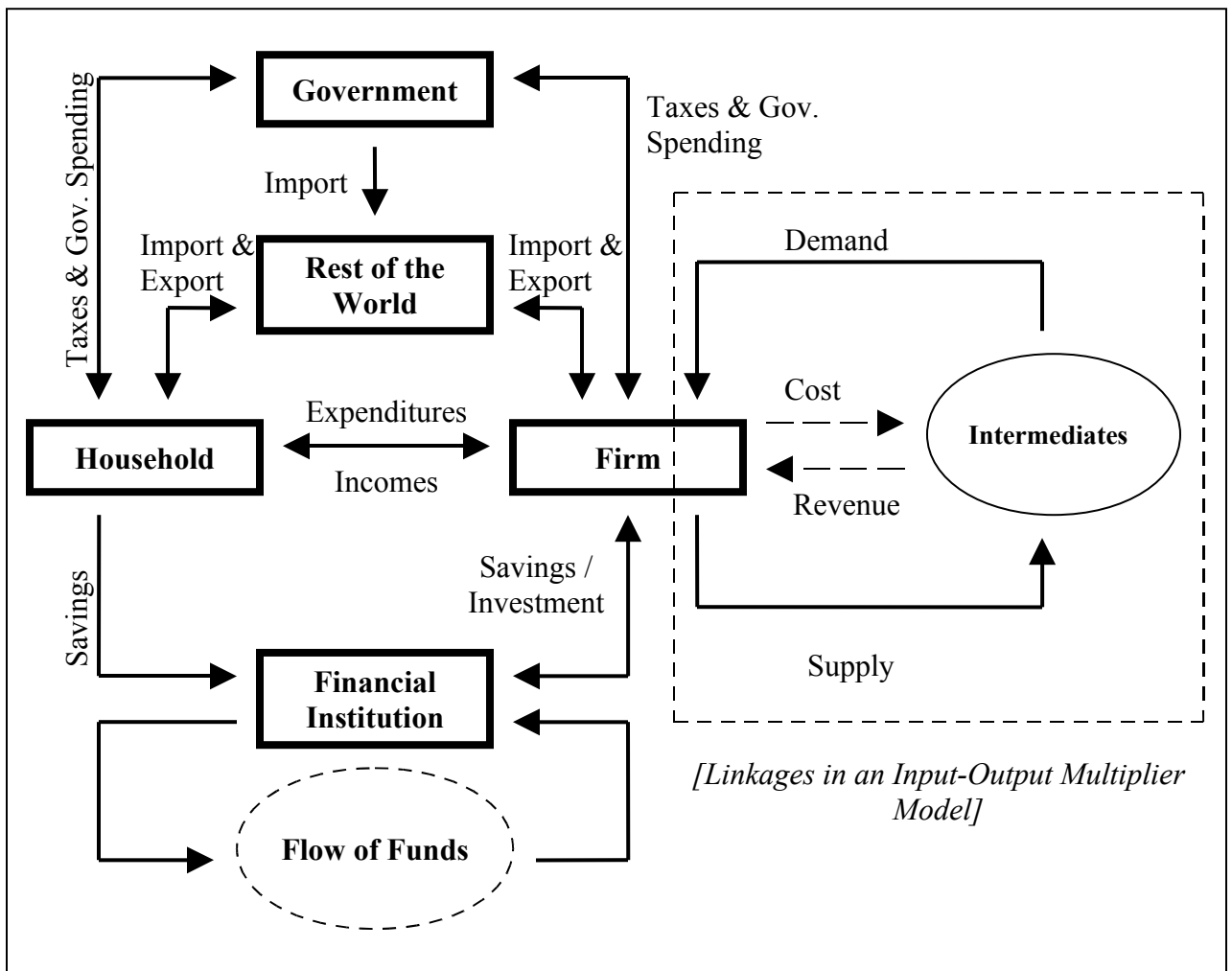
As mention previously, the input-output (hereafter I-O) tables are typically used to constructs a comprehensive accounting framework. The I-O table provided detail and consistent information about the production structure for the part of constructions in SAMs (Jorge, 1991). The contributions of I-O table are significant to construct a SAM framework, which relates to the fact that a large number of modules are directly linked to the I-O structure. For that justification a SAM may also be considered as an 'extension' of the I-O system³.

Figure 1 represents that snapshot of linkages between Social Accounting Matrix and Input-output Multiplier Model. The SAM distinguishes that national accounts and I-

³ See also Jorge V. A. (1991), and Steven K. and Willem R. (1988).

O production account into debits (expenditures) and credits (receipts) as in balance sheets of activities and institutions. The SAM generalizes the I-O framework by integrating the I-O tables in a disaggregated structure of institutional incomes and expenditures. Therefore, SAMs differ from I-O models in that SAMs framework show more detailed interrelations between sectors of the economy and they capture entire circular flows of income.

Figure 1: Linkages in a Social Accounting Matrix Multiplier Model



Sources: Authors' construction.

3. THE STRUCTURE OF MACRO SOCIAL ACCOUNTING MATRIX

A Social Accounting Matrix (SAM) can simply define as a comprehensive tool used to analyze the whole real economy transactions. More technically, a SAM is a square matrix which represented each sectors and institutions' income and expenditure account. Hence, each of the rows (account incomes) and columns (account expenditures) will show that markets transactions details by each activities, sectors and institutions accounts. The underlying principle of double-entry book keeping requires that, each transactions in the SAM is performed by a single entry at the intersection of the account, which is the total revenue (row total) must be equals to the total expenditure (column total).

For instance, table 1 shows that suppose i ($i = 1, 2, 3, \dots, n$) is the index of the rows and j ($j = 1, 2, 3, \dots, n$) represents the columns of SAM. The general element of the SAM, t_{ij} is defined as out flow of the account j that constitutes a receipt for account i . The internal consistency of the SAM guarantees that, for each account, total of the resources is identical to total of expenses. Considering a given account k , it comes then:

$$\sum_{j=1}^n t_{jk} = \sum_{i=1}^n t_{ik} \quad (k = 1, 2, 3, \dots, n)$$

In addition, the Walras' law is verified in a balanced SAM. If the above identity holds for $(n-1)$ accounts, then it also holds for n^{th} account.

The classification of accounts in a macro SAM can take various forms, depending on how the constituent accounts are defined and one's analytical interest and specific policy concern. There are usually consist from six major types of headings accounts are distinguished in the Macro Social Accounting Matrix, namely: (i) production activities,

(ii) production commodities, (iii) factors of production, (iv) current account of domestic institutions, (v) capital account of institutions (savings and investment), and (vi) rest of the world.

Table 1: A diagrammatic representation of a SAM: Double-Entry Bookkeeping Principle and consistency of the accounts.

Expenses Resources		Account numbers by column ($j = 1, \dots, k, \dots, n$)					Totals
		1	...	k	...	n	
Account numbers by row ($i = 1, \dots, k, \dots, n$)	1	$t_{1,1}$		$t_{1,k}$		$t_{1,n}$	$\sum_{j=1}^n t_{1,j}$
	⋮						
	k	$t_{k,1}$		$t_{k,k}$		$t_{k,n}$	$\sum_{j=1}^n t_{k,j}$
	⋮						
	n	$t_{n,1}$		$t_{n,k}$		$t_{n,n}$	$\sum_{j=1}^n t_{n,j}$
Totals		$\sum_{i=1}^n t_{i,1}$		$\sum_{i=1}^n t_{i,k}$		$\sum_{i=1}^n t_{i,n}$	

Sources: Emini (2002).

Table 2 shows that macro SAM schematics with verbal explanations in the cells instead of number. In order to explain in some more detail, we will discuss a numbers of intersections between the respective rows and columns numbers 1 to 6.

Row 1 There represents incomes received by the various factors of production.

Therefore, the distributions of income factors generated by domestic production activities are represented by the intersection of row 1 with column 4 (value added). However, these factors of the incomes can be disaggregate based on the various kind of labor incomes, such as the wages, operating surplus, and rental incomes of natural resources (land and mineral rights). This disaggregation of

factors able to show the pictures of how these incomes depends on different kinds of production activities. Nevertheless, the intersection with column 6 shows the factors incomes receive from aboard (can be refer to the balance of payment).

Col. 1 This column shows the effectiveness of the factors incomes allocated to various kinds of the national institutions. For instance, the intersection with row 2 can show how do the different sectors wages go to the different categories of households such as agricultural wages go to rural household and so on.

Row 2 Relates to the sources of income which received by various kinds of institutions such as household, enterprise, and government. Generally, the institution primary sources of incomes are receives from the factors services as represents by the intersection with column 1. However, the incomes transfer by the inter-institutions are also considers as an importance sources to measure their national incomes distribution. For example, the intersection with column 2 shows the current transfer between institutions as namely government taxes, profits distributed by enterprise to shareholders (household), government subsidies and so on. Nevertheless, the details of aboard non-factors incomes (net) are shown at the intersection of row 2 with column 6.

Col. 2 This column shows the allocations of institutions incomes based on their different purposes. After the net of their incomes intermediate transfer purposes (intersection with row 2), typically the institutions will decide allocates their residual incomes on two kinds of expenditures. Commonly, the institutions will save the rest of the incomes after spend their incomes on consumer commodities

(intersection with rows 3 and 5). However, these institutions saving will be transfer to their capital account as an investment.

Row 3 Institutions transfers their own savings into the financial markets and allows the financial institutions play roles on their funds. Therefore, these allow institutions to obtain capital funds for their investment purposes through financial institution and capital markets. The total of investment funds available to the economy as a whole is increased by capital receipts from the rest-of-the-world (intersection with column 6).

Col. 3 Relates to the allocation of the institutions savings to the national investment activities. However, the rest of the funds were spends on capital goods supplied (i.e. gross fixed capital investment) either by domestic production activities or by imports (intersection with row 5).

Row 4 The sources of production activities incomes are receive from the supply of different kinds of commodities and also the supply of intermediate commodities to other production activities. Thus, these revenues were represents as a gross output of each of the production activities.

Col. 4 This column represents total gross input from the market production cost and revenue. The intersections between column 4 and row 5 shows that sales revenues of each production activities in part of purchasing raw materials either in domestic produced or from the aboard. However, the rest of the production costs (value added) at the intersection with row 1 is indicates the values of paid out to the factors of productions in form of wages (labor), rents (land or natural resources), and profits (capital).

- Row 5** Relates to the various types of commodities that are interested by the different kinds of institutions, as well as the aboard. (The details of explanation can be refers to the intersections with columns 2, 3, 4, and 7).
- Col. 5** The national total commodities supply is through the domestic and foreign resources. The intersection with row 4 is represents that net supply of various types of commodities by different kinds of domestic production activities. However, the foreign resources are import from aboard (intersection with row 6).
- Row 6** As mentioned before, the imports from the rest-of-the-world is allocated across different commodity type's distinguished (intersection with column 5).
- Col. 6** Relates to the various kinds of sources income from aboard, such as the factors and non-factors income from aboard, capital or financial flows, and the revenues from various types of commodities export (the details refer to the intersection with rows 1, 2, 3, and 5).

Table 2: Schematic Presentation of a Macro SAM

	Factors of Production	Institutions		Production		Rest of the World	Total Income	
		Current Transactions	Capital Transactions	Activities	Commodities			
		1	2	3	4	5	6	7
Factors of production					Value Added		Net Income from Aboard	Total Factors Income
Institution Current Transactions	Allocation of Factor Incomes to Institutions	Current Transfers Between Institutions					Net Non-factor Income from Aboard	Total Incomes of Institutions after Foreign Transfer
Institution Capital Resources		Savings					Net Capital Flows from Aboard	Total Savings and Investment Finance
Production Activities						Market Outputs		Total Sectors Income (Gross Output)
Commodities		Consumption	Investment	Intermediate Inputs			Exports	Total Market Demand
Rest of the World						Imports		Total Imports
Total Expenditures	Total Factors Expenditure	Total Institutions Expenditures	Aggregate Investment	Total Gross Inputs	Total Market Supply	Total Foreign Exchange Inflow		

Sources: This table is largely derived from Pyatt & Roe (1977), Table 2.6, but has been modified by Jan J. P. (1990) and the authors of this study for presentation purpose.

4. THE STRUCTURE OF DISAGGREGATE FINANCIAL SOCIAL ACCOUNTING MATRIX BASE ON THE CAMERON COUNTRY CASE

This section represents the structure of disaggregate Financial SAM base on the Cameroon case which documented by Emini (2002). The reference of this schematic for the Cameroon Financial SAM is important for us to disaggregate the Malaysian Financial SAM. As mention before, the aggregated capital account in the macro SAM is a single account to record the whole institutions savings and corresponding to the market total investment. In addition, this capital account records only the flows of physical capital. The creation of a distinct capital account for each institution allows keeping details of the institutions' various assets (physical and financial). The financial account keeps the details of the nature and the structure of financial resources and the uses of economic institutions. To name a few, it can consist of the currencies, deposits, bonds, and loans, which holded by household, enterprises, commercial bank, central bank, government, and the aboard.

The table 3 presents the schematic of Financial SAM which can be distributed into three main areas: The first area (AREA I), indicates that real economy SAM without the savings and capital goods account. If we have included the commercial banking account and the central bank account into this first area, then it enables to show the result of financial type current transfers between the institutions (interest on banking deposits, debt loan interest rate and so on). The second area (AREA II) shows that transformation of institution savings and contribution of each institutional agent to the fixed gross capital formation. Furthermore, the last area (AREA III) represents that extra financial module of the SAM, where the shaded cells indicate the record locus devoted to flows of financial assets and liabilities. Therefore, according to Emini (2002) these are the most apparent

buffer-variables linking the real side to the financial one in the SAM.

From the explanation above, it can be concluded that a financial SAM able to provide numerical information to the Malaysian economic structures on the following aspects of the economic process:

- (i) the Malaysian market general equilibrium between the labor market, goods market, and also the money market.
- (ii) the relationship between various kinds of expenditures on the different types of commodities can be used to represent that various kind of institutions expenditure behavior.
- (iii) the relationship between various types of activities and different earnings from different factors of production represents Malaysian structure of income distribution.
- (iv) the link between various types of financial flow of funds that represents various kinds of capital transfers between institutions such as credits, deposit holdings, external debts, and so on.

5. THE USEFULNESS OF FINANCIAL SAM – SOCIAL ACCOUNT AND CAPITAL ACCUMULATION

Detailed capital account would definitely preferable in a SAM analytical or model framework as if the flow of funds could establish the links between both savings and investments and as well identifies different access to investment funds by various economic agents. This gives the accounting framework the introduction of capital market segmentation, formal and informal credit markets, as well as different types of capital transfers in a consistent manner into larger model systems. Besides, different institutions and groups have different access to the level of investment funds. Certain institutions and socio-economic groups have more access to investment funds compared to those confronted with large financial constraints. Thus, they will be able to satisfy their higher level of investment funds. Hence, we might notice how important a financial structure works, and therefore, crucial in deciding future distribution of income and wealth.

There are several statistical and analytical purposes can be mentioned to dedicate more efforts to include more disaggregated capital accounts in the Financial SAM.

(i) The financial SAM able to show the performance of financial market and the relatives of financial market contributed to the national income distribution. A description of an economy's financial system can trace through the analysis of the portfolio structure of (changes in) institutional assets and liabilities and its relation to the agents income and wealth distribution. For example, the institutions holding three types of wealth in the economy system, namely physical capital (machinery, land and so on), money or bank deposits, and financial asset or loans. This portfolio behavior is sufficient to shows

whether these institutions are efficient in distributing and holding their certain forms of wealth in the market.

(2) The understanding of the structure of financial SAM can be a database for a financial Computed General Equilibrium (CGE) model and can be used to analyze the behavior of national's public debt. As mentioned before, institutions will holding their wealth and income for three kinds of purposes, where the loans make by the institutions can refer to the risky of wealth if there holding too much of their wealth in term of credit. On the other hand, financial intermediation through lending may take the form of bank credits mostly to enterprises and households, informal credits⁴ and government borrowing external debts from aboard or internal debts from the Central Bank. However, the institutions holding their financial assets in the aboard, or, vise-versa, will affect that money creation which eventually influences the public cash balances.

(3) The financial SAM are also significant for the policy makers to analyze what policies will significantly promote the nationals' economic growth and without harmful to the others sectors. The disaggregation's capital accounts in the financial SAM able to update the information about the national real markets and money market performance. In fact, the government or policy makers will implements the fiscal policy and monetary policy to stabilize the economics shocks. The detail of financial SAM shows that personals reality wealth in terms of money, physical capital and financial assets. Therefore, the policy makers can implement the policies and estimates the effects of policies on the institutions reality wealth.

⁴ Informal credit channels lack by definition a formalized or legal institution framework and transactions may take place in various form and different conditions (Rob Vos, 1991).

In short, these are the reasons to construct a financial SAM that completely represent the pictures of the flow of national incomes and wealth. The financial SAM not only can use to analyses the domestic wealth but also the rest of the world trade (external debt, direct investment, net export and so on).

6. CONCLUSION

A Social Accounting Matrix is a particular tool to represent those whole economic activities' incomes and expenditures flow through a socio-economic system, which captures the transactions and transfers between all economic agents and institutions in the system. Although, the SAM is widely used by policymakers to analyze the national circular flow of income, however, there still need of some improvement such as the transactions of financial assets. Therefore, this study aims to discuss the concept and constructions framework for the aggregate Financial SAM, which can improve the insufficient information in the previous matrices. The financial SAM refers to the flow of funds between institutions in the national economy activities, which constructs a complete SAM to shows a detailed capital account in the matrices. Besides, the Financial SAM also can be used to assess the savings and capital transfer patterns. Although, most of the SAMs have been compiled to date, only a few SAM have detailed capital accounts. Most researchers did not include the details of the flow of funds into the SAMs framework because they are unable to obtain the details transactions of the financial institutions and agents' assets and liabilities. However, the flow of funds is represents that various kinds of capital transfers between institutions such as credits, deposit holdings, external debts, and so on. Hence, the understanding of the structure of financial

SAM is significant and can be used as a database for a financial computed general equilibrium (CGE) model, which can be used to analyze the behavior of national's public debt. Therefore, these are the reasons to construct a financial SAM that completely represents the pictures of the flow of national incomes and wealth.

7. REFERENCES

- Emini, C. A., "Designing the Financial Social Accounting Matrix Underlying the Integrated Macroeconomic Model for Poverty Analysis: The Cameroon Country-Case," Third draft, University of Yaounde II, Cameroon, 2002.
- Jan J. P. van Heemst, "Introduction: the Social accounting Framework for Development," In *The Social Accounting Framework for Development: Concepts, construction, and applications*, eds. Jorge Alarcon, Jan van Heemst, Steven Keuning, Willem de Ruijter, and Rob Vos. Avebury, 1-31, 1991.
- Jorge V. Alarcon, "The Input-output System and the Social Accounting Matrix". In *The Social Accounting Framework for Development: Concepts, construction, and applications*, eds. Jorge Alarcon, Jan van Heemst, Steven Keuning, Willem de Ruijter, and Rob Vos. Avebury. 117-163, 1991.
- Pyatt, G., and J. I. Round (eds.), "Social Accounting Matrices: A Basis for Planning," *The World Bank*, Washington D C, 1985.
- Pyatt G., and E. Thorbecke, "Planning Techniques for a Better Future," ILO, Geneva, 1976.
- Rob Vos, "The Social Accounting Framework for Development: Concepts, Construction, and Applications: Social Accounts and Capital Accumulation," In *The Social Accounting Framework for Development: Concepts, construction, and applications*, eds. Jorge Alarcon, Jan van Heemst, Steven Keuning, Willem de Ruijter, and Rob Vos. Avebury. 165-190, 1991.
- Steven Keuning and Willem de Ruijter, "Guidelines to the Construction of A Social Accounting Matrix," *The Review of Income and Wealth*, **34**, 71-101, 1988.