THE PARA DATABASE :

A SOCIAL ACCOUNTING MATRIX FOR THAILAND

By

Hom M. Pant

Pibul Jieamanugulgit

Prof. Peter G. Warr

The PARA Database:

A Social Accounting Matrix for Thailand

Hom M. Pant

Pibul Jiemanugulgit

Peter G. Warr

1. Introduction: Data Requirements of PARA

To capture the structure of the Thai economy and to estimate the comparative static economic consequences of exogenous shocks, models of the PARA type require a large number of share and elasticity parameters of the model need to be specified. Our empirical procedure is, as far as possible, to estimate the elasticity parameters econometrically and to compute the share-parameters of the model using a 'general equilibrium' data set observed at a certain point in time. The latter procedure calibrates the model to the initial equilibrium state of the economy and requires the construction of a database that reflects the economy in a state of 'general equilibrium'.

This means that a database for PARA, to be used in parameterizing the model, should possess the following properties: (i) each agent (in PARA) should be satisfying his or her budget constraint, (ii) the market for all commodities and factors should clear simultaneously, and (iii) all production and trading activities should be earning zero rents. The construction of such a database presents serious problems. It is almost impossible to observe an economy in the state of a general (static) equilibrium.. At best, one might expect to observe an economy at some point of dynamic adjustment towards such an equilibrium. The reason is that in the real world, the markets for some commodities may not clear within the period of observation and the budget constraints of some of agents hold only intertemporally. In other words, the speeds with which markets clear and budget constraints are satisfied following a shock may be quite different for different

commodities and different agents, and the real world economy may actually be adjusting to a sequence of shocks over time.

For example, consider any input output table or national income accounts for a sequence of time periods. One can easily observe the non-zero values of net changes in the inventory holdings of the production sectors or observe households that are dissaving. The non-zero values of net changes in inventories held by the production sectors and/or dissavings on the part of the households are not consistent with the concept of a static equilibrium. Therefore, it becomes necessary in every modelling exercise to set out a list of 'reasonable' assumptions under which the observed state of an economy can be regarded as a state of static equilibrium such that the markets for all commodities and factors clear, and budget constraints are satisfied for all agents. The purpose of this paper is to document and describe these assumptions and the procedure adopted in the construction of a general equilibrium database for the implementation of PARA.

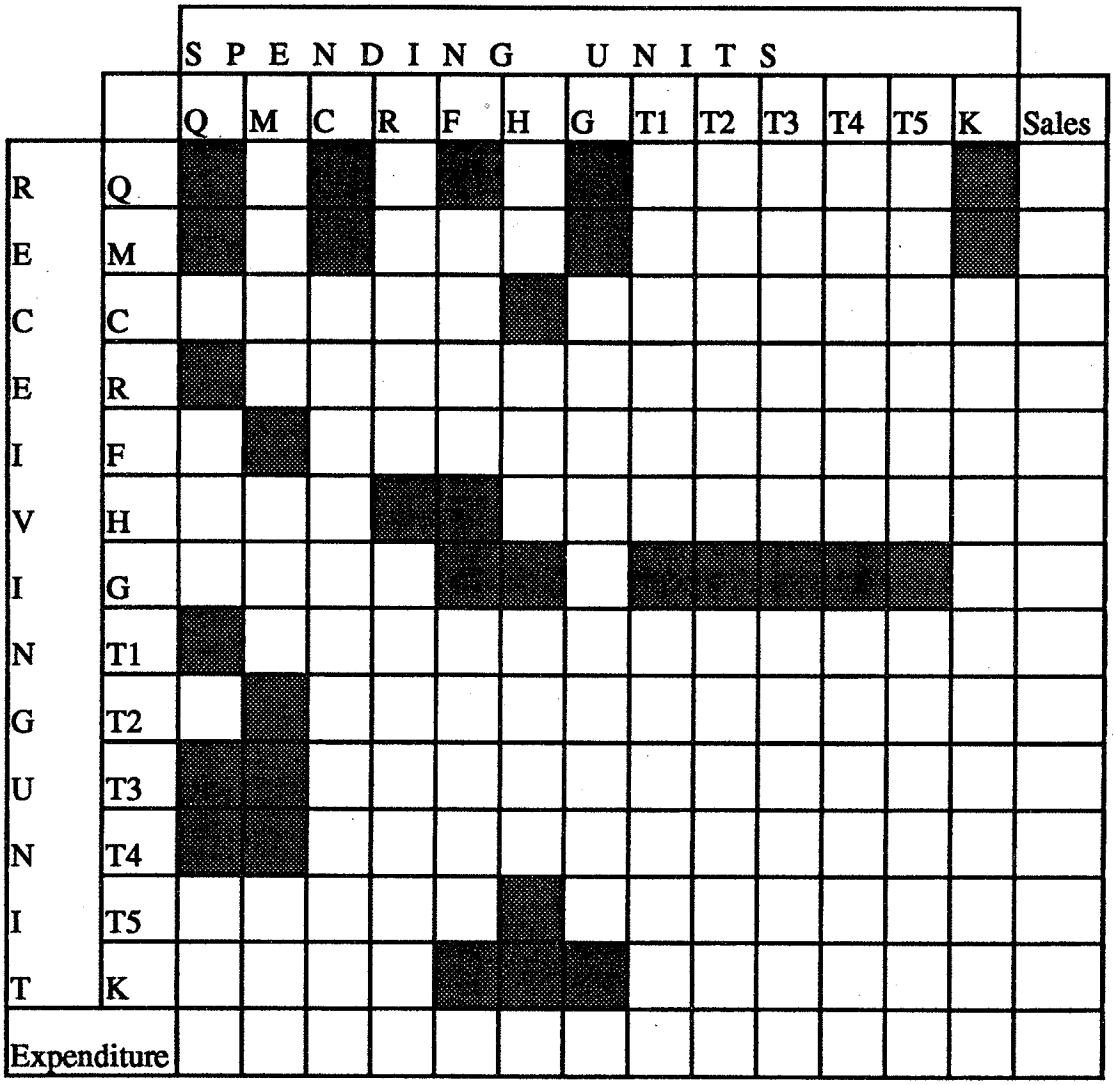
2. PARASAM: The Database for PARA

To construct a consistent database in which all agents (households and the government) satisfy their budget constraints we must identify all sources of income and all items of expenditure and show that they are equal for each of the agents (ie., final demand categories) present in the model. Similarly, on the part of the production sectors it is necessary that the zero-profit conditions are satisfied and markets for the commodities and factors clear at the going prices. An ideal way to assure the satisfaction of all of these conditions in a given economy is to construct a balanced Social Accounting Matrix (SAM).

A SAM is a square array of numbers with a row and a column for each agent or activity. A row in a SAM details the flow of receipts (or sales) of an agent or activity over a period and the corresponding column details the flow of expenditures (or cost) or the disposal of the income over the same period. The SAM designed for the implementation of PARA, which we shall call PARASAM, is described in Figure 1, below.

Figure 1 Schematic Diagram of PARASAM:

A Social Accounting Matrix of the Thai Economy - 1985



Legend:

Q = Set of domestic production activities

M = Set of importing activities

C = Set of consumer goods

R = Set of primary factors

F = Rest of the world

H = Set of households

K = Capital account

G = The Thai government

Tax Collections:

T1 = Corporate income tax

T2 = Tariff revenues

T3 = Business and sales tax

T4 = Excise tax

T5 = Personal income tax

The schematic diagram of the PARASAM contains 13 rows and 13 columns with identical labels, which are as follows. Q represents the 60 domestic single output industries, M represents 60 importing activities each importing a single commodity, C represents the 20 activities of producing 20 consumer goods, R represents primary factors which are owned by the households and are employed in the production of domestic commodities, F represents the Rest of the world (Foreign Exchange Account), H represents the set of 10 Households, G represents the government, T1 -T5 respectively represent different taxing authorities and K represents the consolidated capital account, where all savings (domestic as well as foreign) are pooled to finance the domestic capital creating activity. Of these 13X13 entries defined in the diagram, the relevant ones are shaded and the unshaded ones are simply zeros. For simplicity of reference we shall address each of these cells by a combination of its row label and column label with the convention of writing the row label first. For example, by MC we will mean a 60X20 matrix, defined by the M-row and C-column, describing the cost of each of the imported commodities used in the production of each of the consumer goods.

PARA contains 60 domestic production sectors (represented by the column Q), each of which uses domestic output (Q-row) and imported goods (M-row) as intermediate inputs and primary factors (R-row) to produce output. The cost of intermediate inputs is given by the sum of the column sums of the matrices QQ and MQ, and the primary input cost is given by the column sum of the matrix (RQ +T1Q), where T1Q is the corporate income tax paid by the production sectors and RQ is the matrix of payments made to the primary factors. Thus, the column sum of the Matrix (QQ + MQ + RQ + T1Q) defines the cost of production incurred by the producers and the vector of column sums gives the values of the sectoral outputs at basic prices. T3Q and T4Q represent, respectively, the business and sales taxes, and excise taxes paid by the domestic production sectors. Once these indirect taxes are taken into account, the column sum of the matrix (QQ + MQ + RQ + T1Q + T3Q + T4Q) yields the vector of value of domestic outputs at producer's prices.

Similarly, reading along the Q-row we can observe that the matrix QQ yields the revenue from the sale of the domestic commodities to the production sectors as intermediate inputs, the matrix QC represents the revenue from the sale to the production of consumer goods, QF represents the revenue from export to the rest of the world, QG represents the revenue from the sale to the government for government's consumption, and QK represents the revenue from the sale of domestic outputs in capital creating activities. Thus, the row sum of the matrix (QQ+ QC + QF + QG + QK) yields the vector of total sales revenues of the production sectors. Since the row sum describes the sources of income and the column sum describes the expenditures of the production sectors, we therefore expect that the vector of column sums of the matrix (QQ + MQ + RQ + T1Q +T3Q +T4Q) be equal to the vector of row sums of the matrix (QQ+ QC + QF + QG + QK).

Now, let us consider the second row and the second column, which describe the sources and the uses of the income generated in the importing activities. The sources of income in these activities are the payments received from the sale of imported goods at the domestic market price, which is given by the sum of the row sum of the matrices MQ - imports for the intermediate use, MC - value of the imported goods used in the production of the consumer goods, MG - value of the imported goods that goes into the government's consumption, and MK - the value of the imported goods that are used in capital creation. The uses of the income of the importing sectors are in the payments of the c.i.f. price of imports, tariffs and other domestic taxes levied on the sale of imported commodities. The matrix FM details the c.i.f. price of imports in domestic currency units, T2M records the import duties paid, T3M and T4M respectively record the payments of business and sales taxes, and excise taxes made by the importers. Thus, the sums of the column sums of the matrices FM, T2M, T3M and T4M yield the value of the imports of the 60 commodities at the purchaser's price in the domestic market. Obviously, this vector has to be identical to the vector of the sum of the row sums of the matrices MQ, MC, MG, and MK.

The third column and the third row describe the production of the 20 consumer goods and their sales to the 10 households. The purchase of 60 domestic goods and 60 imported goods in the production of each of the consumer goods is described by the matrices QC and MC respectively. The sum of the row sums of these two matrices yields a vector of costs of consumer goods. These 20 consumer goods are sold to the 10 households and the matrix CH describes the receipt of these activities from the sale of each of the consumer goods to each of the households. The row sum of the matrix CH gives the consumer expenditure on each of the consumer goods.

Both the fourth row and the fourth column contain a single sum-matrix, which describe the income received by the primary factors from the domestic production sectors and their payments made by the factors to their owners - households. The matrix RQ describes the payment made by the production sectors to the factors, which is net of corporate income tax (T1Q), and the matrix HR details the distribution of factor income to the 10 households. Of course, the row sum of the matrix RQ is equal to the column sum of the matrix HR.

The fifth row and the fifth column describe the receipt and expenditure of foreign exchange (in domestic currency units) of the rest of the world vis a vis Thailand. In other words, the fifth row describes the foreign exchange expenditure of Thailand and the fifth column describes Thailand's receipt of foreign exchange from exports and net transfers. Let us consider the row first. The 1x60 matrix FM records the c.i.f. value of Thai imports. Therefore, the row sum of FM gives the total foreign exchange expenditure of Thailand. The rest of the world, however, spends foreign exchange in Thailand in making purchases of Thai products (the matrix QF), *net* transfers to the Thai households (the matrix HF), *net* transfers to the Thai government (the matrix GF), and direct investment in Thailand (the matrix KF). The sum of the fifth column thus yields the total foreign exchange receipts of Thailand in the year 1985.

The sixth row and the sixth column describe the income and expenditure of the Thai households respectively. The households receive income from the ownership of

factors (matrix HR), and from the net transfers from the rest of the world (matrix HF). Thus, the sum of the row sums of the matrices HR and HF yield the gross income of the households. Households allocate their income in the consumption of the consumer goods (the matrix CH), in making *net* transfers to the government (matrix GH), paying income taxes (matrix T1H), and saving (matrix KH). Thus in a well-organised data set we expect the sums of the columns of the matrices CH, GH, T1H and KH to be equal to the sum of the row sums of the matrices HR and HF.

The seventh column and the seventh row describe the government budget - the receipts and outlay of the government. The government receives income from taxes (GT1, to GT5), net transfers - from the rest of the world (GF) and net transfers from the households (GH). The outlay of the government consists of its purchases of domestic and imported goods and services at domestic market prices (matrices QG and MG) and its contribution to the consolidated capital account (matrix KG). Since all the government's expenditures have to be financed in some way, and the G-row details it, then we expect that the sum of the column sums of the matrices QG, MG, and KG is equal to the row sum of the matrices GF, GH, GT1, GT2, GT3, GT4 and GT5.

Columns 8 to 12 and rows 8 to 12 simply state that various taxes collected go to the government's coffer. Column 13 and row 13 describe the consolidated capital account of Thailand. The capital account is a place where savings of the household (KH), savings of the government (KG) and the savings of the rest of the world or the current account deficit of Thailand (KF) are pooled together to finance the domestic capital creation activity, which forms the expenditure side of the account. The expenditure of the capital account involves the purchase of domestic and imported commodities (matrices QK and MK) at domestic market prices. In a balanced account we expect that the sum of the column sums of the two matrices QK and MK is equal to the sum of the row sums of the matrices KF, KH and KG.

3. Data Sources and Empirical Compromises Underlying PARASAM

The core of the PARASAM is the 60-sector Input-Output table of the Thai economy for the year 1985. It was derived by aggregating the 180-sector IO table produced by the Thai government's planning agency, the National Economic and Social Development Board (NESDB) and the Social Research Institute of Chulalongkorn University, Bangkok. The aggregator sector-map is summarised in Table A-1. The RAS technique[1] was applied to balance it, since the original IO table was not balanced. Other sources of data include the new series of the National Income Accounts produced by NESDB, the Socio-Economic Survey (SES) - 1988 of the National Statistical office (NSO), the Annual Crops Cost Survey and Agricultural Statistics of Thailand from the Office of Agricultural Economics (OAE) of the Ministry of Agriculture and Cooperatives, and the Preliminary Survey Report on Wages, Salary and Work Hours-1991 published by the Department of Labour Welfare and Protection.

This paper uses IO 1985 - the latest input-output table available at the time of writing - as its main data source. Wherever necessary, it uses other sources to supplement it, in the ways we shall describe. For example, the National Income Accounts for the year 1985 were used to obtain information on transfers, and SES-1988 was used to extract information on distributional issues. Several empirical compromises were made in constructing the PARASAM. They were necessary whenever existing data were insufficient to identify the elements of the data sub-matrices of the PARASAM. The following paragraphs describe the major assumptions made in this process.

The 180-sector IO table (and hence, the 60-sector IO table) shows entries for re-exports of imported commodities. This information is not necessary for PARA, so the values of the re-exports of each of the commodities were deducted from the c.i.f. values of the imports of the corresponding commodities. The error committed in this adjustment is

---

1 See Pyatt and Round (1985) for further details and references.

the failure to deduct the amount of value added (including tax collected) in the process of re-exporting from the values of re-exports. This level of accuracy, however, is difficult to achieve, and the resulting error is unlikely to be significant in affecting the solution of the model.

The 180-sector IO table also provides figures for special exports and special imports that include trade in non-merchandise goods and services not included in the official trade statistics. In arriving at the PARASAM, the values of special re-exports of each of the commodities were deducted from the value of special imports of the corresponding commodities. If special imports were not sufficient to provide for the special re-exports, then the remaining parts of the value of special re-exports was deducted from the c.i.f. value of ordinary imports of the corresponding commodity. PARA does not distinguish between exports and special exports or between imports and special imports, as do the input-output data. Therefore, these special exports and imports have been included with (regular) exports and imports, respectively.

The presence of special exports and imports implies that the volume of trade implied by the 180-sector IO table is larger than otherwise, and exclusion of re-exports from the trade in the PARASAM means that the implied volume of imports and exports will be smaller in the PARASAM than those implied by the 180-sector IO table.

The total indirect tax collection from each commodity (sector) as reported in the IO table and its decomposition into various indirect taxes are derived from data supplied from the NESDB, with some modifications. The modifications are:

(i) Since there is no import of cassava in the 60-sector IO table, tariff and business tax revenues collected on the imports of cassava are set to zero in PARASAM.

(ii) For some commodities, the values of output at producer prices and at purchaser prices differ from the aggregate demand for the corresponding commodities. To restore the balance and for the zero profit conditions to hold, either the demand or the supply side

has to be adjusted. We adjusted inventory changes, on the demand side, to maintain this balance in the IO table.

Payments to the specific factors in the non-agricultural sectors have been decomposed into two parts: corporate income tax payments (to the government); and payments to the specific factors (which ultimately goes to the households as factor incomes). Thailand introduced a value added tax (VAT) in the early 1990s. To make PARA experiments involving the VAT computationally feasible, small amounts of VAT collection have been introduced into the data base, even though the VAT did not exist in the data base year of 1985. Each of the 58 commodities (all except public administration and the Other Services sector) pays a VAT revenue of 100 baht, and the government demands for these commodities were increased by the same amount.

Inventory changes and gross fixed capital formation (GFCF) were merged together. For some commodities negative inventory changes dominated the positive demand from capital creation. This led to negative demands for certain commodities in gross fixed capital formation. A negative demand originating from the user of a commodity cannot be justified as an equilibrium outcome but this compromise seems less distorting than adjusting the intermediate inputs or other components of final demand, which have implications for the production parameters or the welfare measurements.

On macro accounting, national income figures were employed to obtain various information such as transfers. Government revenue from non-tax sources that includes interest, dividends and other sales revenue of the government are ignored, because the model assumes that all productive factors are owned by the households. Therefore, these payments have been paid to the factors, which are considered as household incomes. Instead of making a transfer from the households to the government, or calculating and identifying the government's share in the supply of productive factors it is assumed that households save and supply the funds to finance GFCF that otherwise would have been financed by the government's savings (or public investments).

Aggregate figures for the net transfer income received by households from the rest of the world and received by the government from the domestic households have been obtained from the national income accounts. The aggregate net transfer incomes of the households from the rest of the world were distributed to the 10 households on the basis of SES information. Similarly, aggregate net transfers from the households to the government were also calculated on the basis of NI and SES data. SES was used to derive the share of each household and NI provided the aggregate figures.

Income received from the factor ownership and net transfer income from the ROW define the gross income of a household. Net transfer payments to the government, income tax payments, and personal consumption expenditures constitute a household's expenditure and the household saving has been defined as the difference between the gross income and the expenditure of the household.

The Government's net transfer income received from the households (including transfer income from the corporations), transfer income from the rest of the world (available from the NIA) and the direct and indirect tax collections contained in the IO table, constitutes the total income of the government. The IO table also provides information on the government's consumption expenditure. The difference between the government's total income and its consumption expenditure defines the government's saving. The aggregate of household savings, government savings and savings from the rest of the world provides the real financial resource that is just sufficient to finance the cost of gross fixed capital creation. The amount of foreign saving injected to the Thai economy in 1985 has been treated as an equilibrium flow of foreign direct investment to the Thai economy.

4. Construction of Data Sub-matrices of PARASAM

In this section, we will describe the procedure adopted in constructing each of the data sub-matrices of the PARASAM. In doing so, we will refer to the schematic diagram

of the PARASAM, and each of the data sub-matrices (represented by shaded areas) will be addressed by the letters representing the row and column of the cell.

4.1. Column 1: Cost Structure of the Domestic Industries

Of the six data sub-matrices contained in column 1, the following sub-matrices are available from the IO table.

(a) QQ: Matrix of the intermediate input costs of each of the 60 domestic production activities producing each of the 60 producer goods.

(b) MQ: Matrix of the costs of each of the 60 imported producer goods used as intermediate inputs in each of the 60 domestic production sectors.

(c) T3Q and T4Q: Business and Sales Tax and Excise Tax revenue

NESDB has decomposed the collection of indirect taxes less subsidies as defined in the IO table into several indirect tax categories (including tariff collections from the imports). These figures, which are available in the 180-sector IO table, have been aggregated according to our aggregator map and the commodity wise distribution of the these taxes and input costs was calculated.

(d). RQ: Cost of the primary factor inputs in the current production of the 60 industries. These sub-matrices required further calculation beyond the IO table, as follows.

The IO table at producer prices provides information on a few factor income aggregates - wages and salaries, operating surplus, depreciation and indirect tax less subsidy - of primary input costs. However, PARA defines more primary factors than those identified in the IO table, so we have a problem of allocating primary factor cost to each of the PARA factors subject to the condition that the payment to each factor adds up to the total primary factor cost as defined in the IO table. To solve this problem, total primary factor cost is taken from the IO table and decomposed into the payments to different primary factors as follows:

(i) Land Rent: The Annual Crops Cost Survey 1985 compiled by the Office of Agricultural Economics was used to obtain information on the rental rate of land and the Annual Agricultural Statistics 1985 to obtain information on the area employed in each of the 20 agricultural industries. These two sources did yield the cost of land in each agricultural industry. These figures have been deducted from the OS of the respective industries.

(ii) Wages: PARA distinguishes between two kinds of labour: skilled and unskilled. Further, PARA also assumes that non-agricultural industries (NAIs) employ both skilled labour and unskilled labour whereas agricultural sectors employ only unskilled labour. Consequently, it is necessary to decompose the amount paid by each of the non-agricultural industries as wages and salary into wages and salary paid to skilled and to unskilled labour, respectively. In so doing, it is assumed that labour employed on a daily wage basis is unskilled and that employed on a monthly wage rate or longer term basis is considered as skilled labour.

For NAIs, data provided by the Department of Labour Welfare and Protection was used to obtain the share of skilled and unskilled labour employed in each of the NAIs, and the share has subsequently been used to decompose the wage bill of the IO into the skilled and unskilled wage bill.

For agricultural sectors, the problem is quite different. Wage payments in some sectors were unrealistically low (for example, paddy). One reason for this is that the compensation of family workers has not been imputed into the wages and salaries paid by the agriculture sectors while calculating the IO table. OAE's cost survey provides information on the number of man-days employed in each of the agricultural industry and the corresponding wage rates as well. These figures have been used to calculate the actual wage payment made by each of the agricultural sectors. The resulting discrepancies have been included in the operating surpluses of the respective sectors.

(iii). Payment to the Mobile and Immobile Capital

For each of the NAIs the adjusted OS is assumed to accrue to the immobile capital and the amount allocated for depreciation (as defined in the IO table) has been assumed to accrue to the mobile capital. For the agricultural sectors, however, all of the operating surplus and depreciation is paid to the mobile capital since PARA assumes that no immobile capital is employed in these sectors.

(e) T1Q: Corporate Income Tax

Total collection of corporate income tax has been obtained from the National income account 1985, which is 15526 million baht. It is assumed that sectoral collection of the corporate income tax is distributed in proportion to the operating surpluses, which can be obtained from the IO table, of the NAIs subject to corporate income tax. Of the 40 NAIs, sectors 22-26, 58 and 60 were exempt from the corporate income tax.

4.2 Column 2: Cost Structure of the Importing Activities

(a) FM, T2M, T3M and T4M: c.i.f. values of imports, tariff revenue, business and sales tax levied and excise tax revenue collected on imported commodities. These data sub-matrices are available from the IO table and NESDB's decomposition of the indirect taxes.

4.3 Column 3: Link Matrix

QC and MC: detailed breakdown of the cost of the domestic and imported commodities used in the production of each of the 20 consumer goods. These two matrices link the consumer goods with the 60 producer goods from two sources. The IO table contains aggregate consumer expenditure on each of the producer goods, but PARA requires information on the allocation of consumer expenditure on each of the consumer goods, and the cost structure of each of the consumer goods. This information is not available in the IO table. The following steps have been adopted in obtaining the link matrices.

Step I: First, aggregate private consumption expenditure (PCE) on each of the 60 commodities by source was obtained from the 60-sector IO table.

Step II: The shares of each of the 20 consumer goods in total consumer expenditure were taken from the econometric estimates of the consumer demand system (Sarntisart and Warr). The total consumer expenditure on domestic and imported producer goods was distributed into 20 consumer goods assuming that the same shares hold for domestic as well as imported components of producer goods. These four vectors have provided the control row and column values for the construction of the link matrices for the domestic as well as imported producer goods.

Step III. The intrinsic relation between the consumer good categories and the producer good categories were carefully examined to identify the independence of some of the consumer good categories with some of the producer good categories and the appropriate cells were restricted to be zeroes. For example, Rubber and plastic in the producer good category may not enter as a component of food in the consumer good category or at the least the share of rubber and plastic in the total cost of food would not be larger than that of rice.

Step IV: The RAS technique was initially applied to obtain the cell values of the link matrix. Where the solution implied absurd cell values, judgement was used to adjust those cells so that the matrix finally balanced. The procedure was applied separately to the link matrices of the domestic and imported source.

4.3 Column 4 Factor Incomes

HR: Distribution of Factor Incomes to the 10 Households

There are 10 household groups, 5 rural and 5 urban, identified by the quintiles in the respective income distribution. These ten households are assumed to own all of the primary factors of production, and thus they receive the payments made to the factors as their incomes. Note that in the IO table, the RQ matrix (as described above - column 1)

specifies the payments made by each of the production sectors to each of the primary factors. But its allocation to the individual households depends on the distribution of factor ownership by household. For the latter, SES-1988 data were used to calculate the share of each household in the total supply of each type of primary factor. These shares were subsequently used to distribute the factor incomes to the household groups.

SES 1988 provides detailed information on each household's (quintile) incomes from different sources. For each PARA factor-income category a corresponding set of SES income categories was defined, (as shown in the following table) and household incomes from each PARA factor were obtained. Secondary level of education has been used to determine the cut off line for the skill category of labour because the SES contains information on wage income of each household by educational level. The share of each of the household groups (quintile) in each of the PARA factor income categories was then calculated to approximate the distribution of factor ownership across the 10 households. These shares were applied to the total payments made by all of the 60 industries to each of corresponding PARA factors to obtain the distribution factor income across the 10 households.

Figure 2 The Mapping of PARA Factor Income and SES Factor Income Categories

PARA factor income categories	SES income categories
Wages:	
(i) wages from skilled labour	(i) wages paid to labour with secondary or higher education,
(ii) wages from unskilled labour	(ii) wages paid to labour with lower than secondary education level.
land rent	land rent, crop received as rent, rent received as pay, rent received free,
Mobile capital income	
(i) employed in NAIs	(i) depreciation
(ii) employed in AIs	(ii) farm income, food as part of pay, other good received as pay, home produced food, other home produced good, other good received free, food received free, and depreciation
Immobile Capital Income	enterprise income, interest and dividend, other rent, imputed value of owner occupied home, room and board.

It is important to note that there are altogether 64 different primary factors in PARA, namely 40 types of sector-specific capital employed in the 40 non-agricultural sectors, 20 types of land employed in the 20 different agricultural sectors, one capital that is mobile within the non-agricultural sectors, one capital that is mobile within the agricultural sectors, and two different skill categories of labour. The calculation procedure outlined above assumes that the share of a particular household in the ownership of each of the sector-specific factor groups (ie, land and immobile capital in general) is the same across industries. For example, if a household owns 10% of land employed in paddy industry, then it also owns 10% of land employed in all other industries. Similarly, if a household owns 10% of immobile capital employed in textile industry, then it also owns 10% of the immobile capital employed in any other industry. This poses a serious limitation to the income distributional analysis.

4.5 Column 5: Foreign Exchange Earnings

QF: fob value of exports. This information is available from the IO table.

HF: Net household transfer income from abroad.

Aggregate data on the net transfer income of the households from the rest of the world is taken from the national income accounts. Total transfer payments of the households to the ROW is 675 million baht and the transfer income from the ROW is 1949 million baht yielding a net transfer income to households equal to 1274 million baht. This net transfer income to the households from the ROW has been distributed to the 10 households in proportions implied by the SES 1988.

GF: Net Transfer payments to the government from the ROW.

The national income accounts shows foreign grants received by the Thai government in 1985 as 4649 million baht, and transfer payment to the ROW as 18 million baht, amounting to the net transfer income of the Thai government from the ROW equal to 4631 million baht.

SF: Foreign Direct Investment

This is the balancing item in the SAM.

4.6 Column 6 :Household Income Allocation Account

CH: Household expenditures on consumer goods

The allocation of each of these consumer goods to 10 different households was obtained by employing shares computed from SES 1988, which contains household consumption expenditure on 20 consumer goods by the quintile groups of the rural and urban households, and the output of the 20 consumer goods as described above in the link matrix. Note that PARA follows the same categorisation of the consumer goods as that in the SES.

GH: Net Transfer Payment to the Government.

The government account (Account 5) in the National Income Accounts (NIA) provides data on aggregate transfers between the government and the households. In 1985, households transferred 1664 million baht and corporations transferred 1419 million baht to the government giving a total of 3083 million baht. Similarly, the government transferred 1199 million baht to the households (this does not include subsidies). These transfers amount to a net transfer to the government of 1884 million baht from the households and corporations. This figure has been distributed to the 10 households by examining the pattern of transfer payments in the SES 1988.

T5H: Personal Income Tax Payments

Total personal income tax collected in the year 1985 has been obtained from the National Income Accounts 1985 (No. 6, Table 58). Then, the household shares in the income tax revenue were calculated from the SES data (NSO), and the direct tax payments of each household group were obtained from these figures.

KH: Saving

A household's saving is defined as the difference between household's gross income (factor and non factor income) less expenditure on consumption, transfer payments and income tax payments. This calculation procedure maintains that each of the households satisfies its budget constraint, which may in some cases imply a negative saving.

4.7 Column 7: Allocation of Government Expenditure

QG, MG: Consumption expenditures of the government on 60 commodities by sources are available in the IO table.

KG: Saving of the Government.

Saving of the Government has been defined as the difference between the government's income from all sources less its consumption expenditure on commodities. The government's income can be derived by summing the G-row of the PARASAM, and its consumption expenditure is obtained by summing over all the cells of the two matrices QG and MG.

4.8 Columns 8-12: Tax Revenues of the Government

These columns contain the total of each type of tax revenue collected from different sources. For example, GT1 = T1Q, GT2 = T2M, GT3 = T3Q + T3M, GT4= T4Q +T4M, and GT5 = T5H.

4.9 Column 13: Expenditure on Capital Creation

QK, MK: The expenditures on different producer goods by sources are available in the IO table.[2] Note that the expenditure on inventory accumulation have been added together with expenditure on fixed capital formation.

5. Summary

This paper has described the database designed for the implementation of PARA and the procedures adopted in deriving it. The purpose of this database was to describe the base values of the variables entering the model and is intended to describe the economy in a state of initial general equilibrium. It may not be possible to observe a real world economy in the state of general (static) equilibrium for it will presumably always be on a path of dynamic adjustment. Construction of a "true" general equilibrium database is therefore infeasible. However, a database described in the framework of a SAM would provide a consistent description of the observed state of an equilibrium of the economy. This is probably the best feasible approximation of the state of general (static) equilibrium, given the nature of available statistics. The PARASAM, described in this paper, provides sufficient information for the computation of the relevant shares during the implementation of PARA.

---

[2] The total of these data in the IO differs slightly from the NIA data. The NIA figure for GFCF is 243949 million baht, whereas the figure from the IO table is 263664 million baht.

References

Department of Labour Welfare and Protection. *Preliminary Survey Report: Wages Salary and Work Hours, 1991*.. Ministry of Interior, Government of Thailand.

National Statistics Office. *Socio-economic Survey, 1988*. Economic Survey Division.

Office of Agricultural Economics. *Agricultural Statistics of Thailand Crops: 1985/86.* Centre of Agricultural Statistics.

Office of Agricultural Economics. *Annual Crops Cost Survey: 1985/86.* Division of Agricultural Economics Research, (unpublished Paper).

National Economic and Social Development Board. *Input-Output Table of Thailand 1985*. Office of the Prime Minister, Bangkok, Thailand.

National Economic and Social Development Board. *National Income of Thailand New Series 1970-1987*. Office of the Prime Minister, Bangkok, Thailand.

Pyatt, G. and J. I. Round (1985). *Social Accounting Matrices: a basis for planning*. Washington DC: World Bank.

Table 1. Thailand: Mapping Between 180 Sector Input-Output Categories and 60 Sectors of PARA

60-SECTOR	180-SECTOR
1 PADDY	1
2 MAIZE	2
3 CASSAVA	4
4 SOYBEAN	6,6A
5 GOUNDNUT	6B
6 MUNGBEAN	6C
7 SUGAR CANE	9
8 SORGHUM	3A
9 KEANF&JUTE	12
10 COTTON	13A
11 VEG&FRUITS	7,8
12 COCONUT	10
13 OIL PALM	11
14 COFFEE	15A
15 TOBACCO	14
16 RUBBER	16
17 OTHER CROPS	3,3B,5,6D,13,13B,13C,13D,13E,15,15B,17
18 CATTLE	18
19 SWINE	19
20 OTH LVSTOCK	20
21 POULTRY	21,22
22 SILK WORM	23
23 AGRI SERVICE	24
24 FORESTRY	25,26,26A,26B,27
25 OCEAN FISHNG	28
26 INLND FISHNG	29
27 MINING	30,30A,30B,31,31A,31B,32,33,34,35,36,37,38,3
28 MEAT PROCES	42,43
29 FOOD PROCES	52,53,54,56,57,58,59,59A,59B,60,44,44A,44B,4 45B,45C,46,47,47A,47B,48,48A,48B

30 RICE MILLING	49,49A,49B
31 SUGAR REFRY	55,55A,55B,55C,55D
32 ANIMAL FEED	61,61A,61B,50,50A,50B,51
33 BEVERAGE	62,63,64
34 CIGARETTES	65,66
35 SPINNING	67,68
36 TEXTILES	69,70,71,72,73,74
37 LEATHER	75,76,77
38 WOOD&PAPER	78,78A,78B,78C,78D,79,80,81,81A,81B,82
39 PRINTING	83
40 CHEMICAL	84,86,87,88,89,90,9
	2
41 FERTILIZER	85,85A,85B
42 PETROLEUM	93,93A,93B,93C,93D,93E,93F,93G,93H,93I,94
43 RUBBER	95,96,97,98
44 CEMENT	99,100,101,102,103, 104
45 BASIC METAL	105,106, 107
46 METAL PRODS	108,109,110, 111
47 AGRI MACH	113
48 OTH MACH	112, 114, 115, 116
49 ELEC EQPMNT	117,118,118A,118B,119,120,121,122
50 MOTOR V	125,126,126A,126B,126C
51 MV REPAIR	127
52 OTH MANUF	91,123,124,128,129,130,131,132,133, 134
53 CONSTRUCTIN	138,139,140,141,142,143, 144
54 EGW	135,135A,135B,135C,135D,135E,135F,135G,136
55 TRANSPORT	149,150,150A,150B,151,152,153,154,155,156,1
56 TRADE	145, 146
57 BANKING	160,161,162, 163
58 PUB_ADM	165
59 OTH SERVICES	147,148,164,164A,164B,164C,164D,166,167,16
	174,175,176,177, 178, 179
60 OTHER SECTOR	180