Social Accounting Matrix for Modelling Indian Economy

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Abstract

India's tax revenues depend on manufacturing. Tariff cuts arising from WTO negotiations have implications for competitiveness of Indian manufacturing as well as deficits. This can be analysed only in a general equilibrium framework. To operationalise a general equilibrium model a Social Accounting Matrix (SAM) is necessary. The paper outlines the procedure for constructing a SAM at the 19–sector level with a focus on manufacturing sector and all indirect taxes.

1. Introduction

Planners, policy makers, governments have to make decisions that affect the welfare of individuals. Policies cover the entire spectrum from taxation, trade, environment, interest rates, market access and labour to name a few. Despite the fact that these policies are diverse and incorporating them using a single unified approach is difficult, general equilibrium modelling tackles this problem to a certain extent.

To evaluate the efficacy of any policy, the impact with respect to the existing situation is necessary. This implies a framework to tabulate the base case with which counter factual policy simulations will be compared. The unified base case accounting for interactions between agents is captured in a Social Accounting Matrix (SAM).

This paper outlines in detail the various procedures required to construct a SAM using the latest Indian Economy Database, that was used in general equilibrium modelling of India's Tax and Trade policy[2].

The first requirement of any Computable General Equilibrium (CGE) model is an account of all agents in the economy. The account of all agents should be balanced i.e.

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[2] for details refer Rege (2003)

their incomes should equal their expenditures. Since the data is collected from different data sources, all of which collect data with different objectives in mind, it is highly improbable that they all will be mutually consistent.

What follows is a description of the procedures undertaken to reconcile the different data to produce a single consistent benchmark data set of the Indian economy for the year of analysis viz. 1989–90.

The rest of the paper is organised as follows. A theoretical description of a Social Accounting Matrix (SAM) is followed by describing the structure of the Indian input-output table and its limitations as far as availability of information is concerned. Next the approach to obtaining a missing data is explained followed by the actual procedures for obtaining a consistent set of factor payments (labour and capital). A description of the various direct and indirect taxes follows. The input-output table used in the analysis is mentioned. The national accounts data used to construct a Social Accounting Matrix (SAM) are elucidated with the actual SAM concluding the paper.

2. Theoretical Structure of a Social Accounting Matrix

All the accounts of various agents are put together at one place in a Social Accounting Matrix (SAM). Dervis, de Melo, and Robinson (1982) give the basic format of a SAM. The SAM provides a consistent picture of the flow-of-funds accounts of separate actors/institutions in the economy. A SAM is always a square matrix as opposed to an input-output table, with the row sum equal to the column sum in a SAM. An entry in a column in the SAM depicts the expenditures made by an actor/institution, while the row entry shows the receipts accruing to the actor/institution. A SAM does not mean a consistent model, but a consistent model always implies a SAM. It is as shown in the Table 1 with some modifications.

Table 1: Format of a Social Accounting Matrix

	A	B	C	D	E	F	G	H	I
A		Domestic Commodity				Export Subsidy		Exports	
B	Int. Input				Private Cons	Govt.Cons	Inv.		
C	Wages								
D	Rentals								
E			Labour Income	Capital Income		Transfers	Capital Inflow		
F	Indirect Taxes			Capital Taxes	Direct Taxes	Sales Taxes	Sales Taxes	Sales Taxes	
G					Private Saving	Govt. Saving			
H		Imports				Reserve Accumulation			
I	Total Costs	Total Absorption	Factor Income	Factor Income	Household Income	Govt. Expenditure	Inv.	Forex. Inflow	

Source: Author and Dervis, de Melo, and Robinson (1982)
Key
A: Activities   B: Commodities   C: Labour
D: Capital   E: Households   F: Government
G: Investment   H: Rest of the World I: Total

The entries in the SAM are obtained from various data sources often not compatible with one another. The base of a SAM is the input-output table. All data manipulations will be in relation to the input-output table.

3. Indian Input-Output Table

The input-output table forms the basis of large-scale economic analysis. A brief outline of the procedures followed by the Central Statistical Organisation (CSO) in constructing an input-output table and subsequent manipulations on it to arrive at the data required for the model is necessary.

The CSO prepares the IO table at 115 sectors comprising of Agriculture (1-17), Animal Husbandry (18-20), Forestry and Logging (21), Fishing (22), Mining and Quarrying (23-32), Manufacturing (33-98) and Tertiary Sectors (99-115). Final Demand comprises of Private Final Consumption Expenditure (PFCE), Government Final Consumption Expenditure (GFCE), Gross Fixed Capital Formation (GFCF), Change in Stocks (CIS), Exports (EXP) and Imports (IMP).

3.1. Matrices in the IO table

The Input-Output Transactions Table (IOTT) has 2 matrices. The *commodity* × *industry* matrix or *absorption* matrix and the *industry* × *commodity* matrix or *make* matrix. The absorption matrix shows the input of commodity i in industry j. Thus steel used by a heavy engineering company would be a part of this matrix. Consumable like diesel for running a captive power plant or ATF for a private commercial aircraft would also be a part of this matrix. The make matrix shows the primary and other secondary products produced by an industry. Thus reactors, pressure vessels and other fabrication goods will be the main commodity produced by the heavy engineering company, but surplus power sold to the grid from captive power operations, or lending the aircraft when not in use, would be secondary output of electricity and transport services by the heavy engineering firm. Based on these 2 matrices rest of the relationships are determined.

The structure of the input-output table is shown in Table 2

Table 2: Input-Output (IO) Accounting Framework

		Commodity	Industry	Final Demand	Total
Commodity			X	F	q
Industry		M			g
Primary I/P			Y'		
Total		q'	g'		

Source: CSO (1990), pg. 48

where,
- q_j : output of the jth commodity
- g_i : output (main + byproducts) of the ith industry

- f_j : final demand of the jth commodity
- x_{jk} : output of the jth commodity used in k^{th} sector
- m_{ij} : output of the jth commodity produced by i^{th} industry
- y_j : value of primary inputs (factor incomes) j^{th} industry
- ': denotes transpose

Table 3: Input-outoput (IO) Derived Matrix

	Commodity	Industry	Final Demand
Commodity	A	$B=X(gbar)^{-1}$	
	$W=A(qbar)$		
Industry	$C=M'(gbar)^{-1}$	E	
	$D=M(qbar)^{-1}$	$Z=E \cdot gbar$	e

Source: CSO (1990), pg. 49

To derive the commodity $\times$ commodity and industry $\times$ industry table, using various assumptions, the flow matrices and outputs are computed as follows[3]. Industries produce many commodities that include a main product and possibly many by–products. The production process of producing commodities will vary between industries. This leads to two assumptions on technology.

1. Commodity Technology Assumption ⁻ the input structure of the industry producing the byproduct is the same as that of an industry producing the same commodity as a main product. To cite an example, power generate using a captive power plant (using diesel generator sets) in a cement industry and sold to the grid would be assumed to be produced using the same inputs as that used by power generation industry (using gas/steam turbines).

2. Industry Technology Assumption ⁻ the input structure of the industry producing the byproduct is the same as that of the main product. To give the same example, power generated in a captive power plant used in cement industry will generate power using turbines rather than diesel generator sets.

Table 4: Derivation of Flow and Output

	Commodity x commodity table	
Commodity technology	$q = (BC^{-1})q + f$	$W = (BC^{-1})$ qbar
Industry technology	$q = (BD)q + f$	$W = BD$ qbar
Commodity technology	Net indirect taxes $T_2=T_1(gbar)^{-1}C^{-1}q$	
Industry technology	Net indirect taxes $T_2=T_1(gbar)^{-1}C^{-1}q$	
Commodity technology	Value added $1 = D^{-1} y$	
Industry technology	Value added $1 = C y$	

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[3] Table 4 shows derivations

	Industry x industry table	
Industry technology	$g = (C^{-1}B)g + e$	$Z = (C^{-1}B)$ gbar
Commodity technology	$g = (DB)g + e$	$Z = (DB)$ gbar
Industry technology	Final demand $e = C^{-1}f$	
Commodity technology	Final demand $e = D\ f$	

- gbar, diagonal matrix with elements of g on the diagonal
- qbar, diagonal matrix with elements of q on the diagonal
- e, final demand for output of industry
- A : *commodity* × *commodity* coefficient matrix
- B : *commodity* × *industry* coefficient matrix, values in absorption matrix used as co-efficients = $X(gbar)^{-1}$
- C : product mix matrix, columns of which show proportion of various commodities produced by • particular industry, = $M^T(gbar)^{-1}$
- D : market share matrix, columns of which show proportion of various industries producing a particular commodity, = $M^T(qbar)^{-1}$
- E : *industry* × *industry* coefficient matrix
- W : *commodity* × *commodity* flow matrix recording the value of purchases of commodities by commodities
- Z: *industry* × *industry* flow matrix recording the value of purchases of industry output by industries

3.2. Associated Problems

The construct a SAM for building a general equilibrium model, data on the following are required.
1. Payments to factors (labour, capital) by sector
2. Taxes on factors (labour tax, capital tax) by sector
3. Depreciation by sector
4. Taxes paid by each industry on various input commodities (excise, tariffs sales taxes, various cess, duties besides subsidies)
5. Direct taxes and transfers

The IOTT does not give a break-up of factor payments or depreciation but one consolidated entry for Gross Value Added by sector and one entry for indirect tax by sector.

Data is primarily obtained from the National Account Statistics (NAS) as far as payments to factors are concerned. The NAS classification is not consistent with the sector classification used in the model. The IO sectors are mapped to the NAS sectors. The data on the Indian economy is classified on basis of scale of activity into organised and unorganised sectors. The unorganised sector does not provide for an appropriate split of factor payments between labour and capital, but has a mixed component of entrepreneurial compensation. The entrepreneurial compensation needs to be split into wage component and return to capital accounting for the risk of the entrepreneur. Hence the SAM does not have a split between organised and unorganised sectors, but to impute correct payments to factors the split is necessary. Each sector is paying mul-

tiple taxes on each commodity at different rates. The IOTT gives information on the to-
tal tax component paid by the sector. To make modelling more meaningful, data on in-
dividual tax rates by commodity are obtained and these rates are used to calculate the
final taxes paid by each sector. The tax rates are calculated from the budget documents
and to match those figures of indirect taxes and subsidies mentioned in tables 39 and
40.

4. Approach to construct a SAM

1. From the raw C × I IOTT table construct a C × C table
2. Obtain payment to factors labour and capital, depreciation, taxes on labour and
   capital
3. Obtain various indirect tax and subsidy rates for various commodities. Obtain
   data on government transfers to domestic agents. Any surplus or deficit of the
   government accrues to or paid by agents in the economy.
4. Data on foreign transactions are reconciled with the transfers to residents from
   abroad and payments to foreigners on account of foreign debt.

5. Sectoral Classification

The Input—Output Transactions Table (IOTT) of the economy at the 60—sector level by
Planning Commission is used for constructing the SAM. The table shows inter—indus-
try transactions at factor cost at 1989—90 prices and is updated based on the IOTT
1983—84 prepared by the Central Statistical Organisation (CSO). The model analyses
the economy at a 19—sector level and the mapping from the 60—sector level to 19—sec-
tor level is depicted in Table 5.

Table 5: Mapping of 60 Sector Input—Output (IO) Table to 19 Sector Model

	Name	19 sectors	60 Sectors Name (Number)
1	AGRI	Agriculture, Forestry and Fishing.	paddy(1), wheat(2), other cereals(3), pulses(4), sugarcane(5), jute(6), cotton(7), tea(8), coffee(9), rubber(10), other crops(11), animal husbandry(12), forestry and logging(13), fishing(14)
2	CCNG	Coal, Crude and Natural Gas.	coal and lignite(15), crude petroleum and natural gas(16)
3	MINES	Metal and Non—metal Mining.	iron ore(17), other metallic minerals(18), non—metallic and minor minerals(19)
4	FDPR	Food Products	sugar(20), khandsari and boora(21), hydrogenatedoil (22), other foods and beaverages(23)

5	TEXT	Textiles and Leather Products	cotton textiles(24), woollen textiles(25), art. silk and synthetic fibre(26) jute, hemp and mesta textiles(27), other textiles(28), leather and leather products(31)
6	PAPER	Wood and Paper Products	wood and wood products(29), paper and paper products(30)
7	CHEM	Rubber, Plastics and Other Chemicals.	rubber products(32), plastic products(33), synthetic fibres and resin(38), other chemicals(39)
8	PETRO	Petroleum and Coal Tar Products.	petroleum products(34), coal tar products(35)
9	FERT	Fertilizer and Pesticides	Fertilizer(36), pesticides(37)
10	CEMENT	Cement and Non-Metallic Mineral Products.	cement(40), other non-metallic mineral products(41)
11	METLS	Metals	iron and steel(42), non ferrous metals(43)
12	MECHMC	Non-Electrical Machinery	tractors and other agriculture machinery(44), machine tools(45), other non-electrical machinery(46)
13	ELECMC	Electrical Machinery	electrical machinery(47), communications equipment(48), electronic equipment(49)
14	VEHCL	Transport Equipment	rail equipment(50), motor vehicles(51), other transport equipment(52)
15	OTHMFG	Other Manufacturing	other manufacturing(53)
16	TRNSP	Transport Services	rail transport service(56), other transport service(57)
17	ELEC	Electricity	electricity(55)
18	CONSTR	Construction	construction(54)
19	SRVCE	Other Services	communication(58), trade(59), other services(60)

Souce: Author

6. Factor Payments

The Indian nomenclature used for denominating different values is as follows

Value	Name
100,000	1 lakh
1,000,000	1 million = 10 lakhs
10,000,000	10 million = 100 lakhs = 1 crore

The Indian economy can be broadly classified as

  A. Organised and unorganised[4], This is further sub-classified as

  B. Primary, secondary and tertiary. The primary sector consists of three sub-sectors,

the secondary sector consists of 13 manufacturing sectors while the tertiary sector comprises of three sub-sectors

The following approach is used. The economy is split first according to classification A. The economy thus classified is further split using sub-classification B. Finally each of the major sectors is split to the level of model disaggregation.

The production side of the economy is modelled as each producer producing only one commodity. The assumption can be relaxed by assuming fixed coefficient joint products. The Value Added (VA) is either Cobb-Douglas or CES function of primary factors labour and capital. The data on net VA (NVA) is given in the CSO (1994) National Account Statistics (NAS), Factor Income (New Series) 1980-81 to 1989-90 (pp. 26, 27, 32, 33, 38, 39) by 9 major sectors for both organised and unorganised sectors. The gross VA (GVA) is obtained from the IO table. The approach to obtaining consistent factor payments at the 19-sector level is as follows. The economy is classified according to two levels of disaggregation, one at the 7-sector level and the other at the 19-sector level. The mapping from 7 sectors to 19 is outlined in Table 6.

Table 6: Mapping from 7 sectors to 19 sectors

7 Sectors (NAS Sectors)	19 Sectors (IO Table)
Agriculture	AGRI
Mining & Quarrying	CCNG, MINES
Transport Services	TRNSP
Electricity	ELEC
Construction	CONSTR
Other Services	SRVCE
Manufacturing	FERT, PETRO, CHEM, PAPER, TEXT, FDPR, ELECMC, VEHCL, MECHMC, METLS, CEMENT, OTHMFG

The economy is first aggregated from 19 to the 7-sector level and consistent accounts at the 7-sector level are obtained. After this the economy is split to the original 19-sector level.

The above procedure is adopted in the light of the following. There is no one to one mapping of sectors from NAS to the IO table; both are mapped to a common 7-sector classification.

As shown in Table 7, to reconcile the difference in NVA between NAS and the IO table, the NAS value added is scaled to match that from the IO table. However in case of Electricity, the VA and depreciation figures are taken from the CSO (1993) Annual Survey of Industries (ASI) and scaled to the IO level. The value added for Gas and Water Supply is included in Other Services. The final figures for VA and depreciation are as per column e and f respectively.

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[4] Organised sector is defined as an activity involving 10 or more workers with power or 20 or more workers without power. Unorganised sector is an activity involving less than 10 workers with power or less than 20 workers without power.

Table 7: Value Added and Depreciation at 1989–90 prices (Rs. Lakhs)

a	b	c	d	e	f
No.	Sector Name	GVA(IO)	NVA(CSO)	New NVA	Depreciation
1	Agriculture	12310107	11928100	11577356	732751
2	Mining and Quarrying	864364	746900	724938	139427
3	Manufacturing	7091581	6504500	6313236	778345
4	Transport Services	2148550	1661500	1612644	535906
5	Electricity	824483	330100	677694	146788
6	Construction	2292503	2260600	2194127	98376
7	Other Services	13991781	12594000	11866374	2125407
8	TOTAL GVA	39523369			
9	depreciation	4557000	4557000	4557000	4557000
10	TOTAL NVA	34966369	36025700	34966369	

Source: National Account Statistics (NAS), Factor Income (New Series) 1980–81 to 1989–90

The NVA in the IO table is split into organised and unorganised sectors in the same proportion as the NAS as shown in Table 8.

Table 8: Value Added in Organised and Unorganised Sectors (Rs Crores)

a	b	c	d	e	f
No.	Sector Name	NVA Org NAS	NVA Unorg–NAS	New NVA Org–IO	New NVA Unorg–IO
1	Agriculture	5076	114205	4926.74	110846.80
2	Mining and Quarrying	6930	539	6726.24	523.15
3	Manufacturing	39247	25798	38092.95	25039.41
4	Transport Services	6928	9687	6724.28	9402.16
5	Electricity	3150	151	6466.94	310.00
6	Construction	10082	12524	9785.54	12155.73
7	Other Services	58720	67220	55327.42	63336.32
8	TOTAL NVA (NAS)	130133	230124	128050.10	
9	TOTAL NVA (IO)	349663.69			

Source: Computed from Table 7 and NAS, Factor Income (New Series) 1980–81 to 1989–90

6.1. Organised Sector

In the previous section, Table 8 shows the NVA in organised and unorganised sectors at the broad 7–sector classification. This section discusses the methods employed to obtain NVA at the 19–sector level and the corresponding payments to factors for the organised sector.

6.1.1. Primary Sector

This subsection deals with factor payments in the three primary sectors. Agriculture, Forestry and Fishing. The model combines agriculture, forestry and fishing into a single agriculture sector. The NAS gives the payments to factors in all the three sectors. The payments to factors of labour and capital are obtained by splitting the NVA from the organised IO table in the same proportion as factor payments in NAS as mentioned

in Table 9.

Table 9: Value Added in the Organised Agriculture Sector (Rs Crores)

a	b	c	d	e
No.	Sector Name	NAS-Total	NAS Organised	IO Organised
1	Agriculture, Forestry and Fishing	119281	5076	4926.74
1a	Compensation of Employees	24078	2897	2811.81
1b	Operating Surplus	2179	2179	2114.93
1c	Mixed Income	93024		

Source: Computed from Table 8 and NAS, Factor Income (New Series) 1980–81 to 1989–90

Mining and Quarrying An activity like mining and quarrying takes place predominantly in the organised sector. The factor payments in mining and quarrying as per NAS are given in Table 10.

Table 10: Value Added in Mining and Quarrying (Rs Crores)

a	b	c	d
No.	Sector Name	NVA–CSO	NVA–IO
1	Mining and Quarrying	7469	7249.38
2	Compensation of Employees	2822	2739.02
3	Operating Surplus	4148	4026.03
4	Mixed Income	499	484.33

Source: Computed from Table 7 and NAS, Factor Income (New Series) 1980–81 to 1989–90

The mixed income[5] as per the NAS is attributed to capital. The NAS gives mining and quarrying as one activity, but in the model there are two sectors in this activity viz. coal, crude and natural gas and metal and non–metal mining. To obtain factor payments in the two sectors, first the value added in the IO table is split in the same proportion as factor payments as in the NAS for the activity as a whole as in Table 10. Second, the mining and quarrying activity is split into the two sectors in the ratio of the GVA as per the IO table. The final factor payments in sectors 2 and 3 are outlined in Table 11.

Table 11: Factor Payments in Sectors 2 and 3 (Rs Crores)

a	b	c	d	e=c–d	f	g
No.	Sector Name	GVA–IO	NVA	Depreciation	Labour	Capital
1	Coal, Crude, Natural Gas	6959.95	5837.28	1122.68	2205.49	3631.79
2	Metal, Non–metal mining	1683.69	1412.10	271.59	533.53	878.57
3	TOTAL	8643.64	7249.38	1394.27	2739.02	4510.36

Source: Computed from Table 7 and Table 10

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[5] The notion of mixed income arises in cases where it is difficult to impute payments to the individual factors. The model has only two factors viz. labour and capital and henceforth the mixed income will be distributed over the two.

Table 12: Payments to Labour in Organised Manufacturing (Rs Lakhs)

a	b	c	d	e	f=c+d+e
No.	Sector Name (No.)	Total Emoluments	Contribution to PF	Welfare Expenses	Labour (gross of tax)
1	FDPR	178010	14473	8248	200731
2	TEXT	289811	38440	11137	339338
3	PAPER	71916	6430	4295	82641
4	CHEM	173811	18771	20330	212912
5	PETRO	20931	1977	3437	26345
6	FERT	38659	3928	6639	49226
7	CEMENT	66270	6614	5792	78676
8	METLS	174946	22672	16785	214403
9	MECHMC	130560	14014	13007	157581
10	ELECMC	120893	12470	14828	148191
11	VEHCL	185229	16697	13171	215097
12	OTHMFG	64695	5835	5047	75577
13	ELEC	304739	29670	8452	342861

Source: Annual Survey of Industries (ASI) Sample Sector 1989–90

6.1.2. Secondary Sector

Manufacturing Sector: The primary data source for the manufacturing sector is the ASI, 1989–90. The payments to labour by sectors are given in Table 12 while those to capital are in Table 13.

Table 13: Payments to Capital in Organised Manufacturing (Rs Lakhs)

a	b	c	d	e	f	g=d+e+f
No	Sector Name (No.)	Depreciation	Rent Paid	Interest Paid	Profits	Capital (gross of tax)
1	FDPR (4)	71347	7735	90543	202406	300684
2	TEXT (5)	98302	9718	134625	65978	210321
3	PAPER (6)	37821	3677	34698	25785	64160
4	CHEM (7)	119013	14607	134157	169151	317915
5	PETRO (8)	25640	472	12702	152059	165233
6	FERT (9)	61952	2227	73896	-28458	47665
7	CEMENT (10)	58547	4509	80041	-582	83968
8	METLS (11)	110591	4552	112071	102947	219570
9	MECHMC (12)	37357	5154	51888	69650	126692
10	ELECMC (13)	40535	6435	77786	97707	181928
11	VEHCL (14)	48281	3692	55863	36298	95853
12	OTHMFG (15)	19850	2839	35145	39313	77297
13	ELEC (17)	130935	6582	316121	-61062	261641

Source: Annual Survey of Industries (ASI) Sample Sector 1989–90

The ASI gives data on factor payments, welfare expenses, contribution to provident fund, depreciation etc. at the 3 digit industrial classification, which is mapped to

the model sectoral classification.

The purpose of these two tables is as follows. Summation of labour and capital payments gives the net value added in the organised manufacturing sector. The NVA plus depreciation will account for the gross value added. The GVA of the unorganised manufacturing sector is obtained as a residual by subtracting the GVA organised from the GVA in the IO table for each of the manufacturing sectors. A caveat is due here. The IO table is updated from the 1983–84 table, and there is a possibility of data mismatch between two sources (viz. ASI and IO table), of which ASI is the latest available. In this case the ASI data is made consistent with the IO table. The activities in sectors 8, 9, 11 and 17 take place in the organised sector only. As a result of which the value added in the unorganised sector should be zero. For this the ASI data is scaled to match the IO data. Given this data the proportion of factor payments in GVA in ASI is used to derive the new factor payments consistent with the IO table. For these sectors and the corresponding factor payments are shown in Table 14.

Table 14: New Factor Compositions for Sectors 8, 9, 11 and 17 (Rs Lakhs)

a	b	c	d	e	f	g	h
No	Sector Name (No.)	Labour old	Capital old	Depr old	Labour new	Capital new	Depr new
1	PETRO (8)	26345	165233	25640	23210.1	145571.0	22588.9
2	FERT (9)	49226	47665	61952	36607.7	35446.9	46071.6
3	METLS (11)	214403	219570	110591	194614.4	199304.5	100383.9
4	ELEC (17)	342861	261641	130935	384374.2	293320.2	146788.4

Source: Computed from Tables 8, 12 and 13

6.1.3. Tertiary Sector

This subsection deals with factor payments in the tertiary sector comprising of construction and services.

Construction To compute factor payments in construction sector, the NVA from the IO table is split in the same proportion as factor payments in NAS. This is shown in Table 15.

Table 15: Value Added in construction (Rs Crores)

a	b	c	d	e
No.	Sector Name	NAS–Total	NAS Organised	IO Organised
1	Construction	22606	10082	9785.54
1a	Compensation of Employees	17926	8623	8369.44
1b	Operating Surplus	1459	1459	1416.10
1c	Mixed Income	3221		3126.29

Source: Computed from Tables 7 and 8

Transport Services consist of two sectors viz. railways and other transport services. These two are aggregated to form transport services sector in the model. To obtain the factor payments shown in Table 16 the same approach is followed as in the case of construction sector.

Other Services comprise of the following sectors viz. Trade, hotels and restaurants,

storage, communication, finance, insurance, real estate and miscellaneous other services. The factor payments are as in Table 17 computed using the methodology mentioned in the earlier section.

Table 16: Value Added in Transport Services (Rs Crores)

a	b	c	d	e
No.	Sector Name	NAS–Total	NAS Organised	IO Organised
1	Transport Services	16615	6928	6724.28
1a	Compensation of Employees	9265	6301	6115.72
1b	Operating Surplus	627	627	608.56
1c	Mixed Income	6723		

Source: Computed from Tables 7 and 8

Table 17: Value Added in Other Services (Rs Crores)

a	b	c	d	e
No.	Sector Name	NAS–Total	NAS Organised	IO Organised
1	Other Services	125940	58720	55327.42
1a	Compensation of Employees	59388	46823	44117.78
1b	Operating Surplus	11897	11897	11209.64
1c	Mixed Income	54655		

Source: Computed from Tables 7 and 8 and NAS, Factor Income (New Series)

6.2. Unorganised Sector .

6.2.1. Primary Sector

In this case unlike the organised sector, there is only one sector. The reason being the other sectors wholly belong to the organised sector.

Table 18: Value Added in the Unorganised Agriculture Sector (Rs Crores)

a	b	c	d	e
No.	Sector Name	NAS–Total	NAS UnOrganised	IO UnOrganised
1	Agriculture, forestry & Fishing	119281	114205	110846.8
1a	Compensation of Employees	24078	21181	20558.2
1b	Operating Surplus	2179		
1c	Mixed Income	93024	93024	90288.6

Source: Computed from Tables 7 and 8 and NAS, Factor Income (New Series)

Agriculture, Forestry and Fishing: As can be seen from the table 18, the major activity takes place in the unorganised sector.

The concept of mixed income is typical of unorganised sectors. For the model this mixed income will have to be split into payments to factors of labour and capital. To impute the share of labour in mixed income, the wage rate of agricultural labourers is calculated using population of agricultural labourers from the census data by Census Commissioner (1992) and compensation of employees from Table 18. The same wage rate is assumed to hold for cultivators whose population is also obtained from the census. The payments to capital are imputed as a residual from mixed income once the la-

bour income is calculated. Due to the lack of data for forestry and fishing, the same ratio of labour to mixed income in the case of agriculture is used to derive payments to labour and capital in these sectors. The factor payments are shown in Table 19.

Table 19: Factor Payments: Unorganised Agriculture, Forestry and Fishing (Rs Crores)

a	b	c	d	e	f
No.	Heading	Agriculture	Forestry	Fishing	Total
1	Compensation of employees	19904.0		645.2	20558.2
2	Operating Surplus				
3	Mixed Income	81725.1	6078.8	2484.7	90288.8
4	Population of Labourers (lakhs)	745.9			
5	Wage of Labourers (Rs)	2668.2			
6	Population of Cultivators (lakhs)	1107			
7	Wage income of Cultivators	29537.3	2197.0	898.0	32632.4
8	Capital income of Cultivators	52187.7	3881.8	1586.7	57656.2
9	Labour Income	499441.3	2197.0	1552.2	53190.6
10	Capital Income	52187.7	3881.8	1586.7	57656.2

Source: Computed from Table 18 and Census

6.2.2. Secondary Sector

Manufacturing Sectors: The unorganised manufacturing sector is further classified on the basis of number of workers employed. Based on this classification the following distribution results.

1. Own Account Enterprises (OAE): Only one worker.
2. Non–Directory Establishments (NDE): up to 5 workers.
3. Directory Establishments (DE): with workers ranging from 6 to 10.

The data source for the NDE which deal with manufacturing (NDME) is the NSSO (1995) National Sample Survey Organisation, 45th round, July 1989 to June 1990, No. 396/1, Part I.

The data for the remaining falls under the jurisdiction of the CSO and has not yet been released.

To calculate the payments to capital it is necessary to compute the depreciation in the unorganised sector. To calculate this the following is done. Of the total depreciation in the Manufacturing sector, the depreciation in the organised sector is subtracted to residually give the depreciation in the unorganised sector. This total figure is split into depreciation of various sectors using shares of depreciation of various sectors in the organised sector. The depreciation in the unorganised sector is as shown in Table 20.

Table 20: Depreciation in Unorganised Manufacturing (Rs Lakhs)

a	b	c	d=c/c10	e=d*e10	f=c+e
No.	Sector Name (No.)	Depreciation Organised	Share	Depreciation Unorganised	Depreciation Total
1	FDPR (4)	71347	0.134	10512.6	81859.6
2	TEXT (5)	98302	0.185	14484.2	112786.2
3	PAPER (6)	37821	0.071	5572.7	43393.7

4	CHEM (7)	119013	0.224	17535.9	136548.9
5	CEMENT (10)	58547	0.110	8626.6	67173.6
6	MECHMC (12)	37357	0.070	5504.3	42861.3
7	ELECMC (13)	40535	0.076	5972.6	46507.6
8	VEHCL (14)	48281	0.091	7113.9	55394.9
9	OTHMFG (15)	19850	0.037	2924.8	22774.8
10	TOTAL	531053	1.000	78247.5	609300.5

Source: Computed from Tables 13 and 14

The NDME survey of the NSSO gives the number of units, full time employment, part time employment, VA per unit, wage rate for both rural and urban units at the 2-digit level. The total employment is calculated as the sum of the number of units (accounting for the entrepreneur assuming the same wage rate as workers), full time employment and half of part time employment (assuming part time employment gets half the wage rate as full time employment). The wage rate times the total employment gives the payments to labour in the various industries. This 2-digit level is mapped to the IO sectoral classification and the rural and urban units are aggregated to arrive at the labour payments in the unorganised manufacturing sector. The total VA is calculated using the data on number of units and VA per unit. The ratio of labour payments to total VA is used to calculate the share of labour in VA in the unorganised manufacturing sector. This ratio is applied to the NVA in the unorganised manufacturing sector to compute payments to factors.

The following is done to obtain the factor payments in the unorganised manufacturing sector. First NVA is obtained by subtracting depreciation as mentioned in Table 20 from the GVA. Then the ratio of labour to VA from Table 21 is applied to the NVA calculated above to give payments to labour. The payment to capital is obtained as a residual difference between NVA and labour payments.

Table 21: Labour Share in Unorganised Manufacturing (Rs Lakhs)

a	b	c	d	e=d/e
No.	Sector Name	Value Added	Labour Payments	Ratio of Labour to Value Added
1	FDPR (4)	94231.5	32767.0	0.354
2	TEXT (5)	154696.0	65808.7	0.425
3	PAPER (6)	67652.1	29525.5	0.436
4	CHEM (7)	18695.1	6398.0	0.342
5	CEMENT (10)	11133.9	4216.6	0.379
6	METLS (11)	3710.5	1397.9	0.377
7	MECHMC (12)	28009.2	9683.0	0.346
8	ELECMC (13)	8757.8	3211.5	0.367
9	VEHCL (14)	4225.9	2032.0	0.481
10	OTHMFG (15)	68132.1	28842.1	0.423

Source: Computed

The final factor payments are shown in Table 22.

Table 22: Factor Payments in Unorganised Manufacturing (Rs Crores)

a	b	c	d	e=c-d	f	g=e*f	h=e-g
No	Sector Name (No.)	GVA	Deprec- iation	NVA	Ratio of L to VA	Labour	Capital
1	FDPR (4)	525.49	105.13	420.36	0.354	149.02	271.34
2	TEXT (5)	13121.22	144.84	12976.38	0.425	5520.24	7456.14
3	PAPER (6)	1089.62	55.73	1033.89	0.436	451.22	582.67
4	CHEM (7)	477.97	175.36	302.61	0.342	103.56	199.05
5	CEMENT (10)	1492.53	86.26	1406.27	0.379	532.58	873.69
6	MECHMC (12)	540.64	55.04	485.60	0.346	167.87	317.72
7	ELECMC (13)	3137.56	59.73	3077.83	0.367	1128.64	1949.19
8	VEHCL (14)	2363.89	71.14	2292.75	0.481	1102.46	1190.29
9	OTHMFG (15)	5122.21	29.25	5092.96	0.423	2155.98	2936.98

Source: Computed from Tables 14 and 21.

6.2.3. Tertiary Sector

As in the case of organised sector, the tertiary sector comprises of construction and services. First the factor payments to construction are computed followed by services.

Construction There is no data available on the factor payments in the unorganised construction sector. In this case the mixed income arising here is split in the same proportion of labour to capital as in the organised sector. The final payments to labour and capital in the unorganised construction sector are shown in Table 23.

Table 23: Factor Payments in the Unorganised Construction Sector (Rs Crores)

a	b	c	d	e=c*d	f=c-e
No.	Sector Name (No.)	Mixed income	Ratio of labour to Value added	Labour	Capital
1	Construction (18)	3126.29	0.8553	2673.87	452.42

Source: Computed from Table 15

Of the total VA in the unorganised construction sector of Rs 12155.73 crores, mixed income is Rs 3126.29 crores, implying labour payments to be a residual of Rs 9029.44 crores. The total labour payment works out to Rs 11703.31 (9029.44 + 2673.87) crores.

Transport Services In the model there are two service sectors viz. Transport Services (no. 16) and Other Services (no. 19). To obtain payments to primary factors the same methodology is adopted as before for other unorganised sectors. The latest available data for unorganised service sector is from the various issues of the Enterprise Survey by the Central Statistical Organisation (CSO) 1983-84. For the model purposes the same ratio of labour to value added in the above mentioned data is used to compute the shares of primary factors. Table 24 shows the data on the unorganised transport service sector.

Other Services Table 25 shows the data on unorganised other services sector. Using tables 24 and 25 the payment to labour in the two service sectors is calculated using the ratio of labour to value added in the unorganised sector and is shown in Table 26.

Table 24: Unorganised Transport Services (Rs 000's)

a	b	c	d	e	f=c+d+e
No.	Sector	DE	NDE	OAE	Total
1	Transport Services				
1a	Labour	947742	663730	1146	1612618
1b	VA	2753085	662435	3176432	8591952
1c	Ratio of Labour to VA	0.34	0.25	0.00036	0.19

Source: Enterprise Survey, 1983–84

Table 25: Unorganised Other Services (Rs 000's)

a	b	c	d	e	f=c+d+e
No.	Sector	DE	NDE	OAE	Total
1	Total Other Services				
1a	Labour	5995513	2948903	108750	9053166
1b	VA	13606569	8619867	9824891	32051327
1c	Ratio of Labour to VA	0.44	0.34	0.01	0.28

Source: Enterprise Survey, 1983–84

Table 26: Factor Payments in Unorganised Other Services (Rs lakhs)

a	b	c	d	e	f=c−e
No.	Sector	NVA unorganised	Ratio of L to VA	Labour	Capital
1	Transport	940215.5	0.19	176468.1	763747.4
2	Other Services	6333632.0	0.28	1773417.0	4560215.0

Source: Tables 8, 24 and 25

7. Tax Payments

7.1. Direct and Factor Taxes

The IO table does not mention tax rates or tax collections by sector in a manner use-ful for economic modeling. The objective is to obtain tax/subsidy rates on use of various commodities by sectors besides tax rates on labour and capital by sectors.

The section is structure as follows. The tax on Labour is first calculated followed by tax on Capital. The tax on capital also includes subsidy to certain sectors which is accounted for as direct subsidy (negative tax). Other subsidies to sectors are indirect subsidies on input of commodities and are modeled as ad–valorem subsidies in the IO table.

7.1.1. Labour Payments and Labour Tax

The organised sector has to contribute to the provident fund (PF) of the employees. This data for the manufacturing sector is given in the ASI and mentioned in Table 27.

For the sectors where this data is not available a rate of 8.33% is assumed to be the contribution of the employer to the provident fund. The reason is that the employer has

to contribute at least a month's salary of an employee to PF which works out to 8.33%. The contribution of PF is modelled as an "ad—valorem" tax on the use of labour inputs in the organised sector. This is because for every additional unit of labour requirement the producer has to contribute to PF. The Indian Economic Statistics—Public Finance IES—PF (1991), 1991 shows that the government received Rs. 6999.60 crores as special deposits of non—government PF. (Table 1.1, p. 4, IES—PF). The contribution to PF as calculated by procedures in the above paragraph does not match the total mentioned in IES—PF.

There is no contribution to PF in the unorganised sector hence the tax rate for the unorganised sector is zero. In the model there is no distinction between organised and unorganised sector. Hence the tax rate computed for model purposes underestimates the actual tax rate in that the base for calculating the rate is the sum of organised and unorganised labour. In addition to the above contribution of non government provident fund there is a contribution of state government to the provident fund. This is an additional Rs 2972.94 crores (Table 1.1 B, p. 4, IES—PF 1991) as state provident fund net. Thus the total contribution to provident fund from both non—government and government sources is Rs 9972.54 crores. Apart from the employer's contribution to PF, the employees also contribute a month's salary to the provident fund. The total amount collected is then invested as per the guidelines set by the government. Not all the collection is invested in government securities, but may be invested in other instruments specified by the government. Thus the PF collection with the government is potentially less than the total PF collected from employees and employers. Since the total PF collection was Rs. 9972.54 crores, the amount of Rs. 3115.16 crores is assumed to be that part of the employees own contribution that was invested with the government. For modelling purposes this is modelled as a transfer from households to the government.

Table 27: Contribution to Provident Fund (PF) (Rs Lakhs)

a	b	c
	Sector name	Provident Fund
1	AGRI	21629.26
2	CCNG	16965.23
3	MINES	4104.07
4	FDPR	14473.00
5	TEXT	38440.00
6	PAPER	6430.00
7	CHEM	18771.00
8	PETRO	1741.75
9	FERT	2921.12
10	CEMENT	6614.00
11	METLS	20579.46
12	MECHMC	14014.00
13	ELECMC	12470.00
14	VEHCL	16697.00
15	OTHMFG	5835.00
16	TRNSP	47043.83

17	ELEC	33262.41
18	CONSTR	64380.09
19	SRVCE	339366.30
20	TOTAL	685737.50
21	Total IES-PF	699960.00

Source: ASI 1989-90 and IES-PF

7.1.2. Capital Payment and Capital Tax

As far as capital goes both the organised as well as the unorganised sectors have to pay taxes on the profits earned. The taxes on profits are modelled as an ad-valorem tax on the use of capital. The calculation of the tax rates on capital is explained below.

The source of data for the direct taxes is the All India Income Tax Statistics AI-ITS (1995) Assessment Year 1990-91. The AIITS gives in Table 5 (pp. 12-24) Number of Returns, Gross Income and Gross Tax - By Source, Range of Returned Income and status. Table 29 shows the total gross income and gross tax by status as compiled from

Taxes Table 28 from IES-PF 1991 gives data on direct taxes.

a	b	c
	Direct Taxes	Revenue
1	Corporation Tax	4728.92
2	Taxes on Income	5079.10
3	Estate Duty	4.27
4	Interest Tax	3.94
5	Wealth Tax	178.51
6	Gift Tax	8.06
7	Land Revenue	690.85
8	Agricultural Tax	92.59
9	Hotel Receipts Tax	0.00
10	Others (profession tax, non urban immovable property etc)	378.36
11	TOTAL	11164.60

Source: IES-PF Table 1.2, p5

Table 29: Gross Income and Gross Tax by Status

a	b	c	d	e=d/c	f=d/d7	g
	Status	Gross Income	Gross Tax	Average Tax Rate	Share in Gross Tax of Non-Company	Tax Payable
1	Individual	19903.9	3550.3	0.1783	0.7725	3923.9
2	Hindu Undivided Family	1513.8	297.0	0.1962	0.0646	328.3
3	Registered Firm	5948.2	687.2	0.1155	0.1495	759.5
4	Others	204.4	60.9	0.2978	0.0134	67.3
5	Company	11831.6	5792.2	0.4895	na	na
6	TOTAL	39401.9	10387.5	0.2636	na	na
7	Non Company Total	27570.3	4595.3	0.1667	1	5079.1

Source: AIITS (Table 5) and Computed.

Table 5 of the AIITS.

As mentioned in Table 28 the IES–PF does not give a break up of taxes on income accruing from different status as mentioned in Table 29. In the model income tax is modelled as a direct tax on the income of agents while tax on capital is modelled as an ad–valorem tax on use of capital. Hence it is necessary to split the "Non–Company" into two groups viz. "Individual and Hindu Undivided Family" and "Registered Firms and Others". The former will be mapped to agents in the model while the latter to producers who will be paying a tax on use of capital.

The total "Taxes on Income" as per IES–PF is Rs 5079.1 crores while that given by AIITS is Rs 4595.3038 crores. Hence the figures given by AIITS are scaled to match those given in IES–PF and are shown in column g, Table 29. Hence the total tax on capital is Rs 5555.74 crores (Rs 4728.92: CIT and Rs 826.82: registered firms and others). The tax on capital unlike tax on labour is paid by both organised as well as unorganised sector.

The AIITS gives in Table 9, pp. 32–42 Number of returns, Gross Income and Gross Tax from Business and Profession – By nature of Business. This is mapped to the input–output sectoral classification and is used as a proxy for calculating tax paid by each sector as shown in Table 30. The data given by AIITS is scaled to match the data given by IES–PF and the result is as shown in columns f, g and h of Table 30.

Table 30: Gross Tax Paid by Sectors (Rs Lakhs)

a	b	c	d	e=c+d	f	g	h=f+g
No	Sector Name	AIITS Non–Company	AIITS Company	AIITS Total	Actual Non–Company	Actual Company	Actual Total
1	AGRI	38.54	2015.67	2054.21	14.9	1469.3	1484.2
2	CCNG	10.84	45909.70	45920.54	4.2	33465.3	33469.5
3	MINES	129.09	4042.56	4171.65	50.0	2946.8	2996.7
4	FDPR	8572.06	46367.61	54939.67	3318.3	33799.1	37117.4
5	TEXT	2970.86	23470.78	26441.64	1150.0	17108.8	18258.8
6	PAPER	2169.05	11259.91	13428.96	839.7	8207.8	9047.4
7	CHEM	6541.78	70504.30	77046.08	2532.4	51393.3	53925.6
8	PETRO	13.97	16020.15	16034.12	5.4	11677.7	11683.1
9	FERT	5.32	2136.42	2141.74	2.1	1557.3	1559.4
10	CEMENT	822.53	7060.08	7882.61	318.4	5146.4	5464.8
11	METLS	1551.61	49836.61	51388.22	600.6	36327.8	36928.4
12	MECHMC	1699.27	24474.38	26173.65	657.8	17840.3	18498.1
13	ELECMC	657.35	30111.34	30768.69	254.5	21949.3	22203.8
14	VEHCL	351.79	68454.63	68806.42	136.2	49899.2	50035.4
15	OTHMFG	3911.14	8515.90	12427.04	1514.0	6207.6	7721.6
16	TRNSP	3299.90	2927.11	6227.01	1277.4	2133.7	3411.1
17	ELEC	5.21	2532.18	2537.39	2.0	1845.8	1847.8
18	CONSTR	6385.68	12888.33	19274.01	2471.9	9394.8	11866.7
19	SRVCE	174456.05	220213.24	394669.29	67532.8	160521.8	228054.6
20	TOTAL	213592.04	648740.90	862332.94	82682.5	472892.0	555574.5

Source: AIITS (pp. 32–42) and Computed.

Subsidies Apart from taxes the government also gives subsidies to public sector units, which are modelled as ad-valorem subsidies on the use of capital. The IES–PF gives data on subsidies in Table 8.5, p.73. A part of it is reproduced in Table 31.

Table 31: Subsidies in Central Budget (Rs Crores)

a	b	c	d
No.	Subsidies	Value	Mapped to Sector
1	Subsidy on Controlled Cloth	10	5
2	Subsidy to Railways	233	16
3	Subsidy to Industrial Units in backward areas	101	4 to 15
4	Subsidy for River Dredging	21	16
5	Subsidy to GIC for central crop insurance fund	90	19
6	Subsidy to SCI for running shipping service	10	16
7	Subsidy for vegetable oil (to NAFED and others)	4	4
8	Subsidy to Jute corporation of India	12	5
9	Interest subsidy	524	all
10	TOTAL	1005	

Source: IES–PF, Table 8.5, p. 73.

The remaining subsidies are modelled as either subsidy on final consumption (food subsidy) or as input subsidy in intermediate use (fertiliser subsidy). The Table 31 shows the various subsidies and their mapping to various sectors. In the case of subsidy to industrial units in backward areas, the subsidy is distributed to each sector in the proportion of its value added in the total manufacturing. In case of interest subsidy, the subsidy is distributed to each sector in the proportion of the share of value added in the public sector as shown in Table 32.

Table 32: Total Subsidies to Sectors (Rs Lakhs)

a	b	c	d	e	f
No	Sector Name		Ind. Units	Interest	Total
1	AGRI			1849.1	1849.1
2	CCNG			4466.4	4466.4
3	MINES			1080.5	1080.5
4	FDPR	400	1343.9	507.8	2251.7
5	TEXT	2200	1520.5	1591.8	5312.3
6	PAPER		433.2	238.4	671.6
7	CHEM		1524.8	566.5	2091.3
8	PETRO		449.0	155.4	604.4
9	FERT		277.2	95.9	373.1
10	CEMENT		519.0	300.8	819.8
11	METLS		1159.8	401.5	1561.3
12	MECHMC		754.7	305.1	1059.8
13	ELECMC		869.7	555.8	1425.5
14	VEHCL		842.9	483.7	1326.6
15	OTHMFG		405.3	556.2	961.5
16	TRNSP	26400		3811.5	30211.5

17	ELEC			2943.8	2943.8
18	CONSTR			2189.3	2189.3
19	SRVCE	9000		30300.4	39300.4
20	TOTAL	38000	10100.0	52400.0	100500.0

Source: Computed

Net tax paid by each sector shown in Table 33 is the sum of tax paid by each sector minus the subsidy received by it.

Table 33: Tax on capital (Rs. Lakhs)

a	b	c	d	e
No.	Sector Name	Tax	Subsidy	Net Tax
1	AGRI	1484.2	1849.1	-364.9
2	CCNG	33469.5	4466.4	29003.1
3	MINES	2996.7	1080.5	1916.3
4	FDPR	37117.4	2251.7	34865.7
5	TEXT	18258.8	5312.3	12946.5
6	PAPER	9047.4	671.6	8375.8
7	CHEM	53925.6	2091.3	51834.3
8	PETRO	11683.1	604.4	11078.7
9	FERT	1559.4	373.1	1186.3
10	CEMENT	5464.8	819.9	4644.9
11	METLS	36928.4	1561.3	35367.1
12	MECHMC	18498.1	1059.8	17438.3
13	ELECMC	22203.8	1425.5	20778.3
14	VEHCL	50035.4	1326.6	48708.8
15	OTHMFG	7721.6	961.5	6760.1
16	TRNSP	3411.1	30211.5	-26800.4
17	ELEC	1847.8	2943.8	-1096.0
18	CONSTR	11866.7	2189.3	9677.4
19	SRVCE	228054.6	39300.4	188754.2
20	TOTAL	555574.5	100500.0	455074.5

Source: Computed

7.2. Indirect Taxes

The model incorporates all the major indirect taxes as outlined in Table 34.

To calculate the tax rates the actual collections of various taxes was divided by the tax base as mentioned in the table above. To arrive at the sales tax rates however a different approach was adopted. The levying of the sales tax falls under the jurisdiction of each state and there are different sales tax rates for the same item in different states. The impact of different sales tax rates on the flow of commodities between states is beyond the scope of this study even though it very much takes place. For the modelling purposes only one rate is assumed to exist. The rates are selected from NIPFP (1991) data, which gives sales tax rates for different commodities by various states. Tax rates were selected such that they matched the tax collection matched the actual

collection with a difference of about 20 crores. Table 35 shows the indirect tax rates on domestic and imported commodities used in the model.

Table 34: Indirect Taxes and their Model Treatment (Rs Crore)

a	b	c	d
No	Tax Head	Collection	Treatment
1	Excise	22406.30	Ad–valorem tax on Output of Goods
2	Tariff	18036.13	Ad–valorem tax on use of imports
3	Sales Tax	15648.72	Ad–valorem tax on sales of Goods
4	State Excise	4059.18	Ad–valorem tax on liquor
5	Motor Vehicles Tax	1454.21	Ad–valorem tax on use of vehicles
6	Tax on Goods/Pass.	941.10	Ad–valorem tax on transport service
7	Electricity Duty	1086.74	Ad–valorem tax on use of electricity
8	Stamp Duty	2363.37	Ad–valorem tax on financial services
9	Sugarcane Tax	90.86	Ad–valorem tax on use of sugarcane
10	Entertainment Tax	427.49	Ad–valorem tax on final consumption of Other services.

Source: Author and IES–PF

Table 35: Domestic and Imported Indirect Tax Structure

Sector	Excise	Sales	Td_{int}	TD_{final}	Tariff	TM_{int}	NIT
	(%)	(%)	(%)	(%)	(%)	(%)	Rs.000 Crores
AGRI	0.1	0.5	-3.8	-5.9	4.8	5.3	-3.874
CCNG	27.4	10.0	37.4	37.4	0.0	10.0	0.331
MINES	1.1	0.0	1.1	0.0	4.5	4.5	0.054
FDPR	9.2	6.0	26.9	26.9	52.8	58.8	1.181
TEXT	1.8	2.0	3.8	3.8	8.9	10.9	2.577
PAPER	3.7	2.0	5.7	5.7	19.9	21.9	0.458
CHEM	15.7	7.0	22.7	22.7	84.6	91.6	3.150
PETRO	13.7	15.0	28.7	28.7	160.9	175.9	3.546
FERT	0.1	2.0	-49.5	0.0	0.0	-60.9	0.385
CEMENT	12.8	5.0	17.8	17.8	76.6	81.6	0.716
METLS	7.8	4.0	11.8	0.0	61.8	65.8	2.036
MECHMC	9.3	5.0	14.3	14.3	22.7	27.7	1.299
ELECMC	8.8	4.0	12.8	12.8	57.6	61.6	1.497
VEHCL	7.8	2.0	18.8	18.8	20.0	22.0	1.453
OTHMFG	2.4	0.0	2.4	2.4	128.9	128.9	1.670
TRNSP	0.0	0.0	2.3	2.3	0.0	0.0	3.123
ELEC	0.0	0.0	5.1	5.1	0.0	0.0	1.131
CONSTR	0.0	0.0	0.0	0.0	0.0	0.0	2.709
SRVCE	0.0	0.0	1.3	1.3	0.0	0.0	2.664

Source: Computed from IOTT & Budget Documents

7.3. Consistent Set of Factor Payments

The above discussion explained the various procedures adopted to achieve a consistent set of accounts on the production side of the economy. The final consistent data set on payments to labour and capital and the respective taxes is outlined in this section. This is merely a compilation of the final values obtained at the various stages of procedures adopted in the earlier analysis. The taxes on labour are depicted in Table 36 while capital taxes on each sector are outlined in Table 37.

Table 36: Labour Payment and Tax on Labour (Rs Crores)

a	b	c	d	e=c+d	f	g=e−f	h=f/g
No	Sector Name	Organised Labour	Unorganised Labour	Total Labour	Labour Tax	Labour Net	Tax Rate
1	AGRI	2811.81	53190.60	56002.41	216.29	55786.12	0.0038
2	CCNG	2205.49	0.00	2205.49	169.65	2035.84	0.0833
3	MINES	533.53	0.00	533.53	41.04	492.49	0.0833
4	FDPR	2007.31	149.02	215633	144.73	2011.60	0.0719
5	TEXT	3393.88	5520.24	8914.12	384.40	8529.72	0.0451
6	PAPER	826.41	451.22	1277.63	64.30	1213.33	0.529
7	CHEM	2129.12	103.56	2232.68	187.71.	2044.97	0.0918
8	PETRO	232.10	0.00	232.10	17.42	214.68	0.0811
9	FERT	366.08	0.00	366.08	29.21	336.87	0.0867
10	CEMENT	786.76	532.58	1319.34	66.14	1253.26	0.0528
11	METLS	1946.14	0.00	1946.14	205.79	1740.35	0.1182
12	MECHMC	1575.81	167.88	1743.69	140.14	1603.55	0.0874
13	ELECMC	1481.91	1128.64	2610.55	124.70	2485.85	0.0501
14	VEHCL	2150.97	1102.46	3253.43	166.97	3086.46	0.0541
15	OTHMFG	755.77	2155.97	2911.74	58.35	2853.39	0.0204
16	TRNSP	6115.72	1764.68	7880.40	470.43	7409.97	0.0635
17	ELEC	3843.74	0.00	3843.74	332.62	3511.12	0.0947
18	CONSTR	8369.44	11703.31	20072.75	643.85	19428.95	0.0331
19	SRVCE	44117.78	17734.17	61851.95	3393.66	58458.29	0.0581
20	TOTAL	85649.78	95704.33	181354.14	6857.35	174518.48	

Source: Computed

Table 37: Capital Payment and Tax on Capital (Rs Crores)

a	b	c	d	e	f=c+d+e	g	h=f−g	I=g/h
	Sector Name	org Capital	unorg Capital	deprec− iation	Total Capital	Capital Tax	Capital Net	Tax Rate
1	AGRI	2114.9	57656.2	7327.5	67098.6	-3.6	67102.3	-0.00005
2	CCNG	3631.8	0.0	1122.7	4754.5	290.0	4464.4	0.06496
3	MINES	878.6	0.0	271.6	1150.2	19.2	1131.0	0.01697
4	FDPR	3006.8	271.3	818.6	4096.7	348.7	3748.0	0.09303
5	TEXT	2103.2	7456.1	1127.9	10687.2	129.5	10557.7	0.01226
6	PAPER	641.6	582.7	433.9	1658.2	83.8	1574.4	0.05323

7	CHEM	3179.2	199.0	1365.5	4743.7	518.3	4225.4	0.12263
8	PETRO	1455.7	0.0	225.9	1681.6	110.8	1570.8	0.07053
9	FERT	354.5	0.0	460.7	815.2	11.9	803.3	0.01481
10	CEMENT	839.7	873.7	671.7	2385.1	46.4	2338.7	0.01984
11	METLS	1993.0	0.0	1003.8	2996.9	353.7	2643.1	0.13382
12	MECHMC	1266.9	317.7	428.6	2013.2	174.4	1838.8	0.09484
13	ELECMC	1819.3	1949.2	465.1	4233.6	207.8	4025.8	0.05162
14	VEHCL	958.5	1190.3	553.9	2702.7	487.1	2215.6	0.21985
15	OTHMFG	773.0	2937.0	227.7	3937.7	67.6	3870.1	0.01746
16	TRNSP	608.6	7637.5	5359.1	13605.1	-268.0	13873.2	-0.01932
17	ELEC	2933.2	0.0	1467.9	4401.1	-11.0	4412.1	-0.00249
18	CONSTR	1416.1	452.4	983.8	2852.3	96.8	2755.5	0.03513
19	SRVCE	11209.6	45602.2	21254.1	78065.9	1887.5	76178.4	0.02477
20	TOTAL	41184.2	127125.3	45570.0	213879.5	4550.7	209306.9	

Source: Computed

8. Input-Output Table

The 60–sector input–output table for the year 1989–90 is aggregated to 19 sectors as mentioned in Table 5. The table supplied by the Planning Commission gives the transactions in millions of rupees of commodity i used by industry j along with the make matrix which gives the different commodities produced by each industry. The model assumes that each industry produces only one commodity. So the *commodity × industry* table is converted to a *commodity × commodity* table using the procedures outlined in CSO (1990). The final input–output transactions table at 19 sectors under one industry one product assumption is as shown.

$$FDj = PFCEj + GFCEj + INVj + EXPORTSj - IMPORTSj$$

where PFCEj is private final consumption expenditure domestic + imported, GFCEj is government final consumption expenditure domestic + imported, INVj is investment plus change in stocks of good j domestic + imported, EXPORTSj is export of good j and IMPORTSj is imports of good j

$$IUse_j = \sum_{i=1}^{n} A_{ij}$$

$$GO_j = IUse_j + FD_j$$

$$NIT_i = GO_i - GVA_i - \sum_{i=1}^{n} A_{ij}$$

where, FDj is final demand for good j domestic + imported, I Usej is intermediate use of good j domestic + imported, GOj is gross output of good j and NITi is net indirect tax paid by industry i.

Table 38: Nineteen Sector Input–Output (IO) Table (Rs. 000 crores)

Imports$_{ij}$	AGRI	COAL	MINES	FOOD	TEXT	PAPER
AGRI	0	0	0	0.675	1.217	3.972
COAL	0	0	0	0	0	0
MINES	0	0	0	0	0	0
FOOD	0	0	0	0.269	0.008	0
TEXT	0	0	0	0	1.38	0.01
PAPER	0	0	0	0	0	0.03
CHEM	0	0.004	0.018	0.849	11.572	0.589
PETRO	0	0	0	0	0	0
FERT	13.204	0	0	0	0	0
CEMENT	0	0	0	0.034	0	0
METLS	0	0	0	0	0	0
MECHMC	0.021	0.059	0	0	0.04	0.255
ELECMC	0	0	0	0	0	0
VEHCL	0	0	0	0	0	0
OTHMFG	0	0	0	0	0	0
TRNSP	0	0	0	0	0	0
ELEC	0	0	0	0	0	0
CONSTR	0	0	0	0	0	0
SRVCE	0	0	0	0	0	0
	CHEM	PETRO	FERT	CEMENT	METLS	MECHMC
AGRI	0.657	0	0	0	0	0
COAL	0	20.896	0	0	5.62	0
MINES	2.364	0	4.098	8.796	3.261	0
FOOD	0.054	0	0	0	0	0
TEXT	0	0	0	0	0	0
PAPER	0	0	0	0	0	0
CHEM	10.403	0	1.67	0.244	0.353	0.116
PETRO	0.916	0	0	0	0	0
FERT	0	0	0	0	0	0
CEMENT	0	0	0	0.159	0	0
METLS	0.869	0	0	0.185	13.426	7.092
MECHMC	0.472	0.05	0.132	0.269	0.324	8.1
ELECMC	0	0	0	0	0	0
VEHCL	0	0	0	0	0	0
OTHMFG	0	0	0	0	0	0
TRNSP	0	0	0	0	0	0
ELEC	0	0	0	0	0	0
CONSTR	0	0	0	0	0	0
SRVCE	0	0	0	0	0	0

	ELECMC	VEHCL	OTHMFG	TRNSP	ELEC	CONSTR	SRVCE
AGRI	0	0	0	0	0	0	0.105
COAL	0	0	0	0	20	0	0
MINES	0	0	0.028	0	0	30.035	0

FOOD	0	0	0	0	0	0	0.093
TEXT	0	0	0	0	0	0	0
PAPER	0.012	0	0.01	0	0	0.299	3.454
CHEM	0.367	0.388	0.481	0	0	0	4.593
PETRO	0.157	0	0	5.985	0.477	0.555	0
FERT	0	0	0	0	0	0	0
CEMENT	0.016	0	0.036	0	0	0.75	0
METLS	7.743	6.072	9.291	0	0	0	0
MECHMC	0.196	0.997	0.17	0	0	0	0.321
ELECMC	3.829	0.132	0.425	0	0.713	0	0.026
VEHCL	0	4.888	0	0	0	0	0
OTHMFG	0.088	0.18	2.925	0	0	0.26	4.179
TRNSP	0	0	0	5.505	0	0	0
ELEC	0	0	0	0	0	0	0
CONSTR	0	0	0	0	0	0	0
SRVCE	0	0	0	0	0	0	3.395

Domestic$_{ij}$	AGRI	COAL	MINES	FOOD	TEXT	PAPER
AGRI	359.917	0	0.002	140.969	75.314	16.533
COAL	0.751	0.699	0.019	1.696	3.756	1.767
MINES	0	0.453	0.021	1.006	0.028	0.671
FOOD	12.186	0	0	42.456	0.69	0.135
TEXT	4.611	0.001	0.007	3.782	156.767	1.079
PAPER	0.32	0.622	0.07	3.127	5.004	30.99
CHEM	1.381	1.967	0.38	6.3	29.981	3.737
PETRO	17.258	2.576	0.972	3.82	7.639	1.007
FERT	73.13	0	0	0.053	0.004	0
CEMENT	0.007	0.511	0.015	0.797	0.035	0.053
METLS	0.026	0	0.006	0.387	1.155	1.575
MECHMC	7.246	7.575	0.411	1.1	2.814	0.507
ELECMC	0.07	0	0.001	0.001	0.004	0.01
VEHCL	2.28	0.6	0.007	0.002	0.005	0.012
OTHMFG	1.172	1.913	0.312	6.235	5.49	1.388
TRNSP	21.329	2.956	0.39	10.626	21.482	3.336
ELEC	13.309	6.253	1.245	3.655	28.765	3.799
CONSTR	34.106	2.265	0.062	2.101	2.331	0.392
SRVCE	68.432	7.398	0.779	45.478	81.973	12.747
	CHEM	PETRO	FERT	CEMENT	METLS	MECHMC
AGRI	13.061	0.12	0.065	0.801	0.299	0.495
COAL	1.987	91.448	2.344	6.037	6.367	0.214
MINES	2.704	0.056	4.098	10.884	9.453	0.008
FOOD	4.965	0.017	0.031	0.023	0.001	0
TEXT	6.692	0.189	2.042	2.636	0.198	0.141
PAPER	8.193	0.243	0.237	0.673	0.123	0.512
CHEM	66.54	3.883	10.17	1.7	2.128	1.96

PETRO	9.848	19.358	8.531	5.709	11.526	1.437
FERT	0.106	0	7.74	0.002	0	0
CEMENT	1.298	0.006	0.056	5.596	0.458	0.038
METLS	3.157	0.012	0.078	2.434	52.83	28.053
MECHMC	0.862	0.089	0.239	0.489	0.702	18.817
ELECMC	0.013	0	0	0.045	0.405	2.788
VEHCL	0.072	0	0	0.001	0.143	0.704
OTHMFG	7.72	1.913	1.811	1.62	15.119	4.792
TRNSP	9.272	6.324	3.169	7.007	8.902	3.3
ELEC	9.837	1.862	5.768	4.197	12.512	2.095
CONSTR	1.222	0.391	0.306	0.941	2.012	0.925
SRVCE	34.41	14.895	10.708	13.005	21.521	18.869

	ELECMC	VEHCL	OTHMFG	TRNSP	ELEC	CONSTR	SRVCE
AGRI	0.047	0.345	0.628	0.675	0.308	18.213	46.882
COAL	0.092	0.571	1.134	2.146	27.66	0	3.753
MINES	0.009	0.004	0.454	0	0.051	30.035	0.466
FOOD	0	0.009	0.035	0.501	0.007	0	8.044
TEXT	0.147	0.213	0.766	0.524	0.078	1.147	18.244
PAPER	1.759	0.822	1.706	2.718	0.577	16.248	22.59
CHEM	3.65	5.918	3.21	6.467	0.328	8.713	30.38
PETRO	1.214	2.686	1.987	39.573	3.548	11.272	2.953
FERT	0	0	0.019	0.001	0.001	0.812	0.416
CEMENT	0.358	0.222	0.635	0.21	0.24	36.518	0.512
METLS	24.321	22.574	32.138	1.009	0.802	66.59	5.614
MECHMC	0.51	2.029	0.871	0.823	2.343	0.846	1.73
ELECMC	26.777	2.393	2.563	3.287	5.279	20.011	3.35
VEHCL	0.178	22.435	2.299	34.595	0.064	0.515	2.875
OTHMFG	6.284	4.85	11.895	4.308	2.955	1.077	21.165
TRNSP	2.896	3.053	3.986	27.968	9.694	23.081	66.317
ELEC	1.752	2.818	3.719	5.656	53.339	9.736	14.682
CONSTR	0.797	2.639	0.765	9.802	4.151	0.072	36.325
SRVCE	14.484	14.141	16.021	31.486	9.989	60.736	119.73

Final DD	PFCE-D	GFCE-D	INV-D	PFCE-M	GFCE-M	INV-M	Exports
AGRI	100.318	0.134	4.311	1.016	0	0	2.899
COAL	0.285	0.01	0.074	0	0	0	0.009
MINES	0	0	0.542	0	0	0	0.49
FOOD	33.73	0.024	0.086	0.736	0.001	0	1.091
TEXT	34.927	0.076	3.797	0.347	0.001	0	7.319
PAPER	1.204	0.679	0.29	0.347	0.226	0	0.039
CHEM	8.011	0.22	4.367	2.229	0.052	0.031	2.34
PETRO	4.613	1.091	0.123	1.738	0.411	0	0.531
FERT	0	0.031	0.137	0	0	0	0.066
CEMENT	1.433	0	0.106	0.128	0	0.002	4.837
METLS	0	0	1.481	0	0	0	0.316
MECHMC	0.057	0.212	9.337	0.076	0.265	9.775	1.303

ELECMC	0.807	0.089	10.019	1.762	0.026	2.798	1.006
VEHCL	1.396	0.285	9.331	0.03	0.023	1.963	0.721
OTHMFG	2.597	1.684	2.602	1.902	1.233	1.678	0.842
TRNSP	14.321	1.189	0.574	3.243	0.155	0	3.096
ELEC	1.801	1.362	0	0	0	0	0.007
CONSTR	0	4.662	41.374	0	0	0	0
SRVCE	73.133	39.116	3.601	2.303	0.032	0	9.893

	Imported Indirect Tax	Domestic Indirect Tax	Total Indirect Tax	K	L	VA	O/P
AGRI	−8.035	−30.759	−38.795	670.986	560.024	1231.011	1809.746
COAL	0.02	3.294	3.314	47.545	22.055	69.6	108.703
MINES	0.017	0.526	0.543	11.502	5.335	16.837	22.077
FOOD	0.999	10.803	11.802	40.968	21.563	62.531	347.923
TEXT	10.831	15.031	25.862	106.872	89.141	196.013	645.111
PAPER	0.828	3.741	4.569	16.582	12.776	29.358	113.666
CHEM	12.015	19.491	31.506	47.437	22.327	69.764	283.228
PETRO	2.103	33.333	35.437	16.816	2.321	19.137	195.381
FERT	1.751	2.105	3.856	8.152	3.661	11.813	73.064
CEMENT	0.945	6.217	7.163	23.851	13.193	37.044	108.008
METLS	9.956	10.411	20.367	29.969	19.461	49.43	214.497
MECHMC	7.016	5.972	12.988	20.133	17.437	37.569	135.705
ELECMC	8.25	6.712	14.961	42.335	26.105	68.441	168.678
VEHCL	6.015	8.517	14.531	27.028	32.534	59.562	161.818
OTHMFG	10.666	6.034	16.7	39.377	29.117	68.494	170.028
TRNSP	10.528	20.71	31.238	135.834	79.021	214.855	417.844
ELEC	3.278	8.06	11.338	44.011	38.437	82.448	215.199
CONSTR	3.341	23.752	27.093	28.522	200.728	229.25	561.962
SRVCE	10.515	16.165	26.68	780.659	618.519	1399.178	1831.888

Source: Author and planing Commission

9. National Accounts

This section deals with the accounts of the government (both central and state). The various expenditure and receipts of the government are consolidated at one place to facilitate the construction of the social accounting matrix (SAM). The activities of the government can be classified under receipts (revenue and capital) and expenditures (domestic and external). The revenue and capital receipts of the government are depicted in Table 39.

The government has borrowed from the central bank and floated treasury bills, which are not accounted in a real model. So in the construction of the SAM, this amount is deducted from the government income. Apart from planned and non-planned expenditure on commodities, which forms a part of government final consumption ex-

Table 39: Capital and Revenue Receipts of the Government

	Revenue Receipts			Capital Receipts	
	Tax Head	Rs. Crores		Tax Head	Rs. Crores
1A	Indirect Tax		A		
I	Excise	22406.30	i	Market Loans	9707.64
Ii	Tariff	18036.13	ii	Small Savings	7958.20
iii	Sales Tax	15648.72	iii	PPF	616.70
iv	Sate Excise	4059.18	iv	Repayment Loans/Adv.	3130.45
V	MVT	1454.21	v	Transfers from ROW	3567.05
vi	Tax goods/passengers	941.10		Total A	24980.04
vii	Electricity Duty	1086.74			
viii	Stamp Duty	2363.37			
ix	Sugarcane Tax	90.86			
x	Entertainment Tax	427.49			
	Total Indirect Tax	66514.10			
1B	Direct Tax		B		
i	CIT + Other Tax	5555.74	i	PF (Non–Govt.)	6999.60
ii	Income Tax + Other	5608.86	ii	PF (State Govt.)	2972.94
	Total direct Tax	11164.60		Total PF	9972.54
1	Tax Revenue	77678.70			
2A	Revenue from Govt. Service			C	
i	Public Sector	−1121.17	i	Loans LIC/RBI	554.96
ii	Fiscal Sector	835.74	ii	Borrowings from RBI	−105.60
iii	General Services	1579.89	iii	Treasury Bills	173.60
Iv	Social Services	744.09		Total C	622.96
v	Economic Services	4864.98			
	Total Govt. Services	6903.53			
2B	Other Revenue				
I	Interest Receipts	6626.02			
2	Non–Tax Revenue	13529.55			
	Revenue Receipts	91208.25		Capital Receipts	35575.54
	Total Domestic Receipts				126783.79
	Borrowings from Abroad				2958.00
	Miscellaneous Capital Receipts				2924.95
	Total Government Revenue				132666.74

Source: Author and IES–PF

penditure (GFCE) as mentioned in the input–output table, the government also gives subsidies and transfers to individuals and institutions. This expenditure is classified in Table 40 is deducted from the income in addition to GFCE.

On the external front the economy imports and exports goods leading to a current account deficit or surplus as the case may be. This deficit or surplus is financed from transfers or borrowing from the rest of the world, net of interest obligations. This external account is shown in Table 41.

Table 40: Government Subsidies and Transfers to Households

	Subsidies			Transfers	
	Head	Rs. Crores			Rs. Crore
1A	Provision in Central Budget			A	
i	On controlled cloth	10	i	Pension	2958.45
ii	To railways	233	ii	Relief (non–planned)	517.25
iii	Industrial units in back-ward areas	101	iii	Relief (planned)	−21.77
iv	For river dredging	21	iv	Comp. To Landowners	2.79
v	To GIC	90	v	Social Security (NP)	1801.04
vi	To SCI	10	vi	Social Security (P)	1478.31
vii	For vegetable oil	4	vii	Interest Payments	18942.93
viii	To jute corp of India	12	viii	Rural Development	5302.23
ix	Interest	524			
	Total Transfers	36389.68		Total	1005
1B	Other Subsidies				
i	Fertiliser domestic	3771			
ii	Fertiliser imported	830			
iii	Agriculture	7868.34			
iv	Exports	2483.65			
v	Food subsidy	2512.32			
	Total	2512.32			
	Total Subsidies	17465.31			

Source: Author and IES–PF

Table 41: External Account

	Expenditure			Receipts	
	Head	Rs. Crores		Head	Rs. Crore
i	Imports	48903.0	i	Transfers to Households	4000.20
ii	NRI Interest	1558.2	ii	Transfers to Government	3567.05
	Total	50461.2	iii	Borrowings	2958.00
			iv	Misc. Capital Receipts	2924.95
			v	Exports	37011.00
				Total	50461.20

Source: Author, RBI Bulletin and IES–PF

10. Social Accounting Matrix for India

The SAM is prepared using the input–output table, factor payments and factor taxes and national accounts. The actual SAM is shown in Table 42. The entries in the SAM are primarily obtained from the input–output table. Table 39 is used as the basis for calculating the basic tax rates. The indirect taxes (66514.1), direct taxes (11164.6), revenue from government services (6903.53), total revenue (capital + revenue receipts

= 132666.74) are used to obtain the various tax rates in combination with table 40. The tax rates obtained after calibrating to the value mentioned in table 39, the entries are obtained by using these rates to calculate the taxes paid by various actors in the economy. These figures are used in row F of the SAM.

Table 42: Social Accounting Matrix for India

	A	B	C	D	E	F	G	H	I
A		721637.59						36806.10	758443.69
B	337103.55				283157.14	51189.17	99090.73		770540.59
C	174518.48								174518.48
D	209306.99								209306.99
E			174518.48	202403.46		36389.68		4000.20	417300.82
F	37514.67			6903.53	48094.15	2100.74	93.5.58	9654.90	113573.57
G					86060.53	22335.78			108396.31
H		48903.00				1558.20			50461.20
I	758443.69	770540.59	174518.48	209306.99	417311.82	113573.57	108396.31	50461.20	

Source: Author and Dervis, de Melo, and Robinson (1982)

11. Conclusion

The paper has illustrated in detail the procedure for building a Social Accounting Matrix, which is an indispensable part of general equilibrium modelling for economic analysis.

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