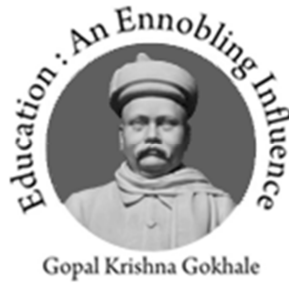


ESTIMATION OF LINKAGES  
BETWEEN  
ORGANIZED AND UN-ORGANIZED SECTORS OF INDIAN ECONOMY

A THESIS SUBMITTED TO



GOKHALE INSTITUTE OF POLITICS AND ECONOMICS

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

IN

ECONOMICS

by

Deepika Chawla

October 2015

ESTIMATION OF LINKAGES  
BETWEEN  
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A thesis submitted by

**DEEPIKA CHAWLA**

To



**Gokhale Institute of Politics and Economics**

*(Deemed to be university u/s 3 of the UGC Act, 1956)*

In order to fulfill partial requirements  
for awarding the degree of  
Doctor of Philosophy  
in the subject of  
Economics

Under the guidance of

**PROF. RAJAS PARCHURE      &      DR. PRADEEP APTE**

*(Principal Supervisor)*

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Estimation of Linkages between Organized and Un-organized Sectors of Indian Economy

Ph. D. thesis

October 2015

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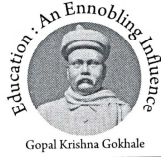
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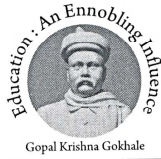
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*In the service of my Master Gurinder Singh Dhillon*

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## List of Abbreviations

(O)	Organized
(U)	Unorganized
CSO	Central Statistical Organization
DGET	Directorate general of Training
GVA	Gross Value Added
GVO	Gross Value of Output
NAS	National Accounts Statistics
NCEUS	National Commission for Enterprises in the Unorganized Sector
NDP	Net Domestic Product
NIC	National Industrial Classification
NIT	Net Indirect Taxes
NSSO	National Sample Survey Office
RBI	Reserve Bank of India
Total II Used	Total Intermediate Inputs Use

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*Deepika Chawla*

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*October 2015*

# 1

## **Organized and unorganized: Characterization of the dichotomy**

'Structuralist' development economics has characteristically used or employed study of the transitional economy as interaction between contrasting segments of the whole. These genres of models are generally termed as dualistic models of development process. The choice of 'two' sectors is devised to sharply bring out the 'contrast'.

The two distinguished segments (such as rural - urban, organized - unorganized, agricultural - non-agricultural) co-exist and have certain economic interactions among themselves. The nature of such interactions and their mutually affecting consequences bring out certain stark features of development process. Distinguishing features that characterize each segment maybe one or several e.g. capital or resources per workers, wages rates differential productivity etc.. Needless to mention, that the real economy consists of several layers of such distinctions. Dualism just facilitates demonstration of the development process of an economy in an easier and transparent manner.

Many less developed economies, including India, have presence of 'unorganized' cum 'informal' sectors which afford a livelihood for a very sizeable labor force and amounts for a significant share of the income produced in the economy. Our aim in this study is to incorporate this type of dualism features (i.e. organized and unorganized) within inter-industry framework.

We believe that incorporating such features, which may be broadly called institutional characteristics, in the inter-industry framework will enhance policy maker's understanding of the inter-dependence between these institutional segments.

The study undertaken has been presented in thesis as follows:

In chapter 2 we present a brief synoptic review of development process as portrayed in dual models. It may be noted that the exercise undertaken in this study does not employ or deal with the same set of variables/or processes. Nonetheless, they provide a useful starting point which inspires the use of institutional segment within inter-industry framework.



In chapter 3 we start explaining broad principles and methodology of segmenting of inter-industry table by the institutional category. We illustrate this by segmenting 3 by 3 table which becomes 6 by 6 table after segmentation.

We explain our choice of aggregation to be applied to original 130 by 130 table so that the incorporating of dualistic segmentation is feasible in view of the availability of data.

In chapter 4 we present Miyazawa's model, which has been used to calculate and interpret the linkages between organized and unorganized sectors of production at highest aggregation order possible in Chapter 5. In chapter 6 we summarize and conclude.

## 2

# **Significance of the institutional categorization: A theoretical and empirical perspective**

### *2.1 Interacting sectors: A view from development models*

Organizational heterogeneity including readily noticeable fragmentation is a key feature of developing economies. Organization of factors of production varies from feudal to capitalist forms. Economic studies of interactions between these segments date back to the loosely defined two-sector dual model studies of interactions between “industry and agriculture”, and “town and country” by classical economists. Ricardo (1815) had expected demand for food to increase in face of rapid industrial growth. Demand for food being inelastic in nature was to push the prices of agricultural commodities and, thus, wages of industrial workers up. Such rise of prices of the agricultural commodities relative to the industrial commodities would have implied deterioration in industry’s terms of trade. A rise in industrial costs of production was anticipated by him to result into a fall in the industrial rate of profit, and thus, impacting rate of growth of the economy negatively (as cited in Chakrabarti). Thus, dependency of growth on the manner of interaction between two very different co-existing sectors is well recognized.

The term ‘dual economy’ was coined by Boeke in 1953 to represent socio-economic division of Indonesian economy into its traditional and modern (Dutch operated capitalist) production sectors. This organizational asymmetry turns out to be of much significance in Lewis’s model (1954) ( as cited in Kanbur & McIntosh, 1987).

Arthur Lewis (1954) portrays development in terms of changing employment structure. Lewis presents the development process of a dual economy as an interaction between two labor segments, the ‘urban industrial sector’s labor’ (with higher marginal product of labor and higher wages) and ‘rural agricultural sector’s labor’ (with surplus labor and much lower wage rates). Productivity increases when abundantly available labor supply is combined with capital in the manufacturing production process. This abundant labor supply of labor barely meets its subsistence consumption levels at the offered wage level. Accompanying capital includes various vintages of labor intensive technologies of production.

Industrial laborers are employed at higher wages to take somewhat the regimented life of industrial sector as compared to the wages received for an unstructured life of the agriculture sector. Training and turnover costs are reduced by the firm by retaining its past employees in subsequent rounds of production rather than employing any new untrained entrants.

In Lewis's model the industrial sector reinvests its surplus i.e. value of output exceeding the wage costs. Saving always implicitly equal to investment implies an increase in capacity of production. Utilization of the increased capacity of production further necessitates additional employment of labor. As a consequence, fresh/untrained unorganized agricultural laborers get an opportunity to join the industrial sector in each successive phase of expansion and industrial sector employment expands with concomitant reduction in agricultural labor.

The situation changes when agricultural sector needs to offer higher wages in order to retain its labor rather than accepting labors' attrition to the industrial sector. High population pressure in agricultural sector is anticipated to delay the time period in which agricultural wage rates start increasing. However, a reverse population pressure i.e. higher rate of growth of population in the industrial sector than the agricultural sector is likely to stimulate the demand for agricultural output and, thus, result in increased wages of the later.

The period from which agricultural wages start rising is called as 'turning point' in development economics. Realization of the turning point qualifies the economy as 'developed' in the model.

However, Ranis and Fei (1961) suggest that faster annual rate of labor absorption by the industrial sector necessitates both:

- a. a higher rate of investment in the agricultural sector to feed the growing population (in the face of a possible absolute diminution of the agricultural labor force), and
- b. a higher rate of investment in the industrial sector, to absorb the newly freed agricultural workers, so as to maintain the balanced-growth between the two sectors.

Thus, investment in the industrial sector should be adequate to provide employment opportunities for the enlarged industrial labor force; and investment in the agricultural sector

must be adequate to increase the productivity sufficiently to feed the increased population in the face of a possibly reduced agricultural labor force.

In case the Lewis's model functions as anticipated, and also fulfills the criterion of balanced growth as suggested by Ranis and Fei, short run unemployment wouldn't have been a reality. Harris and Todaro model (1970) discusses unemployment in a similar situation. Harris and Todaro maintain that it is a worker's expected earning over life that causes him/her to undertake rural-urban migration against the availability of an actual job in the (urban) modern sector. In their model the return to the labor is higher due to "institutional factors". So those in rural area who aspire to have such high wages as paid in urban areas would: either do nothing else but to be in urban area and wait to be absorbed looking continuously for a job, or, to be in urban area, get an informal job (in which their earnings would be lower than their earnings in the rural areas) and simultaneously look for a job in urban area. In this way the chances of a person completely devoted to find a job in urban area are more favorable than the efforts of someone who is trying to do so only in part time, their model implicitly enables urban-unemployment.

Inverse interpretation of Harris-Todaro model suggests that the existence of under and un-employed indicates presence of higher statutory minimum in urban areas than what market mechanism is expected to yield in absence of government.

Mazumdar (1976), a critic of Harris-Todaro point out that workers in job have higher probability of finding a job due to their past experience as compared to the new entrants. It is a distinct argument in Harris-Todaro model that an experienced and a new entrant has an equal probability of absorption in organized sector.

Thus, the crux of dual models suggests that, the economic development implies integration of the two sectors that symbolically represent contrasting features of production. Such 'contrast' might exist in following senses:

- a. Geographical sense: Locations of operations of production as an activity of the two sectors might differ. Example the rural-urban divide.
- b. Technological sense: Production functions being utilized during the course of production might differ for the two sectors. For example, industries are considered capital intensive in operation, while agriculture labor intensive.

- c. Behavioral sense: Traits of the agents involved in production activity in the two sectors might be identified as a highlighting difference. Example, the “haves” (capitalists) are thought to be saving more than the “have-nots” (agricultural and industrial workers).
- d. Information sense: Availability of information to the capitalists about say each other’s costs of production might differ.
- e. Accumulation sense: Capabilities of final outputs in catering final demand might also differ among the two sectors. Example, agricultural output is more or less thought to be consumed only whereas industrial output can be invested, and
- f. Organizational sense: Way in which labor is being managed across the sectors might be different. Example, in capitalist sector labor is largely organized under labor legislations as opposed to the un-organized production setup.

The intended integration among the two contrasting sectors results by the interaction between the sectors. Exchanges of at least one of the following sort are expected to occur:

- a. Exchange of inputs: Inputs of both capital and labor might get exchanged.
  - i. Labor, a mobile input has a possibility of migrating to the location of, say, organized production (which largely coincides with urban cities) being aided by education and training.
  - ii. Capital is largely exchanged as an intermediate input by the two sectors. For example agro-processing industry buys the output of agriculture as an intermediate input while inputs required by the agriculture (like fertilizers, hybridized seeds, machines and tools) are supplied by the industry.
- b. Exchange of outputs: Labor working under two sectors might purchase output of the other sector and this might be true in case of both the sectors. For example, unorganized domestic labor is sold by agencies to the labor engaged in organized production. Also, Wheel detergent is consumed by better off people of rural areas largely engaged in unorganized production.
- c. Exchange of organizational skills: Inputs of capital and labor must be managed for the activity of production to happen. There are several examples of unorganized production being sold under an organized brand name like washing powder Nirma (NIRMA), Amul milk (AMUL), Lizzat papad (Shri Mahila Griha Udyog Lizzat Papad), etc.. In some cases

production at the stage of manufacturing, employment of labor is managed by organized agencies. Like in construction there is a high degree of organized migration. Workers in it are recruited through contractors. It is these contractors who fix wages and retain some parts of their earnings. (NCEUS, 2007b, p. 97).

The above listed exchanges tend to transfer labor within an economy via two routes:

- a. movement of unskilled labor from agriculture to unorganized industry or unorganized services
- b. movement of labor from informal employment in the unorganized sectors to either formal employment in organized sectors (preferably), or at least informal employment in the organized sectors

Both these routes are considered “decent” (Planning Commission, December 2011, p. 21). Those who are unemployed are likely to be left out on the routes mentioned above and, therefore, development models like Ranis & Fei (1961) and Harris & Todaro (1970) caution unemployment to kept in check if not completely eliminated.

Increased supply of labor in more remunerative jobs equilibrates the returns to factors of production in long run implicitly implying uplifting of a large section of labor earning subsistence wages to a higher wage earning bracket. Higher earnings are thereby to transform themselves into higher savings and, thus, higher accumulation. Higher savings and investment are expected then to push the economy to a path of ‘automatic’ growth.

Thus, it is the desirable trajectory of ‘automatic’ growth that makes the role of interactions between the two contrasting sectors in the dual models important.

Indian data sets capture two institutional classifications interaction of whose sectors bear a direct relevance for this study, namely, rural and urban classification; and the organized and unorganized production classification. The contribution of rural and urban areas in national domestic product (at current prices) is given in Table 2.1. Out of the seventeen industries located in rural areas (listed in Panel (a) of Table 2.1), seven industries, namely, mining and quarrying; manufacturing; trade hotels and restaurants; transport by other means; banking and insurance; and other services witnessed growth of about 18 to 22% during 1970 to 2005.

The industries located in urban areas had the maximum growth rate band (15-18 %) lower than the maximum growth rate band of rural areas (18-22%), if the growth rates were classified in five class intervals (referring to Panel (b) of Table 2.1). The urban industrial activities of fishing, mining and quarrying, manufacturing, electricity gas and water supply, construction, trade hotels and restaurants, transport by other means, communications, banking and insurance, public administration and defense, and other services fell in the class interval of industries having growth rates in the range of 15 to 18%.

**Table 2.1: Contribution of rural sector to National Domestic Product**

(Figures in Rs. Crores)

Panel (a)

Industry		1970-71	1980-81	1993-94	1999-00	2004-05
<b>1</b>	<b>agriculture, forestry &amp; fishing</b>	16600	41837	215890	395888	486780
1.1	agriculture	15690	38150	199941	366187	412831
1.2	forestry & logging	752	3120	10806	16195	56319
1.3	fishing	158	567	5143	13506	17630
<b>2</b>	<b>mining and Quarrying</b>	194	807	9849	13978	47014
<b>3</b>	<b>manufacturing</b>	1346	5954	30885	85665	326587
3.1	registered	661	2047	19765	51336	89427
3.2	unregistered	685	3907	11120	34329	61188
<b>4</b>	<b>elect. Gas &amp; water supply</b>	86	365	3334	10998	8442
<b>5</b>	<b>construction</b>	797	2633	17480	43019	100457
<b>6</b>	<b>trade, hotels &amp; restaurant</b>	625	4345	29424	67153	190227
6.1	trade			28079	59770	174323
6.2	hotels & restaurant			1345	7383	15904
<b>7</b>	<b>transport, storage &amp; communication</b>	289	856	12933	30997	180589
7.1	railways	116	165	2298	4531	6722
7.2	transport by other means	101	435	7399	19291	59795
7.3	storage		19	181	417	259
7.4	communication	72	237	3055	6758	7029
<b>8</b>	<b>financing, insurance, real estate &amp; business services</b>	1541	3484	22695	50310	375750
8.1	banking and insurance	124	525	6565	14895	24863
8.2	real estate, ownership of dwellings & business services	1417	2959	16130	35415	81975
<b>9</b>	<b>community, social &amp; personal services</b>	1459	4723	36301	71959	421517
9.1	public admin. & defence	690	1819	15637	21311	24234
9.2	other services	769	2904	20664	50648	81306
<b>10</b>	<b>NDP at factor cost</b>	22937	65004	378791	769967	2431899
11	Population (million)	434	522	655	726	777.7
12	per capita NDP (Rs.)	529	1245	5783	10606	16327

Source: NAS, Min. of S &amp; PI, 2007, 2011



**Table 2.2: Contribution of urban sector to National Domestic Product**

(Figures in Rs. Crores)

Panel (b)

Industry		1970-71	1980-81	1993-94	1999-00	2004-05
<b>1</b>	<b>agriculture, forestry &amp; fishing</b>	650	2254	13939	28670	30870
1.1	agriculture	500	1906	10978	24099	19445
1.2	forestry & logging	101	109	360	1033	5118
1.3	fishing	49	239	2601	3538	6307
<b>2</b>	<b>mining and Quarrying</b>	124	667	5101	18997	23913
<b>3</b>	<b>manufacturing</b>	3873	12744	72854	120461	532713
3.1	registered	2123	8003	46009	77317	123842
3.2	unregistered	1750	4741	26845	43144	79738
<b>4</b>	<b>elect. Gas &amp; water supply</b>	130	547	5467	13206	16951
<b>5</b>	<b>construction</b>	1047	3138	21269	56293	120522
<b>6</b>	<b>trade, hotels &amp; restaurant</b>	2813	9977	67203	181044	438424
6.1	trade			63245	167863	250525
6.2	hotels & restaurant			3958	13181	24339
<b>7</b>	<b>transport, storage &amp; communication</b>	978	2868	24788	74796	286382
7.1	railways	324	394	4494	10096	14976
7.2	transport by other means	525	2003	15489	48570	96356
7.3	storage		95	403	919	1593
7.4	communication	129	376	4402	15211	34252
<b>8</b>	<b>financing, insurance, real estate &amp; business services</b>	2028	5780	57846	162720	588780
8.1	banking and insurance	518	2819	33545	87716	142907
8.2	real estate, ownership of dwellings & business services	1510	2961	24301	75004	146921
<b>9</b>	<b>community, social &amp; personal services</b>	2207	7361	50734	174779	668255
9.1	public admin. & defence	945	3488	23123	85725	126164
9.2	other services	1262	3873	27611	89054	142783
<b>10</b>	<b>NDP at factor cost</b>	13850	45336	319201	830966	4032832
11	Population (million)	107	157	236	275	311.3
12	per capita NDP (Rs.)	1294	2888	13525	30217	44223

Source: NAS, Min. of S &amp; PI, 2007, 2011

This study, however, chooses to capture the details of interactions between organized and unorganized segments of production for the Indian economy. The choice of organized and unorganized segments is justified in section 2.2 below.

## *2.2 Meaning and relevance of organized and unorganized segmentation for Indian economy*

Indian statistical system recognizes organizational duality of factors of production under the label heads of organized (O) – unorganized (U) factors of production. The Delhi Expert Group on Informal sector Statistics (which was the one of the City Groups of United Nations Statistical Commission (UNSC) in 1997) concluded in one of its meetings that definition of informal sector cannot be harmonized across countries as it manifests itself in different ways in different countries (NCEUS, 2008, p. 11). In India there has not been a single definition of unorganized sector and various organizations like RBI, NSSO, DGET, NCEUS have been using varying definitions according to their specific requirements (NCEUS, 2008, pp. 11-16). India's Central Statistical Organization (CSO) estimates of organized and unorganized sector (which are in turn are derived from the data of NSSO rounds) are based on data availability and non-availability criterion, respectively (Naik, Ajaya Kumar; Former Consultant NCEUS, 2009). According to the Guidelines concerning a statistical definition of informal employment, endorsed by the Seventeenth International Conference of Labour Statisticians (November-December 2003), the operational criteria for defining informal jobs of employees are to be determined in accordance with data availability (National Statistical Commission, 2012, p. 79). It is for this reason that CSO's data has been opted for in the current study. CSO publishes data of organized and unorganized segments for all the industrial sectors of Indian economy. Data set as per organized and unorganized classification is printed in aggregated format in National Accounts Statistics (NAS). CSO defines organized sector as "all enterprises which are either registered or come under purview of any one of the Acts like the Indian Factories Act (1948), Mines and Minerals (Regulation and Development) Act (1957), the Company Law, the Central/State Sales Tax Acts, the Shops and Establishment Acts of the State governments are a part of organized (O) sector. Such Acts define conditions of the employment and social security benefits of the workers employed in the enterprises. For example, the "Factories Act, 1948", which provides for the health, safety, welfare and other aspects of labor is not applicable to industrial units employing

less than ten or twenty workers depending on whether power is used for manufacturing or not, respectively. Thus, no protection under the Factories Act is available to workers employed in small establishments not having the minimum threshold employment. Social security benefits in the case of sickness, maternity and employment injury provided under the “Employees State Insurance Act, 1948” are also not available to those outside the purview of Factories Act, 1948. Both the Acts cover only the workers in the manufacturing sector (NCEUS, 2007a, p. 35). Also, all government companies, departmental enterprises as well as public sector corporations are included. Forestry, irrigation works, plantations, recognized educational institutions and hospitals registered as non-profit making bodies” (CSO, National Accounts Statistics, Sources and Methods, 1980, p. 69). Details of coverage under the 16 organized (O) sectors per industry are listed below:

1. Agriculture : government irrigation system, non-departmental enterprises and crop production in plantation crops of tea, coffee and rubber covered in private corporate sector
2. Forestry : recorded production of industrial and fuel wood, as reported by the State Forest Departments
3. Fishing : public non departmental undertakings
4. Mining and quarrying : major minerals, as reported by the Indian Bureau of Mines
5. Manufacturing : registered factories covered under Factories Act
6. Electricity, gas and water supply : total activity of electricity, public sector part of gas and water supply
7. Construction : construction works in the public sector and private corporate sector (Joint Stock Companies)
8. Trade, hotels & restaurants : public and private corporate sector and cooperatives
9. Railways : entire sector
10. Transport by other means : public sector, private shipping companies, private airlines and road transport covered under the private corporate sector
11. Storage : warehousing corporation in public sector, cold storage coverage under Factory Act
12. Communication : public sector and companies covered under the private corporate sector
13. Banking and insurance : total activity excluding

- the commission agents attachments to Life Insurance Corporation of India, and,
  - unorganized non-banking financial undertakings including professional money lenders and pawn brokers
14. Real estate, ownership of dwellings and business services: Real estate and business services 'companies' in the private corporate sector and public sector
15. Public administration and defence : entire sector
16. Other services : public and private corporate sector medical, sanitary services, TV and radio broadcasting and other services and public, and recognized educational institutions in the private sector

Unorganized segment (U) comprises of the portion of economic activities excluded from the coverage of organized segment (CSO, 2007, pp. 308-309). Thus, it includes by definition all the small unincorporated private enterprises owned by individuals or households engaged in the sale and production of goods and services operated on a proprietary or partnership basis (NCEUS, 2007a, p. 48). Line of thought of including all unincorporated enterprises as unorganized goes in line with Venkataramaiah Committee which was set up by RBI on Informal Financial Sector Statistics. The committee submitted its report in the year 2001 (National Statistical Commission, 2012, pp. 36-37). In NSS Rounds, information regarding employment status, type of enterprise, type of job contract, availability of social security benefits, nature of job, existence of union/ association, etc. is collected to identify informal employment for usual status workers engaged in industry groups 012, 014, 015 and divisions 02 to 99 (for details see NSSO, 2007).

For the manufacturing sector, CSO's classification of registered and unregistered factories coincides with that of organized and unorganized segments. Annual Survey of Industries covers registered sector. Registered sector consists of:

- all factories covered under sections 2m(i) and 2m(ii) of Indian Factories Act (I.F.A.), 1948 which respectively refers to the factories employing more than 10 workers using power and more than 20 workers not using power on any day of preceding 12 months.

A 'factory' or 'establishment' is defined as any premises including precincts thereof

- Wherein 10 or more workers are working or were working on any day of the preceding 12 months, and in any part of which a manufacturing process is carrying on with the aid of power or ordinarily so carried on, or,
- Wherein 20 or more workers are working or were working on any day of the preceding 12 months, and in any part of which a manufacturing process is carrying on without the aid of power or ordinarily so carried on.

By implication, ‘unregistered’ manufacturing sector consists of all those enterprises which do not have more than

- 10 employees (with power)
- 20 employees (without power)

National Domestic Product data of the year 2003-04 reveals that the unorganized sector of production defined above contributed a proportion as high as approximately 60 per cent in Indian national income. This percentage has continued to be stable since mid-nineties (CSO, Min. of S &PI, 2006, 2008). Exact percentage contributions of organized and unorganized sectors of production for the years 1995-96, 1999-2000 and 2003-04 have been tabulated in Table 2.3.

**Table 2.3: Per sector decomposition of NDP by organization**

(Figures in percent)

Industry		1980-81		1984-85		1990-91		1994-95		2000-01		2003-04	
		(O)	(U)	(O)	(U)	(O)	(U)	(O)	(U)	(O)	(U)	(O)	(U)
<b>1</b>	<b>agriculture, forestry &amp; logging and fishing</b>	10.60	89.40	11.53	88.47	9.81	90.19	9.18	90.82	3.78	96.22	3.17	96.83
1.1	agriculture	7.35	92.65	8.77	91.23	8.29	91.71	8.04	91.96	3.51	96.49	2.86	97.14
1.2	forestry & logging	60.63	39.37	55.17	44.83	39.65	60.35	39.80	60.20	12.37	87.63	12.46	87.54
1.3	fishing	0.00	100.00	0.39	99.61	0.14	99.86	0.09	99.91	0.10	99.90	0.03	99.97
<b>2</b>	<b>mining and Quarrying</b>	91.44	8.56	94.46	5.54	93.06	6.94	93.16	6.84	91.01	8.99	91.10	8.90
<b>3</b>	<b>manufacturing</b>	51.48	48.52	59.51	40.49	63.04	36.96	64.74	35.26	75.55	24.45	72.83	27.17
<b>4</b>	<b>elect. Gas &amp; water supply</b>	93.23	6.77	92.93	7.07	95.91	4.09	97.42	2.58	97.17	2.83	97.02	2.98
<b>5</b>	<b>construction</b>	53.38	46.62	53.92	46.08	45.89	54.11	46.95	53.05	39.79	60.21	37.53	62.47
<b>6</b>	<b>trade, hotels &amp; restaurant</b>	6.67	93.33	6.50	93.50	5.27	94.73	9.38	90.62	16.29	83.71	19.43	80.57
6.1	trade	6.43	93.57	6.32	93.68	4.85	95.15	8.87	91.13	15.16	84.84	18.47	81.53
6.2	hotels & restaurant	10.21	89.79	9.00	91.00	11.04	88.96	16.74	83.26	28.73	71.27	30.41	69.59
<b>7</b>	<b>transport, storage &amp; communication</b>	67.41	32.59	62.06	37.94	60.89	39.11	56.19	43.81	43.22	56.78	39.03	60.97
7.1	railways	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00
7.2	transport by other means	48.23	51.77	39.23	60.77	34.04	65.96	28.32	71.68	21.48	78.52	20.47	79.53
7.3	storage	27.33	72.67	36.86	63.14	44.66	55.34	45.59	54.41	58.46	41.54	72.60	27.40
7.2+7.3	transport by other means & storage	46.97	53.03	39.11	60.89	34.43	65.57	28.80	71.20	22.09	77.91	20.92	79.08
7.4	communication	100.00	0.00	100.00	0.00	100.00	0.00	94.31	5.69	76.72	23.28	64.21	35.79
<b>8</b>	<b>financing, insurance, real estate &amp; business services</b>	32.41	67.59	34.58	65.42	36.21	63.79	42.37	57.63	50.76	49.24	54.73	45.27
8.1	banking and insurance	96.33	3.67	96.83	3.17	94.60	5.40	91.89	8.11	90.56	9.44	90.45	9.55
8.2	real estate, ownership of dwellings & business services	2.10	97.90	2.18	97.82	3.79	96.21	5.71	94.29	19.34	80.66	25.11	74.89
<b>9</b>	<b>community, social &amp; personal services</b>	66.43	33.57	70.24	29.76	74.18	25.82	72.41	27.59	76.44	23.56	73.33	26.67
9.1	public admin. & defence	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00
9.2	other services	45.95	54.05	50.39	49.61	55.43	44.57	53.85	46.15	58.72	41.28	54.20	45.80
8.2+9.2	Other services including real estate	25.79	74.21	27.77	72.23	29.72	70.28	30.63	69.37	40.49	59.51	39.96	60.04
<b>10</b>	<b>All sectors</b>	32.21	67.79	35.88	64.12	36.88	63.12	37.87	62.13	39.49	60.51	40.63	59.37

Source: (CSO, Min. of S &amp; PI, 2006, 2008)

With 60 per cent of income being stably earned under unorganized (refer to Table 2.3), it becomes important to analyze the underlying dynamics and suggest any policy measures that need to be taken in order to dissolve this share; this study aims at the same. Importance of the dissolution of the share of unorganized sector is emphasized in development models as discussed in section 2.1.

On the employment front, comparison of the estimates of 55th NSSO Round (1999-00) with those of 61st NSSO Round (2004-05) (refer to Table 2.4) show an increase in total employment in the economy from 397 million to 457 million. Change in the number of organized or formal workers has been nil or rather marginally negative (i.e. 35 million in both the years). Both the facts together indicate towards increase in employment of an informal kind i.e., 61 million (from 362 to 423 million) of about 17 per cent. From a sectoral point of view, the employment in organized sector recorded an increase of 8.5 million or 16 per cent (from 54.1 million to 62.6 million). This implies entire increase in the employment in the organized sector of an informal kind over 1999-00 to 2004-05.

Persistently rising informality of employment (share of informal employment being as high as 92.4 per cent in the year 2004-05) and consistently high share of unorganized sector in NDP (of about 60 per cent since mid-nineties) have prompted this study to bring out the interactive role of unorganized sector of production in the current state of Indian economic development.

**Table 2.3: Cross-Tabulation of Organized and Unorganized Sectors' employment**

(in millions)

Panel (a)

1999-2000	Informal/Unorganized worker	Formal/Organized Worker	Total
Informal/Unorganized sector	341.3 (99.6)	1.4 (0.4)	342.7 (100)
Formal/Organized sector	20.5 (37.8)	33.7 (62.2)	54.2 (100)
Total	361.8 (91.2)	35.1 (8.8)	396.9 (100)

2004-2005	Informal/Unorganized worker	Formal/Organized Worker	Total
Informal/Unorganized sector	393.5 (99.6)	1.4 (0.4)	394.9 (100)
Formal/Organized sector	29.1 (46.6)	33.4 (53.4)	62.5 (100)
Total	422.6 (92.4)	34.8 (7.6)	457.4 (100)

Source: Retrieved from NSS Rounds (55<sup>th</sup> and 61<sup>st</sup>)



### 3

## **Embodiment of the institutional distinctions with input-output framework**

For measuring the linkages between organized and unorganized sectors of production, data pertaining to Indian industries should be either available or estimated in accordance with organized-unorganized classification. Input-output flows per industry for all the industries of India are compiled by Central Statistical Organization (C.S.O.) in the form of input-output tables. These input-output flows are, however, not based on the categorization of organized and unorganized segments. Hence, an ex-ante need to bifurcate or split the columns (where each column denotes composition of inputs required by a particular industry from all the industries including itself) and the rows (where each row denotes distribution of an industry's output throughout the economy, to all the industries including itself and others, taken as consumers) of the input output table into organized (O) and unorganized (U) segments arises.

### ***3.1 Organized and unorganized classification in input-output framework***

An inter industry transactions matrix of a hypothetical economy constituting  $n$  producing sectors records sales (in rows) and purchases (in columns) of these  $n$  producing sectors to and from all industries of an economy including themselves, respectively, of both intermediate and final type (refer Figure 3.1).

**Figure 3.1: Inter-industry transactions matrix**

		Purchases by Industries					Final demand		
		<i>l</i>	...	<i>j</i>	...	<i>n</i>	Total II Use	Total Final Use	Total Output
Sales by Industries	<i>l</i>								
	⋮								
	<i>i</i>								
	⋮								
	<i>n</i>								
	Total								
Value added	Net Indirect Taxes								
	GVA (Compensation made to employees, owners of land and capital)								
	Total Output								

If the transactions between pairs of industries (marked by the shaded region in Figure 3.1), from industry  $i$  to industry  $j$  be denoted by  $z_{ij}$ , and, the sales made to non-industry consumers like households, government, etc for final use be denoted collectively by  $f$ , then, the distribution of total output of sector  $i$  (denoted by  $x_i$ ) can be written in the form of an accounting type equation as:

$$x_i = z_{i1} + \dots + z_{ij} + \dots + z_{in} + f_i = \sum_{j=1}^n z_{ij} + f_i \quad (3.1)$$

**Figure 3.2: Inter-industry transactions table with column split**

	<i>I</i>		...	<i>j</i>		...	<i>n</i>		Total II Use	Total Final Use	Total Output
	<i>I</i> <sup>O</sup>	<i>I</i> <sup>U</sup>		<i>j</i> <sup>O</sup>	<i>j</i> <sup>U</sup>		<i>n</i> <sup>O</sup>	<i>n</i> <sup>U</sup>			
<i>I</i>	$z_{11}^O$	$z_{11}^U$		$z_{1j}^O$	$z_{1j}^U$		$z_{1n}^O$	$z_{1n}^U$			
⋮											
<i>i</i>	$z_{i1}^O$	$z_{i1}^U$		$z_{ij}^O$	$z_{ij}^U$		$z_{in}^O$	$z_{in}^U$			
⋮											
<i>n</i>	$z_{n1}^O$	$z_{n1}^U$		$z_{nj}^O$	$z_{nj}^U$		$z_{nn}^O$	$z_{nn}^U$			
Total	$t_1^O$	$t_1^U$		$t_j^O$	$t_j^U$		$t_n^O$	$t_n^U$			
NIT											
GVA	$g_1^O$	$g_1^U$		$g_j^O$	$g_j^U$		$g_n^O$	$g_n^U$			
Total Output (Split)	$x_1^O$	$x_1^U$		$x_j^O$	$x_j^U$		$x_n^O$	$x_n^U$			
Total Output	$x_1$			$x_j$			$x_n$				

If each purchase of industry  $j$  from industry  $i$  ( $z_{ij}$ ) is split into purchases made by organized and unorganized segments of sector  $j$  from sector  $i$  (refer to Figure 3.2), in accordance to the shares of organized and unorganized segments' per industry in the national income, so that

$$x_j = (z_{1j}^O + \dots + z_{ij}^O + \dots + z_{nj}^O) + (z_{1j}^U + \dots + z_{ij}^U + \dots + z_{nj}^U) + g_j^O + g_j^U \quad (3.2)$$

$$\Rightarrow x_j = \sum_{i=1}^n z_{ij}^O + \sum_{i=1}^n z_{ij}^U + g_j^O + g_j^U \quad (3.3)$$

Where ' $g$ ' represents the incomes received or gross value added by various entities, including government in the form of Net Indirect Taxes, during the production activity of the  $j^{th}$  industry, equations representing purchases of each of the  $n$  industries would then look like:

$$\begin{aligned} x_1 &= (z_{11}^O + \dots + z_{i1}^O + \dots + z_{n1}^O) + (z_{11}^U + \dots + z_{i1}^U + \dots + z_{n1}^U) + g_1^O + g_1^U \\ &\vdots \\ x_j &= (z_{1j}^O + \dots + z_{ij}^O + \dots + z_{nj}^O) + (z_{1j}^U + \dots + z_{ij}^U + \dots + z_{nj}^U) + g_j^O + g_j^U \\ &\vdots \\ x_n &= (z_{1n}^O + \dots + z_{in}^O + \dots + z_{nn}^O) + (z_{1n}^U + \dots + z_{in}^U + \dots + z_{nn}^U) + g_n^O + g_n^U \end{aligned} \quad (3.4)$$

Let

$$\begin{aligned}
 X_C &= [x_1^O \quad \cdots \quad x_n^U], & (3.5) \\
 Z_C &= \begin{bmatrix} z_{11}^O & \cdots & z_{n1}^O & z_{11}^U & \cdots & z_{n1}^U \\ \vdots & \ddots & \vdots & \vdots & \ddots & \vdots \\ z_{1n}^O & \cdots & z_{nn}^O & z_{1n}^U & \cdots & z_{nn}^U \end{bmatrix} \text{ and} \\
 g &= \begin{bmatrix} g_1^O & g_1^U \\ \vdots & \vdots \\ g_n^O & g_n^U \end{bmatrix}
 \end{aligned}$$

Then the information in (3.4) can be summarized in matrix notation as:

$$X_C = Z_C + g \quad (3.6)$$

Note that the order of matrices  $X_C, Z$  and  $g$  is  $n \times 2n$ . Thus,  $X_C, Z$  and  $g$  are rectangular.

If sale transactions of industry  $i$  to industry  $j$  ( $z_{ij}$ ) are to be split into organized and unorganized segments like diagrammatically illustrated in Figure 3.3, then estimates of the total output row totals have to be made on the basis of bifurcated total output column totals, in case the data of organized and unorganized intermediate or final use is unavailable. So that

$$x_i = (z_{i1}^O + \cdots + z_{ij}^O + \cdots + z_{i1}^U) + (z_{i1}^U + \cdots + z_{in}^U + \cdots + z_{i1}^U) + f_i^O + f_i^U \quad (3.7)$$

$$\Rightarrow x_i = \sum_{j=1}^n z_{ij}^O + \sum_{j=1}^n z_{ij}^U + f_i^O + f_i^U \quad (3.8)$$

**Figure 3.3: Inter-industry transactions table with row split**

Sectors		1	...	j	...	n	Total II Use	Total Final Use	Total Output
1	$1^O$	$z_{11}^O$		$z_{1j}^O$		$z_{1n}^O$	$T_1^O$	$f_1^O$	$x_1^O$
	$1^U$	$z_{11}^U$		$z_{1j}^U$		$z_{1n}^U$	$T_1^U$	$f_1^U$	$x_1^U$
⋮									
i	$i^O$	$z_{i1}^O$		$z_{ij}^O$		$z_{in}^O$	$T_j^O$	$f_j^O$	$x_i^O$
	$i^U$	$z_{i1}^U$		$z_{ij}^U$		$z_{in}^U$	$T_j^U$	$f_j^U$	$x_i^U$
⋮									
n	$n^O$	$z_{n1}^O$		$z_{nj}^O$		$z_{nn}^O$	$T_n^O$	$f_n^O$	$x_n^O$
	$n^U$	$z_{n1}^U$		$z_{nj}^U$		$z_{nn}^U$	$T_n^U$	$f_n^U$	$x_n^U$
Total									
NIT									
GVA									
Total Output									

A set of equations like (3.9) identify the sale of output by n industries:

$$\begin{aligned}
 x_1 &= (z_{11}^O + \dots + z_{1j}^O + \dots + z_{1n}^O) + (z_{11}^U + \dots + z_{1j}^U + \dots + z_{1n}^U) + f_1^O + f_1^U \\
 &\vdots \\
 x_i &= (z_{i1}^O + \dots + z_{ij}^O + \dots + z_{in}^O) + (z_{i1}^U + \dots + z_{ij}^U + \dots + z_{in}^U) + f_i^O + f_i^U \\
 &\vdots \\
 x_n &= (z_{n1}^O + \dots + z_{nj}^O + \dots + z_{nn}^O) + (z_{n1}^U + \dots + z_{nj}^U + \dots + z_{nn}^U) + f_n^O + f_n^U
 \end{aligned} \tag{3.9}$$

If

$$X_R = \begin{bmatrix} x_1^O \\ \vdots \\ x_n^U \end{bmatrix}, Z_R = \begin{bmatrix} z_{11}^O & \dots & z_{1n}^O \\ \vdots & \ddots & \vdots \\ z_{n1}^O & \dots & z_{nn}^O \\ z_{11}^U & \dots & z_{1n}^U \\ \vdots & \ddots & \vdots \\ z_{n1}^U & \dots & z_{nn}^U \end{bmatrix} \text{ and } f_R = \begin{bmatrix} f_1^O \\ \vdots \\ f_n^O \\ f_1^U \\ \vdots \\ f_n^U \end{bmatrix} \tag{3.10}$$

Then the information in equation (3.9) can be summarized in matrix notation as:

$$X_R = Z_R + f_R \tag{3.11}$$

Thus, if rows and columns of the  $n$  industry economy are split into their organized and unorganized segments, a double ordered ( $2n$  by  $2n$ ) institutionally split inter-industry transactions matrix as per organized-unorganized classification is obtained (Note that the orders of matrices  $Z_C$  and  $Z_R$  as given in equations (3.6) and (3.11) are  $n$  by  $2n$  and  $2n$  by  $n$ , respectively).

### 3.2 Combining data from external source

In case additional data of inputs and outputs of organized and unorganized segments (whatever available from a reliable external source) is gathered, the row and column totals for industry  $j$  as given in input output table might not equal the row and column totals as given in the external source. These row and column totals from both the sources may be matched using a quasi-RAS method.

Demonstration of the procedure to generate such an input-output table that incorporates the organized-unorganized classification within sectors, incorporating data from an external source, is presented in the following section at 3 by 3 aggregation level for a hypothetical example.

### 3.3 Procedure of splitting: A 3 by 3 Example

Data for a 3 by 3 hypothetical economy is given in Table 3.1.

**Table 3.1: Hypothetical inter-industry transactions matrix**

(Figures in Rs. Lakhs)

Sectors	I	II	III	Total II Use	Total Final Use	Total Output
I	21	11	18	50	30	80
II	11	37	12	60	80	140
III	8	12	10	30	130	160
Total	40	60	40	140	240	380
NIT	-30	70	30	70	20	90
GVA	90	20	60	170	0	0
Total Output	100	150	130	380	260	0

Row of gross value added (GVA) is split into gross value added of organized and unorganized segments by applying the estimated shares of organized and unorganized segments in national

income for all the sectors. Table 3.2 gives hypothetical shares of organized and unorganized segments per sector in national income at 3 by 3 level of aggregation.

**Table 3.2: Shares of organized (O) and unorganized (U) segments**

(Figures in percent)

Sectors	(O)	(U)	Total
I	4	96	100
II	62	38	100
III	46	54	100
All sectors	41	59	100

Input-output table looks like Table 3.3 after the gross value added row gets bifurcated into its organized and unorganized components.

**Table 3.3: Input-output table with GVA row split**

(Figures in Rs. Lakhs)

Sectors	I	II	III	Total II Use	Total Final Use	Total Output
I	21	11	18	50	30	80
II	11	37	12	60	80	140
III	8	12	10	30	130	160
Total	40	60	40	140	240	380
NIT	-30	70	30	70	20	90
GVA(O)	3.6	12.4	27.6	69.7	0	0
GVA(U)	86.4	7.6	32.4	100.3	0	0
Total Output	100	150	130	380	260	0

It is assumed that input-output ratios of only two sectors, namely for sectors I and II, are available out of the three sectors. This assumption has been taken so as to incorporate cases of sectors for which the data is unavailable. The input-output ratios of organized components of sectors I and II are subtracted from one to get the value added (organized) per unit of gross value of output (GVO) (refer Table 3.4).

**Table 3.4: Calculating value added (organized) per unit of GVO**

Sectors	I	II
Input - Output ratio (O)	0.1	0.7
Value added per unit of GVO [=1-input-output ratio(O)]	0.9	0.3

‘Value added per unit of GVO’ for the organized sector is utilized to estimate the ‘gross value of output (organized)’ [ $GVO(O) = GVA(O) / \text{Value added per unit of GVO}$ ]. ‘Estimated gross value of output of the unorganized sector’ then is calculated as a residual [i.e. Total output of the input-output table – Estimated gross value of output (organized)]. Organized and unorganized gross value of output for sectors I and II are estimated and listed in Table 3.5.

**Table 3.5: Estimating GVO (organized) & GVO (unorganized)**

(Figures in Rs. Lakhs)

Sectors	I	II	III	Total II Use	Final Use	Total Output
I	21	11	18	50	30	80
II	11	37	12	60	80	140
III	8	12	10	30	130	160
Total	40	60	40	140	240	380
NIT	-30	70	30	70	20	90
GVA(O)	3.6	12.4	27.6	69.7	0	0
GVA(U)	86.4	7.6	32.4	100.3	0	0
Total Output	100	150	130	380	260	0
Estimated GVO (O)	4	41.3				
Estimated GVO (U)	96	108.7				



‘Gross value added (organized)’ is subtracted from the ‘Estimated gross value of output (organized)’ to arrive at ‘estimated inputs (organized)’. These ‘estimated inputs (organized)’ are then subtracted from ‘total inputs’ given in the input-output table in order to ‘estimate inputs (unorganized)’. Table 3.6 gives the estimated inputs of organized and unorganized segments.

**Table 3.6: Estimating inputs (organized) & (unorganized)**

(Figures in Rs. Lakhs)

Sectors	I	II	III	Total II Use	Final Use	Total Output
I	21	11	18	50	30	80
II	11	37	12	60	80	140
III	8	12	10	30	130	160
Total	40	60	40	140	240	380
NIT	-30	70	30	70	20	90
GVA(O)	3.6	12.4	27.6	69.7	0	0
GVA(U)	86.4	7.6	32.4	100.3	0	0
Total Output	100	150	130	380	260	0
Estimated GVO (O)	4	41.3				
Estimated GVO (U)	96	108.7				
Estimated Inputs(O)	0.4	28.9				
Estimated Inputs(U)	39.6	31.1				

In the above method, ‘gross value of output (unorganized)’ and ‘inputs (unorganized)’ are estimated as a *residual* since input-output ratios of unorganized segment are treated as unavailable. However, in case of the availability of input-output ratios of unorganized segment from an *alternative source*, estimation of gross value of output (unorganized) and inputs (unorganized) can be done by the procedure followed in the case of ‘gross value of output (organized)’ and ‘inputs (organized)’. Thus, in the second method for estimating gross value of output (unorganized) and inputs (unorganized), the input-output ratio of unorganized segment also are extracted from an external source and are used to estimate ‘value added (unorganized) per unit of GVO’ by subtracting the ‘extracted input-output ratio (unorganized)’ from one. ‘Gross value added (unorganized)’ is divided by ‘value added (organized) per unit of GVO’ to yield ‘gross value of output (unorganized)’ estimates. ‘Gross value added (unorganized)’ sector is further subtracted from ‘gross value of output (unorganized)’ for estimating ‘inputs (unorganized)’. Table 3.7, Table 3.8, and Table 3.9 respectively, give the ‘value added

(unorganized) per unit of GVO', 'gross value of output (unorganized)' and 'inputs (unorganized)' are calculated as per the second method. 'Gross value of output (organized and unorganized)' and 'inputs (organized and unorganized)' are added for obtaining the total 'estimated gross value of output and inputs'.

'Estimated gross value of output' is used for arriving at row totals matching with the external data. 'Estimated intermediate sales' are found by multiplying the 'proportion of intermediate sales' with the total 'output of manufacturing sector'. For sector III, the intrinsic input-output ratios of input-output table are kept as it is due in absence of alternative source of data. Table 3.10 lists the 'gross value of output and input totals', 'estimated intermediate sales' and obtained 'row and column vectors of output sold and inputs used'.

**Table 3.7: Calculating value added (unorganized) per unit of GVO**

Sectors	I	II
Input - Output ratio (U)	0.9	0.8
Value added per unit of GVO [1-input-output ratio(U)]	0.1	0.2

**Table 3.8: Estimating GVO (organized) & GVO (unorganized) by 2nd method**

(Figures in Rs. Lakhs)

Sectors	I	II	III	Total II Use	Final Use	Total Output
I	21	11	18	50	30	80
II	11	37	12	60	80	140
III	8	12	10	30	130	160
Total	40	60	40	140	240	380
NIT	-30	70	30	70	20	90
GVA(O)	3.6	12.4	27.6	69.7	0	0
GVA(U)	86.4	7.6	32.4	100.3	0	0
Total Output	100	150	130	380	260	0
Estimated GVO (O)	4	41.3				
Estimated GVO (U)	864	38				

**Table 3.9: Estimating inputs (organized) & (unorganized) by 2nd method**

(Figures in Rs. Lakhs)

Sectors	I	II	III	Total II Use	Total Final Use	Total Output
I	21	11	18	50	30	80
II	11	37	12	60	80	140
III	8	12	10	30	130	160
Total	40	60	40	140	240	380
NIT	-30	70	30	70	20	90
GVA(O)	3.6	12.4	27.6	69.7	0	0
GVA(U)	86.4	7.6	32.4	100.3	0	0
Total Output	100	150	130	380	260	0
Estimated GVO (O)	4	41.3				
Estimated GVO (U)	864	38				
Estimated Inputs(O)	0.4	28.9				
Estimated Inputs(U)	777.6	30.4				

**Table 3.10: Estimating the total intermediate inputs column by 2nd method**

(Figures in Rs. Lakhs)

Sectors	I	II	III	Total II Use	Total Final Use	Total Output	Intermediate sales/Total output	Estimated Intermediate inputs
I	21	11	18	50	30	80	0.6	542.5
II	11	37	12	60	80	140	0.4	34
III	8	12	10	30	130	160		
Total	40	60	40	140	240	380		
NIT	-30	70	30	70	20	90		
GVA(O)	3.6	12.4	27.6	69.7	0	0		
GVA(U)	86.4	7.6	32.4	100.3	0	0		
Total Output	100	150	130	380	260	0		
Estimated GVO (O)	4	41.3						
Estimated GVO (U)	864	38						
Estimated GVO	868	79.3						
Estimated Inputs(O)	0.4	28.9						
Estimated Inputs(U)	777.6	30.4						
Estimated Inputs	778	59.3						

Information given in Table 3.10 contains four critical vectors: (rows of) total and estimated inputs and (columns of) total and estimated intermediate inputs used. Information contained in these four vectors enables application of RAS technique for updating intermediate matrix.

Traditionally RAS is used for projecting later year's input-output table based on an available previous year's table and limited information of the future year. Note that application of RAS assumes a gradual change in input-output coefficients. In the current application, however, problem changes to estimation of new inter-industry transactions matrix based on inputs and outputs calculated from an external source, given a hypothetical input-output table of a 3 by 3 economy. Hence, the task gets redefined to updating of the input-output table via vectors of row and column multipliers given the row and column sum totals based on external data.

Iterations are carried out to get to input-output coefficients based on external data from the given input-output coefficients of hypothetical economy. Proportional adjustments are carried out on the rows and columns of the hypothetical input-output table until the row and column sums of estimated matrix match row and column sums of external data. A set of two proportional adjustments are carried out in alternating sequence of column and row adjustments, or vice-versa, imparting RAS technique its alternative name "bi-proportional method". The values of the convergent matrix or final estimated matrix values are independent of the sequence of the two adjustments.

First estimated matrix is generated by multiplying total output vector based on external data with inter-industry transactions of hypothetical economy. Row and column sums of the first estimated matrix are compared with the row and column sums of external data. Deviations of the row and column sums of the first estimated matrix from the row and column sums of external data are recorded as the first set of row multipliers ( $\hat{r}$ ). First set of row multipliers ( $\hat{r}$ ) are obtained by dividing elements of first estimated matrix's row sum vector with the elements of row sum vector of the external data. First vector of row multipliers is multiplied with the first estimate of the new input-output table so as to make row sums of external data and estimated matrix equal. Column sums of this second estimated matrix still differ from column total vector based on external data. Column multipliers ( $\hat{s}$ ) are, therefore, found by comparing the column sums of second estimated matrix and external data based column totals. Column multiplier vector is multiplied with the second estimate to render column totals of second estimated matrix

and external data based column totals equal. Multiplication of the column multiplier vector with second estimated matrix gives third estimated matrix. The process of iterative adjustments is followed till both the row and column sums of the estimated matrix become equal to row and column sums calculated from external data. Note that multipliers  $\hat{r}$  and  $\hat{c}$  act as scaling factors in the adjustments.

Simple RAS method described in the above paragraph is applied to estimate the input-output table based on external totals. The reasons are twofold. One, the iterative process of RAS does not necessarily converge to a unique solution. Two, simple RAS method performs better in input-output table updating than extrapolation and modified RAS method as least errors are found in the updated table when it is compared to the actual table of the same year (Miller & Blair, 1985).

Settings in MATLAB are adjusted so as to stabilize the row and column errors up to five digit level while conducting RAS transformations. It takes seven iterations for the hypothetical economy in consideration to stabilize. The errors at each step of RAS for the 3 by 3 hypothetical economy are listed in Table 3.11:

**Table 3.11: Iterations in RAS**

iter,rerr,cerr: 1	0.89373	0.72901
iter,rerr,cerr: 2	0.4395	0.40086
iter,rerr,cerr: 3	0.40096	0.39618
iter,rerr,cerr: 4	0.39949	0.396
iter,rerr,cerr: 5	0.39943	0.39599
iter,rerr,cerr: 6	0.39943	0.39599
iter,rerr,cerr: 7	0.39943	0.39599

Table 3.12 below gives the RAS updated transactions matrix based on external totals.

**Table 3.12: New industry transactions matrix**

(Figures in Rs. Lakhs)

	I	II	III	Total Intermediate inputs
I	708.62755	40.84629	35.28022	784.75405
II	34.30935	12.69939	2.17401	49.18274
III	35.06310	5.78766	2.54578	43.39654
Total	778.00000	59.33333	40.00000	877.333

Columns of RAS updated Table 3.12 are split into organized and unorganized components as per the national income contribution by industry (refer Table 3.2). Dimension of the transactions matrix hence becomes  $3 \times 6$  after the column split (refer Table 3.13).

**Table 3.13: Column Split**

(Figures in Rs. Lakhs)

	A1	A0	B1	B0	C1	C0
A	28.345102	680.282446	25.324700	15.521590	16.228899	19.051316
B	1.372374	32.936975	7.873619	4.825767	1.000043	1.173964
C	1.402524	33.660579	3.588348	2.199310	1.171057	1.374720

Rows are split into organized and unorganized components as per the shares of organized and unorganized segments in Gross value of output by industry. Table 3.14 lists resultantly double ordered inter-industry transactions matrix incorporating the organized and unorganized classification per industry for 3 by 3 level of aggregation.

**Table 3.14: Double ordered inter-industry transactions matrix**

(Figures in Rs. Lakhs)

	I1	I0	II1	II0	III1	III0	Total Output
I1	0.13	3.13	0.12	0.07	0.07	0.09	4.00
I0	28.21	677.15	25.21	15.45	16.15	18.96	864.00
II1	0.72	17.16	4.10	2.51	0.52	0.61	41.33
II0	0.66	15.78	3.77	2.31	0.48	0.56	38.00
III1	0.58	13.80	1.47	0.90	0.48	0.56	27.60
III0	0.83	19.86	2.12	1.30	0.69	0.81	32.40

\*First digit of the code I,...,III specify the three sectors of the hypothetical economy. The second digit codes 1 and 0 respectively denote organized and unorganized segments of each sector.

### ***3.4 Summary of the steps in splitting exercise***

Thus, steps for splitting the aggregated input-output table into organized and unorganized segments are:

1. Splitting gross value added as per the shares of organized and unorganized sectors.
2. Calculating value added (organized) per unit of gross value of output (=1-input-output ratio)
3. Estimating gross value of output (organized) & gross value of output (unorganized) by either
  - a. Method 1 i.e. by calculating gross value of output (organized) by dividing gross value added (organized) by Value added per unit of GVO (organized) and obtaining gross value of output (unorganized) as a residual. Or,
  - b. Method 2 i.e. by calculating gross value of output (organized) [and gross value of output (unorganized)] by dividing gross value added (organized) [gross value added (unorganized)] by Value added per unit of GVO (organized) [unorganized segment] calculated from external data source.
4. Estimating organized and unorganized inputs by either
  - c. Method 1 i.e. by calculating inputs (organized) by subtracting gross value added (organized) from estimated gross value of output (organized). Obtaining inputs (unorganized) as a residual by subtracting estimated inputs (organized) from total inputs. Or,

- d. Method 2 i.e. by calculating inputs (organized) [and inputs (unorganized)] as a subtraction of gross value added (organized) [gross value added (unorganized)] from Estimated gross value of output (organized) [Estimated gross value of output (unorganized)].
5. Updating the matrix by RAS method.
6. Splitting the columns of updated input-output table as per the (organized) and (unorganized) shares in national income contribution per industry.
7. Splitting the rows as per shares of (organized) and (unorganized) segments in the value of output.

### 3.5 Sources of data

Thus, in order to carry out the above listed seven steps and split the input-output flows of an economic activity into its organized and unorganized segments, shares of organized and unorganized categories in the value added per activity and input-output ratios of organized and unorganized segments per activity must be known. Table 3.16 and Table 3.17 describes the nature of data available for calculating (a) shares of organized and unorganized categories in the value added by the activity, and (b) input-output ratios of organized and unorganized segments per activity, required in turn for splitting. Table 3.15, Table 3.16 and Table 3.17 also incorporate the sources of data used in 3 by 3 example worked out in Section 3.3.

**Table 3.15: Some characteristics of the available input-output tables**

Level of aggregation of the available data sets	Year(s) of the data collected	Specifications of the data source
4 X 4	1973-74, 1978-79, 1983-84, 1989-90, 1993-94, 1998-99, 2003-04, 2006-07	Chapter 3, Table 3.3
60 X 60, 115 X 115 and 130 X 130	1973-74, 1978-79, 1983-84, 1989-90, 1993-94, 1998-99, 2003-04, 2006-07	Matrices, Matrix 1: Input flow Matrix as the commodity by Industry matrix



**Table 3.16: Some characteristics of the available data in National Accounts Statistics (NAS)  
on Shares of O and U segments in value added**

Level of aggregation of the available data sets	Year(s) of the data collected	Specifications of the data source
(9 X 9) 14 sub-sectors including Manufacturing sector as an aggregate	1973-80	Net domestic product 1973-79: Statement 52, 1970-71 to 1978-79  Net domestic product of organized segment 1979-80: Statement 53, 1970-71 to 1980-81
	1980-2000	Factor Incomes (BASE YEAR 1999- 2000)  Net domestic product Statement 2.1  Net domestic product of organized segment Statement 3.1
	2001-2004	Net domestic product of organized and unorganized segments  Statement 76.1, NAS (2006)
14 sub-sectors of manufacturing sector	1973-2000	Domestic product from manufacturing-  Registered Statement 42, NAS (2007)  Un-Registered Statement 44, NAS (2007)
	2001-2004	Domestic product from manufacturing-  Registered Statement 60, NAS (2006)  Un-Registered Statement 62, NAS (2006)

**Table 3.17: Some characteristics of the available data in National Accounts Statistics (NAS) for calculating Input-Output Ratios of the 14 sub-sectors of the manufacturing sector**

Level of aggregation of the available data sets	Year(s) of the data collected	Specifications of the data source
Registered	1973-2000	Domestic product Statement 42, Back Series(1950-51-1999-2000)  Value of output Statement 46, Back Series (1950-51-1999-2000)
	2001-2004	Domestic product Statement 60, 2006  Value of output Statement 61, 2006
Unregistered	2001-2004	Domestic product Statement 62, 2006  Value of output Statement 62(a), 2006

As given in Table 3.15, Table 3.16 and Table 3.17 above, data for segregation has been taken from three serial publications viz. input-output tables, national accounts statistics and the factor incomes database. The information extracted from these three publications reveal the structure of economic activities carried out within Indian domestic territory.

CSO uses product classification of National Industrial Classification (NIC). NIC has been used for developing and maintaining comparable data base of the economic activities in India.

### ***3.6 Level of aggregation***

Data from input-output tables, national accounts statistics and factor incomes are at different aggregation levels and follow different aggregation. Extracted data was reduced to a common aggregation level of 9 major sectors based on the major divisions of National Industrial Classification (NIC).

The 9 major divisions listed in NIC give way to 27 sectors, given the classifications of the three data sets, namely that of input-output tables; national accounts statistics and factor incomes database, together. Transformations that are needed to arrive at these 27 sectors from the original data formats available (mentioned in Table 3.15, Table 3.16 and Table 3.17) are elaborated in the passages that follow.

The most binding classification format is of the factor income data set. The factor incomes database (with base year 1999-2000) consists of 9 major divisions with 18 sub-divisions representing the 18 industries. National Domestic Product produced by these 9 major divisions (or 18 sub-divisions) is available for the time period 1973 to 2004. However from 1973 to 1980 the national product contributions of “Transport by other means” and “storage” are not distinguished as separate heads. Therefore, to arrive at a common aggregation level for whole time period from 1973 to 2004, the data for “Transport by other means” (7.2) and “storage” (7.3) was aggregated even for the time period 1981 to 2004.

Another aggregation that is needed is that of the “Real estate, ownership of dwellings & business services” and “Other services”. Rationale lies in the 60 sector common aggregation scheme suggested by CSO in “Appendix 4” of the input-output tables published under the title “Aggregated Sector Classification for Input-Output Transactions”. In this Aggregated Sector

Classification for Input-Output Transactions, “Real estate, ownership of dwellings & business services” is not considered as a separate sector till 1989-90. It is included under the head of “Other services”. After 2000 it was assigned importance to be included as a separate industry in the input-output tables. However, in order to strike a correspondence between the aggregated scheme of input-output tables and the factor income database, the two sectors of “Real estate, ownership of dwellings & business services” and “Other services” were combined in the Factor income database too.

For the time period 1973-2000, Net domestic product of organized segment was subtracted from the Net domestic product for all the major divisions to arrive at Net domestic product of unorganized segment. For 2001-2004, however, the values were picked from Statement 76.1 of NAS (2006) and rearranged in the required format.

Two of the 18 industries of the Factor Income database represent manufacturing’s registered and unregistered sectors. However, the aggregation level for the manufacturing sector appears differently for the time periods 1973-2000 and 2001-2004. In order to homogenize the manufacturing sector’s aggregation scheme sectors 151-154 (including the products of meat, fish, fruits, vegetables and oils, dairy products, grain mill products and other food products), 155+16 (including beverages and tobacco products), 171-173+181+01405 (including spinning, weaving and finishing of textiles along with wearing apparels), 182+19 (including leather and fur products), 20+361 (including wood and wood products along with furniture) of the Domestic product statement need to be aggregated for the data set corresponding to the time-period 2001-2004. The resultant NIC 98 based sector scheme of manufacturing sector is given in Table 3.18:

**Table 3.15: Sub-sectors of the manufacturing sector**

NIC-98 Codes	Description
151-154	food products
155+16	beverages and tobacco products
171-173+181+01405	textile products
182+19	leather and fur products
20+361	wood and wood products, furniture, fixtures etc
21+22	paper and printing etc.
23+25	rubber, petroleum products etc.
24	chemical and chemical products
26	non-metallic products
271+272+2731+2732	basic metals
28+29+30	metal products and machinery
31+32	electrical machinery
33+369	other manufacturing
34+35	transport equipment

These estimates of domestic product of the manufacturing sector act as a base for calculating the shares of registered and unregistered segments for each economic activity. These registered and unregistered segments are taken to be same as the organized and unorganized segments for the manufacturing sector.

Aggregation scheme listed in Table 3.18 is also followed for the calculation of input-output ratios for the manufacturing sector. Value of inputs for organized (registered) and unorganized (unregistered) segments of the manufacturing sector are arrived at by subtracting Domestic Product from the Value of output respectively for both the segments. Value of output of the unregistered segment of manufacturing sector is, however, only available for the years 1999 to 2004 (and are published in NAS 2006). Moreover, NAS is the only alternative source of data available for calculating the input-output ratios beyond the intrinsic input-output ratios of the input-output tables.

Due to the absence of Domestic product and value of output data for all sectors other than the sub-sectors of manufacturing in NAS issues, input – output ratios are calculated only for the manufacturing sector.

Thus, the 'availability' of input-output ratios for the unregistered sector from NAS (which are based themselves on the NSSO rounds), limits the choice of the year for which the inter-segmental linkages can be calculated to be from 1999 to 2004. When the years of publishing of the third data base of input-output tables (published for the years 1973-74, 1978-79, 1983-84, 1989-90, 1993-94, 1998-99, 2003-04 and 2006-07) are matched to the time period 1999 to 2004 for which the input-output ratios of organized and unorganized segments can be calculated, the only intersecting year turns out to be 2003-04. The rationale above explains the determination of the year 2003-04 for the calculation of inter-segmental linkages between organized and unorganized segments.

Input-output tables are available at three levels of aggregation (number of sectors being 60, 115 and 130) over the time period 1973 to 2004. The higher numbers of sectors are reduced to 60 so as to bring in correspondence over time. Aggregation scheme given by CSO in its published input-output tables is applied to move from 130 and 115 to 60. Further aggregations are done on the input-output table to maintain a correspondence between input-output table database, factor-income database and National accounts statistics data base. Aggregation scheme followed to move from 60 sectors to 27 sectors is presented in Table 3.19:

**Table 3.19: Aggregation Scheme for the input-output Tables**

27 sector classification		Aggregation scheme (60 to 27)				
1	Agriculture	1	2	3	4	5
2	Forestry and logging	6				
3	Fishing	7				
4	Mining	8	9	10	11	
5	Food products	12	13			
6	Beverages and tobacco products	14	15			
7	Textile products	16	17	18	19	
8	Wood and wood products, furniture, fixtures etc	20	21			
9	Paper and printing etc.	22	23			
10	Leather and fur products	24				
11	Rubber, petroleum products etc.	25	26	27		
12	Chemical and chemical products	28	29	30	31	32
13	Non-metallic products	33	34			
14	Basic metals	35	36			
15	Metal products and machinery	37	38	39	40	
16	Electrical machinery	41				
17	Transport equipment	42	43			
18	Other manufacturing	44				
19	Construction	45				
20	Electricity, gas and water supply	46	47			
21	Railway transport services	48				
22	Transport by other means and storage	49	50			
23	Communication	51				
24	Trade, hotels and rest.	52	53			
25	Banking and insurance	54	55			
26	Other services	57	58	59	56	
27	Public administration & defence	60				

Note that 13 sectors of factor income database along with 14 sub-sectors of the manufacturing sector give 27 sectors of the final aggregation scheme. Input-output table aggregated at 27 sectors on the basis of aggregation scheme listed in Table 3.19 for the year 2003-04 is printed as Table 3.20.

**Table 3.16: Aggregated input-output Table**

(Figures in Rs. Lakhs)

Commodity ↓		1	2	3	4	5	6	7	8	9	10	11	12	13
1	Agriculture	15104816	136	0	0	9544670	239575	1661377	7090	19106	324152	269008	223453	780
2	Forestry and logging	4623	3982	0	0	3690	46538	282	350945	219618	0	713	13573	101
3	Fishing	0	0	44072	0	419850	0	0	0	94	0	0	27	0
4	Mining	24	0	0	23225	20241	4403	59756	6350	52475	753	11288409	605208	231899
5	Food products	436307	0	14365	0	2266245	618694	8349	485	10729	448	4611	390203	569391
6	Beverages and tobacco products	0	0	0	0	2807	249465	8	18	37	33	762	38576	562
7	Textile products	183012	2742	109970	64	42702	27988	3776762	9742	15373	18374	51455	90500	17694
8	Wood and wood products, furniture, fixtures etc	2045	148	3991	21606	136219	11349	52921	28817	66169	2741	17126	197955	39873
9	Paper and printing etc.	7737	4789	0	5058	276492	77999	110292	22594	1257319	3407	36019	172162	59689
10	Leather and fur products	0	0	0	0	0	0	41557	454	185	351842	2283	15211	436
11	Rubber, petroleum products etc.	844595	28441	123204	134200	443316	160944	456456	39101	116958	20342	1423711	1493137	516040
12	Chemical and chemical products	3414125	284	7572	286263	388498	170858	1156365	63386	332079	70968	1878212	8490113	139600
13	Non-metallic products	73	17	0	43553	38386	2786	2126	788	5338	198	3908	20420	499506
14	Basic metals	0	134	5282	666	2086	192	2215	25118	6984	520	32035	85370	45269
15	Metal products and machinery	167313	3895	5244	381163	208094	33423	395481	23773	21122	15174	69736	135285	47507
16	Electrical machinery	569	1381	0	290	14560	0	8883	1729	17047	38	1661	31734	1383
17	Transport equipment	16812	13284	64116	32130	6581	0	0	1359	1	0	606	49	488
18	Other manufacturing	876	7938	0	11336	16319	260	63042	213	17936	10354	16315	105419	15394
19	Construction	401441	25594	0	183926	239320	7054	236952	2933	49778	3753	24647	130736	318261
20	Electricity, gas and water supply	866056	2263	0	218551	341310	63528	708217	27001	158613	24840	434374	736454	485077
21	Railway transport services	208185	6447	1971	32100	84822	14300	26386	5245	24395	6307	311479	142129	140365
22	Transport by other means and storage	1422558	72438	46235	163638	1118967	153503	1412401	63560	302160	100805	307446	1006585	335913
23	Communication	27513	6832	0	11474	61470	7656	91260	6182	12433	3900	57972	70794	33824
24	Trade, hotels and rest.	3192861	14446	27750	77394	3256297	274220	1735166	109615	235974	186938	478272	1449934	454004
25	Banking and insurance	426090	5697	17131	152922	684995	119678	694127	49792	121377	54054	570781	655879	124719
26	Other services	85146	37541	0	71652	246768	41538	498618	18988	39397	24553	64080	150832	33916
27	Public administration & defence	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total input at factor cost	26812792	238430	470903	1851207	19864719	2325949	13198997	865285	3102695	1224497	17345632	16451744	4111693
	Net indirect tax	-4607147	10170	5297	143185	411829	206479	522306	38259	299756	80786	2011425	1758887	273426
	Total input at Purchaser's Price	22205646	248600	476200	1994391	20276548	2532428	13721302	903544	3402451	1305283	19357056	18210633	4385119
	Gross Value Added	49691653	2237400	2693800	5390902	3888457	1261559	4446850	768848	1214079	563977	4009576	6318008	1990994
	GROSS Value of output	71897296	2486000	3170000	7385293	24165005	3793987	18168152	1672392	4616530	1869259	23366632	24528640	6376113



Table 3.20: Aggregated input-output Table

(Figures in Rs. Lakhs)

14	15	16	17	18	19	20	21	22	23	24	25	26	27	Intermediate Use	PFCE	GFCE	Gross fixed capital Formation	Change in stocks	Exports	Less Imports	Total final use	Total output
867	1466	5254	3147	10912	373300	2070	0	521695	0	2857440	0	85684	0	31256009	38750446	259357	131927	465192	1337106	608310	40335719	71591725
42	1607	970	364	664	176002	201	26	0	0	0	0	0	0	823944	1866492	46	0	13984	110211	328437	1662296	2486240
0	0	23	0	0	0	0	0	0	0	8900	0	0	0	472967	2307137	0	0	4148	396635	9245	2698675	3171642
2198299	92050	3977	15085	214	0	1811967	8186	2	0	4424	0	1008	0	16427955	73536	18910	0	-5062	309413	9435439	-9038641	7389313
475075	38834	37788	3066	244735	1812427	826	0	8461	0	1148178	0	29	0	8089251	16289670	270188	0	477274	3957683	5511004	15483809	23573059
1353	0	286	1	238	0	33	0	71	0	240627	3487	1	0	538364	3162537	25619	0	-23371	34212	12014	3186983	3725347
3288	35726	50021	16285	31834	42726	1447	624	128909	929	43285	6639	38542	0	4746643	8904846	281701	27205	289453	4991268	884557	13609917	18356561
9232	75803	59768	24845	39306	574622	3967	148	4363	2221	46390	10628	82592	0	1514847	394403	41233	164171	-369766	43100	122275	150866	1665712
12067	51436	86800	16667	34420	36551	48064	7479	316996	29361	384872	272236	151135	0	3481637	931640	391014	0	182493	139191	619746	1024592	4506229
0	571	12575	8595	9460	0	96	0	3411	0	0	0	0	0	446678	693486	1	0	1216	587896	95580	1187019	1633696
545884	269419	492496	312777	196767	1555632	1315473	144062	9392674	42333	519723	136972	75179	0	20799839	4127792	305844	643074	-1300593	2040965	2398710	3418371	24218212
248540	181853	590498	254916	201260	592956	66446	271	245306	0	10537	2	1573792	0	20364703	3063965	479881	870	1785925	3000061	3669923	4660777	25025481
39999	19606	130200	18381	6125	4508776	51	365	41687	0	7521	6	2914	0	5392732	266690	274	212962	-83300	319383	165806	550203	5942935
4597251	3737391	2647327	1365295	76762	4374410	1484	241	1207	0	4683	0	26	0	17011952	0	0	2556493	62444	1826959	4728681	-282786	16729166
459425	1827037	1072068	1067649	181841	825141	168728	8023	485395	8740	296268	47915	45617	0	8001064	668894	99188	7044696	148171	1829188	2457260	7332877	15333941
22779	353260	3783394	427044	276296	911682	474555	22097	325809	644322	44699	127588	397875	0	7890667	1606966	352682	7896698	574734	963461	2842019	8552524	16443190
761	25148	3089	1342175	5773	14748	17703	953349	810475	11083	6341	76758	137458	0	3540293	1832422	360001	4502088	30202	763323	946142	6541894	10082187
14494	111178	147433	54667	2134124	349713	166083	239556	327045	20286	194751	59594	840811	0	4925141	1100768	52861	5951791	33155	3897888	8861552	2174909	7100049
28155	263364	193250	27364	24503	1069386	272624	522616	235255	67757	247277	159497	1267936	0	6003377	82713	1658812	36407884	0	0	0	38149409	44152786
1117999	283215	340656	376500	71283	993716	4004697	588541	409570	139114	672448	270153	190251	0	13524429	1584449	468320	0	0	0	0	2052769	15577198
622610	93517	51986	52238	204053	280516	446159	278085	109762	10062	39223	88124	40852	0	3321322	1119187	182526	461006	0	429419	0	2192138	5513460
577650	313138	476673	281194	351170	2094593	401131	51001	1507045	53117	2484682	356755	659601	0	16113961	16186938	672030	1516857	0	2493703	315744	20553783	36667743
135728	67063	752133	95759	123260	76559	104548	6411	850173	201511	257439	556696	370818	0	3988506	1360781	372695	0	0	9470	3224	1739723	5728229
1853822	453813	620778	516174	150557	3473214	943281	76754	2998527	65552	1383540	401931	978188	0	25409003	24337765	395409	1747693	0	3887546	62927	30305486	55714489
405021	648540	564430	890663	583429	1962979	793392	51874	832050	18752	2597577	2096680	825047	0	15947671	4469146	824000	0	0	329900	488900	5134148	21081818
42304	417005	492630	482749	102086	5476	31250	84880	1180916	18263	299341	91484	3133202	0	7694620	30745076	7381758	979665	0	7405046	671705	45839841	53534460
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15615700	0	0	0	0	15615700	15615700
13412643	9362041	12616509	7653608	5061067	26104223	11076282	3044587	20736801	1333403	13800167	4763141	10898567	0	247727576	1.66E+08	30510049	70245080	2286300	41103026	45239200	2.65E+08	5.13E+08
1000416	1033724	1316346	742129	353842	2338606	-956254	-158827	2182234	-102074	387012	120178	479214	0	9891200	6164357	553450	4981018	0	17274	0	11716100	21607300
14413057	10395765	13932854	8395736	5414906	28442829	10120028	2885759	22919035	1231329	14187178	4883318	11377780	0	257618776	0	0	0	0	0	0	0	0
4394558	3696676	2279814	2360520	2104975	15680571	5214474	2627700	13748707	4496900	39898259	16198500	42148344	15615700	254941800	0	0	0	0	0	0	0	2.55E+08
18807616	14092439	16212667	10756257	7519882	44123400	15334500	5513460	36667744	5728229	54085437	21081818	53526123	15615700	512560577	1.72E+08	31063500	75226098	2286300	41120300	45239200	2.77E+08	0

### ***3.7 Shares and input-output ratios of O and U segments***

Shares of organized and unorganized segments in per sector national income contributions and input- output ratios for the registered and un-registered sub-sectors of the manufacturing sector of 2003-04 calculated at 27 sectors (9 divisions) level of aggregation are given in Table 3.21.

The least unorganized or the most organized sectors are that of mining and Quarrying, paper and printing etc., rubber, petroleum products etc., chemical and chemical products, basic metals, transport equipment, elect. Gas & water supply, railways, banking and insurance and public admin. & defense. 6 of these 11 sectors in which shares of organized segment is higher or equal to 80% (or more) are a part of manufacturing. Highest share of organized segment is held in the sectors of railways and public administration & defense which are completely organized in nature.

**Table 3.17: Shares in national income and input-output ratios of O and U segments for 2003-04**

Variable Estimated→			Shares in national income			Input-output Ratios	
Industry			2003-04			2003-04	
Division ↓	Codes	Sector ↓	(O)	(U)	Total	(O)	(U)
<b>1</b>		<b>agriculture, forestry &amp; logging and fishing</b>	3.165121	96.834879	100		
1.1		1 agriculture	2.855999	97.144001	100		
1.2		2 forestry & logging	12.462983	87.537017	100		
1.3		3 fishing	0.031951	99.968049	100		
<b>2</b>		<b>4 mining and Quarrying</b>	91.096425	8.903575	100		
<b>3</b>		<b>manufacturing</b>	72.834030	27.165970	100		
3.1 + 3.2	NIC-98 Codes		registered	unregistered		registered	unregistered
	151-154	5 food products	53.726269	46.273731	100	0.898582	0.778616
	155+16	6 beverages and tobacco products	69.126257	30.873743	100	0.698846	0.441244
	171-173+181+01405	7 textile products	51.503112	48.496888	100	0.812269	0.531765
	182+19	8 leather and fur products	29.432624	70.567376	100	0.814623	0.621256
	20+361	9 wood and wood products, furniture, fixtures etc	9.273399	90.726601	100	0.743790	0.465579
	21+22	10 paper and printing etc.	93.931717	6.068283	100	0.755088	0.965006
	23+25	11 rubber, petroleum products etc.	78.536221	21.463779	100	0.847777	0.766127
	24	12 chemical and chemical products	92.069844	7.930156	100	0.719129	0.800926
	26	13 non-metallic products	58.565585	41.434415	100	0.704891	0.604611
	271+272+2731+2732	14 basic metals	84.958685	15.041315	100	0.762084	0.799607
	28+29+30	15 metal products and machinery	60.099417	39.900583	100	0.734952	0.635498
	31+32	16 electrical machinery	76.832284	23.167716	100	0.734952	0.959914
	33+369	17 other manufacturing	57.857862	42.142138	100	0.752124	0.530603
	34+35	18 transport equipment	88.932125	11.067875	100	0.777948	0.642848
<b>4</b>		<b>19 elect. Gas &amp; water supply</b>	97.019963	2.980037	100		
<b>5</b>		<b>20 construction</b>	37.533414	62.466586	100		
<b>6</b>		<b>21 trade, hotels &amp; restaurant</b>	19.430387	80.569613	100		
6.1		trade	18.470562	81.529438	100		
6.2		hotels & restaurant	30.409562	69.590438	100		
<b>7</b>		<b>transport, storage &amp; communication</b>	39.034994	60.965006	100		
7.1		22 railways	100.000000	0.000000	100		
7.2		transport by other means	20.470381	79.529619	100		
7.3		storage	72.600000	27.400000	100		
7.2+7.3		23 transport by other means & storage	20.916616	79.083384	100		
7.4		24 communication	64.211006	35.788994	100		
<b>8</b>		<b>financing, insurance, real estate &amp; business services</b>	54.727615	45.272385	100		
8.1		25 banking and insurance	90.449764	9.550236	100		
8.2		real estate, ownership of dwellings & business services	25.106011	74.893989	100		
<b>9</b>		<b>community, social &amp; personal services</b>	73.333434	26.666566	100		
9.1		26 public admin. & defence	100.000000	0.000000	100		
9.2		other services	54.195745	45.804255	100		
8.2+9.2		27 Other services including real estate	39.956056	60.043944	100		
<b>10</b>		<b>All sectors</b>	40.627665	59.372335	100		

### ***3.8 Splitting of 27 by 27 aggregated input-output table in its O and U segments***

List of the above 7 steps given in section 3.4 is repeated for 27 by 27 level of aggregation. Results of gross value added (organized and unorganized); value added (organized) per unit of GVO; GVO (organized) & GVO (unorganized) by Method 1 & 2; inputs (organized) & (unorganized) by Method 1 & 2; application of RAS technique, updated input-output table and double ordered matrix for 27 by 27 level of aggregation are given in the Table 3.22 to Table 3.32.

Application of Method 1 [i.e. in case GVO (unorganized) is calculated as a residual] brings out unreal negative entries for the unorganized sector in Table 3.24 and Table 3.25. Method 2 attempts to clear off these negative entries. Results of Method 2 (i.e. in case input-output ratios of the unorganized segment are calculated from NAS data) are given in Table 3.27 and Table 3.28 in which the negative entries disappear. These non-negative results instigate further analysis to be based on Method 2.

**Table 3.18: Splitting of gross value added as per the shares of organized & unorganized sectors**

(Figures in Rs. Lakhs)

Commodity ↓	←Industry→													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Agriculture	15104816	136	0	0	9544670	239575	1661377	7090	19106	324152	269008	223453	780	867
2 Forestry and logging	4623	3982	0	0	3690	46538	282	350945	219618	0	713	13573	101	42
3 Fishing	0	0	44072	0	419850	0	0	0	94	0	0	27	0	0
4 Mining	24	0	0	23225	20241	4403	59756	6350	52475	753	11288409	605208	231899	2198299
5 Food products	436307	0	14365	0	2266245	618694	8349	485	10729	448	4611	390203	569391	475075
6 Beverages and tobacco products	0	0	0	0	2807	249465	8	18	37	33	762	38576	562	1353
7 Textile products	183012	2742	109970	64	42702	27988	3776762	9742	15373	18374	51455	90500	17694	3288
8 Wood and wood products, furniture, fixtures etc	2045	148	3991	21606	136219	11349	52921	28817	66169	2741	17126	197955	39873	9232
9 Paper and printing etc.	7737	4789	0	5058	276492	77999	110292	22594	1257319	3407	36019	172162	59689	12067
10 Leather and fur products	0	0	0	0	0	0	41557	454	185	351842	2283	15211	436	0
11 Rubber, petroleum products etc.	844595	28441	123204	134200	443316	160944	456456	39101	116958	20342	1423711	1493137	516040	545884
12 Chemical and chemical products	3414125	284	7572	286263	388498	170858	1156365	63386	332079	70968	1878212	8490113	139600	248540
13 Non-metallic products	73	17	0	43553	38386	2786	2126	788	5338	198	3908	20420	499506	39999
14 Basic metals	0	134	5282	666	2086	192	2215	25118	6984	520	32035	85370	45269	4597251
15 Metal products and machinery	167313	3895	5244	381163	208094	33423	395481	23773	21122	15174	69736	135285	47507	459425
16 Electrical machinery	569	1381	0	290	14560	0	8883	1729	17047	38	1661	31734	1383	22779
17 Transport equipment	16812	13284	64116	32130	6581	0	0	1359	1	0	606	49	488	761
18 Other manufacturing	876	7938	0	11336	16319	260	63042	213	17936	10354	16315	105419	15394	14494
19 Construction	401441	25594	0	183926	239320	7054	236952	2933	49778	3753	24647	130736	318261	28155
20 Electricity, gas and water supply	866056	2263	0	218551	341310	63528	708217	27001	158613	24840	434374	736454	485077	1117999
21 Railway transport services	208185	6447	1971	32100	84822	14300	26386	5245	24395	6307	311479	142129	140365	622610
22 Transport by other means and storage	1422558	72438	46235	163638	1118967	153503	1412401	63560	302160	100805	307446	1006585	335913	577650
23 Communication	27513	6832	0	11474	61470	7656	91260	6182	12433	3900	57972	70794	33824	135728
24 Trade, hotels and rest.	3192861	14446	27750	77394	3256297	274220	1735166	109615	235974	186938	478272	1449934	454004	1853822
25 Banking and insurance	426090	5697	17131	152922	684995	119678	694127	49792	121377	54054	570781	655879	124719	405021
26 Other services	85146	37541	0	71652	246768	41538	498618	18988	39397	24553	64080	150832	33916	42304
27 Public administration & defence	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total input at factor cost	26812792	238430	470903	1851207	19864719	2325949	13198997	865285	3102695	1224497	17345632	16451744	4111693	13412643
Net indirect tax	-4607147	10170	5297	143185	411829	206479	522306	38259	299756	80786	2011425	1758887	273426	1000416
Total input at Purchaser's Price	22205646	248600	476200	1994391	20276548	2532428	13721302	903544	3402451	1305283	19357056	18210633	4385119	14413057
(O)	8.121384057	13.86427942	0.052337753	90.10674944	53.72626871	69.12625732	51.50311163	9.273399015	93.93171673	29.43262411	78.53622146	92.06984412	58.56558547	84.95868529
Gross Value Added (O)	4035649.984	310199.3877	1409.874389	4857566.558	2089122.857	872068.5206	2290266.12	71298.34286	1140405.247	165993.2305	3148969.487	5816980.117	1166037.293	3733558.701
Gross Value Added (U)	45656003.02	1927200.612	2692390.126	533335.4422	1799334.143	389490.4794	2156583.88	697549.6571	73673.7528	397983.7695	860606.5131	501027.8826	824956.7073	660999.2987
(U)	91.87861594	86.13572058	99.94766225	9.893250558	46.27373129	30.87374268	48.49688837	90.72660099	6.068283267	70.56737589	21.46377854	7.930155875	41.43441453	15.04131471
GROSS Value of output	71897296	2486000	3170000	7385293	24165005	3793987	18168152	1672392	4616530	1869259	23366632	24528640	6376113	18807616

**Table 3.22: Splitting of gross value added as per the shares of organized & unorganized sectors**

(Figures in Rs. Lakhs)

15	16	17	18	19	20	21	22	23	24	25	26	27	Intermediate Use	PFCE	GFCE	Gross fixed capital Formation	Change in stocks	Exports	Less Imports	Total final use	Total output
1466	5254	3147	10912	373300	2070	0	521695	0	2857440	0	85684	0	31256009	38750446	259357	131927	465192	1337106	608310	40335719	71591725
1607	970	364	664	176002	201	26	0	0	0	0	0	0	823944	1866492	46	0	13984	110211	328437	1662296	2486240
0	23	0	0	0	0	0	0	0	8900	0	0	0	472967	2307137	0	0	4148	396635	9245	2698675	3171642
92050	3977	15085	214	0	1811967	8186	2	0	4424	0	1008	0	16427955	73536	18910	0	-5062	309413	9435439	-9038641	7389313
38834	37788	3066	244735	1812427	826	0	8461	0	1148178	0	29	0	8089251	16289670	270188	0	477274	3957683	5511004	15483809	23573059
0	286	1	238	0	33	0	71	0	240627	3487	1	0	538364	3162537	25619	0	-23371	34212	12014	3186983	3725347
35726	50021	16285	31834	42726	1447	624	128909	929	43285	6639	38542	0	4746643	8904846	281701	27205	289453	4991268	884557	13609917	18356561
75803	59768	24845	39306	574622	3967	148	4363	2221	46390	10628	82592	0	1514847	394403	41233	164171	-369766	43100	122275	150866	1665712
51436	86800	16667	34420	36551	48064	7479	316996	29361	384872	272236	151135	0	3481637	931640	391014	0	182493	139191	619746	1024592	4506229
571	12575	8595	9460	0	96	0	3411	0	0	0	0	0	446678	693486	1	0	1216	587896	95580	1187019	1633696
269419	492496	312777	196767	1555632	1315473	144062	9392674	42333	519723	136972	75179	0	20799839	4127792	305844	643074	-1300593	2040965	2398710	3418371	24218212
181853	590498	254916	201260	592956	66446	271	245306	0	10537	2	1573792	0	20364703	3063965	479881	870	1785925	3000061	3669923	4660777	25025481
19606	130200	18381	6125	4508776	51	365	41687	0	7521	6	2914	0	5392732	266690	274	212962	-83300	319383	165806	550203	5942935
3737391	2647327	1365295	76762	4374410	1484	241	1207	0	4683	0	26	0	17011952	0	0	2556493	62444	1826959	4728681	-282786	16729166
1827037	1072068	1067649	181841	825141	168728	8023	485395	8740	296268	47915	45617	0	8001064	668894	99188	7044696	148171	1829188	2457260	7332877	15333941
353260	3783394	427044	276296	911682	474555	22097	325809	644322	44699	127588	397875	0	7890667	1606966	352682	7896698	574734	963461	2842019	8552524	16443190
25148	3089	1342175	5773	14748	17703	953349	810475	11083	6341	76758	137458	0	3540293	1832422	360001	4502088	30202	763323	946142	6541894	10082187
111178	147433	54667	2134124	349713	166083	239556	327045	20286	194751	59594	840811	0	4925141	1100768	52861	5951791	33155	3897888	8861552	2174909	7100049
263364	193250	27364	24503	1069386	272624	522616	235255	67757	247277	159497	1267936	0	6003377	82713	1658812	36407884	0	0	0	38149409	44152786
283215	340656	376500	71283	993716	4004697	588541	409570	139114	672448	270153	190251	0	13524429	1584449	468320	0	0	0	0	2052769	15577198
93517	51986	52238	204053	280516	446159	278085	109762	10062	39223	88124	40852	0	3321322	1119187	182526	461006	0	429419	0	2192138	5513460
313138	476673	281194	351170	2094593	401131	51001	1507045	53117	2484682	356755	659601	0	16113961	16186938	672030	1516857	0	2493703	315744	20553783	36667743
67063	752133	95759	123260	75659	104548	6411	850173	201511	257439	556696	370818	0	3988506	1360781	372695	0	0	9470	3224	1739723	5728229
453813	620778	516174	150557	3473214	943281	76754	2998527	65552	1383540	401931	978188	0	25409003	24337765	395409	1747693	0	3887546	62927	30305486	55714489
648540	564430	890663	583429	1962979	793392	51874	832050	18752	2597577	2096680	825047	0	15947671	4469146	824000	0	0	329900	488900	5134148	21081818
417005	492630	482749	102086	5476	31250	84880	1180916	18263	299341	91484	3133202	0	7694620	30745076	7381758	979665	0	7405046	671705	45839841	53534460
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15615700	0	0	0	0	15615700	15615700
9362041	12616509	7653608	5061067	26104223	11076282	3044587	20736801	1333403	13800167	4763141	10898567	0	247727576	1.66E+08	30510049	70245080	2286300	41103026	45239200	2.65E+08	5.13E+08
1033724	1316346	742129	353842	2338606	-956254	-158827	2182234	-102074	387012	120178	479214	0	9891200	6164357	553450	4981018	0	17274	0	11716100	21607300
10395765	13932854	8395736	5414906	28442829	10120028	2885759	22919035	1231329	14187178	4883318	11377780	0	257618776	0	0	0	0	0	0	0	0
60.09941688	76.83228365	88.93212452	57.85786244	40.16586741	96.5508569	100	22.2967191	69.53707063	19.35041195	90.11224114	40.82609021	100									
2221680.72	1751633.159	2099260.586	1217893.54	6298237.357	5034619.33	2627700	3065510.579	3127012.529	7720477.476	14596831.38	17207520.94	15615700									
1474995.28	528180.8409	261259.4143	887081.4601	9382333.643	179854.6704	0	10683196.42	1369887.471	32177781.52	1601668.619	24940823.06	0									
39.90058312	23.16771635	11.06787548	42.14213756	59.83413259	3.449143104	0	77.7032809	30.46292937	80.64958805	9.887758859	59.17390979	0									
14092439	16212667	10756257	7519882	44123400	15334500	5513460	36667744	5728229	54085437	21081818	53526123	15615700	512560577	1.72E+08	31063500	75226098	2286300	41120300	45239200	2.77E+08	0

(Figures in Rs. Lakhs)

**Table 3.19: Calculating value added (organized) per unit of GVO**

Commodity ↓	Industry→													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Agriculture	15104816	136	0	0	9544670	239575	1661377	7090	19106	324152	269008	223453	780	867
2 Forestry and logging	4623	3982	0	0	3690	46538	282	350945	219618	0	713	13573	101	42
3 Fishing	0	0	44072	0	419850	0	0	0	94	0	0	27	0	0
4 Mining	24	0	0	23225	20241	4403	59756	6350	52475	753	11288409	605208	231899	2198299
5 Food products	436307	0	14365	0	2266245	618694	8349	485	10729	448	4611	390203	569391	475075
6 Beverages and tobacco products	0	0	0	0	2807	249465	8	18	37	33	762	38576	562	1353
7 Textile products	183012	2742	109970	64	42702	27988	3776762	9742	15373	18374	51455	90500	17694	3288
8 Wood and wood products, furniture, fixtures etc	2045	148	3991	21606	136219	11349	52921	28817	66169	2741	17126	197955	39873	9232
9 Paper and printing etc.	7737	4789	0	5058	276492	77999	110292	22594	1257319	3407	36019	172162	59689	12067
10 Leather and fur products	0	0	0	0	0	0	41557	454	185	351842	2283	15211	436	0
11 Rubber, petroleum products etc.	844595	28441	123204	134200	443316	160944	456456	39101	116958	20342	1423711	1493137	516040	545884
12 Chemical and chemical products	3414125	284	7572	286263	388498	170858	1156365	63386	332079	70968	1878212	8490113	139600	248540
13 Non-metallic products	73	17	0	43553	38386	2786	2126	788	5338	198	3908	20420	499506	39999
14 Basic metals	0	134	5282	666	2086	192	2215	25118	6984	520	32035	85370	45269	4597251
15 Metal products and machinery	167313	3895	5244	381163	208094	33423	395481	23773	21122	15174	69736	135285	47507	459425
16 Electrical machinery	569	1381	0	290	14560	0	8883	1729	17047	38	1661	31734	1383	22779
17 Transport equipment	16812	13284	64116	32130	6581	0	0	1359	1	0	606	49	488	761
18 Other manufacturing	876	7938	0	11336	16319	260	63042	213	17936	10354	16315	105419	15394	14494
19 Construction	401441	25594	0	183926	239320	7054	236952	2933	49778	3753	24647	130736	318261	28155
20 Electricity, gas and water supply	866056	2263	0	218551	341310	63528	708217	27001	158613	24840	434374	736454	485077	1117999
21 Railway transport services	208185	6447	1971	32100	84822	14300	26386	5245	24395	6307	311479	142129	140365	622610
22 Transport by other means and storage	1422558	72438	46235	163638	1118967	153503	1412401	63560	302160	100805	307446	1006585	335913	577650
23 Communication	27513	6832	0	11474	61470	7656	91260	6182	12433	3900	57972	70794	33824	135728
24 Trade, hotels and rest.	3192861	14446	27750	77394	3256297	274220	1735166	109615	235974	186938	478272	1449934	454004	1853822
25 Banking and insurance	426090	5697	17131	152922	684995	119678	694127	49792	121377	54054	570781	655879	124719	405021
26 Other services	85146	37541	0	71652	246768	41538	498618	18988	39397	24553	64080	150832	33916	42304
27 Public administration & defence	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total input at factor cost	26812792	238430	470903	1851207	19864719	2325949	13198997	865285	3102695	1224497	17345632	16451744	4111693	13412643
Net indirect tax	-4607147	10170	5297	143185	411829	206479	522306	38259	299756	80786	2011425	1758887	273426	1000416
Total input at Purchaser's Price	22205646	248600	476200	1994391	20276548	2532428	13721302	903544	3402451	1305283	19357056	18210633	4385119	14413057
Input - Output ratio (O)					0.898582	0.698845613	0.812268633	0.743790405	0.755087918	0.814623251	0.847777365	0.719129071	0.704891317	0.762083701
<b>Value added per unit of GVO [1-input-output ratio(O)]</b>					<b>0.101418</b>	<b>0.301154387</b>	<b>0.187731367</b>	<b>0.256209595</b>	<b>0.244912082</b>	<b>0.185376749</b>	<b>0.152222635</b>	<b>0.280870929</b>	<b>0.295108683</b>	<b>0.237916299</b>
(O)	8.121384057	13.86427942	0.052337753	90.10674944	53.72626871	69.12625732	51.50311163	9.273399015	93.93171673	29.43262411	78.53622146	92.06984412	58.56558547	84.95868529
Gross Value Added (O)	4035649.984	310199.3877	1409.874389	4857566.558	2089122.857	872068.5206	2290266.12	71298.34286	1140405.247	165993.2305	3148969.487	5816980.117	1166037.293	3733558.701
Gross Value Added (U)	45656003.02	1927200.612	2692390.126	533335.4422	1799334.143	389490.4794	2156583.88	697549.6571	73673.7528	397983.7695	860606.5131	501027.8826	824956.7073	660999.2987
(U)	91.87861594	86.13572058	99.94766225	9.893250558	46.27373129	30.87374268	48.49688837	90.72660099	6.068283267	70.56737589	21.46377854	7.930155875	41.43441453	15.04131471
GROSS Value of output	71897296	2486000	3170000	7385293	24165005	3793987	18168152	1672392	4616530	1869259	23366632	24528640	6376113	18807616

**Table 3.23: Calculating value added (organized) per unit of GVO**

(Figures in Rs. Lakhs)

15	16	17	18	19	20	21	22	23	24	25	26	27	Intermediate Use	PFCE	GFCE	Gross fixed capital Formation	Change in stocks	Exports	Less Imports	Total final use	Total output
1466	5254	3147	10912	373300	2070	0	521695	0	2857440	0	85684	0	31256009	38750446	259357	131927	465192	1337106	608310	40335719	71591725
1607	970	364	664	176002	201	26	0	0	0	0	0	0	823944	1866492	46	0	13984	110211	328437	1662296	2486240
0	23	0	0	0	0	0	0	0	8900	0	0	0	472967	2307137	0	0	4148	396635	9245	2698675	3171642
92050	3977	15085	214	0	1811967	8186	2	0	4424	0	1008	0	16427955	73536	18910	0	-5062	309413	9435439	-9038641	7389313
38834	37788	3066	244735	1812427	826	0	8461	0	1148178	0	29	0	8089251	16289670	270188	0	477274	3957683	5511004	15483809	23573059
0	286	1	238	0	33	0	71	0	240627	3487	1	0	538364	3162537	25619	0	-23371	34212	12014	3186983	3725347
35726	50021	16285	31834	42726	1447	624	128909	929	43285	6639	38542	0	4746643	8904846	281701	27205	289453	4991268	884557	13609917	18356561
75803	59768	24845	39306	574622	3967	148	4363	2221	46390	10628	82592	0	1514847	394403	41233	164171	-369766	43100	122275	150866	1665712
51436	86800	16667	34420	36551	48064	7479	316996	29361	384872	272236	151135	0	3481637	931640	391014	0	182493	139191	619746	1024592	4506229
571	12575	8595	9460	0	96	0	3411	0	0	0	0	0	446678	693486	1	0	1216	587896	95580	1187019	1633696
269419	492496	312777	196767	1555632	1315473	144062	9392674	42333	519723	136972	75179	0	20799839	4127792	305844	643074	-1300593	2040965	2398710	3418371	24218212
181853	590498	254916	201260	592956	66446	271	245306	0	10537	2	1573792	0	20364703	3063965	479881	870	1785925	3000061	3669923	4660777	25025481
19606	130200	18381	6125	4508776	51	365	41687	0	7521	6	2914	0	5392732	266690	274	212962	-83300	319383	165806	550203	5942935
3737391	2647327	1365295	76762	4374410	1484	241	1207	0	4683	0	26	0	17011952	0	0	2556493	62444	1826959	4728681	-282786	16729166
1827037	1072068	1067649	181841	825141	168728	8023	485395	8740	296268	47915	45617	0	8001064	668894	99188	7044696	148171	1829188	2457260	7332877	15333941
353260	3783394	427044	276296	911682	474555	22097	325809	644322	44699	127588	397875	0	7890667	1606966	352682	7896698	574734	963461	2842019	8552524	16443190
25148	3089	1342175	5773	14748	17703	953349	810475	11083	6341	76758	137458	0	3540293	1832422	360001	4502088	30202	763323	946142	6541894	10082187
111178	147433	54667	2134124	349713	166083	239556	327045	20286	194751	59594	840811	0	4925141	1100768	52861	5951791	33155	3897888	8861552	2174909	7100049
263364	193250	27364	24503	1069386	272624	522616	235255	67757	247277	159497	1267936	0	6003377	82713	1658812	36407884	0	0	0	38149409	44152786
283215	340656	376500	71283	993716	4004697	588541	409570	139114	672448	270153	190251	0	13524429	1584449	468320	0	0	0	0	2052769	15577198
93517	51986	52238	204053	280516	446159	278085	109762	10062	39223	88124	40852	0	3321322	1119187	182526	461006	0	429419	0	2192138	5513460
313138	476673	281194	351170	2094593	401131	51001	1507045	53117	2484682	356755	659601	0	16113961	16186938	672030	1516857	0	2493703	315744	20553783	36667743
67063	752133	95759	123260	75659	104548	6411	850173	201511	257439	556696	370818	0	3988506	1360781	372695	0	0	9470	3224	1739723	5728229
453813	620778	516174	150557	3473214	943281	76754	2998527	65552	1383540	401931	978188	0	25409003	24337765	395409	1747693	0	3887546	62927	30305486	55714489
648540	564430	890663	583429	1962979	793392	51874	832050	18752	2597577	2096680	825047	0	15947671	4469146	824000	0	0	329900	488900	5134148	21081818
417005	492630	482749	102086	5476	31250	84880	1180916	18263	299341	91484	3133202	0	7694620	30745076	7381758	979665	0	7405046	671705	45839841	53534460
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15615700	0	0	0	0	15615700	15615700
9362041	12616509	7653608	5061067	26104223	11076282	3044587	20736801	1333403	13800167	4763141	10898567	0	247727576	1.66E+08	30510049	70245080	2286300	41103026	45239200	2.65E+08	5.13E+08
1033724	1316346	742129	353842	2338606	-956254	-158827	2182234	-102074	387012	120178	479214	0	9891200	6164357	553450	4981018	0	17274	0	11716100	21607300
10395765	13932854	8395736	5414906	28442829	10120028	2885759	22919035	1231329	14187178	4883318	11377780	0	257618776	0	0	0	0	0	0	0	0
0.734952203	0.734952203	0.777948055	0.752123673																		
0.265047797	0.265047797	0.222051945	0.247876327																		
60.09941688	76.83228365	88.93212452	57.85786244	40.16586741	96.5508569	100	22.2967191	69.53707063	19.35041195	90.1122414	40.82609021	100									
2221680.72	1751633.159	2099260.586	1217893.54	6298237.357	5034619.33	2627700	3065510.579	3127012.529	7720477.476	14596831.38	17207520.94	15615700									
1474995.28	528180.8409	261259.4143	887081.4601	9382333.643	179854.6704	0	10683196.42	1369887.471	32177781.52	1601668.619	24940823.06	0									
39.90058312	23.16771635	11.06787548	42.14213756	59.83413259	3.449143104	0	77.7032809	30.46292937	80.64958805	9.887758859	59.17390979	0									
14092439	16212667	10756257	7519882	44123400	15334500	5513460	36667744	5728229	54085437	21081818	53526123	15615700	512560577	1.72E+08	31063500	75226098	2286300	41120300	45239200	2.77E+08	0



Table 3.20: Estimating GVO (organized) &amp; GVO (unorganized)

(Figures in Rs. Lakhs)

Commodity ↓	Industry →													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Agriculture	15104816	136	0	0	9544670	239575	1661377	7090	19106	324152	269008	223453	780	867
2 Forestry and logging	4623	3982	0	0	3690	46538	282	350945	219618	0	713	13573	101	42
3 Fishing	0	0	44072	0	419850	0	0	0	94	0	0	27	0	0
4 Mining	24	0	0	23225	20241	4403	59756	6350	52475	753	11288409	605208	231899	2198299
5 Food products	436307	0	14365	0	2266245	618694	8349	485	10729	448	4611	390203	569391	475075
6 Beverages and tobacco products	0	0	0	0	2807	249465	8	18	37	33	762	38576	562	1353
7 Textile products	183012	2742	109970	64	42702	27988	3776762	9742	15373	18374	51455	90500	17694	3288
8 Wood and wood products, furniture, fixtures etc	2045	148	3991	21606	136219	11349	52921	28817	66169	2741	17126	197955	39873	9232
9 Paper and printing etc.	7737	4789	0	5058	276492	77999	110292	22594	1257319	3407	36019	172162	59689	12067
10 Leather and fur products	0	0	0	0	0	0	41557	454	185	351842	2283	15211	436	0
11 Rubber, petroleum products etc.	844595	28441	123204	134200	443316	160944	456456	39101	116958	20342	1423711	1493137	516040	545884
12 Chemical and chemical products	3414125	284	7572	286263	388498	170858	1156365	63386	332079	70968	1878212	8490113	139600	248540
13 Non-metallic products	73	17	0	43553	38386	2786	2126	788	5338	198	3908	20420	499506	39999
14 Basic metals	0	134	5282	666	2086	192	2215	25118	6984	520	32035	85370	45269	4597251
15 Metal products and machinery	167313	3895	5244	381163	208094	33423	395481	23773	21122	15174	69736	135285	47507	459425
16 Electrical machinery	569	1381	0	290	14560	0	8883	1729	17047	38	1661	31734	1383	22779
17 Transport equipment	16812	13284	64116	32130	6581	0	0	1359	1	0	606	49	488	761
18 Other manufacturing	876	7938	0	11336	16319	260	63042	213	17936	10354	16315	105419	15394	14494
19 Construction	401441	25594	0	183926	239320	7054	236952	2933	49778	3753	24647	130736	318261	28155
20 Electricity, gas and water supply	866056	2263	0	218551	341310	63528	708217	27001	158613	24840	434374	736454	485077	1117999
21 Railway transport services	208185	6447	1971	32100	84822	14300	26386	5245	24395	6307	311479	142129	140365	622610
22 Transport by other means and storage	1422558	72438	46235	163638	1118967	153503	1412401	63560	302160	100805	307446	1006585	335913	577650
23 Communication	27513	6832	0	11474	61470	7656	91260	6182	12433	3900	57972	70794	33824	135728
24 Trade, hotels and rest.	3192861	14446	27750	77394	3256297	274220	1735166	109615	235974	186938	478272	1449934	454004	1853822
25 Banking and insurance	426090	5697	17131	152922	684995	119678	694127	49792	121377	54054	570781	655879	124719	405021
26 Other services	85146	37541	0	71652	246768	41538	498618	18988	39397	24553	64080	150832	33916	42304
27 Public administration & defence	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total input at factor cost	26812792	238430	470903	1851207	19864719	2325949	13198997	865285	3102695	1224497	17345632	16451744	4111693	13412643
Net indirect tax	-4607147	10170	5297	143185	411829	206479	522306	38259	299756	80786	2011425	1758887	273426	1000416
Total input at Purchaser's Price	22205646	248600	476200	1994391	20276548	2532428	13721302	903544	3402451	1305283	19357056	18210633	4385119	14413057
Input - Output ratio (O)					0.898582	0.698845613	0.812268633	0.743790405	0.755087918	0.814623251	0.847777365	0.719129071	0.704891317	0.762083701
Value added per unit of GVO [1-input-output ratio(O)]					0.101418	0.301154387	0.187731367	0.256209595	0.244912082	0.185376749	0.152222635	0.280870929	0.295108683	0.237916299
(O)	8.121384057	13.86427942	0.052337753	90.10674944	53.72626871	69.12625732	51.50311163	9.273399015	93.93171673	29.43262411	78.53622146	92.06984412	58.56558547	84.95868529
Gross Value Added (O)	4035649.984	310199.3877	1409.874389	4857566.558	2089122.857	872068.5206	2290266.12	71298.34286	1140405.247	165993.2305	3148969.487	5816980.117	1166037.293	3733558.701
Gross Value Added (U)	45656003.02	1927200.612	2692390.126	533335.4422	1799334.143	389490.4794	2156583.88	697549.6571	73673.7528	397983.7695	860606.5131	501027.8826	824956.7073	660999.2987
(U)	91.87861594	86.13572058	99.94766225	9.893250558	46.27373129	30.87374268	48.49688837	90.72660099	6.068283267	70.56737589	21.46377854	7.930155875	41.43441453	15.04131471
GROSS Value of output	71897296	2486000	3170000	7385293	24165005	3793987	18168152	1672392	4616530	1869259	23366632	24528640	6376113	18807616
Estimated GVO (O)					20599132.9	2895752.339	12199698.74	278281.3143	4656386.233	895437.1667	20686604.72	20710509.77	3951213.1	15692740.35
Estimated GVO (U)					3565872.1	898234.6609	5968453.262	1394110.686	-39856.2334	973821.8333	2680027.28	3818130.233	2424899.9	3114875.649



Table 3.21: Estimating inputs, (organized) &amp; (unorganized)

(Figures in Rs. Lakhs)

	←Industry→													
Commodity ↓	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Agriculture	15104816	136	0	0	9544670	239575	1661377	7090	19106	324152	269008	223453	780	867
2 Forestry and logging	4623	3982	0	0	3690	46538	282	350945	219618	0	713	13573	101	42
3 Fishing	0	0	44072	0	419850	0	0	0	94	0	0	27	0	0
4 Mining	24	0	0	23225	20241	4403	59756	6350	52475	753	11288409	605208	231899	2198299
5 Food products	436307	0	14365	0	2266245	618694	8349	485	10729	448	4611	390203	569391	475075
6 Beverages and tobacco products	0	0	0	0	2807	249465	8	18	37	33	762	38576	562	1353
7 Textile products	183012	2742	109970	64	42702	27988	3776762	9742	15373	18374	51455	90500	17694	3288
8 Wood and wood products, furniture, fixtures etc	2045	148	3991	21606	136219	11349	52921	28817	66169	2741	17126	197955	39873	9232
9 Paper and printing etc.	7737	4789	0	5058	276492	77999	110292	22594	1257319	3407	36019	172162	59689	12067
10 Leather and fur products	0	0	0	0	0	0	41557	454	185	351842	2283	15211	436	0
11 Rubber, petroleum products etc.	844595	28441	123204	134200	443316	160944	456456	39101	116958	20342	1423711	1493137	516040	545884
12 Chemical and chemical products	3414125	284	7572	286263	388498	170858	1156365	63386	332079	70968	1878212	8490113	139600	248540
13 Non-metallic products	73	17	0	43553	38386	2786	2126	788	5338	198	3908	20420	499506	39999
14 Basic metals	0	134	5282	666	2086	192	2215	25118	6984	520	32035	85370	45269	4597251
15 Metal products and machinery	167313	3895	5244	381163	208094	33423	395481	23773	21122	15174	69736	135285	47507	459425
16 Electrical machinery	569	1381	0	290	14560	0	8883	1729	17047	38	1661	31734	1383	22779
17 Transport equipment	16812	13284	64116	32130	6581	0	0	1359	1	0	606	49	488	761
18 Other manufacturing	876	7938	0	11336	16319	260	63042	213	17936	10354	16315	105419	15394	14494
19 Construction	401441	25594	0	183926	239320	7054	236952	2933	49778	3753	24647	130736	318261	28155
20 Electricity, gas and water supply	866056	2263	0	218551	341310	63528	708217	27001	158613	24840	434374	736454	485077	1117999
21 Railway transport services	208185	6447	1971	32100	84822	14300	26386	5245	24395	6307	311479	142129	140365	622610
22 Transport by other means and storage	1422558	72438	46235	163638	1118967	153503	1412401	63560	302160	100805	307446	1006585	335913	577650
23 Communication	27513	6832	0	11474	61470	7656	91260	6182	12433	3900	57972	70794	33824	135728
24 Trade, hotels and rest.	3192861	14446	27750	77394	3256297	274220	1735166	109615	235974	186938	478272	1449934	454004	1853822
25 Banking and insurance	426090	5697	17131	152922	684995	119678	694127	49792	121377	54054	570781	655879	124719	405021
26 Other services	85146	37541	0	71652	246768	41538	498618	18988	39397	24553	64080	150832	33916	42304
27 Public administration & defence	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total input at factor cost	26812792	238430	470903	1851207	19864719	2325949	13198997	865285	3102695	1224497	17345632	16451744	4111693	13412643
Net indirect tax	-4607147	10170	5297	143185	411829	206479	522306	38259	299756	80786	2011425	1758887	273426	1000416
Total input at Purchaser's Price	22205646	248600	476200	1994391	20276548	2532428	13721302	903544	3402451	1305283	19357056	18210633	4385119	14413057
Input - Output ratio (O)					0.898582	0.698845613	0.812268633	0.743790405	0.755087918	0.814623251	0.847777365	0.719129071	0.704891317	0.762083701
Value added per unit of GVO [1-input-output ratio(O)]					0.101418	0.301154387	0.187731367	0.256209595	0.244912082	0.185376749	0.152222635	0.280870929	0.295108683	0.237916299
(O)	8.121384057	13.86427942	0.052337753	90.10674944	53.72626871	69.12625732	51.50311163	9.273399015	93.93171673	29.43262411	78.53622146	92.06984412	58.56558547	84.95868529
Gross Value Added (O)	4035649.984	310199.3877	1409.874389	4857566.558	2089122.857	872068.5206	2290266.12	71298.34286	1140405.247	165993.2305	3148969.487	5816980.117	1166037.293	3733558.701
Gross Value Added (U)	45656003.02	1927200.612	2692390.126	533335.4422	1799334.143	389490.4794	2156583.88	697549.6571	73673.7528	397983.7695	860606.5131	501027.8826	824956.7073	660999.2987
(U)	91.87861594	86.13572058	99.94766225	9.893250558	46.27373129	30.87374268	48.49688837	90.72660099	6.068283267	70.56737589	21.46377854	7.930155875	41.43441453	15.04131471
GROSS Value of output	71897296	2486000	3170000	7385293	24165005	3793987	18168152	1672392	4616530	1869259	23366632	24528640	6376113	18807616
Estimated GVO (O)	4035649.984	310199.3877	1409.874389	4857566.558	20599132.9	2895752.339	12199698.74	278281.3143	4656386.233	895437.1667	20686604.72	20710509.77	3951213.1	15692740.35
Estimated GVO (U)	67861646.02	2175800.612	3168590.126	2527726.442	3565872.1	898234.6609	5968453.262	1394110.686	-39856.2334	973821.8333	2680027.28	3818130.233	2424899.9	3114875.649
Estimated Inputs(O)	0	0	0	0	18510010.04	2023683.818	9909432.618	206982.9714	3515980.986	729443.9362	17537635.23	14893529.65	2785175.807	11959181.65
Estimated Inputs(U)	26812792	238430	470903	1851207	1354708.957	302265.1815	3289564.382	658302.0286	-413285.986	495053.0638	-192003.233	1558214.35	1326517.193	1453461.35



Table 3.22: Calculating value added (unorganized) per unit of GVO

(Figures in Rs. Lakhs)

Commodity ↓	Industry →													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Agriculture	15104816	136	0	0	9544670	239575	1661377	7090	19106	324152	269008	223453	780	867
2 Forestry and logging	4623	3982	0	0	3690	46538	282	350945	219618	0	713	13573	101	42
3 Fishing	0	0	44072	0	419850	0	0	0	94	0	0	27	0	0
4 Mining	24	0	0	23225	20241	4403	59756	6350	52475	753	11288409	605208	231899	2198299
5 Food products	436307	0	14365	0	2266245	618694	8349	485	10729	448	4611	390203	569391	475075
6 Beverages and tobacco products	0	0	0	0	2807	249465	8	18	37	33	762	38576	562	1353
7 Textile products	183012	2742	109970	64	42702	27988	3776762	9742	15373	18374	51455	90500	17694	3288
8 Wood and wood products, furniture, fixtures etc	2045	148	3991	21606	136219	11349	52921	28817	66169	2741	17126	197955	39873	9232
9 Paper and printing etc.	7737	4789	0	5058	276492	77999	110292	22594	1257319	3407	36019	172162	59689	12067
10 Leather and fur products	0	0	0	0	0	0	41557	454	185	351842	2283	15211	436	0
11 Rubber, petroleum products etc.	844595	28441	123204	134200	443316	160944	456456	39101	116958	20342	1423711	1493137	516040	545884
12 Chemical and chemical products	3414125	284	7572	286263	388498	170858	1156365	63386	332079	70968	1878212	8490113	139600	248540
13 Non-metallic products	73	17	0	43553	38386	2786	2126	788	5338	198	3908	20420	499506	39999
14 Basic metals	0	134	5282	666	2086	192	2215	25118	6984	520	32035	85370	45269	4597251
15 Metal products and machinery	167313	3895	5244	381163	208094	33423	395481	23773	21122	15174	69736	135285	47507	459425
16 Electrical machinery	569	1381	0	290	14560	0	8883	1729	17047	38	1661	31734	1383	22779
17 Transport equipment	16812	13284	64116	32130	6581	0	0	1359	1	0	606	49	488	761
18 Other manufacturing	876	7938	0	11336	16319	260	63042	213	17936	10354	16315	105419	15394	14494
19 Construction	401441	25594	0	183926	239320	7054	236952	2933	49778	3753	24647	130736	318261	28155
20 Electricity, gas and water supply	866056	2263	0	218551	341310	63528	708217	27001	158613	24840	434374	736454	485077	1117999
21 Railway transport services	208185	6447	1971	32100	84822	14300	26386	5245	24395	6307	311479	142129	140365	622610
22 Transport by other means and storage	1422558	72438	46235	163638	1118967	153503	1412401	63560	302160	100805	307446	1006585	335913	577650
23 Communication	27513	6832	0	11474	61470	7656	91260	6182	12433	3900	57972	70794	33824	135728
24 Trade, hotels and rest.	3192861	14446	27750	77394	3256297	274220	1735166	109615	235974	186938	478272	1449934	454004	1853822
25 Banking and insurance	426090	5697	17131	152922	684995	119678	694127	49792	121377	54054	570781	655879	124719	405021
26 Other services	85146	37541	0	71652	246768	41538	498618	18988	39397	24553	64080	150832	33916	42304
27 Public administration & defence	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total input at factor cost	26812792	238430	470903	1851207	19864719	2325949	13198997	865285	3102695	1224497	17345632	16451744	4111693	13412643
Net indirect tax	-4607147	10170	5297	143185	411829	206479	522306	38259	299756	80786	2011425	1758887	273426	1000416
Total input at Purchaser's Price	22205646	248600	476200	1994391	20276548	2532428	13721302	903544	3402451	1305283	19357056	18210633	4385119	14413057
Input - Output ratio (O)					0.898582	0.698845613	0.812268633	0.743790405	0.755087918	0.814623251	0.847777365	0.719129071	0.704891317	0.762083701
Value added per unit of GVO [1-input-output ratio(O)]					0.101418	0.301154387	0.187731367	0.256209595	0.244912082	0.185376749	0.152222635	0.280870929	0.295108683	0.237916299
Input - Output ratio (U)					0.778615954	0.441244396	0.531764982	0.465578527	0.965006261	0.621256135	0.766126691	0.800925578	0.604611056	0.799607494
Value added per unit of GVO [1-input-output ratio(U)]					0.221384046	0.558755604	0.468235018	0.534421473	0.034993739	0.378743865	0.233873309	0.199074422	0.395388944	0.200392506
(O)	8.121384057	13.86427942	0.052337753	90.10674944	53.72626871	69.12625732	51.50311163	9.273399015	93.93171673	29.43262411	78.53622146	92.06984412	58.56558547	84.95868529
Gross Value Added (O)	4035649.984	310199.3877	1409.874389	4857566.558	2089122.857	872068.5206	2290266.12	71298.34286	1140405.247	165993.2305	3148969.487	5816980.117	1166037.293	3733558.701
Gross Value Added (U)	45656003.02	1927200.612	2692390.126	533335.4422	1799334.143	389490.4794	2156583.88	697549.6571	73673.7528	397983.7695	860606.5131	501027.8826	824956.7073	660999.2987
(U)	91.87861594	86.13572058	99.94766225	9.893250558	46.27373129	30.87374268	48.49688837	90.72660099	6.068283267	70.56737589	21.46377854	7.930155875	41.43441453	15.04131471
GROSS Value of output	71897296	2486000	3170000	7385293	24165005	3793987	18168152	1672392	4616530	1869259	23366632	24528640	6376113	18807616

Table 3.26: Calculating value added (unorganized) per unit of GVO

(Figures in Rs. Lakhs)

15	16	17	18	19	20	21	22	23	24	25	26	27	Intermediate Use	PFCE	GFCE	Gross fixed capital Formation	Change in stocks	Exports	Less Imports	Total final use	Total output
1466	5254	3147	10912	373300	2070	0	521695	0	2857440	0	85684	0	31256009	38750446	259357	131927	465192	1337106	608310	40335719	71591725
1607	970	364	664	176002	201	26	0	0	0	0	0	0	823944	1866492	46	0	13984	110211	328437	1662296	2486240
0	23	0	0	0	0	0	0	0	8900	0	0	0	472967	2307137	0	0	4148	396635	9245	2698675	3171642
92050	3977	15085	214	0	1811967	8186	2	0	4424	0	1008	0	16427955	73536	18910	0	-5062	309413	9435439	-9038641	7389313
38834	37788	3066	244735	1812427	826	0	8461	0	1148178	0	29	0	8089251	16289670	270188	0	477274	3957683	5511004	15483809	23573059
0	286	1	238	0	33	0	71	0	240627	3487	1	0	538364	3162537	25619	0	-23371	34212	12014	3186983	3725347
35726	50021	16285	31834	42726	1447	624	128909	929	43285	6639	38542	0	4746643	8904846	281701	27205	289453	4991268	884557	13609917	18356561
75803	59768	24845	39306	574622	3967	148	4363	2221	46390	10628	82592	0	1514847	394403	41233	164171	-369766	43100	122275	150866	1665712
51436	86800	16667	34420	36551	48064	7479	316996	29361	384872	272236	151135	0	3481637	931640	391014	0	182493	139191	619746	1024592	4506229
571	12575	8595	9460	0	96	0	3411	0	0	0	0	0	446678	693486	1	0	1216	587896	95580	1187019	1633696
269419	492496	312777	196767	1555632	1315473	144062	9392674	42333	519723	136972	75179	0	20799839	4127792	305844	643074	-1300593	2040965	2398710	3418371	24218212
181853	590498	254916	201260	592956	66446	271	245306	0	10537	2	1573792	0	20364703	3063965	479881	870	1785925	3000061	3669923	4660777	25025481
19606	130200	18381	6125	4508776	51	365	41687	0	7521	6	2914	0	5392732	266690	274	212962	-83300	319383	165806	550203	5942935
3737391	2647327	1365295	76762	4374410	1484	241	1207	0	4683	0	26	0	17011952	0	0	2556493	62444	1826959	4728681	-282786	16729166
1827037	1072068	1067649	181841	825141	168728	8023	485395	8740	296268	47915	45617	0	8001064	668894	99188	7044696	148171	1829188	2457260	7332877	15333941
353260	3783394	427044	276296	911682	474555	22097	325809	644322	44699	127588	397875	0	7890667	1606966	352682	7896698	574734	963461	2842019	8552524	16443190
25148	3089	1342175	5773	14748	17703	953349	810475	11083	6341	76758	137458	0	3540293	1832422	360001	4502088	30202	763323	946142	6541894	10082187
111178	147433	54667	2134124	349713	166083	239556	327045	20286	194751	59594	840811	0	4925141	1100768	52861	5951791	33155	3897888	8861552	2174909	7100049
263364	193250	27364	24503	1069386	272624	522616	235255	67757	247277	159497	1267936	0	6003377	82713	1658812	36407884	0	0	0	38149409	44152786
283215	340656	376500	71283	993716	4004697	588541	409570	139114	672448	270153	190251	0	13524429	1584449	468320	0	0	0	0	2052769	15577198
93517	51986	52238	204053	280516	446159	278085	109762	10062	39223	88124	40852	0	3321322	1119187	182526	461006	0	429419	0	2192138	5513460
313138	476673	281194	351170	2094593	401131	51001	1507045	53117	2484682	356755	659601	0	16113961	16186938	672030	1516857	0	2493703	315744	20553783	36667743
67063	752133	95759	123260	75659	104548	6411	850173	201511	257439	556696	370818	0	3988506	1360781	372695	0	0	9470	3224	1739723	5728229
453813	620778	516174	150557	3473214	943281	76754	2998527	65552	1383540	401931	978188	0	25409003	24337765	395409	1747693	0	3887546	62927	30305486	55714489
648540	564430	890663	583429	1962979	793392	51874	832050	18752	2597577	2096680	825047	0	15947671	4469146	824000	0	0	329900	488900	5134148	21081818
417005	492630	482749	102086	5476	31250	84880	1180916	18263	299341	91484	3133202	0	7694620	30745076	7381758	979665	0	7405046	671705	45839841	53534460
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15615700	0	0	0	0	15615700	15615700
9362041	12616509	7653608	5061067	26104223	11076282	3044587	20736801	1333403	13800167	4763141	10898567	0	247727576	165927742	30510049	70245080	2286300	4.1E+07	45239200	264832997	512560573
1033724	1316346	742129	353842	2338606	-956254	-158827	2182234	-102074	387012	120178	479214	0	9891200	6164357	553450	4981018	0	17274	0	11716100	21607300
10395765	13932854	8395736	5414906	28442829	10120028	2885759	22919035	1231329	14187178	4883318	11377780	0	257618776	0	0	0	0	0	0	0	0
0.734952203	0.734952203	0.777948055	0.752123673																		
0.265047797	0.265047797	0.222051945	0.247876327																		
0.635498308	0.95991379	0.642847896	0.530602877																		
0.364501692	0.04008621	0.357152104	0.469397123																		
60.09941688	76.83228365	88.93212452	57.85786244	40.16586741	96.5508569	100	22.2967191	69.53707063	19.35041195	90.11224114	40.82609021	100									
2221680.72	1751633.159	2099260.586	1217893.54	6298237.357	5034619.33	2627700	3065510.579	3127012.529	7720477.476	14596831.38	17207520.94	15615700									
1474995.28	528180.8409	261259.4143	887081.4601	9382333.643	179854.6704	0	10683196.42	1369887.471	32177781.52	1601668.619	24940823.06	0									
39.90058312	23.16771635	11.06787548	42.14213756	59.83413259	3.449143104	0	77.7032809	30.46292937	80.64958805	9.887758859	59.17390979	0									
14092439	16212667	10756257	7519882	44123400	15334500	5513460	36667744	5728229	54085437	21081818	53526123	15615700	512560577	172092100	31063500	75226098	2286300	4.1E+07	45239200	276549097	0

**Table 3.23: Estimating GVO (organized) & GVO (unorganized) by second method**

(Figures in Rs. Lakhs)

Commodity ↓	←Industry→													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Agriculture	15104816	136	0	0	9544670	239575	1661377	7090	19106	324152	269008	223453	780	867
2 Forestry and logging	4623	3982	0	0	3690	46538	282	350945	219618	0	713	13573	101	42
3 Fishing	0	0	44072	0	419850	0	0	0	94	0	0	27	0	0
4 Mining	24	0	0	23225	20241	4403	59756	6350	52475	753	11288409	605208	231899	2198299
5 Food products	436307	0	14365	0	2266245	618694	8349	485	10729	448	4611	390203	569391	475075
6 Beverages and tobacco products	0	0	0	0	2807	249465	8	18	37	33	762	38576	562	1353
7 Textile products	183012	2742	109970	64	42702	27988	3776762	9742	15373	18374	51455	90500	17694	3288
8 Wood and wood products, furniture, fixtures etc	2045	148	3991	21606	136219	11349	52921	28817	66169	2741	17126	197955	39873	9232
9 Paper and printing etc.	7737	4789	0	5058	276492	77999	110292	22594	1257319	3407	36019	172162	59689	12067
10 Leather and fur products	0	0	0	0	0	0	41557	454	185	351842	2283	15211	436	0
11 Rubber, petroleum products etc.	844595	28441	123204	134200	443316	160944	456456	39101	116958	20342	1423711	1493137	516040	545884
12 Chemical and chemical products	3414125	284	7572	286263	388498	170858	1156365	63386	332079	70968	1878212	8490113	139600	248540
13 Non-metallic products	73	17	0	43553	38386	2786	2126	788	5338	198	3908	20420	499506	39999
14 Basic metals	0	134	5282	666	2086	192	2215	25118	6984	520	32035	85370	45269	4597251
15 Metal products and machinery	167313	3895	5244	381163	208094	33423	395481	23773	21122	15174	69736	135285	47507	459425
16 Electrical machinery	569	1381	0	290	14560	0	8883	1729	17047	38	1661	31734	1383	22779
17 Transport equipment	16812	13284	64116	32130	6581	0	0	1359	1	0	606	49	488	761
18 Other manufacturing	876	7938	0	11336	16319	260	63042	213	17936	10354	16315	105419	15394	14494
19 Construction	401441	25594	0	183926	239320	7054	236952	2933	49778	3753	24647	130736	318261	28155
20 Electricity, gas and water supply	866056	2263	0	218551	341310	63528	708217	27001	158613	24840	434374	736454	485077	1117999
21 Railway transport services	208185	6447	1971	32100	84822	14300	26386	5245	24395	6307	311479	142129	140365	622610
22 Transport by other means and storage	1422558	72438	46235	163638	1118967	153503	1412401	63560	302160	100805	307446	1006585	335913	577650
23 Communication	27513	6832	0	11474	61470	7656	91260	6182	12433	3900	57972	70794	33824	135728
24 Trade, hotels and rest.	3192861	14446	27750	77394	3256297	274220	1735166	109615	235974	186938	478272	1449934	454004	1853822
25 Banking and insurance	426090	5697	17131	152922	684995	119678	694127	49792	121377	54054	570781	655879	124719	405021
26 Other services	85146	37541	0	71652	246768	41538	498618	18988	39397	24553	64080	150832	33916	42304
27 Public administration & defence	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total input at factor cost	26812792	238430	470903	1851207	19864719	2325949	13198997	865285	3102695	1224497	17345632	16451744	4111693	13412643
Net indirect tax	-4607147	10170	5297	143185	411829	206479	522306	38259	299756	80786	2011425	1758887	273426	1000416
Total input at Purchaser's Price	22205646	248600	476200	1994391	20276548	2532428	13721302	903544	3402451	1305283	19357056	18210633	4385119	14413057
Input - Output ratio (O)					0.898582	0.698845613	0.812268633	0.743790405	0.755087918	0.814623251	0.847777365	0.719129071	0.704891317	0.762083701
Value added per unit of GVO [1-input-output ratio(O)]					0.101418	0.301154387	0.187731367	0.256209595	0.244912082	0.185376749	0.152226355	0.280870929	0.295108683	0.237916299
Input - Output ratio (U)					0.778615954	0.441244396	0.531764982	0.465578527	0.965006261	0.621256135	0.766126691	0.800925578	0.604611056	0.799607494
Value added per unit of GVO [1-input-output ratio(U)]					0.221384046	0.558755604	0.468235018	0.534421473	0.034993739	0.378743865	0.233873309	0.199074422	0.395388944	0.200392506
(O)	8.121384057	13.86427942	0.052337753	90.10674944	53.72626871	69.12625732	51.50311163	9.273399015	93.93171673	29.43262411	78.53622146	92.06984412	58.56558547	84.95868529
Gross Value Added (O)	4035649.984	310199.3877	1409.874389	4857566.558	2089122.857	872068.5206	2290266.12	71298.34286	1140405.247	165993.2305	3148969.487	5816980.117	1166037.293	3733558.701
Gross Value Added (U)	45656003.02	1927200.612	2692390.126	533335.4422	1799334.143	389490.4794	2156583.88	697549.6571	73673.7528	397983.7695	860606.5131	501027.8826	824956.7073	660999.2987
(U)	91.87861594	86.13572058	99.94766225	9.893250558	46.27373129	30.87374268	48.49688837	90.72660099	6.068283267	70.56737589	21.46377854	7.930155875	41.43441453	15.04131471
GROSS Value of output	71897296	2486000	3170000	7385293	24165005	3793987	18168152	1672392	4616530	1869259	23366632	24528640	6376113	18807616
Estimated GVO (O)					20599132.9	2895752.339	12199698.74	278281.3143	4656386.233	895437.1667	20686604.72	20710509.77	3951213.1	15692740.35
Estimated GVO (U)					8127659.494	697067.6925	4605772.312	1305242.571	2105341	1050799.252	3679797.908	2516786.82	2086443.536	3298523.05





Table 3.24: Estimating inputs, (organized) &amp; (unorganized) by second method

(Figures in Rs. Lakhs)

Commodity ↓	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Agriculture	15104816	136	0	0	9544670	239575	1661377	7090	19106	324152	269008	223453	780	867
2 Forestry and logging	4623	3982	0	0	3690	46538	282	350945	219618	0	713	13573	101	42
3 Fishing	0	0	44072	0	419850	0	0	0	94	0	0	27	0	0
4 Mining	24	0	0	23225	20241	4403	59756	6350	52475	753	11288409	605208	231899	2198299
5 Food products	436307	0	14365	0	2266245	618694	8349	485	10729	448	4611	390203	569391	475075
6 Beverages and tobacco products	0	0	0	0	2807	249465	8	18	37	33	762	38576	562	1353
7 Textile products	183012	2742	109970	64	42702	27988	3776762	9742	15373	18374	51455	90500	17694	3288
8 Wood and wood products, furniture, fixtures etc	2045	148	3991	21606	136219	11349	52921	28817	66169	2741	17126	197955	39873	9232
9 Paper and printing etc.	7737	4789	0	5058	276492	77999	110292	22594	125319	3407	36019	172162	59689	12067
10 Leather and fur products	0	0	0	0	0	0	41557	454	185	351842	2283	15211	436	0
11 Rubber, petroleum products etc.	844595	28441	123204	134200	443316	160944	456456	39101	116958	20342	1423711	1493137	516040	545884
12 Chemical and chemical products	3414125	284	7572	286263	388498	170858	1156365	63386	332079	70968	1878212	8490113	139600	248540
13 Non-metallic products	73	17	0	43553	38386	2786	2126	788	5338	198	3908	20420	499506	39999
14 Basic metals	0	134	5282	666	2086	192	2215	25118	6984	520	32035	85370	45269	4597251
15 Metal products and machinery	167313	3895	5244	381163	208094	33423	395481	23773	21122	15174	69736	135285	47507	459425
16 Electrical machinery	569	1381	0	290	14560	0	8883	1729	17047	38	1661	31734	1383	22779
17 Transport equipment	16812	13284	64116	32130	6581	0	0	1359	1	0	606	49	488	761
18 Other manufacturing	876	7938	0	11336	16319	260	63042	213	17936	10354	16315	105419	15394	14494
19 Construction	401441	25594	0	183926	239320	7054	236952	2933	49778	3753	24647	130736	318261	28155
20 Electricity, gas and water supply	866056	2263	0	218551	341310	63528	708217	27001	158613	24840	434374	736454	485077	1117999
21 Railway transport services	208185	6447	1971	32100	84822	14300	26386	5245	24395	6307	311479	142129	140365	622610
22 Transport by other means and storage	1422558	72438	46235	163638	1118967	153503	1412401	63560	302160	100805	307446	1006585	335913	577650
23 Communication	27513	6832	0	11474	61470	7656	91260	6182	12433	3900	57972	70794	33824	135728
24 Trade, hotels and rest.	3192861	14446	27750	77394	3256297	274220	1735166	109615	235974	186938	478272	1449934	454004	1853822
25 Banking and insurance	426090	5697	17131	152922	684995	119678	694127	49792	121377	54054	570781	655879	124719	405021
26 Other services	85146	37541	0	71652	246768	41538	498618	18988	39397	24553	64080	150832	33916	42304
27 Public administration & defence	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total input at factor cost	26812792	238430	470903	1851207	19864719	2325949	13198997	865285	3102695	1224497	17345632	16451744	4111693	13412643
Net indirect tax	-4607147	10170	5297	143185	411829	206479	522306	38259	299756	80786	2011425	1758887	273426	1000416
Total input at Purchaser's Price	22205646	248600	476200	1994391	20276548	2532428	13721302	903544	3402451	1305283	19357056	18210633	4385119	14413057
Input - Output ratio (O)					0.898582	0.698845613	0.812268633	0.743790405	0.755087918	0.814623251	0.847777365	0.719129071	0.704891317	0.762083701
Value added per unit of GVO [1-input-output ratio(O)]					0.101418	0.301154387	0.187731367	0.256209595	0.244912082	0.185376749	0.152222635	0.280870929	0.295108683	0.237916299
Input - Output ratio (U)					0.778615954	0.441244396	0.531764982	0.465578527	0.965006261	0.621256135	0.766126691	0.800925578	0.604611056	0.799607494
Value added per unit of GVO [1-input-output ratio(U)]					0.221384046	0.558755604	0.468235018	0.534421473	0.034993739	0.378743865	0.233873309	0.199074422	0.395388944	0.200392506
(O)	8.121384057	13.86427942	0.052337753	90.10674944	53.72626871	69.12625732	51.50311163	9.273399015	93.93171673	29.43262411	78.53622146	92.06984412	58.56558547	84.95868529
Gross Value Added (O)	4035649.984	310199.3877	1409.874389	4857566.558	2089122.857	872068.5206	2290266.12	71298.34286	1140405.247	165993.2305	3148969.487	5816980.117	1166037.293	3733558.701
Gross Value Added (U)	45656003.02	1927200.612	2692390.126	533335.4422	1799334.143	389490.4794	2156583.88	697549.6571	73673.7528	397983.7695	860606.5131	501027.8826	824956.7073	660999.2987
(U)	91.87861594	86.13572058	99.94766225	9.893250558	46.27373129	30.87374268	48.49688837	90.72660099	6.068283267	70.56737589	21.46377854	7.930155875	41.43441453	15.04131471
GROSS Value of output	71897296	2486000	3170000	7385293	24165005	3793987	18168152	1672392	4616530	1869259	23366632	24528640	6376113	18807616
Estimated GVO (O)					20599132.9	2895752.339	12199698.74	278281.3143	4656386.233	895437.1667	20686604.72	20710509.77	3951213.1	15692740.35
Estimated GVO (U)					8127659.494	697067.6925	4605772.312	1305242.571	2105341	1050799.252	3679797.908	2516786.82	2086443.536	3298523.05
Estimated Inputs(O)					18510010.04	2023683.818	9909432.618	206982.9714	3515980.986	729443.9362	17537635.23	14893529.65	2785175.807	11959181.65
Estimated Inputs(U)					6328325.35	307577.213	2449188.431	607692.9143	2031667.247	652815.4823	2819191.395	2015758.937	1261486.829	2637523.751



Table 3.25: Filling in the matrix

(Figures in Rs. Lakhs)

Commodity ↓	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Agriculture	15104816	136	0	0	9544670	239575	1661377	7090	19106	324152	269008	223453	780	867
2 Forestry and logging	4623	3982	0	0	3690	46538	282	350945	219618	0	713	13573	101	42
3 Fishing	0	0	44072	0	419850	0	0	0	94	0	0	27	0	0
4 Mining	24	0	0	23225	20241	4403	59756	6350	52475	753	11288409	605208	231899	2198299
5 Food products	436307	0	14365	0	2266245	618694	8349	485	10729	448	4611	390203	569391	475075
6 Beverages and tobacco products	0	0	0	0	2807	249465	8	18	37	33	762	38576	562	1353
7 Textile products	183012	2742	109970	64	42702	27988	3776762	9742	15373	18374	51455	90500	17694	3288
8 Wood and wood products, furniture, fixtures etc	2045	148	3991	21606	136219	11349	52921	28817	66169	2741	17126	197955	39873	9232
9 Paper and printing etc.	7737	4789	0	5058	276492	77999	110292	22594	1257319	3407	36019	172162	59689	12067
10 Leather and fur products	0	0	0	0	0	0	41557	454	185	351842	2283	15211	436	0
11 Rubber, petroleum products etc.	844595	28441	123204	134200	443316	160944	456456	39101	116958	20342	1423711	1493137	516040	545884
12 Chemical and chemical products	3414125	284	7572	286263	388498	170858	1156365	63386	332079	70968	1878212	8490113	139600	248540
13 Non-metallic products	73	17	0	43553	38386	2786	2126	788	5338	198	3908	20420	499506	39999
14 Basic metals	0	134	5282	666	2086	192	2215	25118	6984	520	32035	85370	45269	4597251
15 Metal products and machinery	167313	3895	5244	381163	208094	33423	395481	23773	21122	15174	69736	135285	47507	459425
16 Electrical machinery	569	1381	0	290	14560	0	8883	1729	17047	38	1661	31734	1383	22779
17 Transport equipment	16812	13284	64116	32130	6581	0	0	1359	1	0	606	49	488	761
18 Other manufacturing	876	7938	0	11336	16319	260	63042	213	17936	10354	16315	105419	15394	14494
19 Construction	401441	25594	0	183926	239320	7054	236952	2933	49778	3753	24647	130736	318261	28155
20 Electricity, gas and water supply	866056	2263	0	218551	341310	63528	708217	27001	158613	24840	434374	736454	485077	1117999
21 Railway transport services	208185	6447	1971	32100	84822	14300	26386	5245	24395	6307	311479	142129	140365	622610
22 Transport by other means and storage	1422558	72438	46235	163638	1118967	153503	1412401	63560	302160	100805	307446	1006585	335913	577650
23 Communication	27513	6832	0	11474	61470	7656	91260	6182	12433	3900	57972	70794	33824	135728
24 Trade, hotels and rest.	3192861	14446	27750	77394	3256297	274220	1735166	109615	235974	186938	478272	1449934	454004	1853822
25 Banking and insurance	426090	5697	17131	152922	684995	119678	694127	49792	121377	54054	570781	655879	124719	405021
26 Other services	85146	37541	0	71652	246768	41538	498618	18988	39397	24553	64080	150832	33916	42304
27 Public administration & defence	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total input at factor cost	26812792	238430	470903	1851207	19864719	2325949	13198997	865285	3102695	1224497	17345632	16451744	4111693	13412643
Net indirect tax	-4607147	10170	5297	143185	411829	206479	522306	38259	299756	80786	2011425	1758887	273426	1000416
Total input at Purchaser's Price	22205646	248600	476200	1994391	20276548	2532428	13721302	903544	3402451	1305283	19357056	18210633	4385119	14413057
Input - Output ratio (O)					0.898582	0.698845613	0.812268633	0.743790405	0.755087918	0.814623251	0.847777365	0.719129071	0.704891317	0.762083701
Value added per unit of GVO [1-input-output ratio(O)]					0.101418	0.301154387	0.187731367	0.256209595	0.244912082	0.185376749	0.152222635	0.280870929	0.295108683	0.237916299
Input - Output ratio (U)					0.778615954	0.441244396	0.531764982	0.465578527	0.965006261	0.621256135	0.766126691	0.800925578	0.604611056	0.799607494
Value added per unit of GVO [1-input-output ratio(U)]					0.221384046	0.558755604	0.468235018	0.534421473	0.034993739	0.378743865	0.233873309	0.199074422	0.395388944	0.200392506
(O)	8.121384057	13.86427942	0.052337753	90.10674944	53.72626871	69.12625732	51.50311163	9.273399015	93.93171673	29.43262411	78.53622146	92.06984412	58.56558547	84.95868529
Gross Value Added (O)	4035649.984	310199.3877	1409.874389	4857566.558	2089122.857	872068.5206	2290266.12	71298.34286	1140405.247	165993.2305	3148969.487	5816980.117	1166037.293	3733558.701
Gross Value Added (U)	45656003.02	1927200.612	2692390.126	533335.4422	1799334.143	389490.4794	2156583.88	697549.6571	73673.7528	397983.7695	860606.5131	501027.8826	824956.7073	660999.2987
(U)	91.87861594	86.13572058	99.94766225	9.893250558	46.27373129	30.87374268	48.49688837	90.72660099	6.068283267	70.56737589	21.46377854	7.930155875	41.43441453	15.04131471
GROSS Value of output	71897296	2486000	3170000	7385293	24165005	3793987	18168152	1672392	4616530	1869259	23366632	24528640	6376113	18807616
Estimated GVO (O)					20599132.9	2895752.339	12199698.74	278281.3143	4656386.233	895437.1667	20686604.72	20710509.77	3951213.1	15692740.35
Estimated GVO (U)					8127659.494	697067.6925	4605772.312	1305242.571	2105341	1050799.252	3679797.908	2516786.82	2086443.536	3298523.05
Estimated GVO	71897296	2486000	3170000	7385293	28726792.39	3592820.032	16805471.05	1583523.886	6761727.233	1946236.418	24366402.63	23227296.59	6037656.636	18991263.4
Estimated Inputs(O)					18510010.04	2023683.818	9909432.618	206982.9714	3515980.986	729443.9362	17537635.23	14893529.65	2785175.807	11959181.65
Estimated Inputs(U)					6328325.35	307577.213	2449188.431	607692.9143	2031667.247	652815.4823	2819191.395	2015758.937	1261486.829	2637523.751
Estimated Inputs	26812792	238430	470903	1851207	24838335.39	2331261.032	12358621.05	814675.8857	5547648.233	1382259.418	20356826.63	16909288.59	4046662.636	14596705.4



Table 3.26: RAS updated inter-industry matrix

(Figures in Rs. Lakhs)

Commodity ↓	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Agriculture	14956730.44207	127.59559	0.00000	0.00000	11403249.36619	218188.92520	1516663.81337	6648.59257	30196.67975	341489.74380	338197.50124	231630.03322	706.01281	876.39458
2 Forestry and logging	4332.14360	3535.53983	0.00000	0.00000	4172.07199	40110.36781	243.62843	311444.21386	328484.64627	0.00000	848.30583	13315.03315	86.51613	40.17793
3 Fishing	0.00000	0.00000	37641.72809	0.00000	448858.36853	0.00000	0.00000	0.00000	132.94277	0.00000	0.00000	25.04494	0.00000	0.00000
4 Mining	21.11969	0.00000	0.00000	20576.86448	21490.90325	3563.64875	48479.44617	5291.90708	73704.98584	704.98347	12612260.58700	557530.12685	186539.94828	1974796.49783
5 Food products	544804.53219	0.00000	17289.89129	0.00000	3414301.48205	710549.62424	9611.31688	573.52523	21383.36104	595.16074	7310.17249	510066.24920	649913.97844	605577.96828
6 Beverages and tobacco products	0.00000	0.00000	0.00000	0.00000	3617.67675	245087.10995	7.87827	18.20856	63.08277	37.50270	1033.42702	43136.56061	548.74924	1475.36007
7 Textile products	185844.67078	2638.23528	107642.27581	65.43314	52319.69910	26140.40963	3535819.33441	9368.73440	24917.09249	19850.98169	66341.01301	96206.97874	16424.54383	3408.48755
8 Wood and wood products, furniture, fixtures etc	2010.09677	137.83544	3781.32045	21381.84971	161550.31834	10260.09138	47956.95495	26824.68788	103811.72734	2866.42393	21372.90547	203693.69292	35826.08196	9263.57897
9 Paper and printing etc.	9980.45662	5853.26491	0.00000	6569.06995	430335.18992	92541.56254	131166.13767	27601.53252	2588758.18717	4675.81888	58992.04308	232489.08389	70383.17698	15890.46060
10 Leather and fur products	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45417.46198	509.67916	350.04082	443745.72469	3436.12261	18876.60934	472.45669	0.00000
11 Rubber, petroleum products etc.	890729.26430	28419.57676	125244.92133	142494.13122	564101.29603	156114.04781	443808.93227	39052.36471	196877.16203	22824.35937	1906351.70396	1648482.43779	497481.95247	587701.68875
12 Chemical and chemical products	3148523.19201	248.15404	6730.94723	265790.79999	432277.61128	144921.48517	983155.74409	55358.34301	488806.62543	69630.22155	2199156.11990	8196499.21975	117681.89304	233982.36776
13 Non-metallic products	83.51187	18.42679	0.00000	50163.82532	52983.99001	2931.40899	2242.27300	853.71674	9747.02514	240.98957	5676.28053	24455.04772	522351.42336	46712.57594
14 Basic metals	0.00000	151.29356	6067.03677	799.02728	2999.16880	210.43178	2433.40145	28345.71669	13283.50098	659.25162	48467.30022	106495.89379	49310.31520	5592393.25801
15 Metal products and machinery	142869.86631	3151.33043	4316.30113	327694.33643	214396.15228	26249.82181	311341.11706	19224.59500	28788.17822	13785.38068	75605.25046	120933.89767	37082.18420	400483.78284
16 Electrical machinery	651.54733	1498.31425	0.00000	334.33277	20115.99660	0.00000	9377.63376	1874.95545	31156.58541	46.29403	2414.83413	38040.47854	1447.61352	26627.33578
17 Transport equipment	18633.59625	13950.24051	68498.61988	35853.80667	8800.66860	0.00000	0.00000	1426.45808	1.76907	0.00000	852.77389	56.85397	494.41754	861.03601
18 Other manufacturing	944.58155	8110.02091	0.00000	12306.72328	21231.24051	257.85685	62670.79983	217.50899	30869.46755	11878.21669	22336.05142	118998.55714	15173.42359	15954.49148
19 Construction	431295.21023	26053.53175	0.00000	198949.69712	310226.13351	6970.41031	234700.05518	2984.19521	85360.81343	4289.82134	33620.25057	147040.02057	312559.77167	30879.32508
20 Electricity, gas and water supply	907002.05865	2245.54819	0.00000	230442.37526	431278.47921	61192.39619	683799.13801	26779.61962	265136.34784	27677.16618	577577.26724	807412.32713	464375.96073	1195261.88727
21 Railway transport services	215830.67749	6332.81699	1969.64730	33505.49347	106100.81604	13635.45880	25219.54233	5149.57620	40367.58365	6956.55626	409993.03823	154253.09687	133020.72723	658929.86155
22 Transport by other means and storage	1487725.48464	71778.56965	46608.14125	172299.58449	1411941.08475	147652.11305	1361791.87998	62950.46838	504380.14751	112161.19454	408230.67845	1102023.17311	321126.67342	616704.27134
23 Communication	28183.57284	6631.03753	0.00000	11833.69011	75974.48931	7213.23370	86186.34587	5997.21140	20328.35450	4250.40622	75398.09180	75917.51844	31672.31543	141934.15218
24 Trade, hotels and rest.	3294466.21928	14123.03989	27599.81274	80400.65500	4053923.34448	260240.06090	1650615.73018	107111.79365	388630.95812	205215.59940	626561.88790	1566176.60704	428214.60396	1952686.10972
25 Banking and insurance	451882.08185	5724.60502	17512.35674	163283.00920	876511.57815	116736.87971	678676.20181	50008.70486	205460.51415	60990.10040	768559.08145	728173.64670	120907.47395	438490.99530
26 Other services	90247.67367	37701.02267	0.00000	76462.29510	315578.26435	40493.68742	487236.28307	19059.57646	66650.45372	27687.52024	86233.94211	167360.40090	32860.42232	45773.33516
27 Public administration & defence	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Estimated Inputs	26812792.00000	238430.00000	470903.00000	1851207.00000	24838335.39373	2331261.03153	12358621.04964	814675.88571	5547648.23308	1382259.41844	20356826.62809	16909288.58717	4046662.63626	14596705.40056

Table 3.30: RAS updated inter-industry matrix

(Figures in Rs. Lakhs)

15	16	17	18	19	20	21	22	23	24	25	26	27	Estimated Intermediate inputs	Estimated Total value of output = Estimated GVO'
1264.89386	6637.88422	3005.78891	9395.07260	337702.68389	2004.54355	0.00000	492166.64242	0.00000	2677426.18112	0.00000	81345.15732	0.00000	31256009.000000	71897296.000000
1312.18091	1159.76250	329.01890	541.03030	150678.69433	184.20395	22.69943	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	823944.000000	2486000.000000
0.00000	26.00249	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	7462.38854	0.00000	0.00000	0.00000	472967.000000	3170000.000000
70582.80418	4465.29541	12804.48303	163.74368	0.00000	1559374.52575	6711.36198	1.67680	0.00000	3683.92266	0.00000	850.44749	0.00000	16427955.000000	7385293.000000
42253.19417	60203.37173	3692.84593	265716.89563	2067589.64872	1008.67789	0.00000	10065.71198	0.00000	1356678.40052	0.00000	34.71821	0.00000	9857788.677227	28726792.393734
0.00000	389.78514	1.03034	221.05095	0.00000	34.47297	0.00000	72.25593	0.00000	243222.85632	3494.32318	1.02412	0.00000	519212.026008	3592820.031527
31612.13492	64809.89110	15951.40033	28108.41213	39638.57888	1437.02062	590.36123	124717.68980	859.90695	41593.65882	6324.75148	37524.55368	0.00000	4345561.868560	16805471.049644
64924.54813	74956.75110	23556.08765	33593.63966	516013.65949	3813.37731	135.53394	4085.85679	1989.92822	43148.64726	9800.43723	77834.54306	0.00000	1440102.735468	1583523.885714
57815.44735	142861.73395	20738.42435	38606.74939	43075.70289	60634.75811	8988.43419	389588.26802	34523.42357	469800.30004	329453.11763	186919.06868	0.00000	5224297.238023	6761727.233080
589.81222	19019.76471	9828.00021	9750.89459	0.00000	111.29456	0.00000	3852.43005	0.00000	0.00000	0.00000	0.00000	0.00000	532131.431378	1946236.418440
247584.99634	662702.02802	318179.74651	180436.35071	1498854.16130	1356760.14414	141549.82933	9437581.98649	40695.03820	518666.63341	135518.71161	76015.91073	0.00000	20927112.689962	24366402.628087
146132.50768	694807.16304	226759.28602	161383.63867	499580.22790	59926.68367	232.84101	215531.08897	0.00000	9195.25161	1.73033	1391507.51393	0.00000	18901414.781623	23227296.587170
19543.98906	190044.22893	20283.12964	6092.64640	4712368.87816	57.05838	389.02802	45436.01563	0.00000	8141.79328	6.43942	3196.13868	0.00000	5478684.210305	6037656.636260
3880677.49959	4025001.95081	1569304.19452	79535.49099	4762279.81655	1729.40995	267.55919	1370.31898	0.00000	5280.60211	0.00000	29.70464	0.00000	19312287.378201	18991263.400557
1359431.04189	1168023.71920	879386.82836	135013.53827	643716.16302	140903.58223	6382.78829	394893.98966	6802.79813	239394.87911	38384.21794	37346.37176	0.00000	6485194.904973	12428796.475863
352473.97364	5527562.34689	471679.31707	275095.10033	953745.22591	531427.68962	23573.80642	355443.88915	672514.82307	48434.03682	137060.96450	436808.51625	0.00000	9494252.712366	19784867.522283
24287.32250	4368.31135	1434917.56464	5563.56816	14933.64158	19188.81222	984446.02685	855837.27212	11196.95240	6650.49868	79812.55284	146069.00267	0.00000	3576544.025849	10185424.111040
104460.73959	202837.58490	56859.24639	2000919.22388	344510.46813	175139.64128	240660.65770	335982.87211	19938.70607	198716.62654	60284.84376	869249.55958	0.00000	4719183.923278	6803142.711100
246551.81678	264905.38640	28357.83021	22890.04915	1049645.62115	286444.78417	523116.36465	240805.30215	66354.78972	251394.51098	160759.14217	1306053.55476	0.00000	6003377.000000	44123400.000000
258450.53612	455194.19792	380336.30705	64911.67604	950779.64487	4101624.36430	574250.94189	408662.42663	132800.07955	666407.93974	265425.31698	191029.30238	0.00000	13524429.000000	15334500.000000
84479.86158	68765.16965	52238.51072	183942.15880	265690.89485	452352.83974	268598.75669	108415.16232	9508.52716	38478.99367	85709.34832	40605.77519	0.00000	3321322.000000	5513460.000000
285356.31087	636050.72269	283660.83478	319333.72252	2001279.57452	410263.58453	49692.88455	1501596.73059	50635.08667	2458910.90207	350020.22593	661370.57540	0.00000	16113961.000000	36667744.000000
59860.44832	983039.84402	94618.96838	109787.98619	70806.64086	104736.42665	6118.52265	829735.51894	188157.72653	249546.56605	534990.97108	364191.37007	0.00000	3988506.000000	5728229.000000
408019.45119	817259.05510	513737.98564	135076.73511	3274099.58263	951853.38176	73785.11523	2947727.16555	61653.28084	1350877.36510	389069.15548	967694.16184	0.00000	25409003.000000	54085437.000000
599320.91582	763751.79716	911124.44173	538005.04409	1901930.87043	822878.12991	51254.99698	840712.44731	18127.44401	2606821.94201	2086057.06091	838905.82920	0.00000	15947671.000000	21081818.000000
385134.04929	666209.77157	493552.83972	94083.29276	5302.61993	32392.59274	83818.48980	1192518.28163	17644.48893	300232.10351	90967.68919	3183984.20036	0.00000	7694620.000000	53526123.000000
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	0.000000	15615700.000000
8732120.47586	17505053.52228	7824904.11104	4698167.71110	26104223.00000	11076282.00000	3044587.00000	20736801.00000	1333403.00000	13800167.00000	4763141.00000	10898567.00000	0.00000		









**Table 3.31: Splitting the columns according to the shares of organized and unorganized sectors**

(Figures in Rs. Lakhs)

221	220	231	230	241	240	251	250	261	260	271	270	Value of outp
109737.01376	382429.62866	0.00000	0.00000	518092.99564	2159333.18547	0.00000	0.00000	33210.04731	48135.11001	0.00000	0.00000	75116858.91
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	2597323.149
0.00000	0.00000	0.00000	0.00000	1444.00292	6018.38562	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	3311952.688
0.37387	1.30293	0.00000	0.00000	712.85421	2971.06845	0.00000	0.00000	347.20446	503.24303	0.00000	0.00000	7716006.625
2244.32353	7821.38846	0.00000	0.00000	262522.85931	1094155.54121	0.00000	0.00000	14.17409	20.54412	0.00000	0.00000	30013178.95
16.11070	56.14523	0.00000	0.00000	47064.62465	196158.23167	3148.81293	345.51025	0.41811	0.60601	0.00000	0.00000	3753706.612
27807.95296	96909.73684	597.95410	261.95285	8048.54433	33545.11450	5699.37531	625.37618	15319.80814	22204.74554	0.00000	0.00000	17558020.51
911.01201	3174.84478	1383.73779	606.19043	8349.44099	34799.20626	8831.39363	969.04360	31776.80076	46057.74230	0.00000	0.00000	1654434.129
86865.40176	302722.86626	24006.57743	10516.84614	90908.29339	378892.00665	296877.58781	32575.52983	76311.74760	110607.32108	0.00000	0.00000	7064517.566
858.96551	2993.46455	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	2033388.939
2104271.14524	7333310.84125	28298.13745	12396.90075	100364.13020	418302.50321	122118.94820	13399.76341	31034.32429	44981.58644	0.00000	0.00000	25457530.81
48056.36148	167474.72749	0.00000	0.00000	1779.31907	7415.93255	1.55923	0.17109	568098.11292	823409.40101	0.00000	0.00000	24267415.57
10130.74077	35305.27485	0.00000	0.00000	1575.47054	6566.32274	5.80271	0.63671	1304.85846	1891.28022	0.00000	0.00000	6308023.067
305.53617	1064.78280	0.00000	0.00000	1021.81826	4258.78385	0.00000	0.00000	12.12724	17.57739	0.00000	0.00000	19841692.7
88048.40361	306845.58605	4730.46654	2072.33159	46323.89529	193070.98382	34588.87903	3795.33891	15247.06342	22099.30833	0.00000	0.00000	12985358.33
79252.32552	276191.56363	467647.10749	204867.71559	9372.18565	39061.85118	123508.70684	13552.25766	178331.83889	258476.67736	0.00000	0.00000	20670834.44
190823.63251	665013.63962	7786.03270	3410.91970	1286.89889	5363.59979	71920.88007	7891.67276	59634.26280	86434.73987	0.00000	0.00000	10641527.69
74913.15721	261069.71489	13864.79212	6073.91395	38452.48585	160264.14070	54324.02378	5960.81998	354880.60935	514368.95024	0.00000	0.00000	7107787.63
53691.68180	187113.62036	46141.17699	20213.61273	48645.87349	202748.63749	144863.66585	15895.47632	533210.60246	772842.95230	0.00000	0.00000	46099247.07
91118.31333	317544.11330	92345.28511	40454.79444	128952.68159	537455.25815	239180.70169	26244.61529	77989.79532	113039.50706	0.00000	0.00000	16021179.33
24173.02420	84242.13812	6611.95124	2896.57591	7445.84379	31033.14989	77234.61464	8474.73368	16577.75041	24028.02478	0.00000	0.00000	5760352.891
334806.80502	1166789.92557	35210.15598	15424.93069	475809.38898	1983101.51309	315411.07003	34609.15590	270011.74774	391358.82766	0.00000	0.00000	38309726.59
185003.79792	644731.72102	130839.37118	57318.35534	48288.28853	201258.27752	482092.35394	52898.61714	148685.09728	215506.27279	0.00000	0.00000	5984739.253
657246.44590	2290480.71965	42871.88544	18781.39540	261400.33506	1089477.03005	350598.93559	38470.21989	395071.69147	572622.47037	0.00000	0.00000	56507384.37
187451.29280	653261.15450	12605.29355	5522.15047	504430.78452	2102391.15748	1879792.76906	206264.29185	342492.45061	496413.37859	0.00000	0.00000	22025862.39
265892.45146	926625.83017	12269.46073	5375.02820	58096.14883	242135.95468	81973.02344	8994.66575	1299896.26192	1884087.93844	0.00000	0.00000	55923024.27
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	0.00000	1.0

**Table 3.28: Splitting the rows according to the value of output of organized and unorganized sectors**

(Figures in Rs. Lakhs)

	011	010	021	020	031	030	041	040	051	050	061	060	071	070
011	98649.93	1116044	1.43669	8.925838	0	0	0	0	497559.9	428541.8	12249.15	5470.815	63438.49	59735.6
010	1116044	12625993	16.25352	100.9795	0	0	0	0	5628981	4848167	138576.7	61892.27	717690.6	675799.2
021	48.7787	551.8418	67.95953	422.2176	0	0	0	0	310.7676	267.6601	3844.12	1716.893	17.39637	16.38095
020	303.0513	3428.472	422.2176	2623.145	0	0	0	0	1930.731	1662.913	23882.68	10666.68	108.0798	101.7713
031	0	0	0	0	0.010311	19.69052	0	0	126.215	108.7074	0	0	0	0
030	0	0	0	0	19.69052	37602.34	0	0	241028.6	207594.8	0	0	0	0
041	1.545521	17.48474	0	0	0	0	16706.82	1834.322	10403.96	8960.794	2219.705	991.3831	22498.23	21185.02
040	0.16969	1.919733	0	0	0	0	1834.322	201.399	1142.3	983.8484	243.712	108.8487	2470.189	2326.004
051	31727.26	358936	0	0	6.488871	12391.58	0	0	1315377	1132917	352208	157306.1	3549.59	3342.401
050	12518.41	141622.9	0	0	2.56027	4889.262	0	0	518999.5	447007.4	138968.3	62067.19	1400.537	1318.788
061	0	0	0	0	0	0	0	0	1566.543	1349.243	136549.3	60986.78	3.270319	3.079432
060	0	0	0	0	0	0	0	0	377.0995	324.7908	32870.25	14680.78	0.787234	0.741283
071	10956.67	123954.7	265.5273	1649.663	40.89746	78100.52	42.80096	4.699322	20405.65	17575.11	13117.58	5858.684	1321971	1244808
070	4136.49	46796.82	100.245	622.8	15.44009	29485.42	16.15872	1.774143	7703.777	6635.162	4952.303	2211.839	499085.9	469954.4
081	28.68841	324.5569	3.358286	20.86429	0.347791	664.1643	3385.806	371.7438	15252.95	13137.17	1246.389	556.6727	4340.547	4087.191
080	134.5593	1522.292	15.7516	97.86126	1.631267	3115.177	15880.68	1743.616	71542.01	61618.19	5846.028	2611.001	20358.78	19170.44
091	558.1768	6314.751	558.8392	3471.945	0	0	4076.173	447.5425	159215.3	137130.1	44052.57	19675.12	46520.73	43805.33
090	252.3744	2855.155	252.6738	1569.807	0	0	1843.003	202.3521	71987.71	62002.07	19917.95	8895.921	21033.91	19806.17
101	0	0	0	0	0	0	0	0	0	0	0	0	10762.07	10133.89
100	0	0	0	0	0	0	0	0	0	0	0	0	12629.34	11892.16
111	61414.87	694797	3345.128	20782.54	55.651	106274.9	109006.4	11968.34	257301.1	221610	91618.43	40919.38	194056.1	182729.1
110	10924.67	123592.7	595.0418	3696.864	9.899374	18904.51	19390.4	2128.965	45769.52	39420.69	16297.37	7278.868	34519.31	32504.42
121	227997	2579369	30.67685	190.5885	3.141112	5998.476	213545	23446.12	207081.6	178356.7	89323.95	39894.61	451489.8	425136.4
120	27706.69	313450.6	3.727919	23.16074	0.381715	728.9481	25950.46	2849.225	25165.01	21674.3	10854.84	4848.08	54866.03	51663.52
131	4.438541	50.21398	1.671895	10.38712	0	0	29580.81	3247.818	18629.16	16045.06	1326.116	592.2809	755.7602	711.6466
130	2.343778	26.51556	0.882847	5.484933	0	0	15620.19	1715.015	9837.156	8472.614	700.2574	312.7548	399.0802	375.786
141	0	0	17.33256	107.6834	2.623836	5010.652	594.9272	65.31991	1331.473	1146.781	120.1986	53.68408	1035.6	975.1526
140	0	0	3.643203	22.63442	0.551515	1053.21	125.0503	13.72987	279.868	241.0466	25.26504	11.28408	217.6772	204.9714



**Table 3.32: Splitting the rows according to the value of output of organized and unorganized sectors**

(Figures in Rs. Lakhs)

	081	080	091	090	101	100	111	110	121	120	131	130	141	140
011	50.07244	489.8853	2303.57	148.8179	8162.754	19570.94	21571.01	5895.31	17319.78	1491.786	33.58034	23.75767	60.46966	10.70571
010	566.4781	5542.157	26060.69	1683.602	92346.64	221409.4	244036.5	66694.65	195941.6	16876.84	379.9002	268.7746	684.1037	121.1156
021	4004.207	39175.29	42778.41	2763.619	0	0	92.36762	25.24387	1699.64	146.3933	7.024847	4.969991	4.732522	0.837859
020	24877.26	243387.5	265772.9	17169.76	0	0	573.8597	156.8346	10559.49	909.5096	43.64383	30.87746	29.40212	5.205431
031	0	0	0.065357	0.004222	0	0	0	0	0.012068	0.001039	0	0	0	0
030	0	0	124.8101	8.063122	0	0	0	0	23.04676	1.985063	0	0	0	0
041	442.1896	4326.176	62383.03	4030.139	186.9671	448.2706	8925247	2439251	462533.4	39838.9	98440.01	69645.07	1511776	267648.9
040	48.5501	474.9915	6849.331	442.4882	20.52801	49.21777	979945.6	267817	50783.75	4374.104	10808.2	7646.665	165985.1	29386.45
051	38.13759	373.1204	14402.9	930.4727	125.6102	301.1619	4116.797	1125.112	336748.6	29004.82	272935.6	193098.5	368926.3	65315.71
050	15.04769	147.2196	5682.855	367.1303	49.56118	118.8274	1624.336	443.9276	132868.6	11444.23	107690.3	76189.56	145564.7	25771.18
061	1.360945	13.31485	47.75832	3.085337	8.896465	21.33008	654.1476	178.7771	32010.24	2757.104	259.0254	183.2572	1010.257	178.8586
060	0.327608	3.20516	11.49642	0.742705	2.141564	5.134593	157.4669	43.03536	7705.528	663.6922	62.35279	44.11382	243.1898	43.05497
071	630.6934	6170.409	16990.57	1097.644	4241.402	10169.14	37822.52	10336.81	64301.69	5538.431	6982.874	4940.296	2102.17	372.1739
070	238.1067	2329.525	6414.479	414.3955	1601.263	3839.173	14279.2	3902.474	24275.92	2090.933	2636.256	1865.118	793.6358	140.5074
081	437.1526	4276.897	17136.34	1107.061	148.2617	355.4707	2949.803	806.1747	32957.51	2838.695	3687.239	2608.675	1383.076	244.8635
080	2050.408	20060.23	80375.8	5192.528	695.4021	1667.289	13835.67	3781.258	154583	13314.53	17294.52	12235.65	6487.139	1148.501
091	1762.639	17244.84	1674538	108180.4	947.7156	2272.234	31904.71	8719.488	147404.7	12696.26	28385.9	20082.67	9296.846	1645.939
090	796.9608	7797.092	757126.7	48912.76	428.5006	1027.369	14425.41	3942.434	66647.64	5740.492	12834.42	9080.189	4203.481	744.1956
101	21.7458	212.7507	151.2762	9.772914	60090.07	144071.4	1241.59	339.3238	7996.15	688.724	127.3046	90.06639	0	0
100	25.51878	249.6639	177.5232	11.46855	70515.94	169068.3	1457.011	398.1979	9383.515	808.2205	149.3925	105.6933	0	0
111	3074.568	30080.13	157002.1	10142.83	5703.289	13674.15	1271074	347381.8	1288545	110984.9	247353.2	174999.3	423899.1	75048.24
110	546.9137	5350.748	27928.02	1804.238	1014.519	2432.401	226102.6	61793.35	229210.4	19742.34	43999.97	31129.42	75404.5	13349.82
121	4577.35	44782.66	409394	26448.13	18273.38	43812.08	1539991	420876.2	6728805	579565.1	61453.17	43477.34	177248.7	31380.59
120	556.2497	5442.087	49750.46	3214.036	2220.621	5324.141	187143.1	51145.8	817699.2	70430.03	7467.924	5283.462	21539.65	3813.438
131	51.81014	506.8862	5991.649	387.0793	46.4183	111.2921	2917.399	797.3189	14734.93	1269.148	200201.5	141640	25971.9	4598.134
130	27.35842	267.662	3163.899	204.3978	24.51125	58.76794	1540.537	421.0254	7780.798	670.1754	105716.7	74793.22	13714.5	2428.051
141	2172.058	21250.4	10310.26	666.0753	160.3338	384.4148	31453.12	8596.07	81020.55	6978.459	23863.01	16882.78	3926001	695069.8
140	456.5539	4466.71	2167.158	140.0052	33.70124	80.80176	6611.264	1806.844	17030.05	1466.832	5015.866	3548.662	825222.7	146099.6



**Table 3.32: Splitting the rows according to the value of output of organized and unorganized sectors**

(Figures in Rs. Lakhs)

	151	150	161	160	171	170	181	180	191	190	201	200	211	210
011	61.73826	40.98863	414.1937	124.8944	217.0937	27.01797	441.4612	321.5487	11015.94	16410.19	157.1816	5.61509	0	0
010	698.4556	463.7114	4685.844	1412.952	2456.018	305.659	4994.327	3637.736	124625.3	185651.3	1778.222	63.52449	0	0
021	109.3355	72.58891	123.5407	37.252	40.56737	5.048733	43.39915	31.6108	8390.857	12499.66	24.65769	0.880861	3.147113	0
020	679.2776	450.9789	767.5313	231.4385	252.0361	31.36667	269.6294	196.3909	52130.55	77657.63	153.1928	5.472597	19.55232	0
031	0	0	0.010456	0.003153	0	0	0	0	0	0	0	0	0	0
030	0	0	19.96785	6.02103	0	0	0	0	0	0	0	0	0	0
041	38223.15	25376.72	3091.372	932.1606	10260.72	1276.979	85.36587	62.17824	0	0	1356638	48463.97	6047.39	0
040	4196.702	2786.231	339.4165	102.3464	1126.574	140.2056	9.372727	6.826846	0	0	148951.7	5321.091	663.9719	0
051	18209.23	12089.28	33168.54	10001.52	2354.95	293.0807	110241.1	80296.67	595502.1	887105.3	698.3457	24.94741	0	0
050	7184.692	4769.987	13087.08	3946.23	929.1765	115.6389	43497.06	31682.11	234963.2	350019.1	275.5415	9.843331	0	0
061	0	0	241.3765	72.78376	0.738526	0.091912	103.0815	75.08184	0	0	26.8263	0.958332	0	0
060	0	0	58.10433	17.52056	0.177779	0.022125	24.81386	18.07376	0	0	6.457648	0.23069	0	0
071	13791.85	9156.542	36147.93	10899.91	10298.07	1281.627	11805.85	8599.066	11557.76	17217.32	1007.204	35.98095	428.5646	0
070	5206.86	3456.884	13646.99	4115.061	3887.848	483.8546	4457.08	3246.42	4363.42	6500.082	380.2515	13.58395	161.7967	0
081	6857.071	4552.475	10120.78	3051.781	3681.47	458.1702	3415.693	2487.901	36423.17	54258.73	647.0314	23.11428	23.81812	0
080	32162.2	21352.8	47470.21	14313.99	17267.46	2148.988	16020.87	11669.18	170838.2	254493.6	3034.817	108.4146	111.7158	0
091	23927.95	15886	75587.68	22792.42	12700.64	1580.634	15382.15	11203.95	11914.64	17748.95	40315.23	1440.205	6189.783	0
090	10818.8	7182.703	34176.25	10305.38	5742.476	714.6688	6954.893	5065.76	5387.091	8025.021	18228.15	651.1749	2798.652	0
101	163.0886	108.2761	6723.392	2027.346	4021.271	500.4595	2595.651	1890.604	0	0	49.43899	1.766138	0	0
100	191.3851	127.0624	7889.928	2379.099	4718.978	587.2913	3046.008	2218.632	0	0	58.01686	2.07257	0	0
111	126325.9	83868.98	432274.7	130346.5	240231	29897.48	88630.71	64556.26	511109.9	761388.3	1112134	39729.41	120173.1	0
110	22471.24	14918.88	76894.38	23186.44	42733.04	5318.257	15765.91	11483.47	90917.83	135438.1	197829.8	7067.191	21376.76	0
121	78308.56	51989.81	475992.5	143529	179810.8	22378.01	83255.71	60641.26	178918.2	266530.2	51590.35	1842.993	207.6116	0
120	9516.228	6317.916	57843.66	17441.96	21851.01	2719.425	10117.42	7369.259	21742.53	32389.33	6269.373	223.9645	25.22942	0
131	7686.799	5103.34	95556.55	28813.76	11804.72	1469.134	2306.909	1680.291	1238678	1845229	36.05268	1.287931	254.5909	0
130	4059.025	2694.826	50458.77	15215.15	6233.498	775.778	1218.166	887.2801	654085.7	974375.8	19.03767	0.680094	134.4371	0
141	1927182	1279475	2555376	770538.3	1153216	143521.3	38024.92	27696.34	1580582	2354555	1379.746	49.28946	221.0878	0
140	405082.5	268938.2	537125.2	161962.7	242399.4	30167.34	7992.617	5821.611	332229.1	494913.8	290.0145	10.36036	46.47138	0





**Table 3.32: Splitting the rows according to the value of output of organized and unorganized sectors**

(Figures in Rs. Lakhs)

	221	220	231	230	241	240	251	250	261	260	271	270
011	8912.164	31058.58	0	0	42076.32	175367.7	0	0	2697.115	3909.237	0	0
010	100824.8	351371	0	0	476016.7	1983965	0	0	30512.93	44225.87	0	0
021	0	0	0	0	0	0	0	0	0	0	0	0
020	0	0	0	0	0	0	0	0	0	0	0	0
031	0	0	0	0	0.755759	3.149888	0	0	0	0	0	0
030	0	0	0	0	1443.247	6015.236	0	0	0	0	0	0
041	0.336883	1.174025	0	0	642.3298	2677.133	0	0	312.8547	453.4559	0	0
040	0.036988	0.128902	0	0	70.52445	293.9352	0	0	34.34981	49.78709	0	0
051	1609.338	5608.486	0	0	188247.4	784586.6	0	0	10.16382	14.73158	0	0
050	634.9855	2212.902	0	0	74275.48	309569	0	0	4.010268	5.812539	0	0
061	12.98495	45.25211	0	0	37933.29	158100.2	2537.89	278.4754	0.336989	0.488436	0	0
060	3.125748	10.89312	0	0	9131.331	38058.01	610.9228	67.03482	0.08112	0.117577	0	0
071	20186.8	70350.28	434.0765	190.161	5842.729	24351.61	4137.382	453.9832	11121.2	16119.23	0	0
070	7621.155	26559.46	163.8776	71.79181	2205.815	9193.504	1561.993	171.393	4198.606	6085.518	0	0
081	160.0971	557.9328	243.1718	106.5292	1467.293	6115.455	1551.989	170.2953	5584.311	8093.979	0	0
080	750.9149	2616.912	1140.566	499.6613	6882.148	28683.75	7279.405	798.7483	26192.49	37963.76	0	0
091	59818.87	208466.6	16531.86	7242.306	62602.96	260919.7	204441.4	22432.77	52551.21	76168.47	0	0
090	27046.53	94256.22	7474.722	3274.54	28305.34	117972.4	92436.23	10142.76	23760.53	34438.85	0	0
101	395.1985	1377.253	0	0	0	0	0	0	0	0	0	0
100	463.767	1616.212	0	0	0	0	0	0	0	0	0	0
111	1786486	6225839	24024.57	10524.73	85207.21	355130.7	103676.6	11376.14	26347.54	38188.5	0	0
110	317785.6	1107472	4273.566	1872.172	15156.92	63171.77	18442.32	2023.623	4686.783	6793.089	0	0
121	42849.23	149328.1	0	0	1586.521	6612.381	1.390284	0.152552	506542	734189.1	0	0
120	5207.133	18146.67	0	0	192.7976	803.5512	0.16895	0.018538	61556.1	89220.28	0	0
131	6629.843	23104.77	0	0	1031.032	4297.187	3.797455	0.416684	853.9362	1237.707	0	0
130	3500.898	12200.51	0	0	544.4381	2269.136	2.005251	0.220031	450.9222	653.573	0	0
141	252.4687	879.8446	0	0	844.3424	3519.091	0	0	10.0209	14.52444	0	0
140	53.06746	184.9382	0	0	177.4759	739.6926	0	0	2.106336	3.052953	0	0



## 4 Miyazawa's Model: Calculation of inter-segmental linkages in partitioned matrices

The 27 by 27 aggregated input-output table incorporating the organized and unorganized classification contains 27 organized and 27 unorganized components. Square sub-blocks  $P, P_1, S_1$  and  $S$  of an order 27 by 27 come to be when the 54 components are collected as per organized-unorganized transactions' type. Resultant Matrix 'A' (of Leontief or Ghoshian type) containing input-output coefficients per sub-blocks  $P, P_1, S_1$  and  $S$  takes the form given in equation (4.1) below:

$$A = \begin{bmatrix} P & P_1 \\ S_1 & S \end{bmatrix}_{(54 \times 54)} = \begin{bmatrix} P & P_1 \\ S_1 & S \end{bmatrix}_{(27+27 \times 27+27)} \quad (4.1)$$

Where

Sub-blocks  $P$  and  $P_1$  denote P segment's product absorbed by P and S segments, respectively

Sub-blocks  $S_1$  and  $S$  denote S segment's product absorbed by P and S segments, respectively

The Leontief and Ghoshian inverses of Matrix 'A' are summarized by equation (4.2).

$$B^* = (I - A)^{-1} \quad (4.2)$$

Leontief and Ghoshian inverses of Matrix 'A' express collective effects of segments P and S. To measure inter-segmental linkages collective effects of segments P and S need to be expressed as partial effects of segment P and S. Propagation process is explained in terms of partial matrix multipliers below:

- a. "Internal matrix multiplier" of block P measures propagation of organized segment arising as a result of per industry expansion and due to expansion of interactions among industries. It is given by equation (4.3):

$$B = [I - P]^{-1} \quad (4.3)$$

- b. “Internal matrix multiplier” of block S measures propagation of unorganized segment arising as a result of per industry expansion and due to expansion of interactions among industries. It is given by equation (4.4):

$$T = [I - S]^{-1} \quad (4.4)$$

- c. Inter-segmental activities are accounted by following ‘sub-matrix-multipliers’:
- i.  $B_1 = S_1 B \cdots$  measures expansion of unorganized input inflows in organized segment as a consequence of internal expansion of organized segment
  - ii.  $B_2 = B P_1 \cdots$  measures internal expansion of organized segment as a result of increased organized goods sales to the unorganized segment
  - iii.  $T_1 = P_1 T \cdots$  measures expansion of organized input inflows in unorganized segment as a consequence of internal expansion of unorganized segment
  - iv.  $T_2 = T S_1 \cdots$  measures internal expansion of unorganized segment as a result of increased unorganized goods sales to the organized segment

Note that  $B_2$  and  $T_2$  give the coefficients of induced outputs whereas  $B_1$  and  $T_1$  give the coefficients of induced inputs.

- d. Inter-segmental external propagation in partial matrix multipliers terms takes two forms if  $B_2$  and  $T_2$  are selected as base:

$$L = [I - B_2 T_2]^{-1} = [I - (B P_1)(T S_1)]^{-1} \quad (4.5)$$

or, 
$$K = [I - T_2 B_2]^{-1} = [I - (T S_1)(B P_1)]^{-1} \quad (4.6)$$

- e. Total propagation effect of P and S blocks take values  $LB$  and  $KT$  respectively (i.e. “external matrix multiplier” post-multiplied by “internal matrix multiplier”). Assuming

$$M = KT = [I - (T S_1)(B P_1)]^{-1} T$$

$$N = LB = [I - (B P_1)(T S_1)]^{-1} B,$$

the Leontief/Ghoshian inverse takes the forms listed below:

$$B^* = (I - A)^{-1} = \begin{bmatrix} I - P & -P_1 \\ -Q_1 & I - Q \end{bmatrix}^{-1} \quad (4.7)$$

$$= \begin{bmatrix} B + B_2MB_1 & B_2M \\ MB_1 & M \end{bmatrix} \quad (4.8)$$

$$= \begin{bmatrix} N & NT_1 \\ T_2N & T + T_2NT_1 \end{bmatrix} \quad (4.9)$$

$$= \begin{bmatrix} LB & LB_2T \\ KT_2B & KT \end{bmatrix} \quad (4.10)$$

$$= \begin{bmatrix} LB & LBT_1 \\ KTB_1 & KT \end{bmatrix} \quad (4.11)$$

Multiplicative elements in the above five versions are interpreted as first element stemming out of the second, second stemming of the third and so on. Thus, each successive element adds to the interpretation.

Equations (4.8)-(4.11) take the following forms when expanded in terms of "internal", "external" and "induced" sub-matrix multipliers:

$$(4.8) = \begin{bmatrix} B + B_2 \left[ (I - (TS_1)(BP_1))^{-1} T \right] B_1 & B_2 \left[ (I - (TS_1)(BP_1))^{-1} T \right] \\ \left[ (I - (TS_1)(BP_1))^{-1} T \right] B_1 & \left[ (I - (TS_1)(BP_1))^{-1} T \right] \end{bmatrix} \quad (4.12)$$

$$(4.9) = \begin{bmatrix} (I - (BP_1)(TS_1))^{-1} B & \left[ (I - (BP_1)(TS_1))^{-1} B \right] T_1 \\ T_2 \left[ (I - (BP_1)(TS_1))^{-1} B \right] & T + T_2 \left[ (I - (BP_1)(TS_1))^{-1} B \right] T_1 \end{bmatrix} \quad (4.13)$$

$$(4.10) = \begin{bmatrix} (I - (BP_1)(TS_1))^{-1} B & (I - (BP_1)(TS_1))^{-1} B_2 T \\ \left[ (I - (TS_1)(BP_1))^{-1} T_2 B \right] & (I - (TS_1)(BP_1))^{-1} T \end{bmatrix} \quad (4.14)$$

$$(4.11) = \begin{bmatrix} (I - (BP_1)(TS_1))^{-1} B & (I - (BP_1)(TS_1))^{-1} B T_1 \\ K \left[ (I - (TS_1)(BP_1))^{-1} B_1 \right] & (I - (TS_1)(BP_1))^{-1} T \end{bmatrix} \quad (4.15)$$

Equations (4.12) and (4.14) give partitioned Leontief/Ghoshian inverse from the perspective of the organized segment, second and the fourth do the same from the view point of unorganized segment. Note that the first and fourth sub-matrices on the left hand principal diagonal of

(4.12) and (4.13) decompose internal and external multipliers in additive form, which are done in (4.14) and (4.15) in a multiplicative format.

Study of inter-segmental linkages in terms of partial multipliers was introduced by Miyazawa (1976). Working of Miyazawa's model is illustrated in the course of estimating linkages between organized (O) and unorganized (U) segments of the Indian economy at 3 by 3 level in the following section.

#### **4.1 Working of Miyazawa's model**

The example illustrating splitting of input-output table in Chapter 3 is carried out further in this section to demonstrate the working of Miyazawa model. Table 3.14 shows each sector of the three by three sector split into organized and unorganized components. The 6 by 6 matrix put into a block format (refer to equation (4.1)) takes the form of Table 4.1:

**Table 4.1: Organized-unorganized inter-industry table in block format**

(Figures in Rs. Thousands)

		Organized			Unorganized		
		I1	II1	III1	IO	II0	III0
Organized	I1	13.06230	11.67040	7.47880	313.49420	7.15280	8.77940
	II1	71.50180	410.22220	52.10310	1716.04410	251.42650	61.16450
	III1	57.50350	147.12220	48.01340	1380.08370	90.17170	56.36350
Unorganized	IO	2821.44790	2520.79960	1615.41120	67714.75030	1545.00620	1896.35220
	II0	65.73560	377.13970	47.90120	1577.65340	231.15020	56.23190
	III0	82.74890	211.71250	69.09240	1985.97420	129.75930	81.10850

Leontief and Ghoshian coefficient matrices of partitioned input-output table (given in Table 4.1) are presented in Table 4.2 and Table 4.3, respectively:

**Table 4.2: Partitioned Leontief Coefficient Matrix, ‘A’**

	Organized			Unorganized		
Organized	0.03266	0.00282	0.00271	0.00363	0.00188	0.00271
	0.17876	0.09925	0.01888	0.01986	0.06617	0.01888
	0.14376	0.03559	0.01740	0.01597	0.02373	0.01740
Unorganized	7.05362	0.60987	0.58529	0.78374	0.40658	0.58529
	0.16434	0.09124	0.01736	0.01826	0.06083	0.01736
	0.20687	0.05122	0.02503	0.02299	0.03415	0.02503

**Table 4.3: Partitioned Ghoshian Coefficient Matrix, ‘G’**

	Organized			Unorganized		
Organized	0.03266	0.02918	0.01870	0.78374	0.01788	0.02195
	0.01730	0.09925	0.01261	0.41517	0.06083	0.01480
	0.02083	0.05331	0.01740	0.50003	0.03267	0.02042
Unorganized	0.03266	0.02918	0.01870	0.78374	0.01788	0.02195
	0.01730	0.09925	0.01261	0.41517	0.06083	0.01480
	0.02554	0.06534	0.02132	0.61295	0.04005	0.02503

Table 4.2 and Table 4.3 measure effects of organized and unorganized segments. Corresponding “disjoined” multipliers associated with the partitioned Leontief inverse are described below.

Any particular industry adding an additional unit of value routes the effects on the system in two directions, namely, one on the segment it belongs to and second on the other segment. For example say an additional unit of value is added by secondary sector of the organized segment. To add this additional unit, input requirements are made to the organized components of primary and tertiary sectors. This increase in input requirements results in expansion of organized segment. Additional unit of value added also generates an additional unit of raw material for production by unorganized components of primary, secondary and tertiary sectors. Internal and external expansionary effects of organized and unorganized segments are listed in Table 4.5, Table 4.4, Table 4.7 and Table 4.6:

**Table 4.5: Internal multiplier of organized segment,  $B = [I - P]^{-1}$**

	I	II	III
I	1.034812	0.003359	0.002918
II	0.208691	1.111703	0.021934
III	0.158958	0.040762	1.018925

**Table 4.7: Internal multiplier of unorganized segment,  $T = [I - S]^{-1}$**

	I	II	III
I	5.155423	2.345902	3.136674
II	0.102547	1.112121	0.081358
III	0.125136	0.094258	1.102476

**Table 4.4: External multiplier of organized segment, L**

	I	II	III
I	1.215006	0.020771	0.018086
II	1.384012	1.138736	0.116689
III	1.015434	0.09964	1.085526

**Table 4.6: External multiplier of unorganized segment, K**

	I	II	III
I	1.404431	0.621388	0.352899
II	0.012832	1.022897	0.01135
III	0.013581	0.022252	1.011939

Values in internal multiplier of unorganized segment are higher than those of internal multiplier of organized segment. Exceptions to the pattern are the values of sector II and III in the column of sector I. Thus, expansion of unorganized sector through the sales of sector I (by 4.15542), sector II (by 1.34590) and sector III (by 2.13667) sectors is more than expansion witnessed by organized segment when, say, sector I produces an additional unit of output. In case of unorganized segment's sector I, expansion is more due to its sales rather than the purchases.

Values in Table 4.4 and Table 4.6 reveal higher external linkages of organized segment than the unorganized segment. Exceptions being the diagonal elements on the left hand principal diagonal, and value of sector I in the column of sector II. Thus, intra-sectoral sales' internal linkages and sector II's purchase linkages are higher than intra-sectoral external linkages and sector II's sales linkages, respectively.

Row and column sums of B, L, T and K also re-emphasize the above facts.



**Table 4.8: Summary table of External and Internal multipliers of organized and unorganized segment of the hypothetical economy**

	Internal multiplier of (O) segment, B		External multiplier of (O) segment, L		Internal multiplier of (U) segment, T		External multiplier of (U) segment, K	
	Row Sum	Column Sum	Row Sum	Column Sum	Row Sum	Column Sum	Row Sum	Column Sum
I	1.041089	1.402460	1.253863	3.614452	10.637999	5.383106	2.378719	1.430844
II	1.342328	1.155824	2.639436	1.259147	1.296026	3.552280	1.047080	1.666538
III	1.218645	1.043777	2.200601	1.220301	1.321870	4.320509	1.047772	1.376189
(Average)	1.200687	1.200687	2.031300	2.031300	4.418632	4.418632	1.491190	1.491190

As per Table 4.8, organized segment expands by 0.20068 units on an average in case an additional unit of output is produced by organized component of secondary sector. Whereas, unorganized segment expands by 1.03130 units in case an additional unit is produced by organized segment. Similarly if unorganized component of secondary sector produces one additional unit of output on an average, unorganized and organized segments will expand by 3.41863 and 0.49119 units, respectively.

Internal (external) multipliers are higher for unorganized (organized) segment [equal to 4.41863 and 2.03130, respectively]. Internal and external multipliers both get reflected in the collective effects (calculated by subtracting one from the multiplication of internal multiplier with external multiplier for a segment). Total effects of unorganized segment (=5.58902) in this case are, thus, greater than (=1.43895) of organized segment. These facts indicate towards unorganized segment being more internally dependent (and thus less externally dependent) for its propagation.

Dependency/independency of a segment and sectors is determined with “internal propagation ratios”. Internal propagation ratio equals division of internal expansionary effects (given by internal matrix multiplier) with total expansionary effects (given by Leontief inverse of a segment). Higher “internal propagation ratio” reflects higher value of transactions within a segment as compared to value of its transactions with the other segment implying a segment being more dependent on its own activities for growth rather than being dependent on the other segment. Internal propagation ratios of organized and unorganized segment (given by  $B/B_{str}$  and  $T/B_{str}$ , respectively) are listed in Table 4.9 and Table 4.10:

**Table 4.9: Internal propagation ratios of organized segment**

B/B*	I	II	III
I	0.818349	0.120351	0.130107
II	0.123604	0.871691	0.148288
III	0.127766	0.257288	0.916944

**Table 4.10: : Internal propagation ratios of unorganized segment**

T/B*	I	II	III
I	0.701579	0.583706	0.647423
II	0.594581	0.951541	0.598293
III	0.629058	0.620160	0.950372

Table 4.9 and Table 4.10 illustrate heterogeneity within the internal propagation ratios of organized and unorganized segments. For interpreting, the internal propagation ratios are classified in overlapping groups A, B, C, D and E. The ranges of groups A, B, C, D and E are specified below:

**Table 4.11: Groups of internal propagation ratios**

Group	Range of group	Sub-group	Range of sub-group
Group A	0.9-0.8		
Group B	0.9-0.7		
Group C	0.9-0.5	C1	0.9-0.8
		C2	0.8-0.7
		C3	0.7-0.5
Group D	0.7-0.4	D1	0.7-0.5
		D2	0.5-0.4
Group E	0.5-0.1	E1	0.5-0.4
		E2	0.4-0.3
		E3	0.3-0.1

Groups are divided into sub-groups as shown in Table 4.11. Frequency tables of internal propagation ratios of organized and unorganized segments (given in Table 4.12 and Table 4.13, respectively) are generated corresponding to these sub-groups. Titles  $f_A, \dots, f_E$  denote

frequencies of groups A,..., group E. Sectors against Modal groups and sub-groups are discovered and recorded in Table 4.14 and Table 4.15. In case of bi/tri or nearly bi/tri modality, sector is repeated against the multiple sub-groups.

According to Table 4.14 and Table 4.15, operations of all the sectors make unorganized segment comparatively more independent than the organized segment as the sectors of unorganized segment falls neatly in group C3 or D1 with internal propagation ratios ranging from 0.5 to 0.7, unlike in the case of organized segment whose sectors are operational in range E3 with internal propagation ranging from 0.1 to 0.3.

Internal expansion of a segment differs from its total expansion only by its expansion owing to external sources (i.e. sales and purchase transactions with the other segment). In algebraic terms,

$$B^* = B + B_2MB_1 = (I - P)^{-1} + B_2MB_1 \quad (4.16)$$

The external transactions of organized segment are mathematically given by the expression  $B_2MB_1$  in equation (4.16). In other words, it is the weightage of  $B_2$  (expansion of organized segment due to the sales that it makes to the unorganized segment),  $M$  (weightage of direct and indirect expansionary effects that organized segment experiences due to its sales and purchase transactions with the unorganized segment out of the total expansion that unorganized segment witnesses) and  $B_1$  (expansion of organized segment due to the availability of inputs that it has from the unorganized segment) in the external transactions that govern internal/external dependency. Hence,

$$\text{Internal or external dependency} = f(B_2, M, B_1) \quad (4.17)$$

$B_2$ ,  $M$ , and  $B_1$  are scrutinized in the following paragraphs so as to go in depth of the factors governing external dependencies/interactions/linkages. Values of  $B_2$  and  $B_1$  are given in Table 4.16 and Table 4.17, respectively. 8 out of 9 values of  $B_1$  (columns of which indicate inducible power of organized segment) are greater than  $B_2$  (columns of which indicate inducible power of

unorganized segment), indicating higher inducing potential of organized segment than unorganized segment.

$M$ , the amount of organized segment's expansion out of internal expansion of unorganized segment, is algebraically:

$$M = KT = [I - (TS_1)(BP_1)]^{-1}T \quad (4.18)$$

Where,  $KT$  is the external multiplier of unorganized segment multiplied by internal multiplier of the unorganized segment.

**Table 4.12: Frequency distribution of internal propagation ratios of organized segment**

B/B*	Group A		fA	Group B		Group C			fC	Group D		fD	Group E			fE
	0.9-0.8			0.9-0.7		0.9-0.5				0.7-0.4			0.5-0.1			
	0.9	0.9-0.8		0.9-0.7		0.9-0.8	0.8-0.7	0.7-0.5		0.7-0.5	0.5-0.4		0.5-0.4	0.4-0.3	0.3-0.1	
I	0	1	1	1	1	1	0	0	1	0	0	0	0	0	2	2
II	0	1	1	1	1	1	0	0	1	0	0	0	0	0	2	2
III	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2	2

**Table 4.13: Frequency distribution of internal propagation ratios of unorganized segment**

T/B*	Group A		fA	Group B		Group C			fC	Group D		fD	Group E			fE
	0.9-0.8			0.9-0.7		0.9-0.5				0.7-0.4			0.5-0.1			
	0.9	0.9-0.8		0.9-0.7		0.9-0.8	0.8-0.7	0.7-0.5		0.7-0.5	0.5-0.4		0.5-0.4	0.4-0.3	0.3-0.1	
I	0	0	0	1	1	0	1	2	3	2	0	2	0	0	0	0
II	1	0	1	0	0	0	0	2	2	2	0	2	0	0	0	0
III	1	0	1	0	0	0	0	2	2	2	0	2	0	0	0	0

**Table 4.14: Sectors of organized segment according to their internal/external dependence**

Group A	Group B	Group C			Group D		Group E		
0.9-0.8	0.9-0.7	0.9-0.5			0.7-0.4		0.5-0.1		
		0.9-0.8	0.8-0.7	0.7-0.5	0.7-0.5	0.5-0.4	0.5-0.4	0.4-0.3	0.3-0.1
		C1	C2	C3	D1	D2	E1	E2	E3
									A
									B
									C

**Table 4.15: Sectors of unorganized segment according to their internal/external dependence**

Group A	Group B	Group C			Group D		Group E		
0.9-0.8	0.9-0.7	0.9-0.5			0.7-0.4		0.5-0.1		
		0.9-0.8	0.8-0.7	0.7-0.5	0.7-0.5	0.5-0.4	0.5-0.4	0.4-0.3	0.3-0.1
		C1	C2	C3	D1	D2	E1	E2	E3
				A	A				
				B	B				
				C	C				

**Table 4.16: Inducible power of  
unorganized segment**

B <sub>2</sub>	I	II	III
I	0.003868	0.002239	0.002918
II	0.023188	0.074469	0.021934
III	0.017662	0.027175	0.018926

**Table 4.17: Inducible power of  
organized segment**

B <sub>1</sub>	I	II	III
I	7.519480	0.725546	0.630332
II	0.191861	0.102695	0.020165
III	0.228743	0.058658	0.027234

**Table 4.18: Internal multiplier of  
unorganized segment, T**

T	I	II	III
I	5.155423	2.345902	3.136674
II	0.102547	1.112121	0.081358
III	0.125136	0.094258	1.102476

**Table 4.19: External multiplier of  
unorganized segment, K**

K	I	II	III
I	1.404431	0.621388	0.352899
II	0.012832	1.022897	0.011350
III	0.013581	0.022252	1.011939

For separating expansionary effects originating from internal and external interactions, values of  $T$  and  $K$  are presented in Table 4.18 and Table 4.19. Note that values in Table 4.18 are homogeneously greater than those in Table 4.19 implying internal dependence/external independence of the unorganized segment for its growth.

Inter-segmental linkages are, thus, determined by internal and external input patterns. Inter-segmental multipliers  $B_1$  (growth of organized segment due to increased input availability from unorganized segment),  $B_2$  (growth of organized segment due to increased sales it makes to unorganized segment),  $T_1$  (growth of unorganized segment due to increased input availability from organized segment) and  $T_2$  (growth of unorganized segment due to increased sales it makes to organized segment) are summarized in Table 4.20 and Table 4.21.

**Table 4.20: Some coefficients of Inducement (from  $B_2$  and  $T_2$ ) to production per unit of input in other segment\***

(a) Row sum elements of $T_2$		(c) Row sum elements of $B_2$	
(U) segment		(O) segment	
I	44.054341	II	0.119591
(Average)	15.5323	(Average)	0.064126
(b) Column sum of elements of $T_2$		(d) Column sum of elements of $B_2$	
(U) segment		(O) segment	
I	39.447961	II	0.103883
(Average)	15.532297	(Average)	0.064126

**Table 4.21: Some coefficients of Inducement (from  $B_1$  and  $T_1$ ) to production per unit of input in other segment\***

(a) Row sum elements of $B_1$		(c) Row sum elements of $T_1$	
(U) segment		(O) segment	
I	8.875358	II	0.321994
(Average)	3.168238	III	0.223672489
		(Average)	0.196762193
(b) Column sum of elements of $B_1$		(d) Column sum of elements of $T_1$	
(O) segment		(U) segment	
I	7.940084	I	0.217739
(Average)	3.168238	II	0.198318318
		(Average)	0.196762

\*listed sectors have values higher than the average



In Table 4.20, the average value of  $T_2$  is greater than of  $B_2$ , implying higher growth of unorganized segment due to the sales it makes to organized segment than vice-versa. Table 4.20 reveals that sector I furnishes this trend being the common sector between the sub-tables Table 4.20 (a) and Table 4.20 (b).

The average value of  $T_1$  also turns out to be lower than  $B_1$  indicating lower growth of unorganized segment even after increased input availability from organized segment. Sub-tables Table 4.21 (c) and (d) reveal that sector II's operations tend to reverse this trend.

It is interesting to note the changes when Goshian inverse is assumed to describe the total effects of the producing segments. Partial matrix multipliers then associated with the organized and unorganized segments are described in the paragraphs that follow.

Internal and external multipliers Quantitative of organized and unorganized segments are:

**Table 4.22: Internal multiplier of organized segment, B**

	I	II	III
I	1.034582	0.034100	0.009974
II	0.020029	1.111261	0.007254
III	0.011411	0.030236	0.504687

**Table 4.24: Internal multiplier of unorganized segment, T**

	I	II	III
I	4.968734	0.096991	0.055946
II	2.221496	1.108473	0.032994
III	1.587155	0.052580	0.524370

**Table 4.23: External multiplier of organized segment, L**

	I	II	III
I	1.185081	0.181195	0.053448
II	0.114893	1.117451	0.033263
III	0.031448	0.031330	0.509092

**Table 4.25: External multiplier of unorganized segment, K**

	I	II	III
I	1.320522	0.021511	0.005100
II	0.238120	1.019178	0.003869
III	0.072053	0.005243	0.501158

Values of internal multiplier of unorganized segment are higher than those of the internal multiplier of organized segment (refer Table 4.22 and Table 4.24), the only exception being the cell showing sales of Sector II to Sector II. This implies that one unit of sales by unorganized segment of (say) sector I to unorganized segment of sector III leads to higher propagation of unorganized segment as compared to one unit sales made by organized segment of sector I to

organized segment of sector III, except for the sales of sector II to sector II, where the pattern is reverse. Values of external multiplier of organized segment are higher for the columns of sector II and sector III, implying higher propagation of unorganized segment with an additional unit of purchase by sector II and III. However, the pattern is reverse for sector I.

Same characteristics are summarized by row and column sums of these internal and external multipliers B, L, T and K (refer table Table 4.26):

**Table 4.26: Summary table of External and Internal multipliers of organized and unorganized segment of the hypothetical economy**

	Internal multiplier of (O) segment, B		External multiplier of (O) segment, L		Internal multiplier of (U) segment, T		External multiplier of (U) segment, K	
	Row Sum	Column Sum	Row Sum	Column Sum	Row Sum	Column Sum	Row Sum	Column Sum
I	1.078656	1.066021	1.419723	1.331422	5.121671	8.777385	1.347133	1.630695
II	1.138544	1.175597	1.265607	1.329975	3.362963	1.258045	1.261167	1.045932
III	0.546334	0.521915	0.571870	0.595803	2.164106	0.613310	0.578454	0.510127
(Average)	0.921178	0.921178	1.085733	1.085733	3.549580	3.549580	1.062252	1.062252

Values in Table 4.26 imply that one additional unit of output from the organized component of (say) secondary sector expands organized segment by 0.92117 units on an average as per Table 27. This additional unit of output from the organized component of secondary sector expands the unorganized segment by 0.08573 units. Similarly in case unorganized component of secondary sector produces one additional unit of output, the unorganized and organized segments would expand by 2.54958 and 0.06225 units respectively.

Note that internal multiplier of unorganized segment (=3.54958) is higher than internal multiplier of organized segment (=0.92117). However, external multiplier exhibits a reverse trend being higher for organized segment (=1.08573) than for the unorganized segment (=1.06225).

Both internal and external multipliers get reflected in the total effects of organized and unorganized segments. Total effect per segment equals subtraction of one from the multiplication of internal multiplier with external multiplier for each segment. Total effects of organized segment (=0.00015) are much less than 2.77054 of unorganized segment in the Ghoshian case too. Higher total effects of unorganized segment indicate higher expansionary benefits of the

unorganized segment than the organized segment. Thus, organized segment turns out to be less dependent on the unorganized segment rather than vice-versa.

Sectors determining external dependency or internal independency of a segment are discovered with the aid of “internal propagation ratios”. Internal propagation ratio is the ratio of internal expansionary effects (given by internal matrix multiplier) to the total expansionary effects (given by Leontief inverse). Note that the “internal propagation ratio” reflects external dependency as later equals subtraction of former from one (i.e. external dependency =1-internal propagation ratio). Thus, higher “internal propagation ratio” conveys lower external dependency and, hence, lower interactions with the other segment as compared to its higher internal transactions. Higher internal interactions and lower external transactions makes the segment ‘more internally dependent’ on its own activities. Internal propagation ratios of organized and unorganized segments are given by  $B/B^*$  and  $T/B^*$  in Table 4.27 and Table 4.28, respectively:

**Table 4.27: Internal propagation ratios of organized segment**

$B/B^*$	I	II	III
I	0.818167	0.118239	0.064443
II	0.122581	0.871343	0.073449
III	0.063284	0.127438	0.454174

**Table 4.28: Internal propagation ratios of unorganized segment**

$T/B^*$	I	II	III
I	0.676173	0.548716	0.307934
II	0.566505	0.948420	0.284566
III	0.299199	0.294967	0.452025

The internal propagation ratios given are further re-classified in overlapping groups A, B, C, D and E in Table 4.29 and Table 4.30. Note that groups A, B, C, D and E are same as in Table 4.11.

**Table 4.29: Sectors of organized segment according to their internal/external dependence**

Group A	Group B	Group C			Group D		Group E		
0.9-0.8	0.9-0.7	0.9-0.5			0.7-0.4		0.5-0.1		
		0.9-0.8	0.8-0.7	0.7-0.5	0.7-0.5	0.5-0.4	0.5-0.4	0.4-0.3	0.3-0.1
		C1	C2	C3	D1	D2	E1	E2	E3
							III		III

**Table 4.30: Sectors of unorganized segment according to their internal/external dependence**

Group A	Group B	Group C			Group D		Group E		
0.9-0.8	0.9-0.7	0.9-0.5			0.7-0.4		0.5-0.1		
		0.9-0.8	0.8-0.7	0.7-0.5	0.7-0.5	0.5-0.4	0.5-0.4	0.4-0.3	0.3-0.1
		C1	C2	C3	D1	D2	E1	E2	E3
				I	I				
									III

According to the data of Table 4.29 and Table 4.30, sector III plays the key role in independency/dependency of organized and unorganized segments on each other. As sector III of the organized segment falls into the sub-group E1 (internal propagation ratio 0.4-0.5 beyond group E1 (internal propagation ratio 0.1-0.3), it shows lower external dependence of the organized segment on the unorganized segment than vice-versa.

Expansion of the organized segment due to its external transactions equals the mathematical expression  $B_2MB_1$ . Thus, the weightage of  $B_2$ (expansion of organized segment due to the sales that it makes to the unorganized segment),  $M$  (weightage of direct and indirect expansionary effects that organized segment experiences due to its sales and purchase transactions with the U segment out of the total expansion that unorganized segment witnesses) and  $B_1$ (expansion of organized segment due to the availability of inputs that it has from the

unorganized segment) in the external transactions govern internal/external dependency of a segment.  $B_2$ ,  $M$ , and  $B_1$  are analyzed in the following paragraphs.

Values of  $B_1$  and  $B_2$  are given in Table 4.31 and Table 4.32, respectively. Values indicate that except for the case of sector II, inducible power of unorganized segment is higher than the organized segment.

$M$  (denoting the amount of organized segment's expansion out of internal expansion of unorganized segment) is given by  $KT$  (=external multiplier of unorganized segment  $\times$  internal multiplier of the unorganized segment). Expansionary effects witnessed by the U segment as a result of its internal and external interactions are given by  $T$  and  $K$  (refer Table 4.33 and Table 4.34). Values in Table 4.34 are homogeneously greater than those in Table 4.33 implying an internal dependence/external independence of the unorganized segment for its growth.

Inter-segmental linkages are, therefore, determined by the internal and external input patterns. Inter-segmental multipliers, namely,  $B_1$  (growth of organized segment due to increased input availability from unorganized segment),  $B_2$  (growth of organized segment due to increased sales it makes to unorganized segment),  $T_1$  (growth of unorganized segment due to increased input availability from organized segment) and  $T_2$  (growth of unorganized segment due to increased sales it makes to organized segment) are given in Table 4.35 and Table 4.36.

Average value of  $T_2$  turns out to be lower than  $B_2$ , implying higher growth of organized segment as a consequence of induced sales it makes to unorganized segment than vice-versa. As per Table 4.35, sectors I and II are responsible for such a pattern. Note that average value of  $T_1$  is also higher than the average value of  $B_1$  indicating higher growth of unorganized segment due to induced sales to the organized segment.

**Table 4.31: Inducible power of organized segment**

$B_1$	I	II	III
I	0.034583	0.034101	0.009973
II	0.020029	0.111261	0.007254
III	0.027975	0.074129	0.011491

**Table 4.32: Inducible power of unorganized segment**

$B_2$	I	II	III
I	0.829983	0.020901	0.023415
II	0.480689	0.068192	0.017032
III	0.273855	0.018532	0.011004

**Table 4.33: Internal multiplier of unorganized segment, T**

T	I	II	III
I	4.968734	0.096991	0.055946
II	2.221496	1.108473	0.032994
III	1.587155	0.052580	0.524370

**Table 4.34: External multiplier of unorganized segment, K**

K	I	II	III
I	1.320522	0.021511	0.005100
II	0.238120	1.019178	0.003869
III	0.072053	0.005243	0.501158

**Table 4.35: Some coefficients of Inducement (from  $B_2$  and  $T_2$ ) to production per unit of input in other segment\***

(a) Row sum elements of $T_2$		(c) Row sum elements of $B_2$	
(U) segment		(O) segment	
I	0.418929	I	0.874298
II	0.325757	(Average)	0.581201
(Average)	0.312709		
(b) Column sum of elements of $T_2$		(d) Column sum of elements of $B_2$	
(U) segment		(O) segment	
I	0.324058	I	1.584526
II	0.421022	(Average)	0.581201
(Average)	0.312709		

**Table 4.36: Some coefficients of Inducement (from  $B_1$  and  $T_1$ ) to production per unit of input in other segment\***

(a) Row sum elements of $B_1$		(c) Row sum elements of $T_1$	
(U) segment		(O) segment	
I	0.078657	I	4.121668
II	0.138544		
(Average)	0.110265	(Average)	3.066563391
(b) Column sum of elements of $B_1$		(d) Column sum of elements of $T_1$	
(O) segment		(U) segment	
II	0.219491	I	8.779737
(Average)	0.110265	(Average)	3.066563

## 5

### **Inter-segmental relationship: Estimation of linkages between Organized and Unorganized segments at 27 by 27 aggregation level**

In this chapter we present our estimates of linkages between organized and unorganized partitioned segments of Indian economy. The segments have been calculated and presented in input-output framework at the end of Chapter 3. Miyazawa's model which is utilized for the calculation of inter-linkages between organized and unorganized segments is described and illustrated in Chapter 4. Miyazawa's model measures total effects of all the producing sectors on the economy (as is done by Leontief or Ghosh inverse) and the 'disjoined' effects per producing segment (measured by decomposed multipliers, refer Section 4.1) on the other segments and rest of the economy.

Method of partitioning input-output table in organized and unorganized segments with 27 production sectors in each segment as represented by blocks P and S in equation (4.1) has been discussed in Chapter 3. Order of partitioned matrix is 54 by 54. Partial matrix multipliers of organized and unorganized segments associated with Leontief inverse are summarized in the paragraphs that follow.

Table 5.1 summarizes row and column sums of internal (which equals a segment's 'own' multiplier in case the other segment wouldn't exist) and inter-segmental external matrix multipliers of each segment. Values reveal that every additional unit of sales made by organized segment initiates two kinds of propagations. First, organized segment buys this additional input from its own self and propagates by about 1.5906 units on an average. Second, unorganized segment too propagates (by about 0.1201 units) due to input requirements that arise from organized segment so as to manufacture this additional unit of value. Total effect of organized segment then measures 1.7817 ( $=1.5906 \times 1.1201$ ) units on an average. Simple average has been chosen to calculate the 'own' effects of segments and the inter-segmental external effects as the weights of each industry in value added and final output are unknown for both the organized-unorganized categories.



**Table 5.1: Summary Table of Internal and External Multipliers of Organized and Unorganized segments of the Indian Economy**

	Internal multiplier of (O) segment, B27		External multiplier of (O) segment, L27		Internal multiplier of (U) segment, T27		External multiplier of (U) segment, K27	
	Row Sum	Column Sum	Row Sum	Column Sum	Row Sum	Column Sum	Row Sum	Column Sum
Agriculture	1.085798	1.180461	1.044612	1.088522	2.924764	1.322665	1.540788	1.042876
Forestry and logging	1.032059	1.073124	1.004033	1.031910	1.223672	1.057221	1.036355	1.015750
Fishing	1.000015	1.158517	1.000003	1.041946	1.043178	1.064330	1.011221	1.035823
Mining	2.635947	1.283913	1.415342	1.063865	1.113426	1.094927	1.126642	1.059941
Food products	1.521328	1.271619	1.120066	1.161909	1.267734	2.247408	1.085128	1.188116
Beverages and tobacco products	1.057303	1.480398	1.007331	1.130705	1.023150	1.584009	1.002970	1.299575
Textile products	1.206150	1.421191	1.038641	1.151627	1.143628	1.760764	1.027229	1.254846
Wood and wood products, furniture, fixtures etc	1.025185	1.168042	1.004256	1.047028	1.087424	1.366574	1.046687	1.072303
Paper and printing etc.	1.765006	2.317669	1.077470	1.172351	1.097723	1.068868	1.098850	1.062164
Leather and fur products	1.074137	1.234180	1.014425	1.138612	1.189172	1.777302	1.016269	1.128922
Rubber, petroleum products etc.	2.421473	1.910094	1.417121	1.065125	1.214602	1.208406	1.134602	1.221195
Chemical and chemical products	2.667790	1.975925	1.333641	1.121676	1.119958	1.163988	1.116884	1.157874
Non-metallic products	1.187340	1.617997	1.037796	1.149989	1.090982	1.361907	1.030696	1.210850
Basic metals	2.894001	1.964761	1.335663	1.129422	1.216006	1.207813	1.173382	1.180345
Metal products and machinery	1.535479	1.775732	1.099775	1.141313	1.190637	1.293429	1.116254	1.257924
Electrical machinery	1.456306	3.307254	1.062271	1.488419	1.353686	1.144926	1.259591	1.111910
Transport equipment	1.492067	1.910810	1.053606	1.142378	1.022098	1.379507	1.012550	1.346044
Other manufacturing	1.404264	1.581457	1.090278	1.167103	1.176217	1.425921	1.072082	1.282744
Construction	1.231373	1.585522	1.041058	1.157664	1.212155	1.286817	1.148250	1.152825
Electricity, gas and water supply	2.723652	1.954874	1.276428	1.093924	1.033571	1.175010	1.033151	1.184061
Railway transport services	1.442778	1.752065	1.078933	1.107352	1.000000	1.000000	1.000000	1.000000
Transport by other means and storage	1.300329	1.622596	1.073047	1.132103	1.960558	1.229284	1.481702	1.113663
Communication	1.294655	1.242105	1.060494	1.057482	1.078144	1.131530	1.052950	1.093281
Trade, hotels and rest.	1.379793	1.176261	1.093798	1.065039	2.498569	1.161688	1.769777	1.042190
Banking and insurance	2.295586	1.224357	1.292496	1.030671	1.118409	1.072673	1.073809	1.042004
Other services	1.225553	1.164441	1.050757	1.045206	1.295127	1.107621	1.127525	1.038118
Public administration & defence	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000
(Average)	1.590591	1.590591	1.120129	1.120129	1.295946	1.295946	1.138282	1.138282

Two similar propagations take place when an additional unit is sold by the unorganized segment (refer again to Table 5.1). One, the activities contained in unorganized segment expand by about 1.2959 units on an average as a result of induced input requirements from its own self. Two, additional requirements are posed from the organized segment for the additional unit of value to be produced by the unorganized segment. For every additional unit produced by unorganized segment organized segment grows by about 0.1382 units. Note that impetus imparted by unorganized segment to the organized segment (=0.1382 units) is greater than the impetus imparted by organized segment to the unorganized segment (=0.1201 units) (refer to the values of inter-segmental external multipliers  $L$  and  $K$  in Table 5.1).

Lower production interactions within the enterprises of unorganized segment (as indicated by internal matrix multiplier of unorganized segment being equal to 1.2959 units) as compared to the production relations among enterprises in organized segment (internal matrix multiplier of organized segment being equal to 1.5905 units) makes unorganized segment likely to be more dependent on organized segment for its sales and, therefore, growth, rather than vice-versa. Unorganized segment's sales in that case would depend more on organized segment's requirements from it. Dependency of unorganized segment on the organized segment benefits organized segment's propagation in a major way. On the other hand, due to less dependency of organized segment on the unorganized segment for its sales, the effects responsible for unorganized segment's propagation originating from organized segment get limited. This is indicated by the higher value of internal segmental external multiplier of unorganized segment (=1.1382) as compared to the value of external multiplier of the organized segment (=1.1201) in Table 5.1.

Internal and external dependencies are re-viewed in depth via "internal i.e. 'within' propagation ratios" of organized and unorganized segments. Internal propagation ratios are obtained by dividing elements of internal matrix multiplier of organized segment ( $B$ ) and the elements of internal matrix multiplier of unorganized segment ( $T$ ) by corresponding elements of Leontief/Ghoshian inverse ( $B^*$ ). Thus, weight of internal transactions (the transactions that take place within the organized and unorganized segments) in the total transactions (which include both the internal transactions within the organized and unorganized segments and external

transactions between the organized and unorganized segments) is checked to comment on internal and external dependencies of a segment.

Lower “internal propagation ratio” indicates lower internal transactions (within a segment) vis-à-vis external transactions (transactions that take place between the organized and unorganized segments). Thus, higher “internal propagation ratio” indicates higher internal dependency of a segment as compared to its external dependency. Table 5.2 and Table 5.3 list the sectors of organized and unorganized segments, respectively, as per their dependence (and, thus, independence) on activity of unorganized and organized segments, respectively. Table 5.2 and Table 5.3 have been constructed on the same lines as Table 4.14 and Table 4.15.

Modal range of internal propagation ratios of the organized segment turns out to be 0.5 to 0.7 (refer Table 5.2) covering 13 industries out of total 27. These 13 industries are: textile products, paper and printing etc., chemical and chemical products, metal products and machinery, electrical machinery, transport equipment, other manufacturing, construction, electricity, gas and water supply, railway transport services, communication, banking and insurance and other services. Values in Table 5.2 suggest that these 13 industries are highly dependent for their propagation on their sales to the industries contained within the organized segment itself. In other words, these 13 industries are less dependent for their propagation on the sales that they make to the unorganized segment.

Even though the number of industries in the modal range for the organized and unorganized segments is the same, the composition of constituent industries in modal range differs from that of organized segment. For the unorganized segment the corresponding modal range turns out to be 0.1-0.3 (refer Table 5.3) containing the sectors of forestry and logging, fishing, mining, food products, beverages and tobacco products, paper and printing etc., leather and fur products, chemical and chemical products, basic metals, electrical machinery, transport equipment. Lower internal propagation ratio of the modal range brings out lower internal dependency/high external dependency of unorganized segment.

In Table 5.2 and Table 5.3 there are 5 common sectors. These fall in the groups C3, E2 and E3. These 5 are: (1) banking and insurance, (2) beverages and tobacco products, (3) agriculture, (4) forestry and logging and (5) fishing. 4 out of these 5 sectors (namely the sectors

of beverages and tobacco products, agriculture, forestry and logging and fishing) fall in groups E2 and E3 exhibit high dependency/more interactions between respective organized and unorganized components. However, banking and insurance (the fifth common sector falling in group C3) has high internal propagation ratio for both organized and unorganized components. Thus, this sector seems to be more or less functionally independent in both the segments.

**Table 5.2: Organized segment's sectors by degree of dependence on unorganized segment's activity**

Group A 0.9-0.8	Group B 0.9-0.7	Group C 0.9-0.5			Group D 0.7-0.4		Group E 0.5-0.1		
		0.9-0.8 C1	0.8-0.7 C2	0.7-0.5 C3	0.7-0.5 D1	0.5-0.4 D2	0.5-0.4 E1	0.4-0.3 E2	0.3-0.1 E3
			Wood and wood products, furniture, fixtures etc Transport by other means and storage Trade, hotels and rest.	Textile products Paper and printing etc. Chemical and chemical products Metal products and machinery Electrical machinery Transport equipment Other manufacturing Construction Electricity, gas and water supply Railway transport services Communication Banking and insurance Other services	Mining			Beverages and tobacco products	Agriculture Forestry and logging Fishing

**Table 5.3: Unorganized segment's sectors by degree of dependence on organized segment's activity**

Group A 0.9-0.8	Group B 0.9-0.7	Group C 0.9-0.5			Group D 0.7-0.4		Group E 0.5-0.1		
		0.9-0.8 C1	0.8-0.7 C2	0.7-0.5 C3	0.7-0.5 D1	0.5-0.4 D2	0.5-0.4 E1	0.4-0.3 E2	0.3-0.1 E3
			Other services	Trade, hotels and rest.	Banking and insurance			Agriculture Non-metallic products Other manufacturing Electricity, gas and water supply	Forestry and logging Fishing Mining Food products Beverages and tobacco products Paper and printing etc. Leather and fur products Chemical and chemical products Basic metals Electrical machinery Transport equipment

Internal propagation ratios (given by  $B + B_2MB_1$ )<sup>1</sup> differ from corresponding Leontief inverse ratios (given by  $B$ ) by  $B_2MB_1$  (which gives expansion of organized segment in lieu of its sales to and purchases from unorganized segment). Weightage of each sector in the difference  $B_2MB_1$ , namely,  $B_2$ ,  $M$  and  $B_1$ , is ascertained below.

Values of  $B_1$  and  $B_2$  are listed in Table 5.4 and Table 5.5, respectively. Column elements of  $B_1$  [ $B_2$ ] indicate induced expansion from an industry from organized segment [unorganized segment] on an industry of unorganized segment [organized segment]. Sectors of railway transport services, paper and printing and electrical machinery have 20 or more values in columns of  $B_2$  are greater than  $B_1$ . Higher values of  $B_2$  than  $B_1$  indicate higher inducement of organized segment due to its sales to the unorganized segment than the organized segment's growth due to its purchases from the unorganized segment.

$B_1$  operates on organized segment via operator  $M$  ( $=KT$  i.e. external multiplier of unorganized segment multiplied to internal multiplier of unorganized segment). In other words  $M$  measures the expansion of organized segment due to its induced propagated sales to unorganized segment as result of propagation in the later. Table 5.6 and Table 5.7 contain the values of  $T$  and  $K$ , respectively. 14 or more values in columns of  $T$  are greater than  $K$  for the sectors of food products, beverages and tobacco products, textile products, wood and wood products, furniture, fixtures etc, leather and fur products, construction, trade, hotels and restaurants and other services. Higher values of  $T$  than  $K$  imply higher internal propagation of unorganized segment being higher due to internal expansion of its own activities than its interactions with the organized segment.

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<sup>1</sup> Refer equation (4.8)











Internal and external input patterns experienced by the organized and unorganized segments in the economy, thus, bring out the features of inter-segmental linkages. Results of internal and external expansion processes are summarized in Table 5.8 and Table 5.9. Listed sectors have higher values than the average.

Higher value of  $B_2$  ( $= 0.5529$  on an average) than  $T_2$  ( $= 0.2443$  on an average) reflects higher expansion of organized segment due to its sales to the unorganized segment than the expansion of unorganized segment due to its sales to the organized segment. It is the sales of the common sectors between the sub-tables Table 5.8 (c) and Table 5.8 (d) namely, food products; rubber, petroleum products etc; chemical and chemical products; basic metals; and electricity, gas and water supply that lead to this observation. Similar situation is expressed on a comparison of  $B_1$  and  $T_1$ .

**Table 5.8: Some coefficients of Inducement to production per unit of input in other segment [ $B_2$ ,  $T_2$ ]**

(a) Row sum elements of T2 (U) segment		(c) Row sum elements of B2 (O) segment	
Agriculture	1.15222507	Mining	1.792100
Basic metals	0.26066433	Food products	0.730174
Electrical machinery	0.68460413	Rubber, petroleum products etc.	1.429126
Construction	0.25388105	Chemical and chemical products	1.583859
Transport by other means and storage	0.825368	Basic metals	1.531628
Trade, hotels and rest.	1.2111088	Electricity, gas and water supply	1.591194
Other services	0.27527242	Banking and insurance	1.397598
(Average)	0.24432925	(Average)	0.552983
(b) Column sum of elements of T2 (U) segment		(d) Column sum of elements of B2 (O) segment	
Agriculture	0.322665	Food products	0.592913
Food products	0.571449	Beverages and tobacco products	0.891320
Beverages and tobacco products	0.314766	Textile products	1.050524
Textile products	0.305016	Rubber, petroleum products etc.	1.398259
Paper and printing etc.	0.481990	Chemical and chemical products	0.691712
Leather and fur products	0.380452	Non-metallic products	0.827998
Non-metallic products	0.270119	Basic metals	0.812601
Basic metals	0.246727	Metal products and machinery	1.066810
Electrical machinery	0.958241	Transport equipment	1.464962
Construction	0.286817	Other manufacturing	1.101091
(Average)	0.244329	Construction	0.585522
		Electricity, gas and water supply	0.954874
		Transport by other means and stor	0.622596
		(Average)	0.552983

**Table 5.9: Some coefficients of Inducement to production per unit of input in other segment [B<sub>1</sub>, T<sub>1</sub>]**

(a) Row sum elements of B1 (U) segment		(c) Row sum elements of T1 (O) segment	
Agriculture	0.970646	Mining	1.033070
Paper and printing etc.	0.34589	Food products	0.678559
Basic metals	0.398108	Rubber, petroleum products etc.	1.206421
Electrical machinery	0.909757	Chemical and chemical products	0.987126
Construction	0.34467	Basic metals	1.027650
Transport by other means and storage	1.046637	Other manufacturing	0.458141
Trade, hotels and rest.	1.582922	Electricity, gas and water supply	0.939751
Other services	0.326919	Banking and insurance	1.079121
(Average)	0.302769	(Average)	0.404910
(b) Column sum of elements of B1 (O) segment		(d) Column sum of elements of T1 (U) segment	
Food products	0.494576	Food products	0.609484
Beverages and tobacco products	0.332723	Beverages and tobacco products	0.726935
Textile products	0.304723	Textile products	0.880251
Paper and printing etc.	0.763393	Leather and fur products	0.498439
Leather and fur products	0.315546	Rubber, petroleum products etc.	1.013585
Chemical and chemical products	0.352030	Chemical and chemical products	0.424583
Non-metallic products	0.312105	Non-metallic products	0.617778
Basic metals	0.357402	Basic metals	0.528081
Metal products and machinery	0.313665	Metal products and machinery	0.684027
Electrical machinery	1.366141	Transport equipment	0.935403
Transport equipment	0.356750	Other manufacturing	0.854858
Construction	0.332444	Construction	0.431127
(Average)	0.302769	Electricity, gas and water supply	0.594870
		Transport by other means and stor	0.426146
		(Average)	0.404910

Thus, higher demand from the unorganized segment is expected to pass on the benefits to organized segment's industries.

For example, inducement that organized segment's sector of rubber, petroleum products receives due to input demands of unorganized segment are distinctly high row sum equal to

1.2064 (refer to Table 5.9). High row sum is an indicator of high demand from the unorganized component of rubber, petroleum products.

Note that results are magnified when Goshian inverse is assumed to describe the total effects of producing sectors. Partial matrix multipliers associated with Goshian case are described in the following paragraphs. Internal and inter-segmental external multipliers are summarized in Table 5.10:

**Table 5.10: Summary Table of Internal and external multipliers of organized and unorganized segments of Indian Economy**

	Internal multiplier of (O) segment, B27		External multiplier of (O) segment, L27		Internal multiplier of (U) segment, T27		External multiplier of (U) segment, K27	
	Row Sum	Column Sum	Row Sum	Column Sum	Row Sum	Column Sum	Row Sum	Column Sum
Agriculture	1.162474	1.090801	1.075077	1.048556	1.408782	1.825105	1.054476	1.540832
Forestry and logging	1.313816	1.002806	1.103578	1.001132	1.215428	1.013198	1.101015	1.008184
Fishing	1.091022	1.000030	1.019820	1.000007	1.090942	1.042668	1.022415	1.025557
Mining	4.278216	1.179091	1.594643	1.044369	1.654039	1.013100	2.312335	1.010181
Food products	1.240379	1.651686	1.055349	1.330914	1.214830	1.537869	1.067490	1.210468
Beverages and tobacco products	1.091177	1.168423	1.023510	1.040216	1.092083	1.060341	1.022615	1.030645
Textile products	1.157970	1.469544	1.028930	1.182215	1.155241	1.359336	1.032627	1.216308
Wood and wood products, furniture, fixtures etc	1.846043	1.016621	1.140527	1.001513	1.447198	1.151355	1.227443	1.022211
Paper and printing etc.	2.041254	2.098666	1.144494	1.098815	1.266552	1.043412	1.282204	1.035461
Leather and fur products	1.128073	1.082687	1.030712	1.023529	1.208693	1.214151	1.032049	1.030780
Rubber, petroleum products etc.	1.689891	3.163645	1.188818	1.137004	1.582805	1.439164	1.241840	1.190768
Chemical and chemical products	1.999181	2.677674	1.158953	1.264851	1.359348	1.081978	1.320898	1.088153
Non-metallic products	1.518297	1.266116	1.089729	1.064758	1.562749	1.131818	1.110943	1.086557
Basic metals	2.170478	2.398973	1.187528	1.200245	1.382173	1.139668	1.298746	1.125551
Metal products and machinery	1.579969	1.588127	1.107458	1.118910	1.231491	1.235890	1.162664	1.219579
Electrical machinery	1.520578	2.577764	1.076982	1.332638	1.171698	1.287281	1.116706	1.287010
Transport equipment	1.400683	1.789678	1.050941	1.133895	1.122427	1.060108	1.089978	1.054337
Other manufacturing	1.613175	1.392868	1.147119	1.099668	1.384730	1.219276	1.192744	1.116307
Construction	1.122961	2.237324	1.022034	1.305050	1.075217	2.414767	1.034668	1.776463
Electricity, gas and water supply	2.226930	2.343409	1.178166	1.146954	1.326213	1.026167	1.365791	1.025127
Railway transport services	1.810643	1.423788	1.132341	1.065818	1.000000	1.000000	1.000000	1.000000
Transport by other means and storage	1.345414	1.469132	1.082846	1.115566	1.284618	1.973612	1.105831	1.993879
Communication	1.659478	1.119711	1.135073	1.024335	1.356450	1.032304	1.190533	1.031067
Trade, hotels and rest.	1.374301	1.188106	1.083350	1.068614	1.297238	1.641544	1.110187	1.342942
Banking and insurance	1.719283	1.449056	1.143319	1.062881	1.398782	1.033848	1.218327	1.020655
Other services	1.100455	1.356419	1.020767	1.109615	1.086315	1.398082	1.024420	1.249925
Public administration & defence	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
(Average)	1.563042	1.563042	1.074891	1.074891	1.236150	1.236150	1.138479	1.138479

Comparison of figures in Table 5.1 and Table 5.10 reveals that propagation of organized segment due to its own activities, propagation of unorganized segment due to its own activities and propagation and purchases from the organized segment undergo only minor changes. Propagation of organized segment due to its sales and purchase interactions with the unorganized segment, however, reduces from 12.01 to 7.49. Reduction in external propagation of organized reduces the total propagation of organized segment to 1.6801 in Ghoshian case from 1.7816 in Leontief's case.

A comparison of "internal propagation ratios" show an increase in the number of sectors under category C3 of the organized segment increases from 13 to 17 with mining, food products, rubber and petroleum products etc. and basic metals joining the group (refer Table 5.11). Increase in number of sectors under the category C3 indicates less dependence (explaining less external multiplier) for input requirements and sales venue for the activities under segment organized on the activities of unorganized segment. However, for the unorganized segment the industry wise situation remains largely unchanged.

**Table 5.11: Organized segment's sectors by degree of dependence on unorganized segment's activity**

Group A	Group B	Group C			Group D		Group E		
0.9-0.8	0.9-0.7	0.9-0.5			0.7-0.4		0.5-0.1		
		0.9-0.8	0.8-0.7	0.7-0.5	0.7-0.5	0.5-0.4	0.5-0.4	0.4-0.3	0.3-0.1
		C1	C2	C3	D1	D2	E1	E2	E3
			Food products	Mining	Mining		Basic metals	Food products	Agriculture
			Wood and wood products, furniture, fixtures etc	Food products	Leather and fur products			Non-metallic products	Forestry and logging
			Transport by other means and storage	Textile products	Rubber, petroleum products etc.				Fishing
			Trade, hotels and rest.	Paper and printing etc.	Non-metallic products				Beverages and tobacco products
				Rubber, petroleum products etc.	Basic metals				
				Chemical and chemical products					
				Basic metals					
				Metal products and machinery					
				Electrical machinery					
				Transport equipment					
				Other manufacturing					
				Construction					
				Electricity, gas and water supply					
				Railway transport services					
				Communication					
				Banking and insurance					
				Other services					

Common sectors between Table 5.3 and Table 5.11 (namely the sectors of basic metals, food products, non-metallic products, agriculture, forestry and logging, fishing, beverages and tobacco products) reveal that organized and unorganized components of the sectors in organized segment falling under group E are highly dependent on each other. On the other hand, common sectors in group C (i.e. the sectors of banking and insurance, trade, hotels and restaurants) function in a highly independent way with their activities mainly restricted within the segments.

$B_1$  and  $B_2$  (the components of difference  $B_2MB_1$ ) enlisted in Table 5.12 and Table 5.13 respectively segregate the parameters responsible for the growth of organized segment as a result of an interaction with unorganized segment. Values of  $B_1$  are greater than  $B_2$  for 17 sectors out of the 27 sectors. These 17 are mining, food products, beverages and tobacco products, textile products, paper and printing etc., rubber, petroleum products etc., chemical and chemical products, non-metallic products, basic metals, metal products and machinery, electrical machinery, transport equipment, other manufacturing, electricity, gas and water supply, railway transport services, communication, and banking and insurance. Higher values of  $B_1$  than  $B_2$  imply induced higher propagation of organized segment due to increased input availability per unit from the unorganized segment than the propagation which organized segment gets via its sales to unorganized segment. This result is in contrast to that obtained in Leontief's case (in which organized segment was more sales dependent on unorganized segment than being input dependent). Less expansion of unorganized segment due to organized segment also explain less external multiplier of organized segment.







Internal and external input patterns of inter-segmental activity (refer to Table 5.14 and Table 5.15) reveal expansion of organized segment being more dependent on input requirements from unorganized segment than vice-versa, as the average value of  $T_2$  is more than that of  $B_2$  (and the average value of  $B_1$  is greater than  $T_1$ ). The industries responsible for the pattern are the sectors that are common between sub-tables Table 5.14 (a) and Table 5.14 (b), namely rubber, petroleum products, etc.; chemical and chemical products; transport equipment; and construction.

**Table 5.14: Some coefficients of Inducement to production per unit of input in other segment [ $T_2$ ,  $B_2$ ]**

(a) Row sum elements of $T_2$		(c) Row sum elements of $B_2$	
(U) segment		(O) segment	
Fishing	2.03483862	Fishing	1.515152
Textile products	0.60538921	Textile products	0.561254
Wood and wood products, furniture, fixtures etc	0.62667159	Wood and wood products, furniture, fixtures etc	0.442941
Leather and fur products	0.52927019	Leather and fur products	0.628713
Rubber, petroleum products etc.	0.614002	Rubber, petroleum products etc.	0.536975
Chemical and chemical products	0.46686855	Chemical and chemical products	0.585207
Non-metallic products	0.7908794	Non-metallic products	0.560407
Transport equipment	0.47888311	Transport equipment	0.448014
Construction	0.70401497	Construction	0.557239
Transport by other means and storage	0.49405407	Transport by other means and storage	0.429626
Trade, hotels and rest.	0.5204715	Trade, hotels and rest.	0.488268
(Average)	0.44406383	(Average)	0.40939
(b) Column sum of elements of $T_2$		(d) Column sum of elements of $B_2$	
(U) segment		(O) segment	
Food products	0.624494	Agriculture	1.027252
Paper and printing etc.	0.671985	Food products	0.561289
Rubber, petroleum products etc.	1.606905	Textile products	0.442137
Chemical and chemical products	0.951775	Rubber, petroleum products etc.	0.591320
Basic metals	0.788892	Electrical machinery	0.475753
Electrical machinery	0.952726	Construction	1.843213
Transport equipment	0.482978	Transport by other means and storage	1.634907
Construction	0.949715	Trade, hotels and rest.	0.783997
Electricity, gas and water supply	0.732491	Other services	0.516599
(Average)	0.434705	(Average)	0.406755

**Table 5.15: Some coefficients of Inducement to production per unit of input in other segment [B<sub>1</sub>, T<sub>1</sub>]**

(a) Row sum elements of B1		(c) Row sum elements of T1	
(O) segment		(U) segment	
Mining	3.278216	Agriculture	0.408782
Wood and wood products, furniture, fixtures etc	0.846043	Mining	0.654039
Paper and printing etc.	1.041254	Wood and wood products, furniture, fixtures etc	0.447198
Rubber, petroleum products etc.	0.689891	Rubber, petroleum products etc.	0.582805
Chemical and chemical products	0.999181	Chemical and chemical products	0.359348
Basic metals	1.170478	Non-metallic products	0.562749
Other manufacturing	0.613175	Basic metals	0.382173
Electricity, gas and water supply	1.22693	Other manufacturing	0.384730
Communication	0.659478	Electricity, gas and water supply	0.326213
Banking and insurance	0.719283	Communication	0.356450
(Average)	0.607093	Banking and insurance	0.398782
		(Average)	0.318729
(b) Column sum of elements of B1		(d) Column sum of elements of T1	
(O) segment		(U) segment	
Food products	0.634185	Agriculture	0.870918
Paper and printing etc.	1.080951	Food products	0.551662
Rubber, petroleum products etc.	2.077905	Textile products	0.363425
Chemical and chemical products	1.617716	Rubber, petroleum products etc.	0.455178
Basic metals	1.245136	Construction	1.453794
Electrical machinery	1.521700	Transport by other means and storage	0.995636
Transport equipment	0.758065	Trade, hotels and rest.	0.651420
Construction	1.187220	Other services	0.404944
Electricity, gas and water supply	1.223056	(Average)	0.318729
(Average)	0.607093		

## 6

### Summary and conclusions

The predominant position of unorganized sector in Indian economy (employment equal to 92.4 per cent, contribution to NDP equal to 60 per cent) prompted this study. Our primary aim has been at estimation of linkages between organized and unorganized segments of Indian economy. Modelling of organized and unorganized sectors resembles that of ‘dualistic models’. However, it faces limits of limited availability of data. These models are also a class of models that portray interdependence between organized and unorganized sectors. Therefore we first briefly discuss the data limitations in estimating such models in section 6.1. we then proceed to discuss implications of our attempt to model interdependence in inter-industry framework and discuss major observations based on our estimates in section 6.2.

#### *6.1 Observed data gaps*

The development models of Ricardo, Lewis, Ranis and Fei, and Majumdar (discussed in section 2.1) explain the transfer of labor from ‘traditional’ sectors to ‘modern’ sectors with ‘wage gap’. However, the inter-industry wage matrix for the organized and unorganized segments is currently unavailable.

Attempt to use rural and urban incomes as proxy for unorganized and organized incomes at least involves estimation of incomes for the input-output years. Calculation of incomes of the input-output years from the available data of bench mark years is suggested to be done by using the index of wages of rural-skilled workers and index of earning per worker of (CSO, National Accounts Statistics, Sources and Methods, 1980). It is found that the deflators of compensation of employees pertaining to both organized and unorganized sectors of manufacturing turn out to be identical 1981-82 onwards.

An inter-industry matrix giving details of even the skills or educational levels of those engaged in unorganized sector is not available.

Also, the data pertaining to inter-industry labor migration, a phenomenon which is understood to stabilize wages rates across activities and institutions, also stands to be

unavailable. Availability of such a matrix could help studying the movement of economy away or towards the general equilibrium point or Lewis's turning point (refer to section 2.1). It would also help a quick study of unfulfilled labor gaps and seasonality.

Increasing urbanization and institutionally mixed kind of employment within industries like construction, which have an organized nature of contract but further employ unorganized labor in order to minimize its costs and thereby increase profits, further pose a requirement and challenge in collection of data of the organized-unorganized type.

In face of unavailability of the above data, the study has attempted to utilize the data available (details of which are given in section 3.5) from reliable sources such as CSO. Relevant mathematical techniques (refer to sections 3.2 and 3.3) are applied to this data in order to approximate the inter-industry matrix of organized-unorganized type (given at the end of section 3.8).

Construction of organized-unorganized type inter-industry matrix enables calculation of linkages between the two production institutions (refer Chapter 5) with the aid of Miyazawa multipliers (discussed in detail in Chapter 4). The pattern of linkages that emerge after analyzing Miyazawa's multipliers for Leontief and Ghosh inverses are discussed in section 6.2.

## ***6.2 Patterns of organized and unorganized linkages***

It is found that although the total effects of organized segment (=internal matrix multiplier or the organized segment X external matrix multiplier of the organized segment) exceed the total effects of unorganized segment for both the Leontief and Ghoshian multipliers. The external matrix multiplier (as defined on page 77), is however higher for unorganized segment of the economy. For convenience of comparison, the total effects of segments and external matrix multipliers of organized and unorganized segments for Leontief and Ghoshian multipliers are tabulated in Table 6.1 and Table 6.2, respectively.

**Table 6.1: Total effects of organized and unorganized segments**

	Organized	Unorganized
Leontief	1.78165	1.47514
Ghoshian	1.68009	1.40733

**Table 6.2: External matrix multipliers  
of organized and unorganized segments**

	Organized	Unorganized
Leontief	1.12012	1.13828
Ghoshian	1.07489	1.13847

Thus, the higher values of total effects multipliers for the organized segment are due to higher values of internal matrix multiplier associated with it. Higher internal matrix multiplier of the organized segment implies that organized segment's activities lead more to its own expansion. Thus, it can be said that for an overall growth of the economy, expansion of organized segment will be beneficial and that the growth of the organized segment is largely aided by the expansion of unorganized segment.

Table 6.3 lists industries of organized segment those are (a) highly dependent for their growth on the industries of organized segment itself, and (b) those that are highly dependent on the industries of unorganized segment for Leontief multiplier.

**Table 6.3: Dependence of some of the organized segment's industries  
(Leontief Multiplier)**

Organized segment's industries dependent on the organized segment's industries itself	Organized segment's industries dependent on the unorganized segment
Wood and wood products, furniture, fixtures etc	Agriculture
Transport by other means and storage	Forestry and logging
Trade, hotels and rest.	Fishing
Textile products	Beverages and tobacco products
Paper and printing etc.	Food products
Chemical and chemical products	
Metal products and machinery	
Electrical machinery	
Transport equipment	
Other manufacturing	
Construction	
Electricity, gas and water supply	
Railway transport services	
Communication	
Banking and insurance	
Other services	
Mining	

The industries in Table 6.3 are listed in the descending order of their dependence. The industries appearing in the first column of Table 6.3 have an internal propagation ratio falling in the range of 0.9 to 0.5. Thus, higher internal propagation ratio (closer to or equal to 0.9) showing higher internal dependence of an activity must be associated with for example the industry of 'Transport by other means and storage'. The industries appearing in the second column of Table 6.3 have internal propagation ratios falling in the range of 0.4 to 0.1. Hence, lower internal propagation ratio (closer to or equal to 0.1) showing higher external dependence of an activity must be associated with for example the industry of 'Agriculture'.

Therefore the growth of organized segment's activities of Agriculture, Forestry and logging, Fishing, Beverages and Tobacco Products, and Food products are highly dependent on unorganized segment. In other words, if the unorganized segment expands so will these sectors.

Similar information is tabulated for the unorganized segment in Table 6.4.

**Table 6.4: Dependence of some of the unorganized segment's industries  
(Leontief Multiplier)**

Unorganized segment's industries dependent on the unorganized segment's industries itself	Unorganized segment's industries dependent on organized segment
Other services	Forestry and logging
Trade, hotels and rest.	Fishing
Banking and insurance	Mining
	Food products
	Beverages and tobacco products
	Paper and printing etc.
	Leather and fur products
	Chemical and chemical products
	Basic metals
	Electrical machinery
	Transport equipment
	Agriculture
	Non-metallic products
	Other manufacturing
	Electricity, gas and water supply

Thus, 15 industries of unorganized segment (listed in second column of Table 6.4) will get boosted with expansion of the activities of organized segment. It is only the unorganized activities of Other services, Trade, hotels and restaurants, and Banking and insurance that are highly independent (with their internal propagation ratios closer to 0.9) from the activities of organized segment.

The listed dependencies in Table 6.3 and Table 6.4 reflect the sales and purchase dependencies together. However, dependence of organized segment on the unorganized segment features more due to its dependence via sales and not purchases (as the value of coefficients of  $B_2$  are greater than  $B_1$ , refer to the average value of  $B_2$  and  $B_1$  in tables Table 5.8 and Table 5.9). The sales of food products; rubber, petroleum products etc; chemical and chemical products; basic metals; and electricity, gas and water supply are mainly responsible for this pattern (refer to the common/intersecting sectors between the sub-tables Table 5.8 (c) and Table 5.8 (d)). Thus, if sales of organized components of these sectors to the unorganized segment increase, consequent



faster expansion of organized segment will give impetus to higher growth of the economy. In other words, increase in demand from the unorganized segment has the ability to boost the organized segment, and thereby the economy as a whole.

For the Ghoshian multiplier, industries of organized segment those are (a) highly dependent for their growth on the industries of organized segment itself, and (b) those that are highly dependent on industries of unorganized segment, are listed in Table 6.5.

**Table 6.5: Dependence of some of the organized segment's industries  
(Ghoshian Multiplier)**

Organized segment's industries dependent on the sales to organized segment's industries itself	Organized segment's industries dependent on the sales to unorganized segment
Food products	Agriculture
Wood and wood products, furniture, fixtures etc	Forestry and logging
Transport by other means and storage	Fishing
Trade, hotels and rest.	Beverages and tobacco products
Mining	Food products
Food products	Non-metallic products
Textile products	
Paper and printing etc.	
Rubber, petroleum products etc.	
Chemical and chemical products	
Basic metals	
Metal products and machinery	
Electrical machinery	
Transport equipment	
Other manufacturing	
Construction	
Electricity, gas and water supply	
Railway transport services	
Communication	
Banking and insurance	
Other services	
Leather and fur products	
Non-metallic products	

As compared to Table 6.3, four more industries, that of Food products; Rubber and petroleum Products, etc; Basic metals; Leather and Fur products; and non-metallic products made it to first column i.e. even their growth is based on the activities of organized segment itself.

On the other hand, Non-metallic products got added to second column implying its organized component to be more dependent on the unorganized segment's activities too.

Note that Food Products and Non-metallic products appear on both the columns, indicating a large number of its internal propagation ratios be falling under both the ranges, 0.9 to 0.5 and 0.4 to 0.1.

No changes are made in the list of "Dependence of some of the unorganized segment's industries" (refer to Table 6.4).

However, in Ghoshian case values of  $B_1$  turn out to be higher than  $B_2$  (refer to Table 5.14 and Table 5.15) i.e. dependence of organized segment on the unorganized segment features more due to its dependence via purchases and not sales. Industries responsible for the pattern are rubber, petroleum products, etc.; chemical and chemical products; transport equipment; and construction (the common sectors between sub-tables Table 5.14 (a) and Table 5.14 (b)). Thus, it is the sales of the unorganized components of these sectors to the organized segment which boosts the later and, thereby, whole economy.

### ***6.3 Policy implications and avenues for further research***

This study explores coexistence and interdependence of organized and unorganized segments, revealing the patterns of growth and unemployment during the process of industrialization. Institutional organizational differences between these segments have their own specific advantages and limitations. New thrust of policies aiming at accelerating industrial growth, such as boosting export oriented unorganized sectors of India (for example the sector of handmade carpets) and Make in India (promoting the sectors of food processing, inland fisheries, etc.) are likely to exploit these specific characteristics and strengths of inter-segmental linkages via sectors of packaging, transport, advertising, etc..

This thesis demonstrates possibility of incorporating institutional categorization within industries and incorporating the same within framework of inter-industry analysis. This exercise has accomplished

this on the basis of available data pertaining to institutional features. Such institutional characterization may be extended further to other variables, notably to nature of factors of production viz. skilled and unskilled labor, number of mandays worked/available during this year, wage rates, sources of capital, replacement and re-investment rates of equipment, contractual commitments with suppliers and customers, seasonality of operations, etc.. If NSSO surveys also focus on differential state of such aspects in its surveys pertaining to unorganized segments, these details can be readily incorporated within input-output framework. Such data and their analysis will provide a richer portrayal through Social Accounting Matrix (SAM) models.

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