CHAPTER 7

IMPACT OF ENERGY PRICE HIKE ON REGIONAL ECONOMIES

So far we were analysing the various aspects of regional variation in the fuel consumption and the fuel price was only indirectly taken note of via regional cost differentials. However, a consideration of price *per se* in the context of its impact on regional economies is not only important but is a desideratum as the energy prices are found to be increasing much faster than those of other commodities.

The first obvious effect of the energy price rise is the sympathetic rise in prices of other commodities. The second consequence can be a change in the relative output levels of different sectors leading to a compositional or structural change in the economy. Due to the variation in the pattern of existing fuel consumption in various regions as noted earlier and also the unequal relative price rise in different fuels, the impact of the energy price rise is not likely to be uniform over the various regions. Therefore it is important to examine the effects of energy price rise on the economy both at national and at regional level.

The input-output frame would be convenient to analyse the impact of the said price rise on the different sectors of the economy. For the analysis in such a frame, input-output tables are a primary requisite. The input-output tables for

Indian Union over a period of years are available and the analysis related to the structural change due to energy price hike is carried out for India as a whole and is presented in the Appendix 7.1. At the regional level it would be useful to assess how the hike in energy prices has affected the composition, particularly the output-mix over time and secondly to examine how the relative position of a region as regards the price of a particular industry group has changed as a result of the hike in the energy prices. The relative positions of a region vary because of different fuel mixes and also due to product-mix. To examine the changes over time, regional input-output tables are required for different time periods. As such a set of tables is not available, this aspect could not be examined. However for the year 1965, input-output tables for different regions on a comparable basis are available. In this chapter, an analysis of sectoral price changes in different regions due to energy price hike is undertaken. The methodology in the input-output frame and the results are discussed below.

7.1 Effect of Energy Price Hike on Prices of Other Sectors

7.1.1 Methodology of Analysis

In the input-output frame, the whole economy is divided into a number of sectors. An input coefficient (a_{ij}) represents the requirement of a consuming sector (i) per unit output of a producing sector (j) and an input column represents the technical requirements of all inputs to produce one rupee worth output of the producing sector. The income generated in the production process is output net of all inputs viz. the value added coefficient

which is $[1 - \sum_i a_{ij}]$ where 'i' represents the i^{th} input. The consistent prices for equilibrium are obtained by the following system of equations -

$$\sum_i a_{ij} P_i + V_j = P_j \qquad \text{for all } j.$$

The changes in the equilibrium prices due to changes in the input prices are studied with the help of the above system of equations.

An increase in the price of any sector leads to one of the three following alternatives, viz.:

(1) All the price increase in one or more sectors is attributed to the producing sector, resulting in the reduction in the value added and prices of all other sectors remain unchanged.

(2) The entire price rise of a sector is transferred to the consuming sectors, maintaining its existing level of value added.

(3) The effect of price rise is shared between the producer and consumer sectors which reduces the value added to some extent and the remaining effect is attributed to the prices of other sectors. All the three alternatives can be studied with the above system of equations, which can be rewritten in the matrix form for the purpose of price evaluation as

$$V = P(I - A) \qquad \ldots (1)$$

or

$$V(I - A)^{-1} = P \qquad \ldots (2)$$

where V is a row vector of value added, P is a row vector of prices, A is the technological matrix and I is the identity

matrix of the same order as that of A. Using the standard input-output methods new prices can be determined.

Let us consider a three sector economy and write the system of prices as -

$$\left.\begin{aligned} a^*_{11}P_1 + a^*_{21}P_2 + a^*_{31}P_3 + V_1 &= P_1 \\ a^*_{12}P_1 + a^*_{22}P_2 + a^*_{32}P_3 + V_2 &= P_2 \\ a^*_{13}P_1 + a^*_{23}P_2 + a^*_{33}P_3 + V_3 &= P_3 \end{aligned}\right\} \quad \ldots (I)$$

where a^*_{ij} is the physical input coefficient from i^{th} sector to j^{th} one, P_1, P_2 and P_3 are the prices of three sectors and V_1, V_2 and V_3 are the value added coefficients.

If the price of the third sector for instance, changes from P_3 to $(1+r)P_3$, then the whole system undergoes a change as sector '3' enters as input in all other sectors directly or indirectly. The changes are either of the three alternatives, mentioned above. In the case of first alternative, the solution is easy as V_1 changes by $(r.P_3)$ and P_1, P_2 remain unchanged. In the case of the second alternative, where value added remains unchanged and prices of other sectors undergo changes, the system has to be reformulated and new prices are to be obtained.

Let the new prices of the three sectors be f_1, f_2 and f_3. The system with these new prices becomes -

$$\left.\begin{aligned} a^*_{11}f_1 + a^*_{21}f_2 + a^*_{31}f_3 + V_1 &= f_1 \\ a^*_{12}f_1 + a^*_{22}f_2 + a^*_{32}f_3 + V_2 &= f_2 \\ a^*_{13}f_1 + a^*_{23}f_2 + a^*_{33}f_3 + V_3 &= f_3 \end{aligned}\right\} \quad \ldots (II)$$

Taking for instance, the price of the third sector as given exogenously as

$$f_3 = (1 + r)P_3$$

and hence the system gets reduced to two equations system as -

$$\left.\begin{aligned} a^*_{11}f_1 + a^*_{21}f_2 + V^N_1 &= f_1 \\ a^*_{12}f_2 + a^*_{22}f_2 + V^N_2 &= f_2 \end{aligned}\right\} \quad \ldots \text{(III)}$$

where $V^N_1 = a^*_{31}f_3 + V_1$ and

$V^N_2 = a^*_{32}f_3 + V_2$.

The system (III) can now be solved for f_1 and f_2 as

$$\begin{bmatrix} 1 - a^*_{11} & -a^*_{21} \\ -a^*_{12} & 1 - a^*_{22} \end{bmatrix} \begin{bmatrix} f_1 \\ f_2 \end{bmatrix} = \begin{bmatrix} V^N_1 \\ V^N_2 \end{bmatrix}$$

or

$$[V^N_1 \; V^N_2] \; [I - A^*]^{-1} = [f_1 \; f_2].$$

In the case of the third alternative, mentioned above, the estimation of V^N_1 and V^N_2 can be made with the prior knowledge about share between the producer and the consumer sector of the impact due to price changes and the system can be solved with the above equations for new prices.

If the prices of the original system are normalized such that each price is taken as unity, the price solution vector of f_1 and f_2 of the new system would give the new prices as ratios of the earlier prices.

7.1.2 Application of the Price Impact Model

Using a similar methodology Rangarajan et al[1] have studied changes in the prices of other sectors consequent on the changes

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1 C. Rangarajan, Raaj Kumar Sah and K.S. Reddy, "Impact of Hike in Prices of Coal and Petroleum Products," Artha Vijnana, Vol. XXIII, No. 2, June 1981, pp. 176-181.

in the price of the energy sectors for the Indian economy as a whole under four different assumptions about the price restrictions on the various sectors viz. Coal, Electricity and Railways. The 66 x 66 Interindustry matrix of the Planning Commission, which refers to 1973-74 technical coefficient at 1971-72 prices, has been used for the said study and the price increases of Coal and Petroleum Products are those announced in July, August and September 1979. When no such restriction was imposed exogenously on any economic sector, they observed that all high fuel using industries showed a more than one per cent price increase. And these increases were observed to be the highest price increases when compared with those obtained under the certain price restrictions of the above-noted sectors.

Though this is the only study of its type dealing with the impact of energy price hike on the Indian economy, the results of the same cannot be accepted as they are for the following reasons. Since the authors use the input-output table of an earlier vintage price and use the current price hikes, the resulting increases found are over the base year prices rather than the current ones as the price corrections are not carried out.

The focus of our impact study is to understand the rate of energy price hike on the different regional economies. Such a regional study not only provides an understanding of the magnitudes of the price increases of the non-energy sectors under conditions of energy price hike, but also has a very large bearing on the locational policy implications.

To carry out the regional impact study, we need to have regional input-output tables. Such tables are available only for the year 1965 on a comparable basis for all the regions. Though the data are of old vintage, an analysis based on these tables would give us an indication of the differential impact of energy price hike on different regions.

The data are taken from the Artha Vijnana (1979)[2] which contains all regional input-output tables including the Indian Union. The tables have been uniformly constructed for 85 sectors and are evaluated at the 1965 producer prices. Because of the difficulties involved in handling such large sized tables, these are aggregated into 8 x 8 sectors. Since the energy sectors are of significant importance, out of these 8 sectors, four are devoted to energy and the rest of the economy is divided into four other sectors. The eight sectors are: Agriculture, Manufacturing Division 2, Manufacturing Division 3, Transport, Firewood, Coal, Petroleum Products and Electricity.

The reduced 8 x 8 input coefficient matrices for each region are presented in the Table $A_7.2$ of this chapter.

The sectoral price impact due to energy price hike is studied, once with Petroleum Products alone as the exogenous sector and subsequently with all energy sectors as exogenous. On the basis of the number of endogenous sectors, the former model is termed as 7 sector model and the latter is called as the 4 sector one.

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2 P. Venkatramaiah, A.R. Kulkarni and Latika Argade, "Regional Input Output Tables for India, 1965," Artha Vijnana, Vol. XXI, No. 3, 4, September-December 1979.

The impact of energy price for both these models is studied for the following five time periods, viz. 1970, 1975, 1977, 1980 and 1981, for which actual energy price changes are utilized. The energy price changes over the period are calculated from the wholesale price index data[3] and presented below.

Table 7.1 : Energy Sector's Price Index for 1970 to 1981

(1965 = 1)

Year	Sector			
	Firewood	Coal	Petroleum Products	Electricity
1970	1.539	1.395	1.029	1.229
1975	2.726	2.381	3.612	1.887
1977	3.065	2.756	4.421	2.205
1980	3.963	4.679	5.432	2.874
1981	4.799	5.857	7.466	3.313

7.2 Differential Regional Price Impacts

7.2.1 Differential Price Impacts on 7 Sector Model

We discuss firstly the results of the 7 sector model, where the impact of rise in the price of Petroleum Products alone is considered. The results are presented in Table 7.2 to 7.6 in the form of percentage increase in the prices of all sectors for the five years due to the price rise in Petroleum Products, for each region. The Table 7.2 shows that for a rise of 2.9 per cent in the price of Petroleum Products; the consequent

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3 Government of India, Ministry of Commerce and Industry, 'Wholesale Price Index Numbers, 1970-71 = 100', Office of the Economic Adviser , New Delhi.

Table 7.2 : Percentage Price Increase in Sectors Due to Price Hike in Petroleum Products, 1970 (Petroleum price : 1.029, 2.9 per cent increase)

State	Agri-culture	Manufac-turing Industries Div. 2	Manufac-turing Industries Div. 3	Transport	Firewood	Coal*	Electri-city
1. Andhra Pradesh	0.0144	0.0335	0.0524	0.1074	0.0029	0.0361	0.1084
2. Assam	0.0047	0.0363	0.0489	0.0794	0.0032	0.0398	0.3024
3. Bihar	0.0137	0.0258	0.0399	0.0656	0.0029	0.0317	0.0629
4. Gujarat	0.0116	0.0434	0.0476	0.0673	0.0031	0.0000	0.0456
5. Kerala	0.0040	0.0458	0.0516	0.1421	0.0053	0.0000	0.0360
6. Madhya Pradesh	0.0127	0.0331	0.0403	0.0824	0.0031	0.0328	0.0585
7. Tamil Nadu	0.0149	0.0484	0.0734	0.1297	0.0062	0.0389	0.0352
8. Maharashtra	0.0067	0.0113	0.0107	0.0080	0.0004	0.0255	0.0213
9. Karnataka	0.0025	0.0100	0.0048	0.0110	0.0004	0.0000	0.0389
10. Orissa	0.0053	0.0233	0.0227	0.0526	0.0020	0.0292	0.0205
11. Punjab	0.0189	0.0579	0.0765	0.1599	0.0076	0.0000	0.0159
12. Rajasthan	0.0135	0.0387	0.0453	0.0956	0.0032	0.0000	0.0910
13. Uttar Pradesh	0.0084	0.0295	0.0557	0.1006	0.0041	0.0000	0.0418
14. West Bengal	0.0060	0.0502	0.0562	0.1207	0.0054	0.0350	0.0332
15. Delhi	0.0109	0.0659	0.0796	0.1574	0.0196	0.0000	0.0557
All India	0.0119	0.0424	0.0521	0.1047	0.0042	0.0349	0.0472

* In case of Coal, zero per cent price increase is due to non-production of Coal in those regions.

Table 7.3 : Percentage Price Increase in Sectors Due to Price Hike in Petroleum Products,1975
[Price for Petroleum Products: 3.612 i.e. 261.2 Per Cent Increase]

Sector / State	Agri-culture	Manufac-turing Industries Div. 2	Manufac-turing Industries Div. 3	Trans-port	Fire-wood	Coal *	Electri-city
Andhra Pradesh	1.30	3.02	4.72	9.67	0.26	3.25	9.76
Assam	0.43	3.27	4.41	7.16	0.29	3.58	27.23
Bihar	1.23	2.32	3.60	5.91	0.26	2.86	5.66
Gujarat	1.05	3.91	4.29	6.06	0.27	0.00	4.11
Kerala	0.36	4.12	4.65	12.80	0.48	0.00	3.24
Madhya Pradesh	1.15	2.98	3.63	7.42	0.29	2.96	5.27
Tamil Nadu	1.34	4.36	6.61	11.68	0.56	3.50	3.17
Maharashtra	0.60	1.02	0.96	0.72	0.03	2.30	1.92
Karnataka	0.23	0.90	0.43	0.99	0.04	0.00	3.51
Orissa	0.48	2.10	2.04	4.74	0.18	2.63	1.85
Punjab	1.70	5.22	6.89	14.40	0.69	0.00	1.43
Rajasthan	1.22	3.48	4.08	8.61	0.29	0.00	8.19
Uttar Pradesh	0.76	2.66	5.02	9.06	0.37	0.00	3.76
West Bengal	0.54	4.53	5.06	10.87	0.49	3.16	2.99
Delhi	0.98	5.94	7.17	14.18	1.77	0.00	5.01
India	1.07	3.82	4.70	9.43	0.37	3.15	4.25

* See note to Table 7.2.

Table 7.4 : Percentage Price Increase in Sectors Due to Price Hike in Petroleum Products,1977
(Price for Petroleum Products: 4.421 i.e. 342.1 Per Cent Increase)

Sector / State	Agri-culture	Manufac-turing Industries Div. 2	Manufac-turing Industries Div. 3	Trans-port	Fire-wood	Coal*	Electri-city
Andhra Pradesh	1.70	3.95	6.18	12.67	0.34	4.26	12.79
Assam	0.56	4.28	5.77	9.37	0.38	4.69	35.67
Bihar	1.62	3.04	4.71	7.74	0.34	3.74	7.42
Gujarat	1.37	5.12	5.62	7.94	0.36	0.00	5.38
Kerala	0.47	5.40	6.09	16.76	0.63	0.00	4.24
Madhya Pradesh	1.50	3.91	4.75	9.72	0.37	3.87	6.90
Tamil Nadu	1.75	5.71	8.66	15.30	0.73	4.59	4.15
Maharashtra	0.79	1.33	1.26	0.94	0.04	3.01	2.51
Karnataka	0.29	1.18	0.56	1.30	0.05	0.00	4.59
Orissa	0.62	2.75	2.67	6.20	0.24	3.45	2.42
Punjab	2.23	6.83	9.02	18.86	0.90	0.00	1.87
Rajasthan	1.60	4.56	5.35	11.28	0.38	0.00	10.73
Uttar Pradesh	0.99	3.48	6.58	11.87	0.48	0.00	4.93
West Bengal	0.70	5.93	6.63	14.24	0.64	4.14	3.92
Delhi	1.29	7.77	9.39	18.57	2.31	0.00	6.57
India	1.40	5.00	6.15	12.35	0.49	4.12	5.57

* See note to Table 7.2.

Table 7.5 : Percentage Price Increase in Sectors Due to Price Hike in Petroleum Products, 1980
[Price for Petroleum Products: 5.432 i.e. 443.2 Per cent Increase]

Sector / State	Agri-culture	Manufac-turing Industries Div. 2	Manufac-turing Industries Div. 3	Trans-port	Fire-wood	Coal *	Electri-city
Andhra Pradesh	2.20	5.12	8.00	16.41	0.44	5.52	16.57
Assam	0.72	5.55	7.48	12.14	0.49	6.08	46.21
Bihar	2.10	3.93	6.10	10.03	0.44	4.85	9.61
Gujarat	1.78	6.63	7.28	10.29	0.46	0.00	6.97
Kerala	0.60	7.00	7.88	21.71	0.82	0.00	5.50
Madhya Pradesh	1.95	5.06	6.16	12.59	0.48	5.02	8.93
Tamil Nadu	2.27	7.40	11.22	19.82	0.95	5.94	5.38
Maharashtra	1.02	1.72	1.64	1.22	0.06	3.89	3.25
Karnataka	0.38	1.53	0.73	1.68	0.06	0.00	5.95
Orissa	0.81	3.56	3.46	8.04	0.24	3.45	2.42
Punjab	2.89	8.85	11.69	24.44	1.17	0.00	2.43
Rajasthan	2.07	5.91	6.93	14.62	0.49	0.00	13.90
Uttar Pradesh	1.28	4.51	8.52	15.38	0.63	0.00	6.39
West Bengal	0.91	7.68	8.59	18.44	0.83	5.36	5.07
Delhi	1.67	10.07	12.16	24.05	3.00	0.00	8.51
India	1.82	6.47	7.97	16.00	0.64	5.34	7.22

* See note to Table 7.2.

Table 7.6 : Percentage Price Increase in Sectors Due to Price Hike in Petroleum Products, 1981
[Price for Petroleum Products: 7.466 i.e. 646.6 Per Cent Increase]

State / Sector	Agri-culture	Manufac-turing Industries Div. 2	Manufac-turing Industries Div. 3	Trans-port	Fire-wood	Coal *	Electri-city
Andhra Pradesh	3.22	7.47	11.68	23.95	0.64	8.05	24.17
Assam	1.06	8.10	10.91	17.71	0.72	8.87	67.41
Bihar	3.06	5.74	8.90	14.63	0.64	7.07	14.02
Gujarat	2.59	9.67	10.62	15.01	0.68	0.00	10.18
Kerala	0.89	10.21	11.50	31.68	1.19	0.00	8.02
Madhya Pradesh	2.84	7.39	8.99	18.37	0.71	7.32	13.03
Tamil Nadu	3.31	10.80	16.37	28.92	1.38	8.67	7.85
Maharashtra	1.50	2.51	2.39	1.78	0.08	5.68	4.75
Karnataka	0.56	2.24	1.06	2.45	0.09	0.00	8.68
Orissa	1.18	5.20	5.05	11.73	0.44	6.52	4.57
Punjab	4.22	12.91	17.06	35.65	1.71	0.00	3.54
Rajasthan	3.02	8.62	10.11	21.33	0.71	0.00	20.28
Uttar Pradesh	1.87	6.58	12.44	22.44	0.91	0.00	9.32
West Bengal	1.33	11.20	12.54	26.91	1.22	7.82	7.40
Delhi	2.43	14.69	17.74	35.09	4.37	0.00	12.41
India	2.65	9.44	11.63	23.35	0.93	7.79	10.53

* See note to Table 7.2.

price rise in Agriculture sector of India as a whole is 0.0119 per cent and that in Andhra Pradesh is 0.0144 per cent. Further tables present the consequent price rise in different sectors for price rises of Petroleum Products by 261.2 per cent in 1975, 342.1 per cent in 1977, 443.2 per cent in 1980 and 646.6 per cent in 1981 respectively when compared with the 1965 Petroleum Price as base price.

To study the relative position of each region with reference to the differential impact of price rise in Petroleum Products over the time span, we calculate a new relative price index, which is a ratio of percentage price increase of a region to that of all India. Consider the following for illustration. For 1970, when Petroleum prices increased by 2.9 per cent, uniformly across the country, the all India Agriculture price increased by 0.0119 per cent, while the said price rise for Andhra Pradesh was 0.0144 per cent. Hence the relative index for Andhra Pradesh in Agriculture sector works out as (0.0144/0.0199).100. However, in the present situation, when we have the same technological structure over the period and have only one exogenous sector, the relative price increase with all India as 100, turns out to be the same over the different time periods. The relevant relative price change indices for each of the States for different sectors are evaluated and presented in Table 7.7.

A value of the index, if less than 100, indicates relatively lower increase in a sector's price, while the same when greater than 100, suggests relatively higher rise in the sector's

Table 7.7 : Sectoral Price Change Indices at Regional Level (Based on 7 Sector Model)

State	Sector						
	Agri-culture	Manufac-turing Div. 2	Manufac-turing Div. 3	Transport	Firewood	Coal	Electricity
Andhra Pradesh	121	79	100	103	69	103	229
Assam	40	86	94	76	77	114	640
Bihar	115	61	77	63	69	91	133
Gujarat	98	103	91	64	72	-	97
Kerala	33	108	99	136	128	-	76
Madhya Pradesh	107	78	77	79	75	94	124
Tamil Nadu	125	114	141	124	148	111	75
Maharashtra	56	27	21	8	9	73	45
Karnataka	21	24	9	11	9	-	82
Orissa	45	55	43	50	38	65	34
Punjab	159	137	147	153	183	-	34
Rajasthan	114	91	87	91	77	-	193
Uttar Pradesh	70	70	107	96	98	-	89
West Bengal	50	119	108	115	130	100	70
Delhi	92	156	153	150	469	-	118
India	100	100	100	100	100	100	100

price. Looking at the Table 7.7, we find that for the Agriculture sector, Punjab shows the highest value of the price change index (159), indicating its highest use of Petroleum Products in Agriculture. The other States with relatively high price rise for Agriculture sector are Andhra Pradesh, Bihar, Madhya Pradesh, Tamil Nadu and Rajasthan. Kerala shows the lowest price rise (33) for the Agriculture sector. Comparing regional price change indices for the Manufacturing Division 2, it is observed that Gujarat, Kerala, Tamil Nadu, Punjab, West Bengal and Delhi have relatively larger price rise when compared with the country as a whole. Maharashtra and Karnataka have the lowest value on the said index, indicating their relative advantage with respect to the price rise. For the Manufacturing Division 3, Tamil Nadu, Punjab, West Bengal and Delhi have higher price rise than the average. Karnataka shows the lowest value on the relative price change index for the said Manufacturing Division 3.* The Coal sector does not show any significant variation in its relative price change index across regions. Assam, however, has the highest index, though it has very small production share in Coal. The price rise in Petroleum Products sector has a differential impact on Electricity Generation sector. The highest impact is observed in Assam (640), followed by Andhra Pradesh and Rajasthan. The States of Orissa

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* Since the coverage of the Transport sector is not uniform at the regional level, the technologies referred to, do not reflect the real price impact of Petroleum price hike. Hence the results of the Transport sector are not discussed in the present analysis.

and Punjab show the lowest price rise in Electricity Generation sector in comparison with all India.

The above results, broadly show that coal-based States viz. Bihar, Madhya Pradesh, Orissa and also Karnataka are less affected by the price hike in Petroleum Products than the other States. On the other hand, in case of the following non-coal based States of Gujarat, Kerala, Tamil Nadu and Delhi, a significant impact of the said price hike is observed. The differential impact of price hike analysed above is to a large extent due to the changes in the product-mix of a given sector across regions.

7.2.2 Differential Price Impacts on 4 Sector Model

We now discuss the results of the four sector model where all energy sectors are made exogenous. As the prices of different fuels have not changed uniformly and as the fuel mix is different in different regions, the effect of energy price changes, has differential impact on the prices of other sectors, over a period of time, for different regions. As a consequence the relative position of a State may change over time. The results of the percentage price rise in different non-energy sectors, due to price hike in all the energy sectors are presented in Tables 7.8 to 7.12.

To study the differential impact of energy price hike on different regions over the time period, similar relative price change indices, with all India price rise as 100, have been calculated. It is observed that, though the basic input structure remains the same, due to differential price increase in the four

Table 7.8 : Percentage Price Increase in Economic Sectors Due to Price Hike of Energy, 1970

	Firewood	Coal	Petroleum Products	Electricity
Price Vector :	1.539	1.395	1.029	1.229

(Value in Percentage)

State	Sector			
	Agriculture	Manufacturing Div. 2	Manufacturing Div. 3	Transport
Andhra Pradesh	0.36	1.36	2.81	2.57
Assam	0.11	0.56	2.30	1.61
Bihar	0.29	1.45	5.04	3.32
Gujarat	0.40	1.97	1.80	2.04
Kerala	0.04	1.33	1.99	0.87
Madhya Pradesh	0.46	2.61	5.10	2.84
Tamil Nadu	0.28	1.28	1.42	1.05
Maharashtra	0.23	0.94	0.99	1.57
Karnataka	0.12	1.50	0.97	0.82
Orissa	0.21	3.81	3.20	1.60
Punjab	0.27	1.46	1.82	2.00
Rajasthan	0.32	1.63	2.83	2.23
Uttar Pradesh	0.24	1.19	3.57	2.30
West Bengal	0.11	1.85	2.70	1.82
Delhi	0.16	0.86	0.81	0.50
India	0.29	1.68	2.65	2.12

Table 7.9 : Percentage Price Increase in Economic Sectors Due to Price Hike of Energy, 1975

	Firewood	Coal	Petroleum Products	Electricity
Price Vector :	2.726	2.381	3.612	1.887

(Value in Percentage)

State	Sector			
	Agriculture	Manufacturing Div. 2	Manufacturing Div. 3	Transport
Andhra Pradesh	2.48	7.48	14.16	18.09
Assam	0.78	4.99	11.50	12.32
Bihar	2.20	7.22	20.82	17.16
Gujarat	2.37	10.62	10.45	12.98
Kerala	0.47	8.47	11.42	15.34
Madhya Pradesh	2.69	11.73	20.91	16.91
Tamil Nadu	2.30	8.60	11.33	14.85
Maharashtra	1.38	4.27	4.40	6.11
Karnataka	0.62	5.92	3.62	3.77
Orissa	1.18	14.46	13.12	10.14
Punjab	2.58	10.09	13.00	20.84
Rajasthan	2.29	8.99	13.75	16.07
Uttar Pradesh	1.57	6.67	16.77	16.64
West Bengal	0.90	10.80	14.18	16.78
Delhi	1.51	8.74	9.70	15.38
India	2.02	9.45	13.65	16.36

Table 7.10 : Percentage Price Increase in Economic Sectors Due to Price Hike of Energy, 1977

	Firewood	Coal	Petroleum Products	Electricity
Price Vector :	3.065	2.756	4.421	2.205

(Value in Percentage)

State	Sector			
	Agriculture	Manufacturing Div. 2	Manufacturing Div. 3	Transport
Andhra Pradesh	3.22	9.63	18.39	23.43
Assam	1.01	6.45	14.64	15.92
Bihar	2.86	9.34	26.76	22.19
Gujarat	3.05	13.72	13.56	16.80
Kerala	0.61	10.86	14.80	20.01
Madhya Pradesh	3.47	14.99	26.70	21.85
Tamil Nadu	3.04	11.34	14.79	19.36
Maharashtra	1.78	5.52	5.69	7.81
Karnataka	0.80	7.44	4.48	4.81
Orissa	1.52	17.82	16.89	13.13
Punjab	3.36	13.03	16.84	27.06
Rajasthan	2.97	11.62	17.76	20.80
Uttar Pradesh	2.03	8.59	21.17	21.47
West Bengal	1.17	14.02	18.29	21.85
Delhi	2.00	11.45	12.67	20.12
India	2.62	12.23	17.65	21.22

Table 7.11 : Percentage Price Increase in Economic Sectors Due to Price Hike of Energy, 1980

	Firewood	Coal	Petroleum Products	Electricity
Price Vector :	3.963	4.679	5.432	2.874

(Value in Percentage)

State	Sector			
	Agriculture	Manufacturing Div. 2	Manufacturing Div. 3	Transport
Andhra Pradesh	5.18	15.65	31.77	38.60
Assam	1.58	9.71	22.38	25.53
Bihar	4.53	16.22	51.05	39.22
Gujarat	4.78	22.47	22.23	28.09
Kerala	0.86	15.80	22.02	27.76
Madhya Pradesh	5.84	25.38	48.98	37.07
Tamil Nadu	4.42	16.73	22.14	27.91
Maharashtra	2.96	9.47	10.01	15.48
Karnataka	1.27	11.79	7.11	8.54
Orissa	2.50	27.41	31.96	21.79
Punjab	5.04	20.31	26.18	41.13
Rajasthan	4.77	19.54	30.66	34.00
Uttar Pradesh	3.15	13.47	31.89	33.78
West Bengal	1.81	22.12	30.94	33.46
Delhi	2.80	16.58	17.79	26.85
India	4.13	19.60	29.89	33.95

Table 7.12 : Percentage Price Increase in Economic Sectors Due to Price Hike of Energy, 1981

	Firewood	Coal	Petroleum Products	Electri-city
Price Vector :	4.799	5.857	7.466	3.313

(Value in Percentage)

State	Sector			
	Agri-culture	Manufa-cturing Div. 2	Manufa-cturing Div. 3	Trans-port
Andhra Pradesh	7.08	21.10	42.42	53.02
Assam	2.17	13.50	29.85	35.27
Bihar	6.23	21.70	67.74	52.76
Gujarat	6.48	30.15	29.97	38.32
Kerala	1.21	21.44	29.38	39.52
Madhya Pradesh	7.92	33.69	64.87	50.39
Tamil Nadu	6.01	22.58	30.33	39.47
Maharashtra	4.01	12.52	13.25	20.54
Karnataka	1.70	15.41	9.30	11.45
Orissa	3.38	35.95	42.28	29.67
Punjab	7.00	27.80	35.83	57.60
Rajasthan	6.54	26.35	40.89	46.77
Uttar Pradesh	4.27	18.11	42.38	46.48
West Bengal	2.50	29.72	41.56	46.45
Delhi	3.82	22.97	24.90	38.69
India	5.64	26.33	40.03	48.82

energy sectors, any given region shows different relative positions over the time period, when compared with all India. The sectorwise relative indices for each region for the five time points are presented in Table 7.13, and the results based on them are discussed below.

The results show that those States having Coal as the major source of energy viz. Bihar, Madhya Pradesh and Orissa, scored a relative advantage in their sectoral price increases, when Petroleum prices alone increased, during the period 1975 to 1977, as seen by the decline in their price change indices. After 1977, they showed again an upward trend, because of the price rise in Coal also. In Agriculture and Mining sector the price change indices at regional level change significantly from 1970 to 1975 and thereafter remain more or less the same. The major fuel used in this sector is Petroleum and to a lesser extent Electricity. Use of other fuels is negligible. Because of the massive hike of Petroleum prices in 1973, Tamil Nadu and Punjab, whose Agriculture price rise from 1965 to 1970 is less than All India price rise, show in 1975 a greater than all India price rise. The other States which show an increase in the relative price change index from 1970 to 1975 are Bihar, Kerala, West Bengal and Delhi, while Gujarat, Madhya Pradesh, Maharashtra, Karnataka and Orissa show a substantial decline. This must be because of larger Petroleum input relative to all India in the former group of States, while the Petroleum input in Agriculture is lower compared to all India in the latter group of States. The index for other States remain more or less the same.

Table 7.13: Sectoral Price Change Indices at Regional Level (Based on 4 sector Model)

State	Agriculture and Mining					Manufacturing Division 2					Manufacturing Division3					Transport				
	1970	1975	1977	1980	1981	1970	1975	1977	1980	1981	1970	1975	1977	1980	1981	1970	1975	1977	1980	1981
1. Andhra Pradesh	124	123	123	125	126	81	79	79	80	80	106	104	104	106	106	121	111	110	114	109
2. Assam	38	39	39	38	38	33	53	53	50	51	87	84	83	75	75	76	75	75	75	72
3. Bihar	100	109	109	110	110	86	76	76	83	82	190	153	152	171	169	157	105	105	116	108
4. Gujarat	138	117	116	116	115	117	112	112	115	115	68	77	77	74	75	96	79	79	83	79
5. Kerala	14	23	23	21	21	80	90	89	81	81	75	84	84	74	73	41	94	94	82	81
6. Madhya Pradesh	159	133	132	141	140	156	124	123	130	128	193	153	151	164	162	134	103	103	109	103
7. Tamil Nadu	97	114	116	107	107	77	91	93	85	86	54	83	84	74	76	50	91	91	82	81
8. Maharashtra	79	68	68	72	71	56	45	45	48	48	37	32	32	33	33	74	37	37	46	42
9. Karnataka	41	31	31	31	30	90	63	61	60	59	37	27	25	24	23	39	23	23	25	23
10. Orissa	72	58	58	61	60	228	153	146	140	137	121	96	96	107	106	75	62	62	64	61
11. Punjab	93	128	128	122	124	87	107	107	104	106	69	95	95	88	90	94	127	128	121	118
12. Rajasthan	110	113	113	116	116	97	95	95	100	100	107	101	101	103	102	105	98	98	100	96
13. Uttar Pradesh	83	78	77	76	76	71	71	70	69	69	135	123	120	107	106	108	102	101	100	95
14. West Bengal	38	45	45	44	44	111	114	115	113	113	102	104	104	104	104	86	103	103	99	95
15. Delhi	55	75	76	68	68	51	92	94	85	87	31	71	72	60	62	24	94	95	79	79
India	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Madhya Pradesh, Karnataka, Orissa and Maharashtra are the four States which seem to have improved their relative positions with respect to India in all the manufacturing sectors as seen from the declining movement of the price change indices over the time. Bihar and Uttar Pradesh are also found to have improved their position significantly in the Manufacturing Division 3 and marginally in Division 2. Assam, Gujarat and Rajasthan showed the improvement in their relative position in some sectors and deterioration in the remaining ones. On the other hand, Tamil Nadu, Punjab, West Bengal and Delhi are the four States whose relative position is seen to have deteriorated in the entire Manufacturing Division. The sectors in Andhra Pradesh and Kerala do not show any change in their relative positions due to price hike in the energy sectors.

7.3 Results of the Impact Analysis

Comparing the sectoral price change indices between the two models discussed above, the following observations may be made. While the price change indices of the same order in magnitude on both the models indicate that Petroleum Products are a major source of energy in a given region, the differential magnitude of the said indices indicate otherwise. The Agriculture sector shows that the price change indices are nearly the same in both the models as Petroleum Products are the major source of energy used in Agriculture. When the Petroleum sector alone is exogenous the price rise in the Manufacturing Division is larger than that when all energy sectors are exogenous, for the following regions: Assam, Kerala, Tamil Nadu, Punjab and

Delhi. The opposite situation is observed in the case of Bihar, Madhya Pradesh, Maharashtra, Karnataka and Orissa. Thus the price hike in energy, naturally affects the prices of various sectors differently depending upon its fuel use and the composition of fuel use. What is more significant is, because of differences in fuel mix amongst regions and differential variation in prices of different fuels, the price of a given sector's output varies differently across regions. The large hike in Petroleum prices has improved the comparative position of the Coal-based States like Orissa, Bihar and Madhya Pradesh and these States also happen to be less developed. Whether this favourable aspect has actually been taken advantage of is a different matter. The subsequent increases in Coal and other fuel prices have to an extent diminished the advantage gained initially as a result of Petroleum price hike. While pricing of Coal has to depend mainly on the costs of extraction of it, its impact on the industrial development of Coal producing States, which also happen to have a relatively larger consumption of it, should also be one of the important considerations in its pricing policy.

APPENDIX 7.1

As mentioned in the introduction of the Chapter 5, the consequence of energy price rise can be that the rate of growth of industries, with high energy intensity, is reduced, thus effecting a change in the output composition of the industrial sector. As the energy price rise is not the only reason for the change in the sectoral output levels, a direct comparison between the output compositions at different time periods is not of much relevance. Hence to examine the effect of energy price hike on the structure of the economy in terms of output composition, energy intensities of certain activities are studied over the period below.

The analysis is based on the four input-output tables viz. 1968-69,[4] 1973-74,[5] 1979-80[6] and 1983-84;[7] out of which the last table is a projected transaction matrix based on the 1979-80 Table. The original input-output tables are aggregated to seven sectors; of which four sectors relate to the major economic activities viz. Primary sector, Manufacturing

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4 "Inter-industry transactions, 1968-69," National Accounts Statistics, 1970-71—1975-76, January 1978, Central Statistical Organization, Government of India, New Delhi, p. 123.

5 'National Accounts Statistics, 1970-71 to 1978-79,' Central Statistical Organization (C.S.O.), Government of India, 1981, p. 103.

6 'A Technical Note on the Sixth Plan of India (1980-85),' Planning Commission, Government of India, 1981.

7 Ibid.

Division 2, Manufacturing Division 3 and Others, and the remaining three sectors relate to the energy sector viz. Coal, Electricity and Petroleum Products. Since the transaction matrices are available in the monetary units, the energy intensities, obtained, will be in value terms, which do not reflect the "real" comparison between the energy intensities over the period, because of the price element involved. To overcome this difficulty, the sectoral energy intensities, expressed in value terms are converted to physical energy intensities expressed in TCR units as follows:

$$\text{Energy consumption of a fuel in TCR units} = \frac{\text{(Energy consumption in money terms at given prices) x 100}}{\text{(Price index of a fuel with 1970-71 = 100)}} \cdot \frac{\text{(TCR equivalent per unit of a fuel)}}{\text{(Price of a fuel per unit of it in 1970)}}$$

While the prices and price indices for Coal and Electricity are directly available, a weighted price and price index are worked out for Petroleum Products.[8] The price indices are also evaluated with 1970-71 = 100 as the base.[9] The output figures are deflated with these price indices and the energy intensities are estimated in TCR units per thousand rupees of output at 1970-71 prices for each activity. These intensities, together with fuelwise consumption share at the sectoral level are

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8 Chandhok, H.L., 'Wholesale Price Statistics - India 1947-78,' Vol. I, Economic and Scientific Research Foundation, New Delhi, India, 1978.

9 'Wholesale Price Index Number,' Ministry of Commerce and Industry, Office of the Economic Advisers, Government of India, New Delhi.

presented in Table $A_7.1$. Based on the above, the following observations may be made.

Table $A_7.1$: Sectoral Energy Intensities and Fuelwise Consumption Shares

Year	Energy Intensity TCR/000 Rs.	Coal % share	Petroleum Products % share	Electricity % share
		Agriculture and Mining		
1968-69	0.052238	4.4	68.4	27.3
1973-74	0.153707	0.4	74.1	25.5
1979-80	0.157598	2.3	87.5	10.2
1983-84*	0.371514	1.5	87.8	10.7
		Manufacturing Division 2		
1968-69	0.264324	31.3	22.7	46.0
1973-74	0.257398	26.4	31.2	42.4
1979-80	0.418378	15.3	50.7	34.0
1983-84*	0.456789	15.0	51.9	33.1
		Manufacturing Division 3		
1968-69	0.853419	61.4	19.5	19.1
1973-74	0.660104	43.1	29.5	27.4
1979-80	0.650718	44.2	33.1	22.8
1983-84*	0.669790	42.9	32.3	24.8

Note : * The intensities are based on the projected transaction tables.

The primary sector indicates that the energy intensity is increasing considerably over the period 1968-69 to 1979-80. The projected value also indicates a high rate of growth in its energy intensity. The expansion of mining activity and the technological progress in the Agriculture sector are the possible

reasons for such increase in the energy intensity of the primary sector. The consumption share of each fuel over the period, indicates a clear trend that Electricity is being substituted by Petroleum Products. The Manufacturing Division 2, shows a steady growth in its energy intensity, indicating no significant change in the structure of the said sector. The consumption shares of both Coal and Electricity are declining and that of Petroleum Products is increasing.

The results obtained in case of Manufacturing Division 3, which contains the maximum share of HFU industries, are different from the ones, noted above. The energy intensity for this division seems to have declined from 1968-69 to 1979-80, which seems to substantiate the widespread belief that the rate of growth of HFU industries has gone down due to energy crisis. The composition of energy consumption also does not show any sharp increase in the consumption of Petroleum Products as in the case of the other two sectors. While Coal shows a marginal decline, Electricity shows a marginal increase in its consumption share.

One also feels from the above Table $A_7.1$, that the technological substitutions between fuels have not taken place in the desired direction in the economy as a whole. Secondly, the relative output levels have altered only in case of HFU industries in the economy.

Table $A_7.2$: Regional (Energy Specific) Input-Output Coefficient Matrices

Sector	Sector	1	2	3	4	5	6	7	8
				State : Andhra Pradesh					
1.	Agriculture and other primary sectors	0.113330	0.420456	0.073252	-	0.000105	-	0.621831	-
2.	Manufacturing Div. 2	0.009976	0.116700	0.050691	0.015745	0.003057	-	-	-
3.	Manufacturing Div. 3	0.016276	0.015576	0.181913	0.132304	0.001525	0.052415	-	-
4.	Others*	0.082612	0.176525	0.284797	0.210808	0.025156	0.064449	-	0.256774
5.	Firewood	0.000380	0.005289	0.001026	-	0.001652	0.022291	0.057438	-
6.	Coal	-	0.003355	0.022664	0.037941	-	-	-	0.110417
7.	Petroleum Products	0.000906	0.001024	0.002146	0.026085	-	0.008247	0.000526	0.022998
8.	Electricity	0.001146	0.005775	0.022603	0.002626	-	0.022675	0.003267	0.093689
				State : Assam					
1.	Agriculture and other primary sectors	0.084066	0.580340	0.011644	-	0.000101	-	0.621840	-
2.	Manufacturing Div. 2	0.006772	0.055000	0.010700	0.017647	0.002850	-	-	-
3.	Manufacturing Div. 3	0.009638	0.005800	0.253983	0.100646	0.001400	0.050837	-	-
4.	Others*	0.039910	0.122158	0.289598	0.173883	0.038238	0.056500	0.079470	0.423593
5.	Firewood	0.000007	0.001712	0.015447	-	0.000715	0.023272	-	-
6.	Coal	-	0.002948	0.001416	0.026214	-	-	-	-
7.	Petroleum Products	0.000098	0.007300	0.002914	0.020350	-	0.008247	0.000526	0.090226
8.	Electricity	0.000564	0.000942	0.014906	-	-	0.029121	0.004196	0.023296
				State : Bihar					
1.	Agriculture and other primary sectors	0.142531	0.362719	0.028279	-	0.000239	-	0.621924	0.000321
2.	Manufacturing Div. 2	0.005034	0.128300	0.008091	0.026128	0.001271	-	-	0.000094
3.	Manufacturing Div. 3	0.003132	0.023940	0.172121	0.153840	0.001265	0.052825	-	-
4.	Others*	0.058480	0.183423	0.319609	0.189984	0.042722	0.060854	0.022442	0.238623
5.	Firewood	0.000223	0.001388	0.001056	-	0.001012	0.022242	-	-
6.	Coal	-	0.005393	0.069260	0.038833	-	-	-	0.050169
7.	Petroleum Products	0.002629	0.001360	0.002932	0.015266	-	0.008247	0.000526	0.007689
8.	Electricity	0.000641	0.005772	0.012660	0.013033	-	0.025780	0.003714	0.371145

* This sector contains the transport sector.

(continued)

Table $A_7.2$: (continued)

Sector	Sector	1	2	3	4	5	6	7	8
					State : Gujarat				
1.	Agriculture and other primary sectors	0.162085	0.119554	0.026320	-	0.000033	-	0.621945	0.000167
2.	Manufacturing Div. 2	0.022679	0.257600	0.104233	0.023144	0.002206	-	-	0.000004
3.	Manufacturing Div. 3	0.010649	0.078602	0.189334	0.173555	0.000498	-	-	-
4.	Others*	0.073049	0.274230	0.271905	0.231729	0.043417	-	0.080335	0.270961
5.	Firewood	0.001700	0.004349	0.001712	-	0.001940	-	-	0.000025
6.	Coal	-	0.005897	0.008171	0.027191	-	-	-	0.145042
7.	Petroleum Products	0.001132	0.002798	0.005158	0.014573	-	-	0.000526	0.008319
8.	Electricity	0.001090	0.010470	0.011278	0.003936	-	-	0.003232	0.071659
					State : Kerala				
1.	Agriculture and other primary sectors	0.039265	0.286710	0.066152	-	0.002829	-	-	-
2.	Manufacturing Div. 2	0.002845	0.161300	0.080143	0.024844	0.000087	-	-	-
3.	Manufacturing Div. 3	0.003070	0.022858	0.172674	0.126116	0.010940	-	-	-
4.	Others*	0.020850	0.211678	0.233802	0.217339	0.033430	-	-	0.190413
5.	Firewood	0.000002	0.010167	0.009407	-	0.001163	-	-	0.000036
6.	Coal	-	0.002823	0.004433	0.007300	-	-	-	-
7.	Petroleum Products	0.000191	0.001942	0.001539	0.035708	-	-	-	0.000553
8.	Electricity	0.000262	0.009122	0.028298	0.000252	-	-	-	0.203046
					State: Madhya Pradesh				
1.	Agriculture and other primary sectors	0.252661	0.265961	0.044119	-	0.000535	-	-	0.001334
2.	Manufacturing Div. 2	0.012836	0.216400	0.053464	0.015108	0.001111	-	-	-
3.	Manufacturing Div. 3	0.007933	0.070087	0.104415	0.116599	0.001825	0.047175	-	-
4.	Others*	0.091826	0.186161	0.260245	0.205915	0.036977	0.067683	-	0.269638
5.	Firewood	0.000006	0.009108	0.012064	-	0.000488	0.023103	-	-
6.	Coal	-	0.007731	0.066696	0.035345	-	-	-	0.150850
7.	Petroleum Products	0.000416	0.001213	0.003148	0.020218	-	0.008247	-	0.010102
8.	Electricity	0.000309	0.010239	0.016517	0.007341	-	0.023518	-	0.033895

(continued)

Table $A_7.2$: (continued)

Sector	Sector	1	2	3	4	5	6	7	8
					State : Tamil Nadu				
1.	Agriculture and other primary sectors	0.141893	0.170648	0.031513	-	0.004509	-	-	-
2.	Manufacturing Div. 2	0.016529	0.277400	0.043357	0.024768	0.005183	-	-	-
3.	Manufacturing Div. 3	0.016915	0.025038	0.243483	0.143625	0.001830	0.043096	-	-
4.	Others*	0.052894	0.203148	0.294051	0.230447	0.044142	0.070826	-	0.156612
5.	Firewood	0.000051	0.004191	0.002358	-	0.002139	0.022491	-	-
6.	Coal	-	0.000861	0.005601	0.011996	-	-	-	0.078828
7.	Petroleum Products	0.001255	0.001262	0.004853	0.030204	-	0.008247	-	0.001983
8.	Electricity	0.005835	0.015952	0.014763	0.000454	-	0.070826	-	0.172095
					State : Maharashtra				
1.	Agriculture and other primary sectors	0.202934	0.136540	0.018651	-	0.000493	-	0.372552	0.000524
2.	Manufacturing Div. 2	0.011077	0.188100	0.051675	0.019139	0.001426	-	-	-
3.	Manufacturing Div. 3	0.012404	0.049884	0.259538	0.161950	0.000485	0.040905	-	-
4.	Others*	0.078662	0.247102	0.281403	0.215506	0.043392	0.072977	0.332549	0.218689
5.	Firewood	0.000225	0.001771	0.001260	-	0.000697	0.023323	-	0.000003
6.	Coal	-	0.000289	0.000583	0.026598	-	-	-	0.046253
7.	Petroleum Products	0.001529	0.001916	0.001664	0.001255	-	0.008247	0.000251	0.004812
8.	Electricity	0.000885	0.007898	0.006346	-	-	0.025082	0.009349	0.206891
					State : Karnataka				
1.	Agriculture and other primary sectors	0.137330	0.214296	0.035014	-	0.001581	-	-	0.000007
2.	Manufacturing Div. 2	0.008105	0.200900	0.027819	0.015622	0.003756	-	-	-
3.	Manufacturing Div. 3	0.012184	0.034683	0.189344	0.162571	0.008791	-	-	-
4.	Others*	0.059470	0.210234	0.254608	0.215813	0.030435	-	-	0.205885
5.	Firewood	0.000088	0.011559	0.008778	-	0.000188	-	-	-
6.	Coal	-	0.003945	0.000725	0.011030	-	-	-	-
7.	Petroleum Products	0.000457	0.001617	0.000219	0.002645	-	-	-	0.008320
8.	Electricity	0.000933	0.008066	0.001336	0.000685	-	-	-	0.322168

(continued)

Table $A_7.2$: (continued)

Sector	Sector	1	2	3	4	5	6	7	8
					State : Orissa				
1.	Agriculture and other primary sectors	0.150065	0.230026	0.054925	-	0.000661	-	-	-
2.	Manufacturing Div. 2	0.008351	0.100600	0.009275	0.018644	0.003194	-	-	-
3.	Manufacturing Div. 3	0.006320	0.039908	0.099346	0.093310	0.002662	0.047257	-	-
4.	Others*	0.072091	0.287846	0.250660	0.129490	0.035273	0.071760	-	0.264831
5.	Firewood	0.000146	0.047882	0.000286	-	0.000039	0.023766	-	-
6.	Coal	-	0.003992	0.052089	0.020764	-	-	-	-
7.	Petroleum Products	0.000132	0.001192	0.001681	0.014649	-	0.008247	-	0.001030
8.	Electricity	0.000110	0.001854	0.015692	0.007179	-	0.020734	-	0.175166
					State : Punjab				
1.	Agriculture and other primary sectors	0.173055	0.323445	0.026396	-	0.001746	-	-	0.000015
2.	Manufacturing Div. 2	0.012205	0.165100	0.025822	0.033388	0.002648	-	-	-
3.	Manufacturing Div. 3	0.012181	0.035387	0.289382	0.158360	0.001361	-	-	-
4.	Others*	0.069098	0.233453	0.305867	0.262479	0.045888	-	-	0.079213
5.	Firewood	0.000066	0.004576	0.003697	-	0.003092	-	-	-
6.	Coal	-	0.005379	0.005025	0.026084	-	-	-	-
7.	Petroleum Products	0.001012	0.000713	0.001127	0.035817	-	-	-	0.000014
8.	Electricity	0.001540	0.006147	0.010246	0.000209	-	-	-	0.199599
					State : Rajasthan				
1.	Agriculture and other primary sectors	0.0245290	0.255335	0.030540	-	0.003090	-	-	0.000041
2.	Manufacturing Div. 2	0.009921	0.260700	0.040373	0.022592	0.001715	-	-	-
3.	Manufacturing Div. 3	0.007267	0.020487	0.211358	0.129990	0.003761	-	-	-
4.	Others*	0.080565	0.197404	0.268335	0.212154	0.030290	-	-	0.245241
5.	Firewood	0.000200	0.001909	0.004180	-	0.001966	-	-	0.000053
6.	Coal	-	0.008956	0.023082	0.031291	-	-	-	0.065882
7.	Petroleum Products	0.000596	0.001613	0.002228	0.023583	-	-	-	0.021600
8.	Electricity	0.000654	0.006996	0.018142	0.002124	-	-	-	0.053453

(continued)

Table A_7.2 : (continued)

Sector	Sector	1	2	3	4	5	6	7	8
					State : Uttar Pradesh ✓				
1.	Agriculture and other primary sectors	0.163940	0.347163	0.026773	-	0.001043	-	-	0.000374
2.	Manufacturing Div. 2	0.013288	0.157700	0.026645	0.027121	0.001878	-	-	-
3.	Manufacturing Div. 3	0.000773	0.029255	0.259549	0.152056	0.002372	-	-	0.000002
4.	Others*	0.053267	0.171466	0.292493	0.234847	0.038703	-	-	0.303500
5.	Firewood	0.000005	0.002958	0.028028	-	0.000637	-	-	0.000014
6.	Coal	-	0.002279	0.001319	0.026613	-	-	-	0.072262
7.	Petroleum Products	0.000286	0.000945	0.003477	0.023309	-	-	-	0.002639
8.	Electricity	0.001649	0.007434	0.015775	0.002725	-	-	-	0.086256
					State : West Bengal ✓				
1.	Agriculture and other primary sectors	0.085547	0.110577	0.027431	-	0.000368	-	-	0.002924
2.	Manufacturing Div. 2	0.009139	0.365100	0.029674	0.014634	0.001025	-	-	-
3.	Manufacturing Div. 3	0.007246	0.032676	0.257288	0.122850	0.001673	0.049547	-	0.000137
4.	Others*	0.034356	0.192026	0.264781	0.191366	0.043917	0.060673	-	0.153470
5.	Firewood	0.000017	0.003835	0.004349	-	0.001373	0.024168	-	-
6.	Coal	-	0.005088	0.024193	0.021058	-	-	-	0.143724
7.	Petroleum Products	0.000154	0.001924	0.002379	0.030660	-	0.008247	-	0.001158
8.	Electricity	0.000050	0.013574	0.011570	0.008511	-	0.027601	-	0.188205

(continued)

Table $A_7.2$: (continued)

Sector	Sector	1	2	3	4	5	6	7	8
					State : Delhi				
1.	Agriculture and other primary sectors	0.075576	0.129636	0.025801	-	-	-	-	0.000734
2.	Manufacturing Div. 2	0.007966	0.345300	0.031810	0.022532	0.005573	-	-	-
3.	Manufacturing Div. 3	0.004265	0.051650	0.268255	0.228549	0.005625	-	-	0.000002
4.	Others*	0.024260	0.227689	0.309682	0.308281	0.118751	-	-	0.205685
5.	Firewood	0.000015	0.000480	0.002095	-	0.005469	-	-	0.000713
6.	Coal	-	0.004184	0.002903	0.001369	-	-	-	0.075706
7.	Petroleum Products	0.001763	0.000450	0.002297	0.030756	-	-	-	0.005268
8.	Electricity	0.005020	0.008411	0.007435	-	-	-	-	0.143499
					All India				
1.	Agriculture and other primary sectors	0.145557	0.209961	0.031169	-	0.000745	-	0.461020	0.000847
2.	Manufacturing Div. 2	0.010752	0.226900	0.037532	0.021702	0.002051	-	-	0.000005
3.	Manufacturing Div. 3	0.011449	0.041475	0.234122	0.142258	0.002581	0.045136	-	0.000024
4.	Others*	0.070025	0.207903	0.267052	0.215221	0.037563	0.067336	0.241954	0.189572
5.	Firewood	0.000266	0.004340	0.003804	-	0.000788	0.020750	-	0.000031
6.	Coal	-	0.004399	0.020482	0.027554	-	-	-	0.081749
7.	Petroleum Products	0.000590	0.001925	0.002939	0.025069	-	0.008305	0.000349	0.005401
8.	Electricity	0.001365	0.011897	0.015988	0.003813	-	0.028474	0.008304	0.187473