Chapter Three

IMPACT OF HOUSING INVESTMENT
ON EMPLOYMENT GENERATION

1. Introduction

The removal of unemployment has been regarded as one of the major objectives of economic planning in India. The overall investment strategy is accordingly designed with the aim not only of achieving rapid growth but also of creating additional employment opportunities on a large scale. In this context, it is necessary to examine the impact of housing investment on employment generation. An attempt has been made in this chapter to evaluate the comparative strength of the employment generating potential of investment in housing in relation to investment in other sectors of the economy. We have measured the impact of sectoral investment on employment generation in terms of the estimated values of employment multipliers associated with investment in different sectors of the economy.

2. Concept and Measurement of Employment Multiplier

The size of employment multiplier for a given sector indicates the extent of employment generation resulting from an increase in the final demand for the product of that sector. Given an input-output table, we can define two types of employment multipliers. Employment multiplier of Type-I for a given sector is defined as the ratio of total direct and indirect employment generated in the economy to the direct employment generated in the given sector as a result of an initial expenditure of one unit in that sector. Employment multiplier of Type-II includes not only the direct and indirect employment generation but also the induced employment generation resulting from induced additions in the overall final demand vector in response to an initial increase in the final demand in a given sector. It is evident that these two types of employment multipliers represent the counterparts of the corresponding concepts of the two types of income multipliers discussed in the preceding chapter.

The first step in calculating the employment multiplier consists in obtaining the direct labour requirement per unit of output in each sector. The estimates of direct labour output ratios constitute the labour coefficients vector, $L = (l_1, l_2, l_3, \ldots l_n)$ As already noted in Chapter One, each column of the Leontief inverse matrix indicates the total direct and indirect output requirements per unit of final demand in the corresponding sector. The total direct and indirect employment generated per unit of final demand in a given sector can, therefore, be obtained by multiplying the row vector L with the corresponding column of the inverse matrix $(1-A)^{-1}$. Thus, if the elements of the jth column of the inverse matrix are denoted by C_{1j}, C_{2j}, $\ldots C_{nj}$, we can obtain the total direct and indirect employment generated by one unit increase in the final demand of jth sector as :

$$Ej = l_1 C_{1j} + l_2 C_{2j} + \ldots + l_n C_{nj}$$

Given the direct and indirect employment generated per unit of final demand, we can derive the employment multiplier of Type-I as the ratio of total employment generated to the direct employment generated in the given sector. Thus, the employment multiplier of Type-I is given by

$$e_j = \frac{E_j}{l_j}$$

The employment multiplier of Type-II can be obtained by following the same procedure, with the only difference that the inverse matrix is of a different dimension. As indicated in Chapter Two, the direct and indirect as well as induced impact of a change in the final demand of a given sector is captured by the elements of $(1-A^*)^{-1}$, where A^* represents the extended technology matrix which includes household sector as an additional sector. Thus, the employment multiplier of Type-II can be obtained as :

$$E^*_j = l_1 C^*_{1j} + l_2 C^*_{2j} + \ldots + l_n C^*_{nj}$$

where C^*_{1j}, $\ldots$, C^*_{nj}, are the elements of the jth column of $(1-A^*)^{-1}$

In what follows, we have made an attempt to estimate the employment multipliers for different sectors of Indian economy within the framework of input-output model for 1996-97 and examine on the basis of these multipliers the relative position of construction vis-a-vis other sectors with regard to employment generation.

3. Estimates of Labour Coefficients

As already noted earlier, the first step in the computation of employment multiplier is to derive a set of labour coefficients for different sectors for the reference year of the input-output table. Labour coefficients indicate the number of persons employed per unit of gross output. Since the sectoral employment figures relating to the reference year 1996-97 are not readily available, we have derived the required estimates from the information available from various sources. The broad methodology that we have followed for deriving the estimates of sectoral employment is as follows :

Information on sectoral employment is available from three different sources, viz., Population Census, National Sample Survey and Central Statistical Organization. The estimates provided by the Population Census relate to the year 1990-91 and are available for nine broad sectoral categories :   (a) Agriculture, (b) Livestock, (c) Forestry, Fishing and Allied Activities, (d) Mining & Quarrying, (e) Manufacturing (f) Construction, (g) Trade & Commerce, (h) Transport, Storage & Communication, and (i) Other Services. Since there are problems of comparability with regard to the data on working force between 1981 Census and 1991 Census, it would be extremely difficult to derive the required estimates of sectoral employment for 1996-97 using the Census Data.

The estimates of working force available from the National Sample Survey relate to the year 1983, 1987-88 and 1993-94, corresponding to the 38th Round, 43rd Round and 50th Round of NSS, respectively. These estimates are available in the form of worker-population ratio and the sectoral structure of working force by the broad categories of male and female workers in rural and urban areas. The broad sectoral classification adopted by the NSS consists of eight sectors, viz., (a) Agriculture including Forestry & Fishing, (b) Mining & Quarrying, (c) Manufacturing, (d)

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Electricity, Gas & Water Supply, (e) Construction, (f) Transport, (g) Trade, and (h) Other Services. While the NSS estimates have a better degree of comparability over time, there are distinct possibilities of a relatively higher degree of sampling error in the sectoral employment estimates especially in the non-agricultural sector. This would pose serious problems in deriving the required estimates of sectoral employment for the year 1996-97.

As a part of the detailed exercise of estimating national income, the National Income Division of the Central Statistical Organization derives the estimates of sectoral working force for selected benchmark years. CSO's estimates are based on a indepth analysis of the Census data as well as the NSS data. We have obtained the estimates of sectoral employment prepared by CSO for the benchmark years 1980-81 and 1993-94. The main advantage of the CSO estimates is that a close correspondence between the estimates of sectoral national income and sectoral employment is ensured especially among various categories of non-agricultural sector. Moreover, the problems of comparability over time are dealt with as accurately as possible in the detailed exercise carried out by the CSO.

We have used the estimates of sectoral employment obtained from the CSO for the benchmark years 1980-81 and 1993-94 for deriving the required estimates of sectoral employment for the 14 broad sectors for the year 1996-97. For this purpose, we have reviewed the growth rates of sectoral working force derived from the CSO estimates and the estimates provided by the NSS. After a careful examination of the growth rates of sectoral employment derived from the two alternative sources, we have used the growth rates of sectoral employment implicit in the CSO estimates for each of the non-agricultural sectors. However, for the agricultural sector, we have used the growth rate implicit in the NSS estimates because in our opinion the growth rate of agricultural working force indicated by the CSO estimates appears to be unrealistic. The required estimates of sectoral employment for 1996-97 for each of the 14 broad sectors are derived by applying the average annual growth rates of the sectoral employment to the benchmark figures for 1993-94 obtained from the CSO.

The estimates of sectoral employment so derived for the year 1996-97 are presented in *Table 11* along with the estimates of sectoral gross output. Labour coefficients for different sectors, derived as the ratio of total employment to gross output, are also presented in this table. It can be seen from the figures given in this table that there are marked variations in the labour coefficient associated with different sectors. This indicates that the direct employment generated per unit of output varies significantly from one sector to another.

SI. No.	Sector	Total Employment	Gross Output (Rs. Million)	Labour Coeffcient (in persons per Rs. Mn. of output)
	Table 11			
	Sectoral Employment and Labour Coefficient, 1996-97			
1	Agriculture	275,673,250	3951223	69.77
2	Forestry & Logging	439,592	125060	3.52
3	Fishing	1,822,008	157733	11.55
4	Mining	3,458,787	292842	11.81
5	Construction related Mfg.	10,233,685	1851600	5.53
6	Other Manufacturing	41,217,607	7050406	5.85
7	Construction	16,951,652	1628708	10.41
8	Electricity, Gas & Water Supply	1,683,307	866312	1.94
9	Transport	13,731,960	1416915	9.69
10	Trade	37,439,543	2182775	17.15
11	Financial Services	4,637,664	804207	5.77
12	Social Services	9,467,486	613530	15.43
13	Public Admn. and Defence	13,215,863	602635	21.93
14	Other Services	19,419,337	1656409	11.72
	Total	449,391,740	23200354	19.37

4. Estimates of Employment Multipliers

The employment multipliers of Type-I and Type-II computed for different sectors of Indian economy on the basis of input-output model for the year 1996-97 are presented in *Table 12*. According to the estimates presented in this table, the type-I

employment multiplier (showing the extent of direct and indirect employment generation in the economy as a whole) for the construction sector exceeds Two. This value of the Type-I employment multiplier can be considered fairly high in relation to the corresponding multiplier values observed in the case of most of the other sectors. On the whole, in terms of Type-I employment multiplier, construction ranks fifth among the fourteen major sectors of the economy. The four sectors having a multiplier value higher than that of construction are : Electricity, gas & water supply, Construction related manufacturing, Other manufacturing and Transport. The employment multiplier of two obtained for the construction sector indicates that the extent of total direct and indirect employment generation in the economy as a whole resulting from a unit increase in the final demand in the construction sector is more than twice the direct employment generated in the construction sector itself. It should be noted that the direct employment generation in itself is significantly higher in the construction sector as compared to several other sectors of the economy.

SI. No.	Sector	Direct and Indirect Multiplier Type-I	Rank	Direct and Indirect Multiplier Type-II	Rank
1	Agriculture	1.22	13	2.08	14
2	Forestry & Logging	1.50	7	18.47	2
3	Fishing	1.24	12	6.43	10
4	Mining	1.39	9	6.44	9
5	Construction related Manufacturing	3.40	3	14.17	4
6	Other Manufacturing	4.32	2	14.53	3
7	**Construction**	**2.02**	**5**	**7.76**	**7**
8	Electricity, Gas and Water Supply	4.74	1	35.45	1
9	Transport	2.09	4	8.25	6
10	Trade	1.27	11	4.75	12
11	Financial Services	1.45	8	11.80	5
12	Social Services	1.36	10	5.22	11
13	Public Administration and Defence	1.00	14	3.72	13
14	Other Services	1.67	6	6.76	8

Table 12
Employment Multipliers for Different Sectors

As already noted earlier, Type-I employment multiplier is computed on the assumption that the final demand of all other sectors remains unchanged when the final demand for the given sector increases. The Type-II employment multiplier includes the effects of induced changes in the final demand for other sectors on the total employment generation.

As shown in *Table 12*, the Type-II employment multiplier for the construction sector is as high as 7.76. This value indicates that an additional unit of final expenditure on construction sector induces overall employment generation in the economy as a whole by an extent which is almost eight times the direct employment generated in the construction sector itself. It is interesting to observe that out of the six sectors where Type-II employment multiplier exceeds that of the construction sector, there are only two sectors which rank higher than construction in terms of their contribution to overall GDP.

5.   Sectoral Expenditure and Employment Generation

The estimates of employment multipliers for different sectors constitute the basis of analysing the relationship between changes in sectoral expenditure and the resulting changes in the total employment generated in different sectors. To begin with, we may examine the impact of a ten per cent increase in the final demand of construction sector on the additional employment generated in different sectors of the economy. The estimates of direct and indirect additional employment (corresponding to Type-I employment multiplier) generated by ten per cent increase in the final expenditure on construction sector are presented in *Table 13*, while the estimates of direct, indirect and induced additional employment (corresponding to Type-II employment multiplier) are presented in *Table 14*.

It is evident from *Table 13* that a ten per cent increase in the final expenditure in the construction sector would result in a significant increase in the employment generated in several sectors of the economy, the major ones being construction related Manufacturing, Transport, Electricity, Gas and Water Supply, Trade,

Financial Services and the Construction Sector itself. On the whole, the total increase in employment for all sectors taken together, resulting from a ten per cent increase in the final expenditure in the construction sector, turns out to be as high as 2957 thousand. The corresponding figure for direct, indirect and induced increase in employment (based on Type-II multiplier) turns out to be 11334 thousand which represents more than 2.5% increase in the total employment in the economy as a whole.

Table 13
Total Increase in Sectoral Employment induced by 10% increase in the Final Expenditure in Construction Sector - Type-I

(Rs. Million)

Sl. No.	Sector	Type-I Increase in Employment	Ratio of Addl. Employment to Sectoral Employment
1	Agriculture	484,217	0.18%
2	Forestry & Fishing	7,590	0.34%
3	Mining	7,168	0.21%
4	Construction related Manufacturing	284,356	2.78%
5	Other Manufacturing	177,730	0.43%
6	Construction	1,477,645	8.72%
7	Electricity, Gas and Water Supply	13,930	0.83%
8	Transport	102,717	0.75%
9	Trade	297,680	0.80%
10	Financial Services	47,680	1.03%
11	Other Services incl. Social Services & Public Administration	56,147	0.13%
	TOTAL	2,956,861	0.66%

Table 14
Total Increase in Sectoral Employment induced by 10% increase in the Final Expenditure in Construction Sector - Type-II

Sr. No.	Sectors	Type-II Increase in Employment	Ratio of Addl. Employment to Sectoral Employment
1	Agriculture	6,664,118	2.42%
2	Forestry & Fishing	50,094	2.21%
3	Mining	15,511	0.45%
4	Construction related Mfg.	387,022	3.78%
5	Other Manufacturing	751,085	1.82%
6	Construction	1,520,281	8.97%
7	Electricity, Gas and Water Supply	39,178	2.33%
8	Transport	335,056	2.44%
9	Trade	894,443	2.39%
10	Financial Services	120,091	2.59%
11	Other Services incl. Social Services & Public Admn.	556,906	1.32%
	TOTAL	11,333,787	2.52%

It is an interesting exercise to compare the impact of increased sectoral final demand on the sectoral employment generation for the construction sector vis-à-vis the other sectors of the economy. We have estimated the total direct and indirect as well as induced additional employment generated in the economy as a whole in response to a ten per cent increase in the final demand of each of the given sectors. *Tables 15 & 16* show the total additional employment generated in the national economy as a result of a ten per cent increase in the final expenditure of a given sector. The additional employment potential indicated in *Table 15* is computed on the basis of Type-I employment multipliers while the additional employment potential shown in *Table 16* is computed on the basis of Type-II employment multipliers.

Table 15
Employment Generation Induced by Ten Percent Increase in Sectoral Final Demand - Type-I

Sl. No.	Sector	Type-I Direct And Indirect Increase in Employment	Ratio of Addl. Employment to Total Employment	Rank
1	Agriculture	21937231	4.88%	1
2	Forestry & Logging	36048	0.01%	14
3	Fishing	192000	0.04%	11
4	Mining	399413	0.09%	10
5	Construction related Mfg.	802519	0.18%	9
6	Other Manufacturing	9806086	2.18%	2
7	**Construction**	**2956861**	**0.66%**	**3**
8	Electricity, Gas and Water Supply	132718	0.03%	13
9	Transport	1390725	0.31%	6
10	Trade	2276251	0.51%	5
11	Financial Services	137338	0.03%	12
12	Social Services	1274787	0.28%	8
13	Public Administration and Defence	1321586	0.29%	7
14	Other Services	2279257	0.51%	4

It is evident from the estimates presented in *Table 15* that the extent of absolute increase in employment in the economy as a whole achieved by increasing the final expenditure on a given sector by ten per cent can be considered highly significant in the case of five sectors, construction being one of them. On the basis of employment generation indicated by Type-I employment multiplier, Construction sector ranks third among the 14 major sectors of the economy; Agriculture and Other Manufacturing being the only two sectors which rank higher than Construction in terms of the employment potential measured in absolute terms. If we consider the impact of induced changes in the final demand for other sectors also, as shown by the Type-II employment multiplier, we again find that Construction sector ranks third among the 14 sectors of the economy. In fact, the pattern of relative ranking of

sectors is found to be broadly similar with regard to employment generation based on both types of multiplier.

				Table 16			

Table 16
Employment Generation Induced by Ten Percent Increase in Sectoral Final Demand - Type-II

Sl. No.	Sector	Type-II Direct And Indirect Increase in Employment	Ratio of Addl. Employment to Total Employment	Rank
1	Agriculture	37263106	8.29%	1
2	Forestry & Logging	445291	0.10%	14
3	Fishing	992900	0.22%	13
4	Mining	1853517	0.41%	10
5	Construction related Mfg.	3349108	0.75%	9
6	Other Manufacturing	32949379	7.33%	2
7	**Construction**	**11333787**	**2.52%**	3
8	Electricity, Gas & Water Supply	993093	0.22%	12
9	Transport	5487942	1.22%	6
10	Trade	8516913	1.90%	5
11	Financial Services	1116076	0.25%	11
12	Social Services	4906277	1.09%	8
13	Public Admn. and Defence	4917030	1.09%	7
14	Other Services	9234294	2.05%	4

Conclusion :

It is evident from the above analysis that an increase in the expenditure on the Construction sector would make a major contribution to overall employment generation and lead to a significant increase in the overall growth rate of employment in the economy.