# 307

# Working Paper

IMPACT OF HOUSING INVESTMENT ON
INCOME AND EMPLOYMENT GENERATION

by

BAKUL H. DHOLAKIA

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I

## INTRODUCTION

Formulation of a rational housing policy requires a detailed analysis of the impact of housing investment on the growth of national economy. The impact of housing investment on various sectors of the economy can be examined within the framework of inter-industry analysis involving inter-sectoral linkages and impact multipliers.[*1] Since accelerating the growth of productive capacity and generating employment are the major objectives of economic policy

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[*1] For a discussion of inter-industry analysis and linkages of housing investment in India, see Professor Bakul H. Dholakia: 'Inter-Industry Linkages of Housing Investment in India', Working Paper No. 301, Indian Institute of Management, Ahmedabad, November 1979

in India, the analysis of impact multipliers needs to be carried out with reference to income and employment generation. Thus, in the context of national goals and optimal allocation of scarce resources, the priority that can.be assigned to housing investment can be determined mainly on the basis of a comparative evaluation of the income and employment multipliers of investment in housing vis-a-vis other sectors of the economy.

It is rather surprising to find that empirical analysis of the impact of housing investment in India has so far remained largely an unexplored field of research. An attempt has, therefore, been made in this paper to examine the impact multipliers of housing investment in relation to the corresponding multipliers for investment in other sectors of the Indian economy. It seeks to measure the income multipliers as well as the employment multipliers associated with investment in various sectors of Indian economy and to assess on the basis of this analysis the relative importance of housing vis-a-vis other sectors in the context of priorities in resource allocation.

The paper is divided into seven sectors. The first section is of introductory nature. The second section discusses the methodology of analysing the impact multipliers within the framework of input-output models. The third section examines income multipliers associated with investment in different sectors of Indian economy. The fourth section examines the available data on employment in housing and other sectors. The fifth section is devoted to an analysis of the employment multipliers for different sectors. The sixth section examines the growth and employment aspects of the national resource allocation policy. The seventh and final section summarises the main conclusions emerging from the analysis presented in the earlier sections.

II

## THE METHODOLOGY

Within the framework of an input-output model, it is possible to derive a set of income and employment multipliers associated with increased expenditure in different sectors. These multipliers provide a summary

measure of the total repercussions in terms of changes in
output, net income and employment in various sectors
generated by a given change in the final demand for the
output of a particular sector. In what follows, we examine
the concept and method of measuring the value of these
multipliers.

## Income Multiplier:

The size of the income multiplier indicates the
extent of income leverage that is obtained by increasing
the final demand in a given sector. Given an input-output
table, the income multiplier for $j^{th}$ sector may be defined
as the ratio of total direct and indirect, and sometimes
also induced, additions to income in response to an initial
expenditure of one unit in that sector.

The first step in calculating the income multiplier
consists in the computation of direct income generated
per unit of output in each sector. This is indicated by
the value added proportions for different sectors.[*2] Since

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[*2] Value added proportion indicates the ratio of value
added to gross output.

a unit of output produced in each sector requires inputs
from several other sectors, an increase in the final demand
for a given sector sets in motion a chain reaction of
increased demand for the output of various sectors. Thus,
the second round effects show the increase in output of
various sectors that is required for providing additional
inputs to the given sector whose final demand has undergone an
initial increase. Similarly, the third round effects show
the increase in output levels of different sectors required
to support the additional output generated in the second
round. This chain would continue till the new equilibrium
output levels are established.

The direct as well as indirect effects of a unit
increase in final demand of a given sector are captured
by the corresponding column of the Leontief Inverse in the
open input-output model.[3] The elements in the $j^{th}$ column of
the inverse matrix show the direct and indirect output
requirements of various sectors to sustain a unit increase

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[3]For details regarding the derivation and interpretation
of the Leontief Inverse Matrix see Bakul H. Dholakia,
'Inter-Industry Linkages of Housing Investment In India',
Working Paper 301, Indian Institute of Management, Ahmedabad,
November 1979. See also, Chiou-Shuang Yan, Introduction to
Input-Output Economics, Holt, Rinehart and Winston, New York;
1969, ch. 3

in the final demand of the $j^{th}$ sector.  Hence the total
direct and indirect incomes generated by one unit of final
demand can be computed by multiplying the elements of
the given column by the corresponding value added proportions
and aggregating them.  The income multipliers can then be
derived by dividing the total direct and indirect income
generated by the corresponding value added proportions for
each of the sectors.

The income multiplier obtained by the above method
captures the direct and indirect income effects of a unit
increase in final demand of a given sector based on the
assumption that, while the final demand of the given sector
changes, the final demand of all other sectors remains
unchanged.  In reality, however, the final demand of other
sectors may also change in response to any change in the
final demand of a given sector.

The inter-dependence in the final demand of different
sectors arises on account of two factors.  Firstly, an
increase in the output of different sectors may lead to
an increased demand for investment expenditure, which in
turn may produce a considerable effect on income.  This
effect becomes significant when the changes in final demand

and the resulting changes in sectoral output whose impact
has to be assessed are of a sizeable magnitude. For small
changes, as are generally postulated in the marginal analysis,
the total investment expenditures are not likely to change
significantly and the same can, therefore, be treated as
constant. The second factor which introduces an element of
interdependence in the final demand for different sectors operates
through the induced chain of secondary consumption responding
arising out of an initial increase in income. This is the
celebrated Keynesian multiplier effect which states that
an initial increase in the output and income levels leads
to subsequent induced increases in final consumption
expenditures which in turn generates secondary and tertiary
changes in the output and income levels bringing about a
series of chain reactions.

It follows from the above discussion that the income
multipliers associated with a given change in final demand
are of two types. The Type-I multiplier is based on
the elements of the Leontief Inverse in the open input-output
model and shows the total direct and indirect income
generation effect of a unit increase in the final demand

of a given sector assuming that the final demand of all
other sectors remains constant. The Type-II multiplier takes
into account not only the direct and indirect income effect
but also the induced income effect associated with the
consumption multiplier and indicates the sum total of
direct and indirect as well as induced income generated by a
unit increase in the final demand of a given sector making
due allowance for the induced increase in the final demand
of other sectors.

To measure the size of the Type-II income multiplier,
it is necessary to enlarge the technology matrix by incorporating
the household sector within the framework of intersectoral
transactions. To accomplish this, we can treat households
as the production sector whose output is net income or value
added and whose input requirement is consumption of goods
and services. In such a treatment we are essentially
relating income to consumption, the latter being considered
as the input necessary to produce the output in the form
of income. Thus, in the extended technology matrix ($A^*$),
one row and one column are added to represent the
household sector. The additional row represents the value
added proportions for the respective sectors, while the

additional column represents the proportion of total
income spent in the form of final consumption expenditure
on the products of the respective sectors.  It may be
noted that introduction of the household sector within
the framework of inter-industry transactions does not
imply, in the above case, a closed system because the
households do not spend all their income on consumption.
A part of the household income is saved and invested and a
part is also paid in the form of taxes which is in turn
spent by the government.[*4]

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 in 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

[*4]For a discussion of the closed as well as the open
input-output systems and also of the concepts and measurement
of income multipliers, see Chiou-Shuang Yan, Introduction to
Input-Output Economics, op.cit., chs. 3 and 5.  See also,
(1) G.S. Bhalla: 'Sectoral Income Multipliers in the Punjab
and India', Anvesak, Vol.I, No.2, December 1971; and
(2) A. Kundu, P.N. Mathur, G.S. Bhalla, K.S.C. Rao, Input-Output
Framework and Economic Analysis, Centre for the Study of
Regional Development, Jawaharlal Nehru University, New Delhi,
1976; ch. 5

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.

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, $L = (l_1, l_2, l_3, \ldots\ldots, l_n)$. As already noted earlier, 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 $(I-A)^{-1}$. Thus, if the elements of $j^{th}$ column of the inverse matrix are denoted by $c_{j,1}, c_{j,2}, \ldots\ldots, c_{j,n}$, then we can obtain the total direct and indirect employment

generated by one unit increase in the final demand of $j^{th}$ sector as:

$$E_j = l_1 c_{j,1} + l_2 c_{j,2} + \cdots + l_n c_{j,n}$$

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 Type-I is given by

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

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 noted earlier, 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 $(I-A^*)^{-1}$, 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:

$$E_j^* = l_1 c_{j,1}^* + l_2 c_{j,2}^* + \cdots + l_n c_{j,n}^*$$

where $c_{j,1}^*, \ldots, c_{j,n}^*$, are the elements of $j^{th}$ column of $(I-A^*)^{-1}$.

## Limitations of Impact Multipliers:

Two major limitations of the multipliers computed from the input-output table relating to a given reference year deserve special mention. Firstly, the multiplier effect indicated by the computed values of the income and employment multipliers would operate in actual practice only to the extent to which there are no supply constraints and other bottlenecks in the economy. If the economy suffers from severe shortages of certain critical inputs in the short run, increased expenditure in a given sector may fail to bring about the corresponding increase in the output levels of related industries and consequently the chain of direct and indirect income and employment generation might fail to materialise.

Another major limitations of the income as well as employment multipliers is that it looks at the problem of income or employment generation in isolation from other important problems such as a more efficient and optimal utilisation of resources, the need for import substitution or export promotion, and the objectives of reducing income

disparities or encouraging the production of certain specified industries. Thus, the industries having the highest multiplier effect might actually turn out to be relatively inefficient or less preferred when some of these other considerations are given due weightage.

## III

## INCOME MULTIPLIER

The Data:

To estimate the income multipliers for different sectors of the Indian economy, we have used the input-output table prepared by the Planning Commission for the year 1973-74, consisting of 66 sectors.[5] From the input-output data given in the Approach Paper for the Fifth Five Year Plan, we have derived 20 x 20 sector domestic technology matrix (A) by adopting the usual procedures of aggregation.[6]

[5] c.f. <u>A Technical Note On The Approach to the Fifth Plan Of India, 1974-79</u>, Planning Commission, Government of India, April 1973.

[6] The domestic technology matrix is derived by subtracting the elements of import coefficients matrix from the corresponding elements of the total coefficients matrix. For a discussion of the Input-Output data for the Indian economy and the need for aggregation of the 66 x 66 sector input-output table into the corresponding 20 x 20 sector table, see Bakul H. Dholakia, 'Inter-Industry Linkages of Housing Investment in India', <u>Working Paper No. 301</u>, Indian Institute of Management, Ahmedabad, November 1979

We have used the elements of inverse matrix $(I-A)^{-1}$ for deriving the direct and indirect income multipliers (Type-I) for each of twenty sectors.

To estimate the Type-II income multiplier which incorporates the direct and indirect as well as the induced effects of a change in sectoral final demand on the sectoral output levels, we have derived the private final consumption proportions as well as value added proportions for different sectors from the data provided in the Approach Paper. These proportions, which constitute an additional column and an additional row respectively in the 21 x 21 technology matrix $(A^*)$ obtained as an extension of the original 20 x 20 matrix, are presented in Appendix Table 1. Appendix Table 2 presents the inverse matrix corresponding to the extended 21 x 21 matrix $(I-A^*)^{-1}$.

Estimates of Income Multipliers:

The estimates of the Type-I and Type-II income multipliers computed for each of the twenty major sectors of Indian economy on the basis of the above information relating to the year 1973-74 are presented in Table 1.

Table 1

Income Multiplier For Different Sectors*

| Sector | Direct And Indirect Income Multiplier (Type-I) | Direct, Indirect And Induced Income Multiplier (Type-II) |
|---|---|---|
| 1 | 2 | 3 |
| 1. Agriculture And Allied Activities | 1.30 | 4.66 |
| 2. Mining | 1.13 | 4.04 |
| 3. Food Products, Beverages And Tobacco | 4.26 | 15.26 |
| 4. Textile Products | 2.10 | 7.53 |
| 5. Wood And Wood Products | 1.53 | 5.48 |
| 6. Paper And Printing | 2.65 | 9.49 |
| 7. Leather And Leather Products | 6.56 | 23.53 |
| 8. Rubber, Plastic And Petroleum Products | 2.81 | 10.08 |
| 9. Chemicals | 1.96 | 7.01 |
| 10. Non-Metallic Minerals | 1.56 | 5.58 |
| 11. Basic Metals And Metal Products | 2.09 | 7.48 |
| 12. Non-Electrical Machinery | 2.16 | 7.76 |
| 13. Electrical Machinery | 2.58 | 9.25 |
| 14. Transport Equipment And Parts | 2.43 | 8.70 |
| 15. Misc.Industries Including Repair Services | 3.67 | 13.14 |
| 16. Electricity | 1.93 | 6.93 |
| 17. Construction | 2.01 | 7.21 |
| 18. Railways | 1.43 | 5.14 |
| 19. Other Transport | 1.08 | 3.86 |
| 20. Other Services | 1.05 | 3.75 |

*Based On The Input-Output Table For The Year 1973-74

It is evident from the estimates given in Table 1 that the
value of income multiplier varies considerably from sector
to sector. Considering the Type-I income multiplier, we
find that there are nine sectors for which the value of
direct and indirect income multiplier is less than two, while
there are eight sectors for which the value of income multiplier
lies between two and three. Construction sector belongs to
the latter category, the value of its Type-I income
multiplier being 2.01. There are only three sectors whose
Type-I income multiplier exceeds 3. However, out of these
three, two sectors, viz., leather and leather products and
miscellaneous industries contribute less than one percent
to aggregate gross output and final demand in the economy
as a whole. In fact, out of those sectors which make
significant contribution to the national output and final
demand, there are only four sectors whose Type-I income
multiplier is found to be significantly greater than that
observed for construction sector. These four sectors are
food products, beverages and tobacco, rubber, plastic
and petroleum products, electrical machinery, and transport
equipment.

The value of Type-II income multiplier in the
construction sector turns out to be 7.21, as against the
corresponding value of 2.01 observed for the Type-I
multiplier. These values indicate that a unit increase in
the final expenditure on the construction sector generates
additional income in the economy as a whole which is more
than seven times as high as the direct income generated
within the construction sector itself, according to the
Type-II multiplier; and more than twice as high as the
direct income generated within the construction sector
according to the Type-I multiplier.

If we examine the value of Type-II multiplier in
the construction sector in relation to the value obtained
for other sectors, we find that there are only five sectors,
each making a significant contribution to the national
output and final demand, whose income multipliers are found
to be significantly greater than that observed for the
construction sector. These five sectors include non-electrical
machinery in addition to the four sectors already noted
above in connection with the comparative value of Type-I
multiplier.

Sectoral Expenditure and Income Generation:

The estimates of income multipliers for different
sectors constitute the basis for analysing the relationship
between changes in sectoral expenditure and the resulting
changes in the net income generated in different sectors.  It
would be interesting, for instance, to examine the total
direct and indirect additional income generated in the
economy as a whole in response to a one percent increase in the
final demand of a given sector.  Table 2 shows the total
additional income at 1971-72 prices in all sectors taken
together resulting from a one percent increase in the
final expenditure on each of the sectors keeping the final
expenditure in the remaining sectors unchanged.

It can be seen from the figures given in Table 2 that,
in terms of the direct and indirect income generation
induced by increased sectoral expenditure, construction
sector ranks third among the twenty major sectors of the
economy.  The total increase in the national income measured
at 1971-72 prices resulting from a one percent increase
in the final expenditure on construction sector turns out
to be about Rs. 41 crores.  The two sectors for which the

## Table 2

### Direct And Indirect Increase In National Income Generated By One Percent Increase In Sectoral Final Demand

| Sector | Increase In National Income (Rs.crores at 1971-72 prices) |
|---|---|
| 1 | 2 |
| 1. Agriculture And Allied Activities | 188.42 |
| 2. Mining | 2.18 |
| 3. Food Products, Beverages And Tobacco | 36.56 |
| 4. Textile Products | 32.13 |
| 5. Wood And Wood Products | 2.39 |
| 6. Paper And Printing | 1.91 |
| 7. Leather And Leather Products | 1.77 |
| 8. Rubber, Plastic And Petroleum Products | 2.49 |
| 9. Chemicals | 4.63 |
| 10. Non-Metallic Minerals | 1.58 |
| 11. Basic Metals And Metal Products | 7.6 |
| 12. Non-Electrical Machinery | 7.13 |
| 13. Electrical Machinery | 5.76 |
| 14. Transport Equipment And Parts | 6.36 |
| 15. Misc.Industries Including Repair Services | 4.12 |
| 16. Electricity | 2.00 |
| 17. Construction | 40.82 |
| 18. Railways | 7.48 |
| 19. Other Transport | 8.80 |
| 20. Other Services | 82.38 |

corresponding figures of income generation induced by one percent increase in the final demand is found to be higher than what is observed in the case of construction are agriculture and allied activities (Rs. 188 crores) and other services (Rs. 82 crores). Besides these three sectors there are two other sectors where the one percent increase in the final expenditure will bring about a significant increase in national income, viz., food products, beverages and tobacco (Rs. 37 crores) and textile products (Rs. 32 crores). It is interesting to note in this connection that besides these two sectors, one percent increase in the final demand of each of the remaining eleven sectors belonging to the broad category of Manufacturing Sector taken together would bring about a total increase in national income of less than Rs. 46 crores indicating an average income generation of the order of Rs. 4 crores per sector.

It follows from the above analysis of income multipliers associated with final expenditure in different sectors of the Indian economy that increased investment in the construction sector has a significant impact on the level of national income. It is also evident that the

income generating potential of housing investment can be
regarded as fairly high especially in relation to that of
comparable investment expenditure in several other sectors
of the economy

IV

## EMPLOYMENT IN HOUSING

The most comprehensive source of information on
employment in different sectors of Indian economy is the
population census. The economic tables of the census
provide information on the total number of workers in each
state engaged in major sectoral categories classified by
sex and rural-urban residence. While construction is one
of the major sectoral categories distinguished in the
census, the information of the working force in housing
construction is not directly available. We have estimated
number of workers engaged in construction of residential
dwellings from the available information on detailed
industrial classification of persons at work other than
cultivation. To ensure comparability of geographical

coverage of different states between the census years 1961 and 1971, we have adjusted the reported 1961 census figures for the states of Old Punjab, Himachal Pradesh and Assam by collecting and reclassifying the information at the district level. The estimates of employment in housing so derived for different states for the census years 1961 and 1971 are presented in Appendix Tables 3, 4 and 5.

To examine the employment in housing in relation to other sectors of the economy, it is necessary to compute the proportions of employment in housing as well as construction activity in the total working force. These proportions bring out the relative importance of housing sector in the national economy viewed from the angle of employment. We have examined three different proportions in this context: (i) the proportion of total working force in the economy as a whole employed in the construction sector; (ii) the proportion of total working force employed in housing sector; (iii) the ratio of working force in housing sector to the working force in construction activity as a whole. Tables 3 to 5 indicate these proportions obtained for different states for the years 1961 and 1971.

Table 3

Proportion Of Construction Workers In Total Working Force

| | | | | | (Figures in Persons) | |
| State | 1961 | | | 1971 | | |
| | Rural Areas· | Urban Areas | All Areas | Rural Areas | Urban Areas | All Areas |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Andhra Pradesh | 0.79 | 3.99 | 1.18 | 1.01 | 4.99 | 1.50 |
| Assam | 0.76 | 1.94 | 0.84 | 0.66 | 3.89 | 0.97 |
| Bihar | 0.38 | 3.08 | 0.56 | 0.27 | 3.45 | 0.56 |
| Gujarat | 0.76 | 2.38 | 1.06 | 0.61 | 3.94 | 1.43 |
| Haryana | 0.98 | 6.46 | 1.76 | 1.52 | 3.37 | 1.94 |
| Himachal Pradesh | 1.50 | 5.12 | 1.67 | 3.16 | 16.14 | 4.00 |
| Jammu & Kashmir | 0.35 | 2.23 | 0.57 | 1.60 | 5.13 | 2.26 |
| Karnataka | 0.99 | 5.68 | 1.77 | 1.17 | 4.15 | 1.79 |
| Kerala | 1.17 | 1.83 | 1.26 | 1.61 | 2.43 | 1.73 |
| Madhya Pradesh | 0.53 | 5.65 | 1.02 | 0.44 | 3.22 | 0.79 |
| Maharashtra | 0.84 | 2.73 | 1.24 | 0.85 | 3.27 | 1.50 |
| Orissa | 0.21 | 3.82 | 0.40 | 0.38 | 2.47 | 0.55 |
| Punjab | 1.54 | 4.54 | 2.16 | 1.55 | 3.42 | 1.98 |
| Rajasthan | 0.58 | 5.97 | 1.14 | 0.71 | 4.35 | 1.24 |
| Tamil Nadu | 0.84 | 3.32 | 1.34 | 0.96 | 3.42 | 1.59 |
| Uttar Pradesh | 0.47 | 3.18 | 0.74 | 0.36 | 2.36 | 0.61 |
| West Bengal | 0.68 | 3.12 | 1.31 | 0.54 | 2.29 | 1.00 |
| Union Territories & Other States | 1.01 | 4.30 | 1.97 | 1.57 | 5.48 | 3.13 |
| ALL INDIA | 0.67 | 3.65 | 1.09 | 0.74 | 3.50 | 1.23 |

Source:  i) Census Of India, 1961, Volume I – India, Part II-B(i)
        ii) Census Of India, 1971, Series I – India, Part II-B(i)

Table 4

## Proportion Of Workers In Construction Of Residential Dwellings In Total Working Force

(Figures in Percent)

| State | 1961 | | | 1971 | | |
|---|---|---|---|---|---|---|
| | Rural Areas | Urban Areas | All Areas | Rural Areas | Urban Areas | All Areas |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Andhra Pradesh | 0.36 | 2.57 | 0.63 | 0.50 | 2.96 | 0.85 |
| Assam | 0.27 | 1.53 | 0.36 | 0.23 | 1.49 | 0.35 |
| Bihar | 0.23 | 2.50 | 0.38 | 0.14 | 2.03 | 0.32 |
| Gujarat | 0.26 | 2.17 | 0.62 | 0.34 | 2.75 | 0.93 |
| Haryana | 0.38 | 3.80 | 0.87 | 0.73 | 3.00 | 1.13 |
| Himachal Pradesh | 0.19 | 2.41 | 0.29 | 0.37 | 1.81 | 0.46 |
| Jammu & Kashmir | 0.09 | 1.23 | 0.22 | 0.60 | 3.64 | 1.11 |
| Karnataka | 0.39 | 4.36 | 1.14 | 0.56 | 3.66 | 1.20 |
| Kerala | 0.74 | 1.47 | 0.83 | 1.22 | 2.17 | 1.36 |
| Madhya Pradesh | 0.17 | 3.79 | 0.51 | 0.15 | 2.41 | 0.43 |
| Maharashtra | 0.32 | 2.24 | 0.73 | 0.32 | 2.60 | 0.94 |
| Orissa | 0.11 | 3.36 | 0.29 | 0.15 | 0.59 | 0.19 |
| Punjab | 0.62 | 2.63 | 1.04 | 0.98 | 2.59 | 1.35 |
| Rajasthan | 0.33 | 5.36 | 0.85 | 0.54 | 4.06 | 1.05 |
| Tamil Nadu | 0.49 | 2.90 | 0.97 | 0.58 | 3.09 | 1.22 |
| Uttar Pradesh | 0.22 | 2.37 | 0.44 | 0.26 | 2.17 | 0.50 |
| West Bengal | 0.45 | 2.70 | 1.02 | 0.36 | 1.45 | 0.55 |
| Union Territories & Other States | 0.69 | 3.95 | 1.64 | 0.72 | 4.58 | 2.20 |
| ALL INDIA | 0.32 | 2.89 | 0.60 | 0.39 | 2.66 | 0.79 |

Sources:  i) Census Of India, 1961, Volume I – India, Part II-B(i)
         ii) Census Of India, 1971, Series I – India, Part II-B(i)
        iii) Census Of India, 1971, Series I – India, Part II-B(iii)

## Table 5

### Proportion Of Total Construction Workers Engaged
### In The Construction Of Residential Dwellings

(Figures in Percent)

| State | 1961 | | | 1971 | | |
|---|---|---|---|---|---|---|
| | Rural Areas | Urban Areas | All Areas | Rural Areas | Urban Areas | All Areas |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Andhra Pradesh | 45.70 | 64.48 | 53.38 | 49.17 | 59.35 | 53.77 |
| Assam | 35.81 | 79.31 | 42.66 | 34.12 | 38.22 | 35.68 |
| Bihar | 60.70 | 81.05 | 68.24 | 53.01 | 58.73 | 56.21 |
| Gujarat | 34.87 | 91.27 | 58.56 | 55.99 | 69.82 | 65.39 |
| Haryana | 39.33 | 58.87 | 49.60 | 47.89 | 89.17 | 61.15 |
| Himachal Pradesh | 12.44 | 47.06 | 17.45 | 11.64 | 11.19 | 11.52 |
| Jammu & Kashmir | 25.53 | 55.00 | 39.08 | 35.75 | 70.94 | 49.03 |
| Karnataka | 39.68 | 85.66 | 64.32 | 47.68 | 88.33 | 67.18 |
| Kerala | 63.09 | 80.43 | 66.48 | 76.06 | 89.43 | 78.88 |
| Madhya Pradesh | 31.89 | 67.07 | 50.55 | 33.84 | 74.76 | 54.69 |
| Maharashtra | 38.34 | 81.92 | 58.91 | 38.07 | 79.60 | 62.59 |
| Orissa | 54.00 | 88.05 | 71.52 | 40.17 | 23.74 | 34.13 |
| Punjab | 40.32 | 57.94 | 48.01 | 63.44 | 75.73 | 68.35 |
| Rajasthan | 56.00 | 89.86 | 74.36 | 75.77 | 93.35 | 84.77 |
| Tamil Nadu | 58.34 | 87.35 | 72.87 | 60.49 | 90.46 | 76.99 |
| Uttar Pradesh | 47.22 | 74.46 | 59.09 | 71.65 | 92.09 | 81.57 |
| West Bengal | 65.53 | 86.47 | 78.32 | 67.35 | 63.23 | 64.64 |
| Union Territories & Other States | 68.09 | 91.69 | 83.07 | 46.24 | 83.56 | 72.49 |
| ALL INDIA | 46.90 | 79.17 | 62.02 | 52.76 | 75.96 | 64.47 |

Source: Same as Table 4.

It can be seen from Table 3 that, on an average, a little more than one percent of the working force is engaged in the construction activity. There are, however, marked variations in this proportion among different states. Bihar, Orissa and Uttar Pradesh are the states where the proportion of construction workers in total working force is significantly below one percent, while Haryana, Himachal Pradesh, Karnataka and Punjab are the states where this proportion is found to be significantly greater than one percent in both 1961 as well as 1971. On the whole, the proportion of working force engaged in construction is found to be much higher in urban areas as compared to the rural areas in almost every state. Moreover, this proportion seems to have increased in both rural as well as urban areas in most states during the period 1961 to 1971.

Tables 4 and 5 indicate the share of housing in the total working force in the economy as a whole and also in the working force engaged in construction sector. It is evident from the figures given in Table 4 that the general observations regarding the rural-urban differences and the trends in the proportion of construction workers in total

working force made above on the basis of Table 3 apply to
the proportion of workers engaged in housing construction also.

The degree of comparative changes in the proportions
of total working force engaged in construction activity as
a whole on the one hand and the housing construction on the
other in rural and urban areas shows some differences. As a
result, the share of housing construction in the working
force engaged in construction activity has undergone changes
between 1961 and 1971. For instance, we find that the share
of housing in total construction workers has increased in
rural areas and decreased in the urban areas of several
states during the period 1961 to 1971. It is also
interesting to observe that the proportion of construction
workers engaged in housing is much higher in urban areas
as compared to the rural areas of many states.

On the whole about 62 percent of the construction
workers were engaged in housing in the year 1961, the
corresponding figure in 1971 being higher at 64.5 percent.
This proportion shows a significant increase during the
decade 1961-71 in seven states viz. Gujarat, Haryana,
Jammu and Kashmir, Kerala, Punjab, Rajasthan and Uttar
Pradesh, whereas it shows a significant decrease in Bihar,

Orissa and West Bengal.   We can also notice a high degree

of interstate variation in this proportion both in the year

1961 as well as 1971.


V


EMPLOYMENT MULTIPLIERS

In this section, we have made an attempt to estimate

the employment multipliers for different sectors of Indian

economy within the framework of input-output model for 1973-74

and examine on the basis of these multipliers the relative

position of construction vis-a-vis other sectors with regard

to employment generation.

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 relating to 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 1973-74 are not readily available, we
have estimated the same from the information available from
different sources. A broad methodology that we have followed
for deriving the estimates is as follows.

For estimating the sectoral employment, we can divide
the twenty major sectors of the economy into four broad
categories: (a) Organised sector including mining, electricity
and railways; (b) Semi-organised sectors including construction,
other transport and services; (c) Manufacturing sector
including thirteen sectors; and (d) Agriculture and Allied
activities. The estimates of employment in each of these
sectors for the benchmark year 1970-71 is obtained directly
from the 1971 census.[*7] The figures relating to the sectors
belonging to the first category obtained for the year 1970-71
are carried forward to the year 1973-74 using the index
number of employment in each of the respective sectors for
the year 1973-74 (with 1970-71 as the base year) computed
from the information relating to the employment in the

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[*7] Census of India, 1971, Series I--India, Part II -B(iii)

organised sector.[8]

For the sectors belonging to the second category we have assumed that the growth of employment in the unorganised part of each of the respective sectors between 1970-71 and 1973-74 is the same as the corresponding growth observed in the organised component of each sector, the latter being obtained from the same source which provides information on employment in the organised sector classified by various sectoral groups. The estimates relating to the third category of sectors mentioned above are computed by combining the information on employment and value added in each of the thirteen sectors available from Annual Survey of Industries and National Accounts Statistics.[9] The estimates of employment in Agriculture and Allied Activities for the year 1973-74 are obtained by carrying the 1970-71 figures forward with the help of the index of rural population.

The estimates of sectoral employment so derived for the year 1973-74 are presented in Table 6 along with the estimates of sectoral gross output. Labour coefficients for different sectors derived as the ratio of total employment

[8] Economic Survey, 1978-79

[9] c.f. (1) Annual Survey of Industries, 1970 and 1973-74, (2) National Accounts Statistics 1970-71 - 1975-76, January 1978, Central Statistical Organisation, Government of India.

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, the highest degree of direct employment generation being 5,251 persons per unit of gross output (Rupees one crore at 1971-72 prices) in agriculture and allied activities while the lowest being 262 persons in chemicals. However, in the ultimate analysis, what matters is the total employment generation effect associated with the creation of additional direct employment in a given sector, which is indicated by the employment multipliers.

## Estimates Of Employment Multipliers:

The employment multipliers of Type-I and Type-II computed for different sectors of the Indian economy on the basis of input-output model for the year 1973-74 are presented in Table 7.[*10] 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

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[*10] The extent of employment generation underline the type-I and type-II employment multipliers, measured in absolute terms, is shown in Appendix Table 6.

Table 7

Employment Multipliers for Different Sectors[*]

| Sector | Direct And Indirect Employment Multiplier Type-I | Direct, Indirect And Induced Employment Multiplier Type-II |
|---|---|---|
| 1 | 2 | 3 |
| 1. Agriculture And Allied Activities | 1.22 | 3.67 |
| 2. Mining | 1.13 | 7.59 |
| 3. Food Products, Beverages And Tobacco | 4.77 | 18.21 |
| 4. Textile Products | 2.51 | 11.88 |
| 5. Wood And Wood Products | 1.30 | 3.84 |
| 6. Paper And Printing | 2.34 | 11.74 |
| 7. Leather And Leather Products | 1.91 | 5.02 |
| 8. Rubber, Plastic And Petroleum Products | 4.63 | 34.12 |
| 9. Chemicals | 4.58 | 47.07 |
| 10. Non-Metallic Minerals | 1.47 | 9.12 |
| 11. Basic Metals And Metal Products | 2.75 | 21.03 |
| 12. Non-Electrical Machinery | 2.40 | 19.18 |
| 13. Electrical Machinery | 4.46 | 42.20 |
| 14. Transport Equipment And Parts | 2.90 | 24.48 |
| 15. Misc. Industries Including Repair Services | 1.53 | 5.08 |
| 16. Electricity | 2.55 | 23.13 |
| 17. Construction | 3.96 | 29.25 |
| 18. Railways | 1.65 | 14.43 |
| 19. Other Transport | 1.07 | 7.66 |
| 20. Other Services | 1.04 | 6.67 |

[*] Based On The Input-Output Table for the year 1973-74

as a whole) for the construction sector is around four,
which can be considered fairly high in relation to the
corresponding multiplier values observed in other sectors.
In fact, on the basis of type-I employment multiplier,
construction ranks fifth among the twenty major sectors
of the economy, the four sectors having a multiplier value
significantly higher than that of construction being food
products, beverages and tobacco, rubber, plastic and
petroleum products, chemicals, and electrical machinery.
The employment multiplier of four 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 as much as four times higher than the direct
employment generated in the construction sector itself.

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 also on the total employment generation.

As shown in Table 7, the type-II employment multiplier
for the construction is as high as 29.25. This value
indicates that an additional unit of final expenditure on
construction sector induces overall employment generation in
the economy by an extent which is more than twenty-nine
times the direct employment generated in the construction
sector itself. It is evident from Table 7 that there are
only three sectors whose Type II employment multiplier
is found to be higher than that of the construction sector.
These sectors are rubber, plastic and petroleum products,
chemicals, and electrical machinery. Thus, the construction
ranks fourth among the twenty major sectors of the economy
in terms of induced employment multiplier.

Sectoral Expenditure and Employment Generation:

The estimates of employment multipliers for different
sectors constitute the basis for analysing relationship
between changes in sectoral expenditure and the resulting
changes in the total employment generated in different
sectors. It is an interesting exercise to examine the total
direct and indirect as well as induced additional employment
generated in the economy as a whole in response to one
percent increase in the final demand of each of the given

sectors. <u>Table 8</u> shows the total additional employment
generated in the economy as a result of one percent increase
in the final expenditure of a given sector computed on
the basis of Type-I as well as Type-II employment multipliers.

It is evident from the estimates presented in Table 8
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 one percent 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, the total direct and indirect
increase in employment resulting from one percent increase
in the final expenditure on the construction sector is
83 thousand. 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 find that the total
employment generation resulting from one percent increase
in the final expenditure on construction is as high as
around 614 thousand.

There are only three sectors for which the total
increase in employment resulting from a one percent increase

Table 8

Total Employment Generation Induced By One Percent
Increase In Sectoral Final Demand

| Sector | (Figures in '000 Persons) | |
| | Direct And Indirect Increase In Employment | Direct, Indirect And Induced Increase In Employment |
| --- | --- | --- |
| 1 | 2 | 3 |
| 1. Agriculture And Allied Activities | 1221.1 | 3671.5 |
| 2. Mining | 5.0 | 33.4 |
| 3. Food Products, Beverages And Tobacco | 168.8 | 644.2 |
| 4. Textile Products | 112.1 | 529.9 |
| 5. Wood And Wood Products | 15.8 | 46.8 |
| 6. Paper And Printing | 6.2 | 31.1 |
| 7. Leather And Leather Products | 14.2 | 37.3 |
| 8. Rubber, Plastic And Petroleum Products | 5.1 | 37.4 |
| 9. Chemicals | 6.5 | 66.7 |
| 10. Non-Metallic Minerals | 4.0 | 24.7 |
| 11. Basic Metal And Metal Products | 11.7 | 111.2 |
| 12. Non-Electrical Machinery | 13.2 | 106.0 |
| 13. Electrical Machinery | 8.9 | 83.8 |
| 14. Transport Equipment And Parts | 11.1 | 93.8 |
| 15. Misc. Industries Including Repair Services | 23.1 | 76.7 |
| 16. Electricity | 3.2 | 29.2 |
| 17. Construction | 83.0 | 613.8 |
| 18. Railways | 12.5 | 109.8 |
| 19. Other Transport | 18.7 | 133.2 |
| 20. Other Services | 198.9 | 1270.2 |

in sectoral expenditure is found to be significantly greater
than that for the construction sector. These sectors are
agriculture and allied activities, food products, beverages
and tobacco, and other services. Thus, it is evident that
increase in the expenditure on the construction sector would
go a long way to make a significant contribution to overall
employment generation in the economy.


VI


## PRIORITY FOR HOUSING INVESTMENT
## IN SECTORAL RESOURCE ALLOCATION

Formulation of resource allocation policy depends
primarily on the basic objectives of policy making. The
major objectives of India's economic policy as they have
emerged in the course of observed growth experience of
the seventies are: (a) acceleration of the pace of economic
growth; (b) employment generation; and (c) redistribution
of income in favour of lower income groups to bring about
a reduction in the income and consumption inequalities.

Accordingly, the priority for investment expenditure in different sectors, given the overall resource constraint, can be determined by analysing the impact of additional expenditure in different sectors, on growth, employment and redistribution. On the basis of the analysis presented in the preceding sections of this paper, we have examined the first two aspects of resource allocation policy in this section.

## Growth Versus Employment Aspect of Resource Allocation:

The estimates of income and employment multipliers presented in Tables 1 and 7 above indicate the relative magnitude of the impact of additional expenditure of one unit in different sectors on the process of income generation and employment generation respectively. It would be interesting to examine the relative strength of income generation vis-a-vis employment generation of the additional expenditure in each of the given sectors. This exercise would involve a comparison of the values of income and employment multipliers for each sector. This comparison is attempted in Table 9.[*11]

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[*11]The classification given in Table 9 is based on the assumption that, for Type-I multipliers values greater than two can be considered high so far as income multiplier is concerned, and values greater than three can be regarded as high so far as the employment multiplier is concerned. Similarly, for Type-II multipliers, we have assumed that for income multipliers values greater than seven can be considered as high while for employment multipliers values greater than twenty can be considered as fairly high.

Table 9

Classification of Sectors Based on the Values of
Income Multiplier Vis-a-vis Employment Multiplier

Classification Based on Type-I Multipliers

|  | Employment Multiplier | |
|---|---|---|
|  | High values (Greater than Three) | Low values (Less than Three) |
| **Income Multiplier** **High Value** (Greater than Two) | 1. Food Products, Beverages and Tobacco<br>2. Rubber, Plastic and Petroleum Products<br>3. Electrical Machinery<br>4. Construction (Including Housing) | 1. Textile Products<br>2. Paper and Printing<br>3. Leather and Leather Products<br>4. Basic Metals and Metal Products<br>5. Non-Electrical Machinery<br>6. Transport Equipment<br>7. Miscellaneous Industries |
| **Low Value** (Less than Two) | 1. Chemicals | 1. Agriculture and Allied Activities<br>2. Mining<br>3. Wood and Wood Products<br>4. Non-Metallic Minerals<br>5. Electricity<br>6. Railways<br>7. Other Transport<br>8. Other Services |

<u>Table 9 (concluded)</u>

<u>Classification Based on Type-II Multipliers</u>

<u>Employment Multipliers</u>

|  | <u>High Values</u><br>(Greater<br>than Twenty) | <u>Low Values</u><br>(Less<br>than Twenty) |
|---|---|---|
| <u>High Values</u><br>(Greater<br>than Seven) | 1. Rubber, Plastic and<br>   Petroleum Products<br>2. Chemicals<br>3. Basic Metals<br>4. Electrical Machinery<br>5. Transport Equipment<br>6. Construction<br>   (Including Housing) | 1. Food Products,<br>   Beverages and Tobacco<br>2. Textile Products<br>3. Paper and Printing<br>4. Leather and Leather<br>   Products<br>5. Electrical Machinery<br>6. Miscellaneous<br>   Industries |
| <u>Low Values</u><br>(Less<br>than Seven) | 1. Electricity | 1. Agriculture and<br>   Allied Activities<br>2. Mining<br>3. Wood and Wood Products<br>4. Non-metallic minerals<br>5. Railways<br>6. Other Transports<br>7. Other Services |

Income Multipliers

It is evident from the classification given in
Table 9 that, out of twenty major sectors of the economy,
only four sectors have high values for both income as well
as employment multipliers according to Type-I measure,
construction being one of them. As against this, there
are as many as eight sectors for which the values of both
multipliers are found to be low. The remaining sectors
show lower values for one of the two multipliers,
especially the employment multiplier.

According to the classification based on Type-II
multipliers, we found that there are six sectors showing
high values for both multipliers, construction being one
of them. Similarly, there are seven sectors for which the
values of both the multipliers are found to be low. It is
interesting to note that there are only three sectors
which show relatively high values of both income as well
as employment multipliers based on Type-I as well as
Type-II classifications. These sectors are rubber,
plastic and petroleum products, electrical machinery, and
construction. Out of these three sectors, construction

makes the greatest contribution to gross output as well as
final demand in the economy as a whole. The share of
construction is 7.24 percent in aggregate gross output
and 9.12 percent in aggregate final demand, the corresponding
figures for rubber, plastic and petroleum products being
1.35 percent and 0.72 percent respectively, and for electrical
machinery, 1.44 percent and 1.41 percent, respectively.

Thus, considering the objectives of accelerating
growth and simultaneously generating employment, construction
including housing appears to be the leading sector in terms
of both the values of income and employment multipliers as
well as its absolute contribution to aggregate final output
and final demand. It follows, therefore, that construction
in general and housing in particular needs to be accorded
a very high priority in overall resource allocation policy.

VII

## SUMMARY AND CONCLUSIONS

Finally, we may summarise the major findings of our study. The main conclusions that can be drawn from the above analysis are as follows:

1. The magnitude of Type-I income multiplier for the construction sector is 2.01 and the corresponding magnitude for Type-II income multiplier is 7.21. Thus, a unit increase in the housing investment would generate additional income in the economy as a whole which is more than twice as high as the direct income generated within the housing sector itself, considering the direct and indirect income generation. The total income generation would be more than seven times higher than the direct income generated within the housing sector if we consider induced changes in the final demand for other sectors also.

2. A comparison of the magnitudes of income multipliers associated with housing investment vis-a-vis investment in other sectors shows that the former

ranks fairly high among the twenty major sectors of the economy. Among the sectors which make a significant contribution to the national output and final demand, there are only four sectors whose Type-I income multiplier is found to be significantly greater than that observed for the construction sector, the corresponding figure based on a comparison of the Type-II income multipliers being **five**.

3.  One percent increase in the housing expenditure (from the level observed in 1973-74) would generate a total direct and indirect increase in national income measured at 1971-72 prices of about Rs. 41 crores. Comparative figures computed for other sectors show that construction sector including housing ranks third among the twenty major sectors of the economy on the basis of direct and indirect income generation potential measured in absolute terms.

4.  On the whole, a little less than two-thirds of the working force in the construction sector is engaged in housing construction. This proportion

is found to be much higher in the urban areas as compared to the rural areas in almost every state. For the economy as a whole, the proportion of total working force engaged in construction is 1.23 percent, the corresponding proportion for the housing construction being 0.79 percent, according to the figures available for the census year 1971.

5.    The Type-I employment multiplier for the construction sector is found to be 3.96. The Type-II employment multiplier for the construction sector is found to be as high as 29.25. Thus, an increase in the housing investment by one unit would generate direct and indirect additional employment in the economy as a whole by an extent which is almost four times greater than the direct employment generated in the housing sector itself. Similarly, if we consider the induced changes in the final expenditure of other sectors also, the extent of employment generation turns out to be more than 29 times as high as the direct employment generation in the housing sector itself. In terms of the magnitudes of

Type-II employment multipliers, construction sector ranks fourth among the twenty sectors of the economy.

6. The extent of absolute increase in employment in the economy as a whole generated by a one percent increase in the housing investment is around 83 thousand if we consider the direct and indirect increase in employment. It would be as high as around 6.14 thousand if we also consider the impact of induced changes in the final demand for other sectors. A comparison of the corresponding values obtained for other sectors shows that the construction sector including housing ranks fourth in terms of the total increase in employment measured in absolute terms resulting from the one percent increase in sectoral expenditure.

7. One of the major considerations in the formulation of resource allocation policy is to assess the relative strength of income generation vis-a-vis employment generation impact of additional

sectoral expenditure. Viewed from this angle, construction including housing is one of the three sectors for which the values of both income as well as employment multipliers are simultaneously found to be fairly high on the basis of Type-I as well as Type-II measures. Thus, housing investment induces both income and employment generation by a significant extent especially in relation to the corresponding effect of investment in most of the other sectors.

The above analysis clearly shows that an increase in housing investment would go a long way to make a significant contribution to the overall income and employment generation in Indian economy. From the comparative viewpoint, the extent of income generation and employment generation potential of additional housing expenditure is found to be more powerful than that of the comparable increase in the final expenditure in many sectors of the economy. It follows, therefore, that a national resource allocation policy based on the twin objectives of accelerating growth and simultaneously generating employment should necessarily accord a high priority to the housing sector.

Appendix Table  1


Value Added And Consumption Proportions, 1973-74

| Sector | Value Added* Proportions | Proportion of Income Spent on the Final Consumption of Sectoral Output |
|---|---|---|
| 1 | 2 | 3 |
| 1. Agriculture And Allied Activities | 0.759281 | 0.413148 |
| 2. Mining | 0.875576 | 0.004030 |
| 3. Food Products, Beverages And Tobacco | 0.230769 | 0.073801 |
| 4. Textile Products | 0.446492 | 0.061417 |
| 5. Wood And Wood Products | 0.645201 | 0.004023 |
| 6. Paper And Printing | 0.293737 | 0.003398 |
| 7. Leather And Leather Products | 0.143723 | 0.001628 |
| 8. Rubber, Plastic And Petroleum Products | 0.267332 | 0.004668 |
| 9. Chemicals | 0.437085 | 0.009382 |
| 10. Non-Metallic Minerals | 0.617272 | 0.002940 |
| 11. Basic Metals And Metal Products | 0.444696 | 0.002630 |
| 12. Non-Electrical Machinery | 0.413496 | 0.000423 |
| 13. Electrical Machinery | 0.345098 | 0.003466 |
| 14. Transport Equipment And Parts | 0.373711 | 0.001403 |
| 15. Miscellaneous Industries Including Repair Services | 0.246643 | 0.007178 |
| 16. Electricity | 0.513819 | 0.004009 |
| 17. Construction | 0.485124 | 0.017642 |
| 18. Railways | 0.692263 | 0.016721 |
| 19. Other Transport | 0.891510 | 0.017285 |
| 20. Other Services | 0.953442 | 0.088469 |

*Ratio of Value Added to Gross Output.

Appendix Table 2

Elements Of The Extended Inverse Matrix Indicating The Direct, Indirect And Induced Output Effects In Changes In Final Demand

| Sector | Agriculture And Allied Activities | Mining | Food Products, Beverages And Tobacco | Textile Products | Wood And Wood Products | Paper And Printing |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1. Agriculture And Allied Activities | 3.138960 | 1.965230 | 2.463750 | 2.105430 | 2.129070 | 1.678070 |
| 2. Mining | 0.028983 | 1.037250 | 0.031804 | 0.032488 | 0.030798 | 0.037365 |
| 3. Food Products,Beverages and Tobacco | 0.293021 | 0.290504 | 1.365170 | 0.278433 | 0.290977 | 0.235657 |
| 4. Textile Products | 0.260660 | 0.263819 | 0.265698 | 1.398310 | 0.263108 | 0.221056 |
| 5. Wood And Wood Products | 0.018964 | 0.018945 | 0.023122 | 0.018855 | 1.054800 | 0.016013 |
| 6. Paper And Printing | 0.020958 | 0.023385 | 0.030770 | 0.027478 | 0.025354 | 1.062820 |
| 7. Leather And Leather Products | 0.005906 | 0.005995 | 0.005873 | 0.005687 | 0.005900 | 0.004653 |
| 8. Rubber, Plastic And Petroleum Products | 0.040931 | 0.067148 | 0.045217 | 0.044670 | 0.051090 | 0.045344 |
| 9. Chemicals | 0.138601 | 0.138490 | 0.136964 | 0.175206 | 0.163240 | 0.269162 |
| 10. Non-Metallic Minerals | 0.035453 | 0.042650 | 0.046612 | 0.035922 | 0.036602 | 0.036452 |
| 11. Basic Metals And Metal Products | 0.059742 | 0.073409 | 0.082939 | 0.104636 | 0.061746 | 0.054564 |
| 12. Non-Electrical Machinery | 0.002665 | 0.016198 | 0.002756 | 0.004443 | 0.002701 | 0.002357 |
| 13. Electrical Machinery | 0.020293 | 0.020533 | 0.020989 | 0.019727 | 0.020543 | 0.017209 |
| 14. Transport Equipment And Parts | 0.017050 | 0.017279 | 0.019235 | 0.017432 | 0.018315 | 0.016523 |
| 15. Misc.Industries Including Reapair Services | 0.026887 | 0.034292 | 0.027407 | 0.025968 | 0.027345 | 0.021984 |
| 16. Electricity | 0.069270 | 0.093154 | 0.076169 | 0.084635 | 0.071925 | 0.105019 |
| 17. Construction | 0.113865 | 0.106819 | 0.120916 | 0.110219 | 0.116414 | 0.101624 |
| 18. Railways | 0.087272 | 0.087342 | 0.092806 | 0.087689 | 0.089514 | 0.094852 |
| 19. Other Transport | 0.090079 | 0.092584 | 0.102975 | 0.101860 | 0.117469 | 0.113509 |
| 20. Other Services | 0.583909 | 0.553126 | 0.786356 | 0.625717 | 0.632013 | 0.565544 |
| 21. Household | 3.541330 | 3.541350 | 3.520530 | 3.360490 | 3.536570 | 2.787460 |

Source: A Technical Note On The Approach To The Fifth Plan Of India, 1974-79, Planning Commission, Government of India, 1973.

Appendix Table 2 (continued)

| Sector Number | Leather And Leather Products | Rubber, Plastic And Petroleum Products | Chemicals | Non-Metallic Minerals | Basic Metals And Metal Products | Non-Electrical Machinery | Electrical Machinery |
|---|---|---|---|---|---|---|---|
| | 7 | 9 | 10 | 11 | 12 | 13 | 14 |
| 1 | 2.404200 | 1.542080 | 1.732330 | 1.917030 | 1.841460 | 1.785810 | 1.770970 |
| 2 | 0.045511 | 0.139883 | 0.054165 | 0.033669 | 0.071377 | 0.038018 | 0.046687 |
| 3 | 0.312560 | 0.234535 | 0.278716 | 0.282928 | 0.273110 | 0.263637 | 0.262565 |
| 4 | 0.262922 | 0.291378 | 0.242097 | 0.286316 | 0.247917 | 0.248357 | 0.246958 |
| 5 | 0.021444 | 0.015316 | 0.019226 | 0.020884 | 0.018731 | 0.020924 | 0.022990 |
| 6 | 0.033532 | 0.020752 | 0.026722 | 0.025308 | 0.025378 | 0.027295 | 0.029096 |
| 7 | 1.024660 | 0.004619 | 0.005129 | 0.005757 | 0.005557 | 0.005356 | 0.005331 |
| 8 | 0.152731 | 1.116580 | 0.073751 | 0.063481 | 0.058456 | 0.061853 | 0.089546 |
| 9 | 0.263348 | 0.203227 | 1.298070 | 0.144276 | 0.131304 | 0.125231 | 0.138359 |
| 10 | 0.063886 | 0.032264 | 0.069169 | 1.081310 | 0.048927 | 0.039550 | 0.081315 |
| 11 | 0.069319 | 0.063545 | 0.079174 | 0.105031 | 1.392710 | 0.235159 | 0.362535 |
| 12 | 0.002848 | 0.003844 | 0.002782 | 0.003547 | 0.004919 | 1.098930 | 0.005499 |
| 13 | 0.021447 | 0.016066 | 0.013420 | 0.020515 | 0.020126 | 0.043063 | 1.128500 |
| 14 | 0.013392 | 0.015279 | 0.017142 | 0.019130 | 0.019263 | 0.020554 | 0.018406 |
| 15 | 0.027027 | 0.021860 | 0.026847 | 0.027015 | 0.025959 | 0.024605 | 0.025955 |
| 16 | 0.098650 | 0.074289 | 0.104677 | 0.109668 | 0.101970 | 0.084891 | 0.079643 |
| 17 | 0.150570 | 0.088579 | 0.102998 | 0.114817 | 0.114536 | 0.117431 | 0.110517 |
| 18 | 0.104951 | 0.086635 | 0.097166 | 0.121170 | 0.119105 | 0.108816 | 1.100859 |
| 19 | 0.151071 | 0.089544 | 0.108875 | 0.114560 | 0.102054 | 0.113471 | 0.112316 |
| 20 | 0.604291 | 0.552201 | 0.583448 | 0.610331 | 0.678349 | 0.669365 | 0.676809 |
| 21 | 3.381700 | 2.695390 | 3.066040 | 3.445210 | 3.328030 | 3.208470 | 3.191200 |

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Appendix Table 2 (cont ed)

| Sector Number | Transport Equipment And parts | Miscellaneous Industries Including Repair Services | Electricity | Construction | Railways | Other Transport | Other Services | Final Consumption |
|---|---|---|---|---|---|---|---|---|
| | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 1 | 1.814080 | 1.918170 | 1.967390 | 2.032860 | 1.963380 | 1.900230 | 1.975080 | 1.975390 |
| 2 | 0.052853 | 0.049488 | 0.065277 | 0.040947 | 0.047575 | 0.031943 | 0.029072 | 0.027942 |
| 3 | 0.269008 | 0.271234 | 0.291714 | 0.286886 | 0.291136 | 0.282019 | 0.293417 | 0.293101 |
| 4 | 0.255911 | 0.335126 | 0.263094 | 0.262214 | 0.265972 | 0.257383 | 0.263241 | 0.263198 |
| 5 | 0.018194 | 0.025083 | 0.019231 | 0.038337 | 0.019101 | 0.018476 | 0.019049 | 0.018843 |
| 6 | 0.024444 | 0.060279 | 0.024339 | 0.024132 | 0.025851 | 0.024303 | 0.021718 | 0.020845 |
| 7 | 0.005448 | 0.005522 | 0.005945 | 0.005832 | 0.005939 | 0.005769 | 0.005965 | 0.005977 |
| 8 | 0.222347 | 0.135339 | 0.051241 | 0.047425 | 0.052051 | 0.080616 | 0.043029 | 0.038846 |
| 9 | 0.142055 | 0.307072 | 0.118481 | 0.137092 | 0.119827 | 0.116160 | 0.117219 | 0.114797 |
| 10 | 0.036379 | 0.046353 | 0.036682 | 0.172475 | 0.038115 | 0.032748 | 0.034363 | 0.033063 |
| 11 | 0.221453 | 0.170244 | 0.064372 | 0.191223 | 0.076036 | 0.061676 | 0.060168 | 0.057290 |
| 12 | 0.004273 | 0.003093 | 0.003228 | 0.003073 | 0.003474 | 0.002677 | 0.002785 | 0.002664 |
| 13 | 0.034497 | 0.028615 | 0.031377 | 0.056726 | 0.024178 | 0.020779 | 0.022238 | 0.019805 |
| 14 | 1.296770 | 0.021015 | 0.020461 | 0.018694 | 0.057109 | 0.045506 | 0.024829 | 0.016497 |
| 15 | 0.028373 | 1.038080 | 0.027751 | 0.026769 | 0.027441 | 0.026158 | 0.027232 | 0.027089 |
| 16 | 0.082879 | 0.134842 | 1.290460 | 0.079031 | 0.117802 | 0.059086 | 0.065427 | 0.039283 |
| 17 | 0.108845 | 0.126616 | 0.120805 | 1.116000 | 0.109999 | 0.101537 | 0.109046 | 0.101152 |
| 18 | 0.097811 | 0.099141 | 0.111345 | 0.091609 | 1.085590 | 0.080242 | 0.084724 | 0.081819 |
| 19 | 0.096539 | 0.215203 | 0.114530 | 0.114349 | 0.120630 | 1.093850 | 0.088914 | 0.087973 |
| 20 | 0.667359 | 0.579649 | 0.798521 | 0.686082 | 0.714578 | 0.533566 | 1.559160 | 0.539151 |
| 21 | 3.253030 | 3.240300 | 3.561760 | 3.495360 | 3.554900 | 3.441430 | 3.576400 | 3.584520 |

Source: Same as Appendix Table 1

Appendix Table 3

Employment In Housing By Sex And Rural-Urban Residence, 1961

| | | | (Figures in '000 Persons) | |
|---|---|---|---|---|
| State | Rural Areas | | Urban Areas | |
| | Male | Female | Male | Female |
| 1 | 2 | 3 | 4 | 5 |
| Andhra Pradesh | 49.8 | 9.7 | 48.4 | 9.7 |
| Assam | 10.4 | 0.7 | 4.5 | 0.1 |
| Bihar | 40.1 | 1.3 | 29.3 | 3.2 |
| Gujarat | 15.8 | 2.4 | 30.2 | 4.3 |
| Haryana | 9.2 | 0.2 | 14.6 | 1.0 |
| Himachal Pradesh | 2.5 | 0.0 | 1.6 | 0.0 |
| Jammu & Kashmir | 1.1 | 0.1 | 2.2 | 0.0 |
| Karnataka | 31.0 | 4.0 | 71.9 | 15.3 |
| Kerala | 35.2 | 0.7 | 10.6 | 0.5 |
| Madhya Pradesh | 21.4 | 4.4 | 51.6 | 9.7 |
| Maharashtra | 39.8 | 7.9 | 79.1 | 12.0 |
| Orissa | 7.5 | 0.6 | 13.2 | 0.8 |
| Punjab | 17.5 | 0.2 | 19.5 | 0.2 |
| Rajasthan | 25.0 | 3.0 | 48.9 | 4.3 |
| Tamil Nadu | 51.3 | 9.5 | 77.4 | 12.4 |
| Uttar Pradesh | 55.9 | 1.1 | 67.9 | 1.5 |
| West Bengal | 37.3 | 1.3 | 77.7 | 2.2 |
| Union Territories & Other States | 15.0 | 1.0 | 35.2 | 2.3 |
| ALL INDIA | 465.8 | 47.1 | 683.8 | 79.5 |

Source: i) Census Of India, 1961 - Volume I - India, Part II-8(i)

Appendix Table 4

Employment In Housing By Sex And Rural-Urban Residence, 1971

(Figures in '000 Persons)

| State | Rural Areas | | Urban Areas | |
|---|---|---|---|---|
| | Male | Female | Male | Female |
| 1 | 2 | 3 | 4 | 5 |
| Andhra Pradesh | 67.1 | 9.8 | 65.6 | 10.9 |
| Assam | 8.5 | 0.2 | 5.9 | 0.1 |
| Bihar | 22.3 | 0.6 | 30.4 | 1.9 |
| Gujarat | 20.1 | 1.4 | 49.7 | 7.2 |
| Haryana | 15.4 | 0.5 | 13.5 | 0.5 |
| Himachal Pradesh | 4.1 | 0.3 | 1.4 | 0.1 |
| Jammu And Kashmir | 6.9 | 0.0 | 8.2 | 0.1 |
| Karnataka | 41.3 | 3.9 | 68.0 | 9.2 |
| Kerala | 62.8 | 1.7 | 19.1 | 1.2 |
| Madhya Pradesh | 18.0 | 2.0 | 41.8 | 4.1 |
| Maharashtra | 38.8 | 4.3 | 116.0 | 13.9 |
| Orissa | 9.0 | 0.6 | 3.2 | 0.1 |
| Punjab | 29.4 | 0.1 | 23.1 | 0.3 |
| Rajasthan | 34.7 | 2.2 | 45.7 | 2.0 |
| Tamil Nadu | 56.4 | 7.3 | 101.7 | 14.9 |
| Uttar Pradesh | 60.2 | 1.2 | 73.7 | 0.8 |
| West Bengal | 32.1 | 0.7 | 46.8 | 1.0 |
| Union Territories & Other States | 14.7 | 1.3 | 62.3 | 6.3 |
| ALL INDIA | 541.8 | 38.1 | 776.1 | 74.6 |

Source: Census Of India, 1971, Series I - India, Part II-B(iii)

Appendix Table 5

Proportion Of Female Workers In Total Working Force
In All Sectors And In Housing Construction, 1971

(Figures in Percent)

| State | All Sectors | | | Housing Construction | | |
|---|---|---|---|---|---|---|
| | Rural Areas | Urban Areas | All Areas | Rural Areas | Urban Areas | All Areas |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Andhra Pradesh | 30.88 | 16.70 | 28.85 | 12.74 | 14.25 | 13.49 |
| Assam | 9.46 | 5.69 | 9.10 | 2.30 | 1.67 | 2.04 |
| Bihar | 14.65 | 7.15 | 13.96 | 2.62 | 5.88 | 4.53 |
| Gujarat | 17.84 | 9.39 | 15.76 | 6.51 | 12.65 | 10.97 |
| Haryana | 4.02 | 5.15 | 4.22 | 3.14 | 3.57 | 3.34 |
| Himachal Pradesh | 28.85 | 8.43 | 27.52 | 6.82 | 6.67 | 6.78 |
| Jammu & Kashmir | 6.37 | 4.39 | 6.04 | 0.00 | 1.20 | 0.66 |
| Karnataka | 21.35 | 14.75 | 19.98 | 8.63 | 11.92 | 10.70 |
| Kerala | 24.08 | 19.25 | 23.36 | 2.64 | 5.91 | 3.42 |
| Madhya Pradesh | 26.42 | 12.01 | 24.63 | 10.00 | 8.93 | 9.26 |
| Maharashtra | 31.35 | 11.77 | 26.03 | 9.98 | 10.70 | 10.52 |
| Orissa | 10.92 | 9.96 | 10.85 | 6.25 | 3.03 | 5.43 |
| Punjab | 1.16 | 4.31 | 1.89 | 0.34 | 1.28 | 0.76 |
| Rajasthan | 13.70 | 6.98 | 12.72 | 5.96 | 4.19 | 4.96 |
| Tamil Nadu | 22.96 | 14.75 | 20.86 | 11.46 | 12.78 | 12.31 |
| Uttar Pradesh | 10.87 | 5.05 | 10.14 | 1.95 | 1.07 | 1.47 |
| West Bengal | 8.16 | 5.60 | 7.48 | 2.13 | 2.09 | 2.11 |
| Union Territories & Other States | 30.01 | 8.75 | 21.42 | 8.13 | 9.18 | 8.98 |
| ALL INDIA | 18.86 | 10.41 | 17.36 | 6.57 | 8.77 | 7.88 |

Source: i) Census Of India, 1971, Series I – India, Part II-B(i).
ii) Census Of India, 1971, Series I – India, Part II-B(iii)

Appendix Table  6

Total Employment Generation Induced By One Unit
Increase In Sectoral Demand

|  | (Figures in Persons) | |
| Sector | Direct And Indirect Increase In Employment | Direct, Indirect And Induced Increase In Employment |
| 1 | 2 | 3 |
| 1. Agriculture And Allied Activities | 6403 | 19250 |
| 2. Mining | 2258 | 15106 |
| 3. Food Products, Beverages And Tobacco | 4534 | 17307 |
| 4. Textile Products | 3272 | 15464 |
| 5. Wood And Wood Products | 6541 | 19371 |
| 6. Paper And Printing | 2522 | 12634 |
| 7. Leather And Leather Products | 7575 | 19843 |
| 8. Rubber, Plastic And Petroleum Products | 1536 | 11315 |
| 9. Chemicals | 1198 | 12322 |
| 10. Non-Metallic Minerals | 2408 | 14907 |
| 11. Basic Metals And Metal Products | 1425 | 13499 |
| 12. Non-Electrical Machinery | 1563 | 13303 |
| 13. Electrical Machinery | 1368 | 12945 |
| 14. Transport Equipment And Parts | 1587 | 13389 |
| 15. Misc. Industries Including Repair Services | 5064 | 16820 |
| 16. Electricity | 1604 | 14525 |
| 17. Construction | 1983 | 14664 |
| 18. Railways | 1661 | 14558 |
| 19. Other Transport | 2037 | 14522 |
| 20. Other Services | 2409 | 15384 |