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MACROECONOMIC ANALYSIS OF HOUSING DEMAND AND HOUSING INVESTMENT IN INDIA

by

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I

INTRODUCTION

Houses are durable assets, which, like all consumer durables, are generally demanded for the flow of services that they generate over their life time. Similarly, houses are produced because, like all durable capital assets, they represent a specific form of investment which yields returns over a fairly long period of time. Thus, an analysis of the demand of housing services on the one hand and investment in housing on the other, constitute the starting point for analysing the economics of housing. While considerable work has been done in the field of economics of housing in some of the advanced Western countries,[*1] it is rather surprising to find that it has so far remained a relatively unexplored field of research in India.

An attempt has, therefore, been made in this paper to examine, at the macroeconomic level, the factors influencing housing demand and housing investment in Indian economy.

The main objectives underlying the present study are:

i) to estimate the housing demand function and the elasticity of housing demand for the Indian economy as a whole and also for rural and urban areas separately;

ii) to examine the interstate differences, if any, in the elasticities of housing demand;

iii) to examine the trends in housing investment and housing stock in Indian economy;

iv) to examine the various factors influencing housing investment and estimate their relative importance as determinants of housing investment in the economy as a whole and also in rural and urban areas; and

v) to examine the extent of interstate variations in housing investment and the factors influencing it.

In view of the above objectives, the paper is divided into seven sections. The first section discusses the purpose and plan of the study. The second section is devoted to an analysis of housing demand and estimation of the elasticities of the housing demand in India, on the basis of time series data relating to national accounts statistics

for the economy as a whole and also for rural and urban areas. In the third section, an attempt is made to estimate the elasticities of housing demand in different states on the basis of time series data relating to state domestic product and related aggregates for each state. The fourth section examines trends in the aggregate housing investment and also in the housing stock valued at current as well as constant prices for the economy as a whole. In the fifth section, an attempt is then made to examine the relative importance of various factors influencing housing investment in rural areas, urban areas and the economy as a whole by using the technique of multiple regression analysis. In the sixth section, the same technique is used to examine the factors influencing interstate variations in housing investment in India on the basis of cross-section data for the year 1970-71. In the seventh and final section, the main findings of the study are summarized.

The statistical data required for conducting the time series as well as cross-section analysis of housing demand and housing investment in Indian economy are not directly available in the required form and detail. We have, therefore, derived the required series of data from available information. The details regarding the sources of data and the method by which the various series have been prepared are given in the Appendix.

II

ELASTICITY OF AGGREGATE HOUSING DEMAND

2.1 Housing Demand:

The demand for housing has a number of features that make it quite different from the demand for perishable consumer goods. The first and foremost of these characteristics is that the demand for housing is the demand for a flow of services which extends beyond the period in which the good is purchased. Secondly, the demand for housing service expresses itself in two forms. One is the demand for purchasing the asset itself while the other is the demand for renting it. The former is the demand for owning the house, whereas the latter is the demand for rental accommodation. Both represent derived demands for the services that housing provides. Thirdly, housing provides not one but various kinds of services in the form of shelter, security, comfort and a feeling of independence, privacy and status. Moreover, housing as an asset, if purchased, also provides services associated with investment in any productive asset. Finally, the analysis of demand for housing becomes fairly complicated not only because of the two alternative forms in which the demand expresses itself, but also because the services associated with housing can be purchased in varying combinations as well as in varying conditions. For instance, it is

obvious that the service in the form of shelter can vary from the bare minimum protection from the elements to highly luxurious levels.

It is evident that the above features of housing services make housing a considerably heterogeneous commodity. The heterogeneity of housing makes it extremely difficult to measure the demand for housing directly in physical units. The reason is that the flow of services provided by housing varies with the attributes of each house implying that a simple count of the number of houses demanded or of the number of rooms or even plinth area is an inadequate measure of the actual quantity of housing services demanded in the economy as a whole. An ideal physical measure of housing demand would involve measurement in terms of quality-adjusted housing units. Since the better quality housing costs more in relation to inferior quality housing, any adjustment in the measure of housing demand taking into account the quality differences would generally be in terms of the actual cost or expenditure on different types of housing. Thus, if we make the inevitable but still quite plausible assumption that relative expenditure on different types of housing reflects the corresponding quality differences, a fairly close approximation to the required measure of housing demand adjusted for quality changes at the macro level can be achieved by using a surrogate such as the aggregate current annual expenditure on housing services in the economy as a whole.*[2] We have

accordingly measured the aggregate demand for housing services in Indian economy by using the aggregate annual gross rental paid for the use of residential dwellings measured at constant base period prices as the proxy variable indicating current expenditure on the purchase of housing services in the economy as a whole.

2.2 Determinants of Housing Demand:

The aggregate demand for housing is determined by a variety of factors. According to the conventional analysis of demand functions, the demand for a commodity depends primarily upon the price of the commodity and the income of the buyer. In the case of housing services also, these two factors have been found to be significant determinants of aggregate demand. The relevant question, however, is the one relating to concept and measurement of these variables.

Since we are measuring the demand for housing in terms of the total amount of expenditure in the form of rent (at constant prices) incurred on the purchase of housing services, the relevant concept of price would be the average rent per standardized quality adjusted dwelling unit (or a given area) in money terms or at current prices. In the context of time series analysis, it is the price index of money rent which is used to deflate the total gross rental at current prices to arrive at the corresponding gross rental at constant prices that

serves as an overall indicator of the percentage changes in the average price of housing services over a period of time. Moreover, as a determinant of the housing demand, the relevant concept of price is the price of housing services relative to other prices, because it is the relative price that influences demand. Movements in relative price of housing services are reflected by the ratio of price index for gross rental to the general price index of all commodities taken together. Demand for housing services under normal circumstances is expected to have an inverse relationship to price as measured by the above indicator.

Similarly, the demand for housing services is expected to have a direct relationship to aggregate income. However, one aspect of the concept of income which is relevant in this context deserves special mention. Since those who demand housing services are considering the alternative allocations of their money income to various commodities, they are concerned not with the amount of money income as such, but more with the overall purchasing power of their money income. This implies that the concept of real income (measured at constant base period prices) is more appropriate in this context than that of money income.

In addition to income and price, the aggregate demand for housing services also depends upon real wealth of the households and the demographic factors. Given the households' income and price, higher the amount of wealth possessed by the households, greater will be the demand for housing services. Similarly, higher the rate of growth of population, greater will be the aggregate demand for housing services. Another demographic variable that assumes significance in this context is the rate of household formation. The rate of household formation is closely associated with the overall growth rate of population, the rate of marriage, the age of marriage, employment opportunities and a variety of socio-cultural factors. It is not clear, therefore, whether the rate of household formation can be regarded as a truly independent variable influencing the aggregate demand for housing.

2.3 Income and Price Elasticities of Housing Demand:

Several studies have been made in the Western countries to estimate the responsiveness of housing demand to changes in income and in the price of housing services.*3 In their attempt to estimate the income elasticities of housing demand and also the price elasticities of housing demand, these studies have arrived at a variety of results and consequently there has been a considerable amount of debate and controversy on the overall value of these elasticities.

Traditionally, economists have argued that those goods and services which are considered as "necessities" tend to have an income elasticity of demand which is less than unity. Since the general view about housing is that it is one of the basic necessities of life, it is argued that the quantity of housing services demanded will have a tendency to change less than proportionately in response to changes in price or income. This view suggests that both the income elasticity as well as the price elasticity of demand for housing will be less than unity indicating that the demand for housing is relatively inelastic with respect to price or income. This view finds support from the studies made by Houthakker, Lesser, Lee, Wilkinson, and Vipond & Walker.*4

The hypothesis that the demand for housing is likely to be inelastic with respect to income and price has, however, been challenged in the studies made by Grebler, Muth, Reid, and Clark & Jones.*5 In fact, as Wilkinson has argued in his study, the estimates of the elasticity of demand for housing are likely to vary according to the definition of the variables and their measurement, and also according to the characteristics and types of housing markets, the socio-demographic attributes of the purchasers and the quality of housing. Wilkinson has also pointed out that insofar as these factors vary in their

geographical distribution, we should expect some regional variations around the national estimates of these elasticities.*6

Most of the work on the estimation of elasticities of demand for housing that has already been done so far relates to industrialised countries of the West. Very little work seems to have been done in the direction of estimating the elasticities of housing demand in underdeveloped countries like India. There can be little doubt that the paucity of such studies in underdeveloped countries is largely due to the inherent difficulties of undertaking them rather than any lack of interest in this field. In fact, the non-availability and intractability of the minimum necessary data required to undertake a meaningful study in this field accounts for the lack of work on the estimation of elasticities of demand for housing in India and other underdeveloped countries.

We have made an attempt in this section to estimate from the available data on housing demand, aggregate income and the trends in the relative price of housing services, the income and price elasticities of housing demand in India, using time series data for the period 1960-61 to 1975-76. Our attempt represents more an effort to answer the broad questions regarding the value of these elasticities for Indian economy rather than any effort to achieve precise and unequivocal estimates of these elasticities.

To estimate the income and price elasticities of housing demand in India, we define the following functional relationship indicating the demand function for housing services:

$$D = F(Y, P) \quad \ldots\ldots \quad (1)$$

where, D indicates the aggregate demand for housing services in the economy, Y indicates aggregate real income and P indicates the relative price of housing services.

As already indicated above, we have used aggregate gross rental at constant 1970-71 prices to measure the changes in aggregate demand for housing services over time. Similarly, we have used gross domestic product at constant 1970-71 prices to measure the changes in aggregate income over time. The use of some of the other alternative measures of aggregate income such as net domestic product, personal income, personal disposable income, etc., would not make any significant difference in the results because there is a very high correlation between the time series of different measures, the coefficients of correlation between each of the alternative measures and GDP being as high as 0.98 and above. We have measured the relative price of housing services in terms of the ratio of the price index of gross rental to the price index of GDP. Time series data on each of these variables for the economy as a whole as well as for the rural and urban areas covering the period 1960-61 to 1975-76 are given in the Appendix Tables.

The broad indicator of the value of income elasticity of demand for housing is the behaviour of housing expenditure expressed as a proportion of aggregate income over a given period of time. If the proportion of total income spent on housing services declines over time, it implies that the income elasticity of demand for housing is less than unity and that housing demand is income inelastic. Table 1 shows the current actual expenditure on housing services expressed as a proportion of GDP, personal disposable income and also private final consumption expenditure. It is evident from the figures given in the table that the proportion of income spent on housing and also the share of housing in aggregate consumption expenditure have been more or less steadily declining during the period 1960-61 to 1975-76. This clearly suggests that the demand for housing in Indian economy is relatively income inelastic.

To derive the estimates of income and price elasticity of housing demand, we specify the functional relationship for housing demand as follows:

$$D_t = A \cdot Y_t^a \cdot P_t^b \cdot U_t \qquad \ldots\ldots \qquad (2)$$

where a represents the income elasticity of demand for housing, b represents the price elasticity of demand for housing and U_t indicates the error term. Equation 2 can be written in the

Table 1

Trends in the Share of Gross Rental in GDP, Personal Disposable Income and Private Final Consumption Expenditure

Year	Gross Rental as percentage of		
	GDP	Personal Disposable Income	Private Final consumption Expenditure
1	2	3	4
1960-61	4.96	5.52	5.94
1961-62	4.94	5.52	5.98
1962-63	4.97	5.61	6.07
1963-64	4.81	5.46	6.01
1964-65	4.37	4.89	5.39
1965-66	4.46	4.98	5.39
1966-67	4.16	4.61	4.95
1967-68	3.71	4.06	4.29
1968-69	3.82	4.21	4.52
1969-70	3.68	4.08	4.43
1970-71	3.65	4.06	4.48
1971-72	3.70	4.12	4.49
1972-73	3.65	4.04	4.46
1973-74	3.22	3.54	3.88
1974-75	3.02	3.34	3.59
1975-76	3.20	3.53	3.90

Source: (i) National Accounts Statistics, 1960-61 - 1974-75, C.S.O., Government of India, October 1976.
(ii) National Accounts Statistics, 1970-71 - 1975-76, C.S.O., Government of India, January 1978.

logarithmic form as:

$$\log D_t = \log A + a \log Y_t + b \log P_t + U_t \quad \ldots\ldots \quad (2a)$$

We have estimated equation 2a by applying the multiple regression technique and using the corresponding time series data relating to the period 1960-61 to 1975-76. The results are shown in Table 2.

The model given in equation 2a tries to estimate the income elasticity of demand and the price elasticity of demand simultaneously. The estimates based on this equation, therefore indicate the partial effects in the sense that the estimate of income elasticity of demand (a) shows the effect of a one per cent change in income on housing demand assuming that the relative price of housing services remains unchanged. Similarly, the estimate of price elasticity (b) shows the effect of a one per cent change in the relative price of housing services on housing demand, income remaining constant. It is also, however, possible to estimate the income elasticity of demand for housing directly by estimating the following equation:

$$\log D_t = \log A_t + a \log Y_t + U_t \quad \ldots\ldots \quad (3)$$

Table 2

Estimates of Income Elasticity and Price Elasticity of Demand for Housing in India

Area/Equation	Regression Coefficients			
	Constant Term	Coefficient of Income(Income Elasticity)	Coefficient of Relative Price(Price Elasticity)	Coefficient of Determination (R^2)
1	2	3	4	5
All Area				
Equation 2a	3.6790 (6.3019)	0.4462* (12.1965)	-0.2505* (4.9923)	0.9840
Equation 3	0.9881 (2.6630)	0.5941* (16.6421)	- -	0.9519
Equation 4	10.6055 (23.2442)	- -	-0.7470* (7.5491)	0.8030
Rural Area				
Equation 2a	5.1479 (8.9706)	0.2573* (5.2824)	-0.2292* (7.3363)	0.9446
Equation 3	1.8754 (2.3748)	0.4866* (5.9529)	- -	0.7177
Equation 4	8.1224 (42.7685)	- -	-0.3353* (8.1468)	0.8266
Urban Area				
Equation 2a	2.1986 (5.6640)	0.5818* (36.8035)	-0.3289* (5.4305)	0.9944
Equation 3	0.2047 (0.9308)	0.6311* (27.9424)	- -	0.9823
Equation 4	13.7574 (6.1000)	- -	-1.6103* (3.2857)	0.4358

Note: Figures in brackets indicate t-Ratios.

*Statistically significant at 1% level of significance.

Source: Appendix Tables 1, 3, 4 and 6.

Similarly, the price elasticity of demand for housing can also be estimated directly by using the following equation:

$$\log D_t = \log A_t + b \log \dot{P} + U_t \quad \ldots\ldots \quad (4)$$

The estimate of a derived from equation 3 would indicate the magnitude of income elasticity of demand for housing regardless of any changes in the relative price of housing that might have taken place. Similarly, the estimate of b derived from equation 4 would indicate the magnitude of price elasticity of demand for housing regardless of any changes that might have occurred in aggregate income. The estimates based on these two equations are also presented in Table 2 along with the estimates of equation 2a.

It is evident from the Table 2 that the estimates of equation 2a are highly satisfactory in the case of the economy as a whole as well as for rural and urban areas taken separately, the estimated equation showing a very high explanatory power in each case with the value of R^2 ranging from 0.945 in the case of rural areas to 0.994 in the case of urban areas.

It becomes clear from these estimates that the income elasticity of demand for housing in India is considerably less than unity for the economy as a whole and also in rural and urban areas. The estimated

value of income elasticity of demand for housing for the economy as a whole turns out to be about 0.45, its value being higher in urban areas (0.58) as compared to rural areas (0.26). The price elasticity of demand for housing also turns out to be considerably less than unity in each of the three cases. The estimated value of the price elasticity of demand for housing for the economy as a whole turns out to be -0.25, its value being again higher in urban areas (-0.33) than in rural areas (-0.23). It is satisfying to note that, not only do the estimates have the expected sign, but they are also statistically significant at one per cent level of significance in each case.

It is interesting to observe the estimates of income elasticity of demand for housing obtained directly by using equation 3 are also significantly less than unity in each case, though they are also somewhat higher in each case than the corresponding estimates derived from equation 2a. Thus, the direct estimates of income elasticity of demand for housing have turned out to be 0.59 for the economy as a whole, 0.63 for urban areas and 0.49 for rural areas. Each of these estimates is statistically significant at one per cent level, each equation having fairly high explanatory power.

A similar conclusion emerges if we compare the direct estimates of price elasticity of demand for housing obtained by using equation 4

with the corresponding estimates obtained from equation 2a. The direct estimates of price elasticity of demand for housing obtained from equation 4 have turned out to be -0.75 for the economy as a whole and -0.34 for the rural areas, both estimates being statistically at one per cent level of significance. In the case of urban areas, however, the direct estimate of price elasticity obtained from equation 4 turns out to be -1.61 which is significantly greater than the corresponding estimate of -0.33 obtained from equation 2a. It should be noted that the estimate based on equation 4 is not statistically significant at one per cent level though it is found to be significant at five per cent level. Moreover, the explanatory power of equation 4 in the case of urban areas is also not very high. It is not clear, therefore, whether much significance can be attached to the estimate based on equation 4 in the case of urban areas. While this may imply that the estimate of price elasticity for urban areas obtained from equation 2a is perhaps an underestimate, the extent of underestimation is difficult to ascertain.

The broad conclusions which emerge from the estimates presented in Table 2 are: (a) The demand for housing in India seems to be inelastic with respect to both income as well as price. (b) The magnitude of income elasticity of demand for housing seems to be greater than the magnitude of price elasticity indicating that the

demand for housing is more responsive to changes in income given the prices than to changes in prices given the income. (c) The values of both income as well as price elasticity of demand for housing seem to be greater in urban areas as compared to the rural areas indicating that the demand for housing is comparatively more responsive to changes in income and prices in urban areas than in rural areas.

III

INTERSTATE VARIATIONS IN ELASTICITY OF HOUSING DEMAND

The magnitude of elasticities of demand for housing depends upon a variety of factors such as nature of housing market, tenure systems, socio-demographic attributes of the buyers, the quality of housing, average standard of living and variations in tastes, preferences and habits of the consumers. It is evident that these factors are likely to vary from region to region resulting in some regional variations in the value of elasticity coefficients. It would be interesting, therefore, to examine the nature and extent of interstate variations in the estimated values of income elasticity and price elasticity of housing demand in India.

From the time-series data on total rental and state domestic product at constant prices and also on the relative price of housing, for different states covering the period 1960-61 to 1970-71, we have estimated the values of income elasticity and price elasticity of housing demand in each state by estimating the parameters in equations 2a, 3 and 4 given above. These estimates are presented in Table 3.

It is evident from the estimates given in Table 3 that there is significant variation in the values of the elasticity coefficients among different states. The coefficient of variation turns out to be as high as 0.94 in the case of income elasticity and 1.16 in the case of price elasticity estimated with the help of equation 2a. The coefficient of inter-state variation revealed by the income elasticity estimated from equation 3 is, however, 0.62 which indicates a somewhat lower extent of variation as compared to the corresponding estimates obtained from equation 2a. The situation in the case of price elasticity is, however, exactly opposite. The coefficient of interstate variation revealed by the price elasticity estimated from equation 4 is as high as 2.10 which indicates a much greater degree of variation as compared to the corresponding estimates obtained from equation 2a.

Besides the overall extent of variation in the estimated elasticity coefficients, we can make the following observations on the

Table 3

Statewise Estimates of Income Elasticity and Price Elasticity of Demand for Housing in India

State/Equation	Regression Coefficients			Coefficient of Determination (R^2)
	Constant Term	Coefficient of Income (Income Elasticity)	Coefficient of Relative Price (Price Elasticity)	
1	2	3	4	5
Andhra Pradesh				
Equation 2a	1.1680 (0.4845)	0.7707** (2.9455)	-0.6627 (2.1290)	0.7800
Equation 3	-2.1941 (0.9215)	0.8128 (2.3862)	- -	0.5316
Equation 4	6.8655 (3.0090)	- -	-0.7298 (1.4807)	0.3055
Assam				
Equation 2a	-9.8836 (20.2234)	2.6227* (14.6372)	-0.9015* (5.6770)	0.9963
Equation 3	-8.7222 (5.8161)	1.7015* (6.6246)	- -	0.9360
Equation 4	-4.4185 (1.6500)	- -	1.2036 (2.1029)	0.5958
Bihar				
Equation 2a	7.6844 (4.1548)	-0.0628 (0.2969)	-0.7627* (4.0274)	0.8055
Equation 3	3.0185 (1.0377)	0.1075 (0.2572)	- -	0.0149
Equation 4	7.1965 (9.3946)	- -	-0.7515* (4.4780)	0.8002

(continued)

Table 3 (continued)

State/Equation	Regression Coefficients			Coefficient of Determination (R^2)
	Constant Term	Coefficient of Income (Income Elasticity)	Coefficient of Relative Price (Price Elasticity)	
1	2	3	4	5
Gujarat				
Equation 2a	2.3013 (2.5131)	0.4169* (4.8696)	-0.3940* (4.3455)	0.9455
Equation 3	-1.2369 (1.7012)	0.6751* (6.3146)	- -	0.8158
Equation 4	6.5226 (11.7899)	- -	-0.7005* (5.7294)	0.7848
Haryana				
Equation 2a	-0.4221 (0.4734)	0.4651* (5.0865)	-0.1574 (0.8673)	0.8661
Equation 3	-1.0486 (2.0593)	0.4504* (5.1403)	- -	0.8409
Equation 4	1.5123 (0.7673)	- -	0.0122 (0.0279)	0.0001
Karnataka				
Equation 2a	0.5541 (0.9100)	0.9305* (24.4083)	-0.6452* (6.7601)	0.9979
Equation 3	-3.3449 (4.9071)	1.0938* (10.597)	- -	0.9656
Equation 4	13.1550 (3.3290)	- -	-2.1219** (2.3483)	0.5792

Table 3 (continued)

State/Equation	Regression Coefficients			Coefficient of Determination (R^2)
	Constant Term	Coefficient of Income (Income Elasticity)	Coefficient of Relative Price (Price Elasticity)	
1	2	3	4	5
Kerala				
Equation 2a	-3.8118 (7.0007)	1.0946* (13.1917)	-0.0986 (1.5527)	0.9562
Equation 3	-4.1121 (7.5324)	1.0706* (12.1958)	- -	0.9430
Equation 4	2.3084 (1.8016)	- -	0.0520 (0.1849)	0.0037
Madhya Pradesh				
Equation 2a	3.8355 (8.0462)	0.0764 (1.6399)	-0.2719* (5.7390)	0.9035
Equation 3	1.5111 (2.8268)	0.2393* (3.0431)	- -	0.5068
Equation 4	4.5678 (24.8821)	- -	-0.3195* (7.7925)	0.8702
Maharashtra				
Equation 2a	-0.0939 (0.0755)	0.8213* (6.7435)	-0.4799* (5.5528)	0.9811
Equation 3	-6.3511 (5.8460)	1.3743* (9.4826)	- -	0.9091
Equation 4	8.1644 (15.3200)	- -	-0.9575* (7.9118)	0.8742

Table 3 (continued)

State/Equation	Regression Coefficients			Coefficient of Determination (R^2)
	Constant Term	Coefficient of Income (Income Elasticity)	Coefficient of Relative Price (Price Elasticity)	
1	2	3	4	5
Orissa				
Equation 2a	-0.1298 (0.2221)	0.2879* (6.9032)	0.1975 (1.5352)	0.8815
Equation 3	0.6820 (2.5541)	0.3045* (7.0453)	- -	0.8465
Equation 4	0.5927 (0.4141)	- -	0.4258 (1.3766)	0.1738
Punjab				
Equation 2a	-0.0290 (0.0422)	0.4573* (9.2720)	-0.0458 (0.5264)	0.9852
Equation 3	-0.3840 (3.0641)	0.4809* (24.0648)	- -	0.9847
Equation 4	6.1465 (11.4513)	- -	-0.7774* (6.5521)	0.8266
Rajasthan				
Equation 2a	2.8264 (1.9054)	0.2094 (1.3083)	-0.3537 (1.9104)	0.4989
Equation 3	0.7280 (0.6335)	0.2836 (1.5844)	- -	0.2389
Equation 4	4.4385 (5.1537)	- -	-0.4121 (2.1949)	0.3742

Table 3 (concluded)

State/Equation	Regression Coefficients			Coefficient Of Determination (R^2)
	Constant Term	Coefficient of Income (Income Elasticity)	Coefficient of Relative Price (Price Elasticity)	
1	2	3	4	5
Tamil Nadu				
Equation 2a	-5.4705 (6.3775)	0.9824* (12.0713)	0.3845 (2.2394)	0.9505
Equation 3	-3.6711 (4.7521)	0.9815* (9.0311)	- -	0.9006
Equation 4	1.5348 (0.5887)	- -	0.3797 (0.6791)	0.0487
Uttar Pradesh				
Equation 2a	1.1021 (2.3435)	0.5336* (9.9132)	-0.1126** (2.3743)	0.9285
Equation 3	0.5857 (1.1818)	0.5349* (8.2145)	- -	0.8823
Equation 4	5.2100 (6.8111)	- -	-0.1230 (0.7234)	0.0537
West Bengal				
Equation 2a	1.8126 (1.6207)	0.5096* (5.0870)	-0.2616** (2.6776)	0.9686
Equation 3	-1.0366 (2.3140)	0.7450* (11.9183)	n - -	0.9403
Equation 4	7.4071 (18.3428)	- -	-0.6987* (7.6919)	0.8680

Note: Figures in bracket indicate t-Ratios.

*Statistically significant at 1% level of significance.

**Statistically significant at 5% level of significance.

Source: Appendix Table 18

estimates of income elasticity and price elasticity of housing demand presented in Table 3:

1. Barring one or two exceptions, the estimated elasticity coefficients show the expected sign in all cases. Thus, the estimated income elasticity of demand for housing turns out to be positive in each state except Bihar. Similarly, the estimated price elasticity of demand for housing turns out to be negative in each state except Orissa and Tamil Nadu. In the case of these exceptions, where the estimated elasticity coefficients do not have the expected sign, the estimates are found to be statistically insignificant, indicating that not much reliance can be placed on the estimates obtained in these cases.

2. The income elasticity of demand estimated from equation 2a turns out to be statistically significant in almost every state, the only exceptions being Bihar, Madhya Pradesh and Rajasthan. Moreover, the estimates of the value of income elasticity of demand for housing obtained from equation 2a are not significantly different from the corresponding estimates obtained from equation 3 except in the case of Assam and Maharashtra.

3. Regarding the magnitude of income elasticity, we find that Assam is the only state in which the income elasticity is significantly greater than unity. Karnataka, Kerala and Tamil Nadu are the states in which the income elasticity is close to unity, whereas in all other states the income elasticity is significantly less than unity. This implies that in most of the states, the demand for housing is inelastic with respect to income, though the degree of inelasticity differs from state to state.

4. The price elasticity of demand for housing estimated from equation 2a turns out to be statistically significant only in the case of eight states, viz., Assam, Bihar, Karnataka, Madhya Pradesh, Uttar Pradesh, Gujarat, Maharashtra, West Bengal, the estimates for other states being statistically insignificant. Moreover, the estimates of price elasticity obtained from equation 2a differ significantly from the corresponding estimates obtained from equation 4 in the case of Assam, Gujarat, Karnataka, Maharashtra, Punjab and West Bengal.

5. In all cases where the estimates of price elasticity are found to be statistically significant, the estimated value of the elasticity is also found to be negative and significantly less than unity. Among the states where the price elasticity is statistically significant, Assam, Bihar and Karnataka are the

states where the value of price elasticity exceeds two-thirds, though it is less than unity, whereas Madhya Pradesh, Uttar Pradesh and West Bengal are the states where the price elasticity is as low as one-fourth or less. Thus, Assam, Bihar and Karnataka represent the states in which the demand for housing is moderately inelastic with respect to price while Madhya Pradesh, Uttar Pradesh and West Bengal represent the states where the demand for housing is highly inelastic with respect to price. On the whole, the demand for housing appears to be inelastic with respect to price in almost every state.

6. It is interesting to find that there is no correlation between the value of income elasticity and the corresponding value of price elasticity observed in different states. The coefficient of correlation between income elasticity and price elasticity estimated from equation 2a is as low as -0.3067 which is statistically insignificant. While there does not seem to be any relationship between the valuesof income and price elasticity of demand for housing, the average value of income elasticity obtained for all states taken together is found to be significantly greater than the corresponding average value of price elasticity, the former being 0.67 whereas the latter being -0.30. Thus, on an average, the demand for housing seems to be more responsive to changes in

income than to changes in relative price. This conclusion holds good regardless of the equations that we use for estimating the elasticity coefficients, because the mean values of the two elasticities obtained from equation 2a are very close to the corresponding mean values obtained from equation 3 and 4.

7. Finally, it can be noticed that Assam, Gujarat, Karnataka, Maharashtra, Uttar Pradesh, and West Bengal are the six states in which the estimates of income elasticity as well as the price elasticity are both found to be statistically significant, whereas Rajasthan is the only state in which neither of the two estimates is found to be statistically significant. Of the six states in which both elasticities are found to be statistically significant, Gujarat, Uttar Pradesh and West Bengal are the states where both the elasticities are found to be less than or equal to one-half. In the remaining three states, at least one of the two elasticities is foundto be fairly close to unity. Thus, on the basis of the estimated values of elasticity coefficients and their statistical reliability, it seems that Gujarat, Uttar Pradesh, and West Bengal are the states in which the demand for housing is considerably inelastic with respect to both income as well as price. There are other states also, such as Haryana, Madhya Pradesh, Punjab and

Rajasthan, which might also fall under this category, but it should be noted that in each of these four states, the estimate of at least one of the two elasticities involves a fairly high error-margin which reduces the statistical reliability of the estimate.

IV

TRENDS IN HOUSING INVESTMENT AND HOUSING STOCK

4.1 Trends in Housing Investment:

Having discussed some aspects of demand for housing, we may now consider the supply side of the housing market. The aggregated supply of housing depends primarily on the amount of national resources devoted to residential construction. It is generally observed that the share of national resources invested in residential construction varies significantly among different countries. Studies made by Howenstine, Dennison, Kuznets, Strassmann, and Burnes and Grebler have shown that the share of housing investment in national income is related to the general level of economic development and that there are stages of housing investment which are geared to levels of general economic development.*7

According to Howenstine, construction resources in the earliest stage of development "should be used primarily to build factories and

other essential producers' goods, and should be devoted to housing only to the extent clearly necessary for the success of such investments". During the second phase, "as existing unemployment and underemployment are eliminated and workers are provided with the capital . . . to make a fully productive contribution to the national output, housing should progressively be brought up to the minimum standard of health and decency", with priority for those "whose contribution to national productivity could be expected to benefit most from better housing, i.e., those who were fully employed and difficult to replace." In the third stage, "additional improvements in housing . . . may be made for their own sake assuming that the people want better housing in preference to other goods and services or leisure."*8

The studies made by Strassmann and Burns & Grebler contain theoretical reasoning supported by empirical analysis based on cross-section post-war data covering a number of countries. The study made by Strassmann classifies a sample of 27 countries, on the basis of the relevant data for the period 1955-64, into three different categories covering three development levels. The proportion of housing investment in gross domestic product is found to be 2.5 per cent for the category of underdeveloped countries, 4.6 per cent for the countries in the intermediate stage of development and 4.4 per cent

for the category of developed countries.*9

The study made by Burns and Grebler examines a larger sample of countries and relates to a more recent period as compared to Strassmann's study. Their study includes a sample of 39 countries covering entire development spectrum and is based on the data for the period 1963-1970. The major findings of the study are: (a) In the poorest thirteen countries (with per capita gross domestic product ranging from $81 to $337), the share of residential construction in gross domestic product is 2.7 per cent; (b) In the middle-range 13 countries (with per capita GDP ranging from $335 to $1069), the share of residential construction in GDP is 4.4 per cent; and (c) In the richest 13 countries, the share of residential construction in GDP is 6.6 per cent on an average.*10 The study, however, points out that the variations among different countries even in the same category are remarkably high and the proportion of GDP allocated to residential construction varies all the way from less than one per cent to almost nine per cent.

Most of the studies analyse cross-section data relating to a given point of time or a brief time interval and are more in the nature of international comparison of the share of national resources divided to residential construction. One of the studies made by

Kuznets, however, analyses time series data for eleven developed countries.*[11] The major conclusion that emerges from Kuznets' study is that the share of construction in gross fixed capital formation shows a clear tendency to decline over time and the share of residential construction in total construction has also shown a tendency to decline over time. Thus, the evidence available from the analysis based on the cross-section as well as time series data suggests that the share of housing investment in GDP would tend to increase as the country passes on from a lower stage of development to a higher stage, but once the country has reached a fairly high level of development, the share of housing investment may tend to fall off with further economic growth.

It would be interesting to examine the trends in housing investment in India in the light of the above hypothesis. Table 4 to 6 bring out the trends in housing investment in India. Table 4 shows the growth of housing investment in India during the period 1950-51 to 1975-76. Table 5 shows the trends in the rural-urban composition of GCF in residential construction. Table 6 shows the trends in the ratio of gross-capital formation in residential dwellings to gross capital formation in all sectors taken together and also the trends in the ratio of GCF in dwellings to GDP.

Table 4

Growth of Housing Investment in India, 1950-51 to 1975-76

Year	Index Numbers of GCF in Residential Dwellings	
	at current prices	at 1970-71 prices
1	2	3
1950-51	100.00	100.00
1951-52	93.13	88.40
1952-53	68.73	65.75
1953-54	68.73	65.62
1954-55	71.13	67.62
1955-56	77.32	71.78
1956-57	117.53	105.44
1957-58	87.29	75.36
1958-59	106.53	85.39
1959-60	118.90	92.55
1960-61	106.53	79.23
1961-62	115.46	80.23
1962-63	106.19	71.49
1963-64	111.00	72.21
1964-65	123.02	78.22
1965-66	196.22	112.03
1966-67	309.28	163.04
1967-68	327.84	167.91
1968-69	393.47	188.25
1969-70	457.73	206.73
1970-71	350.86	146.20
1971-72	419.24	165.76
1972-73	410.65	147.42
1973-74	598.63	196.28
1974-75	592.78	145.99
1975-76	555.33	117.48

Source: Appendix Tables 7 and 8.

Table 5

Trends in the Rural-Urban Composition of Housing Investment in India

(Figures in Percent)

Year	GCF in Dwellings at current prices		GCF in Dwellings at 1970-71 prices	
	Share of Rural Areas	Share of Urban Areas	Share of Rural Areas	Share of Urban Areas
1	2	3	4	5
1950-51	61.51	38.49	59.17	40.83
1951-52	60.89	39.11	58.67	41.33
1952-53	60.00	40.00	58.17	41.83
1953-54	59.50	40.50	57.64	42.36
1954-55	58.94	41.06	56.99	43.01
1955-56	58.67	41.33	56.49	43.51
1956-57	57.89	42.11	55.84	44.16
1957-58	57.48	42.52	55.13	44.87
1958-59	56.77	43.23	54.70	45.30
1959-60	56.36	43.64	54.18	45.82
1960-61	55.81	44.19	53.53	46.47
1961-62	55.06	44.94	53.21	46.79
1962-63	54.37	45.63	52.71	47.29
1963-64	53.56	46.44	52.38	47.62
1964-65	52.79	47.21	51.83	48.17
1965-66	53.24	46.76	51.41	48.59
1966-67	52.89	47.11	51.14	48.86
1967-68	52.10	47.90	50.94	49.06
1968-69	51.44	48.56	50.68	49.32
1969-70	50.68	49.32	50.31	49.69
1970-71	49.66	50.34	49.66	50.34
1971-72	46.48	53.52	46.76	53.24
1972-73	50.46	49.54	50.73	49.27
1973-74	44.78	55.22	44.53	55.47
1974-75	45.74	54.26	46.03	53.97
1975-76	46.65	52.35	47.68	52.32

Source: Appendix Tables 7 and 8

Table 6

Trends in the Share of Housing Investment in Total Investment and Total Output in Indian Economy

(Figures in percent)

Year	GCF in Residential Dwellings as percentage of Total GCF		GCF in Residential Dwellings as percentage of GDP	
	at current prices	at 1970-71 prices	at current prices	at 1970-71 prices
1	2	3	4	5
1950-51	28.01	29.05	3.14	3.97
1951-52	22.14	22.65	2.82	3.44
1952-53	26.01	26.12	2.13	2.47
1953-54	20.90	21.76	1.99	2.32
1954-55	18.80	20.20	2.21	2.33
1955-56	14.72	15.22	2.33	2.39
1956-57	16.94	17.61	3.07	3.33
1957-58	13.50	13.48	2.27	2.42
1958-59	16.84	17.85	2.47	2.53
1959-60	16.87	17.75	2.67	2.70
1960-61	11.84	12.57	2.20	2.16
1961-62	13.57	13.93	2.25	2.11
1962-63	10.38	10.67	1.94	1.84
1963-64	9.58	10.02	1.78	1.77
1964-65	9.38	9.92	1.68	1.78
1965-66	12.90	12.97	2.58	2.69
1966-67	16.06	16.77	3.52	3.07
1967-68	17.33	18.52	3.19	3.67
1968-69	21.76	22.03	3.74	4.01
1969-70	20.75	20.88	3.93	4.14
1970-71	14.08	14.08	2.76	2.76
1971-72	15.32	15.36	3.09	3.08
1972-73	14.20	14.00	2.75	2.77
1973-74	16.19	16.64	3.22	3.52
1974-75	12.97	12.61	2.72	2.61
1975-76	11.31	10.22	2.48	1.94

Source: Appendix Tables 4, 5, 7 and 8

It is evident from Table 4 that there has been a significant increase in the aggregate amount of housing investment in Indian economy during the last two and a half decades. The increase in housing investment measured at constant 1970-71 prices is, however, much less impressive than the increase in housing investment measured at current prices. Moreover, the increase in housing investment at constant prices is not so smooth and steady over the period as the increase in housing investment at current prices. On the whole, the aggregate housing investment has increased at an average rate of 7.10% per annum at current prices and 0.65% per annum at constant 1970-71 prices over the period 1950-51 to 1975-76. The growth rate of housing investment in urban areas is significantly higher than the growth rate of housing investment in rural areas, the former being 8.42% per annum at current prices and 1.65% per annum at constant prices, as against the corresponding figures of 6.01% per annum and -0.22% per annum for the latter. It is particularly striking to find that the housing investment in rural areas measured in real terms has actually declined marginally during the period 1950-51 to 1975-76.

The direct consequence of faster growth of housing investment in urban areas as compared to rural areas has been a steadily rising

share of urban areas in aggregate housing investment in the economy. It can be seen from Table 5 that the share of urban areas in the investment in the aggregate investment in residential construction was 38.5 per cent in 1950-51 and it has increased to more than 52 per cent in 1975-76. The share of rural areas in housing investment as correspondingly declined from 61.5 per cent in 1950-51 to less than 48 per cent in 1975-76. Thus, the relatively slow growth of housing investment in rural areas seems to have restricted the overall growth of housing investment in the economy.

The figures given in Table 6 show that aggregate housing investment in Indian economy has failed to keep pace with the aggregate investment on the one hand and national output on the other. Thus, we find that the share of housing investment in total investment has declined considerably from around 29 per cent in 1950-51 to around 10 per cent in 1975-76 in real terms (at 1970-71 prices) and around 11 per cent in money terms (at current prices). Similarly, the share of housing investment in GDP has declined from 3.14 per cent in 1950-51 to 2.45 per cent in 1975-76 when measured at current prices and from 3.97 per cent in 1950-51 to 1.94 per cent in 1975-76 when measured at constant 1970-71 prices. This clearly shows that the growth of housing investment has significantly lagged behind the growth

of investment and output in the economy as a whole. Moreover, it is also evident that the proportion of GDP devoted to residential construction in India is more or less the same as the average proportion observed for the category of underdeveloped countries in the study made by Burns and Grebler. The Indian experience in regard to the share of GDP allocated to residential construction, therefore, does not contradict the hypothesis regarding the stages of housing investment in relation to the levels of general economic development.

4.2 Trends in Housing Stock:

Gross capital formation in residential construction at constant prices indicates the rate at which new houses are being constructed and added to the stock of existing residential dwellings. The extent of current housing investment, therefore, determines the pace at which the actual supply of residential dwellings adjusts to changes in demand. Generally, this adjustment takes place quite slowly, implying that the overall rate of growth of the total housing stock is likely to be low.

The value of total housing stock can be measured by three alternative methods. These alternative methods are: (a) Value of housing stock at constant base period prices; (b) Value of housing stock at current prices, and (c) Value of housing stock at historical cost

or at original purchase prices.*[12]

The first measure indicates the physical growth in housing stock because it represents the changes taking place in the aggregate value of the stock of quality adjusted housing units in the economy as a whole. It is this measure which comes closest to measuring the changes in the supply of residential dwellings. The second measure indicates the aggregate money value of the stock of quality adjusted housing units measured at current prices prevailing in each year. This measure represents the current replacement cost at prevailing market prices of all existing residential dwellings taken together. The third measure indicates the amount actually spent on constructing the existing stock of residential dwellings. It represents accumulated actual expenditures incurred on residential construction during the past periods upto the present period.

We have estimated the aggregate value of housing stock in Indian economy according to each of these three measures from the available information on the value of housing stock and trends in housing investment in the economy. The growth of housing stock based on each of these measures is brought out by the figures given in Table 7.

Table 7

Growth of Housing Stock in India, 1950-51 to 1975-76

Year	Index of the Value of Housing Stock at Historical Cost	Housing Stock at current prices	Housing Stock at constant 1970-71 prices
1	2	3	4
1950-51	100.00	100.00	100.00
1951-52	101.72	106.72	101.30
1952-53	102.39	106.40	101.87
1953-54	103.05	107.31	102.42
1954-55	103.78	108.41	103.03
1955-56	104.70	111.79	103.76
1956-57	107.26	117.70	105.56
1957-58	108.39	123.25	106.39
1958-59	110.14	134.15	107.51
1959-60	112.30	139.88	108.86
1960-61	113.77	147.62	109.77
1961-62	115.38	159.70	110.68
1962-63	116.44	165.96	111.29
1963-64	117.63	173.14	111.92
1964-65	119.20	178.64	112.73
1965-66	123.63	201.44	114.59
1966-67	132.44	224.81	117.99
1967-68	141.68	238.99	121.53
1968-69	153.37	265.08	125.68
1969-70	167.29	291.04	130.40
1970-71	176.10	323.24	133.13
1971-72	187.31	349.59	136.44
1972-73	197.45	392.76	139.14
1973-74	214.23	442.38	143.35
1974-75	228.25	600.07	145.90
1975-76	239.34	705.74	147.48

Source: Appendix Tables 12, 13 and 14.

It can be seen from Table 7 that the increase in the physical stock of residential dwellings as indicated by the index of housing stock at constant 1970-71 prices is of a moderate magnitude. During the period of two and a half decades of economic planning in India, the overall increase in housing stock measured in real terms is only about 47.5 per cent, which implies an average growth rate of 1.57% per annum. During the same period, total population has increased by 67.41 per cent or at an average rate of 2.08% per annum. Thus, during the period 1950-51 to 1975-76, there has been a decline in the per capita value of the physical stock of quality adjusted residential dwellings. The per capita value of the stock of the residential dwellings at 1970-71 prices turns out to be Rs. 602 in 1950-51 which has declined to Rs. 530 in 1975-76.

It should be noted, however, that this overall decline seems to be the result largely of the extremely low rate of growth of housing stock recorded during the first decade of planning. The growth of housing stock appears to have accelerated considerably during the period of ten years following 1965-66. Thus, we find that the growth rate of housing stock in real terms was less than one per cent per annum during the period 1950-51 to 1960-61, whereas it turns out to be as high as 2.56% per annum during the period

1965-66 to 1975-76. Consequently, in recent years, the per capita value of housing stock at constant 1970-71 prices shows some increase from Rs. 510 in 1965-66 to Rs. 530 in 1975-76.

On the whole, it is satisfying to find that the housing growth is accelerating and ultimately catching up with the growth of population in the country, though the accumulated shortage of housing stock that has developed due to slow growth of housing stock in earlier years still continues to persist. The only relieving feature of the growth experience in recent years is that this backlog of housing shortage has perhaps now stopped accumulating further. However, to eliminate the existing backlog of housing shortage, what is required is not just keeping pace with the growth of population but a much higher growth of housing stock as compared to the current rate of population growth. On the basis of our estimates, this still seems to be no where within sight.

V

DETERMINANTS OF HOUSING INVESTMENT IN INDIA

As already discussed in the preceding section, the general level of economic development as indicated by the Gross Domestic Product (GDP) is a major factor that determines the level of aggregate investment in residential construction. In addition to GDP, there can be several other factors which may influence the level of housing investment such as the current rate of return on housing investment, the rate at which housing stock appreciates over time, the total amount accruing to the owners of residential dwellings in the form of rent, the structure of the economy, the rate at which population is growing, etc. We have made an attempt in this section to examine the importance of some of these factors as determinants of housing investment in Indian economy, and also in the rural and urban sectors of the economy, using time series data.

To begin with, we can classify the various factors influencing the housing investment into three broad categories: (a) those which indicate the overall ability to invest in residential construction on the part of all economic units taken together; (b) those indicating the overall returns to investments in housing or indicating the profitability of housing investment; and (c) those indicating the

changes in the structure of the economy.

To measure the ability to invest in residential construction at the macro-economic level, GDP can be used as the main proxy variable. Moreover, inasmuch as the current investment in housing is likely to be financed partly out of the current earnings from the past investment in housing, the aggregate gross rental earned on existing residential dwellings can also be used as an indicator of the ability to invest in housing. Thus, while GDP would indicate the overall ability to invest in housing, gross rental would reflect the 'plough back' effect.

The returns to housing investment can be looked at from three different angles. Firstly, as the current average rate of return on the accumulated aggregate expenditure on housing incurred up to the current period. This can be measured by the ratio of gross rental at current prices to the aggregate value of housing stock at historical cost.*[13] Secondly, return on housing investment can also be viewed from the angle of appreciation in the value of existing housing stock resulting from rising costs of construction, rising land values and the general shortage of housing in the economy. The returns to housing investment accruing in the form of appreciation of housing cost over time can be measured in terms of the ratio of the

aggregate value of existing housing stock at current prices (indicating replacement cost) to the aggregate valuation of housing stock at historical cost (indicating accumulated expenditure at purchase prices). Thirdly, the returns to housing investment can be viewed in terms of rate at which the current price of housing services is rising in relation to the current cost of construction of residential dwellings. This would reflect the rate at which current returns to housing investment are increasing in relation to the current cost. This can be measured in terms of the ratio of the price index of gross rental to the price index of residential construction.

Structural factors influencing aggregate housing investment are relatively more difficult to identify and measure especially in the context of the time series analysis. However, one major indicator of the changing structure of the economy, for which information is readily available, is the structure of national output by sector of origin. The changing structure of the economy can, therefore, be measured in terms of the ratio of GDP originating in the secondary and tertiary sectors of the economy to the corresponding GDP originating in the primary sector of the economy. This ratio would indicate the relative importance of industrial sector and the services sector in the economy in relation to the agricultural

sector. Inasmuch as most of the economic activity in secondary and tertiary sectors is concentrated in urban areas and most of the economic activity in primary sector is concentrated in rural areas, the ratio of GDP in secondary and tertiary sectors to GDP in primary sectors would also reflect to some extent the urban-rural income differential in the economy.

In the light of the above discussion, we can postulate the following functional relationship for analysing the determinants of aggregate housing investment in India:

$$HI = F(Y,R,r,A,P,S) \quad \ldots\ldots \quad (5)$$

where HI = Gross Capital Formation in Residential Dwellings

Y = Gross Domestic Product at factor cost

R = Gross Rental on Residential Dwellings

r = Ratio of Gross rental to the value of the Stock of residential dwellings at historical cost

A = Index of housing stock appreciation as measured by the ratio of the value of residential dwellings at current prices to the corresponding value at historical cost.

P = The ratio of the price index of gross rental to the price index of GCF in residential dwellings

S = The ratio of GDP originating in Secondary and Tertiary sectors to the corresponding GDP originating in the primary sector of the economy

As already discussed above, the factors Y and R are used as proxy variables to indicate the ability to invest in residential construction. Similarly, r, A and P are the factors which indicate the profitability of investment in residential dwellings or the overall returns to housing investment, and S is used as a proxy variable to indicate structural change in the economy. Time series data on each of these variables relating to the economy as a whole and also to rural and urban sectors of the economy are given in Appendix Tables. The time series data available for the economy as a whole cover the period 1950-51 and 1975-76 whereas separate data for rural and urban areas are available for the period 1960-61 to 1975-76.

To estimate the relative importance of each of the above mentioned factors as the determinants of aggregate housing investment in India, we have assumed that the functional relationship shown in equation 5 is linear and it can, therefore, be written as:

$$HI_t = a_0 + a_1 Y_t + a_2 R_t + a_3 r_t + a_4 A_t + a_5 P_t + a_6 S_t + U_t \quad \ldots\ldots \quad (6)$$

where a_0, a_1, a_2, a_3, a_4, a_5, and a_6 are unknown parameters of the equation to be estimated and U_t is the error term.

On a priori grounds, we may expect each of the explanatory variables included in the above functional relationship to have a direct relationship with the dependent variable (viz., housing investment) indicating that the housing investment would tend to vary in the same direction as each of the explanatory variables taken individually taking the rest of the variables as given. This implies that we may expect each of the parameters associated with the explanatory variables in equation 6 to be positive.

To examine the influence of each of the three broad categories of factors determining aggregate housing investment, we can postulate housing investment as a function of only a given category of factors. This would give us the following three functional relationships that can be postulated:

$$HI_t = a_0 + a_1 Y_t + a_2 R_t + U_t \quad \ldots\ldots \quad (7)$$

$$HI_t = b_0 + b_1 r_t + b_2 A_t + b_3 P_t + U_t \quad \ldots\ldots \quad (8)$$

$$HI_t = c_0 + c_1 S_t + U_t \quad \ldots\ldots \quad (9)$$

Equation 7 postulates housing investment as a function only of the economy's ability to invest in residential construction. Equation 8

postulates housing investment exclusively as a function of the returns to housing investment. Equation 9 postulates housing investment to be a function of the structural factors only. As against this, equation 6 postulates housing investment to be a function of all these variables taken together. It may be noted here that since time series data relating to the structure of GDP originating in rural areas and urban areas separately are not available, equation 6 is modified marginally in the case of rural and urban areas to exclude the structural factors, as follows:

$$HI_t = a_0 + a_1 Y_t + a_2 R_t + a_3 r_t + a_4 A_t + a_5 P_t + U_t \quad \ldots\ldots \quad (6a)$$

The estimates of equations 6, 7, 8 and 9 derived from the time series data for the period 1950-51 to 1975-76 relating to Indian economy are given in Table 8. The estimates of equations 6a, 7 and 8 derived for the urban areas and the rural areas separately from the time series data for the period 1960-61 to 1975-76, are given in Tables 9 and 10, respectively.

The following observations can be made on the estimates presented in Table 8: (a) Equation 6 shows a very high explanatory power with R^2 being almost 0.96. This indicates that all the six

Table 8

Results of the Regression Analysis of Housing Investment in India: All Areas

Equation Number	Regression Coefficients							Coefficient of Determination	Adjusted Coefficient of Determination
	Constant Term	GDP (Y)	Gross Rental in Dwellings (R)	Rate of Return on Housing Investment (r)	Index of Housing Stock Appreciation (A)	Ratio of Price Index of Gross Rental and GCF (P)	Structure of GDP in All Sector (S)	(R^2)	$(\bar{R}^2)$
1	2	3	4	5	6	7	8	9	10
Equation 6	3080.85 (2.1487)	0.0352 (1.3131)	0.3823 (0.3890)	43.1954 (0.9435)	-7.9462 (2.9039)	-15.6477 (1.9451)	-7.0754 (1.2668)	0.9565	0.9404
Equation 7	-36.7449 (0.2189)	0.0304 (2.0407)	-0.0254 (0.0474)	- -	- -	- -	- -	0.9251	0.9154
Equation 8	-172.595 (0.0905)	- -	- -	12.1786 (0.2507)	5.9749 (1.8366)	-4.3906 (0.3551)	- -	0.8260	0.7943
Equation 9	-2052.95 (2.6704)	- -	- -	- -	- -	- -	26.8845 (3.5780)	0.3479	0.2935

Note: Figures in brackets indicate t-Ratios.

Source: Appendix Tables 2, 3, 5, 8, 9, 15 and 17.

Table 9

Results of the Regression Analysis of Housing Investment in India: Urban Areas

Equation Number	Regression Coefficients						Coefficient of Determination	Adjusted Coefficient of Determination
	Constant Term	GDP (Y)	Gross Rental in Dwellings (R)	Rate of Return on Housing Investment (r)	Index of Housing Stock Appreciation (A)	Ratio of Price Index of Gross Rental and GCF (P)	(R^2)	$(\bar{R}^2)$
1	2	3	4	5	6	7	8	9
Equation 6a	3747.56 (4.4755)	0.1565 (3.7354)	-3.3718 (2.4210)	189.314 (4.1137)	-14.0069 (6.9133)	-22.5698 (3.2027)	0.9758	0.9612
Equation 7	-121.578 (0.5361)	0.0089 (0.1815)	0.7980 (0.4181)	- -	- -	- -	0.0583	0.0256
Equation 8	3940.92 (2.2465)	- -	- -	277.28 (3.3679)	-8.0736 (2.1733)	-38.0117 (2.8422)	0.0714	0.0285

Note: Figures in brackets indicate t-Ratios.

Source: Appendix Tables 2, 3, 5, 8, 9, 15 and 17.

Table 10

Results of the Regression Analysis of Housing Investment in India: Rural Areas

Equation Number	Regression Coefficients						Coefficient of Determination	Adjusted Coefficient of Determination
	Constant Term	GDP (Y)	Gross Rental in Dwellings (R)	Rate of Return on Housing Investment (r)	Index of Housing Stock Appreciation (A)	Ratio of Price Index of Gross Rental and GCF (P)	(R^2)	$(\bar{R}^2)$
1	2	3	4	5	6	7	8	9
Equation 6a	3849.31 (3.0168)	0.0117 (0.8442)	0.8352 (1.4754)	94.1391 (2.6500)	-9.3817 (3.5478)	-33.3054 (3.1441)	0.9432	0.9092
Equation 7	-144.85 (0.7098)	0.0159 (0.9011)	0.5293 (0.7631)	- -	- -	- -	0.8682	0.8378
Equation 8	5843.02 (2.7402)	- -	- -	141.351 (2.3534)	10.0053 (2.1689)	-51.1697 (2.9261)	0.7904	0.7206

Note: Figures in brackets indicate t-Ratios.

Source: Appendix Tables 2, 3, 5, 8, 9, 15 and 17.

explanatory variables taken together explain about 96% of the variation in housing investment over time. (b) Since there is a very high degree of multi-collinearity among the explanatory variables appearing in equation 6, the estimated regression coefficients of most of the variables have turned out to be statistically insignificant. (c) Among the three different categories of factors, the ability to invest appears to have a very strong influence on aggregate housing investment. This is reflected in the explanatory power of equation 7 with R^2 being as high as 0.93. Between the two indicators of the ability to invest include in equation 7, the coefficient of gross domestic product turns out to be positive and statistically significant, whereas the coefficient of gross rental turns out to be negative and statistically insignificant. This implies that the overall ability to invest as indicated by the economic activity variable of GDP is a major factor influencing the trend in housing investment, whereas the ploughing back effect as indicated by the impact of current gross rental on current housing investment seems to be relatively insignificant. It should be noted that latter result could also be partly due to the multi-collinearity. (d) The profitability of housing investment also appears to be a significant factor in determining the trend in housing investment in the economy. This is reflected in the high explanatory power of equation 8 which

shows that the three measures of returns to housing investment (viz., r, A and P) taken together explain about 83% of the variation in housing investment. (e) The estimates of equation 9 shows that the structure of GDP also plays a significant part in influencing housing investment, though its relative importance as determinant of aggregate housing investment seems to be considerably less than that of the other two types of factors. The estimated coefficient of the ratio of GDP originating in the non-primary sectors to GDP originating in the primary sector turns out to be positive and statistically significant with R^2 being 0.35.

Having examined the determinants of aggregate housing investment in the economy as a whole, we may now turn to the determinants of housing investment in urban areas and rural areas taken separately. Estimates presented in Table 9 bring out the influence of various explanatory factors on housing investment in urban areas, whereas the estimates presented in Table 10 relate to rural areas. The following observations can be made on the estimates given in Tables 9 and 10: (a) Equation 6a shows high explanatory power in urban areas as well as in rural areas, R^2 for urban areas (0.98) being somewhat higher than the corresponding R^2 for rural areas (0.94). This indicates that the ability to invest and the returns to housing investment taken together explained about 98% of the variation in housing investment in urban areas and about 94% of the variation in

rural areas. As in the case of the estimates for the economy as a whole, the estimates of equation 6a for rural and urban areas suffer from multi-collinearity which affects the precision of the regression coefficients of most of the explanatory variables. (b) In urban areas, both the ability to invest as well as the returns on housing investment taken separately appear to be highly significant in determining the trend in housing investment. This is reflected in high explanatory power of almost the same degree revealed by equations 7 and 8 for urban areas, R^2 being 0.86 in the former and 0.85 in the latter. (c) In the case of rural areas, the explanatory power of equation 7 is found to be somewhat higher than that of equation 8. Thus the ability to invest is found to explain about 87% of the variation in housing investment in rural areas, whereas the returns to housing investment explain about 79% of the variation.

The main conclusions which emerge from the above analysis are: (i) Housing investment in Indian economy is determined by a variety of factors such as the economy's ability to invest in residential construction, the profitability of housing investment and the process of structural change in the economy. (ii) Of these factors, however, the ability to invest in residential construction appears to be the most important factor influencing housing investment in the economy

as a whole as well as in the rural and urban sectors of the economy, though the returns to housing investment is also found to be a significant determinant of the aggregate housing investment. (iii) Among the individual factors, GDP appears to be the single most important variable governing the volume of housing investment in the economy. The variations in GDP over time explain more than 85% of variations in housing investment in the rural areas as well as in the urban areas.

VI

DETERMINANTS OF INTERSTATE VARIATIONS IN HOUSING INVESTMENT

As already noted above, aggregate housing investment varies according to the stage of economic development. It should not be surprising, therefore, to find that the volume of housing investment varies from state to state especially in view of the fact that different states have different levels of economic development. The aggregate volume of investment in residential construction would vary among states also because of the differences in the size and population of different states. A more appropriate indicator of the interstate variations in housing investment would, therefore, be per capita gross capital formation in residential dwellings rather than total

GCF in residential dwellings. In this section, we have examined the extent of interstate variation in per capita GCF in residential dwellings and the relative significance of some of the factors influencing this variable. Our analysis is based on the cross-section data for 15 major states and the combined category of other states and union territories taken together relating to the bench-mark year 1970-71.

We have estimated per capita investment in housing in different states for the year 1970-71 from the relevant information available from different sources. Table 11 shows our estimates of per capita GCF in residential dwellings and the position of each state in relation to the national average. It can be seen from the figures given in this table that the per capita investment in residential dwellings per annum varies considerably among different states. Orissa shows the lowest per capita housing investment (Rs. 6.47) whereas other states and union territories show the highest per capita investment in dwellings (Rs. 46.75). The coefficient of variation for per capita housing investment turns out to be 51 per cent which is highly significant. Out of the 15 states, Andhra Pradesh, Assam, Bihar, Karnataka, Madhya Pradesh, Orissa, Rajasthan and Tamil Nadu are the states in which the per capita

Table 11

Statewise Estimates of Per Capita Housing Investment, 1970-71

State	Per Capita GCF in Residential Dwellings (in Rs.)	As percentage of All India Figure
1	2	3
Andhra Pradesh	9.70	52.07
Assam	9.71	52.12
Bihar	15.24	81.80
Gujarat	30.45	163.45
Haryana	22.02	118.20
Karnataka	17.37	93.24
Kerala	22.44	120.45
Madhya Pradesh	13.44	72.14
Maharashtra	19.66	105.53
Orissa	6.47	34.73
Punjab	32.10	172.30
Rajasthan	15.33	82.29
Tamil Nadu	13.93	74.77
Uttar Pradesh	21.51	115.46
West Bengal	21.51	115.46
Other States & Union Territories	46.75	250.94
All India	18.63	100.00

Source: Appendix Table 19.

investment in housing is found to be considerably less than the national average. Similarly, Gujarat, Haryana, Kerala, Punjab and other states and union territories show per capita investment in housing which is significantly higher than the national average. In other states, viz., Maharashtra, Uttar Pradesh and West Bengal, the per capita housing investment seems to be fairly close to the national average.

To examine the factors influencing per capita investment in housing in different states, we can adopt the same framework that we have discussed in the preceding section while analysing the determinants of aggregate housing investment in India. Thus, we can postulate the per capita investment in residential dwellings in different states to be a function of the ability of different states to invest in housing, the returns to housing investment in different states, and the structural differences in various state economies. While it is possible to measure the ability to invest in residential construction in terms of the per capita state domestic product and per capita gross rental in different states, it is rather difficult to measure the returns to housing investment in different states on the basis of available information. For exstimating the importance of different factors in determining the per capita investment

in housing in different states, we have therefore postulated housing investment to be a function of the ability to invest and the structural factors.

The specific functional relationship that we have used for the purpose of estimation is as follows:

$$PCHI_i = a_0 + a_1 PCI_i + a_2 PCR_i + a_3 U_i + a_4 D_i + e_i \quad \ldots\ldots \quad (10)$$

where $PCHI_i$ = Per capita GCF in residential dwellings in i^{th} state

PCI_i = Per capita gross domestic product in i^{th} state

PCR_i = Per capita gross rental in i^{th} state

U_i = Degree of urbanisation measured by the ratio of urban population to total population in i^{th} state

D_i = Degree of urban-rural income differentials measured by the ratio of per capita income in urban areas to the corresponding per capita income in rural areas in i^{th} state

e_i = Error term

The explanatory variables PCI and PCR measure the ability of the state economy to invest in residential construction, whereas U and D indicate the structure of the state economy. On a priori grounds, the per capita housing investment is expected to vary directly with each

of these explanatory variables implying that the coefficients of these variables in the estimated equation are expected to be positive.

To examine the separate influence of the ability to pay on the one hand and the structural factors on the other hand on per capita GCF in residential dwellings, we can estimate the following two equations:

$$PCHI_i = b_0 + b_1 PCI_i + b_2 PCR_i + e_i \quad \cdots\cdots \quad (11)$$

$$PCHI_i = c_0 + c_1 U_i + c_2 D_i + e_i \quad \cdots\cdots \quad (12)$$

The estimates of equations, 10, 11 and 12 derived from the cross-section data on the above variables for 16 states (15 states and other states and union territories taken together) relating to the year 1970-71 are presented in Table 12.

The following observations regarding the determinants of interstate variations in housing investment can be made from the estimates presented in Table 12: (a) Equation 10 has a fairly satisfactory explanatory power, the R^2 being 0.77. This indicates that the four explanatory variables considered above (viz., per capita income, per capita gross rental, degree of urbanisation and urban-rural

Table 12

Determinants of Inter-State Variation in Housing Investment: Results of the Regression Analysis

Equation Number	Regression Coefficients					Coefficient of Determination	Adjusted Coefficient of Determination
	Constant Term	Per capita State Income (Y)	Per capita Gross Rental (R)	Degree of Urbanisation (U)	Urban/Rural Income differential (D)	(R^2)	($\bar{R}^2$)
1	2	3	4	5	6	7	8
Equation 10	-7.4916 (1.0014)	0.0321 (4.1896)	0.1236 0.5109	-0.0591 (0.1785)	0.0055 (0.2518)	0.7743	0.6717
Equation 11	-5.9855 (1.3302)	0.0310 (5.2928)	0.0984 (0.5842)	- -	- -	0.7724	0.7199
Equation 12	7.3122 (0.7660)	- -	- -	0.7789 (2.8993)	-0.0147 (0.4665)	0.4089	0.2725

Note: Figures in brackets indicate t-Ratios.

Source: Appendix Table 20.

income differentials) account for about 77% of the interstate variation in per capita investment in housing. Out of these four explanatory variables, the regression coefficient of per capita state income is found to be positive and statistically significant at 1% level of significance, while the coefficients of other variables are found to be statistically insignificant. (b) the explanatory power of equation 11 is also found to be fairly high, the value of R^2 being 0.77. This indicates that the ability of state economies to invest in residential construction as measured by per capita state income and per capita rental account for 77% of the variation. In this equation also, per capita GDP is found to be statistically significant at 1% level. (c) Equation 12 does not have a very high explanatory power, though it is found to be statistically significant. The proportion of interstate variation in housing investment which is explained by the structural factors as measured by the degree of urbanisation and the urban-rural income differentials turns out to be 41%. Of the two structural factors, the regression coefficient of degree of urbanisation is found to be positive and statistically significant at 5% level of significance.

The conclusions that can be derived from the analysis of interstate variations in per capita housing investment are:

(i) The ability to invest seems to be the major factor determining the magnitude of housing investment in different states. This conclusion, which emerges from the analysis of cross-section data for the year 1970-71 seems to be well in line with one that has been derived from the analysis of time series data. Thus, the general level of economic activity and the resulting ability to invest appear to be the major factor determining the volumes of housing investment in India both over a period of time and also across the regions. (ii) The structural factors seems to be playing a significant but essentially a supportive role in determining the magnitude of housing investment in different states. (iii) Among the specific explanatory variables that can be considered significant while analysing interstate variations in housing investment, per capita state income and degree of urbanisation appear to be the two most important factors influencing housing investment in different states.

VII

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 aggregate demand for housing in India seems to be inelastic with respect to both income as well as relative price of housing services.

2. The value of income elasticity of demand for housing in Indian economy according to our estimates is around 0.45, while the price elasticity of demand for housing services is around -0.25. Thus, the magnitude of income elasticity of demand for housing seems to be greater than the magnitude of price elasticity indicating that the demand for housing in Indian economy is more responsive to changes in income given the relative price of housing than to changes in the relative price given the income.

3. Values of both income as well as price elasticity of demand for housing seem to be greater in the urban areas as compared to the rural areas indicating that the demand for housing is comparatively more responsive to changes in income and relative prices in urban areas than in rural areas.

4. There is a significant variation in the values of income and price elasticity of demand for housing among different states. This is indicated by the magnitude of the coefficient of interstate variation which turns out to be as high as 0.94 in the case of income elasticity and 1.16 in the case of price elasticity of demand for housing.

5. The estimated income elasticity of demand for housing turns out to be statistically significant in almost every state. Moreover, it is also found to be significantly less than unity in most of the states though the degree of inelasticity differs widely from state to state.

6. The estimated price elasticity of demand for housing turns out to be statistically significant in only 8 out of 15 states, for which the estimates have been prepared. In all cases where the estimated price elasticity is found to be statistically significant, it is also found to be negative and significantly less than unity indicating that the demand for housing in most states appears to be considerably inelastic with respect to relative price of housing.

7. There is no correlation between the value of income elasticity and the corresponding value of price elasticity estimated for different states. This indicates that no conclusion regarding the likely value of one elasticity can be drawn from any a priori knowledge regarding the value of the other elasticity.

8. While there seems to be a significant increase in the aggregate housing investment in Indian economy at current prices, the increase measured in real terms is much less impressive and can even be regarded as inadequate. Moreover, the aggregate housing investment measured at constant prices shows marked fluctuations around a mild upward trend.

9. During the last two and a half decades, the housing investment in Indian economy has failed to keep pace with the aggregate investment on the one hand and national output on the other. Consequently, the share of housing investment in total investment and also in gross domestic product has declined significantly during the period 1950-51 to 1975-76.

10. The share of urban areas in aggregate housing investment in Indian economy has increased significantly during the period 1950-51 to 1975-76. This indicates a relatively slow growth of housing investment in rural areas which in turn seems to have restricted the overall growth of housing investment in the economy.

11. On an average, the share of GDP allocated to residential construction in India during the sixties turns out to be more or less the same as the average value of this proportion (2.7) observed for the category of underdeveloped countries having per capita GDP of less than $350.

12. During the period 1950-51 to 1975-76, the overall increase in housing stock measured in real terms has lagged behind the corresponding growth of population. Consequently, the per capita value of the stock of residential dwellings has declined during this period. However, most of the decline is confined to the fifties and the per capita value of housing stock actually shows an increase between the 1965-66 and 1975-76. This indicates that in recent years the backlog of housing shortage has perhaps stopped accumulating further.

13. Aggregate housing investment in Indian economy is determined by a variety of factors such as the economy's ability to invest in residential construction, the profitability of housing investment and the process of structural change in the economy. These factors taken together account for about 96 per cent of the variation in housing investment during the period 1950-51 to 1975-76.

14. Among these factors, the ability to invest in residential construction appears to be the most important factor influencing housing investment in the rural sector of the economy. In urban areas, however, both the ability to invest as well as the returns of housing investment appear to be highly significant in determining housing investment.

15. Per capita investment in housing shows a considerable degree of variation among different states, the coefficient of interstate variation being as high as 0.51 in the year 1970-71.

16. Variations in the ability of the state economy to invest in residential construction and also in the structure of the state economy explain about 77 per cent of the observed

interstate variation in per capita housing investment. Among these two factors, the ability to invest in housing appears to be more important in determining the volume of housing investment in different states as compared to the structure of the state economy, though the latter is also found to be statistically significant. This implies that while the ability to invest appears to be the primary factor determining the volume of housing investment, the structural factors also play a significant but essentially a supportive role in determining housing investment in different states.

APPENDIX

NOTE ON SOURCES OF DATA AND METHODOLOGY OF ESTIMATION

The purpose of this note is to discuss the method by which the various series of data relating to the housing sector required for the present study have been derived from the available official and other sources of information.

To estimate the elasticities of demand for housing on the basis of time series data, we require information on the following variables: (a) gross rental at constant prices; (b) gross domestic product at constant prices, and (c) price indexes for gross rental and gross domestic product. Inasmuch as the elasticities of housing demand are to be estimated for the rural and urban sectors of the economy and also separately for each state, we require time series data on these variables for the country as a whole with rural and urban break-up as well as for each state.

To conduct the time series analysis of investment in housing, we require data on the following variables for the economy as a whole as well as separately for rural areas and urban areas over a fairly long time period: (a) gross capital formation in residential dwellings; (b) gross domestic product; (c) gross rental earned on residential dwellings; (d) price indexes for gross rental and also for gross

capital formation in residential dwellings; and (e) value of the stock of residential dwellings at historical cost, at current prices and also at constant prices.

In addition to this, to conduct the cross-section analysis of investment in housing, we require data on the following variables for each state: (a) gross capital formation in residential dwellings; (b) per capita income; (c) degree of urbanisation; and (d) urban-rural income differential.

The details regarding the method of estimation and the sources of data underlying the required series for each of the above-mentioned variables that we have used for the purpose of our analysis are provided in the following methodological notes on each series.

A. Time Series Data:

Time series data on housing demand, investment and related variables that we have used for our study relate to (a) the economy as a whole, (b) rural sector of the economy, and (c) urban sector of the economy and generally cover the period 1950-51 to 1975-76, though in some cases the time series cover the period from 1960-61 to 1975-76.

1. Gross Rental on Residential Dwellings: Official estimates of gross rental on residential dwellings (or gross domestic product originating in the sector 'Ownership of Dwellings') are prepared by the

Central Statistical Organization (CSO), Government of India. These estimates are available from the various issues of the white paper on National Accounts Statistics published by the CSO.*14 The Disaggregated Tables provide information on gross domestic product in residential dwellings (gross rental) separately by rural and urban areas and at current as well as constant prices.*15 However, due to minor modifications in the methodology of estimation and the availability of more recent data, the estimates for the period 1970-71 to 1975-76 given in the latest issue of the white paper of National Accounts Statistics are not fully comparable with the estimates relating to the earlier period given in the previous issues of National Accounts Statistics. To prepare a comparable time series, we have, therefore, carried the latest CSO estimates for the bench-mark year 1970-71 backwards with the help of the corresponding index numbers of gross rental (with 1970-71 = 100) derived from the CSO's estimates of gross rental for the period 1950-51 to 1970-71 available from the previous issues of National Accounts Statistics. We have used this method to derive the comparable estimates of gross rental at current as well as at constant 1970-71 prices separately for rural and urban areas. By following a similar procedure, we have also derived the corresponding estimates of depreciation allowance in residential dwellings. It may be noted here that since the Disaggregated Tables do not provide the

estimates of gross rental in rural and urban areas at current prices for the period before 1960-61, the estimates of gross rental in rural and urban areas at current prices relate only to the period 1960-61 to 1975-76, while the estimates of gross rental in rural and urban areas at constant 1970-71 prides as well as the estimates of gross rental in residential dwellings for the economy as a whole at current and constant 1970-71 prices relate to the entire 25 year period, i.e., 1950-51 to 1975-76.*16

2. Gross Domestic Product: Official estimates of gross domestic product by industry of origin are available from the various issues of the white paper on National Accounts Statistics published by the CSO.*17 The comparable estimates of gross domestic product by industry of origin (16 sectors) at current prices as well as at constant 1970-71 prices are derived by following the same method that we have described above in connection with the derivation of the time series of gross rental on residential dwellings.

Since no estimates are available for the gross domestic product originating in rural areas and urban areas separately, we have used the gross domestic product originating in the primary sector as a proxy for the gross domestic product in rural areas. Similarly,

we have used the gross domestic product originating in all other sectors taken together as a proxy for the gross domestic product in urban areas.

3. Gross Capital Formation in Residential Dwellings: Official estimates of gross capital formation by industry of use at current as well as at constant prices are available from the various issues of National Accounts Statistics published by the CSO. From this information, we have derived the comparable time series of gross capital formation in the sector 'real estate, ownership of dwellings and business services' for the period 1950-51 to 1975-76 by linking the estimates available from different issues of National Accounts Statistics by using the method already described above.

From the unpublished work done at the CSO, the estimates of gross capital formation in residential dwellings (which constitutes one of the sub-sectors of 'real estate, ownership of dwellings and business services') are available together with their rural-urban breakup for the period 1970-71 to 1975-76. We have derived the time series of gross capital formation in residential dwellings by carrying the corresponding unpublished CSO estimates for the year 1970-71 backwards with the help of comparable estimates of GCF in

real estate, ownership of dwellings and business services. To derive the estimates of GCF in residential dwellings in rural areas and urban areas, we have carried the proportion of GCF in residential dwellings in urban areas to GCF in residential dwellings in all areas (implicit in the unpublished CSO estimates for the year 1970-71), with the help of the corresponding proportions implicit in the official estimates of gross domestic product originating in residential dwellings in urban areas and in all areas, respectively. The rural-urban break-up of GCF in residential dwellings is, then, obtained by applying the proportions of urban areas to all areas, so derived, to the corresponding comparable estimates of GCF in residential dwellings. This entire exercise is done separately for the estimates at current prices and at constant 1970-71 prices.

By using a similar method, we have also derived the estimates of depreciation allowance for residential dwellings at current and at constant prices separately for rural and urban areas for the entire period under consideration. The estimates of net capital formation in residential dwellings are then derived as the difference between GCF in residential dwellings and the corresponding depreciation allowance.

4. Price Indexes: The price indexes for gross rental on residential dwellings (with 1970-71 = 100) for rural areas, urban areas and the economy as a whole are derived as the ratios of the estimates at current prices and the corresponding estimates at constant 1970-71 prices. Price indexes for gross domestic product and gross capital formation in residential dwellings in rural areas, urban areas and the economy as a whole are also derived by following a similar procedure.

5. Value of the Stock of Residential Dwellings: Official estimates of the value of capital stock in the form of residential dwellings are not available. A recent study made by the Reserve Bank of India, however, provides the estimates of the stock of residential dwellings in rural areas and urban areas as on March 31, 1961 (i.e., relating to the year 1960-61) valued at current prices.*18 We have used the RBI estimates as the bench-mark estimates of housing stock. However, we have adjusted the RBI estimates for the price changes between 1960-61 and 1970-71 by using the price index for gross capital formation in residential dwellings to derive the bench-mark estimates of value of residential dwellings in 1960-61 at 1970-71 prices. Since we have already derived the comparable estimates of net capital formation in residential dwellings at 1970-71 prices in the period 1950-51 to 1975-76, we have followed the perpetual inventory method to derive the time series of the value of residential dwellings in

rural and urban areas at constant 1970-71 prices from the bench-mark estimates for 1960-61 derived from the RBI study.

From the time series of the value of housing stock at 1970-71 prices, we have derived the time series of value of housing stock at current prices by using the price index for GCF in residential dwellings. To derive the value of residential dwellings at historical cost or at original purchase prices, we have used the following procedure. The estimated value of residential dwellings in 1950-51 at current prices is assumed to consist of accumulated expenditures on residential construction incurred over a period of four preceding decades. Moreover, the time profile of accumulation is assumed to be uniform over the four decades. This gives us the estimates of capital accumulation in residential dwellings during the period 1910-11 to 1950-51 at 1950-51 prices. The price index for residential dwellings is extrapolated backwards to cover the four preceding decades by using the average annual rate of change in the price index of GCF in residential dwellings observed during the period 1950-51 to 1955-56. By using the estimates of capital accumulation at 1950-51 prices and the price index of residential dwellings so derived, we have estimated the capital accumulation in residential dwellings at current prices during the period 1910-11 to 1950-51 and by aggregating these values we have derived the estimated value of residential dwellings in

1950-51 at historical cost. The time series of the value of residential dwellings at historical cost for the period 1950-51 to 1975-76 is then derived by carrying the bench-mark figures for 1950-51 forward by adding net capital formation in residential dwellings at current prices estimated for each year for the period under consideration.

The time series of gross rental, gross domestic product, gross and net capital formation in residential dwellings, price indexes for gross rental, gross domestic product & gross capital formation in residential dwellings, and the value of the stock of residential dwellings at 1970-71 prices, at current prices and at historical cost, so derived, are presented in Appendix Tables 1 to 14. The estimates of rate of return on housing stock at current and at constant 1970-71 prices implicit in the corresponding estimates of gross rental on residential dwellings and the value of housing stock at historical cost and at 1970-71 prices respectively are presented in Appendix Tables 15 & 16. Similarly, the indexes showing the rate at which aggregate housing stock has appreciated in value over time are presented in Appendix Table 17.

8. Time Series Data on rental and aggregate income for each State

The estimates of net domestic product by industry of origin at current as well as at constant prices for each state are prepared by the respective State Statistical Bureaus. From these estimates, we have obtained the data on net rental at current as well as at constant prices and also the data on net domestic product at current as well as at constant prices for each state, for the period 1960-61 to 1970-71. We have derived the index of relative price of housing services as the ratio of the implicit price index for rental to the corresponding implicit price index for State Domestic Product for each state. In the case of four States, namely Andhra Pradesh, Assam, Bihar and Haryana, comparable time series estimates of the required variables are not available for a few years in the period under consideration. For these States, we have, therefore, used the time series estimates for only those years in the period 1960-61 to 1970-71 for which comparable estimates are available. The estimates of net rental at constant prices, State Domestic Product at constant prices and the index of relative price of housing services for different states covering the period 1960-61 to 1970-71 are presented in Appendix Table 18.

C. Cross-Section Data:

The cross-section data relating to housing investment and the factors influencing it that we have used in our analysis represent the relevant information on major states and relate to the bench-mark year 1970-71.

1. GCF in Residential Dwellings: Direct information on gross capital formation in residential dwellings in different states is not available from the official source and not much research work seems to have been done in this field by private research scholars. Some estimates of gross capital formation in residential dwellings in rural areas can, however, be derived from the estimates of the total value of buildings owned by rural households which are prepared by the Reserve Bank of India for the two bench-mark years, viz. 1961-62 and 1971-72.*[19] We have used this information to estimate the gross capital formation in residential dwellings in rural areas in different states for the year 1970-71 by allocating the GCF in residential dwellings in rural areas estimated for the country as a whole for the year 1970-71 among the states in the same proportion as the implicit GCF in residential dwellings in rural areas in different states obtained from the RBI studies.

Since no information is available on GCF in dwellings in urban areas at the state level, we have estimated the same by

assuming that the inter-state profile of per capita investment in housing in urban areas is the same as the corresponding profile observed for rural areas. The estimates of GCF in residential dwellings in different states for the year 1970-71 are, then, derived by adding together the corresponding state-wise estimates of GCF in dwellings in rural areas and urban areas.

2. State Per Capita Income: Estimates of net domestic product and the per capita income are prepared by the Statistical Bureau of each state. However, these estimates are not directly comparable for various reasons.*20 The comparable estimates of state domestic product by industry of origin for the bench-mark year 1970-71 are, however, available from a recent study made by R.H. Dholakia.*21 We have used these estimates to allocate the estimated GDP in each of the sixteen sectors in 1970-71, for which the official estimates for the economy as a whole are available, among different states. Comparable estimates of per capita GDP in each state for the year 1970-71 are then derived from the estimated GDP and population figures obtained from 1971 population census.

3. Degree of urbanisation: The information regarding proportion of urban population to total population is available directly from the 1971 Population Census. We have used the ratio of urban population

to total population for different states derived from the 1971 census to measure the degree of urbanization for the bench-mark year 1970-71.

5. Urban-Rural Income Differential: No information is available from the official source on the extent of urban-rural income differential in different states. A recent study on this subject made by B.H. Dholakia and R.H. Dholakia, however, provides the estimates for per capita income in rural areas and urban areas in different states for the year 1970-71.*22 We have used the ratio of urban per capita income to rural per capita income available from this study for the purpose of our analysis.

The state-wise estimates of GCF in residential dwellings in 1970-71 are presented in Appendix Table 19. The estimates of per capita GCF in dwellings, per capita GDP, per capita gross rental, degree of urbanisation and urban-rural income differential for different states are presented in Appendix Table 20.

NOTES AND REFERENCES

*1 For a comprehensive bibliography of research on Economics of Housing and also a brief survey of the research work which has already been done in this field, see, Roy K. Wilkinson and Stuart Gulliver: 'Housing: Economic Research', in Social Policy: A Survey of Recent Developments, Edited by Michael H. Cooper (Basil Blackwell: Oxford, 1973).

*2 C.f. Susan Charles: Housing Economics, (Macmillan Press Ltd., 1977), ch 2

*3 For useful bibliography of the studies on Elasticity of Demand for Housing and also a pre-survey of their main findings, see R.K. Wilkinson: 'The Income Elasticity of Demand for Housing', Oxford Economic Papers, Vol.25, No.3, November 1973.

*4 C.f. (i) Houthakker, H.S., 'The Present State of Consumption Theory', A Survey Article, Econometrica, Vol.29, No.4, 1961
(ii) Lesser, C.E.V., 'Commodity Group Expenditure Functions for the United Kingdom, 1948-57, Econometrica, Vol.29, pp.24-32, 1961
(iii) Lee, T.H., 'The Stock Demand Elasticities for Non-Farm Housing, The Review of Economics and Statistics, Vol.XIV, No.2, 1964
(iv) R.K. Wilkinson: 'The Income Elasticities of Demand for Housing', Oxford Economic Papers, Vol.25, no.3, November 1973.
(iv) Joan Vipond and J.B. Walker: 'The Determinants of Housing Expenditure and Owner Occupation', Bulletin of the Oxford University Institute of Economics and Statistics, Vol.34, No.2, May 1972.

*5 C.f. (i) Grebler, L.T., Housing Market Behaviour in a Declining Area. (Columbia, 1952).
(ii) Muth, R.F. 'The Demand for Non-Farm Housing' in A.C. Haberger, The Demand for Durable Goods, pp. 29-96, 1960
(iii) Reid, M.G., Housing and Income (University of Chicago Press, 1962)
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*6 R.K. Wilkinson: 'The Income Elasticity of Demand for Housing', op.cit.

*7 C.f. (i) E.J. Howenstine: 'Appraising the Role of Housing in Economic Development', International Labour Review, January 1957
(ii) D.V. Dennison, The Government of Housing (Baltimore, Md: Penguin, 1967).
(iii) S. Kuznets, 'Quantitative Aspects of the Economic Growth of Nations, Part V, Capital Formation Proportions: International Comparisons for Recent Years, Economic Development and Cultural Change, Part II, July 1960
(iv) W.P. Strassmann, 'The Construction Sector in Economic Development', Scottish Journal of Political Economy, 1970
(v) L.S. Burnesand L. Grebler: 'The Housing of Nations: Analysis and Policy in a Comparative Framework (The Macmillan Press Ltd., 1977) ch.2

*8 E.J. Howenstine: 'Processing the Role of Housing in Economic Development', op.cit.

*9 W.P. Strassmann: 'The Construction Sector in Economic Development', op.cit.

*10 L.S. Burnesand L. Grebler: 'The Housing of Nations', op.cit.

*11 S. Kuznets, 'Quantitative Aspects of the Economic Growth of Nations, Part VI, 'Long Term Trends In Capital Formation Proportions', Economic Development and Cultural Change, Part II, July 1961

*12 For a discussion of the problems that arise in the measurement of capital stock and the alternative concepts and methods of measurement of capital, see Bakul H. Dholakia: The Sources of Economic Growth in India (Good Companions, 1974), Ch.5

*13 This would be the case if we are trying to explain the trends in housing investment at current prices. If, however, we are trying to explain the trends in housing investment at constant prices or in real terms, this aspects of the return on housing investment would be reflected by the ratio of gross rental at constant prices to the value of housing stock at the same base period at constant prices.

*14 Central Statistical Organization, Government of India:
(i) National Accounts Statistics, 1960-61 to 1972-73, January 1975;
(ii) National Accounts Statistics, 1960-61 to 1974-75, October 1976; and
(iii) National Accounts Statistics, 1970-71 to 1975-76, January 1978.

*15 Central Statistical Organization , Government of India: National Accounts Statistics, 1960-61 to 1972-73: Disaggregated Tables; March 1975. (This publication provides data at constant 1960-61 prices for the period 1950-51 to 1972-73).

*16 The estimates of net rental in residential dwellings for the economy as a whole at current prices for the period 1950-51 to 1959-60 are derived from the corresponding official estimates at constant 1960-61 prices by using the price index for the sector 'Finance and Real Estate' available from the following study: Uma Dutta Roy Chaudhury and Pratap Narayan: "National Income Statistics: What They Tell", Economic and Political Weekly, September 14, 1975.

The estimates of depreciation allowance for residential dwellings at current prices for the period 1950-51 and 1959-60 are obtained from the corresponding official estimates at constant 1960-61 prices by applying the implicit price index for gross capital formation in residential dwellings derived from the CSO estimates of GCF in residential dwellings at current and constant 1960-61 prices for the same period. The estimates of gross rental at current prices for the period 1950-51 to 1959-60 are then derived by adding the corresponding estimates of net rental and depreciation allowance.

*17 For references, see Footnote No.14.

*18 Reserve Bank of India: "Estimates of Tangible Wealth in India", Reserve Bank of India Bulletin, October 1972.

*19 C.f. (i) Reserve Bank of India: "All India Rural Debt and Investment Survey, 1961-62", Reserve Bank of India Bulletin, June 1965;
(ii) Reserve Bank of India: All India Debt and Investment Survey, 1971-72, Statistical Tables, Vol.1, 1975

*20 For a discussion on the available estimates of state income in India and the factors underlying their non-comparability, see Ravindra H. Dholakia: Inter-State Variation in Economic Growth in India, (Unpublished Ph.D. thesis, M.S. University of Baroda, April 1977); Ch.2.

*21 Ibid.

*22 B.H. Dholakia and R.H. Dholakia: "Urban-Rural Income Differentials in India: An Inter-Regional Analysis", Indian Journal of Industrial Relations, Volume 14, No.2, October 1978.

Appendix Table 1

Estimates of Gross Rental on Residential Dwellings at 1970-71 prices

(Rupees Crores)

Year	Rural Areas	Urban Areas	All Areas
1	2	3	4
1950-51	547	319	866
1951-52	557	331	888
1952-53	564	343	907
1953-54	575	355	930
1954-55	584	369	953
1955-56	594	383	977
1956-57	603	397	1000
1957-58	612	413	1025
1958-59	623	428	1051
1959-60	634	444	1078
1960-61	643	462	1105
1961-62	654	474	1128
1962-63	662	490	1152
1963-64	673	504	1177
1964-65	682	518	1200
1965-66	691	534	1225
1966-67	715	559	1274
1967-68	723	569	1292
1968-69	730	579	1309
1969-70	734	589	1323
1970-71	741	609	1350
1971-72	751	629	1380
1972-73	761	642	1403
1973-74	772	665	1437
1974-75	783	685	1468
1975-76	795	705	1500

Appendix Table 2

Estimates of Gross Rental on Residential Dwellings at current prices

(Rupees Crores)

Year	Rural Areas	Urban Areas	All Areas
1	2	3	4
1950-51	N.A.	N.A.	485
1951-52	N.A.	N.A.	512
1952-53	N.A.	N.A.	504
1953-54	N.A.	N.A.	520
1954-55	N.A.	N.A.	496
1955-56	N.A.	N.A.	519
1956-57	N.A.	N.A.	566
1957-58	N.A.	N.A.	596
1958-59	N.A.	N.A.	539
1959-60	N.A.	N.A.	666
1960-61	424	277	701
1961-62	442	297	739
1962-63	466	324	790
1963-64	511	363	874
1964-65	538	395	933
1965-66	573	413	986
1966-67	615	449	1064
1967-68	634	477	1111
1968-69	661	509	1170
1969-70	696	551	1247
1970-71	741	609	1350
1971-72	785	675	1460
1972-73	849	739	1588
1973-74	911	829	1740
1974-75	976	939	1915
1975-76	1033	1052	2085

Appendix Table 3

Price Index for Gross Rental on Residential Dwellings

Year	Rural Areas	Urban Areas	All Areas
1	2	3	4
1950-51	N.A.	N.A.	56.00
1951-52	N.A.	N.A.	57.66
1952-53	N.A.	N.A.	55.57
1953-54	N.A.	N.A.	55.91
1954-55	N.A.	N.A.	52.05
1955-56	N.A.	N.A.	53.12
1956-57	N.A.	N.A.	56.60
1957-58	N.A.	N.A.	58.15
1958-59	N.A.	N.A.	60.80
1959-60	N.A.	N.A.	61.78
1960-61	65.94	59.96	63.44
1961-62	67.58	62.66	65.51
1962-63	70.39	66.12	68.58
1963-64	75.93	72.02	74.26
1964-65	78.89	76.25	77.75
1965-66	82.92	77.34	80.49
1966-67	86.01	80.32	83.52
1967-68	87.69	83.83	85.99
1968-69	90.55	87.91	89.38
1969-70	94.82	93.55	94.26
1970-71	100.00	100.00	100.00
1971-72	104.53	107.32	105.80
1972-73	111.56	115.11	113.19
1973-74	118.01	124.66	121.09
1974-75	124.65	137.08	130.45
1975-76	129.94	149.22	139.00

Appendix Table 4

Estimates of Gross Domestic Product at 1970-71 prices

(Rupees crores)

Year	Primary Sector	Secondary and Tertiary Sectors	All Sectors
1	2	3	4
1950-51	10421	7160	17581
1951-52	10606	7325	17931
1952-53	11149	7415	18564
1953-54	12010	7721	19731
1954-55	12071	8211	20282
1955-56	12087	8837	20924
1956-57	12692	9379	22071
1957-58	12100	9591	21691
1958-59	13403	10120	23523
1959-60	13222	10732	23954
1960-61	14036	11567	25603
1961-62	14180	12334	26514
1962-63	13877	13194	27071
1963-64	14272	14194	28466
1964-65	15531	15156	30687
1965-66	13524	15562	29086
1966-67	13400	15975	29375
1967-68	15367	16565	31932
1968-69	15472	17317	32789
1969-70	16428	18433	34861
1970-71	17762	19176	36938
1971-72	17672	19843	37515
1972-73	16561	20538	37099
1973-74	17805	21130	38935
1974-75	17461	21545	39006
1975-76	19373	22918	42291

Appendix Table 5

Estimates of Gross Domestic Product at Current Prices

(Rupees Crores)

Year	Primary Sector	Secondary and Tertiary Sectors	All Sectors
1	2	3	4
1950-51	5112	4158	9270
1951-52	5219	4399	9618
1952-53	5068	4304	9372
1953-54	5565	4461	10026
1954-55	4541	4833	9374
1955-56	4735	4918	9653
1956-57	5821	5313	11134
1957-58	5548	5628	11176
1958-59	6544	5996	12540
1959-60	6527	6409	12936
1960-61	7136	6984	14120
1961-62	7391	7558	14949
1962-63	7573	8320	15893
1963-64	8758	9399	18157
1964-65	10650	10685	21335
1965-66	10462	11642	22104
1966-67	12434	13127	25561
1967-68	15331	14617	29948
1968-69	14994	15632	30626
1969-70	16457	17417	33874
1970-71	17762	19176	36938
1971-72	18420	21065	39485
1972-73	20202	23259	43461
1973-74	26969	27058	54027
1974-75	29975	33507	63482
1975-76	28263	36988	65251

Appendix Table 6

Price Index for Gross Domestic Product

Year	Primary Sector	Secondary and Tertiary Sectors	All Sectors
1	2	3	4
1950-51	49.05	58.07	52.73
1951-52	49.21	60.05	53.64
1952-53	45.46	58.04	50.48
1953-54	46.34	57.78	50.81
1954-55	37.62	58.86	46.22
1955-56	39.17	55.65	46.13
1956-57	45.86	56.65	50.45
1957-58	45.85	58.68	51.52
1958-59	48.82	59.25	53.31
1959-60	49.36	59.72	54.00
1960-61	50.84	60.38	55.15
1961-62	52.12	61.28	56.38
1962-63	54.57	63.06	58.71
1963-64	61.36	66.22	63.78
1964-65	68.57	70.50	69.52
1965-66	77.36	74.81	76.00
1966- 67	92.79	82.17	87.02
1967-68	99.77	88.24	93.79
1968-69	96.91	90.27	93.40
1969-70	100.18	94.49	97.17
1970-71	100.00	100.00	100.00
1971-72	104.24	106.16	105.25
1972-73	121.99	113.25	117.15
1973-74	151.47	128.05	138.76
1974-75	171.67	155.52	162.75
1975-76	145.89	161.39	154.29

Appendix Table 7

Estimates of Gross Capital Formation in Residential Dwellings at 1970-71 Prices

(Rupees Crores)

Year	Rural Areas	Urban Areas	All areas
1	2	3	4
1950-51	413	285	698
1951-52	362	255	617
1952-53	267	192	459
1953-54	264	194	458
1954-55	269	203	472
1955-56	283	218	501
1956-57	411	325	736
1957-58	290	236	526
1958-59	326	270	596
1959-60	350	296	646
1960-61	296	257	553
1961-62	298	262	560
1962-63	263	236	499
1963-64	264	240	504
1964-65	283	263	546
1965-66	402	380	782
1966-67	582	556	1138
1967-68	597	575	1172
1968-69	666	648	1314
1969-70	726	717	1443
1970-71	507	514	1021
1971-72	541	616	1157
1972-73	522	507	1029
1973-74	610	760	1370
1974-75	469	550	1019
1975-76	391	429	820

Appendix Table 8

Estimates of Gross Capital Formation in Residential Dwellings at Current Prices

(Rupees Crores)

Year	Rural Areas	Urban Areas	All areas
1	2	3	4
1950-51	179	112	291
1951-52	165	106	271
1952-53	120	80	200
1953-54	119	81	200
1954-55	122	85	207
1955-56	132	93	225
1956-57	198	144	342
1957-58	146	108	254
1958-59	176	134	310
1959-60	195	151	346
1960-61	173	137	310
1961-62	185	151	336
1962-63	168	141	309
1963-64	173	150	323
1964-65	189	169	358
1965-66	304	267	571
1966-67	476	424	900
1967-68	497	457	954
1968-69	589	556	1145
1969-70	675	657	1332
1970-71	507	514	1021
1971-72	567	653	1220
1972-73	603	592	1195
1973-74	780	962	1742
1974-75	789	936	1725
1975-76	770	846	1616

Appendix Table 9

Price Index For Gross Capital Formation in Residential Dwellings

Year	Rural Areas	Urban Areas	All Areas
1	2	3	4
1950-51	43.47	39.65	41.69
1951-52	45.79	41.76	43.92
1952-53	45.43	41.43	43.57
1953-54	45.53	41.53	43.67
1954-55	45.73	41.71	43.86
1955-56	46.82	42.71	44.91
1956-57	48.45	44.19	46.47
1957-58	50.35	45.92	48.29
1958-59	54.23	49.46	52.01
1959-60	55.84	50.93	53.56
1960-61	58.45	53.31	56.06
1961-62	62.08	57.63	60.00
1962-63	63.88	59.75	61.92
1963-64	65.53	62.50	64.09
1964-65	66.78	64.26	65.57
1965-66	75.62	70.26	73.02
1966-67	81.79	76.26	79.09
1967-68	83.25	79.48	81.40
1968-69	88.44	85.80	87.14
1969-70	92.98	91.63	92.31
1970-71	100.00	100.00	100.00
1971-72	104.81	106.01	105.45
1972-73	115.52	116.77	116.13
1973-74	127.87	126.58	127.15
1974-75	168.23	170.18	169.28
1975-76	196.93	197.20	197.07

Appendix Table 10

Estimates of Net Capital Formation in Residential Dwellings at 1970-71 prices

(Rupees crores)

Year	Rural Areas	Urban Areas	All areas
1	2	3	4
1950-51	203	162	365
1951-52	150	131	281
1952-53	53	69	122
1953-54	47	73	120
1954-55	50	82	132
1955-56	61	97	158
1956-57	187	201	388
1957-58	65	113	178
1958-59	97	147	244
1959-60	118	173	291
1960-61	62	133	195
1961-62	59	138	197
1962-63	23	110	133
1963-64	19	116	135
1964-65	36	139	175
1965-66	150	252	402
1966-67	321	414	735
1967-68	338	425	763
1968-69	407	491	898
1969-70	470	548	1018
1970-71	238	352	590
1971-72	268	448	716
1972-73	246	335	581
1973-74	329	582	911
1974-75	183	367	550
1975-76	100	241	341

Appendix Table 11

Estimates of Net Capital Formation in Residential Dwellings at Current Prices

(Rupees crores)

Year	Rural Areas	Urban Areas	All areas
1	2	3	4
1950-51	86	58	144
1951-52	66	49	115
1952-53	21	24	45
1953-54	18	26	44
1954-55	20	29	49
1955-56	26	36	62
1956-57	88	83	171
1957-58	30	46	76
1958-59	50	67	117
1959-60	63	82	145
1960-61	34	64	98
1961-62	35	73	108
1962-63	10	61	71
1963-64	12	68	80
1964-65	20	85	105
1965-66	123	174	297
1966-67	276	314	590
1967-68	286	333	619
1968-69	365	418	783
1969-70	432	500	932
1970-71	238	352	590
1971-72	277	474	751
1972-73	286	393	679
1973-74	399	725	1124
1974-75	312	627	939
1975-76	242	501	743

Appendix Table 12

Estimated Value of the Stock of Residential Dwellings at 1970-71 prices

(Rupees crores)

Year	Rural Areas	Urban Areas	All areas
1	2	3	4
1950-51	8708	12889	21597
1951-52	8858	13020	21878
1952-53	8911	13089	22000
1953-54	8958	13162	22120
1954-55	9008	13244	22252
1955-56	9069	13341	22410
1956-57	9256	13542	22798
1957-58	9321	13655	22976
1958-59	9418	13802	23220
1959-60	9536	13975	23511
1960-61	9598	14108	23706
1961-62	9657	14246	23903
1962-63	9680	14356	24036
1963-64	9699	14472	24171
1964-65	9735	14611	24346
1965-66	9885	14863	24748
1966-67	10206	15277	25483
1967-68	10544	15702	26246
1968-69	10951	16193	27144
1969-70	11421	16741	28162
1970-71	11659	17093	28752
1971-72	11927	17541	29468
1972-73	12173	17876	30049
1973-74	12502	18458	30960
1974-75	12685	18825	31510
1975-76	12785	19066	31851

Appendix Table 13

Estimated Value of the Stock of Residential Dwellings at Current Prices

(Rupees crores)

Year	Rural Areas	Urban Areas	All areas
1	2	3	4
1950-51	3785	5110	8895
1951-52	4056	5437	9493
1952-53	4048	5423	9471
1953-54	4079	5466	9545
1954-55	4119	5524	9643
1955-56	4246	5698	9944
1956-57	4485	5984	10469
1957-58	4693	6270	10963
1958-59	5107	6826	11933
1959-60	5325	7117	12442
1960-61	5610	7521	13131
1961-62	5995	8210	14205
1962-63	6184	8578	14762
1963-64	6356	9045	15401
1964-65	6501	9389	15890
1965-66	7475	10443	17918
1966-67	8347	11650	19997
1967-68	8778	12480	21258
1968-69	9685	13894	23579
1969-70	10619	15340	25959
1970-71	11659	17093	28752
1971-72	12501	18595	31096
1972-73	14062	20874	34936
1973-74	15986	23364	39350
1974-75	21340	32036	53376
1975-76	25178	37598	62776

Appendix Table 14

Estimated Value of the Stock of Residential Dwellings at Historical Cost

(Rupees crores)

Year	Rural areas	Urban areas	All areas
1	2	3	4
1950-51	2850	3840	6690
1951-52	2916	3897	6813
1952-53	2937	3921	6858
1953-54	2955	3947	6902
1954-55	2975	3976	6951
1955-56	3001	4012	7013
1956-57	3089	4095	7184
1957-58	3119	4141	7260
1958-59	3169	4208	7377
1959-60	3232	4290	7522
1960-61	3266	4354	7620
1961-62	3301	4427	7728
1962-63	3311	4488	7799
1963-64	3323	4556	7879
1964-65	3343	4641	7984
1965-66	3466	4815	8281
1966-67	3742	5129	8871
1967-68	4028	5462	9490
1968-69	4393	5880	10273
1969-70	4825	6380	11205
1970-71	5063	6732	11795
1971-72	5340	7206	12546
1972-73	5626	7599	13225
1973-74	6025	8324	14349
1974-75	6337	8951	15288
1975-76	6579	9452	16031

Appendix Table 15

Estimated Gross Rate of Return on Residential Dwellings at current prices

(In percent)

Year	Rural Areas	Urban Areas	All Areas
1	2	3	4
1950-51	N.A.	N.A.	7.24
1951-52	N.A.	N.A.	7.52
1952-53	N.A.	N.A.	7.35
1953-54	N.A.	N.A.	7.53
1954-55	N.A.	N.A.	7.14
1955-56	N.A.	N.A.	7.40
1956-57	N.A.	N.A.	7.[illegible]
1957-58	N.A.	N.A.	8.21
1958-59	N.A.	N.A.	8.66
1959-60	N.A.	N.A.	8.85
1960-61	12.98	6.36	9.20
1961-62	13.39	6.71	9.56
1962-63	14.07	7.22	10.13
1963-64	15.38	7.97	11.09
1964-65	16.09	8.51	11.69
1965-66	16.53	8.58	11.91
1966-67	16.44	8.75	11.99
1967-68	15.74	8.73	11.71
1968-69	15.05	8.66	11.39
1969-70	14.42	8.64	11.13
1970-71	14.64	9.05	11.45
1971-72	14.70	9.37	11.64
1972-73	15.09	9.72	12.01
1973-74	15.12	9.96	12.13
1974-75	15.40	10.49	12.53
1975-76	15.70	11.13	13.01

Appendix Table 16

Estimated Gross Rate of Return on Residential Dwellings at 1970-71 prices

Year	Rural Areas	Urban Areas	All areas
1	2	3	4
1950-51	6.28	2.47	4.01
1951-52	6.29	2.54	4.06
1952-53	6.33	2.62	4.12
1953-54	6.42	2.70	4.20
1954-55	6.48	2.79	4.28
1955-56	6.55	2.87	4.36
1956-57	6.51	2.93	4.39
1957-58	6.57	3.02	4.46
1958-59	6.61	3.10	4.53
1959-60	6.65	3.18	4.59
1960-61	6.70	3.27	4.66
1961-62	6.77	3.33	4.72
1962-63	6.84	3.41	4.79
1963-64	6.94	3.48	4.87
1964-65	7.01	3.55	4.93
1965-66	6.99	3.59	4.95
1966-67	7.01	3.66	5.00
1967-68	6.86	3.62	4.92
1968-69	6.67	3.58	4.82
1969-70	6.43	3.52	4.70
1970-71	6.36	3.56	4.70
1971-72	6.30	3.59	4.68
1972-73	6.25	3.59	4.67
1973-74	6.18	3.60	4.64
1974-75	6.17	3.64	4.66
1975-76	6.22	3.70	4.71

Appendix Table 17

Index of Appreciation in the value of the Stock of Residential Dwellings*

(Rupees crores)

Year	Rural Areas	Urban Areas	All Areas
1	2	3	4
1950-51	133	133	133
1951-52	139	140	139
1952-53	138	138	138
1953-54	138	138	138
1954-55	138	139	139
1955-56	141	142	142
1956-57	145	146	146
1957-58	150	151	151
1958-59	161	162	162
1959-60	165	166	165
1960-61	172	173	172
1961-62	182	185	184
1962-63	187	191	189
1963-64	191	199	195
1964-65	194	202	199
1965-66	216	217	216
1966-67	223	227	225
1967-68	218	228	224
1968-69	220	236	230
1969-70	220	240	232
1970-71	230	254	244
1971-72	234	258	248
1972-73	250	275	264
1973-74	265	281	274
1974-75	337	358	349
1975-76	383	398	392

*Derived as: $\frac{\text{Value of Dwellings at current prices}}{\text{Value of Dwellings at Historical cost}} \times 100$

Appendix Table 18

Statewise Estimates of Net Rental on Residential Dwellings & Net Domestic Product at Constant Prices and Index of Relative Price of Housing, 1960-61 to 1970-71

Year	Andhra Pradesh			Assam			Bihar		
	Net Rental at 1960-61 prices	NDP at 1960-61 prices	Index of Relative price of Housing	Net Rental at 1948-49 prices	NDP at 1948-49 prices	Index of Relative price of Housing	Net Rental at 1960-61 prices	NDP at 1960-61 prices	Index of Relative price of Housing
1	2	3	4	5	6	7	8	9	10
1960-61	29.8	983	100.0	2.1	268	87.3	40.4	993	100.0
1961-62	30.7	1058	105.9	N.A.	N.A.	N.A.	41.3	1042	103.8
1962-63	31.7	1055	109.5	N.A.	N.A.	N.A.	42.3	1061	101.5
1963-64	32.7	1112	104.6	N.A.	N.A.	N.A.	43.2	1081	95.0
1964-65	33.7	1191	104.2	N.A.	N.A.	N.A.	44.2	1087	92.0
1965-66	34.8	1083	99.9	3.5	328	91.1	45.2	1118	89.8
1966-67	35.9	1125	93.7	N.A.	N.A.	N.A.	46.3	966	90.8
1967-68	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1968-69	N.A.	N.A.	N.A.	3.7	368	118.8	N.A.	N.A.	N.A.
1969-70	N.A.	N.A.	N.A.	3.8	377	126.1	N.A.	N.A.	N.A.
1970-71	N.A.	N.A.	N.A.	4.1	388	119.8	N.A.	N.A.	N.A.

(continued)

Appendix Table 18 (continued)

Year	Gujarat			Haryana			Karnataka		
	Net Rental at 1960-61 prices	NDP at 1960-61 prices	Index of Relative price of Housing	Net Rental at 1960-61 prices	NDP at 1960-61 prices	Index of Relative price of Housing	Net Rental at 1956-57 prices	NDP at 1956-57 prices	Index of Relative price of Housing
1	2	3	4	5	6	7	8	9	10
1960-61	25.0	738	100.0	3.9	245	100.00	34.2	556	90.4
1961-62	25.7	812	102.4	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1962-63	26.3	806	105.3	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1963-64	27.1	859	107.6	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1964-65	27.8	935	99.6	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1965-66	28.6	868	92.9	4.6	275	93.1	42.8	637	78.8
1966-67	29.4	889	85.1	4.7	304	78.6	N.A.	N.A.	N.A.
1967-68	30.2	977	81.5	4.9	364	82.3	50.4	750	75.67
1968-69	31.1	911	82.6	5.0	332	90.0	54.6	797	73.3
1969-70	31.9	997	79.4	5.2	413	94.6	55.8	834	77.7
1970-71	32.8	1154	83.7	5.4	440	107.2	57.1	905	80.8

(continued)

Appendix Table 18 (continued)

Year	Kerala			Madhya Pradesh			Maharashtra		
	Net Rental at 1960-61 prices	NDP at 1960-61 prices	Index of Relative price of Housing	Net Rental at 1960-61 prices	NDP at 1960-61 prices	Index of Relative price of Housing	Net Rental at 1960-61 prices	NDP at 1960-61 prices	Index of Relative price of Housing
1	2	3	4	5	6	7	8	9	10
1960-61	11.1	444	100.0	21.8	832	100.0	41.6	1597	100.0
1961-62	11.3	450	94.4	22.1	824	98.4	43.1	1596	99.5
1962-63	11.6	467	99.7	22.3	811	100.0	44.8	1643	95.0
1963-64	12.1	480	107.5	22.5	883	96.8	47.7	1712	90.1
1964-65	12.5	492	93.5	22.8	936	93.8	50.0	1767	84.0
1965-66	12.8	503	86.0	23.1	785	85.3	52.7	1704	79.1
1966-67	13.0	529	86.3	23.3	793	83.2	55.2	1794	71.1
1967-68	13.4	505	78.4	23.5	1011	77.9	57.4	1888	67.7
1968-69	13.9	528	90.7	23.8	949	79.6	59.4	2007	72.4
1969-70	14.3	554	101.7	24.1	1009	76.6	61.0	2064	74.1
1970-71	14.8	589	117.5	24.4	1070	80.4	64.0	2127	72.7

(continued)

Appendix Table 18 (continued)

Year	Orissa			Punjab			Rajasthan		
	Net Rental at 1960-61 prices	NDP at 1960-61 prices	Index of Relative Price of Housing	Net Rental at 1960-61 prices	NDP at 1960-61 prices	Index of Relative Price of Housing	Net Rental at 1960-61 prices	NDP at 1960-61 prices	Index of Relative price of Housing
1	2	3	4	5	6	7	8	9	10
1960-61	12.1	374	100.0	12.2	411	100.0	11.9	559	100.0
1961-62	12.3	394	103.4	12.4	426	105.3	12.1	622	105.0
1962-63	12.4	432	96.8	12.7	433	103.9	12.3	603	109.6
1963-64	12.6	483	98.6	13.1	461	102.1	12.5	561	103.6
1964-65	12.8	519	100.2	13.5	512	97.5	12.7	643	96.1
1965-66	13.0	465	110.6	13.8	500	97.3	12.9	579	96.4
1966-67	13.2	504	105.3	14.2	538	82.4	13.1	608	84.9
1967-68	13.3	499	96.3	14.7	603	82.4	13.3	732	96.7
1968-69	13.5	544	102.4	15.1	632	82.8	13.5	590	98.1
1969-70	13.7	555	102.5	15.5	681	84.5	13.7	656	93.0
1970-71	13.9	574	109.1	16.1	704	80.3	N.A.	N.A.	N.A.

(continued)

Appendix Table 18 (concluded)

Year	Tamil Nadu			Uttar Pradesh			West Bengal		
	Net Rental at 1960-61 prices	NDP at 1960-61 prices	Index of Relative price of Housing	Net Rental at 1960-61 prices	NDP at 1960-61 prices	Index of Relative Price of Housing	Net Rental at 1960-61 prices	NDP at 1960-61 prices	Index of Relative price of Housing
1	2	3	4	5	6	7	8	9	10
1960-61	23.8	1112	100.0	95.9	1799	100.0	64.9	1091	100.0
1961-62	24.5	1108	102.8	97.9	1839	99.7	66.7	1108	95.2
1962-63	25.1	1139	106.2	100.1	1839	98.7	68.6	1151	95.2
1963-64	25.8	1161	104.0	102.3	1836	90.2	70.4	1258	91.5
1964-65	26.5	1201	109.5	104.7	2048	80.6	72.2	1339	90.0
1965-66	27.2	1174	109.7	107.0	1996	83.2	74.1	1314	87.1
1966-67	28.0	1213	103.2	106.3	1947	73.7	75.9	1321	79.4
1967-68	28.8	1270	108.3	108.3	2114	79.6	77.7	1371	73.0
1968-69	29.6	1291	113.5	110.4	2167	93.9	79.6	1409	75.7
1969-70	30.4	1349	113.1	112.4	2310	93.5	81.4	1464	76.7
1970-71	31.2	1467	95.7	114.7	2421	100.1	83.2	1489	77.8

Appendix Table 19

Statewise Estimates of Gross Capital Formation in Residential Dwellings in Rural and Urban Areas, 1970-71

(Rupees crores)

State	Rural Areas	Urban Areas	All Areas
1	2	3	4
Andhra Pradesh	21.6	20.6	42.2
Assam	11.4	4.6	16.0
Bihar	59.5	26.4	85.9
Gujarat	31.8	49.5	81.3
Haryana	11.9	10.2	22.1
Karnataka	22.3	28.6	50.9
Kerala	27.0	20.9	47.9
Madhya Pradesh	31.5	24.5	56.0
Maharashtra	35.3	63.8	99.1
Orissa	10.4	3.8	14.2
Punjab	19.4	24.1	43.5
Rajasthan	21.3	18.2	39.5
Tamil Nadu	21.0	36.4	57.4
Uttar Pradesh	115.1	74.9	190.0
West Bengal	41.2	54.1	95.3
Other States & Union Territories	26.3	53.4	79.7
All India	507.0	514.0	1021.0

Appendix Table 20

Statewise Estimates of Per capita GCF in Residential Dwellings and Related Explanatory Variables

States	Per capita GCF in Residential Dwellings(Rs)	Per capita State Income (Rs)	Per capita Gross Rental (Rs)	Degree of Urbanisation (%)	Urban-Rural Income differential
1	2	3	4	5	6
Andhra Pradesh	9.70	633	23.35	19.32	171
Assam	9.71	600	24.38	9.26	228
Bihar	15.24	455	12.62	10.00	397
Gujarat	30.45	896	40.54	28.08	194
Haryana	22.02	991	21.69	17.66	159
Karnataka	17.37	662	29.17	24.31	199
Kerala	22.44	679	26.24	16.24	142
Madhya Pradesh	13.44	514	19.68	16.29	225
Maharashtra	19.66	832	40.41	31.17	338
Orissa	6.47	529	17.39	8.41	268
Punjab	32.10	1091	24.52	23.73	133
Rajasthan	15.33	610	19.88	17.64	198
Tamil Nadu	13.93	714	25.89	30.26	217
Uttar Pradesh	21.51	515	21.27	14.02	226
West Bengal	21.51	738	45.02	24.75	219
Other States & Union Territories	46.75	1494	37.71	33.74	254

*Derived as: $\frac{\text{Per capita Income in Urban Areas}}{\text{Per capita Income in Rural Areas}} \times 100$