



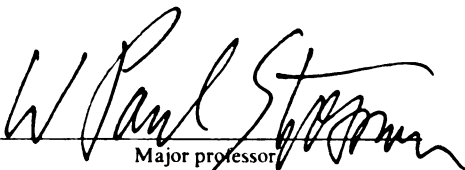
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MARKET IN URBAN ZAMBIA

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Manenga Chilala Ndulo

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AN ANALYSIS OF A LOW INCOME HOUSING
MARKET IN URBAN ZAMBIA

by

Manenga Chilala Ndulo

A DISSERTATION

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ABSTRACT

AN ANALYSIS OF A LOW INCOME HOUSING MARKET IN URBAN ZAMBIA

by

Manenga Chilala Ndulo

This dissertation studies economic behavior and resource allocation in a low income urban housing market in Lusaka, Zambia. It specifically addresses itself to how housing consumption is affected by income and household demographic characteristics, to the analysis of the relative importance of housing attributes in determining the value of the house, to the analysis of demand functions for housing attributes, and to the process of home improvement among low income households. These issues are analyzed within a framework of a competitive urban housing market.

The data for the analysis was collected by the author as part of an international project on low cost housing and employment generation at Michigan State University. The analytical techniques used in the study are regression, hedonic, and logit analysis.

The analysis of the demand for housing shows that housing consumption is directly related to income and

household size. The estimated income elasticity is 0.6.

Female-headed, young, and old households have a higher demand for housing than male-headed and middle-aged households.

The hedonic regression showed that space and structural attributes of the dwelling contributed the most value to the house.

The analysis of the demand functions for housing attributes showed an inverse relation between the demand price of each attribute and its quantity, except for rooms. Households demanded more of the attributes with marginal increases in income and household size. Female-headed and old-aged households showed a consistently higher demand for attributes than did male-headed, young, and middle-aged households.

Ninety-five percent of the households carried out one or more different types of improvements to the dwelling with an average of 4.3 different types per household. The years of residence at the site and the value of the dwelling are the most important predictors of improvements having been made to the dwelling.

To Muuka Dennis Ndulo

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CHAPTER ONE

PREMISES AND THEORETICAL FRAMEWORK

The Problem

The focus of this research is economic behavior and resource allocation in low income urban housing markets in a less-developed country (LDC). As our case for analysis, we take the low income urban housing market in Lusaka, Zambia. We shall examine the characteristics of housing, the major determinants of demand for it, and supply, and will discuss implications for policy intervention. Questions to be considered will include:

1. How is housing affected by income and demographic characteristics such as age, education, and household size?
2. In a given house, what is the relative importance of each component, such as access, space, and structure, in the bundle of housing services produced by the house?
3. What determines the household's demand for such attributes of a housing bundle as number of rooms, yard area, and quality of the house?
4. How much home improvement goes on? What sorts of households improve their dwellings?

Importance of the Research

Nearly all LDCs are faced with massive housing problems. They are especially severe for low-income households in urban areas. The problems have been exacerbated by high population growth rates, high rates of urbanization, scarcity of resources, and, above all, by mistaken public policies (Linn, 1979, p. 207). Some of these erroneous public policies result from various political forces, but others are a consequence of ignorance about the operation of housing markets. This is especially true in Zambia, where the populace's relatively high income, and the local council housing markets, are overwhelmed with regulations--many of them misguided.

There has been little analysis of low income housing markets in Zambia despite the fact that low-income housing constitutes more than 50 percent of the total urban housing stock (Republic of Zambia, 1979, p. 32). Expansion of the low income housing stock is now the major focus of the national housing policy (Republic of Zambia, 1979, p. 315). There is, therefore, a need for studies on economic behavior and resource allocation in low income housing markets. The availability of such knowledge will help to increase the effectiveness of public intervention. This study is an attempt to contribute to that objective.

Limitations of the Study

This study covers a sample of owner-occupant households; renter households are not included in the empirical analysis. Previous research in Zambia on low-income households has found distinct differences between renters and owner-occupants (Boswell, 1975, p. 4), but the present study is limited in terms of sample data: There are too few renter respondents to carry out a meaningful analysis of them. Households that have recently moved are not isolated from the total sample in our analysis. The theoretical framework for the study assumes perfect competition. This is convenient for carrying out a standard analysis, and distortion may be minimal, because interference with free choice in low-income housing is much less prevalent than in high-income housing in Zambia, as in most LDCs (Mohan, 1979).

Contributions to Knowledge

There have been no economic studies to date on low income housing markets in Zambia. Policymakers who have advocated intervention in low income housing markets have no tested hypotheses on which to base their policies. Household behavior in the housing market is not "erratic," so such hypotheses can be formulated and tested. Policymakers are therefore sorely in need of work that will contribute to their understanding of housing markets in low income urban areas.

This research will, to our knowledge, be the first introduction of empirical evidence on the demand structure for housing and the process of home improvement among Zambian low income urban households.

Literature Review

Most studies of Zambian housing are either political or sociological in nature (Simon, et. al., 1976). However, there is quite a bit of work on housing in developed countries--on housing markets as a whole, and on low-income housing in particular. For our purposes, the relevant work in the literature can be divided into four groups: studies about the relationship between housing and income; studies on the nature of the housing commodity; home-improvement studies; and studies on housing and economic development.

Housing and Income

Early work on housing and income tended to confirm what was known as Schwabe's law: As the income of the household rose, the proportion of that income devoted to housing fell (Wilkinson, 1973, p. 361). This implied that the income elasticity for housing was less than one--an implication confirmed by almost all studies as late as the 1960s (Lee, 1963).

A major development in this research took place in the sixties, when Reid's study (1962) introduced the concept of permanent income to the empirical work. Reid found an

income elasticity of at most 2.0 for homeowners, and at most 1.2 for renters. These levels implied that as household income rises, a greater proportion of that income is devoted to housing expenditures. Reid's study was supported by Muth (1960). However, later studies by Lee (1968), Winger (1968), and Muth (1969) found lower income elasticities.

Thus, by the beginning of the seventies, there was one group of studies giving an estimated income elasticity greater than one, and another group of studies giving an income elasticity of one or less. De Leeuw (1971), reviewing these studies, sought to reconcile them by identifying causes of the variance in the estimates. He identified five major causes:

1. Differences in the concept of income used in the studies--i.e., permanent income against measured income.

2. The distinction between housing value and annual housing expenditures used in the regressions as a dependent variable. Many researchers have used the market value of the house as the dependent variable reflecting demand for owner-occupied housing; however, consumer demand theory uses annual housing expenditures rather than market value of the house.

3. Treatment of imputed rent in measures of owner-occupant income. In regressing the demand for housing with respect to total income, many studies fail to consider the imputed rental income which accrues to owner occupants.

Ideally, the net rental value of the house should be added to the owner-occupant's other income.

4. Omission of the price term in the demand equation. Most studies leave out the price of housing.

5. Special characteristics of the samples used-- e.g., use of census tracts, or mortgage applicants, or restriction to non-movers or movers.

De Leeuw attempted to adjust for these factors in examining the earlier studies. He succeeded in narrowing the variance, coming up with an income elasticity between 0.8 and 1.0 for renters and between 0.7 and 1.5 for owner-occupants.

Studies by Maisel (1971) and Carliner (1973) show that estimated elasticities differ depending on whether they have been derived from individual household data or from grouped data. Polinsky (1977) argued that the omission of the price of housing in regression equations affects estimates of income elasticity obtained, and that when it is included, its misspecification can affect the estimate of the price elasticity of demand.

Mayo (1981) reviewed the theoretical and empirical work in the estimation of housing demand conducted since De Leeuw's (1971) paper. He examined how demand elasticities may be affected by the nature of the functional form used, the presence or absence of demographic variables, and the length of the time over which the housing demand function is estimated.

The most common functional form used in most

analyses is the log-linear form, which does not allow the estimated price and income elasticities to change across the population. Alternative forms can be used which do allow the estimated demand elasticities to change across the population. Mayo concentrated his review on the alternative functional forms which can be related explicitly to a known utility function. He argued that analyses using linear expenditure functions, which may be related to the Stone Geary utility function, are theoretically better founded and usually fit the data as well as or better than other functional forms. However, the demand elasticities estimated with linear expenditure functions are similar to those measured in other ways.

Evidence in the literature on the impact on demand elasticities of demographic variables included in the estimated demand functions is inconclusive, although such functions do seem to have a significant impact on demand.

Response lags in housing demand are important. They seem to be related to residential mobility decisions. Their main impact is the cause short and long run demand elasticities to differ.

On the whole, it is agreed in the literature that no single estimate of income elasticity can be made, and that the important sources of this variability can be identified. It is also generally agreed that income elasticity for owners is about unity, and for renters is between 0.5 and 0.8, if enough other variables are held constant.

Nature of Housing Commodity

In the literature, two strands of work can be identified. One strand examines housing as a homogeneous commodity (Olsen, 1969); the other considers it as heterogeneous (Quigley, 1979). The assumption of homogeneity is useful for some purposes, but it has been found that it leads to studies devoid of analytical power because it implies that various housing services are perfect substitutes for one another.

Lancaster (1966) formulated the theoretical basis for the analysis of commodities in attribute form. He argued that consumer demand theory could be made analytically more powerful by integrating the intrinsic properties of individual commodities in the analysis of consumer choice. Consumers derive utility from the attributes of an individual commodity, not from the commodity itself.

Rosen (1974) developed a structural model for the analysis of commodities in hedonic form. He argued that the equilibrium market prices of heterogeneous commodities, such as housing, are jointly determined by evaluations made by consumers and by producers' offering prices for services provided by each individual attribute in the market.

Empirical applications of Rosen's formulations include the studies of Grether and Mieszkowski (1974) and King (1976). The former sought to analyze market prices for houses by their component and locational characteristics. The authors concluded that it is possible to measure the

contribution of the various attributes of a house to its value. King estimated demand equations for dwelling attributes, with prices estimated via hedonic regression.

Ereckson and Witte (1979) criticized King's work for neglecting supply factors, which, they posited, leads to a simultaneous-equation bias. To counteract this problem, Ereckson and Witte argued that demand equations should be estimated simultaneously within a demand-supply framework. Witte, Sumka and Ereckson (1979) examine a structural model integrating both demand and supply factors.

Home Improvement

Expenditures on home improvements amount to a big share of overall expenditures for new construction. In low income housing areas in LDCs, they are usually a major source of housing-stock expansion. However, there is very little work in the literature on home improvement.

Mendelsohn (1977) made an empirical study of home improvements by owner-occupants in the United States in 1971 and 1972. His basic assumption was that owner-occupants fill dual roles as consumers and investors in their houses. The dwelling unit is therefore both an asset and a consumption good. The owner-occupant, in his home improvement decision making, is therefore expected to try to maximize utility, subject to budget and time constraints.

Mendelsohn provides insight on home-improvement expenditures. His study found substantial home improvement

activity by owner-occupants, with over half of the improvements reported in the survey done wholly by the owner of the dwelling. Mendelsohn estimated the income elasticity of home improvements to be 0.60 for the mean household.

Mendelsohn also found that owner-occupant households with higher incomes spent more on improvements to their dwellings and did less work themselves, presumably preferring to use hired labor.

Younger owner-occupants preferred to do more of the work themselves. Elderly households spent almost as much on improvements as did other age groups.

Housing and Economic Development

One issue which has been prominent in the literature on housing since the 1950s, when the development problems of LDCs began to be treated, is the relationship between housing and the process of economic development. The literature here is diverse and difficult to summarize; however, the major questions raised can be adequately grouped into four major issues--the amount of resources that ought to be allocated to housing, the actual share of housing construction in total output in the development process, the relation between such new housing and employment, and the role of squatter settlements and low-income housing in the development process.

Housing and Resource Allocation. Regarding the amount of resources to be allocated to housing, there are basically two lines of thought in the literature. One strand holds that housing is like any other scarce commodity. There is therefore nothing that calls for more resources to be devoted to housing than market forces currently provide. If more resources are allocated to housing, there will be too few resources allocated to other commodities. To avoid imbalance, then, the use of resources in the economy should be guided by the marginal productivity of each resource (Burns and Grebler, 1976).

The other line of argument is that it is not enough to look at the marginal productivity of the resources used, because there are indirect benefits to housing as well. In terms of resource allocation, one ought therefore look at the social value of housing (Burns and Khing, 1967; Burns and Grebler, 1977). The high level of social productivity of housing implies that more resources should be allocated to its production. Several indirect benefits accruing to society as a result of improved housing conditions have been discussed in the literature. These include improved productivity of the labor force, improved health of the population, and saving of resources originally committed to health and other activities--possible as a result of improved health conditions. Furthermore, among the younger generation, improved school attendance is cited as an indirect benefit of improved housing conditions. This has important impact on future

income and the quality of the labor force (Burns and Khing, 1967).

Share of Housing Construction in Economic Growth. The share of housing construction in total output during the process of economic growth is a related issue commonly discussed in the literature. Besides looking at the resources allocated to housing normatively, researchers ask what actually happens to housing's share in total output as the economy grows. Studies by Strassmann (1970), Turin (1974), and Burns and Grebler (1976) show that, during the early stages of economic growth, the share of housing in total output is low. It increases slowly until the middle stages of development, and thereafter, it levels off.

In the early stages of development, the share of housing in total output is low because resources allocated to non-housing investments yield higher returns. As income grows, housing becomes more important, non-housing investments become less important, and housing's share in total output increases (Strassmann, 1970). Income growth and migration to urban areas are likely to be highest in the middle stages of economic growth; during this time, the rate of growth of the housing stock and the share of housing in total output are likely to peak.

Housing and Employment. It has been argued that a vigorous housing sector will affect the availability of income-earning opportunities. If so, how much employment can be generated from a dynamic housing sector? Discussion

of this question has revolved around two main factors: employment created in the actual construction and improvement of dwellings, and, when the dwelling is complete, the household's ability to create a business within the house, leading to more income-earning opportunities (Winnpenny, 1975). Housing construction is more labor intensive than many other economic activities, able to absorb large quantities of labor with very little capital input. Capital is relatively scarce in LDCs. Labor-intensive construction and use of domestic materials save the country foreign exchange. Furthermore, low-income housing is most labor intensive, and therefore generates more employment per unit of expenditure, than high-income housing (Richards, 1979).

Squatter Settlements and Low-Income Housing. Since the early 1960s, the development literature related to housing in LDCs has increasingly focused on low-income housing. While in developed countries the issue of low-income housing centers around the question of subsidies, in less-developed countries, it centers around the rapid growth of squatter settlements.

Various authors have passionately discussed the importance of squatter settlements in the expansion of housing stock and, more broadly, in the process of socio-economic transformation. Originally, most LDCs adopted policies to eradicate squatter settlements in one way or another. However, as incomes rose and both population growth and migration to urban areas accelerated, these settlements grew so rapidly

that policies to eradicate them became difficult to implement, let alone justify. Relocation and eradication came to be seen as self-defeating since they reduced the housing stock and destroyed the socio-economic relationships so vital to the process of development within the community.

Through the work of Mangin (1967), Turner (1967, 1968), and others, researchers came to recognize that squatter residents constitute a human resource for economic and social development. It has been argued that the very existence of squatter settlements "is a testament to their (occupants') achievement orientation, their capability to plan for their future, their willingness to take risks that offer later economic gain and their ability to work together in effective problem-orientated groups" (Andrews and Phillips, 1970, p. 212). Squatter settlements therefore possess characteristics which are important to the general process of development, it is argued; policymakers should take advantage of these characteristics, especially in regard to house building and home improvement. So, "the government has called off the army and sent in planners from the National Housing Authority to facilitate later installation of utilities" in squatter settlements (Andrew and Phillips, 1980, p. 212). This view now seems nearly universal in the development literature, although there are some dissenting voices (Ward, 1981, p. 341).

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Theoretical Model

Housing markets are diverse and complex. It is therefore necessary to model the housing sector if research is to be meaningful (Quigley, 1979, p. 391). For our purposes, a model of the housing market with both a demand and a supply side is used. The housing commodity is considered as a heterogeneous bundle of attributes (Quigley, 1979, p. 392): access, space, structure, and services (Linn, 1979, p. 208).

Our analysis covers the low income housing market in a fairly large city with an estimated 1982 population of 600,000. Individual households and other economic agents, such as government and small businesses, operate in the environment. The major assumptions in this analysis are described below.

Assumption 1. One major assumption in this analysis is that the housing market acts competitively. The urban housing market in Zambia is segmented into high-income, middle-income, and low-income housing. These markets are further segmented into public and private housing. Public housing is regulated and rationed by public agencies such as the Lusaka City Council and the national government. These public agencies allocate housing on the basis of income, seniority, and other characteristics of the household. The private housing market is free of these restrictions.

The low income housing market in Zambia is sharply separated from the high-income market, in terms of both

types of houses sold or rented and mobility of residents between the two markets. Over time, it is not impossible for a low-income household to relocate to a high income housing area through the acquisition of wealth or the attainment of higher-paying employment, but this is not common.

Mobility between the high and middle income housing markets and from the middle income to the low income housing market is common. There is no short-run mobility of households between low- and high-income markets, and very little mobility from the low-income to the middle-income market. It is easier for a low-income household to move to another low income housing area than to relocate to a higher-income market. It will nearly always consume a new housing bundle within the low income housing market.

Assumption 2. Under our assumed competitive market conditions, any differences in the level of demand and in preferences between households can be explained by income and demographic variables.

Assumption 3. Any differences in house prices will be assumed to be due to differing quantities and relative prices of services produced by the houses as a whole or their attributes separately. Also important to the present study is that the formal financial market is limited. To finance housing, households by and large must provide their own financing--i.e., there is no mortgage market for low-income housing. This is a characteristic of the institutional

environment. The Zambia National Building Society, the major source of housing finance, does not issue loans smaller than \$7,000 (in 1979 U.S. dollars). Furthermore, this minimum must be repaid within five years (Sanyal, 1981, p. 438). Households can also borrow funds for housing from their employers and from the Zambia National Provident Fund; however, these sources are so limited as to be unimportant.

The difficulty regarding a formal financial market eliminate, because of its unimportance, the likely impact of financing on the value of the house.

The demand side of our analysis is based on the theory of market demand. Each low-income household's consumption pattern is determined by the household's preferences, income, and housing price. Under Assumption 2, differences in preferences are likely to occur because of such factors as social status, household size, and the head of the household's stage in the life cycle. This assumption is especially important for housing markets in LDCs because, as Rakesh Mohan has argued, "policymakers do not generally have intuitive notions of the preferences of people outside their class or income experience" (Mohan, 1979, p. 152).

The supply side is the least understood component of housing markets in the literature (MacLennan, 1977, p. 61; Quigley, 1979, p. 392). Nonetheless, one can study the supply side in terms of either the existing stock of housing or new houses being built. In terms of the existing stock

of housing, one can examine sales of old homes, enlargement and improvement of existing dwellings, conversion of houses to non-residential use, and the subdivision and demolition of dwellings.

For our purposes, the improvement of existing dwellings is of primary interest: We are interested in those features of low-income housing which determine the way the housing stock is enlarged or expanded, given a fixed stock of housing.

In our institutional environment, we identify owner-occupant households and the public and private agencies as the main actors who determine our supply of housing.

The government services and subdivides the land. It also provides the security of tenure and formulates other regulations. Private and public agencies provide such services as transportation, health, and education (Linn, 1979, p. 215).

Owner-occupants enlarge the housing stock through staged construction and home improvements. Their decisions are motivated by their objective to maximize utility. In the process of home improvement, owner-occupants may engage the services of other agents, such as bricklayers, builders, carpenters, etc. Therefore, the supply side includes the process of home improvement as a means by which the housing stock grows and is improved by owner-occupants.

The individual household can act both as a consumer and as an investor. The house supplies to the household a

flow of housing services, but it is at the same time a component of the household's investment portfolio, which consists of the current value of the dwelling and other assets held by the household (Mendelsohn, 1977). Expansion of the house is determined by the owner's actions as an investor. He or she extends or improves the house, thereby enlarging the capacity of the housing stock. This is the process we shall concentrate on.

Organization of the Study

In this chapter, we discussed the premises and the theoretical framework of the study. Chapter Two covers the background of the urban housing situation in Zambia. The sample survey results are analyzed in Chapter Three. In Chapters Four and Six, the demand for housing is analyzed. The response to income and some demographic variables are explored. Also examined are the marginal payments that households make for each attribute of the house. In Chapter Five, the determinants of the relative value of the house are examined, concentrating on ten major attributes of the house. In Chapter Seven, the home-improvement process is analyzed. Lastly, Chapter Eight summarizes and discusses the major findings of the study.

Implications for policy are then presented.

CHAPTER TWO

HISTORICAL BACKGROUND OF THE HOUSING SITUATION IN ZAMBIA

Housing Situation in Zambian Urban Areas

Towns and cities developed in Zambia during the colonial period (1889-1964) as a result of colonial settlement. The way these towns were established and developed, and the legal and institutional rules surrounding their planning, continue to affect the nature of the housing problem in the country's urban areas.

Most of the towns present in Zambia today were established by the British South Africa Company between 1889 and 1924. The company had a mandate from the British government to administer most of the area that today comprises Zambia. The mandate was relinquished in 1924, when the British colonial government took over the management of the country; this period lasted up to the time when independence was achieved, in 1964.

Most of the first towns established were either mining towns or government administrative centers. These were, and continue to be, concentrated along the main rail line running through the middle of the country from the south to

the copper mines in the northwest.

The discovery and exploitation of copper during the 1920s, and the subsequent growth of the economy, resulted in the rapid increase of the size and number of urban areas. Zambia's economy became heavily dependent on copper production: The economy's level of output and rate of growth were determined by the performance of the copper industry. This dependence has increased over the years, so that currently, copper production contributes on average about eleven percent of the Gross Domestic Product (GDP) and ninety percent of all export earnings. Twenty-eight percent of all wage employment in the private sector is in copper production; about thirteen percent of the government's revenue is normally derived from the mineral industry.

This dependence on the copper industry is important because it means that the dominant feature of the economy is erratic. (See Nziramasanga and Obidegwu, 1981). The copper industry is itself dependent on world copper prices; therefore, export earnings and government revenues are heavily influenced by the world level of copper prices. For example, during the 1960s the copper industry contributed about forty percent to total government revenue. During the 1970s, this share fell to thirteen percent, mainly because the industry had been adversely affected by low copper prices on the world market. The adverse effects have been most dramatic in terms of the availability of foreign exchange and government revenue. One result has been a

negative effect on development programs, especially in housing.

During the past decade, the Zambian economy has stagnated, mainly because of the world economic situation --particularly, low copper prices. Between 1960 and 1978, total output grew only nominally--at an average of 9 percent per year. In real terms, the economy was static, growing at an average of 0.02 percent per year.

During this decade of economic stagnation, the total population and the rate of urbanization have continued to grow rapidly. The population of Zambia is currently estimated at 6 million (1982). At the time of the 1963 census, it was estimated at 3 million; which increased to 5 million with the 1974 sample census. Not only is the total population increasing; the rate of population growth is also rising. Between 1963 and 1969, the average annual population growth rate was estimated at 2.5 percent. This increased to 2.9 percent between 1969 and 1974, and the rate is currently estimated at 3.0 percent per year.

Exacerbating the effects of the growth of the total population is the even more imposing growth of the urban population. At the time of the 1974 sample census, it was estimated that about 40 percent of the population lived in urban areas, up from approximately 20 percent just 11 years before. Thus, the share of the population living in the urban areas doubled over a period of 11 years. This means that the country's urban population grew from approximately

715,000 in 1963 to 1,656,000 in 1974, a staggering 130 percent boom. (See Table 2.1).

Zambia has always experienced a higher rate of urbanization than most other countries in Africa as a consequence of the early development of the mining industry during the colonial period. However, the rate of urbanization in Zambia has been especially rapid since independence in 1964. The unprecedented rural-urban migration of the population was largely unexpected. For example, the Seers Report (UN/ECA/FAO, 1964) estimated that during the 1963-1970 period, the rate of rural-urban migration would be about 1.5 percent per year. In actuality, the urban population grew by about 67 percent, at an average annual growth rate of 9 percent, during the 1963-1970 period. From 1969 through 1974, total urban population grew by 38 percent, at an average annual rate of 7 percent. Between the sample census of 1974 and the year 1978, total urban population grew by 30 percent, at an average annual rate of about 6 percent. The 1.5 percent annual rate estimated in 1964 by the Seers report pales in comparison.

The rapid growth of Zambia's urban population has been due, then, to both a high population growth rate and a high rate of rural-urban migration. It is currently estimated that the total population is growing at 3 percent per year, with the rural population growing at 1 percent and the urban population at 6.9 percent per year.

The high rate of migration to urban areas since

TABLE 2.1

ESTIMATED POPULATION AND GROSS DOMESTIC PRODUCT,
ZAMBIA: SELECTED YEARS, 1963-1982

Population (Thousands)	1963 Census	1969 Census	1974 Sample Census	1982
Total	3,490	4,057	4,695	6,228
Urban	715	1,192	1,656	2,696
Lusaka	123	262	401	600
Gross Domestic Product at 1970 Prices (Millions of Dollars)	1,447.94	1,446.75	1,446.47	-

SOURCES: Republic of Zambia, Monthly Digest of Statistics (April/June 1979); Republic of Zambia, 1974 Sample Census of Population (Second Report, 1979).

independence has been explained in terms of the removal of restrictions on migration imposed by the colonial government (McLain, 1978); the high expectations of the populace in the post-independence era; the expansion of employment opportunities in urban areas, especially between 1963 and 1969 (Martin, 1977); and the widening gap between rural and urban incomes (Fry and Maimbo, 1971). Prospective opportunities for paid employment and better standards of living continue to make urban areas look more attractive than rural areas, and lead to continued migration to the towns and cities.

The interaction between the economic growth process, the population growth rate, and the high rate of urbanization in Zambia has created an enormous physical need for housing which the prevailing institutional framework has failed to meet. The inadequate supply of formally built housing has created crowded housing conditions and encouraged the growth of squatter settlements.

Both the public and the private sector are major sources of housing. Within the public sector, the government, as an employer and in the form of local councils, rents housing. In the private sector, various companies and individuals rent or sell housing units. The major part of the housing stock in the high and middle income housing sectors is supplied by employers, whether government or private companies. Individuals supply a smaller amount of the stock. In the low income housing sector, the local

councils and individuals supply most of the housing. In the low-income sector, the government is largely limited to the provision of servants' quarters, usually tied to the domestic employees of the occupants of middle- and high-income housing.

Table 2.2 shows the distribution of the urban housing stock as it appeared at the end of 1978. Ten percent of the dwellings were middle and high income housing units, while 90 percent were low income housing units. The table also shows the dominance of local-council and squatter-settlement housing, which comprised 43 percent and 31 percent of the total urban housing stock, respectively.

In the middle and high income housing areas, most of the housing is rental, and is tied to employment. This is generally the case whether the housing is supplied by public agencies or by the private sector. In recent years, however, there has been a rise in the proportion of private renters whose continued occupation of their dwellings is not tied to employment, and of owner-occupiers in the private housing sector.

In the low income housing sector, nearly all low cost housing units and most servants' quarters are supplied by public agencies. Most of the units are rental, and continued occupation of some is tied to continued employment. Rent is usually charged on the basis of the occupant's income or the original value of the house.

TABLE 2.2
DISTRIBUTION OF URBAN HOUSING STOCK (1978)

Category	Number of Units	Percentage Share of Total Stock
High and medium cost	36,400	10.15
Low cost ^a	153,200	42.72
Servants' quarters ^b	17,000	4.74
Site-and-service	35,500	9.90
Improvement area	22,600	6.30
Squatter settlements	111,900	31.20
Total	358,600	100.00

SOURCE: Republic of Zambia, Third National Development Plan, 1979-1983 (Lusaka), p. 320.

^aMainly local council housing.

^bMainly employees of occupants of high- and middle-income housing.

In site-and-service, improvement, and squatter-settlement areas, most housing units are privately owned. Both rental and owner occupation are important aspects of the housing market.

Housing Policy

During the colonial period, urban housing was provided mainly by the occupant's employer, especially for the African population, and was segmented along racial lines, with African and non-African housing. Non-African housing was of a very high standard, and benefited from favorable government policies (Baldwin, 1966, p. 47). The nation's primary employers--the government and the mining companies--engaged in a vigorous effort to expand non-African housing during the colonial era, so that by 1956 it would be claimed that "there is no longer a European housing shortage" in the country (Advisory Commission on the Review of the Constitution of the Federation of Rhodesia and Nyasaland, 1960, p. 258).

The focus of policies in regard to non-African housing was the provision of highly subsidized rental units. There were also some efforts to promote home-ownership, but this was limited, and was secondary to the rental-housing efforts.

The African population was housed in areas surrounding non-African housing zones. The housing for Africans was of inferior quality and of a temporary nature, at least until

the colonial government initiated schemes in 1948 to provide permanent housing for Africans in urban areas (Northern Rhodesia Government, 1952, p. 7). This was done largely by the Local Government Department, the African Housing Board, and private employers, through house-rental schemes operated by the local councils and the mining companies. The focus of government policy was on subsidized rental housing. It was not until the early 1960s that a limited home ownership scheme was introduced for Africans.

The government was never able to provide adequate housing for all of the African population, as it had for the non-African populace. During the 1950s, the continuing shortage of housing in the urban areas led the African population to turn to settlement on privately owned land in the vicinity of the major towns. This was normally done with the permission of the owner of the land, who charged a monthly rent for the right to erect a shelter and live in the settlement. The settlements evolved into permanent communities, and came to be known as unauthorized compounds; in the post-colonial era, they began to be called squatter settlements.

The settlements grew slowly during the colonial era. It has been estimated that in 1960, four years before independence, 33,000 Africans were living in squatter settlements in Lusaka, and these settlements were growing at the rate of 900 units per year (Advisory Commission on the Review of the Constitution of the Federation of Rhodesia

and Nyasaland, 1960, p. 258). The colonial government tried to control and even to destroy the squatter settlements, but was not very successful.

The post-colonial government inherited a housing stock segmented along racial lines. However, as soon as the early 1960s, there began a slow integration into selected non-African housing areas (such as Northmead) of African public officials who had been promoted to higher civil service jobs. Thus, after independence, the segmentation of housing areas changed gradually from racial to income and occupation segregation. Accommodations became segmented into low-, middle, and high-income housing.

The government continued the colonial policy of concentrating on provision of rental housing in the public sector, with housing policies benefiting primarily the high-income sector. However, housing policy concerning low-income housing did evolve in a remarkable way after independence.

The post-colonial government had inherited a situation of excess demand for low-income housing, with a burgeoning squatter population which later grew very rapidly. Government policy came to be based on the premises that squatter settlements were only temporary and that all low-income households were to be housed in site-and-service accommodations and council housing. This would be achieved as soon as resources were available. There was therefore an effort to prevent establishment of new squatter settlements and to

reduce the size of existing settlements through squatter-control units established in the Department of Lands.

At the same time, there was a deliberate effort to establish owner-occupied housing for low-income households (Tipple, 1976). Site-and-service schemes were seen as the most effective way of providing cheap owner-occupied housing for low-income households.

The government introduced "normal" site-and-service schemes in 1966. These were to be fully serviced. However, they proved to be too expensive for most low-income households. Therefore, in 1968 the standard of servicing was lowered with the introduction of "basic" site-and-service schemes, which were to be partially serviced.

Meanwhile, there was also an effort to resettle residents of squatter settlements in new site-and-service areas. This was resisted by most residents, and they slowly acquired such political power that it became impossible even to think of resettling them without their approval. Meanwhile, the population of the squatter-settlement areas continued to grow.

Several reasons have been identified for the unpopularity and slow development of most earlier site-and-service schemes. Apart from their expense, these include: their location at long distances from places of employment and cumbersome, lengthy plot-allocation procedures. The result was a slow rate of house consolidation and a high default rate on loans and service charges (Lusaka Housing

Project Evaluation Team, 1977, p. 1).

During the late 1960s and early 1970s, there occurred an intense national debate on squatter settlements. This debate led to recognition of the expense of the site-and-service schemes and the rapid growth of squatter areas. It questioned the wisdom of the government's policy of not providing public services to squatter settlements. At the same time, there arose activities by voluntary organizations, such as SAIL (Social Action in Lusaka), directed at changing the public image of, and official policy toward, squatter settlements. Apart from encouragement of public discussion, these included efforts to build roads, to dig storm drains, to supply medical services, and to construct water projects in squatter settlements. Such activities did finally help to change the direction of government policy from ignoring squatter settlements to upgrading them.

Thus, during the Second National Development Plan (1972-1976), the value of the investment in squatter settlements, and the inability of the government to provide housing to the entire low income urban population through council housing and site-and-service schemes were recognized. A new policy of upgrading selected squatter areas was introduced. In 1974, the Housing (Statutory and Improvement Areas) Act (Act. No. 30 of 1974) was passed, giving powers to local councils so they could assure security of tenure and access to improved public facilities for the residents of squatter settlements. The selected squatter settlements which have been upgraded are called improvement areas.

Thus, the present low income housing policy is focused on owner-occupation. The vehicles through which owner-occupation is to be achieved are site-and-service and squatter-upgrading schemes. Rental housing is to be provided by the local councils.

The Housing Situation in Lusaka

Our study of low-income housing is restricted to Lusaka, not only the largest but also the fastest-growing city in the country. Since Zambia's independence, Lusaka has experienced the highest rate of urbanization in the country, which has put enormous pressure on the housing situation in the city. Because the problems being experienced in Lusaka are felt, to a lesser extent, in the other urban areas, the way Lusaka solves its housing problems is relevant to them.

Lusaka covers an area of 139 square miles. It was developed on the site of an African village, initially (in 1905) being a mere stopover on the railroad from the south to the copperbelt (Davies, 1969). Lusaka soon developed into a commercial and agricultural marketing center with an active local farming community. However, its growth was slow until 1935, when it became the new capital and administrative center of the country. The growth of the city accelerated further after independence in 1964.

The population of the city in selected years is shown in Table 2.1. The current population of Lusaka is

estimated at 600,000. It has been estimated that the average annual population growth rate of Lusaka was 13.4 percent during the 1963-1969 period and 9.9 percent during the 1969-1974 period.

Much of the growth of Lusaka, especially in the period after independence, has been a result of rural-urban migration in response to the rapid growth of the city's economy after independence, especially during the 1963-1969 period. During this period, new, light import substitution industries were established in the city, and public-sector employment increased following the achievement of independence. The government embarked on an ambitious post-independence public sector building program centered in urban areas, among them Lusaka. It has been estimated that during the 1963-1969 period, formal employment rose by 11.4 percent per year, self-employment by 24.1 percent per year. The male labor force increased by 110 percent, from 32,019 to 67,272 (Martin, 1977, p. 89).

The rapid rate of urbanization worsened the situation of excess demand for housing and led to the rapid growth of squatter settlements. In 1957, the squatter population of Lusaka was estimated at 20 percent of the population; by 1969, this had increased to 40 percent (Martin, 1977, p. 89). It is now estimated that 50 percent of the Lusaka population lives in squatter settlements, 10 percent in site-and-service scheme areas, 20 percent in low cost council housing, and 20 percent in high and middle income housing areas (Knauder, 1978, p. 15).

The distribution of the housing stock in Lusaka at the end of 1974 is shown in Table 2.3.

The seriousness of the housing situation in Lusaka is indicated by a comparison of the number of families on the Lusaka City Council's waiting list with the number of dwellings owned by the council (Table 2.4). The number of families on the council housing list is an expression of the potential demand for housing, but it does not necessarily represent actual demand. A family might not take a house when allocated to it because it might not be able to afford the rent. Some families might have already found accommodation elsewhere, but not have taken the trouble to have their names removed from the register. It is also possible for families to cheat--for example, to have two members of the same household registered on the waiting list. Despite these confounding factors, however, the housing waiting list is a good barometer of the excess demand for council housing.

Conclusion

This chapter has briefly portrayed the housing situation in Zambia. Some of the factors determining demand and supply were discussed. In the following chapters, the low income urban housing market is analyzed using the case of Lusaka. It is believed that the findings will be relevant to the other urban areas of Zambia as well.

TABLE 2.3

DISTRIBUTION OF LUSAKA HOUSING STOCK (1974)

Category	Number of Units	Percentage Share of Total Stock
High and medium cost	9,165	12.4
Low cost	16,756	22.64
Servants' quarters	6,302	8.52
Site-and-service	7,908	10.7
Squatter settlement	33,869	45.8
TOTAL	74,000	100.00

SOURCE: J. T. Robertson, "The Urban Situation: Shelter,"
in Human Settlements in Zambia (Report of the
 workshop held at the University of Zambia, 12-14
 September 1975).

TABLE 2.4

NUMBER OF FAMILIES ON THE LUSAKA CITY COUNCIL
WAITING LIST FOR HOUSING AND NUMBER OF
COUNCIL-OWNED HOUSES

Year	Number of Families on List	Number of Council-Owned Houses	Excess Demand ^a
1965	8,000	-	-
1966	-	10,928	-
1967	-	11,562	-
1968	-	12,696	-
1969	19,839	13,122	51.2%
1970	21,000	13,561	54.9%
1971	26,411	14,388	83.6%
1972	-	14,610	-
1973	28,104	-	-
1981	21,093 ^b	14,670	43.8% ^b

SOURCES: UN/ECA/Bouwcentrum, Third International Course on House Building Costs, pp. 111-43; Republic of Zambia, Annual Report of the Department of Town and Country Planning for 1970, p. 3; Republic of Zambia, Annual Report of the Department of Town and Country Planning for 1971, p. 3; T. Seymour, "The Causes of Squatter Settlement: The Case of Lusaka, Zambia, in an International Context," in H.J. Simons, et. al., Slums or Self-Reliance? Urban Growth in Zambia, p. 50; Sunday Times of Zambia, Feb. 22, 1981.

^aDifference between size of waiting list and number of houses owned, as a percentage of the latter.

^bThe lower figure for 1981 does not indicate a slackening of the need for housing. In the early 1970s, the old housing list was replaced by a new one. It is plausible that a lot of those families on the old list that remained unaccommodated by the Council did not put in new applications and decided instead to look elsewhere for accommodation.

CHAPTER THREE

ANALYSIS OF THE DATA: OWNER-OCCUPANT HOUSEHOLDS

Introduction

The purpose of this chapter is to present analysis of the sample survey data. The objective is to provide the background against which to understand urban low income housing markets, and to add to the very limited store of information about low income urban households in Zambia at present. Throughout the discussion, the present study's sample survey findings will be compared to other evidence available in the literature. The survey undertaken for the present study (Ndulo, 1979) covered 162 households in three housing areas: Bauleni, Chawama, and Kaunda Square.

The housing market in Zambia is segmented into distinct renter and owner-occupant markets. The major economic unit in these markets is the household. Previous research in Zambia, as elsewhere, has found major differences between renter and owner-occupant households (Boswell, 1975, p. 4). However, the sample for the present study is dominated by owner-occupant households. In interviews of the 162 households, it was found that 97 percent were owner-occupant and only 3 percent were renter households.

This finding varies from those of other studies, which have put the percentage of renters at a much higher level. Boswell (1975, p. 5) estimated the proportion of renter to owner-occupant households to be about the same in Chawama in both 1965 and 1974. This observation has been supported by studies carried out by the Lusaka Housing Project Evaluation Team (LHPET). In Garden, it was ascertained that 54 percent of the households were owner-occupants and 46 percent were renters (Banda, 1978b, p. 1). Another study put the figure for renter households at 44 percent for the same area (LHPET, 1977e, p. 2).

The share of households in Chaisa and Chipata that were renters has been estimated at 58 percent and 32 percent, respectively (LHPET, 1977e, p. 2).

Sanyal (1978, p. 14) reported the results of a survey of 150 households in Chawama which found 45 percent of the households to be renters. Another LHPET study (1976a, p. 16) has put the proportion of renters at 19 percent. However, Singini estimated the percentage of renter households in George at 37, and argued that the proportion of renter households in the area appeared to be increasing (Singini, 1978, p. 31).

These various studies suggest that on average, about 40 percent of the households in low income housing markets are renters. This is clearly higher than the present study's sample estimate of 3 percent.

It can be argued that the present study's sample

underrepresents renter households for several reasons. Renting is discouraged by the ruling political party. Landlords are looked down upon, and the level of rents is a very sensitive political issue. This has not prevented renting (of whole homes or part of them) from taking place, but it might have affected the ability of the interviewers to reach renter households.

While the sample survey was being conducted, the sample households were selected by randomly choosing homes. The researchers contacted the head of the household in each home. The outcome of this method is likely to have been an underestimation of renter households: By focusing on the head of the household for each home, the method was biased toward contacting owner-occupants, even if there was a renter household in the home renting a room or two. The renter households we contacted are thus likely to be only those who rented whole buildings.

Studies by the LHPET show that the renter market can be segmented into two parts: those households that rent whole buildings and those that rent a room or two in the home of the landlord. Our sample survey also disclosed this segmentation. Thus, although the proportion of renter to owner-occupant households was 3 to 97 percent, it was also found that 19 percent of the identified owner-occupant households had renters or lodgers living with them.

Other studies also confirm this trend: Sanyal reported on a survey in Chawama which found that 57 percent

of the landlords did not reside in the same building as did their tenants, while 43 percent of the landlords did reside in the same building (Sanyal, 1978, p. 16). Another study of Chawama showed that less than half of the renter households had absentee landlords (i.e., landlords not living in the same building) (Boswell, 1975, p. 5). Further, most of the absentee landlords lived in the same area. In George, 37 percent of the buildings contained households that paid rent to somebody in the same building, and were shared by a mean of two households per building (Singini, 1978, p. 27).

Because renter households are underrepresented in our sample, the analysis of the survey data in this chapter shall be focused on owner-occupant households. We shall discuss renter households, wherever possible, using available data from other sources.

In analyzing the data from the sample survey, the characteristics of the dwelling are considered: structure, space, access to the dwelling, services available to the dwelling, household structure and composition, income and employment, and the process of home improvement.

Characteristics of the Dwelling Stock

The dominant dwelling in Zambia's low income housing market is the owner-occupied dwelling. The category is comprehensive: It includes owner-occupied dwellings with or without mortgages, and low-income residents who do not have legal title to the dwelling but cannot be evicted.

The other form of tenure is rental. A household can rent a room or an entire dwelling, depending on its resources. In cases where the whole dwelling has been rented, it is even possible for the renter, in turn, to rent out a room. In the survey conducted for the present study, 97 percent of the respondents were owners and 3 percent were renters. Among the five renter households, four had no subtenants, while one had a subtenant in the home.

Household heads were asked the market price of their dwellings. The average estimated value was \$2,793 (standard error: \$270). This is a durable, good quality dwelling; it is worth about seventeen times the total monthly disposable income (\$163) of the average owner-occupant household. Households may start off in a temporary structure, but once they have decided to become owners, they end up, over time with a structure of good quality. The quality of the dwelling is such that if a household were to buy it on the market, assuming that it spends about 22 percent of its monthly disposable income of \$163.00 on housing, it would take thirty years to amortize the loan toward the purchase of the dwelling with an interest rate of 15 percent. The average owner-occupied dwelling nearly doubled in value between the time it had been acquired and the time of the survey, in 1979.

The principal characteristics and the average value of the typical dwelling are shown in Table 3.1.

TABLE 3.1
CHARACTERISTICS OF THE DWELLING

Characteristic	Owner Household	Renter Household	Total
Age of dwelling, in years	6.12 (0.32) ^a	3.33 (0.88)	6.07 (0.32)
Area of site, m ²	550.62 (31.35)	358.4 (78.08)	544.61 (30.56)
Floor space area of dwelling, m ²	97.11 (5.96)	47.20 (9.06)	95.55 (5.82)
Number of rooms	3.45 (0.11)	2.20 (0.49)	3.41 (0.11)
Value of dwelling, U.S. Dollars (1979)	2792.89 (269.94)	1063.29 (629.32)	2739.51 (263.22)

SOURCE: M. Ndulo, 1979 Zambia Home Improvement Survey.

^astandard errors are in parentheses.

Structure: Age, Rooms, Roof, and Wall MaterialsAge of Dwelling and Form of Construction

Most dwellings are relatively new--that is, they were built after 1964, the year Zambia became independent. The average age of the dwellings is 6 years (with a standard error of 0.32 years). The average age of houses is low because of the number of dwellings that are replacements for earlier, temporary shelters. It is possible that most respondents built houses with temporary materials, and then, when they accumulated enough resources, destroyed the old building and constructed a new one. However, both the housing stock and the low income urban population have expanded very rapidly since 1964, when inhibitions to rural-urban migration were removed. Most urban households, therefore, consist of people who have migrated to the urban areas since 1964.

Table 3.2 shows how the dwellings were built. The most popular arrangement (used by 61 percent of the households) was for the household to hire workers to build the dwelling. The family can also use its own labor (as did 21 percent), or the dwelling can be bought on the market (16 percent were). These three were the predominant arrangements for building a dwelling. This finding is supported by a LHPET sample survey of George in 1976. That survey found that 44.4 percent of the houses were rented and 54.6 percent were occupied by owners. Of these owner-occupied homes, 52.8 percent were

TABLE 3.2

PERCENTAGE DISTRIBUTION OF THE FORM OF
CONSTRUCTION OF THE DWELLING

Form of Construction	Number of Households	Percentage of Households
Dwelling not new; another family previously occupied it; bought	25	15.9
Family built it using self-help labor	33	21.0
Workers paid by family head; a direct arrangement	96	61.1
Other	3	1.9
TOTAL	157	100.0

SOURCE: M. Ndulo, 1979 Zambia Home Improvement Survey.

NOTE: Includes owner-occupants only. There were also five renter respondents; three occupied a building built by workers paid by the family head; one family-built using self-help labor and one the dwelling was not new when occupied.

built by the owner or by labor hired by the owner (self-built); 40.7 percent were bought; and 6.6 percent were either granted to or inherited by the household (Singini, 1978, p. 15).

In a comparative study of Chawama between 1965 and 1974, Boswell (1975) found an increase in the number of houses bought and in the percentage of self-built houses that hired labor to do the work (Boswell, 1975, p. 18). If this is a verifiable trend, it implies an increase in small-scale construction activity using hired labor in low income housing areas, reflecting, apparently, an increase in paid employment opportunities.

Furthermore, there appears to be a trend toward use of paid labor, rather than self-help labor, in extending houses. This might be related to the continuously improving quality of houses, which demands higher construction skills.

This description is supported by LHPET studies. It was found that most households used paid labor to build their houses (LHPET, 1976a, p. 17; LHPET, 1977c, p. 16). Singini (1978) found that 53.4 percent of the households in George Overspill in 1977 used paid labor in the construction of their homes. The mean amount spent on labor was \$72. It was also found that in both 1976 and 1977, paid labor was used mostly for the construction of the core house, walls, and roof (Singini, 1978, p. 17, 31).

The most important reason why people use hired labor is because they lack the skills to do the work themselves.

Thus, most participants in the Lusaka Housing Project hired labor to build all or part of their houses, and 90 percent of those who hired labor felt that they did not have skills sufficient to build houses to an acceptable standard (LHPET, 1977f, p. 9). An additional reason for hiring labor could be a lack of time to do the work (LHPET, 1977b, p. 44).

The experience of the Lusaka Housing Project managers in encouraging participants to use self-help labor is interesting. Residents were encouraged to use their labor to either build or extend their homes. To induce them to do so, technical assistance was provided. It was believed that owner-occupants who build their houses on their own would thereby minimize building costs through saving on labor costs.

However, as it turned out, the technical assistance went mostly to the hired bricklayers. In George Overspill, fewer than 1 percent of the participants in the project used their own labor to build their entire houses (LHPET, 1977c, p. iv). In Chawama, participants in the project were also encouraged to use self-help labor; however, most used hired labor (LHPET, 1977b, pp. 10, 14).

When the use of self-help labor was limited because residents engaged in wage employment could not find the time to build their own houses, they hired bricklayers. Generally, the female members of the household helped the bricklayers with some aspects of house building (LHPET, 1977f, p. 16).

The most common builders hired were employed artisans who work on buildings in their spare time; unemployed artisans who did housebuilding while looking for formal work; and full-time, self-employed builders (LHPET, 1977f, p. 11).

Respondents who either bought or built their houses were asked whether they had received some special income--like an inheritance or an unusually favorable loan--before buying or building the house. Only 24 percent of our respondents said they had received some special income (76 percent had not). It may therefore be hypothesized that households usually built or bought their dwellings from their earnings or accumulated savings. Because of this fact, the building process was likely to be stretched over a considerable period of time, with work done little-by-little, as money was set aside for such purposes each month.

Number of Rooms

In the survey conducted for the present study, respondents were asked the number of rooms (excluding kitchen, toilet, and bathroom) in their dwellings. The results are shown in Table 3.1. The average number of rooms per owner-occupant household is 3.45 (standard error: 0.11). The renter households had an average of 2.20 rooms (standard error: 0.49). The average for the entire sample is 3.41 rooms per household (standard error: 0.11). Among the owner-occupants, 56 percent had three or fewer rooms, and

44 percent had four or more rooms per household.

Other studies have also found the average number of rooms per household to be about three, with owner-occupant households having slightly larger dwellings and renter households occupying slightly smaller dwellings. LHPET studies have found the average number of rooms per household for George and Kaunda Square to be about three (LHPET, 1976a, p. 15; Singini, 1978, p. 18).

Roof and Wall Materials

Tables 3.3 and 3.4 show the principal wall and roof materials used for the dwellings surveyed for the present study, compared with similar surveys carried out in George in 1977 by LHPET.

Table 3.3 shows that, in the present study's survey, 53 percent of the owner-occupant households had walls made of concrete blocks; 8 percent had burnt bricks; 39 percent had adobe. In comparison, the 1977 George survey refers to renter and owner households. It shows that 23.3 percent of the households had walls made of concrete blocks; 72.7 percent had burnt or sun-dried bricks; and 0.3 percent had adobe walls. The majority of the households, then, had walls made of either concrete blocks or bricks (burnt or sun-dried). This is clearly a reflection of the higher quality and permanent nature of the dwellings. The quality and durability of the dwellings is affirmed by reviewing roof materials used. In the survey conducted for the present

TABLE 3.3

PERCENTAGE DISTRIBUTION OF
PRINCIPAL WALL MATERIALS IN DWELLINGS

Percentage of Dwellings With:	Summer 1979	George 1977
Concrete blocks	53.5	23.3
Burnt or sun-dried bricks	7.6	72.7
Adobe, pole and dagga	38.9	0.3
Other ^a	-	3.8

^aMixtures of concrete blocks and sun-dried and burnt bricks, and iron sheets.

SOURCES: M. Ndulo, 1979 Zambia Home Improvement Survey; R.E. Singini, George 1978 Primary Surveys I and II--Comparisons and Their Operational and Policy Implications (1978), p. 27.

TABLE 3.4

PERCENTAGE DISTRIBUTION OF
PRINCIPAL ROOF MATERIALS IN DWELLINGS

Percentage of Dwellings With:	Summer 1979	George Overspill 1977	George 1977
Metal sheets	49.0	58.6	88.0
Asbestos-cement sheets	50.3	31.0	8.7
Other ^a	0.6	10.4	3.3

^aMixtures of metal sheets and asbestos sheets; thatch or grass; and cardboard or waste material of industrial origin.

SOURCES: M. Ndulo, 1979 Zambia Home Improvement Survey; R.E. Singini, George 1978 Primaries I and II--Comparisons and Their Operational and Policy Implications (1978), pp. 21, 27.

study, it was found that most owner-occupants' dwellings had roofs made of metal sheet (49 percent) and asbestos-cement sheets (50.3 percent). This is similar to the results from the George sample surveys, as shown in Table 3.4.

Space: Site and Floorspace Area

The average owner-occupant household site has an area of 550.6 square meters (m^2) (standard error: 31.4 m^2). This is larger than the standard plot size for site-and-service schemes, which is about 324 m^2 . The average site area identified in the present study is likely to be exaggerated: Some households are likely to have over-estimated plot sizes because of unsettled plot demarcations (Martin, 1977, p. 477).

The average floor-space area for owner-occupied houses in the present study is 97 m^2 (standard error: 6 m^2). This area is larger than that found in the Chuunga 52, John Howard 35, and George 54 areas (LHPET, 1976a, p. 21).

The optimum size of the site for an urban household has been a controversial issue among housing authorities. Culturally, it is important because many people believe that the site must be large enough so that, when the house is built, "a child can run around it" (Mwiinga, 1976, p. 9).

The issue is also important because many household activities take place immediately outside the house, so that to some extent, the site is an extension of the indoor living space. The "swept area" of the site is used for such

household activities as cooking, washing, and leisure experiences (LHPET, 1976a, p. 33). The present study's survey found that 23 percent of the owner-occupant households did their cooking outside. Another 23 percent did their cooking inside but didn't have a kitchen, and 54 percent had a kitchen.

Part of the house site is used for small-scale business activities such as storage and low-level manufacturing (LHPET, 1976a, p. 30). The area is also used for gardening, including the growing of vegetables, mainly for household consumption. A study of George Overspill showed that 9 percent of the households had gardens adjacent to their houses (Singini, 1978, p. 25). Households used the vegetables grown mainly for household consumption. This consumption directly reduces expenditures on food, leaving more money for other purposes, such as housing. Homegrown food is also an important source of nutrition for poor urban households, which usually have no other supply of fresh vegetables because of a lack of refrigeration. Households may also supplement their incomes by selling some of the vegetables they grow.

Decorative gardening is also common. LHPET surveys in site-and-service areas have found that almost all households used some site area for decorative gardening (LHPET, 1976a, p. 27).

Large floor space areas are also important for low-income households. Extra floor space can be used for

small-scale business activities. A 1976 survey on the use of buildings in George showed that, on the average, 95 percent of a building was used for residential purposes and 5 percent was dedicated to mixed residential and business uses (Singini, 1978, p. 14).

Access: Modes of Travel to Work

Among urban poor households, the mode of travel to work is a very important aspect of the decision on where to locate. Households will attempt to keep low the time and money costs of traveling to and from work. These statements are borne out by evidence. For example, the availability of jobs within walking distance was an important factor in the location of George, which is near major employment centers in the heavy-industry area of Lusaka. A LHPET study found that 79 percent of the residents of George had formal employment, and 52 percent of these worked in the heavy-industry area, which is within 45 minutes' walking distance of George (Rakodi, 1978, p. 1).

The placement of other low income housing areas tells a similar story. Kanyama and Chawama are located near the commercial offices in the town center; Kalingalinga is near government offices; Chaisa is near the heavy-industry area. Other surveys in low income housing areas have shown that households tend to locate in residential areas near their members' places of employment, or the members of the household take up jobs close to their residences (LHPET, 1977f, p. 8).

Efficient modes of travel to work are also important to the productivity of the worker. Respondents in the survey conducted for the present study were asked what mode of travel to work they used and how much time they spent traveling to work. The results are shown in Table 3.5.

The dominant mode of travel to work is generally walking. Thirty-one percent of the heads of owner-occupant households interviewed for the present study walked to work; other popular modes of travel to work were bicycling, seventeen percent; taking a public bus or taxi, twenty-seven percent; and using transportation provided by the employer, fifteen percent. These results are generally similar to the results of studies of George in 1973 and 1976, as shown in Table 3.5.

Respondents to the present study's survey were also asked how much time the head of the household spends traveling to work. The average time spent traveling one way to work by owner-occupant household heads was 41 minutes (standard error: 2 minutes).

Services to the Dwelling: Fuel, Water, and Sanitation

Some of the most important indicators of quality for a dwelling are a supply of clean water in the dwelling or nearby; adequate sanitary facilities; and a sophisticated source of energy available for home-related activities.

Table 3.6 shows the percentage distribution of owner-occupants with the various types of water and sanitary

TABLE 3.5

PERCENTAGE DISTRIBUTION
OF MODES OF TRAVEL TO WORK

Mode of Travel	1979 ZHISA ^a	George 1973	George 1976
Works at home	5.2	2.3	-
Walk	30.7	32.7	48.0
Bicycle	17.0	28.7	16.0
Car	4.6	3.3	-
Transport provided by employer	15.0	-	17.0
Public bus, taxi	27.5	26.8	25.0
Other	-	6.4	-

^aM. Ndulo, 1979 Zambia Home Improvement Survey.

SOURCES: M. Ndulo, 1979 Zambia Home Improvement Survey; R.E. Singini, George 1978 Primary Surveys I and II--Comparisons and Their Operational and Policy Implications (1978), p. 3; C. Rakodi, George 1976: Initial Results of the First Primary Sample Survey--Operational and Policy Implications: Supplement to Working Paper No. 4 (1978), p. 2.

TABLE 3.6

PERCENTAGE DISTRIBUTION OF WATER SUPPLY,
SANITARY FACILITIES, AND FUEL USED FOR COOKING

Type of Service	Number of Dwellings	Percentage of All Dwellings
Source of water:		
standpipe	118	75.2
tap, shared	1	0.6
have own tap, no shower	25	15.9
complete bathroom	13	8.3
Type of sanitary facility:		
none	5	3.2
latrine	104	66.2
communal toilet, shared	11	7.0
flush toilet	37	23.6
Type of fuel for cooking:		
wood	28	17.8
charcoal	100	63.7
kerosene	28	17.8
electricity	1	0.6

SOURCE: M. Ndulo, 1979 Zambia Home Improvement Survey.

facilities. Seventy-five percent of the respondents used a standpipe as a source of water. (This is the popular source of water in most low income housing areas in Lusaka; normally, 25 households have one standpipe to share.) Twenty-five percent of the households in our survey had piped water. In terms of sanitary facilities, the dominant form was pit latrines: 66 percent of the households had them, while 24 percent had flush toilets. The latter reflects the case of Kaunda Square (whose respondents were 25 percent of our total sample): Residents of a site-and-service area have access to a higher level of sanitary facilities than do most low income residents.

Table 3.6 also shows the type of fuel used by households for cooking. Most of the households--63.7 percent--used charcoal; 35.6 percent used either wood or kerosene. Only one household among those surveyed used electricity for cooking.

Household Structure and Composition

The urban low income household is the major economic unit in the present study. This unit determines how much housing to consume, whether it should be a renter or an owner-occupant, and whether or not it should improve the dwelling. In these decisions, the household is constrained by the quantity of resources available to it.

Generally, policymakers appear to hold distorted views about members of poor urban households. They are

most often stereotyped as unstable, unemployed, and living on the verge of criminal activities. The present study of the urban poor presents data in this section that can help to correct erroneous views on which public policy might be based.

Age and Gender

Characteristics of owner-occupant households are shown in Table 3.7. The average household head was middle aged (mean age, 41 years). This kind of household is likely to be relatively stable because of the household head's responsibilities toward immediate and extended family members.

It is interesting to note that informal-sector activities in the urban areas in Zambia are dominated by middle-aged entrepreneurs (Todd, 1979). This fact may be of use in developing symbiosis between informal sector and low income housing policies.

The distribution of the ages of the sample household heads in the survey (Ndulo, 1979) reflects the pattern in Lusaka as a whole, with most falling within the 20-to-49 age group and only a few being in the over-50 bracket (LHPET, 1976a, p. 9).

The gender distribution of household heads in low income housing areas also reflects the larger urban society, in which males dominate. This is partly traceable to the nature of the migratory process; Males migrate first, and

TABLE 3.7

CHARACTERISTICS OF OWNER-OCCUPANT HOUSEHOLDS

Characteristic	Percentage Distribution
Age of household head (years):	
< 30	21.0%
30 - 50	67.5%
> 50	19.1%
mean (years)	40.93 (0.90)
Gender of household head:	
male	90.4%
female	9.6%
Schooling completed by household head (years):	
< 8	62.4%
8 - 12	33.8%
> 12	3.8%
mean (years)	5.97
Size of household:	
mean number of members	7.24 (0.24)
Number of renters or lodgers:	
mean	0.26 (0.05)

NOTE: Standard errors are in parentheses.

SOURCE: M. Ndulo, 1979 Zambia Home Improvement Survey.

when they are stabilized, they are followed by female members of households. Ninety percent of the owner-occupant households surveyed for the present study were headed by men; 10 percent were headed by women.

However, there is evidence that the proportion of female household heads is increasing. Studies by the LHPET in George found that the proportion of household heads who were female increased from 5.4 percent in 1973 to 8.1 percent in 1976 (Singini, 1978, p. 7). Another study of George, one year later, found the proportion of female-headed households to be 9 percent (LHPET, 1977a, p. 3).

This trend might be due to the increasing independence of women and the increasing number of women born in urban areas, who look upon urban areas as their permanent home.

Education

The average head of an owner-occupied household had spent about 6 years at school. Sixty-two percent had spent less than 8 years at school; 34 percent, between 8 and 12 years, and 4 percent, more than 12 years. Twelve percent had not attended school; and 88 percent had had one or more years of schooling.

The standard of schooling among the household heads is high compared with that in most African countries. This fact may indicate that those who have attended school are more likely to migrate to urban areas.

Size of the Household

The size of a household is an important factor in how much housing it consumes. A larger household means more demand for space. It is likely to have a larger disposable income. There are likely to be more members working, or more older children who can help with income generating household activities. But at given incomes, demand for space usually falls as size rises.

The average household's population in our sample of owner-occupants was 7. This is a slightly higher level than has been reported by other studies, which have estimated the mean household size to be 6.6 members in Chunga; 5.4 in Kaunda Square; 5.2 in John Howard; and 4.7 in George (LHPET, 1976a, p. 8). These figures are estimates for a sample of owner-occupant and tenant households; our estimate is for owner-occupant households only. It is possible that owner-occupants have larger households than do tenant occupants.

What is the composition of the typical household? Eighty-three percent of the owner-occupant households in the present study's sample had more than four members, while 17 percent had fewer than five members.

The typical household consisted primarily of members younger than fourteen years of age. An average family had four members younger than fourteen years and three members fourteen or more years old. Sixty percent of the households had four or more members younger than fourteen. Eighty-five

percent had one or more children under five, while fifteen percent had no children under five.

The preponderance of children in low income housing areas was also evidenced by a study which showed that 48 percent of the population of George was children under fourteen years old. Individuals over 45 years old were only 5 percent of the population (Singini, 1978, p. 7).

Some households take in lodgers, renters, or relatives. The survey conducted for the present study showed that 19 percent of the households had lodgers or renters. A study of George found that 60 percent of the households consisted of nuclear families, and 23 percent had relatives staying with them (Singini, 1978, p. 1).

A large household size implies overcrowding. A survey conducted by the National Housing Authority shows that there is less overcrowding in site-and-service areas than in public-housing areas, partly because owner-occupant households can enlarge their homes or move out in response to increased household size (Simoko, 1979, p. 2). Public housing cannot be enlarged because this is in the final analysis the responsibility of the landlord. Moving out is less likely because this is done through an administrative process which is not easily responsive to such needs.

Household Mobility

The average household head in our sample had migrated to Lusaka during the past decade, a fact reflecting the huge surge of rural-urban migration during the post-independence

era. Only 6 percent of the residents had been born in Lusaka; 94 percent had not.

This finding is similar to those of other studies. A 1976 LHPET study of George found that 2 percent of the sampled household heads were born in Lusaka; 53 percent had come to Lusaka from rural areas and 43 percent had come either from other urban areas or from outside Zambia (Singini, 1978, p. 10).

Data collected for the present study does not show which households had migrated from rural to urban areas. However, figures from the George survey (Singini, 1978) suggest that about 50 percent of urban poor households had recently migrated from the rural areas. Thus, migrants are equally likely to have migrated directly from the countryside to Lusaka or to have moved first to other urban areas before arriving in Lusaka.

Studies of households in low income residential areas in Lusaka show that the most common pattern of migration is for the migrant initially to stay with relatives until he or she finds a job. The person then starts looking for accommodations, and usually rents a room in the area for about \$13 (UN/ECA-Bouwcentrum, 1973, p. 111-44; Mubanga, 1979b, p. 17).

The pattern of migration just described is consistent with the migration literature. However, it is likely to change over time as the country grows and the rate of migration to urban areas moderates and then stabilizes.

The average household in the survey conducted for the present study had been living at the current site for the past six years (standard error: 0.4). Given the average age of the housing areas, this implies much inter- and intra-urban mobility, with households moving within their residential areas and outside of them to other residential areas.

Within the urban areas, the predominant trend has been for low-income and middle-income households to move from council and public housing to private low income housing areas. This trend has been spurred by a variety of factors--among them, high rents and a shortage of housing units.

A study in 1973 found that Matero, a public housing area near George, was the most common area of previous residence for George households (Singini, 1978, p. 3).

A LHPET study of Chawama found that 64 percent of the households with houses and plots in Chawama Overspill had come from outside Chawama, while 78 percent of those buying houses within the upgraded area of Chawama had come from within Chawama (Banda, 1979b, p. ii). The figures probably reflect two main kinds of moves: an influx of presumably higher-income households from outside, especially from public-housing areas, whose main motivation is ownership of a house; and the motion of a group of households which are mobile within the residential area.

Table 3.8 shows the principal reasons why the

TABLE 3.8

PERCENTAGE DISTRIBUTION OF THE MAJOR REASONS
WHY HOUSEHOLDS MOVED TO THEIR PRESENT LOCATIONS

Reason	Number of Households	Percentage of Households
To be closer to work	8	5.13
To be in a better neighborhood	10	6.41
To pay less	3	1.92
To become a homeowner	76	48.72
To obtain a bigger or better-quality home	12	7.7
Other ^a	47	28.21

^aIncludes resettlement.

SOURCE: M. Ndulo, 1979 Zambia Home Improvement Survey.

households surveyed for the present study moved to the present area. The main reason given was to become an owner: 49 percent of the households moved for this reason. The other important reasons were to obtain a bigger or better-quality dwelling (8 percent); to find a better neighborhood (6 percent); and to be closer to work (5 percent).

A similar study of recent movers in Chawama suggested the same reasons. Asked for the main reason why they bought houses in Chawama, respondents named becoming an owner (51 percent); obtaining a bigger dwelling (26 percent); and being closer to work (2 percent) (Banda, 1979b, p. iii).

Only about 10 percent of the owner-occupants surveyed for the present study said they were thinking of moving again. The main reason given by those household heads was to obtain a bigger and better-quality dwelling.

Structure of Income and Employment

A household may depend on various sources for its disposable income, and these sources may change from time to time, depending on the position in the life cycle of the household. Some households produce for their own consumption. In the urban areas, the major source of income is labor earnings, particularly from work in the small scale production sector. Some households also receive returns from assets owned, or public or private transfer payments.

The importance of these different sources of income

is likely to depend on the level of development in the country and on the standard of living of a household. In this section, the structure of household incomes, and occupations of owner-occupant households, is explored.

Occupation of the Household Head

Table 3.9 shows the occupations reported by owner-occupant household heads in our survey. Forty-eight percent were employed as either unskilled or skilled manual workers. The third most important occupation was self-employment--ownership of a store or other business: 12 percent of the household heads ran a store or other business.

Self-employment has been found to be common in low income residential areas. For example, a study of George and Chawama produced the estimate that 13.4 percent of the heads of households in George were self-employed, and 18.6 percent of the work force in Chawama was self-employed (LHPET, 1977d, p. 9).

Domestic service is one of the most common occupational areas among poor households in Lusaka; in our sample, however, only 2.5 percent of the heads of households were employed in domestic service. This low proportion can be explained by the fact that domestic servants often receive housing at their places of work--usually behind the employer's house. Furthermore, if they reside away from work, they are likely to be renters because they have lower incomes than do people in most other urban occupations.

TABLE 3.9
PERCENTAGE DISTRIBUTION OF THE
OCCUPATIONS OF HOUSEHOLD HEADS

Occupation	Number of Households	Percentage of Households
Salesperson; vendor	7	4.5
Owner of store or other business	18	11.5
Police, military, or other personal service	14	8.9
Domestic service	4	2.5
Unskilled worker	37	23.6
Skilled worker	38	24.2
Office worker	12	7.6
Professional, technician, or foreman	14	8.9
Other	13	8.3
TOTAL	157	100.0

SOURCE: M. Ndulo, 1979 Zambia Home Improvement Survey.

The impression generated by a review of the results of the present study's survey is that most heads of households are employed. However, there may be a high rate of unemployment among other members of the household: 32.5 percent of the households had one or more unemployed workers, while 67.5 percent had none.

Other studies carried out in low income residential areas generally show a high level of employment among the heads of households and a high level of unemployment among adults in general. A LHPET study showed that, among heads of households, an estimated 94 percent were working, 3 percent were seeking work, and 3 percent were neither working nor seeking work. Among the total population of adults, however, it was estimated that 45.8 percent were working, 3.6 percent were seeking work, and 50.6 percent were neither working nor seeking work (LHPET, 1976a, p. 10).

Another author has reported an estimate that, among the unemployed, 64 percent had previously had paid employment in Lusaka. Periods of unemployment were varied; Among the unemployed, 52 percent had been unemployed for less than two years, 12 percent had been jobless for more than two years, and 36 percent had never had a job (Rakodi, 1978, p. 7).

Incomes

The percentage distribution of the sources of income for owner-occupant households in our sample is shown in Table 3.10. Labor earnings were the dominant source of income: 85 percent of the households depended in part or entirely on wages and salaries. This figure reflects the importance of work in the formal sector for the urban poor.

The second most prevalent category of income source reported in the survey was sales or work on one's account: 26 percent of the households earned this type of income. Rental income from lodgers in the building was also important: 15 percent of the households reported this type of income.

Aid in cash from family members, pensions, and other aid were less commonly reported. Aid from other members of the family might be low because many urban residents, though poor, are nonetheless likely to be better off than are their rural relatives. It is the urban dwellers, by and large, who are expected to send remittances to rural family members. However, the urbanites might receive transfers from better-off residents in other urban areas.

The pattern of the income sources shown in this sample is similar to that reported by other studies. For George residents, it has been found that, apart from wages and salaries, the most prevalent sources of income were self-employment (especially retail trade and the renting out of

TABLE 3.10

PERCENTAGE DISTRIBUTION OF THE VARIOUS
SOURCES OF INCOME FOR OWNER-OCCUPANT HOUSEHOLDS

Source	Number of Households	Percentage of Households
Wages and salaries	134	85.4
Sales or work on one's account	40	25.5
Rent from lodgers	23	14.6
Aid in cash from family members not living in the same home	9	5.7
Pensions, other aid	4	2.58

SOURCE: M. Ndulo, 1979 Zambia Home Improvement Survey.

rooms) and allowances from relatives (Rakodi, 1978, p. 4).

The distribution of monthly disposable income levels in our sample of owner-occupant households is shown in Table 3.11. The mean monthly household income is \$162.50 (standard error: \$12.27). This is above the averages found in other studies: \$128 for a survey of Chuunga, Kaunda Square, and John Howard (LHPET, 1976a, p. 13); and \$116 for Chawama (Banda, 1979b, p. 10). It is higher because more care was taken to cover all income sources and because of concentration on owner-occupants.

Home Improvement

In this section, home improvement--the process by which the household extends, improves, subdivides, and rebuilds the dwelling--is examined. This is one of the main means of enlarging the stock of low-income housing in Zambia.

Number of Home Improvements

Data from our survey indicates that most low-income, urban, owner-occupant households improve their dwellings. The distribution of improvements carried out by the households is shown in Table 3.12. Ninety-five percent carried out one or more types of dwelling improvements; only 5 percent did not. The mean number of types of improvements implemented was 4.3 per household (standard error: 0.22). The most popular kinds of improvements were adding a room, improving

TABLE 3.11

PERCENTAGE DISTRIBUTION OF MONTHLY PERSONAL
DISPOSABLE INCOME FOR OWNER-OCCUPANT HOUSEHOLDS

Income	Number of Households	Percentage of All Households
< \$51	9	5.7
\$51 - 100	56	35.7
\$101 - 150	26	16.6
\$151 - 200	24	15.3
\$201 - 300	24	15.3
\$301 - 400	11	7.0
> \$400	7	4.5

SOURCE: M. Ndulo, 1979 Zambia Home Improvement Survey.

TABLE 3.12

DISTRIBUTION OF HOME IMPROVEMENTS
CARRIED OUT BY OWNER-OCCUPANT HOUSEHOLDS

Number of Types of Improvements	Number of Households	Percentage of All Households
0	8	5.1
1 - 2	40	25.1
3 - 5	57	36.3
6 +	52	33.1
TOTAL	157	100.0

SOURCE: M. Ndulo, 1979 Zambia Home Improvement Survey.

floor and roof materials, adding plaster and paint, and improving the toilet (see Table 3.13).

By the end of the average period of residence (about six years per house), these home improvements had helped increase the value of the house by about 95 percent over its original value, as confirmed by respondents' evaluations of their dwellings: 78 percent of the respondents said that their dwellings were now better than when they had acquired them, 17 percent believed they were of the same quality, and only 5 percent believed the homes were worse than when they had acquired them.

Forty-two percent of the respondents said they had added one or more rooms. The average cost of doing so was \$334.00 per room (standard error: \$58.00). Households added rooms for various reasons, among them the presence of additional children (72.3 percent) and of other additional relatives (13.8 percent), and investment purposes (4.6 percent).

Findings of other surveys also indicate that most low-income households, given opportunities and resources, improve their dwellings. One such study found that 67 percent of the households in Kaunda Square, 50 percent in John Howard, and 20 percent in Chuunga were at the time making extensions to their dwellings (LHPET, 1976a, p. 21). Another survey, in George, found that 39.8 percent of the improving owner-occupants had made extensions to their dwellings; 29.1 percent had improved walls; 25.8 percent had improved

TABLE 3.13

MAJOR HOME IMPROVEMENTS MADE
BY OWNER-OCCUPANT HOUSEHOLDS

Type of Improvement	Number of Mentions	Percentage of Improving Households
Additional rooms	66	42.0
Better kitchen	47	29.9
Better toilet	79	50.3
Plaster and paint	87	55.4
Wall materials	45	28.7
Roof materials	89	56.7
Flooring	89	56.7
Windows and doors	61	39.1
Earth fill	55	35.5

NOTE: Other improvements included adding a porch, ceiling work, fencing, installing a more convenient water source, etc.

SOURCE: M. Ndulo, 1979 Zambia Home Improvement Survey.

roofs; 8.9 percent had rebuilt their dwellings; and 10.4 percent had made other kinds of improvements. Furthermore, 54.8 percent of those who had extended their dwellings had added more than one room (Singini, 1978, p. 19).

Intention to Improve

Even if households do not improve their dwellings in the end, the intention is nearly always there. Failure to improve the dwelling is attributable to limited resource levels--both time and money. Even households of the most modest means are likely to carry out inexpensive improvements with their limited resources.

Studies confirm this analysis. Asked about their future intentions regarding improvements, 93.2 percent of the participants in the Lusaka Housing Project expressed intent to extent their homes (LHPET, 1977c, p. 10). Another study shows that households which had recently moved to Chawama Overspill bought or acquired half-complete structures, and all intended to improve the structures in one way or another; indeed, within a few years, 93 percent had already made some sort of improvements, spending an average of \$749.37 per household (Banda, 1979b, pp. ii, 7).

In summary, then, the general desire for improving dwellings has led households, even in housing areas with low incomes, to undertake improvements to their dwellings, with cheaper materials when necessary.

Decision to Improve

For households that intend to improve their dwellings, much depends on the resources available to the household--both time and money--as well as the household's ability to reduce other expenses in order to save money for dwelling improvements. While households carry out improvements to keep dwellings from depreciating or to increase the flow of services, there are also "non-economic" flows. A quality dwelling provides status, pride, community respect, and other such intangibles, which by themselves are enough to motivate many households to improve their dwellings.

However, households renting their dwellings have no incentive to improve. There is also little such incentive in an owner-occupant household if the flow of services from the dwelling is satisfactory, if the household intends to move soon, or if it has no room to extend the dwelling. (Singini, 1978, p. 5).

How do institutional changes, such as the provision of basic services, affect the incentive to carry out home improvements? Respondents were asked about the influence of the household's access to piped water on dwelling improvements. Fifty-eight percent of the respondents with access to piped water said they had made additional improvements to the dwelling as a result of such access; 34 percent had not made any additional improvements; and 8 percent had made fewer improvements as a result.

The same question was asked of households without

access to piped water. For 74 percent of the respondents, the lack of piped water had no great effect on improvements; 24 percent made fewer additional improvements because of this lack; and 2.5 percent made more improvements as a consequence of the lack of piped water.

What is clear from this is that access to piped water does affect dwelling improvements. The strength of this relationship is not clear.

Financing for Dwelling Improvements

Since low-income households have limited incomes, and the opportunities for increasing that income are limited, amassing resources for improving dwellings is a formidable task which requires ingenuity and foresight. Financing is needed to buy materials and pay labor for extending or improving dwellings. Sources of loans and other credit are scarce; households depend mainly on accumulated savings or on wages. The percentage distribution of the various sources of finances for dwelling improvements in our sample is shown in Table 3.14. In all, 47.6 percent of the respondents paid cash for materials and used self-help labor, while 42.9 percent used accumulated savings for materials and paid labor. Only one respondent, a landlord, said he used rental income to finance dwelling improvements; for other households, no clear distinction between wage income and rental income is made when it comes to spending decisions. Only 3.4 percent of the respondents used loans

TABLE 3.14

PERCENTAGE DISTRIBUTION OF THE
SOURCES OF FINANCING FOR DWELLING IMPROVEMENTS

Source of Finances	Number of Households	Percentage of All Households
Financed by owner (in rented dwellings)	1	0.68
Cash paid for materials; self-help labor used	70	47.62
Credit from materials supplier, or loan for materials from others; self-help labor used	7	5.44
Hired labor and materials, financed with savings or by sale of property	63	42.86
Loans for everything obtained from formal loan sources	5	3.4

SOURCE: M. Ndulo, 1979 Zambia Home Improvement Survey.

from formal sources to finance their dwelling improvements. The most important source of finance for dwelling improvements, therefore, is accumulated savings and wages.

Most households were unwilling to take out mortgages to finance either buying houses or making improvements. Households refuse to risk loss of a house if loan payments cannot be made. When respondents were asked whether they would be willing to mortgage their houses in order to get a loan, 71 percent said they would not; only 29 percent would.

Even those low-income households wishing to take out mortgages are generally closed off from formal sources of finance. The Zambia National Building Society has a minimum mortgage of \$6,329.00 for people under age 36 who can qualify for the longest mortgage term, 30 years. The person taking such a mortgage would need a monthly income of about \$190; the loan would be 100 percent of the value of the dwelling. These conditions completely cut off a big segment of the low-income population. Furthermore, the administrative process of getting a loan is cumbersome and difficult (LHPET, 1977d, p. 17).

Summary and Conclusion

In this chapter, the sample survey data was examined, with a focus on the prominent features of the dwelling, the owner-occupant household, and the home-improvement process. The data from the survey conducted for the present study

was also compared with results of other sample surveys, which produced findings generally comparable to ours. However, since our population is the low income urban population in low income private housing markets, our sample is unlikely to be representative of the rest of the nation.

The average household in our sample is large, with about seven members. Most of these family members are children. The head of the household is usually a man. The typical household head was not born in Lusaka; he migrated either from a rural area or from another town. He is usually middle aged, has had about six years of schooling, has wage employment, and walks to work. The average disposable income of the average household is about \$162.50, most of which comes from wage earnings.

The typical dwelling in our sample is worth about \$2,793.00, has three rooms, and a floor space of 97 square meters. The household either bought or built it. If the latter, the household most likely hired labor to construct the dwelling. The walls of the typical dwelling are made of concrete blocks or burnt bricks; the roof is made of asbestos or metal sheets. For their source of water, most dwellings use a public standpipe, and for sanitary facilities, they have pit latrines.

The average household did carry out improvements to its dwelling--for the most part, four different types per home. The major source of financing for this work was

accumulated savings and wage income.

One conclusion emerges clearly from this analysis of the data--that time and income are constraints on household activities. In the next chapters, the data analyzed in this chapter is used to develop a model of the low income housing market.

CHAPTER FOUR

PATTERNS OF DEMAND FOR HOUSING

Introduction

In this chapter, the housing market surveyed for the present study is analyzed for patterns of demand. The focus is on demand for the housing commodity as a whole. The objective of this analysis is to estimate the response of housing consumption to households' income and demographic characteristics. Also examined are differences in the consumption patterns of households with different preferences, achieved by disaggregating the population into a series of somewhat homogeneous cohorts and estimating demand relationships for each group.

Methodological Framework

A perfectly competitive housing market is assumed. The housing commodity consists of a bundle of different attributes; however, in this chapter, the demand for housing as a homogeneous good is studied. In other words, the examination focuses on the demand for the composite housing good, given its heterogeneity. (Olsen, 1969; Quigley, 1979, p. 396).

We derive the expenditure demand function for housing from the theoretical model described in Chapter One. Each individual household maximizes its consumption subject to budget constraints. Following Muth (1969), we assume a general utility function,

$$U = U(x_i) \quad (4.1)$$

$$i = 1, 2, \dots, n$$

subject to the constraint,

$$Y = \sum_{i=1}^n p_i x_i \quad (4.2)$$

where x_i = individual commodity, p_i = price of individual commodity, and Y = disposable income.

For the point-of-utility maximization, we have the Lagrangian and the first-order conditions:

$$L = U(x_i) - \lambda \left(\sum_{i=1}^n p_i x_i - Y \right) \quad (4.3)$$

$$\frac{dL}{dx_i} = \frac{dU}{dx_i} - \lambda p_i = 0 \quad (4.4)$$

$$\frac{dL}{d\lambda} = \sum p_i x_i - Y = 0 \quad (4.5)$$

If we assume that both the first-order and the second-order conditions of the Lagrangian are satisfied, we can derive a general expenditure demand function:

$$d_i = p_i x_i = d_i(Y, p_i) \quad (4.6)$$

$$i = 1, 2, \dots, n$$

Specifically for our housing commodity, we have:

$$H = p_1 x_1 = H(Y, \alpha) \quad (4.7)$$

where x_1 = housing commodity, p_1 = price of house,
 Y = disposable income, and α = demographic variable.

Equation 4.7 is the expenditure demand function for housing. Each household's housing expenditure ($p_1 x_1$) is functionally related to the household's disposable income (Y) and to a set of household demographic variables (α). Our estimated demand function relates to the demand for the composite housing (x_1), given its heterogeneity.

Empirical Specification

To examine the patterns of demand for housing, the expenditure demand equation (4.7) is estimated using the logarithmic linear functional form. This functional form has been found to be convenient in empirical work because it permits elasticities of housing expenditures to be estimated by use of ordinary least squares estimation (Boyes and Gerking, 1980, p. 287). It also yielded a better fit with earlier experimentation with the data (Ndulo, 1981).

The value of the house is regressed on income and demographic variables: household size, gender, age, and the location of the household. The value of the house is used as a proxy for the total housing expenditure of the household. The empirical formulation of the model to be estimated takes the form:

$$\begin{aligned} \ln H_i = & \beta_0 + \beta_1 \ln INC_i + \beta_2 \ln HS_i + \beta_3 D_{1i} \\ & + \beta_4 D_{2i} + \beta_5 D_{3i} + \beta_6 D_{4i} + \beta_7 D_{5i} + \varepsilon_i \end{aligned} \quad (4.8)$$

where H is the value of the house. The continuous variables are INC , monthly income of the household; and HS , the equivalent household size. There are also five dummies for the discrete variables: the gender and age of the head of the household, and the neighborhood location of the household. ε is the random error.

Empirical Results

The value of the house is regressed on income without demographic variables and, separately, on income with demographic variables. The best estimates of the two regression equations are shown in Table 4.1.

The dependent variable is the value of the house. This is the asking price for which the house can be sold on the market, as estimated by the household.

Income and Household Size

Monthly family income is an estimate of the disposable income currently available to the household from various sources. Most households in our survey reported that wage income was the most important component of the family's disposable income. For those households which include people who work in the public sector, wage income is likely to be stable over a long period: Public-sector employment is

TABLE 4.1
REGRESSION OF PROPERTY VALUE
ON INCOME AND DEMOGRAPHIC VARIABLES

INDEPENDENT VARIABLE	Estimated Coefficient ^a	
	Without Demographic Variables	With Demographic Variables
Income	0.810 ^b (6.098)	0.56 ^b (5.47)
Household size		0.60 ^b (3.79)
Gender of head of household male		-0.05 (0.22)
Age of household head		
30-50 years		-0.14 (0.69)
50 years		0.18 (0.71)
Location		
Chawama		1.09 ^b (6.55)
Kaunda Square		2.09 ^b (10.50)
Constant	3.241 ^b (5.260)	2.39 ^b (4.56)
Sample size	155	155
\bar{R}^2	0.19	0.57
F	37.18	29.62

SOURCE: Calculated from data in M. Ndulo, 1979 Zambia Home Improvement Survey.

^at-statistics of coefficients are in parentheses.

^bcoefficient significantly different from zero at the 0.01 level.

more or less permanent because of employment regulations. This implies that current disposable income is likely to be used as a basis for decisions with a long-term horizon, such as housing decisions. However, public-sector employment is likely to be unimportant for the majority of low-income households.

It is theoretically accepted that permanent income is one of the major determinants of demand for housing (Quigley, 1979, p. 396), based on the assumption that households look beyond their current-planning-period income in making demand choices. With perfect capital markets, households can borrow against their future incomes and spread out consumption of housing services over their horizons consistent with their permanent incomes. In making improvements to the house, however, transitory income can be a factor. A sudden windfall can contribute to the marginal decision to improve the house. For elderly households, such windfalls--for example, dowry--are likely to be substantial.

Recently, Goodman and Kawai (1980) urged that transitory and permanent income components be included as separate independent variables. They argued that such a separation of measured income (into transitory and permanent components) in the housing demand regression equation should substantially improve estimation power. However, for the purposes of the present study, monthly

measured income, rather than permanent income, is used in the regression equation. Empirical studies employing some concept of permanent income in the estimation of the income elasticity of demand for housing have reported a higher elasticity than have studies using measured income, because of the fixity and the high transaction costs of housing demand choices, in the short run. Consequently, the estimation of income elasticities in the present study is expected to be biased downward (Quigley, 1979, p. 396).

The number of equivalent adults per household is used as a measure of the size of the household. This number was found by giving one point to any member of the household who is older than fourteen years, and half a point to any member of the household younger than fourteen years, under the hypothesis that the number of equivalent adults per household will have more influence on housing demand than would alternative household size formulations. This hypothesis was tested in regressions with the size of the household and the ratio of household members over fourteen to those under fourteen. The formulation with equivalent household size performed better. Equivalent household size is looked at in order to estimate in more detail the effect of new adult family members. In this way, the effect of having relatives from rural areas joining urban households can be discerned.

The estimated income elasticity of demand for

housing is 0.6. This means that if income increases by 10 percent, the demand for housing will increase, over time, by six percent. The estimated coefficient is significantly different from zero at the 0.01 level. This result is similar to that found elsewhere, i.e., that the income elasticity is less than one. For example, in Colombia, the income elasticity of demand for owners has been estimated to be about 0.8 (Ingram, 1980, p. 23) and for South Korea, 0.21. (Follain, Lim and Renaud, 1980, p. 330). This compares favorably with estimates from similar studies in the United States. These range between 0.2 and 0.5. (Mayo, 1981, p. 97).

The demographic coefficient for equivalent household size is 0.6. It is also significantly different from zero at the 0.01 level. The coefficient is positive, and corresponds to a priori expectation. The estimated coefficient means that for every ten percent increase in the equivalent household size, holding everything else constant, there is a six percent increase in the demand for housing. A ten percent increase in equivalent household size means either a ten percent increase in the number of older members or a twenty percent increase in the number of younger members in the household, or some combination thereof. (Recall that an older member is worth a point and a younger member is worth one-half point in calculating the equivalent household size.) Therefore, an increase in the number of adults in the household raises the demand for housing at a much higher rate

than the same increase in the number of children in the household.

An increase in the number of adults in a household is likely to result primarily from children getting older and relatives from rural areas joining urban households. These factors have more serious implications in terms of the demand for housing than does the birth of additional children, which is less serious until the children pass the age of fourteen.

Differences in the consumption patterns of households whose tastes differ are examined by use of separate regressions for three household size cohorts and two income cohorts. The results are shown in Table 4.2. For the household-size cohort, the behavior of the constant term and the income elasticity coefficient shows a bowl-shaped curve. The constant term for small households is large; it decreases for middle-sized households, and then increases for large-sized households. On the other hand, the income-elasticity coefficient is low for small households, increases for middle-sized households, and then increases slightly again for large-sized households.

Analytically, it can be said this behavior pattern implies that small households make large base expenditures for housing. This leads them to devote larger portions of increases in income to non-housing consumption expenditures. With a ten percent increase in income, everything else constant, households will devote only five percent to housing. Middle-sized households make lower base expenditures for

TABLE 4.2

HOUSING DEMAND CHARACTERISTICS
FOR OWNER-OCCUPANT HOUSEHOLD COHORTS

Household Cohorts	Estimated Parameters ^a			
	β_0	β_1	R^2	N
All households	3.24 ^b (5.26)	0.81 ^b (6.10)	0.20	155
Household size				
1-3 persons	4.08 ^b (2.61)	0.45 (1.27)	0.11	15
4-6 persons	2.86 ^b (2.58)	0.85 ^b (3.62)	0.22	48
> 6 persons	3.22 ^b (3.93)	0.87 ^b (4.90)	0.21	92
Income				
Above median	1.98 (1.19)	1.04 ^b (3.24)	0.12	76
Below median	1.81 (1.33)	1.18 ^b (3.51)	0.14	79
Gender				
Male	3.03 ^b (4.66)	0.85 ^b (6.14)	0.21	140
Female	4.61 ^b (2.10)	0.52 (1.03)	0.07	15
Life cycle stage (household head)				
< 30 years	2.52 (1.39)	0.92 ^b (2.36)	0.23	21
30-50 years	3.44 ^b (4.80)	0.76 ^b (4.96)	0.19	104
> 50 years	1.75 (1.05)	1.23 ^b (3.24)	0.27	30

SOURCE: Calculated from M. Ndulo, 1979 Zambia Home Improvement Study data.

^at-statistics of coefficients are in parentheses.

^bCoefficient significantly different from zero at the 0.01 level.

housing and devote larger portions of increases in income to housing expenditures. For a ten percent increase in income, they increase their consumption of housing by nine percent.

Large households, like small households, make large base expenditures for housing; however, their income elasticity is higher than for small households, and about the same as middle-sized households'. Large-sized households make large base expenditures and also devote larger portions of increases in income to housing expenditures. Nine percent more is devoted to housing expenditures for every ten percent increase in income.

The classification of households into higher- and lower-income classes according to a median income of \$115 per month does not reveal a sharp discontinuity in consumption patterns. Base expenditures and the income-elasticity coefficient for the two income cohorts are nearly the same.

Gender and Life Cycle

The importance of the gender and the life-cycle stage of the head of the household in affecting housing choices is analyzed by use of dummies for gender (female or male) and for life-cycle categories (less than 30 years old, between 30 and 50, and older than 50).

The demographic coefficient with respect to male-headed households is negative and about 0.1 (see Table 4.1). This implies that households headed by females demand more

housing services than do those headed by males, a finding opposite our a priori expectations. However, the coefficient is not significantly different from zero at the 0.01 level.

The demographic coefficient with respect to life-cycle stage is negative for middle-aged heads of households and positive for older heads of households (see Table 4.1). This implies that households headed by middle-aged persons demanded fewer housing services than do households with both younger and older heads. Households with older heads demand more housing services than do those with young heads; however, neither coefficient is significantly different from zero at the 0.01 level. Middle-aged households had been expected to show the strongest demand for housing; the results are therefore contrary to the a priori expectations.

The results of separate regressions for two gender cohorts and three life-cycle cohorts are shown in Table 4.2. These reveal a sharp discontinuity in consumption patterns. Female-headed households show larger base housing expenditures (more than 50 percent higher) than do male-headed households. However, income elasticity is about 39 percent lower for female-headed households than for male-headed households. This implies that as income increases proportionately, male-headed households devote more income to housing expenditures than do female-headed households. It is possible that female-headed households have a larger base, but undertake less self-help improvement with increases in income.

The classification of the households into the three life-cycle cohorts also shows a sharp distinction of consumption patterns between the three groups.

While households are young (the head of the household is less than 30 years of age), they make low base expenditures on housing, with a high income elasticity. In the middle stages of life (head of household between 30 and 50 years old), base expenditures increase by about 37 percent, while income elasticity falls by about 27 percent. In the latter stages of life, base expenditures decrease, while income elasticity increases to a much higher level (1.23). Thus, although older households make small base expenditures on housing, they spend more on housing for every proportionate increase in income than do the young and the middle-aged households. It may be that older households have fewer other commitments because of changes in the life cycle and can therefore spend more on housing as income increases.

Location of the Household

In this section, the effect of the location of the household on the demand for housing is examined. The households are located in three housing areas--a squatter area (Bauleni), an improvement area (Chawama), and a site-and-service housing area (Kaunda Square). Taking the squatter housing area as the basis, we notice that households in site-and-service areas spend more for housing services than do those in squatter areas (see Table 4.1). Households in

improvement areas spend more for housing services than those in squatter areas. This result is as anticipated: It was expected that household in improvement areas would spend more for housing services than would those in squatter areas. The estimated coefficient for the location dummy for a site-and-service area is 2.09 and positive. For an improvement area, the estimated coefficient is 1.09 and also positive. Both coefficients are significantly different from zero at the 0.01 level.

Services to the House and Housing Demand

In this section, the effect of services to the house, such as better water and better sanitary facilities, is examined. The regression equation, with dummies for better water and better sanitary facilities, is shown in Table 4.3. The coefficient for the better water facilities dummy is about 1.1, and that for better sanitary facilities is about 0.3. Neither coefficient is significantly different from zero at the 0.01 level.

The availability of these two services is correlated positively with increases in expenditures for housing services. The effect of water is much stronger than is the effect of sanitary facilities.

TABLE 4.3

REGRESSION OF PROPERTY VALUE
ON INCOME AND SERVICE DUMMIES

Independent Variable	Estimated Coefficient ^a
Income	0.68 ^b (5.76)
Services	
Better water facilities	1.09 (1.53)
Better sanitary facilities	0.29 (0.40)
Constant	3.52 ^b (6.54)
Sample size	155
\bar{R}^2	0.40
F	34.66

SOURCE: Calculated from data in M. Ndulo, 1979 Zambia Home Improvement Survey.

^at-statistics of coefficient are in parentheses.

^bcoefficient significantly different from zero at the 0.01 level.

Households With and Without Lodgers

Low-income households are likely to start up with a one-room unit. Later, they may add another room, either because they have saved enough money to do so or they have had windfall income from a relative. The rental income from the additional room is likely to be used to improve the dwelling. The demand pattern for housing for such households is likely to be different from that of other households. For the present study, therefore, it was decided to distinguish between households with lodgers and those without. The results of the regression equations for the two lodger cohorts are shown in Table 4.4. There is a sharp distinction between the demand patterns for households with lodgers and the patterns for those without lodgers. Both the income elasticity and the equivalent household size elasticity are higher for the households with lodgers. However, the constant term for households with lodgers is lower than for those without lodgers. Households without lodgers have larger base expenditures for housing than do households with lodgers, although both the income and the household size elasticities of demand for housing are greater for households with lodgers (in both cases they are greater than 50 percent). Furthermore, the income and household-size elasticities are similar for households without lodgers.

The effect of the sex of the head of the household gives opposite results for the two cohorts. Among households

TABLE 4.4

REGRESSION OF PROPERTY VALUE ON
INCOME AND DEMOGRAPHIC VARIABLES BY LODGER CATEGORY

Independent Variable	Estimated Coefficients ^a	
	Households With Lodgers	Households Without Lodgers
Income	0.84 ^b (3.37)	0.53 ^b (4.54)
Household Size	0.82 ^c (2.45)	0.53 ^b (2.85)
Gender		
Male	-0.49 (0.81)	0.31 (1.11)
Age of Household Head		
30 - 50 years	-0.50 (1.21)	-0.06 (0.23)
> 50 years	0.12 (0.24)	0.36 (1.15)
Location		
Chawama	0.71 (1.52)	1.08 ^b (5.91)
Kaunda Square	2.13 ^b (3.32)	2.03 ^b (9.50)
Constant	1.89 ^d (1.79)	2.22 ^b (3.43)
Sample Size	29	126
\bar{R}^2	0.58	0.57
F-statistic	6.43	23.43

SOURCE: Calculated from data in M. Ndulo, 1979 Zambia Home Improvement Survey.

^at-statistics of coefficients are in parentheses.

^bcoefficient significantly different from zero at the 0.01 level.

^ccoefficient significantly different from zero at the 0.05 level.

^dcoefficient significantly different from zero at the 0.10 level.

with loggers, female-headed households demanded more housing services than did male-headed households. However, among households without lodgers, male-headed households demanded more housing services than did female-headed households. The coefficients for both lodger categories were insignificant, though.

Middle-aged households demanded less housing services than did younger households regardless of whether the household had lodgers. The pattern for older households is the same for both lodger cohorts: Older households demanded more housing services than did younger households.

On the whole, therefore, we can conclude that the patterns of demand differ between the two lodger cohorts. Households with lodgers made a lower level of base expenditures for housing than did households without lodgers, but demand for housing increased proportionately more for households with lodgers than for those without for the same proportional increase in income.

Households at Different Levels of Education

In this section, the effect of schooling on the demand for housing is examined. The total sample is divided into two cohorts. The first consists of households with primary education (those whose head has had seven or fewer years of schooling); the second is composed of households with secondary education (those whose head has had eight or more years of schooling). The hypothesis is that household heads

who have had secondary education will show a greater demand for housing than will those whose education has not passed the primary level.

The results of the regression equations for the two schooling cohorts are shown in Table 4.5. The coefficients for the income elasticity of demand and the household-size elasticity are dissimilar. The income elasticity coefficients are significantly different from zero at the 0.01 level.

The results suggest that income and household size elasticities differ between the two types of households. While it was expected that those households with more years of schooling would have higher elasticities than would those with fewer years, households with primary education instead had higher elasticities than did households with higher levels of education.

A sharp discontinuity in consumption patterns with respect to the sex of the head of the household is seen. In the case of the households with primary education, female-headed households consumed more housing services than did male-headed households. The situation is reversed for households with secondary education. Here, male-headed households consumed more housing services than did female-headed houses. There is also a sharp discontinuity in consumption patterns with respect to age and location of the household; the direction of the effect of the dummies is the same for both cohorts.

To sum up, it seems that consumption patterns for both

TABLE 4.5

REGRESSION OF PROPERTY VALUE ON INCOME AND
DEMOGRAPHIC VARIABLES BY EDUCATION CATEGORY

Independent Variable	Estimated Coefficients ^a	
	Households With Primary Education	Households With Secondary Education
Income	0.66 ^b (4.62)	0.48 ^b (2.67)
Households size	0.79 ^b (3.57)	0.39 (1.42)
Gender	-0.13 (0.50)	0.66 (1.16)
Age of household head		
30 - 50 years	-0.49 (1.19)	-0.21 (0.72)
> 50 years	-0.26 (0.60)	-
Location		
Chawama	1.13 ^b (5.83)	1.25 ^b (3.29)
Kaunda Square	2.03 ^b (8.47)	2.40 ^b (5.59)
Constant	2.25 ^b (3.35)	2.36 ^c (2.29)
Sample Size	98	57
\bar{R}^2	0.58	0.52
F	20.10	10.92

SOURCE: Calculated from data in M. Ndulo, 1979 Zambia Home Improvement Survey.

^at-statistics of coefficients are in parentheses.

^bcoefficient significantly different from zero at the 0.01 level.

^ccoefficient significant at the 0.05 level.

income and household size were different for households with primary education than for those with secondary education. However, households with fewer years of schooling had higher elasticities than did households with more years of schooling.

Conclusion

This chapter has presented an analysis of the demand for housing. Some of the findings are similar to those of other studies of housing demand elsewhere. The estimated income elasticity confirms the expectation that the demand for housing for homeowners with respect to current income is less than one. The results imply that, as long as the household remains in the low-income settlements, a doubling of a household's current income, everything else also held constant, will be accompanied by a 60 percent increase in housing expenditures. If households were given transfers, they would only spend about 60 percent of the transfers on housing expenditures. If policymakers want households to spend more of these transfers on housing, they need to earmark them for housing expenses. (For example, transfers could be given in the form of building materials.)

The income elasticity coefficient was seen to vary over different household sizes, but not over income groups (those earning less than the median income of \$115 per month and those earning more than the median income). Furthermore, income and equivalent household elasticities are about

similar.

There were three particularly interesting results in the analysis. It was found that female-headed households demand more housing services than do male-headed households *ceteris paribus*. This finding implies that current policies in the less-developed countries to make female-headed households in urban areas economically stronger will also improve housing. It was also found that households whose heads are in the older stage of the life cycle demand more housing services than do the young households, which in turn demand more housing services than do the middle-aged households.

Households with access to piped water spend more on housing services than do those without piped water. This effect is stronger than the effect of access to better sanitary facilities.

CHAPTER FIVE

DETERMINANTS OF DWELLING VALUES

Introduction

In this chapter the market price of the houses in the housing market is studied from the point of the separate attributes. In a perfectly competitive market, each attribute is valued because of the flow of housing services it emits over its economic life; these housing services are capitalized into the property value of the house (Muth 1969).

The amounts of services emitted by various houses, and the prices of such services, cannot be directly observed in the market. The method of hedonic indices is used in the present study to relate the market value of each property to the quantity of its housing services. The observable attributes of the house are used as surrogates for housing services. The purpose is to understand the relative importance and the relation of the attributes (and therefore of the housing services of a housing commodity) to the value of the house. Marginal weights are estimated to give this information, and are later used for estimating demand functions for each specific attribute.

Methodological Framework

A perfectly competitive housing market is assumed. The housing commodity is composed of a bundle of different attributes. The housing market determines an equilibrium price, based on the interaction of demand and supply, which for each house is influenced by the amount and combination of the attributes in each house (Myrick Freeman II 1974; Lucas 1975; Ball and Kirwan 1975).

When the housing market clears, at equilibrium,

$$Q_D = Q_S \quad (5.1)$$

where Q_D is the total market demand and Q_S is the total market supply of housing. This point yields an equilibrium price, from which a hedonic price equation can be deduced (Lucas 1975):

$$P_i = P(v_1, v_2, \dots, v_m) \quad (i = 1, \dots, n) \quad (5.2)$$

where p_i is the equilibrium price level and v_i 's are a set of attributes in each house. The observed relationship in the market between the price of the dwelling and the various attributes of the dwelling is a result of the interaction between demand and supply, and gives the relationship between the value of the dwelling and the emitted flow of housing services, for which the attributes are proxies.

Empirical Specification

To analyze the structure of the attributes of a dwelling, the hedonic price equation (5.2) is estimated using the log-linear functional form. The price of the house is regressed against attributes of the house grouped in the categories space, access, structure, and related services to the house.

It is generally agreed in the literature that the appropriate functional form for a hedonic price equation cannot be specified a priori. Rather, it is usually based on convenience in dealing with the problem at hand (Pollakowski 1982, p. 91). For the purposes of the present study, the log-linear functional form shall be used because it offers convenience, and also because earlier experimentation with the data has shown that it yields a better fit (Ndulo 1981).

The empirical formulation of the model will take the form,

$$\begin{aligned} \ln P_i = & \beta_0 + \beta_1 \ln FLS_i + \beta_2 \ln AGE_i + \beta_3 \ln TOWK_i \\ & + \beta_4 \ln YARD_i + \beta_5 \ln NORM_i + \beta_6 D_{1i} + \beta_7 D_{2i} \\ & + \beta_8 D_{3i} + \beta_9 D_{4i} + \beta_{10} D_{5i} + \epsilon_i \end{aligned} \quad (5.3)$$

where P is the price of the dwelling, representing the property value of the house. Continuous attributes are FLS , floor-space area of the house; AGE , age of the house, $TOWK$, the time it takes the head of the household to travel

to work; YARD, the yard area of the site; and NORM, the number of rooms in the dwelling.

For the discrete attributes of the dwelling, there are the five dummy variables--for better water facilities, D_1 ; better wall materials, D_2 ; better roof materials, D_3 ; better sanitary facilities, D_4 ; and whether or not the house has been plastered and painted, D_5 . ϵ is the random error.

Empirical Results

A number of attributes of a house can be estimated, each representing a flow of household services for each specific attribute. In the present case, ten housing attributes were estimated, grouped into four major categories --structure, space, access, and related services to the dwelling. The best estimate of the regression equation is shown in Table 5.1; the coefficient correlation matrix of the variables in the estimated equation is given in Appendix B.

The dependent variable is the value of the house. This is the expected price for which the dwelling would sell in the market under current market conditions; it is the asking price. The value of this variable depends on how well informed each household is about current market conditions. It was observed that most households tended to be well informed and were able to accurately predict the value of the house.

TABLE 5.1

REGRESSION OF PROPERTY VALUE ON
ATTRIBUTES OF A DWELLING

Independent Variable	Estimated Coefficient ^a
Structure	
Number of rooms	0.935 ^b (5.309)
Age of dwelling	-0.104 (0.871)
Wall materials	1.271 ^b (6.90)
Roof materials	0.171 (1.040)
Plaster and paint	0.491 ^b (4.040)
Space	
Floor-space area	0.089 (0.729)
Yard area	0.078 (0.791)
Access	
Travel time to work	-0.086 (1.226)
Services	
Water facilities	0.360 ^c (1.489)
Sanitary facilities	0.232 ^c (1.312)
Constant	4.318 ^b (5.619)
Sample size	134
\bar{R}^2	0.729
F	36.86

SOURCE: Calculated from data in M. Ndulo, 1979 Zambia Home Improvement Survey.

^at-statistics of coefficients are in parentheses.

^bcoefficient significantly different from zero at the 0.05 level.

^ccoefficient significantly different from zero at the 0.20 level.

Structure

In order to analyze the importance of the structure of the house in contributing to its value, several factors were examined: the number of rooms, the age of the dwelling, and dummies for the quality of wall and roof materials and whether or not the house had been plastered and painted. The number of rooms is the total excluding the kitchen, toilet, and bathroom. A house with better wall materials is made of permanent wall materials, defined as either concrete blocks or burnt bricks. Better roof materials were defined as asbestos-cement sheets. The plaster-and-paint variable is self-explanatory.

Number of rooms

A positive relationship is expected, a priori, between the number of rooms and the value of the house. The rapid rate of urbanization in Zambia (especially during the past two decades) and the associated massive influx of economically weak migrants from rural areas are expected to create over-crowding in low income housing markets, as households attempt to share what little accommodation is available. (Most migrants stay with relatives while looking for jobs, and later move out when they find employment.) Studies carried out by the Lusaka City Council's Lusaka Housing Project Unit show that over-crowding is high in all low income housing areas, but it is higher in the public housing run by the Lusaka City Council than in the private housing areas. This is probably because households in private

low income housing areas can more easily adjust their demand for rooms within the constraints of their budgets: They can always add on rooms or move to more-preferred bundles of housing services within the market. This is not possible for residents in public housing: They face both a rationing constraint and a budget constraint. Whenever they are dissatisfied with their allocation of rooms in the dwelling, they must go to the City Council's administrative allocation mechanism, and enter a queue to satisfy such demand. This might mean waiting for one, two, or more years.

The empirical results of this analysis confirm the a priori expectations. A positive relationship was found between the value of the house and the number of rooms. The estimated coefficient is 0.94, meaning that for every percentage increase in the number of rooms, a nearly equal percentage increase in the value of the house was obtained. Other things being equal, there are constant returns to the number of rooms. The estimated coefficient is significantly different from zero at the 0.05 level.

Age of the dwelling

The value of the dwelling was expected to be negatively related to its age. Households view the dwelling as a capital asset, with an expected economic life. As time goes on, the dwelling is expected to depreciate in value, everything else constant. This will be reflected in a reduced market value as the economic lifespan of the dwelling is reduced. Furthermore, if the dwelling is of low quality

in terms of construction, the rate of depreciation (and thus of the reduction in the market value) will be faster. On the other hand, site value rises with time, and maintenance and improvement expenditures can offset or more than offset depreciation. However, residents of Kaunda Square complained about the durability of their dwellings: They were worried about roof leaks and cracks in wall structures (Ndulo 1979).

An inverse relationship was found between the value of the house and its age, but the estimated coefficient was quite small, 0.10, and was not significant.

Wall materials

Wall materials were apparently the most important aspect of the structure of the dwelling in terms of the market value. In comparing two average dwellings with the same attributes, except in terms of quality of wall materials, a big difference is found in the values of the dwellings. The dwelling with better wall materials--concrete blocks or burnt bricks--is worth about \$5,100.00, and the dwelling with poorer wall materials--such as adobe or sun-dried bricks--is worth only about \$1,390.00. Thus, an otherwise-identical house with better wall materials is worth about four times the value of a dwelling with poorer wall materials. The estimated coefficient is 1.3, significantly different from zero at the 0.05 level.

This result is supported by available evidence from the participants of a house-upgrading scheme in George run jointly by the Lusaka City Council and the World Bank.

Participants generally preferred concrete blocks for their walls, as against other alternatives, such as sun-dried bricks, although the latter would cost less. Residents believed that the only durable house is one with concrete-block walls. One resident is reported to have said, "This is the only chance I have to build a permanent house, and I cannot build it with sun-dried bricks. I want a concrete one" (Mulenga 1978, p. 6).

Plaster and paint

The third most important aspect of the structure of the house in terms of determining its value is whether or not the dwelling is painted and plastered. On casual observation it can be noticed that many dwellings in the low income housing areas not only are plastered and painted, but also are well decorated. Apparently, the general appearance of a dwelling has high marginal significance. It is possible that, because much of the day is spent outside the dwelling, there is a trade-off between the functional aspects and the general appearance of the house. This suspicion is bolstered by a study by the Zambia National Housing Authority, which showed that residents in site-and-service areas would rather spend their income on the surface appearance than on more space. The most common example of such surface embellishment was painting. Residents painted figures or flowers on the walls of the house.

The empirical evidence gathered for the present study also supports this assertion. Dwellings which are plastered

and painted are worth more than others. An average dwelling with everything the same except for a lack of plaster and paint is valued at \$3,093.00, while its plastered and painted counterpart is worth \$5,100.00. This is an increase in value of about 65 percent. The estimated coefficient for the plaster-and-paint dummy is 0.49, significantly different from zero at the 0.05 level.

There is only a low correlation between use of permanent materials and plaster and paint. The correlation coefficients between plaster and paint and better wall materials is 0.08; between plaster and paint and better roof materials, 0.11. These results imply that households tend to plaster and paint their dwellings regardless of the standard of structural materials.

Roof materials

Two houses, identical except that one has an asbestos roof and the other does not, will differ in market value. Most houses have either asbestos roofing or corrugated metal sheets; houses with metal sheets are worth less, perhaps because asbestos roofing affords protection from heat during the hot season and keeps the house warm during the cold season. The estimated coefficient is 0.17; however, it does not seem to bear significantly upon the market value of the house.

Space

The measures of space used for the present study are the floor space of the dwelling and the yard area of the site on which the house is located. The floor space area is the total floor area of the dwelling, including the bathrooms, kitchen, and toilet facilities. The yard area of the site is the total site area minus the total area covered by the dwelling. Many household activities in low income housing areas take place outdoors during much of the year; the yard area is therefore an extension of the inside living space. This is especially true for the "swept area" of the yard, which has definite uses for household activities such as cooking, washing, and leisure (LHPET 1976, p. 27).

The yard area is also used for such activities as vegetable gardening, storage (especially for charcoal or wood), children's playground activity, and diverse business activities such as small-scale manufacturing or commerce (LHPET 1976, p. 29). Sometimes the goods sold are those grown in the vegetable garden. Available studies by the Lusaka Housing Project Evaluation Team (1976) and Schlyter and Schlyter (Ward 1981) confirm the importance of the yard area of the site. Additionally, the household with a bigger yard area will more likely expand--i.e., add another room--than decide to relocate as economic resources change.

The regression equation gave a positive relationship between the value of the house and its floor space (0.09) and yard area (0.08). The coefficient for the yard area is

higher than the coefficient for the floor-space area; however, neither estimated coefficient is significant at the 0.05 level.

Access

The literature on location theory devotes much energy to explaining that accessibility should positively affect the value of the house: that is, that there is an inverse relationship between the value of a house and a measure of accessibility. Households are expected to be willing to pay more to be situated near areas of employment.

As the measure of accessibility for the present study, the amount of time spent by the head of the household to get to his or her place of work was used. The empirical results are consistent with the theoretical notion. The estimated coefficient is 0.09. This implies that for every 10-percent increase in the time it takes to go to work, there is only a one-percent decrease in the value of the house.

Services to the House

Two major services to the house are access to piped water and sanitary facilities. In the regression equation for the present study dummies are used for each service. A dwelling either did or did not have piped water. It had better sanitary facilities if it had a septic tank or a flush toilet. A positive relationship between the value of the house and the dummies for piped water and better

sanitary facilities was expected.

The estimated results were as postulated. The coefficients for better water and better sanitary facilities were 0.36 and 0.23, respectively.

Looking again at the case of two identical houses, this time with everything the same except that one dwelling has a flush toilet and the other does not, the former is worth \$5,100.00 and the latter is worth \$4,176.00. The addition of a flush toilet increases the value of the house by 22 percent. An average house with no piped water is worth \$3,419.00. Improving the house with the addition of indoor piped water increases its value by 49 percent. The estimated coefficients of both dummies are significantly different from zero at the 0.20 level, implying that the provision of both sanitary and water facilities does have significance for the value of the house.

These findings are very important for policy considerations. Currently, a major question is whether public policy should encourage residents in low income private markets to erect indoor piped water and water-borne sanitation systems. The results of the present study indicate that having piped water or a flush toilet in the house is not highly significantly related to the value of the house.

The survey (Ndulo 1979) showed that nearly all residents without better sanitary facilities were dissatisfied with their sanitary facilities. In Chawama, most respondents would have liked the Lusaka Housing Project

to intervene more directly in the erection of pit latrines than in anything else. One can argue that this indicates the importance residents attach to improving their sanitary facilities, but not necessarily in terms of flush toilets and septic tanks, as yet.

The dwelling attributes are ranked by means of Beta coefficients in Table 5.2. Each Beta coefficient is a weight measuring the relative effect of each attribute on the value of the dwelling.

The most important attributes in contributing to the value of the dwelling are those related to its structure. In this case, better wall materials, number of rooms, and plaster and paint. The least important attributes are related to the space of the dwelling. These are floor-space area and yard area.

Conclusion

A clearer understanding of the relationship between the value of a house and its attributes is an important contribution to the recent concern about low income housing markets. Clear understanding should help public policymakers to identify which attributes of the dwelling to focus on when trying to help residents in low income housing areas. The empirical analysis was an attempt to identify such attributes which can be affected by public policy. These attributes were ranked by means of Beta coefficients. The number of rooms, quality of wall materials, plaster and

TABLE 5.2

BETA COEFFICIENTS OF THE ATTRIBUTES OF A DWELLING

Attribute	Beta Coefficient	Rank
Number of rooms	0.324	2
Age of dwelling	-0.050	8
Better wall materials	0.486	1
Better roof materials	0.069	6
Plaster and paint	0.199	3
Floor-space area	0.044	9(tie)
Yard area	0.044	9(tie)
Travel time to work	-0.059	7
Better water facilities	0.081	4(tie)
Better sanitary facilities	0.081	4(tie)

SOURCE: Calculated from Table 5.1.

paint, water facilities, sanitary facilities, quality of roof materials, and travel time to work seem to be relatively important attributes. The other attributes do not seem to bear significantly upon the value of the house.

The equal rating of access to piped water and better sanitary facilities is interesting. One can deduce from this that once residents in low income housing have acquired durable dwellings, they see the provision of basic services such as piped water and improved sanitary facilities as equally important. Not until permanent dwellings have been acquired do residents attempt to get better sewage systems (such as flush toilets) or water piped into the dwelling.

CHAPTER SIX

DEMAND FUNCTIONS FOR DWELLING ATTRIBUTES

Introduction

In this chapter we wish to estimate the households' demand functions for the attributes of the dwelling. In Chapter Five we estimated the coefficients of the dwelling attributes from a hedonic price equation. The coefficients are the marginal weights of the various attributes in our housing bundle. We shall use the information from Chapter Five to derive the marginal prices and together with the attribute quantities estimate the households' demand functions for each attribute. We are interested in examining the relation between attribute quantities and their own prices, and household income. We expect to find an inverse relation between attribute quantities and their own prices and a direct relation between attribute quantities and income.

We also examine the effect of households' taste variables, such as household size and gender, on the attribute demand structure.

Methodological Framework

Following the work of Nelson (1978), Harrison and Rubinfeld (1978), Freeman (1979a, 1979b), and Quigley (1982), we have a housing market which will be in equilibrium when the quantity demanded (Q_D) and the quantity supplied of housing (Q_S) are equal. This situation will give us an equilibrium quantity of housing services (Q) and an equilibrium price (P). However, since each dwelling is a heterogeneous commodity, it contains different combinations of attributes. Therefore, when the homogeneous commodity bundle is in equilibrium,

$$Q_D = Q_S \quad (6.1)$$

the various attributes of the housing bundle, the V_i 's shall be so packaged as to also produce an arbitrary set of attributes in equilibrium,

$$Q_D(V_i) = Q_S(V_i) \quad (6.2)$$

$$i = 1, 2, \dots, m$$

Households derive utility from consuming various combinations of the attributes in the housing bundle subject to the budget constraint. The attributes are provided by suppliers who strive to minimize their costs in their productive activities. The market demand functions for the various attributes will be determined by the attributes' own prices, income and tastes. The market supply for the attributes shall be determined by the technology and cost

conditions faced by suppliers, and shall be a function of the attributes' own prices and a set of supplier characteristics.

At equilibrium households will have packaged their combination of attributes such that quantities demanded of the various attributes is equal to quantities supplied, as expressed by equations (6.1) and (6.2). We therefore have the observed attribute quantities of the housing bundles, V_i 's, and the unobserved marginal prices of the various attributes, MP_i 's.

Equations (6.1) and (6.2) and the equilibrium prices shall give us the hedonic price equation,

$$P = f(V_1, V_2, \dots, V_m) \quad (6.3)$$

We shall use the hedonic price equation to translate a vector of housing attributes into a marginal price, MP_i . The estimated implicit marginal price influences the decisions of both suppliers and demanders of housing attributes.

The marginal price of an attribute can be found by differentiating the hedonic price equation with respect to that attribute,

$$\frac{\partial P}{\partial V_i} = MP_i \quad (6.4)$$

This gives us the increase in expenditure on the dwelling that is required to obtain a dwelling with one more unit of that attribute, holding everything else constant.

For example, if a household desires more of a particular attribute in a dwelling, it has to repackage the existing bundle of attributes so as to have one unit of the desired attribute in the new bundle than in the previous bundle. The marginal price of the attribute is the extra amount that the household will be willing to pay for a dwelling unit with one more of that particular attribute than the previous dwelling unit had.

We use the information on marginal prices, attribute quantities, income and household taste variables to derive the demand functions for the various attributes (Rubinfeld and Harrison, 1978; Freeman, 1979). Formally the demand functions will take the form,

$$MP_i = f(V_i, y, \alpha) \quad (6.5)$$

where MP_i is the marginal price of the attribute, V_i is the attribute quantity, y is income, and α represents the households' taste variables.

On the supply side of the marginal price will be a function of the attribute quantities and other supplier characteristics. However, our basic assumption is that the supply of attributes is perfectly inelastic. This assumption is reasonable in terms of short run cross section analysis. In the short run we expect the supply of individual attributes to be relatively fixed and prices to be therefore demand determined.

Empirical Specification

We wish to generate quantitative estimates of the demand functions for attributes. In Chapter Five we analyzed the structure of the attributes of the dwelling. To do this, we estimated a hedonic price equation (5.2) using a logarithmic functional form. The nature of this functional form will give us enough information to enable us to identify the demand functions we are interested in (Rubinfeld and Harrison, 1978; Brown and Rosen, 1982). We can write the estimated form of equation (5.2) as,

$$\ln P = \hat{\beta}_0 + \sum_{i=1}^5 \hat{\beta}_i \ln x_i + \sum_{i=6}^{10} \hat{\beta}_i D_i \quad (6.6)$$

where P is the value of the dwelling, x_i is a continuous attribute of the dwelling, and D_i is a discrete attribute of the dwelling.

We can derive the marginal price of an attribute for each observation in our sample by total differentiating the hedonic price equation (6.6),

$$\frac{1}{P} dP = \sum_{i=1}^5 \hat{\beta}_i \frac{dx_i}{x_i} \quad (6.7)$$

and solving for $\frac{dP}{dx_i}$,

$$\frac{dP}{dx_i} = \hat{\beta}_i \frac{P}{x_i} = MP_i, \quad (6.8)$$

which is the marginal price of attribute x_i . The marginal prices of the attributes represented by the dummy variables (D_i $i=6, \dots, 10$) in the estimated equation (6.6) are

undefined because the dummies are discrete ($D_i = 1$ or 0). For our analysis we therefore concentrate on the continuous variables for the structure, space and access aspects of the dwelling. These are the number of rooms, age of the dwelling, living area (floorspace area), yard area and travel time to work.

Since for each attribute we have a demand and supply function, we are likely to be faced with the problem of identification. But if our assumption on the supply side is that of perfectly inelastic supply we can identify the demand function. Changes in the level of the attributes over the sample allow us to get information about the households' demand for the attributes. Therefore our general regression equation for the demand function for each attribute derived from equation (6.5) will take the form,

$$\begin{aligned} MP_i = & \alpha_0 + \alpha_1 X_i + \alpha_2 INC_i + \alpha_3 HS_i \\ & + \alpha_4 D_1 + \alpha_5 D_2 + \alpha_6 D_3 + \epsilon_i \end{aligned} \quad (6.9)$$

where MP_i is the marginal price of an attribute, X_i is the quantity of the attribute, INC_i is household income, HS_i is the size of the household, D_1 is the dummy for the gender of the household head ($D_1=1$ if male; $D_1 = 0$ if female), D_2 and D_3 are dummies for life cycle categories ($D_2=1$ if between 30 and 50 years old; $D_2=0$ if otherwise, and $D_3=1$ if greater than 50 years old; $D_3=0$ if otherwise), and ϵ_i is the error term.

The demand price of each attribute is a function of the attributes own quantity level, income and household size and other household taste variables. We exclude the quantities of other attributes in the regression equation on the assumption that the cross price effects are close enough to zero to be ignored.

The marginal price of an attribute is the demand price for the household. It is the amount of money the household will be willing to pay for one additional unit of the attribute, holding everything else constant. We expect that the marginal price of the attribute will decrease with an increase in the quantity of the attribute consumed, other things held constant. On the other hand, if income increases, while holding everything else constant, we expect the household to increase its consumption of that attribute. We therefore hypothesize an inverse relation between quantities of the attributes demanded and the attributes' own marginal prices and a direct relation with household income.

We hypothesize a direct relation between the marginal prices of the attributes and household size, which in this case is the equivalent household size. This is so because we expect larger households to have a stronger demand for the various attributes than smaller households. The demand price of large households is therefore likely to be higher than that of smaller households.

We are not certain of the expected relation between demand price and the gender of the household dummy. For the life cycle categories, we expect a direct relation between the marginal price of the attributes and middle-aged heads of households (those between 30 and 50 years old), and an inverse relation between the marginal price of the attributes and the old heads of households (those older than 50). Middle-aged households are in the most active stage of their life cycle and are therefore likely to have a stronger demand for the various housing attributes than other households. On the other hand, old households are past this most active stage of their life cycle and are less likely to have a strong demand for the housing attributes than most other households.

Empirical Results

We estimate the demand functions for the continuous attributes of the dwelling; structure, space, and access. The dependent variable is the marginal price of the relevant attribute in the demand function, as expressed in equation (6.9). The estimated regression equations for the continuous attributes of the dwelling structure are shown in Table 6.2 and those of the dwelling space and access in Table 6.3. The market wide average marginal prices, price and income elasticities of the dwelling attributes are shown in Table 6.1.

TABLE 6.1
AVERAGE MARGINAL PRICES, PRICE AND INCOME DEMAND
ELASTICITIES

	Average Marginal Price (MP)	Price Elasticity (e_p)	Income Elasticity (e_y)
Number of rooms (room)	\$676.74 (56.23)	+2.63	-0.76
Yard area (m)	0.97 (0.13)	-1.65	0.71
Age of the dwelling (year)	76.85 (10.10)	-1.13	0.53
Living area (m)	2.64 (0.24)	-5.23	1.59
Travel time to work (minute)	16.38 (3.98)	-0.84	0.67

SOURCE: Calculated from data in M. Ndulo, 1979 Zambia Home Improvement Survey and Equation (6.9).

- NOTES: 1. Standard errors are in parentheses.
2. The average marginal prices are marketwide and are calculated at the mean value of each attribute for the total sample. Thus for n households, the average marginal price for an attribute is,

$$MP = \frac{\sum_{i=1}^n MP_i}{n}$$

3. Price elasticities are calculated from the estimated equation as,

$$e_p = 1/\alpha_1 \cdot \frac{\overline{MP}_i}{\overline{X}_i}$$

Income elasticities are calculated from the estimated equation as,

$$e_y = \frac{\alpha_2}{\alpha_1} \cdot \frac{\overline{Y}}{\overline{X}_i}$$

4. The negative income elasticity for number of rooms is because of positive quantity coefficient in the estimated regression.

TABLE 6.2

REGRESSION OF MARGINAL PRICES OF HOUSING ATTRIBUTES
ON INCOME AND DEMOGRAPHIC VARIABLES: STRUCTURE

DEPENDENT VARIABLE	MARGINAL PRICE OF	
	Rooms	Age
INDEPENDENT VARIABLE	ESTIMATED COEFFICIENTS ^a	
Number of rooms	63.243 (1.763)	
Age of dwelling		-9.760 ^b (4.308)
Income	1.283 ^b (3.311)	0.232 ^b (3.794)
Household size	37.231 (1.523)	4.637 (1.147)
Gender of head male	-111.614 (0.664)	-10.275 (0.356)
Life cycle		
30-50 years	-26.777 (0.196)	-4.498 (0.192)
> 50 years	115.121 (0.645)	16.911 (0.563)
Constant	91.567 (0.367)	75.364 (1.779)
Sample size	134	134
\bar{R}^2	0.13	0.20
F	4.44	6.42

SOURCE: Calculated from data in M. Ndulo, 1979 Zambia Home Improvement Survey.

^at-statistics of coefficient are in parentheses.

^bcoefficient significantly different from zero at the 0.01 level.

TABLE 6.3
REGRESSION OF MARGINAL PRICES OF HOUSING ATTRIBUTES
ON INCOME AND DEMOGRAPHIC VARIABLES:
SPACE AND ACCESS

DEPENDENT VARIABLE	MARGINAL PRICE OF		
	Living Area	Yard Area	Travel Time to Work
INDEPENDENT VARIABLE	ESTIMATED COEFFICIENTS ^a		
Living area	-0.426 x 10 ⁻² (1.485)		
Yard area		-0.107 x 10 ^{-2c} (4.460)	
Travel time			-0.370 ^c (3.718)
Income	0.520 x 10 ^{-2c} (3.060)	0.261 x 10 ^{-2c} (3.559)	0.083 ^c (3.568)
Household size	0.072 (0.642)	0.072 (1.477)	1.198 (0.795)
Gender male	-0.507 (0.664)	-0.443 (1.298)	-34.169 ^c (3.250)
Life cycle 30-50 years	-0.555 (0.894)	-0.123 (0.448)	-7.285 (0.848)
50 years	0.239 (0.298)	0.149 (0.418)	15.573 (1.403)
Constant	2.415 ^b (2.255)	1.021 ^b (2.044)	46.331 ^c (3.048)
Sample size	134	134	134
\bar{R}^2	0.04	0.20	0.25
F	2.02	6.63	8.59

SOURCE: Calculated from data in M. Ndulo, 1979 Zambia Home Improvement Survey Data (1979).

^at-statistics of coefficient are in parentheses.

^bcoefficient significantly different from zero at the 0.01 level.

^ccoefficient significantly different from zero at the 0.05 level.

Structure: Number of Rooms and Age of the Dwelling

For the dwelling structure we have two continuous attributes--the number of rooms and age of the dwelling. In this section, we analyze the demand functions for these attributes. The estimated coefficients of the demand functions are shown in Table 6.2.

Our first equation is a regression of the marginal price of rooms on number of rooms, income, household size, gender and life cycle dummies. We get the expected relation except for the number of rooms variable and the life cycle dummies. The quantity of rooms demanded varies directly with the demand price, holding everything else constant. That is, households are always willing to pay more for additional rooms, *ceteris paribus*. Our estimated coefficient is 63.2, giving us a positive price elasticity of 2.6. That is for every one unit increase in the number of rooms, households are willing to pay \$63.2 more than they paid for the last room. From an average of \$677, they will go to \$740 for one more room. Alternatively for every one percent increase in the price of rooms, there is a 2.6 percent increase in the quantity of rooms demanded. This is different from our theoretical expectations. A priori, we expected an inverse relation between marginal price and number of rooms demanded. However, the estimated coefficient is not only positive but is not significantly different from zero at the 0.05 level.

This result might be because the household in our

sample is both the main consumer and supplier of the attribute. In this case it is plausible that the fact that he can always rent out rooms makes his demand for rooms so strong that he is always willing to pay more for an additional room, holding everything else constant. In addition, we may have misspecified the issue, and marginal rooms might be harder to add on or be of higher quality in undetected ways. It may be further noted that these are extra rooms at given space, in effect subdivisions.

Middle-aged households pay less and old-aged households pay more for an additional room. On the other hand our estimated regression shows that both large and high income households are willing to pay more, while male headed households pay less for an additional room. However, only the income coefficient is significant at the 0.05 level.

Our estimated demand function for the age of the dwelling shows that households pay less for the same dwelling with a marginal increase in age, but at the same time, holding everything else constant, with a marginal income or household size increase, they will pay more for the same dwelling. The estimated price and income elasticities for the age attribute of the dwelling are -1.13 and 0.53 respectively and are both significantly different from zero at the 0.01 level.

Space: Living and Yard Areas

We have two variables measuring space. These are the living and yard areas of the dwelling. The estimated demand functions for living and yard area attributes are shown in Table 6.3.

The estimated coefficients for the living area demand function gives us the expected signs except for the life cycle dummies. These show that middle-aged households demand less and old-aged households demand more living area space than other households. However both coefficients are not significant at the 0.05 level.

The demand for living area space is both income and price elastic. The estimated elasticities are 1.59 and -5.23 respectively.

The estimated demand function for yard area gives us the same relationship as that of the living area attribute. However, in this case the demand function for yard area is income inelastic and price elastic. The estimated coefficients are 0.71 and -1.65 respectively.

Access: Travel Time to Work

The estimated results of the demand function for access is shown in Table 6.3. We use the time taken by the head of the household to travel to work as a proxy for access. This function will therefore be a measure of the value of accessibility to the household.

The estimated regression shows that the household

will be willing to pay less for the same dwelling with a marginal increase in the travel time to work--a decrease in accessibility. However, with marginal increases in income, family size or as households get older, ceteris paribus, households will pay more for the same dwelling with equal accessibility.

The estimated price and income elasticities are -0.8 and 0.7 respectively. This gives us a price and income inelastic demand for access.

Conclusion

Accessibility, number of rooms, age, living and yard areas are some of the important attributes of a dwelling. This chapter gave us an idea of the importance of these attributes in terms of consumer demand. Several facts came out clearly. As expected, except for rooms, there is an inverse relation between the demand price of each attribute and its quantity. Households demand more of the attributes with marginal increases in income and family size. Female-headed and old-aged households have consistently a higher demand for attributes than male-headed, young and middle-aged households.

The demand for living area is both price and income elastic, while the demand for yard area and age (durability), are price elastic and income inelastic. The demand for access is both price and income inelastic.

CHAPTER SEVEN

THE HOME IMPROVEMENT PROCESS

Introduction

This chapter looks at the supply of housing. One can study housing supply in terms of either the existing stock of housing or new housing or their jointly determined interacting changes. In terms of the existing stock of housing, one can examine sales of old houses, enlargement and improvement of existing dwellings, conversion of houses into non-residential use, and the subdivision and demolition of dwellings. In this chapter we are only interested in the enlargement and improvement of existing dwellings--the home improvement process. We are interested in the home improvement process because it is the major means through which households expand and improve the housing stock and quality on the supply side.

We are interested in what sorts of households improve dwellings. We therefore wish to analyze the factors that are likely to determine the actions of the owner occupant household to make improvements to the dwelling. In the analysis we shall concentrate on two types of actions; making any improvement and adding an extra room or more to the

dwelling.

Methodological Framework

Our underlying conceptual framework of the home improvement process follows the work of Mendelsohn (1977). The house supplies to the household a flow of housing services and it is at the same time a component of the household's investment portfolio. The owner occupant household is therefore both a consumer and an investor. In his or her role as both a consumer and an investor, the household wishes to maximize its utility function;

$$U(H, X, A, T) \quad (7.1)$$

given its discount rate and subject to the income and time constraint. Where H = quantity of housing, X = quantity of other goods, A = assets and T = leisure time.

Income earned by the household is allocated to expenses for home improvements, to other goods and to other assets, such as financial assets.

The household's time is allocated between leisure, work and home improvements. Total assets are allocated between other assets and the value of the house. We also have the housing production function

$$H = H(H_0, K, L) \quad (7.2)$$

where H_0 = initial stock of housing, K = total expenditure on home improvements and L = household's input of labor into

home improvements.

In his double role as consumer and investor, the owner occupant will work on home improvements until the marginal rewards from that work are equal to the marginal value of this leisure time. He will spread his income such that the marginal value of a dollar spent on improvements, assets or consumption of other goods is the same. He will also use the wage rate to determine whether to use hired labor or not.

For any given stock of housing, H_0 , the housing production function becomes strictly the home improvement function, describing our home improvement process.

Thus we now have a home improvement function where the quantity of home improvements is a function of the initial stock of housing, the total expenditures on home improvements, the household's input of labor into home improvements and other factors that affect the supply of home improvements. Mathematically we can write our home improvement function;

$$HI = H (H_0, K, L, F) \quad (7.3)$$

where HI = quantity of home improvements, and F = other supply factors.

The other supply attributes of the owner occupant household that affects the supply of dwelling improvements are the household's age and family size; the length of his residence at the site; the presence of lodgers; and the

receipt of a one-time special income.

The total expenditure on home improvements and the household's input of labor into home improvements is a function of the household's income. The analysis of the sample survey data showed that most households financed their home improvements from their wage earnings. In terms of labor used for home improvements, most households used hired labor for their home improvements, because of lack of skills and a time constraint. This is most likely to happen as wage income increases. The higher the wage income of the owner occupant, the less likely she or he will perform the home improvements by himself (herself).

However, in the cases of those who make home improvements using their own labor, we do not have information about the time owner occupants spent improving their dwellings. We also do not have information on the total expenditures on home improvements by the households. However, since both total expenditures on home improvements and the households' input of labor into home improvements is a function of income, we substitute the household's disposable income for total home improvement expenditures and total input of labor into home improvements in the home improvement function 6.1. Thus we have a modified function;

$$HI = H(H_0, Y, F) \quad (7.4)$$

where HI = quantity of home improvements; Y = household disposable income; and F = other supply attributes of the

household.

Our basic empirical problem is to determine how the household's supply attributes in the home improvement function affect the process of making improvements. It is difficult to observe or measure the probability that a household with given attributes will make an improvement. However, given a sample we can identify those households who have made improvements and those who have not made improvements. In this case, the dependent variable, the quantity of home improvements, becomes a binary variable. The Home Improvement function (7.4) can then be expressed in the form;

$$HI (1, 0) = H (H_0, Y, F) \quad (7.5)$$

where $HI = 1$, is the case where the household made an improvement, and $HI = 0$, is the case where the household did not make an improvement.

We hypothesize a positive relationship between the probability of making an improvement and housing value, the household's monthly disposable income, the size of the household, the years of residence at the present site, the presence of lodgers and the one-time receipt of special income. We hypothesize a negative relationship between the probability of making an improvement and the age of the household head. If the head of the household is older, given years of residence, the less likely she or he will have made improvements to the dwelling because of her or his stage in the life cycle. In the following sections we

empirically test these hypotheses.

Empirical Specification

Our basic assumption is that the probability of making an improvement to the dwelling, P_i , can be characterized by the logistic form,

$$P_i = \frac{e^{-(\beta_0 + \beta X_i)}}{1 + e^{-(\beta_0 + \beta X_i)}} \quad (7.6)$$

$$i = 1, \dots, n$$

where β_0 is a constant, β is the coefficient vector and X_i is a vector of explanatory variables in (7.5). (Pindyck and Rubinfeld, 1981; Watson, 1974). Alternatively we can write your logistic function in the form,

$$\log \left[\frac{P_i}{1-P_i} \right] = \beta_0 + \beta_1 HV_i + \beta_2 Y_i + \beta_3 HS_i + \beta_4 AGEH_i \\ + \beta_5 YROC_i + \beta_6 D_{1i} + \beta_7 D_{2i} \quad (7.7)$$

where P = probability of making an improvement, HV = the value of the dwelling, Y = the household's monthly disposable income, HS = the equivalent household size, $AGEH$ = the age of the head of the household, and $YROC$ = the number of years the household has occupied the present site. D_1 and D_2 are two dummies for the presence of lodgers and the one-time receipt of special income.

We are interested in two kinds of actions by owner occupant households; the making of an improvement and the adding of a room or more to the dwelling. In our sample

survey, we have data on the types of improvements made by the households. There are fourteen types altogether. These are additional rooms, better kitchen, more convenient water, better toilet, plaster and paint, better basic wall materials, better roofing, inside ceiling, improved flooring, better windows or doors, terrace or porch, fence around the property, earth fill and other unspecified improvements.

However, in the collection of the data, only types of improvements were counted, and not volume or repeats of given types. For example, a roofing change counted only once. These improvements are therefore not quantifiable for equal weight. One cannot make types of improvements the dependent variable. On the other hand, we can identify from the data which households made any type of improvement and which did not. We can analyze the home improvement process in terms of binary choice. We use logit anlayze for this analysis because it is the most appropriate method of analysis for use in binary choice studies (Watson, 1974).

However, because one or two types of improvements may be insignificant minor changes, we shall look at the making of three or more types of improvements instead of the making of any improvement to the dwelling. We look at the addition of rooms to the dwelling because it is one of the major improvements carried by owner occupant households. In our sample survey we found that 69.4 percent of the owner occupant households carried out three or more improvements to the dwelling and 42 percent of the improving

households built one or more additional rooms. An extra room can be a source of rental income for the household, but also expands the capacity of the housing stock.

We shall use equation 7.7 to estimate the parameters associated with making three or more improvements and adding a room or more to the dwelling in the following section. The estimation was done with the maximum likelihood estimation procedure, using the program QUAIL, developed at the University of California (Berkman, et. al., 1979).

Empirical Results

The estimated logit equations are shown in Table 7.1. The dependent variables are the logarithm of the odds that a particular choice will be made: in this case, that the household will make three or more dwelling improvements and that it will add one or more rooms.

We postulated that households with higher incomes are most likely to make additional improvements to the dwelling. Holding everything else constant, households with higher incomes are more likely to have more money put aside for dwelling improvements. However, the estimation results do not demonstrate that more income makes it likely for a household to carry out additional improvements. The coefficients for both types of improvements--making three or more improvements and adding a room are insignificant, and the trend is even in the wrong direction.

For our average owner occupant in Table 7.2 with a

TABLE 7.1
MAXIMUM LIKELIHOOD ESTIMATES OF HOME
IMPROVEMENT EQUATIONS

INDEPENDENT VARIABLES	DEPENDENT VARIABLE	
	Making Additional Improvements	Making Additional Rooms
	$\text{Log } \left(\frac{Q_3}{1 - Q_3} \right)$	$\text{Log } \left(\frac{Q_1}{1 - Q_1} \right)$
ESTIMATED LOGIT COEFFICIENTS ^a		
Household disposable income	-0.358×10^{-3} (-0.167)	-0.166×10^{-2} (0.823)
Housing value	0.561×10^{-3b} (2.927)	0.611×10^{-4} (0.774)
Household size	0.119 (1.084)	0.064 (0.688)
Age of household head	-0.028^d (1.333)	-0.313×10^{-2} (0.168)
Years of residence at the site	0.108^c (1.762)	0.115^b (2.161)
Lodgers = 1 if yes, = 0 if no.	0.587 (0.889)	-0.236 (0.485)
Special income = 1 if yes, = 0 if no.	0.468 (0.787)	0.260 (0.559)
Constant	-0.148 (0.142)	-1.260^d (1.365)
Likelihood ratio statistic	56.89	12.79

SOURCE: Calculated from data in M. Ndulo, 1979 Zambia Home Improvement Survey.

^aAsymptotic t-statistic in parentheses.

^bcoefficient significant at the 0.05 level.

^ccoefficient significant at the 0.10 level.

^dcoefficient significant at the 0.20 level.

Q_3 , probability of making three or more improvements.

Q_1 , probability of adding a room or more.

TABLE 7.2
PROBABILITIES OF MAKING IMPROVEMENTS
FOR AN AVERAGE OWNER OCCUPANT^a

Selected Attributes	Probabilities	
	3 or more Types of Improvements	Additional Rooms
Average owner occupant household	0.748	0.404
Average owner occupant household with lodgers	0.843	0.348
Average owner occupant household with lodgers and had special income	0.896	0.409

SOURCE: Calculated from Table 7.1.

^aAn average owner occupant household occupying a dwelling with a housing value of \$2792.89, with a disposable income of \$162.50, 6 years of residence at the present site, an equivalent household size of 6 and with a household head, 41 years old.

monthly disposable income of \$162.50, the probability of making three or more improvements is 0.748. When income falls to say \$90.00, the probability is increased to 0.752, and when income rises to say \$300.00, the probability is reduced to 0.741.

Similarly, the probability of adding rooms is 0.404 for the average owner occupant. When income falls to \$90.00, the probability is increased to 0.428. When income rises to \$300.00, the probability is reduced to 0.361.

It is plausible that owner households will opt to buy another dwelling, rather than stay on and improve the dwelling when income increases. Owner occupant households with higher incomes are also likely to start with a better quality dwelling which needs less improvement than otherwise. This is likely to be the case in Kaunda square where the households started off with a higher level of services to the dwelling than most other households in the sample.

The estimated results for housing value are as we expected. They demonstrate that the higher the value of the dwelling, holding everything else constant, the more likely that households will have made additional improvements to the dwelling. The coefficient is significant at the 0.05 level for making three or more improvements. It is insignificant for making additional rooms.

We included the household size variable in the logit regressions to allow for the possibility that the size of the household would have an important effect on making

improvements. In our sample survey, we found that households added rooms mainly because of additional children and relatives. Furthermore, the larger the household, the more likely that there will be some disguised unemployed workers who can help in making the improvements. Our estimated results suggest that, holding everything else constant, the larger the household size, the more likely that the household will make additional improvements. However, neither coefficient is significant.

We also included the age of the head of the household. Our expectation is that as the age increases, the probability of making an additional improvement to the dwelling declines. Our estimated results demonstrate that this is the case. The coefficient for making three or more improvements is significant at the 0.20 level, while that for adding a room is not significant.

The residence variable represents the number of years that the household has lived at the present site. It is expected that as the time of residency increases, the more likely that households feel attached to the community. Other things equal, the more that households feel attached to the community, the more likely that they carry out improvements to the dwelling. Besides, there will have been more time for improving. The estimated results show that the longer the time of residence at the site, the more likely that the household will make additional improvements. The results also show that the estimated coefficients are

significant.

We have two dummies in our regressions; the presence of lodgers and the receipt of a one-time special income. We expect that households with lodgers are more likely to make improvements to the dwelling. We also expect that households who have received some special income, such as an inheritance or an unusually good loan, before deciding to buy or build the house are more likely to make additional improvements to the dwelling.

Our estimated results confirm our prediction for making additional improvements (three or more different types). Households with lodgers are more likely to make additional improvements than those without. An average owner occupant household without lodgers has a probability 0.748 of making additional improvements. If the same household has lodgers, the probability increases to 0.843. If furthermore, the household had received some special income before building or buying the house, the probability increases to 0.896.

However, contrary to our expectations, households with lodgers are less likely to add rooms to their present dwelling. Presumably, the fact that they have lodgers means that they have already achieved their optimum number of rooms in the house. Therefore any kind of improvement will be directed to improving the quality of the dwelling.

Thus, for the average owner occupant household without lodgers, the probability of adding rooms is 0.404. For

those households with lodgers, the probability declines to 0.348. If the same household had received special income, the probability of adding a room increases to 0.409. However, both the dummy coefficients for lodgers and special income are insignificant.

Conclusion

In this chapter we attempted to estimate the probability of an owner occupant household making additional improvements (three or more different types) to the dwelling. Our empirical results agreed with our theoretical expectations except for the changes in the household's monthly disposable income. The direction of the empirical relationship between adding rooms to the dwelling and the presence of lodgers is also contrary to our theoretical expectations.

Our estimated results seem to indicate that the value of the dwelling and the years of residence at the site are the most important predictors of additional improvements having been made to the dwelling.

CHAPTER EIGHT

CONCLUSIONS AND POLICY CONSIDERATIONS

The purpose of this study was to analyze the operation of a low income housing market in urban Zambia, taking that of Lusaka as a case study. In so doing, we tried to answer certain questions in regard to the demand for housing and its attributes, the relative importance of the components of the housing bundle and we examined the process of home improvement, in terms of how much of it goes on and what kinds of households are likely to have carried out improvements to the dwelling.

The analysis of these aspects of the study was achieved through the analysis of the cross section data collected from a sample of homeowners from the low income housing market in Lusaka. The major techniques used in the study are ordinary least squares, hedonic and logit regression analysis.

Conclusions

In the analysis of the data, several conclusions were derived in answer to our questions. These are outlined below.

1. Demand for Housing. We have examined the response of housing consumption to income and taste variables of the household. Our results showed that the income elasticity of demand for housing is 0.6. This implies that the demand for housing is relatively insensitive to income. Our analysis is of course based on cross section micro observations and uses current income, rather than permanent income, for the income variable. However, our estimated result is similar to that of studies elsewhere, both in developing and developed countries, which have often shown the income elasticity to be less than one.

For example we noted that the income elasticity of demand for owners has been estimated at about 0.8 for Colombia and 0.21 for South Korea. The estimates from similar studies in the United States vary between 0.2 and 0.5.

The elasticity estimates appear especially low for studies limited to parts of the market, such as renters only, low income households only, residents in one neighborhood, etc. However, although less than one, the elasticity might be higher in LDC's because households rarely have other investment opportunities--except for education, small businesses, and work materials.

Our analysis of the taste variables showed that the equivalent household size elasticity of demand for housing is 0.6. This is similar to that of income and implies that the demand for housing is relatively insensitive to the size

of the household. This suggests that urban demand for housing will not be much affected by future changes in the average household size.

When households are located in either a site and service scheme or an improvement area, their demand for housing increases, compared with those households located in a squatter settlement. This implies that site and service and squatter upgrading schemes are beneficial, since they bring about changes in the quality of the neighborhood in such a way as to increase the demand for housing by households.

Our analysis found a sharp distinction between the demand patterns for households with lodgers and those without lodgers, and those with more education (post primary education) and those with less education (primary education). On the whole, households with lodgers, and those with less education demanded more housing services than those without lodgers and with more education.

2. The Value of Attributes in the Housing Bundle.

In terms of the relative importance of the attributes in the housing bundle, we found that the most important attributes in explaining the value of the house are the number of rooms in the dwelling, the quality of wall materials, plaster and paint, and access to better water and better sanitary facilities. Households attached more importance to space and the permanency of the dwelling implied by the quality of the wall materials than they did to the quality of water and

sanitary facilities.

2. Demand for Dwelling Attributes. Our analysis for the demand for dwelling attributes is preliminary and exploratory. We limited our analysis to five dwelling attributes, in other words, assuming that implicit markets for other attributes can be ignored. We also assumed that cross price elasticities are zero. Given these restrictions we were able to say something about the nature of the demand for dwelling attributes.

The demand for housing attributes was price elastic and income inelastic with respect to yard area and age, and price and income inelastic with respect to access. It was price and income elastic with respect to living area. This implies that only the demand for living area is relatively elastic and will be much affected by changes in its own price and income. However, the income and price elasticities of demand vary for different attributes. The growth of income would therefore result in changing patterns of demand for attributes.

4. Home Improvements. Our analysis showed us that most owner occupants over time improve their dwellings. 95 percent of the households carried out one or more types of dwelling improvements with a mean of about four types of improvements per household.

Most households used hired labor and financed their improvements with accumulated savings and wages. Furthermore, households who are older, who live in highly valued dwellings,

and those with long years of residence at the site are likely to have made more dwelling improvements to the dwelling.

Policy Considerations

The main contribution of this study is in increasing the knowledge about the low income housing market in Zambia. The results obtained are of course limited to Lusaka and specifically to low income owner occupants. There is therefore need for further research of the same kind both in Lusaka and other urban areas to reject or verify the conclusions of this study. Further research is also needed to analyze the rental market, and other aspects of the low income urban housing market, such as its relation to public housing.

However, given the modest nature of our study and its limitations, we have now general and empirical evidence to use in the formulation of policy, which did not before exist. On the basis of this, several implications for policy can be discussed.

At the outset, it is important to stress that if policy makers are to deal effectively with housing problems, specific housing policies should be underpinned by a properly conceived overall policy framework. The focus of urban low income housing policy is to improve the housing situation of low income households through squatter upgrading and site and service schemes. To be effective these specific policies

need to be coordinated with the overall policy framework. This should include the reorientation of such policies as monetary and fiscal policies to be beneficial to the housing market, inducing the development of grassroot financial institutions and the reorganization of the public housing institutions.

Currently enormous public resources are spent on high income housing. This bias in resource use is an institutional characteristic of the urban housing sector. Policy makers should strive to change this situation. Policies should be directed to deemphasize the unlimited commitment of the government to provide housing for its workers. Resources saved with such policies should be used to stimulate low income housing through squatter upgrading and site and service schemes. It is in this context that specific policies addressed to low income housing issues will have a desirable impact on their solution.

Our analysis implies that in the case of Lusaka, policies of squatter upgrading and site and service schemes are beneficial to low income housing. Such policies have in the final analysis led to improved housing conditions for the low income urban population. Governments faced with severe housing problems and a large squatter population are better off encouraging squatter upgrading, rather than squatter eradication. Sites should also be provided on which households can acquire plots to build houses.

The question which has often arisen is about the

initial level of services to be provided on such plots. Our analysis shows that households value space and the permanency of their dwellings more than any other component of the dwelling. Better wall materials, number of rooms and plaster and paint are highly ranked. On the other hand, the provision of better water and sanitary facilities such as piped water and flush toilets are not as highly ranked as the former. This implies that the current policy of providing standard sites rather than normal sites in the site and service schemes in Lusaka is justified.

Policy makers now have empirical evidence to use in determining how housing demand responds to, for example, income growth and population changes--both in terms of its growth and migration. They should understand better what form of subsidy is best for increasing the consumption of housing by low income households, given an inelastic demand for housing.

If policy makers wished to increase housing consumption through transfer payments to low income households, they are better off earmarking them to specific housing expenses, otherwise only about 60 percent of the transfer payment will be spent on housing.

The patterns of demand for dwelling attributes also change with income, price and population changes. Policy makers can now determine in what way they will change and how much households are willing to pay for some specific attributes. This kind of information is important for

project analysis.

The ranking of the various attributes indicates to the policy maker which attributes matter most to households. On this basis a selective policy to help low income house building activity can be focused on those attributes, such as subsidized loans towards the building of an additional room.

The higher demand for housing by households with lodgers means that an enlightened rental policy--i.e. encouraging households to take in lodgers, is important. Such a policy will also, through this new source of income, increase the households' ability to improve and expand the house and thus increase rental housing.

The present system of technical assistance to help households build a better house is directed at the households, on the assumption that they will use self help labor to improve the dwelling. However, most households use hired labor. There is, therefore, a need to reexamine this policy, and perhaps to direct technical assistance and advice to small scale builders.

One other important issue exists for policymakers. Low income households are by definition poor households. If there are to be substantial house building activities, potential sources of finance must be generated to pay for both materials and labor. Therefore, institutions are needed to develop these potential credit sources for home improvements.

APPENDICES

APPENDIX A

RESEARCH METHODOLOGY

The data for this study was collected in Lusaka by the author with the help of five University of Zambia students during the summer of 1979. The collection of the data covered a period of three months--June to September. The project was part of the international reserach on low cost housing and employment generation in LDCs underway at Michigan State University and included Sri Lanka, Columbia, Pakistan, Kenya, Tunisia, Peru and Zambia. The research was sponsored by the Bureau of Science and Technology, Agency for International Development.

The focus of the research was the low income urban population living in private low income settlements. Information was gathered through a sample survey of the targeted population. The questionnaire for the survey was designed at Michigan State University by the principal investigator of the international project.

Lusaka was selected as the site for the research in Zambia because the author is familiar with Lusaka. Furthermore, it was believed that research assistants and transportation would be readily available there. The questionnaires

for the survey were written in English and then were translated into the local languages during the interviews; it was easier to do this for Lusaka than it would have been elsewhere.

It was decided to sample households in selected low income settlements. These represented a site and service scheme, a squatter settlement, an upgraded housing scheme and an expandable core housing scheme. Kaunda Square was chosen for a site-and-service scheme, and Chawama for an upgraded housing and an expandable core housing scheme because they were the oldest areas with such schemes. Bauleni was chosen for a squatter settlement on the basis of discussions with housing officials in Lusaka.

The upgraded and expandable core housing sections of Chawama are together formally known as the Improvement Housing area. We lump these two schemes together in the study.

Given the limited time and resources available, it was decided to interview 168 households with a quarter from each housing scheme. However, only 162 households were interviewed. Six households were either unavailable or were unacceptable respondents. The distribution of the respondents is shown in table A.1.

The five University of Zambia students employed as research assistants for the survey all had previous field research experience. Initially, the research assistants studied the questionnaire for two days at the

TABLE A.1

DISTRIBUTION OF SAMPLE SURVEY RESPONDENTS

Area of Survey		Respondents	
		Potential	Actual
Kaunda Square	Site and Service	42	36
Bauleni	Squatter Settlement	42	41
Chawama	{ Core Housing	42	41
	{ Up-Graded	42	42
TOTAL		168	162

University of Zambia Main Campus. The study covered concepts, definitions and the structure used in the questionnaire. Then a pilot survey of twenty-five households was undertaken in Kalingalinga so that the research assistants could be further familiarized with the questions.

The households interviewed in Kaunda Square were selected, using a table of random numbers, from a map of Kaunda Square provided by the Lusaka City Council. Kaunda Square Stage I has a total of 119 blocks, with an average of 18 houses in each block. We numbered the 119 blocks and, using a table of random numbers, we came up with a sample of 50 blocks. We then assigned numbers to the houses in the 50 blocks and came up with the 42 houses to be surveyed.

In Chawama, samples were taken from both the expandable core-housing and the up-graded sections. In the expandable core-housing section, the sample was chosen from a map provided by the Lusaka Housing Project Unit. Houses were assigned numbers and then 42 houses were chosen using a table of random numbers.

The numbering of houses in the up-graded part of Chawama was disorderly and there was no map available. However, the area was clearly divided into sections for political-party organization. We used these sections to select our sample of 42 households for the area. The same procedure was used in Bauleni.

Each questionnaire was checked at the end of the day

by the author with the help of Dr. David Todd of the Urban Community Research Unit, University of Zambia. Questionnaires which had unsatisfactory answers were followed up the next day.

The major problem experienced by the research assistants was that of finding the respondent at home. Initially, our surveys were done during the day. This produced very few completed questionnaires. After three days we realized that respondents were not usually at home in the day during the week, since most of them worked. We therefore changed our interview schedules to evenings and weekends. This was more successful in contacting the respondent at the first visit.

After the survey was complete, the data was punched and put on tape for analysis and storage. Both the questionnaire for the survey and the data are available at Michigan State University.

APPENDIX B

CORRELATION COEFFICIENTS AMONG VARIABLES: DETERMINANTS OF DWELLING VALUES^a

	1	2	3	4	5	6	7	8	9	10	11
1. SALE	1.00										
2. FLSPACE	0.40	1.00									
3. NOROOM	0.52	0.52	1.00								
4. TOWK	-0.21	0.02	-0.10	1.00							
5. YARD	-0.29	-0.07	-0.16	0.15	1.00						
6. AGE	-0.23	0.04	0.12	0.07	0.18	1.00					
7. DRF	0.52	0.10	0.23	-0.09	-0.36	-0.47	1.00				
8. DWL	0.54	0.17	0.27	-0.12	-0.44	-0.51	0.69	1.00			
9. DWR	0.39	0.14	0.26	-0.16	-0.20	-0.02	0.26	0.24	1.00		
10. DSF	0.42	0.10	0.27	-0.19	-0.34	-0.09	0.47	0.45	0.54	1.00	
11. DPP	0.41	0.30	0.30	-0.10	-0.10	0.10	0.11	0.08	0.18	0.17	1.00

^aCONTINUOUS VARIABLES: SALE = value of the dwelling; FLSPACE = floorspace area; NOROOM = number of rooms; AGE = age of the dwelling; TOWK = travel time to work; YARD = yard area of the site.

DISCRETE VARIABLES: DSF = sanitary facilities; DRF = roof materials; DWL = wall materials; DWR = water facilities; DPP = plaster and paint.

APPENDIX C

A NOTE ON MONETARY VALUES

All monetary values in the study were converted to U.S. dollars at the prevailing exchange rate in 1979. The rate was 1.00 U.S. dollar = 0.79 Zambian kwacha.

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