

Housing Affordability Ratios in Rio de Janeiro, Brazil

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ABSTRACT

Most housing problems such as structural obsolescence, inadequate space, and tenure insecurity, can be traced logically to the problem of affordability. This paper utilizes a sample of 2,582 households, drawn from low, moderate, and upper income regions in Rio de Janeiro, Brazil, to explore the relationship between rent-income ratios and a set of household attributes. The conventional view of the affordability problem is based upon the notion that a household can reasonably be expected to pay 25 percent of its income for housing. Such traditionally enshrined rules-of-thumb are inadequate.

The results of this study demonstrate the inadequacy of utilizing any single ratio to predict housing consumption for income and demographic subgroups located in different regions of a city. The range of ratios presented should have important implications for strategic planning, and effective housing project design in Brazil.

INTRODUCTION

Several developing countries, in the last quarter century, have achieved unprecedented rates of urban growth and Brazil is no exception. Between 1960 and 1970, the Rio de Janeiro metropolitan area increased by two million persons (Vetter 1975). Data for 1980 indicate a population of 9.2 million, while projections for the year 2000 show a doubling of Rio's population to about 19 million (IBOB 1983a). This explosive growth presents a serious problem for the provision and consumption of affordable housing.

A significant part of the urban growth problem, as Grimes (1976) points out, is that solutions geared towards the purchasing power, and hence, the expenditure levels of urban families have not been adequately examined. For instance, the conventional view of the affordability problem is based upon the notion of the share of income that a household can reasonably be expected to pay for housing, namely, the 25 percent of income rule of thumb. Mayo et al. (1987, 190), report that about three-quarters of World Bank sites and services projects financed in developing countries between 1972 and 1984 were planned on the assumption that low to moderate income households could spend 20 to 25 per cent of their incomes on housing and of thumb are inappropriate. As Chatterjee (1981, 172) rightly points out, they do not account for the variability of housing consumption spatially, and across a variety of socio-economic and demographic profiles. This latter viewpoint defines the crux of this paper whose central objective is to relate rent-income ratios to specific income, demographic, and spatial subgroups.

The rationale for this research is that studies on housing expenditure and affordability in developing countries are usually aggregate in nature (Ingram 1981; Jiménez and Keare 1984), and income and price specific (Houthakker 1957; Khan 1963). However, there is a great deal of variation in affordability ratios when socially and culturally determined variables such as the age and size composition of the household are incorporated. Failure to account for the variability of affordability from place to place and among households with different attributes, results in the design of ineffective housing policies and programs.

The range of results presented should, therefore, serve three major purposes. First, the study should alert policy makers and international donor agencies to the complexities of housing demand in developing countries. Second, the results should assist in the design of squatter upgrading and site and service projects geared towards low income groups in the formal housing sector. Third, they should illustrate that well-designed housing projects targeted to rightful beneficiaries with different socio-economic and locational constraints, are cost-effective and allow modest surpluses to be recycled to finance future projects.

The concept of affordability addressed here is certainly interrelated and interdependent with the components of cost recovery and cost replicability. As Prakash (1985, 1) states, if urban facilities and services are beyond the financial capacity and ability of target populations, it will be impossible to design appropriate cost recovery and resource [end p. 49] mobilization methods. Under these circumstances, large-scale replicability of urban projects would be severely restricted due to resource constraints and rapid urbanization in countries such as Brazil.

The paper begins with a review of affordability studies in developing countries. This is followed by a presentation of a methodological review of the derivation of the affordability ratio, the data base, and regional and income sub-samples. The distribution of affordability ratios across a set of locational, household size, age and income attributes are then examined. The policy implications, which the affordability ratios present for strategic planning and effective housing project design are discussed in the concluding sections of the paper.

HOUSING AFFORDABILITY IN DEVELOPING COUNTRIES

Housing affordability studies in developing countries range from descriptive analyses using rent-income ratios (Grootaert and Dubois 1985) and contingency analyses of associations between variables (Barbosa 1985), to more complex double-logarithmic (Jiménez and Keare 1984), hedonic (Follain et al. 1980), and linear expenditure (Aryeetey-Attoh and Chatterjee 1986) specifications. Logarithmic models have been employed to estimate the sensitivity of housing expenditures to household income, the income elasticity of housing demand. Hedonic analyses involve the estimation of regression coefficients to reveal the market valuation or implicit price of structural, amenity, and locational attributes associated with the dwelling unit. Linear expenditure systems describe how a household allocates its budget shares to various consumption goods after it has fulfilled its "committed" or subsistence expenditure.

Descriptive analyses of affordability ratios are important in developing countries since there is a paucity of data that provides some magnitude of the variations of housing expenditure. The development community has become increasingly aware of the need to pay attention to behavioral differences and to incorporate them into microeconomic modeling of consumer behavior. There is widespread recognition that careful analysis of locality specific and descriptive data, can provide a formulation against which hypotheses derived from microeconomic theory can be tested. Consequently, descriptive accounts of housing affordability, comparable to work done in the 1950s (Rodwin 1950), 1960s (Wheaton et al. 1966), and 1970s (McCarthy 1976) for the United States, are valuable in the developing country housing context. This preference for descriptive information can provide a valuable foundation for theory, development, and analytical modeling suited to the process of urbanization in the developing world, and can be gauged, for example, from a number of city specific studies done by international agencies such as the World Bank and the United States Agency for International Development.

The rent-income ratio has been interpreted in the literature in two ways. First, it has been employed as an affordability measure and thus is an important indication of household welfare. Second, it indicates a household's willingness to spend a certain portion of its income on housing, thereby assessing a household's preference for housing relative to other consumption items. Grimes (1976) makes an important distinction between housing need and affordability. The former is a social concept and its estimation incorporates normative standards expressed as the number of households per unit and space per person. Housing affordability, on the other hand, relates to effective demand-an economic concept-in which availability of income and amount of household expenditure are critical variables. The physical indicators of housing deterioration such as overcrowding and the lack of basic utilities, are only symptoms of an economic reality that reflects the increasing gap between housing costs and affordability. Stone (1983, 99) further attributes problems associated with community viability and public resource allocation to the interaction between household incomes and housing costs.

International donor agencies like the World Bank have underscored the importance of the affordability concept by recommending its use in the design of squatter upgrading, self-help, and site and service projects. These projects represent a sharp break with previous highly regulatory policies which emphasized rent

control, squatter eradication, and rigid building standards. Donor agencies have now established project design standards on the basis of what households are able to pay for shelter and services, rather than on the basis of an often arbitrary and inflated notion of housing need (Mayo 1986).

In the United States, the 30 percent rent/income ratio has become an arbitrary rule for determining eligible candidates for housing vouchers. In Salins' (1986) opinion, however, the ratio is as likely to reflect the owner's preference for higher quality dwellings as it is to indicate exorbitant rent inflation.

In spite of its utility, the affordability ratio has been restricted to aggregate studies at the national and cross-national level. National level studies have been employed to test conventional theories such as Schwabe's law which asserts that [end p. 50] the proportion of housing expenditure decreases with increasing income. Strassman's (1982) study of Cartagena, Colombia and Follain et al.'s (1981) of Korea, confirmed this hypothesis.

Cross-national studies have been concerned with measuring the effect of the socio-economic composition of the household and the level of economic development in a country, on housing expenditure. Malpezzi et al.'s (1985) comparative study of sixteen cities in eight developing countries revealed that in the short run, housing is treated as a necessity with low-income households willing to spend higher fractions of income for housing than are higher income households. In the long run, as economic development proceeds, the share of household budgets allocated to housing increases among households at all levels. Lakshmanan et al.'s (1978) study of thirty-one developed and developing countries found that housing demand is low in the early stages of development, when a nation's resources are directed to other productive sectors, then increase rapidly in the middle stages of development as the housing sector catches up. Then, at the high stages of development, housing demand again declines as resources shift elsewhere.

Musgrove's (1978) study of nine Latin American cities, excluding Rio, attributes the housing consumption behavior of households to the non-linear life cycle interaction between the age of the household head and income. He hypothesized that a peak in the incomes of middle-aged household heads would be followed by a decline in their retirement years. This could be interpreted in two ways. First, it implies a rent burden for younger and older households who have lower incomes. Second, it can be expected, a priori, that expenditures on housing are likely to increase along with the aspiration levels of young and middle-aged households as they pass through various phases of their life cycle. These hypotheses are examined in the empirical sections of this paper.

Musgrove's incorporation of demographic variables adds a new dimension to affordability studies in developing countries. It is one that is frequently ignored in microeconomic housing consumption modeling, but a dimension which forms a significant component of this study.

These aggregate studies all acknowledge the need to incorporate more behavioral dimensions in the affordability equation. However, many fail to account for the spatial framework within which such a study might occur, perhaps due to the paucity of data. This study addresses this caveat. It takes advantage of a rich data set, amenable to spatial disaggregation, to portray the impact of socio-economic and locational constraints on housing consumption patterns in Rio de Janeiro. The study, therefore, presents an opportunity for policy makers to reach a broader spectrum of households in Rio. If housing is to confer its wide range of benefits, it is essential that programs are tailored to a country's resource level and the differential abilities of households to pay for housing.

METHODOLOGY

The affordability ratio is derived from dividing the mean monthly rent or installment (exclusive of utilities and property tax) by mean monthly household income. The latter includes total household income from all occupation-primary and secondary. The ratio (A) is applied to income (i) and demographic (j) subgroups in specific regions (k) in Rio, and can be symbolically represented as:

$R_{ijk} = \frac{R}{I_{ijk}}$

where R represents the mean monthly rent or installment, and j denotes the mean monthly household income.

The Data Base

The affordability ratios are drawn from a sample of 2,582 households in low, moderate, and upper income regions in urban Rio. The sample was obtained from the 1980 population census tape compiled and prepared by the Brazilian Institute for Geography and Statistics (IBGE 1983). The IBGE stratified urban Rio into eleven administrative regions all of which comprised aggregations of districts, such as the Irajá-Anchieta-Bangu-Campo Grande region (Figure 1). A sample fraction of 0.49 percent was then applied equally to each administrative region to extract approximately 6,067 households from an estimated 1.23 million households residing in the municipality of Rio in 1980.

The principal sample employed for this study, however, is considerably smaller (2,582) because only those households earning income and paying rent are included.

Regional and Income Sub-samples

The eleven administrative regions are further segmented into low, moderate, and upper income regions (Figure 1) based on average household income and minimum salary reference points. In Brazil, income groups are categorized in terms of minimum salaries. In theory, a minimum salary is related to the market basket of basic necessities and is adjusted annually to reflect the increase in the cost of these -- food, shelter, clothing, laundry and transportation. The actual methodology for calculation is not made public. In November [end p. 51] of 1980, the minimum salary for Brazil was 5,789 cruzeiros (Cr.) or US\$96 based on exchange rates presented by the Central Bank of Brazil (Vetter 1982).

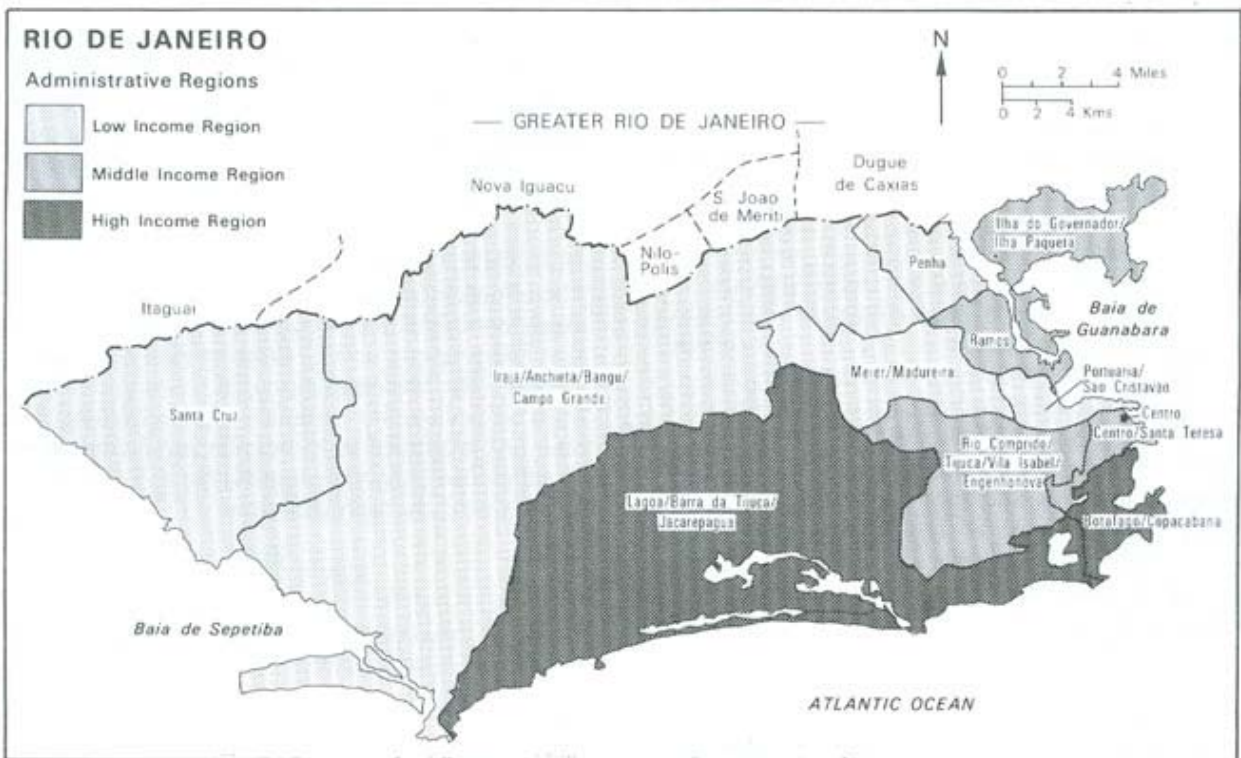


Fig. 1. Rio de Janeiro: low, moderate, and upper income regions.

Barbosa (1985) indicates that the National Bank for Housing in Brazil (BNH) established three minimum

salaries, which translates into Cr. 17,367, as the poverty level for 1980. This study, therefore, distinguishes regions with average household incomes below this reference point as low income regions. Regions with average incomes between Cr. 17,500 and 35,000 are classified as middle income, while those above Cr. 35,000 are designated as upper income. These regional delimitations conform with earlier studies conducted by Leeds (1974), Vetter (1975), Perlman (1976), and Portes (1979).

These regional sub-samples are further segmented into low and high income households to capture the behavioral characteristics associated particularly with squatter and tenement residents interspersed in the moderate and upper income regions. Low income households represent those with incomes below Cr. 30,000 (or less than 5 minimum salaries), while high income households earn above Cr. 58,000. It should be noted that the Brazilian government, due to the inflationary nature of the economy, recently converted its currency to a new denomination where a thousand *cruzeiros* is now equivalent to one *cruzado*

EMPIRICAL EVIDENCE OF HOUSING AFFORDABILITY IN RIO

Aggregate Affordability Ratios

The mean affordability ratio computed for urban Rio was 6.4 percent, with slightly lower percentages for the low (5.6) and moderate income regions (6.2 percent), and a slightly higher share for residents in the upper income region (7.0 percent). This ratio is quite low compared with estimates from other studies. Grootaert and Dubois (1985, 30) measured their ratio as a percentage of total household expenditure and reported an average of 16.2 percent for urban Ivory Coast, while Follain et al. (1980, 317) estimated a median rent to consumption expenditure ratio of about 15 percent for Korea.

Malpezzi et al. (1985, 5), who consider net rent (exclusive of utility payments), report a range of ratios from a high of 25 percent for Bangalore, India to a low of 4 percent for homeowners in Davao, Philippines. The latter ratio is more consistent with findings in this study. These comparisons are made with caution since such generalizations do not take into account the fine scale economic and political differences between countries, and the variety of operational definitions associated with the affordability ratio in other studies. **[end p. 52]**

Intra-Urban Variations of Affordability Ratios

The expected decline in rental shares with an increase in income is shown in Table 1. This implies an inelastic demand for housing in Rio and is consistent with conventional theories of housing demand.

Table 1. Rent-income ratios in Rio De Janeiro: by region

Income Group (Cruzeiros)	Urban Rio	Low-	Middle-	Upper-
		Income Region	Income Region	Income Region
0-30,000	20.7	18.0	24.9	25.7
30,000-54,000	13.1	9.6	14.6	22.7
54,000-90,000	9.0	7.4	11.3	12.1
90,000-159,000	7.4	6.3	8.4	9.0
159,000+	5.8	4.5	5.3	6.6
Number of Households	2582	882	774	927

Source: Compiled from IBGE Census tape, 1983.

Another observation from Table 1 is that housing expenditure increases consistently from the low to the high income region. Malpezzi et al. (1985, 44) state that "as city mean income increases, mean rent -income ratios also increase, indicating an upward shift in Engel curves as cities develop." While such an observation can be made for cities, it can also apply to regions and districts within cities as is the case here. Positive externalities, amenity levels, and notions of class monopoly rent derived from the urban land rent model, act as interrelated factors in explaining the gradual decline in land values and associated housing expenditures from the upper income, southern coastal zone. The relative location of this southern zone and its elaborate transportation system make it accessible to natural amenities such as the beaches along Copacabana, Ipanema and Barra da Tijuca, and to job opportunities and public services.

The concentration of high income groups in this southern zone also exerts a political "pull" which influences urban institutions to their benefit. In Vetter and Brasileiro's (1978, 266) opinion, there is a circular and cumulative causal process built into public and private institutions of the urban system which tends to increase the interpersonal and spatial concentration of real income. These processes act collectively to relegate moderate income groups to the northeast industrial and working class districts of Rio, while low income groups occupy the northwestern peripheral sections.

Another significant observation from Table 1, relates to the rate of increase in rent-income ratios among similar income groups in different regions. The ratios increase most sharply from the low to high income region among the lowest income categories (18.0 to 25.7), and least among the highest income groups (4.5 to 6.6). The spatial or regional component therefore has a greater impact on the rental allocations of poorer households than the richer ones. The demand for housing amongst low income residents in the southern zone is especially high because, as Perlman (1976, 24) points out, there are opportunities in this zone to earn higher incomes by pursuing informal jobs. This indicates a preference for centrality and is consistent with Harvey and Chatterjee's (1974, 25) observations regarding steep bid rent curves associated with the poor at central

locations. Low income households are subject to strict building codes in this coastal zone and constantly face the threat of *favela* (illegal squatter) removal. Therefore, investments are rarely made to upgrade housing. Rather, low income earners generally invest in movable objects such as televisions, radios, and refrigerators.

Household Size and Housing Affordability

The size characteristics of the household is analyzed in this section in conjunction with its income status, to determine whether comparable income groups with different compositional attributes engage in similar expenditure patterns. For instance, what types of expenditure adjustments do large households make as compared with smaller households of comparable incomes? This is a question that addresses welfare and needs-based considerations and directs attention towards defining interventionist strategies for households burdened with size constraints.

Housing expenditure patterns of comparable income groups in Rio de Janeiro, vary by household size. A pattern of declining rent-income ratios amongst low-income groups exceeding a household size of four is exhibited in Table 2. Three factors explain this trend. First, there can be considerable economies of scale. This reflects a situation where such consumption items as bedrooms and bathrooms remain unchanged since larger households tend to share them. Second, there is the competing goods argument which states that households adjust their expenditure patterns in favor of other basic necessities. Therefore, the budget devoted to food and clothing rises with household size and is followed by uniform reductions in the shares devoted to housing. Analysts such as Howe (1977) and Merz (1983), have developed elaborate linear expenditure systems to describe how a household allocates its budget to various consumption [end p. 53] goods after it has fulfilled its "committed" or subsistence expenditures. Aryeetey-Attoh and Chatterjee (1986, 7) have also proposed a modified linear expenditure system to estimate the allocation of household incomes among a set of dwelling attribute dimensions in Rio de Janeiro. Third, lower rental allocations associated with larger households have been attributed to a positive relationship between household size and family income, due to the larger number of earners who contribute to the household economy. Strassman (1982, 51), for example, found in Cartagena, Colombia that mortgages are granted in proportion to earnings of the household head only. As a result, the presence of other working adult members in the household tends to reduce the affordability ratio. These three factors act conjointly to explain the lower rental allocations of larger households.

Normally, one would expect a positive association between housing expenditure and household size considering the space requirements of larger households. This is the case for three- and four-member low income households residing in the low and moderate income regions in Rio, where a slight increase in affordability ratios can be observed from two to three-member households. Beyond the four-member threshold level, however, the size constraint begins to burden low income households thereby restricting their budgetary allocations to housing. Stone (1983, 102) contends that larger households need substantially more for their non-shelter needs than smaller households in order to achieve a comparable quality of life. This implies that a larger household can afford to spend less than a smaller household can for housing, if it is to meet non-shelter needs at a given level of adequacy.

Table 2. Rent-income ratios by household size for low and high income households in Rio de Janeiro

Size	Urban Rio		Low-Income Region		Middle-Income Region		Upper-Income Region	
	Low	High	Low	High	Low	High	Low	High
1-2	13.6	5.7	10.7	5.2	14.9	4.5	20.5	6.1
3-4	13.6	5.7	11.8	4.2	17.1	4.8	17.8	6.3
5-6	10.7	5.5	9.3	3.2	11.1	3.9	15.5	6.6
7+	7.2	5.9	7.3	2.2	6.7	4.9	10.2	7.1
Numbers of Households	683	1150	258	385	213	330	212	435

Source: Compiled from IBGE Census tape, 1983.

On the other hand, larger high income households in the moderate and upper income regions of Rio do not have to adjust their housing expenditure patterns to achieve comparable levels of living relative to smaller households. Table 2 reveals that these households spend more on housing to meet their quality and quantity requirements. The relatively lower expenditure levels associated with larger high income households in the low income region can be attributed to the combined effect of lower land and housing costs in this peripheral region, and the cumulative effect of incomes generated by members of these households.

The spatial component again has an effect on the rental allocations of households with different sizes. Housing expenditures among similar size categories tend to increase systematically from the low to the upper income region, except for one instance where expenditures decline from 7.3 to 6.7 for large (seven or more) low income households in the low and moderate income regions respectively. This could be attributed to the larger and more spacious, government projects (*conjuntos*) in the middle income, working class districts which provide opportunities for economies of scale to prevail. Households in the low income region have access to plots of land in the periphery in which they invest and slowly develop over time as their incomes increase. Others settle for smaller single family units or *vilas* which usually warrant extensions.

The Life Cycle Effect on Housing Affordability

The taste and aspiration levels of household heads are normally affected by their age and life cycle characteristics. Estimates for the low income region in Table 3 reveal a steady increase in the afford ability ratios of low income household heads as they age. This positive relationship is a function of a number of factors which operate simultaneously.

Some younger household heads in this region occupy *conjunto* or public housing projects and are protected by mortgages indexed against inflation and by government subsidies associated with these units. Older household heads, on the other hand, devote higher proportions of their incomes to housing because they are unprotected by government [end p. 54] subsidy programs. Their lower incomes are further exacerbated by the lack of minimal old age protection plans and inadequate social security systems. In addition, they are susceptible to the inflationary nature of rents charged for rooming and courtyard housing in this region.

Table 3. Rent-income Ratios by Age of Head for low and high income households in Rio de Janeiro.

Age of Head	Urban Rio		Low-Income Region		Middle- Income Region		Uper-Income Region	
	Low	High	Low	High	Low	High	Low	High
<24	11.1	7.9	9.2	1.3	12.5	6.1	17.8	9.1
25-34	11.9	6.0	10.3	3.6	13.6	5.7	15.6	6.7
35-44	12.1	5.8	10.6	4.4	13.7	4.1	14.0	6.7
45-54	13.6	5.1	11.0	4.0	16.1	4.5	20.8	5.4
55-64	14.9	5.1	11.2	3.5	17.1	3.9	27.3	6.9
65+	20.1	5.3	15.3	1.2	26.9	3.2	25.3	7.2

Source: Compiled from IBGE Census tape, 1983.

The positive relation between age of household head and housing expenditure is also a reflection of the incremental building process associated with low income households in developing countries, an issue well-documented by Turner (1967) and Moser (1982). Low income households in this peripheral region engage in a land development (*loteamento*) process modelled after the sites-services approach to housing in developing countries. A *loteamento* is a parcel of vacant land, subdivided into small lots for low income housing. Poor households are then encouraged to mobilize their own resources towards constructing their homes. The progressive development of the home is a gradual process that could extend over a considerable period of a low income household's life cycle. In a highly speculative private sector such as Rio de Janeiro's, low income families can only afford land costs in peripheral areas and usually do not have enough resources to build on land in a relatively short period of time. These households, therefore, have no other alternative but to build slowly and gradually by stages.

The relationship between age of household head and housing expenditure for low income households in the moderate income, working class district is symmetrical to the one just observed for the low income region. A different trend, however, occurs in the upper income, southern region where the higher rental premiums associated with younger and older household heads is a reflection of the non-linear life cycle effect between age of household head and income. It is also an indication of the higher location premiums that low income households have to incur to gain access to employment.

High income households in all three regions exhibit a nonlinear pattern of housing expenditure with age. In all three regions, peaks in housing expenditure occur in the younger and middle-aged groups. Since housing is a durable good, it is acquired at early ages so its utility value can be maximized over a long period of time. It can be expected, therefore, that an increase in the aspiration levels of younger household heads who are able to afford housing will be followed, concomitantly, by an increase in their expenditure levels.

The systematic decline in housing expenditure for older, high income household heads in the low and moderate income regions can be attributed to three factors operating simultaneously. First, older household heads may need less space since they are in the "family fission" stage of their life cycle where children may have left the household. Second, since housing is a durable good purchased at an early age, older household

heads may already have amortized their loans. Third, their accumulated wealth, retirement incomes and social security payments, combined with the fact that they may already have fulfilled their housing commitments, accounts for the relatively lower housing allocations.

CONCLUSIONS AND POLICY IMPLICATIONS

The range of affordability ratios presented in this paper, from an income, demographic, and spatial perspective, is a reflection of the dangers and inadequacies of relying on a single rule of thumb for housing policy formulation and interpretation. The incorporation of demographic variables adds an important sociocultural and behavioral dimension to the study. The variations in expenditure patterns [end p. 55] resulting from the household size and age attributes reflect the Latin American culture, in general, and the *carioca* culture of Rio specifically. The spatial component also demonstrates the burdensome impact of location on poorer households who need to be in close proximity to their workplace. Any attempt, therefore, to reduce affordability of housing to a single percentage of income, no matter how low or high, simply does not correspond to the reality of fundamental and obvious differences among households spatially distributed in urban areas. Often, the lack of data on effective demand or the ability to pay for housing has forced project planners and international agencies to use arbitrary rules of thumb as a basis for setting standards of affordability and physical design. Chatterjee and Aryeetey-Attoh (1988, 319) have, therefore, proposed a broad based information system for housing planning to strengthen the link between data, modelling and planning needs.

The use of inappropriate affordability assumptions leads to a neglect of intended target populations and necessitates the provision of unsustainable subsidies to encourage participation of low income groups, thereby frustrating the goal of large-scale project viability. This results in the continuation of policies that channel housing, intended for low income groups, to high income groups. Mayo and Gross (1985, 12), in evaluating affordability assumptions and project outcomes of the World Bank, concluded that physical standards linked to arbitrary ratios were set at levels higher than appropriate. They also confirmed a leakage of benefits in sites and service projects to higher income households and an occurrence of subsidy levels well above 50 percent for various projects.

It is imperative that conventional normative approaches to estimating housing requirements and the adoption of ad hoc physical standards, must give way to economically realistic and financially feasible programs. The results of this study indicate that the fraction of income that households allocate for housing is highly variable, depending on household income, the age and size composition of the household, and the location of the household. The results address the caveats expressed above and provide policy makers with a range of indicative affordability ratios for which to plan housing targeted especially for low to moderate income groups.

An affordability analysis presented in a more realistic framework is compatible with cost recovery and replicability and, therefore, should trigger a series of cost-effective strategies. First, policy makers are able to determine the minimal level of resources that will be required at macro- and micro-levels to meet the needs of target groups.

This, in turn, should facilitate the design of more efficient and equitable cost recovery squatter upgrading, self-help, and site and service programs. Second, project costs reduced to levels which can be afforded by intended beneficiaries, necessitate the use of appropriate technologies that require local rather than imported building materials. They also require policies that accept lower minimum standards--reducing lot size in a site and service project, making core houses smaller, or providing communal rather than individual standpipes. Chatterjee (1982, 62) mentions that given the unequal distribution of income and power in developing countries, the resources and political will required to transfer income to subsidize housing for the poor are likely to be scarce. In this context, the prudent planner of strategies for housing low and moderate income groups, whelp, and squatter upgrading efforts, can greatly be augmented if housing units are tailored to their affordability by different groups in society. The information in this study, therefore, can shift the planner's focus to the supply side. It can help the planner identify housing production targets and standards, and in

developing policies towards the building materials industry and various housing systems that can be afforded by low income groups.

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RESUMEN

La mayoría de los problemas de habitación como obsolescencia estructural, espacio inadecuado, y tenencia insegura, encaminamos a pueden comprobar el problema de capacidad de gasto. Este estudio utiliza una muestra de 2,582 hogares, tomada de regiones con ingresos bajos, medianos, y altos, en Rio de Janeiro, Brazil, para examinar la relación entre la proporción de ingreso que utiliza para la propiedad alquilada y un grupo de características hogareños. La perspectiva convencional del problema de capacidad de gasto, está basado en el concepto que el hogar puede pagar 25 por ciento de sus ingresos para habitación. Estos reglamentos tradicionales son inadecuados.

Los resultados de este estudio, demuestra la insuficiencia en la utilización de una sola proporción para pronosticar el nivel de gasto para habitaciones para los grupos localizados en diferentes regiones de la ciudad. La escala de los porcentajes presentados tiene implicaciones importantes para la planificación estratégica y diseño efectivo de proyectos de habitación en Brazil. [end p. 58]