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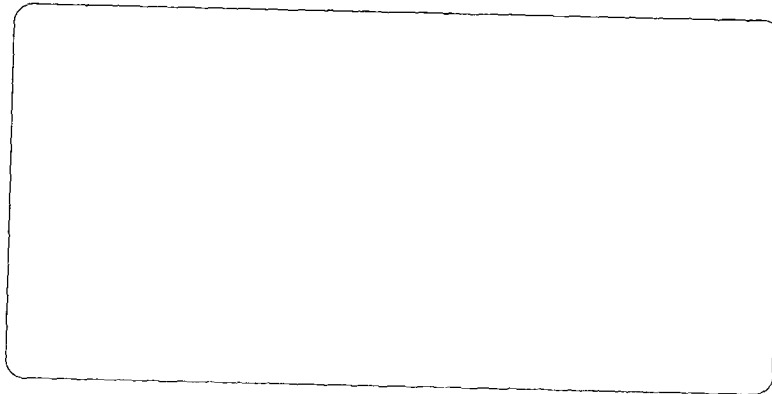
Progressive Development and Affordability in the Design of Urban Shelter Projects

Douglas H. Keare
Emmanuel Jimenez

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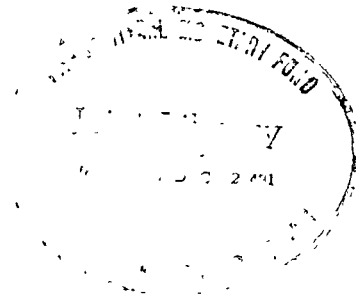Number 560

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Douglas H. Keare is urban adviser in the Urban Development Department of
the World Bank, Emmanuel Jimenez is assistant professor of economics at the
University of Western Ontario and a Consultant to the World Bank.

Abstract

The progressive development approach to house construction by and for the urban poor in sites and services and area upgrading schemes relies on affordable designs, tailored to meet individual families' needs. This feature was one of the main areas of investigation in a pilot program of evaluation of four of the early World Bank-supported projects in El Salvador, the Philippines, Senegal, and Zambia. The primary objective of this paper is to examine the concept and determination of affordability as a design factor. It begins by a discussion of the conceptual and measurement considerations which underlie affordability calculations; and then uses data generated by the evaluation program in El Salvador to conduct an empirical exercise to measure the determinants of willingness to pay. A principal finding of the investigation is that it matters greatly what definition of income one uses in making affordability calculations. Total family income, including "unearned" income, appears to be the most reliable indicator of families' willingness to pay for housing; and permanent income measures, or proxies, should be used where possible. Appropriately calculated measures of the propensity to consume housing indicate that owners spend a considerably greater proportion of their incomes on housing than do renters. This proportion also varies with other factors, such as certain household characteristics and city size. One standard feature, however, is that the proportion declines with income, with an income elasticity that remains within quite a narrow range across countries.

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PROGRESSIVE DEVELOPMENT AND AFFORDABILITY IN THE

DESIGN OF URBAN SHELTER PROJECTS

by Douglas H. Keare and Emmanuel Jimenez

I. INTRODUCTION

The Progressive Development Model: When, in the early 1970s,
the World Bank began to commit considerable resources to the development
of urban housing in Third World countries, the resulting lending program
was based on the proposition that sites and services and squatter area
upgrading projects, [1] providing secure tenure and a range of basic
services, [2] would enable and encourage low-income households to improve
their housing through self-help financing and/or construction.
Improvements in living environments were expected to lead to growth in
productivity and incomes over time. Both project types were
characterized as "progressive development," implying that improvements
would be made at a pace dependent on the incomes and preferences of
project households.

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[1]   Sites and services development consists of the provision of new
      serviced sites which selected applicants buy or lease. Upgrading
      involves improvements to existing areas, although some families may
      have to be resettled to neighboring serviced sites to make room for
      essential infrastructure.
[2]   Including, for example, water supply, sewerage, storm water
      drainage, footpaths, streets (with various surfaces), optional
      electricity and some core construction.

Progressive development can be further defined formally as a method of housing construction or upgrading achieved through:

(a) staged development, in which the infrastructure and occasionally part of the house are built by a contractor and the rest of the shelter is completed by the household;

(b) flexibility in housing design, construction time and materials used; and

(c) self-help components, which can be organized in the following ways:

(i) mutual help, in which families work together in groups, often with supervision from project management;

(ii) self-help construction in which the household hires a contractor to build the shelter;

(iii) self-help construction in which the household hires and supervises individual laborers;

(iv) self-help construction in which the household uses its own labor to build its house.

The progressive development approach assumes that it is better to take advantage of existing housing stock within a city, whatever its condition, than to demolish and replace it; and better also to provide new housing which is more nearly tailored to the needs of poor families than that provided through most other public sector programs. Upgrading schemes provide essential infrastructure and secure tenure to dwellers in existing urban slums, as well as extending credit, materials and

technical assistance for the improvement of their own dwellings. Sites and services schemes provide contractor-built utility infrastructure and in most cases core units as well, leaving project participants in a position to complete their own new dwellings, again with provisions for materials loans and technical assistance.

Both progressive development strategies attempt to make project designs as flexible as possible, giving participant families as broad a range of choice as possible of the timing and methods of construction, as well as of materials and sources of labor. A key design feature of both upgrading and sites-and-services projects has been provision of opportunities for participants to use family labor in self-help and mutual-help construction processes. The flexibility built into such programs was intended to enable families to adjust the pace of house construction to their frequently fluctuating incomes, and to use their own labor (or exchange labor with others) to reduce "out-of-pocket" expenditures.

All these features of progressive development practice were intended to make improved housing accessible to poor families, and even to affect the quality of social existence within low income areas. It was expected that the encouragement of self-help and mutual-help house construction would also promote a sense of civic responsibility and community solidarity previously lacking in many impoverished neighborhoods. Some planners and policy makers remain to be convinced, and the inevitable problems of project implementation and the occasional "problem projects" fuel these doubts; nevertheless, the results of these efforts to develop means of improving the quality of urban life on a

mass scale have so far been very encouraging. The successes have been both numerous and dramatic enough to cause project administrators and designers to believe that the progressive development model has proved a valid strategy for coping with ever-burgeoning urban populations in the Third World.

Designing Affordable Projects: The principles followed in designing urban projects financed by the World Bank center on the practice of delivering "packages" of tenure, services and assistance in house construction, either in new subdivisions (sites and services) or in existing squatter areas (upgrading). The design of these projects seeks to ensure that beneficiaries are neither prevented from spending what they want and are able to afford on housing, nor induced to spend beyond their capacity and willingness. These considerations define the concern for affordability. Closely related to the issue of affordability are those of accessibility and replicability. Accessibility is achieved when families within the prescribed range of incomes actually gain entrance to the project. Replicability refers to the goal of having project costs paid for by the beneficiaries, with little or no subsidy. This is necessary for such programs to be extended on a much wider scale, consonant with needs, without causing unsustainable burdens on municipal or national budgets.

The aim of improving project design is to have these three objectives converge, even though there is no assurance that they will. If a project is not affordable, it can either be replicable (by the entry of higher-income families) or accessible (through subsidy of the targeted families), but not both. On the other hand, an affordable

project may not be replicable (if the cost recovery mechanism fails) or accessible (if, for example, selection procedures favor higher-income families over members of the target population). In any case, affordability remains a central issue in project design.

Objectives of the Paper: The primary objective of this paper is to examine the concept and determination of affordability as a design factor in urban housing projects utilizing progressive development approaches. It begins by a discussion of the conceptual and measurement considerations which underlie many affordability calculations. It then uses data generated by the evaluation program in El Salvador [1]/ to conduct an empirical exercise to measure the determinants of willingness to pay. It aims, thereby, to provide improved guidelines on factors to consider in making affordability calculations, given existing field conditions.

The paper's message is intended for two audiences: for project and program managers seeking to make the best use of available data; and for national statistical offices (which should be) seeking to improve the utility of data bases for such purposes over time.

1/ This data base is one of several generated during a five-year pilot effort to rigorously evaluate the execution and effects of early urban development projects in El Salvador, the Philippines, Senegal, and Zambia. See Keare, Douglas H. and Scott Parris, "Evaluation of Shelter Programs for the Urban Poor: Principal Findings", World Bank Staff Working Paper No. 547, 1982, for a more detailed discussion of the methods and particularly the results of the evaluation. This program was jointly financed by the International Development Research Centre (Canada) and the Bank.

II. CONCEPTUAL CONSIDERATIONS

For more than a decade, the World Bank has been trying to
assist agencies in its member countries in designing and implementing
workable solutions to urban shelter problems. The working definition of
affordability used in appraisal reports has been as follows: a certain
level of urban services is affordable to a low-income beneficiary
household if the amount the household is willing and able to pay for
shelter-related expenses is sufficient to cover the monthly cost of
services. The definition may be written symbolically. If "a"
represents the average propensity to consume housing (the proportion of
monthly income Y a household is willing to spend on it), then a unit of
project housing with service level "j" and monthly costs "C_j" is
estimated to be affordable down the "i"th percentile of the income
distribution if the following is true: $aY_i \geq C_j$. [1]

As an example, consider a project whose costs are such that,
if it were to pay for itself, beneficiaries must be charged $100 per
month. If all households are assumed to be willing and able to devote
20 percent of their incomes to housing (a = 20), then a household must

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[1] In the estimation of "a" it is typically necessary to rely on
measures of monthly rent, whether actual or implicit. When using
the resulting estimates of "a" to assess affordability, one is
concerned with design costs. To fill the bill, the cost concept
used must be (fully amortized) occupancy costs. Occupancy costs
are defined as the total costs (capital charges, taxes, operational
and maintenance costs, utilities charges, etc.) of occupying the
housing unit. "Fully amortized" means that, using credit to the
extent necessary, costs are conceived as a steady monthly charge
over a very extended period (20-30 years).

earn at least $500 per month to afford project housing. If the income distribution is as follows:

Percentile of Population	Y	=	Monthly Income
14	Y_{14}		$490
15	Y_{15}		$500
16	Y_{16}		$508

then the project is affordable down to the 15th (income) percentile of the population.

This example, however, is complicated by the fact that the value of "a" is unlikely to be constant. The proportion of their incomes that households are willing and able to spend may vary in a distribution with mean $\bar{a}_i$ and standard deviation σ_i for the "i"th income percentile. This is because "a" is a function not only of income, but of other variables as well, such as relative prices, family size, sex of household head, assets and certain characteristics of the extended family. In addition "a" may be different for renters (a^R) versus owners (a^O). This type of relationship is depicted in Figure 1, where the solid lines represent loci of means, and the broken ones correspond to a general notion of the proportion of the population that housing policy should try to reach. Thus, in this illustration, the "a" that is chosen (representing either one of the dotted lines) would be set such that no more than say 5 to 15 percent of families would be found in the shaded areas. Conceptually this means that 85 to 95

Figure 1: PROPENSITY TO CONSUME HOUSING BY HOMEOWNERS AND RENTERS

percent of families would choose to join and stay in the projects, their own "a"s being greater than those assumed in the design.

The Bank's interest in affordability has hinged upon avoiding projects that are too expensive for target groups, thus emphasizing keeping standards and costs down. This explains why the affordability criterion says that: cost must be equal to or less than the affordable proportion of income, and why programs of the Bank have stressed the harmful effects of designing projects that target groups cannot afford.

In essence, housing programs and projects with distributional objectives such as the above should reach as far down as possible in the income distribution. They should also be replicable, which requires good cost recovery performance. For this reason there are admissions criteria in projects financed by the Bank, the objectives being to admit "successes" and exclude "failures." However, this is not a simple task. There are possibilities of erring in several ways in these projects, for which lower and upper income bounds usually are set: If the lower bound is set too low, one may admit households that fail -- at high costs to individual projects and the perceived credibility of the approach. If the lower bound is set too high, one will exclude poor households that would have succeeded, and this will compromise distributional objectives. Project designers may sometimes be tempted to set the upper bound too high, so as to ensure adequate demand for project participation. On the other hand, it would probably not be desirable to set this ceiling so low as to totally forego diversity within the project population, or the attendant opportunities for cross-subsidy and market interactions. Although the principles are reasonably

subsidy and market interactions. Although the principles are reasonably clear, as a practical matter, information on which to base efficient decisions about these cut-off levels is thus far in short supply.

At both ends of the income spectrum, but particularly at the lower end, it is necessary to constantly improve the affordability criteria on which judgments are based. Findings to date indicate that to reach the lowest income groups, total income must be carefully estimated and the costs of a project mandated by the public sector kept to a minimum. For this reason progressive development projects are designed to provide large numbers of relatively low quality sites, possibly including core units, rather than a few high quality houses. These steps insure against screening out large numbers of families who, though poor, can afford to improve their housing at least to the modest degree implied by the lower standards.

At the same time, project designers must be careful not to constrain unduly the behavior of households that have both the desire and capacity to do more than the minimum. As we will document in later sections of this paper, the evidence indicates that participants' behavior varies greatly, due to the interaction of a number of forces that sometimes conflict with and sometimes reinforce each other. These include variable incomes, variable investment plans and variable timing of house construction and investment. The range of outcomes is probably accentuated in newly settled sites-and-services areas, where one can see shacks juxtaposed with completed family dwellings, and large houses containing rental accommodations for several people. Even though the extent of this diversity is likely to be reduced in the long run, it is

almost certainly desirable to encourage diversity it in the short run; for it can be a means of moving projects toward the fulfillment of their major objectives. This approach calls for considerable flexibility in credit programs and other project components so that they can address a wide range of the population's needs and capacities.

III. MEASUREMENT CONSIDERATIONS

Calculations on affordability depend upon the way in which each of the components of the inequality is measured. The equation can also be written as

$$a \geq C_j / Y_i$$

An ideal data base would enable an analyst seeking to develop an estimate of "a" for a particular target group in a given society to simply calculate "a" using the present incomes and housing costs actually incurred by the target population, or some sub-sample of it. However, data bases even approaching the ideal are very rarely encountered in reality. For the sub-populations in question, it is frequently the case that, if suitable cost estimates exist, income estimates either do not exist or are for the population as a whole, or for a different sub-sample. On the other hand, if the income data exist, suitable cost estimates may be missing. Not infrequently both kinds of information are missing. In addition, the target population could be a squatter community, or squatters generally; in which case estimating affordability based on what they spend currently might be misleading.[1] In contemplating a first project in such circumstances, one is typically forced to assume an "a" based on a wider sample, or to use an "a" calculated from another sample judged to be similar or

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[1] In most cases it would be misleading. Because of the risk (of eviction without compensation) involved in squatting, rational squatters will invest less in their housing than if they had absolutely secure tenure to the same parcel of land.

comparable. Then the task of designing the project is one of applying this figure judiciously to the incomes obtained or estimated for the target population.

This paper seeks to take advantage of a data base generated by the aforementioned evaluation program to derive more reliable estimates of "a" than are generally possible in field circumstances. [1] While it focuses primarily on the left-hand side of this inequality, a few comments first need to be made about the measurement of C_j.

A. The Measurement of Costs

The crucial question that needs to be addressed is what definition of costs to use. A number of alternatives are possible. As outlined in Figure 2, the direct project costs (C_1) provide only a partial view. Adding the costs (C_2) which households voluntarily incur for materials and labor to complete their houses, is conceptually straightforward but difficult to execute because costs shift both with varying levels of expenditure and a broad range of time periods over which they may be extended. In designing a project, one must estimate or guess what these patterns will be. In the earliest projects, and to some extent still in first projects anywhere, there is little information on which even to base a guess. As experience increases, however, particularly if it is systematically exploited through

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1/ Being designed specifically to this purpose (the assessment of affordability factors) among others, the data generated by the evaluation coordinate information on income and costs for the same sample, are more carefully generated (and therefore of higher quality or reliability) than most data and are generated for more than one point in time.

FIGURE 2:   THE DESIGN OF PROJECT COSTS

where

C_1 = Project Costs (payment for land, services, core house, etc., not
including credit components).

C_2 = Added Materials and Labor Costs (still no credit components).

C_3 = Total Costs ($C_1 + C_2$)

C_4 = Amortized Costs ("True" C, with "ideal" credit system fully
amortizing total costs to a constant monthly payment).

C_5 = Project Costs (Actual costs, with actual credit scheme that
does not fully amortize all costs). 1/

1/   The difference between C_5 and C_4 may be thought of as due to
"inadequacies" in design.

evaluation programs, the basis for sound estimates grows. Ideally the concept used should be that of fully amortized occupancy costs, or C_4 in Figure 2. Project designers may, however, be fully excused for using the "blemished" C_5, as this again reflects the real world in which they must operate; what matters is how close the project -- with its imperfect credit mechanism(s) -- comes to rendering its offering affordable. Unnecessary confusion is, however, caused by using more limited (and misleading) concepts such as C_1, C_2 or some mixture of them.

The other principal consideration, when one is attempting to calculate the ratio of costs to income, is choosing what income definition to use. The crucial point here is that whoever is doing the affordability calculation should be aware what components of income (as well as costs) went into the estimate of "a" which is being compared with the estimates of C/Y. This is examined in further detail below, in the discussion of the definition of Y.

B.   The Measurement of "Willingness to Pay"

We now turn to the left-hand side of the affordability relationship. Until the evaluation and research programs designed to inform the World Bank's policy decisions, 1/ as well as those of some of

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1/   The Bank's formal research program began to achieve significant dimensions by the late 1960s. Research on urban and regional economics has constituted a part of the larger program since 1971. Research on affordability in housing has been a part of this program since 1972/3. It has been carried out both under formal research projects and under the evaluation program which gives rise to this paper. There is a variety of publications available on urban development. For details see The World Bank Catalog of Publications 1983 and The World Bank Research News both available free of charge.

its client agencies, [1] had been in operation long enough to generate

appropriate data bases, rigorous estimates for "a" virtually did not

exist. Policy formulation and project design necessarily relied upon a

very few, opportunistically located data sets, and arbitrary judgments

concerning the stability of relevant parameters across geographical

boundaries and income levels initially had to be made in the interest of

getting the learning by doing process underway.

Grimes was one of the first to collect information for devel-

oping countries. [2] Using aggregate data, he concluded that:

> the average percentage of household expenditure
> devoted to housing ... falls into a fairly narrow
> range (across cities), from 11.7 percent in Kingston
> to about 20 percent in Mexico City and Seoul.[3]

However, in looking at some rough and strictly non-comparable

government micro-level data for five countries, Grimes also found that:

> The fragmentary data available on expenditure by
> various income groups ... indicate a general tendency
> for housing expenditure by low-income households to
> claim a higher than average share ... As income rises
> and other demands are met, the share of income devoted
> to housing may remain constant or fall. [4]

By the second year of the evaluation program it had been

determined not only that the progressive development model was viable

(in the sense that housing was being completed and occupied, or up-

graded, according to the case), but also that the "first generation"

1/ The Fundacion Salvadorena de Desarrollo y Vivienda Minima, or
    FSDVM, on whose project and data this paper is based, initiated its
    own evaluation program before the Bank did.

2/ Grimes, O. F. (1976). Housing for Low-Income Urban Families:
    Economics and Policy in the Developing World. Baltimore: Johns
    Hopkins, p. 65.

3/ Ibid., p. 65.

4/ Ibid., pp. 65-67.

projects being supported by the Bank were also affordable and consistent with Grimes' findings. Based on initial, detailed evaluation of one sub-project in the city of Santa Ana, the larger El Salvador project appeared to be affordable down to about the 20th percentile of the income distribution. [1] Despite measurement difficulties, this result seemed to be borne out as well by the evaluations in Senegal and Zambia, and to be broadly confirmed by other project experiences up to that time.

These generally encouraging results were subject to more than one interpretation among the project managers, researchers, and institutions involved. For example, the precise results in the case of El Salvador showed that, assuming an average propensity to consume housing of 20 percent, direct project costs (C_1 of Figure 2) were affordable to those with incomes down to the 17th percentile. However, if crude estimates of additional private costs were included, it appeared that total costs ($C_1 + C_2$, partly "amortized to approximate C_4) might be affordable only down to the 25th percentile of the income distribution. Such calculations suggested that assessing affordability was a matter of greater complexity than had been assumed in the original project design and appraisal. More important, they illustrated the importance, that has been stressed here, of being clear about the cost and income definitions used and of obtaining direct estimates for "a".

1/ Bamberger, Michael, Edgardo Gonzalez-Polio, and Umnuay Sae-Hau, "Evaluation of Sites and Services Projects: The Evidence from El Salvador," World Bank Staff Working Paper No. 549, 1982.

By the time an adequate data base had been accumulated, it was found that the implied values of "a" assumed in the first generation of urban projects financed by the Bank had been distributed about the upper end of the narrow range described by Grimes. An internal analysis of 36 projects approved from 1972 through 1979 by the Executive Directors of the World Bank recorded extreme values for "a" of 8 and 50 percent. However, the bulk of observations was approximately normally distributed about a mean of 20 percent, within a range of 12 to 33 percent. This reflected a number of differing circumstances encountered in the field -- ranging from differences in available data to differences in what it was hoped projects would achieve.

What is most striking about these figures, however, is the large variation in a parameter previously considered by most to be quite stable. And, although obtaining more accurate estimates of "a" was only one of the several complementary goals of the analysis of affordability under the evaluation program, several questions regarding this parameter must be answered in order to gauge its value as an operational tool. Is the value of "a" constant (or close to it) across various income groups of the target population? In most of these early projects, Bank staff assumed that "a" was fixed across all income levels. In some projects (Ivory Coast, El Salvador, Thailand, Botswana, and Brazil) it was tacitly assumed that "a" rises with income. The first project in Bolivia apparently assumed the opposite tendency. The divergent assumptions naturally lead to the next two questions: If "a" is not constant, how does it vary with income? How sensitive is "a" to the definitions of housing expenditures and income? While we will attempt

to answer these questions in Section IV, in the rest of this section we will focus our attention on measurement issues.

In the estimation of "a" we must typically rely on measures of income (Y) and actual housing expenditures or rents (R), so that

$$a = R/Y \ .$$

This can be viewed as the average propensity to consume housing services over a given period. The problems in estimating this value are complicated by the non-homogenous nature of housing, by the uncertainty and variability of personal income in poor countries, and by the heterogeneity of the population itself. [1] The problems dealt with here concern definition and measurement of, first, the income (Y) and, then, housing expenditures (R) of a prescribed segment of a market or population.

Income in the Measurement of "a": To minimize the risk of measurement errors, ambiguities in definition must be removed; the ambiguities which are most pronounced are those involved in determining whose incomes and what sources to include. In early project design as well as research efforts, a developed-country bias crept in, resulting in a tendency to think only, or primarily, of the household head's wage income, since that was judged to be the most stable component of total household income. A number of studies have since led unambiguously to the conclusion that this assumption brings about serious underestimations and distortions of household incomes.

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[1] This is important, because in project design it is frequently necessary to employ estimates of "a" which come from sub-populations different from those to be "treated" in the project.

Programs too have admitted a wide variety of definitions of income. In some, such as the Zambia project, income comprises solely the earned (labor) income of the household head; in others, the earned (labor) incomes of all family members have been included; and still others have counted the family's total income from all sources. The distinction is important, because total income can be twice as great on average as the labor income of the household head. 1/ Income, moreover, fluctuates significantly during the year and over the family life cycle, and these fluctuations influence the perceptions families hold regarding their access to resources for housing investment.

There is also the problem of measurement accuracy. The evaluation program has established even firmer evidence than had been collected before that, in addition to the sources of error typically associated with income estimates from socio-economic surveys, some families purposely distort reported income. Among the many potential reasons for this are some directly associated with projects; for example, some families may claim that their incomes are less than they really are so as not to be considered too well off to join the project,

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1/ This variation in definitions implies that estimates of "a" can differ by at least a factor of 2, based on this factor alone. On this basis alone, there would seem to be a strong case for consistency in the way incomes are measured or assessed, as in defining and measuring occupancy costs and in most other aspects of this work. This, of course is not always possible, given variations in data and other circumstances. Still, it indicates that -- in the absence of data we want -- it may be better to estimate data according to consistent principles rather than to accept actual data gathered according to inconsistent ones.

while others may claim a higher income in order not to be considered financial risks.

Obviously, program affordability definitions, based as they have been in the past on particular sources and definitions of income, have affected the degree to which low income households can participate in projects. With respect to income, exclusion can occur because projects' regulations may require participants to have certain verifiable kinds of employment, as in the formal sector alone; may consider only the earnings of certain household members, such as the head; or, indeed, may limit the income definition to earnings.

As an example of an important type of exclusion in many projects up to now, let us consider transfer income. Evidence from the evaluations in El Salvador, the Philippines, and Senegal, as well as from a related investigation in Cartagena, Colombia, shows that inter-household transfer payments within the extended family constitute an important source of income, and this source is most important for the lowest income families. In Santa Ana, El Salvador, for example, recurrent transfers have been found to augment the incomes of roughly one-third of the families living within the "informal" housing sector, including 58 percent of those in the lowest and 48 percent of those in the next lowest deciles; 1/ and transfers in that city represent a stable source of approximately 40 percent of household income for these

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1/ The average monthly amount transferred is 86 colones (US$34.40) per
     recipient.

these two deciles, as opposed to 10 percent for the total sample.
Similar patterns appear to hold among the project area populations in
the Tondo area of Manila, the Philippines, and in the South Orient zone
in Cartagena, Colombia. In Tondo, 43 percent of families in the lowest
third of the income distribution, as opposed to 21 percent of the total,
receive transfers accounting for over half their incomes. In the
Cartagena project area the corresponding figures are 50 percent, 32
percent and 41 percent. Total income, therefore, rather than the wages
of primary or secondary earners, appears to be a more appropriate
measure of the sum of a household's disposable resources and inherent
purchasing power.

There is still considerable resistance to this last idea,
however, and most affordability and demand estimates to date have been
made on the basis of earned income sources only. The disputed practice
persists partly as a matter of definition, and partly due to the added
difficulty of obtaining reliable information on gifts and transfers.
One argument has been that unearned income should not be considered when
estimating affordability, because such income is subject to the whims
and tribulations of others, and is therefore unreliable. Recent studies
have indicated, however, that transfers, particularly within the

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1/   See, for example, Kaufmann, Daniel, "Social Interaction as a
      Strategy of Economic Survival Among the Urban Poor: A Theory and
      Evidence," Unpublished Ph.D. Dissertation, Harvard University,
      1982. The sample studied consists of 181 participant and 320
      control group households in Santa Ana. The information on these
      families is also consistent with that from an earlier survey in
      Belo Horizonte, Brazil. (See, for example, Anna Maria Sant'Anna,
      Thomas W. Merrick and Dipak Mazumdar, "Income Distribution and the
      Economy of the Urban Household: The Case of Belo Horizonte", World
      Bank Staff Working Paper, No. 237, June 1976.)

extended family, are regularly received and thus not only an important

but also a <u>stable</u> component of household income among low-income urban

families in developing countries. Moreover, it appears that transfers

may be allocated in a compensatory manner, to help the most impoverished

families meet their basic needs. 1/

Transfers are sensitive to household composition and

employment status, as well as to shifts in individual incomes. In

studies conducted to date (in Colombia, El Salvador and the

Philippines), female-headed households receive more and larger transfers

than male-headed ones, 2/ and households headed by unemployed workers

are more apt to receive transfers than those headed by working

members. These transfers are progressive: most of the net transfers

are to the lowest 65 percent of the income distribution. The relatively

few net givers falling in this lower segment of the population are

concentrated between the 40th and 65th percentiles from the bottom, with

transfers again flowing toward poorer families. The transferred funds,

moreover, are often "earmarked" for basic needs expenditures, a further

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1/ Hypotheses about the motivation for transfers include the
proposition that an underlying "contract" exists by which the
better-off households provide resources to less well-off households
until basic needs criteria are met. These "exchangers" might even
reverse roles, moreover: transfer givers may become transfer
receivers if income or wealth among extended family members is
shifted. In general, the motivation for transfers does not seem to
be only utilitarian, which would posit a more continuous transfer
relationship across the income spectrum, nor does it appear to be
based on altruistic motives, since the income differential between
givers and receivers is at times very small. Ibid., Ch. 2,3,4.
2/ In the Santa Ana sample, 60 percent of female-headed households, as
opposed to but 25 percent of male-headed ones, received trans-
fers. These transfers constituted more than 40 percent of income
for more than a quarter of female-headed households. Ibid, p.12.

reflection of the "social contract" attached to the transfers between kin-linked households. For many reasons, then, the very existence of the transfers and the characteristics of receiving households demons- trate that social equity objectives will not be well served by shelter programs if eligibility is based on earnings alone rather than on total income.

It is evident that the precise definition of the components of income is crucial in making the affordability calculation. We suggest, based on the research described above, that the total household income -- including the incomes of all family members from all sources -- is the appropriate definition to use. There is, however, a more subtle definitional issue that also needs to be settled. It stems from an hypothesis popularized by economists like M. Friedman and A. Modigliani that households do not base their consumption decisions on their current intake of income. [1] If they did so, they would cut back consumption, not only of housing but of all other commodities, when times are unexpectedly lean and increase it, when there is windfall income. The permanent income hypothesis postulates that, in a world where households can borrow and lend freely (e.g., in the form of savings accounts), they can protect themselves from fluctuations in consumption even though income is varying. [2] Households thus calculate what they believe to be that component of their income which is stable or permanent and base

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1/ See, for example, M. Friedman (1957), A Theory of Consumption,
    Princeton: University Press.
2/ Based on the level of income/consumption and access to formal
    and/or informal credit sources, this ability to maintain
    consumption levels is of variable longevity.

their consumption decisions on that. In the life cycle variant of this hypothesis, households smooth out their entire lifetime consumption, so that there are not discrete jumps in consumption upon entering the labor force or upon retirement. In its present form, this theory predicts that a household would make an implicit calculation of the present value of its stream of future lifetime earnings and form a consumption plan in accordance with that stream. A practical way to estimate "permanent income" is to assume that households take past income, adjusted for a trend and expectations, as a good predictor of permanent income. Thus, an average of incomes in past years (which may be weighted, depending on the discount factor) would seem to be a good proxy for permanent income.

Nevertheless, formidable measurement problems persist, so we must again distinguish between what is desirable in establishing standards in a research or evaluation program, and what is feasible or practical in an operational setting. Available data sets are typically one-time household surveys which provide bases neither for averaging nor for adjustment, let alone for purposes of estimating permanent income. Thus, strictly from the standpoint of measurement accuracy, the World Bank evaluation program enjoys two tremendous planned advantages in this respect. First, surveys are repeated to give at least three readings at one to two year intervals. Second, an unprecedented survey in the Philippines followed incomes and expenditures of a small sample of households over a three-year period, enabling detailed observations concerning variations in income over time, changes in the composition of income and relationships with other variables. Such observations are very useful in the formulation and refinement of hypotheses.

There is, however, competition here between measurement
accuracy and practicality, which is analogous to that regarding cost
concepts discussed earlier. Policymakers and project designers seldom
have more than one good data set, if that, at their disposal. They are
thus faced with two practical alternatives: (a) to estimate "a" using
current income and apply it to current income measures or estimates; or
(b) to estimate "a" using permanent income and apply it to consumption
expenditure, as a proxy for permanent income, or even to estimate "a"
using this proxy, as has been done by some analysts. 1/ Which approach
will produce the best or most cost effective results is a question to be
answered only as empirical evidence accumulates. 2/

Remaining measurement problems relate to capturing accurately
all income sources for all persons within a household. These problems
include failure or refusal (by the "counters") to record all the
sources; difficulties attendant on collecting unearned income
information, such as lack of recall and concealment; and complications
caused by such social arrangements as polygamy. There are several
likely causes of data unreliability. One is the impossibility of
accounting for fluctuations in incomes in one-time surveys. Another is
the informants' possible ignorance of total income sources, whether due

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1/   See, for example, Follain, J., B. Renaud and, G. C. Lim, "The
     Demand for Housing in Developing Counties: The Case of Korea,
     Journal of Urban Economics", 7:313-336 (1980).

2/   Recent analysis using the El Salvador data base indicates that the
     permanent income hypothesis may be weaker in developing countries
     where capital markets are far from perfect and where windfall
     income may thus have an impact on consumption (see E. Jimenez and
     D.H. Keare, "Housing Consumption and Income in the Low Income Urban
     Setting: Evidence From Panel Data in El Salvador", Journal of
     Urban Economics, (forthcoming).

to poor record-keeping, secrecy of other family members, or inability to

reckon the effects of such activities as self-help construction or the

family's raising of its own food. Then there is the possibility of

outright fabrication of figures, perhaps to meet project criteria, to

avoid purveying information that might reach the tax collectors, or

simply to get rid of the interviewers. Such problems have consistently

plagued analysts attempting to obtain accurate estimates of income.

Though the difficulties are real, they are often exaggerated by

practitioners and researchers uncomfortable with quantification. Much

is now understood about all aspects of sampling, surveying and cross-

checking; and experience has shown that acceptable results can be

obtained with careful, cost-effective application of this knowledge.

Housing Expenditures in the Measurement of "a": In gauging or

estimating housing expenditures, or the value of housing services

consumed during a year, the first problem is to be clear about what is

being measured. This is a relatively straightforward matter where

renters are concerned. The rental charge is usually unambiguous and

consistent, although there are practices (particularly where rent

controls are in vogue) such as "key money", surreptitious payments, and

excess charges for certain services, that make the calculation more

elaborate. 1/ The task is considerably more difficult for owners, since

there is seldom any summary measure of housing expenditures over a given

period, such as a month. For low-income households, self-help in house

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1/ A colleague has also advised us of instances -- presumably depend-
    ing on particular market conditions -- of landlords behaving, at
    least in a limited sense, as "discriminating monopolists" and
    relating rental charges to tenants' incomes.

construction complicates the issue further, as one must also place a value on non-purchased inputs such as family labor and scavenged materials.

There are two ways of approaching this problem. One is to bring all costs down to an estimate of monthly occupancy cost. For a host of reasons, this figure is difficult to estimate accurately. [1] Thus a second, easier method is more often relied upon. This approach entails asking the owner two questions: What would you sell your house for? and what would you rent it for? It is assumed that, if inflation exists, the respondent is equally aware of it in answering both questions, and that money illusion therefore does not affect the results. Recent evidence shows that the answers to these questions, when provided by low-income households, are accurate representations of value. Research performed using the Philippines data base, for example, showed that, on average, squatter dwellers had the same estimate of value of their dwellings as a professional appraiser. [2]

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[1] The appropriate conceptual approach, however, is clear and has been presented above, pp. 11-13.

[2] See Jimenez, Emmanuel, "The Value of Squatter Dwellings in Developing Countries," Economic Development and Cultural Change, July 1982.

IV. HOUSING CONSUMPTION IN EL SALVADOR
AN EMPIRICAL EXERCISE

We hope to illustrate in this section the effects of these

measurement considerations using data from El Salvador. [1] We will show

how sensitive measures of "a" are to the definitions used. We will then

attempt to answer some of the questions raised earlier about the factors

which determine "a".

The data for this analysis have been collected in El Salvador

as part of the evaluation program. They consist of responses to

extensive socio-economic questionnaires applied in 1977, 1979, and 1980

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[1] The El Salvador sites and services project was one of the first
shelter projects to be appraised by the World Bank. The Appraisal
Report, published in 1974, stressed the existence of a large and
increasing housing deficit which the small and fairly costly
government housing programs were not able to resolve either
numerically or in terms of providing units which were economically
accessible to the urban poor. Given this increasing deficit and
the inability of existing programs to generate sufficient new units
or to produce them at a price affordable to the low-income
population, the objectives of the project were to demonstrate that
a sites and services program with partially built units is a
practical alternative to conventional fully-built Government
housing programs; ease the severe shortage of low-cost urban
shelter; demonstrate the potential role of the private sector in
providing self-financing, low-income housing; encourage provision
of adequate community facilities; and generate employment. The
project, to be implemented through the Fundacion Salvadorena de
Desarrollo y Vivienda Minima (FSDVM) would consist of the following
components: approximately 7000 lots serviced with water, sewerage,
storm water drainage, unpaved streets, footpaths and optional
electricity; approximately 7000 sanitary units and 3500 basic
dwellings; off-site infrastructure, consisting of water
distribution and sewer mains and the upgrading of access roads;
financing for a materials fund designed to induce self-help
extension of core units; community facilities; small industries
loans; and training and technical assistance.

to samples of approximately 260 households in each of two cities, Santa

Ana and Sonsonate (The number of families varied with attrition over

time.). These comprised the control groups for the evaluation; that is,

families continuing to live in one of three types of housing: rental

rooms in mesones, quasi-legal dwellings in colonias ilegales, and

illegal dwellings in tugurios. Mesones are rental tenements of from

five to fifty rooms, typically clustered around a central patio, where,

among other things, cooking, bathing and sanitary facilities are

located. In colonias ilegales, legal owners sell plots to legal

purchasers who then build houses on them. These subdivisions, however,

do not meet subdivision codes, and the homes built there may not meet

building codes. Tugurios consist of groups of shacks and hovels thrown

together in rights of way, arroyos, and other undesirable locations. [1]

It appears that estimates derived from data on these families

will prove superior to those previously available to guide project

design. Measurement of income and housing expenditures has been more

complete and accurate in this case than in most other comparable

surveys. The richness of the survey also enables researchers to control

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[1]   As of 1975, when this program got underway, these three types of
       housing (termed vivienda popular) sheltered from 56 to 75 percent
       of the populations of El Salvador's five principal cities. Mesones
       accounted for the bulk of the population living in such housing --
       ranging from 53 percent in San Salvador up to 77 percent in Santa
       Ana and 85 percent in Sonsonate. Colonias ilegales were the most
       variable component, accounting for almost 40 percent of the
       population living in vivienda popular in Usulutan and a third in
       San Salvador, but only 13 and 20 percent in Sonsonate and Santa
       Ana, respectively. Tugurios constituted a significant share (14
       percent) of such housing only in the capital city of San
       Salvador. Fundacion Salvadorena de Desarrollo y Vivienda Minima,
       "La Vivienda Popular en El Salvador, Vol.1, San Salvador, 1976.

for several socio-economic characteristics in the analysis. In
particular, it will be possible to estimate the differences in the
effects of various components of total income, which may be as important
as the wage income of the household head in determining the purchasing
power of poor families. Further, the nature of the panel data permits
estimates to be made using an approximation of permanent income not
previously applied.

A.   Estimates of the Propensity to Consume Housing:

          Calculations of "a" in each of the three survey years for
Santa Ana and Sonsonate indicate that even the simplest reckonings of
the average propensity to consume housing, made with carefully generated
data, are far from straightforward. For example, the average propensity
to consume housing appears to have declined over the four years in
question. 1/ If true, this finding implies a more rapid increase in
nominal incomes than in nominal rents during this period. This
inference is called in question, though, by the considerable
discrepancies in the annual rates of change of the various income
components over the period. Here is another instance of the liability
to make mistakes in affordability calculations. This liability exists
even in cases such as these, where the samples have been carefully drawn
and the surveys are of high quality. Given that this is so, it is
better to rely on a few sound estimates, rather than to proliferate
crude ones.

1/   This is apparent in the annual survey results, which are not
     reproduced here.

Table 1: THE AVERAGE PROPENSITY TO CONSUME HOUSING (SANTA ANA)
OWNERS AND RENTERS, 1980

	Whole Sample*	Renters	Owners
$a_1 = R/Y_{WH}$	.20	.17	.39
	(.33)	(.22)	(.64)
$a_2 = R/Y_{WT}$	.12	.09	.27
	(.24)	(.06)	(.57)
$a_3 = R/Y_{TT}$	.10	.09	.16
	(.07)	(.05)	(.22)

* Weighted average

Notes: R = actual montly rental payments for renters;
imputed values for owners.

Y_{WH} = wage income of household head

Y_{WT} = wage income of entire household

Y_{TT} = total household income from all sources, including
imputed rental income for owner households.

Table 2: THE AVERAGE PROPENSITY TO CONSUME HOUSING (SONSONATE) OWNERS AND RENTERS, 1980

	Whole Sample*	Renters	Owners
$a_1 = R/Y_{WH}$	.18	.15	.34
	(.18)	(.15)	(.27)
$a_2 = R/Y_{WT}$	.13	.12	.22
	(.12)	(.11)	(.14)
$a_3 = R/Y_{TT}$	.10	.10	.15
	(.07)	(.07)	(.10)

* Weighted average

Notes: R = actual montly rental payments for renters; imputed values for owners.

Y_{WH} = wage income of household head

Y_{WT} = wage income of entire household

Y_{TT} = total household income from all sources, including imputed rental income for owner households.

FIGURE 3

Average Propensity to Consume Housing, by Income Decile:
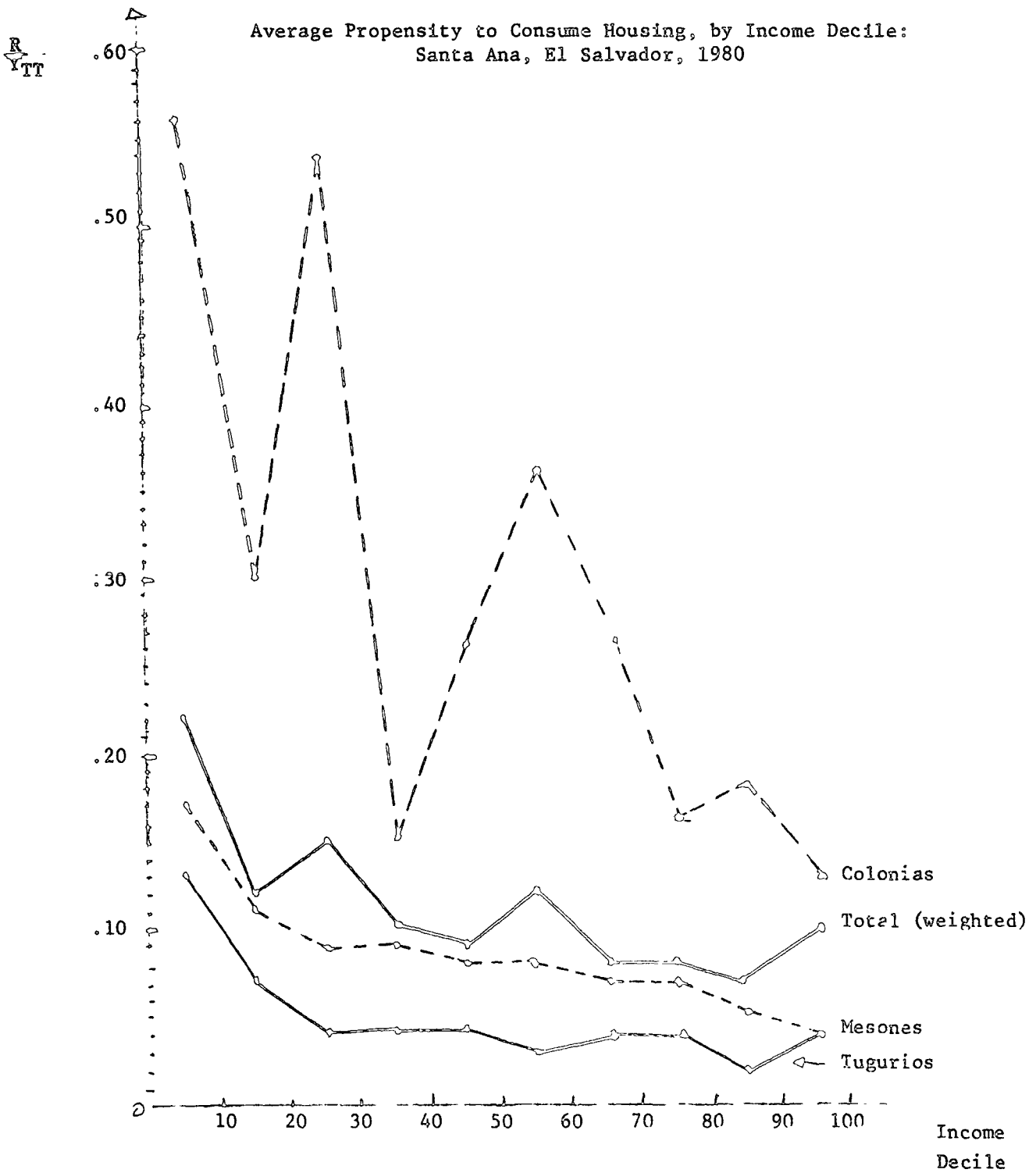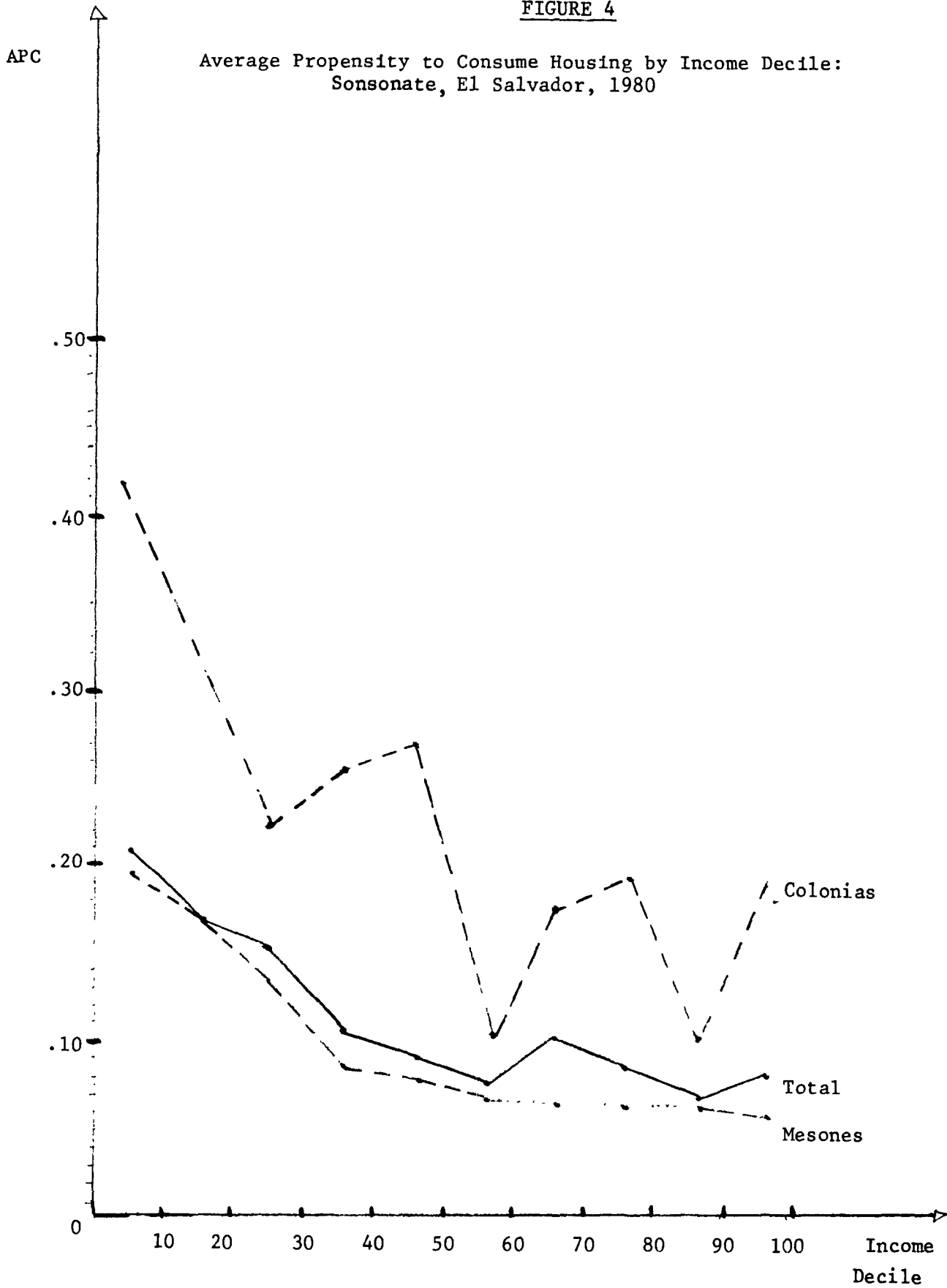Santa Ana, El Salvador, 1980

FIGURE 4

Average Propensity to Consume Housing by Income Decile:
Sonsonate, El Salvador, 1980

Tables 1 and 2 provide results for all low-income dwellers in the Santa Ana and Sonsonate surveys, incorporating owners by imputing a rental value to their homes. This imputed rental value is then added to the total income of the owner households (Y_{TT}), since this is implicit rental income for owner occupiers.

The general result is that owners exhibit a greater average propensity to consume housing than do renters. Further study will be needed before confident statements can be made concerning either the magnitude of, or the reasons for, this difference. [1] Generally speaking, however, the difference is thought to result partly from definitional ambiguity, [2] in part from data problems (the imputation of rental values to owners) and in part from real behavioral differences. [3] Future studies will be most concerned with these behavioral differences.

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[1] Such study is underway in a World Bank Research Project on "Housing Demand and Finance in Developing Countries". Among other things, the study, which was begun in mid-1981, will estimate demand for housing by owners and renters in about a dozen countries. In most countries, at least two cities, and in three countries, several cities, will be covered.

[2] This refers principally to the extent to which owners' housing outlays are, as with renters, for their own housing consumption, as opposed to the creation and maintenance of rental or business accomodations, or other investment purposes.

[3] Theory tells us, that, if all households were alike (which, of course, they aren't) and face identical unit prices, no such differences would exist. In the real world, however, we would expect differences to exist for at least the following three reasons: (1) Part of owners' (apparent) consumption of housing services is to lease space to renters. (2) Owners probably also view housing, in part as an asset to hold. (3) Households differ in other respects -- e.g. family size and age -- than household income.

Another result which is evident in Tables 1 and 2 is that the value of willingness to pay alters drastically, depending upon what type of income is considered. For both cities, and for renters as well as owners, simply considering the wage of the household head will lead to a value of "a"(a_1) which is almost double that which is calculated using total income (a_3). Again, the lesson is that definitions often matter greatly.

It has often been assumed that the average propensity to consume varies systematically with income. Figures 3 and 4 generally confirm the downward trend hypothesized by Grimes five years ago.[1] This is so despite certain shortcomings of the data: the relatively small size of the sample generates extreme values for a few cells, particularly for the stratifications by residential type; and, as with all other studies of this type, this phenomenon is most marked--and the results correspondingly least certain--for the lowest 2 to 3 deciles. [2] Notwithstanding these shortcomings, the following results happen to be unambiguous: First, for both Sonsonate and Santa Ana, the total sample values decline, from .21-.22 for the bottom decile, quite abruptly through the first three deciles, and then fluctuate in a narrow range between about .10 and .08. Second, the stratified sub-samples adopt a similar pattern.

1/ Grimes, op. cit.
2/ We know very little about housing market behavior among those in the lowest two or three deciles. It is one of the aims of the aforementioned Research Project to improve our understanding in this area.

These trends appear clearly in the figures. [1] It should be
noted, though, that they reflect only this particular stratification of
data according to income, the observations having been grouped by tenure
type. A rough stratification of the data according to housing quality
alone reveals that the trend could look quite different:

	Average Total Income	a_3
Tugurio	₡ 320 per month	.06
Meson	₡ 470 per month	.07
Colonia	₡ 724 per month	.19

Failing to note that this result is produced by stratifying according to
tenure type, one might be led to hypothesize -- in error -- that the
propensity to consume housing increases, rather than decreases, with
income. Thus, it is crucially important to consider micro-level data
which are not stratified--or, alternatively, where the implications of

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[1] These findings from El Salvador confirm those of similar studies in
the U.S., Korea and Colombia (See Mayo, S. K., "Theory and
Estimation of the Economics of Housing Demand", Journal of Urban
Economics, 10:95-116 (1981); Follain, J., B. Renaud and G. D. Lim,
op. cit.; and Ingram, G. K., "Analysis of Housing Demand in Bogota
and Cali", paper presented to the Meetings of the Eastern Economic
Association (Philadelphia). While the treatments are not strictly
comparable, because the studies of Colombia and Korea had as their
samples the entire urban populations of Bogota and Cali, Colombia,
and of Korea, respectively, they have all found that the average
propensity to consume housing declines with income. We have found
that this declining trend is most pronounced for the lowest three
deciles of income, and is imperceptible for approximately the
highest three deciles. The latter phenomenon is of little interest
in the planning of housing projects for the urban poor. However,
as indicated, a more precise appreciation of the lowest deciles'
behavior is of considerable importance and will be the subject of
further study.

Table 3: SANTA ANA

RENT/INCOME RATIO (APC) FOR HOUSEHOLDS BY INCOME CLASS

	1976	1979	Renters	1980	Owners
0 - 10%	.3843	.2281	.1723		.1964
10 - 20	.1442	.1213	.1110		.2236
20 - 30	.1338	.1009	.0833		.1194
30 - 40	.1296	.1293	.0970		.2169
40 - 50	.1005	.0640	.0862		.1114
50 - 60	.1062	.1055	.0816		.1554
60 - 70	.0815	.0593	.0821		.2211
70 - 80	.0811	.0739	.0699		.1310
80 - 90	.0547	.0642	.0529		.1249
90 - 100	.0339	.0490	.0524		.1206
Total	.1140	.0894	.0862		.1561
	(.114)	(.061)		.0967	
				(.073)	

Table 4: SONSONATE

RENT/INCOME RATIO (APC) FOR HOUSEHOLDS BY INCOME CLASS

	1976	1979	Renters 1980	Owners
0 - 10%	.2794	.2033	.2432	.2941
10 - 20	.1496	.1080	.1698	
20 - 30	.1269	.1120	.1409	.1745
30 - 40	.1461	.0712	.0930	.1705
40 - 50	.1022	.0893	.0777	.2112
50 - 60	.0758	.986	.9786	.0902
60 - 70	.1051	.0616	.0690	.1710
70 - 80	.0707	.0557	.0583	.1233
80 - 90	.0588	.0714	.0669	.0979
90 -100	.0316	.0382	.0601	.1830
Total	.1118 (.097)	.0816 (.052)	.0978 .0963 (.073)	.1479

APC SANTAANA OWNERS 1980

FIGURE 5

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APC SANTAANA RENTERS 1980

FIGURE 6

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FIGURE 7

CURRENT INCOME (Y)

RATIO OF HOUSING EXPENDITURE TO Y

APC SONSONATE RENTERS 1980

- 43 -

the strafications chosen have been very carefully considered—in order to discover the true underlying relationships. [1]

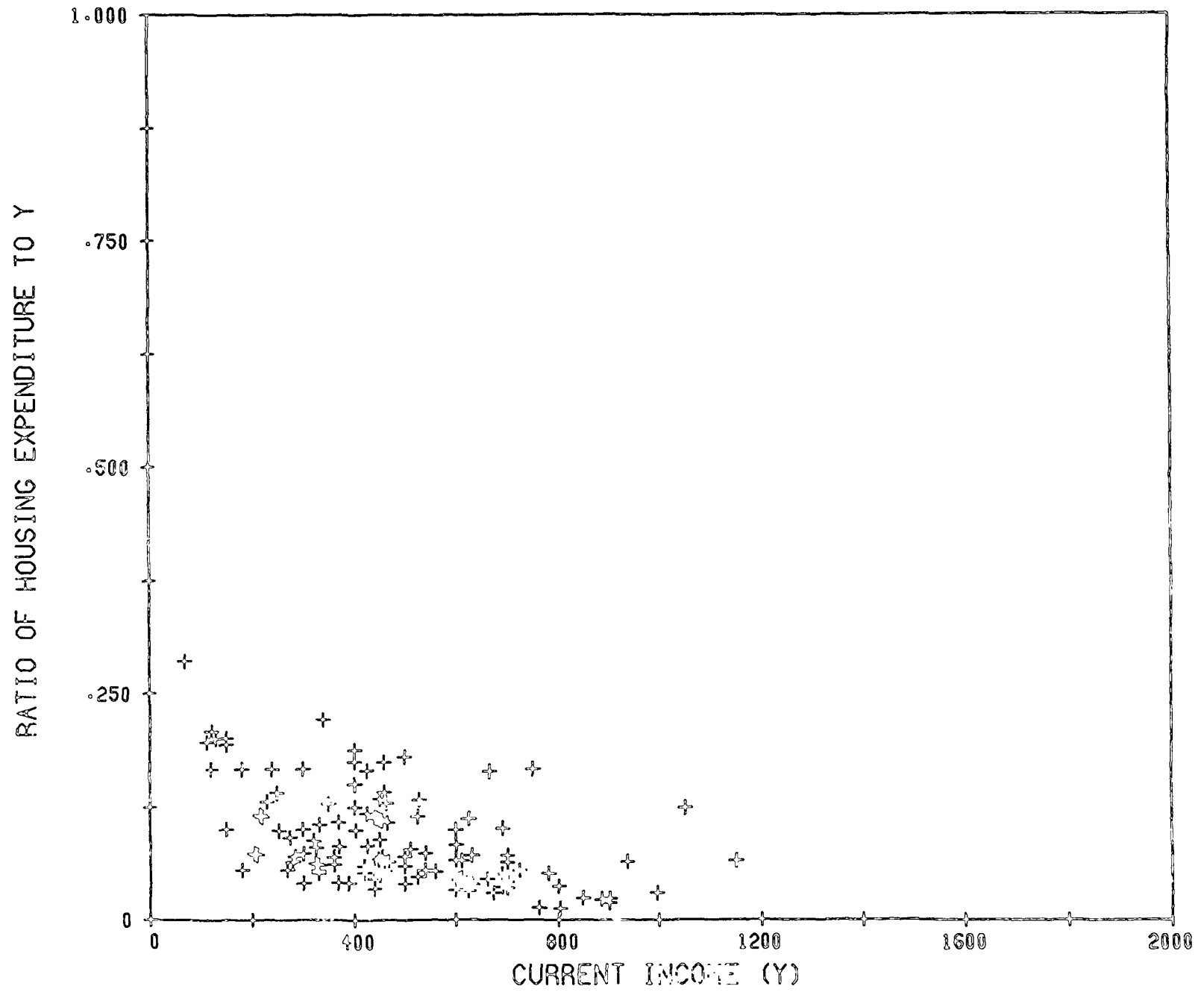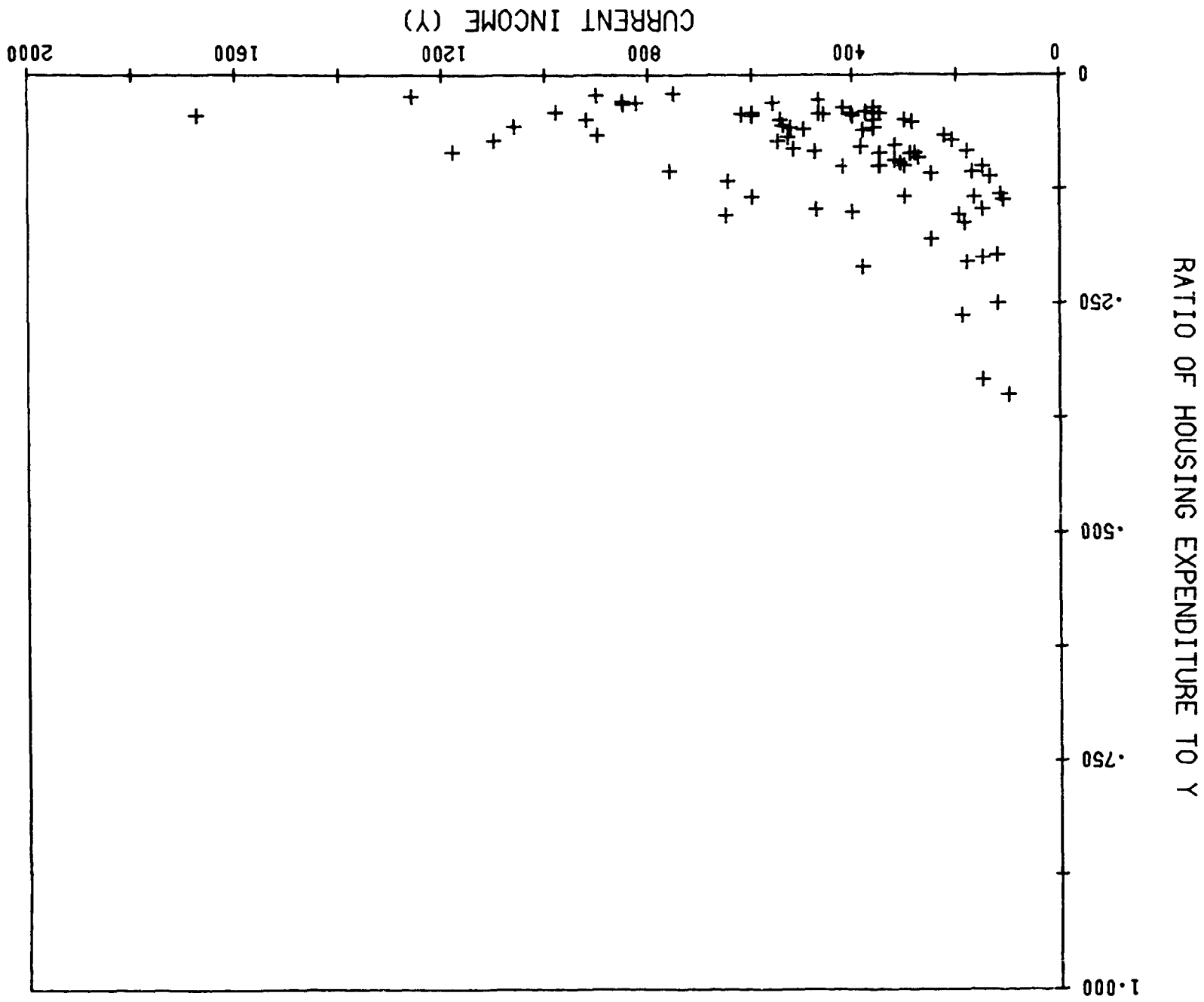Thus, for most purposes, simple stratification into owners and renters, as in Tables 3 and 4, will suffice. It is, however, also important to note the differences among households, as is most evident in the scatter diagrams of Figures 5 - 7. Although the general trend is somewhat obscured, these diagrams highlight the tremendous differences in consumption (at given income levels), particularly at low levels of income and most notably among owners.

Because of these differences, families should never be consigned to live permanently with their relative priorities of the moment, nor forced to adopt new priorities (different "a"s) precipitously. For example, in a project designed for a target population consisting of a large number of renting families with representative incomes but low (ex-ante) "a"s, the use of standards based on owners' behavior (i.e., higher implied "a"s) will result in a large percentage of these families being designed out of the project. There are basically two ways of avoiding this outcome. One is to attempt to design the potentially excluded families into the project as owners by setting base standards very low. The other is to attempt to design them in, as continuing renters, by setting higher standards but providing specific rental components or incentives. Usually a mix of strategies should be employed.

1/   For a more complete treatment of this subject, see Ingram, op.cit.

Given that our measure of affordability varies with so many
factors, an average value of "a" is at best a very rough guide to the
other factors in project design. An average figure, rigidly adhered to,
will pose problems both for households with a low "a" whose income is
adequate, and for those whose high "a" would offset a low income, in an
unrestricted situation. Since what the data show, particularly at low
levels of income, tends to be obscured by the use of averages (some
families spending next to nothing on housing, and other spending a great
deal), the most desirable approach, if it can be implemented, will be to
generate an expected rent profile for a given population's income
distribution, as in Figure 1. Projects should then be designed to
eliminate only the bottom (say, 5 to 15 percent) of this profile, where
all factors are taken into consideration. This premise argues in favor
of projects with options, and with the lowest-cost options providing
very low entry costs, but also the opportunity to add substantial
amounts of investment. This is the opposite of what most public designs
of low income housing $\underline{1/}$ offer, but it is precisely what the private
markets provide, albeit usually in an illegal or quasi-legal fashion.

B. The Determinants of Housing Consumption:

This section will attempt to explain what determines housing
consumption by controlling for the many factors which seem to affect it,
since it is apparent that there is no simple relationship between
housing consumption and income. The basic methodology used is
multivariate analysis. In particular, the objective is to estimate the

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$\underline{1/}$ Though not those financed in part by the World Bank.

Table 5:

International Comparison of Major
Housing Demand Parameters

	Follain Lim and 1/ Renaud	Ingram 2/ Log-log	Ingram 2/ Linear	
Income Elasticity of Demand	.6	.78	.35 to 73	Rises with income Rises with city size
Owners	.6			
Renters	.4			
Price Elasticity of Demand	-.2 to -.3 3/	-.86	-.63 to 0.85	Rises with income
Elasticity of Housing Consumption/Expenditure with Respect to:				
Family Size	.13 to .19 4/	.13	.12 to .28	Falls with income
Age of Head	n/a	.14	.07 to .23	Falls with income
Sex of Head	n/a	-.16	-.07 to -.16	Falls with income
Mean Income ($)	$1872			
Year	1972			

1/   Permanent income (consumption) equations only; national and/or sub-groups; log-log
2/   Household income
3/   -.60 to -.67 for cities other than Seoul
4/   Higher for current income and renters

role of various income measures on housing consumption, while holding

constant such parameters as household size and other demographic

characteristics, as well as whether the household is a renter or

owner. This analysis is related to the empirical literature on housing

demand, under the assumption that prices are held fixed.

The housing demand literature has been reviewed, for developed

countries, by de Leeuw, [1]/ and more recently by Mayo. The general

conclusion is that "for a wide range of analyses employing different

data bases and methodologies, the permanent income elasticity of demand

for housing is estimated to be well below one on average. Studies that

have used data based on individual observations universally produce

estimates below unity for both renters and owners." [2]/

The previously cited papers by Ingram (1980) and Follain,

Renaud, and Lim (1980) provide the first rigorous attempts to conduct

housing demand estimation in developing countries. The latter analyzed

data collected in 1976 in Korea for the regular Family Income and

Expenditure Survey, and a Special Housing Survey. Ingram has used data

collected in Bogota, Colombia in 1972, as part of the Bogota Phase II

planning exercise, and in 1978 as part of a subsequent major research

project conducted by the World Bank and Colombian collaborators. Both

studies are free from the aggregation and specification biases that had

plagued many earlier studies in the United States. The approaches taken

in this paper are generally very similar. These three studies produce

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1/   de Leeuw, F. (1971), "The Demand for Housing: A Review of the
     Cross-Section Evidence," Rev. Econ. Statistics, 53:1-10.

2/   Mayo, op. cit.

strikingly similar results which, though they deal with samples with
widely varying incomes, are consistent both with one another and with
comparable studies carried out using U.S. data.

These results are presented in Table 5. They indicate that
the income elasticity of demand, as well as the average propensity to
consume are quite stable across these countries. Although the results
are not reproduced here, the cited studies also find that the average
propensity to consume housing starts out high at low incomes, drops off
rather sharply (since the minimal consumption of housing services varies
little at low levels of income) and then appears to tend asymptotically
to some lower value. According to the Korean data, this lower value is
on the order of 8 to 12 percent, the typical range is from 12 to 25
percent, and the intercept may be inferred to be on the order of 30
percent or more. The Bogota data reveal that the highest income groups'
average propensities to consume housing fall within the range of 12 to
16 percent, and the intercept may again be inferred to be above 30
percent.

The last stage of our analysis has been to trace the
determinants of housing consumption in order to try to understand what
lies behind the observed trends. The analysis is similar to that of the
growing body of work on housing demand. However, there are a few
important differences. One is that we have been able to obtain a better
measure of permanent income, which is estimated as a simple average over
a three year period. (All income variables prefixed by P are to be
considered as permanent income measures.) This is a result of the panel
nature of our data. The other is that we have postulated that different

forms of income may contribute in varying proportions to the decision to consume housing. We wished to investigate the hypothesis that the wage income of the household head (Y_{WH}) was the primary determinant of consumption behavior. So, in contrast to other studies, we have included other measures of income such as wage income of other household members (Y_{WF}), other income of the household (Y_{OF}), and total household income (Y_{TT}) in the sample.

It is clear that the two concerns -- obtaining an accurate measure of permanent income and including other measures of income -- are related to one another. The underlying assumption, which seems to have pervaded most affordability calculations in the past, is that the wage income of the household head is more stable than income from other sources, and thus is a better proxy for permanent income. Since this does not appear to be borne out by the data, we claim that this is at best a testable hypothesis. We therefore include "permanent" notions of other income sources as well in our final regression.

The housing equation estimated is of the linear form, and for the "i"th household is written: $E_i = Z_i b + u_i$ where $E_i = P_H H_i =$ housing expenditures in terms of actual or imputed rent; Z_i is a row vector of explanatory variables, $Z_i = (Y_i \ X_i)$, where Y_i is a vector of measures of income and X_i is a vector of demographic variables; b is a column vector of coefficients; and u_i is a random error term. The results of the estimation are presented in Tables 6 and 7, the former using current income and the latter permanent income measures for Santa Ana, in 1980. (Tugurios are excluded because, although they constitute

Table 6: HOUSING CONSUMPTION IN SANTA ANA 1980--CURRENT INCOME

	OWNERS		RENTERS		ALL	
CONSTANT	131.933^{**} (2.846)	122.130^{**} (2.894)	-40.780 (-2.235)	-20.828^{+} (-1.036)	-15.612 (-.7110)	2.240 (.1050)
YTT		$.0912^{**}$ (3.451)		$.1875^{**}$ (9.142)		$.1570^{**}$ (8.900)
YWH	$.0732^{*}$ (1.826)		.2420 (11.864)		.1932 (8.541)	
YWF	$.0972^{**}$ (2.593)		$.0720^{**}$ (2.659)		$.1039^{**}$ (4.121)	
YOF	$.1076^{**}$ (2.485)		$.1145^{**}$ (2.441)		$.1609^{**}$ (4.834)	
AGEH	-.0318 (-.0430)	.1494 (.2240)	.2694 (.9631)	-.1619 (-.5386)	.4785 (1.375)	.2159 (.6458)
SEXH	-19.432 (-.836)	-25.383 (1.249)	-23.206^{**} (-2.334)	-.6786 (-.0615)	-22.832 (-1.890)	-9.590 (.8496)
HHSIZE	-7.264^{*} (-1.551)	-6.854^{*} (-1.610)	.3589 (.4613)	-4.477^{**} (1.979)	-.6579 (-.2544)	-3.660 (-1.5213)
R^2	.16	.16	.54	.40	.33	.30
N	72	72	136	136	208	208

* significant at 95%

** significant at 90%

+ coefficient exceeds standard error

Table 7: HOUSING CONSUMPTION IN SANTA ANA 1980--PERMANENT INCOME

	OWNERS		RENTERS		ALL	
CONSTANT	113.462** (2.343)	100.524** (2.204)	16.965* (1.730)	9.990* (1.043)	.4133 (.0161)	-6.364 (-.263)
PYTT		.0895** (2.795)		.0295** (2.566)		.119** (5.617)
PYWH	.0681 (1.324)		.0197+ (1.193)		.1059** (3.370)	
PYWF	.1113** (2.439)		.0111+ (.950)		.1142** (3.963)	
PYOF	.1012** (2.019)		.1048** (5.618)		.1522** (4.263)	
AGEH	-.0802+ (-1.966)	.1620 (.234)	-.0743 (-.538)	.1304 (.964)	.279 (.704)	.4119+ (1.121)
SEXH	-7.683 (-.298)	-18.803 (-.851)	7.021+ (1.524)	5.471+ (1.219)	-6.437 (-.474)	-8.906 (-.738)
HHSIZE	-4.713+ (-1.012)	-3.576 (-.829)	.8850+ (1.003)	-.1317 (-.1424)	.1358 (.0526)	-.140 (-.058)
R^2	.13	.12	.29	.10	.22	.21
N	63	63	93	93	156	156

* significant at 95%

** significant at 90%

+ coefficient exceeds standard error

only a small proportion of the population, they make up a very large

proportion of the sample.)

The first observation is that each of the "other" income

variables, representing sources other than the wage income of the

household head, contributes significantly to explaining the variability

of housing consumption. According to the current income measures in

Table 6, the marginal propensity to consume housing out of "other"

income exceeds that for all other income variables. This finding is

consistent with observations for the Philippines and Senegal that house

construction for a majority of families is financed by savings and

transfers from the extended family network, rather than out of current

wage income. These results are confirmed when permanent income measures

are used in Table 7. The fact that the marginal propensity to consume

out of other incomes is larger than that from wages leads us to believe

that, under the permanent income hypothesis, there are large transitory

components at work.

Further revealing information is contained in Table 8, which

presents estimates of the income elasticities of housing demand for the

various sub-groups at their respective mean incomes and rents. These

results support the conclusion of the previously cited studies that

demand for housing is relatively income inelastic. This is true for

renters and owners in Santa Ana, across all four categories of income

considered. The elasticity of demand with respect to "permanent" wage

income of other household members and with respect to other "permanent"

non-wage income is stable across income groups. The elasticity of

demand with respect to the three-year average of wage income of the

Table 8: INCOME ELASTICITIES OF DEMAND FOR HOUSING
(EVALUATED AT THE MEAN)

	Santa Ana		Bogota		Cali		Korea	
	Renters	Owners	Renters	Owners	Renters	Owners	Renters	Owners
Permanent Income								
Wage of Head	.1599	.1589						
Wage of Others	.0600	.2316						
Other Income	.1285	.0647						
Total Income	.4338	.4530	.78*	.75*	.47*	.73*	.42	.62

* Current income estimates.

household head appears to be quite similar for renters and owners. A similar result is apparent with regard to total permanent incomes of the entire household.

Household size does not seem to contribute significantly to housing demand. However, the sign of the coefficients reflects Ingram's finding that increased family size leads to increased demand among renters, but not among owners. This would be especially true for meson rental units which tend to be one-room dwellings. The only other significant demographic variable is sex of household head. Our estimated coefficients indicate that female-headed households tend to demand more housing, and are thus again consistent with Ingram's findings for Colombia.

V.   PRINCIPAL CONCLUSIONS AND RECOMMENDATIONS

This exercise has comprised an evaluation of experience with respect to the affordability of projects, and of the usefulness of affordability measures used in their design. Taken together, these findings suggest how affordability considerations should be brought to bear in the design of future projects.

The Affordability Record: Evaluation to date shows that the urban housing projects so far financed by the World Bank have generally been affordable to their target populations. This has been so even though actual costs have turned out to be considerably higher than originally estimated. There are two reasons behind the higher costs. First, materials prices have risen at unforeseen rates, and the impacts of this and other inflationary forces have been intensified by substantial delays in project execution. Second, the additional amounts that families have voluntarily invested in their plots and dwellings have greatly exceeded initial estimates. This trend has resulted partly from inflation and partly from the fact that families have generally allocated more resources to house-building than had been anticipated.

Notwithstanding these factors, it is heartening to find that projects have been affordable even to families within the bottom 20 percent of the income distribution. $\underline{1}/$ This appears to have been due in large measure to the validity of the progressive development approach

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$\underline{1}/$ This is not the same as saying that distributional impacts of the projects have been optimal, which subject is currently under investigation.

and to conscientious, and largely successful, efforts to keep project standards and costs down to (or near to) what were presumed to be affordable levels. It was also due in part to luck, in that the target populations' income levels in these first projects were underestimated because little was known initially about the importance of transfers. The unanticipated availability of transfers within the extended family, of course, links back to the unexpected degree of investment in the home.

In El Salvador, in particular, there were some additional reasons for the affordability of the product. The Fundacion's program was of long standing, and considerable experience had been built up. Furthermore, great emphasis had been placed on affordable design from the outset, and modifications -- in standards, in plot layouts and in site layouts -- were continually being made to improve performance in this regard. Great care was taken in the selection of participant families. In addition, the Fundacion utilized the mutual help process to ensure that all families' downpayments could be made, and utilized both rewards and sanctions to encourage good payment performance.

The positive findings on affordability are supported by indirect indicators as well. One such indicator (of lack of affordability or "affordability problems") would have been uncommonly high turnover of project populations. This is not an unambiguous indicator, as people might move out of projects at high rates for reasons quite unrelated to affordability. For example, they could be realizing substantial capital gains. On the other hand, they could be staying on in spite of affordability problems, in which case the effects would likely show up eventually in one or more of the indicators discussed

below. But it is worth stressing that in none of the projects studied
has turnover among project populations been higher than that among
controls.

In El Salvador, the turnover rate has been much lower than
that among the controls or the population at large, once allowance is
made for some early departures among families that found participation
in the mandatory mutual help program onerous. This is unlikely, how-
ever, to be attributable solely to affordable design. It appears that
the most important additional explanation in the El Salvador case is
simply the overall meticulousness of the entire process -- in which the
careful selection of participants, their organization into and
involvement in mutual help teams and the careful explanation of project
(and community) benefits and obligations play an important part. It is
also likely that, where subsidization of (a portion of) project costs [1]/
coexists with barriers to transfer of the subsidy in the event of
resale, [2]/ the participant may be, or at least feel, "locked in" for a
time.

Another possible indicator would have been an unexpectedly
slow rate of house consolidation. This phenomenon has been observed in
the Senegal project, and initially affordability was involved.
Government spokesmen raised people's expectations of what would be done
for them, while the project initially had no loan component. When one

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[1]/ Something which occurred only to a very modest extent (with respect
to interest rates) in the El Salvador project, but has been of some
significance in some other projects.

[2]/ This is proscribed, in El Salvador, by the fact that the tenure
arrangement is leasehold for the first five years.

was introduced, it was inadequate, in that the ceiling amount for individual loans constituted only a very small proportion of the costs of the homes the participants were attempting to build. Even after these problems were resolved, project progress has been slow, for reasons having to do with more general design failures and implementation problems. Individual house construction in all other projects has proceeded at least as rapidly as expected.

Still another possibility is that families might have attempted to adapt to affordability problems by altering income and/or expenditure patterns. There was particular concern in the early phases of program development that participants might be forced to reduce consumption of other necessities, such as food or health services, to meet housing payments. In fact, there have been adjustments on the income side: participating families have a high propensity to expand their houses and rent out part of the additional space, and there have been some indications of possible positive effects on labor force participation. These, however, can hardly be considered indicators of affordability problems so long as the families are successful. On the other hand, there have been no indications that investments in housing have led to reduced consumption of food, medicine, or other necessities.

A final indicator would have been a relatively high rate of default, which is linked to the first indicator, as, presumably, households whose payment lags persist will eventually be evicted. Here the evidence is mixed. In El Salvador, default rates were virtually nil up to the outbreak of the major civil conflict in 1979. In the Philippines, collections have barely started. In the two African

countries, however, default rates on plot payments (and in Zambia on loan repayments) have been distressingly high. In the case of Senegal, it is difficult to separate this phenomenon from the complex of problems that have plagued the project; however, affordability does not appear to have been at the heart of the problem. In Zambia, it was initially thought that affordability might be the key factor, particularly given the economic reversals faced by the country during the period of project execution. Further research, however, has shown this not to be the case. Defaulting has not been related to income, but caused by other factors, notably poor financial administration.

Affordability Measures: This paper has also attempted to evaluate affordability measures currently in use for progressive development projects. It is essential that the measure ("a") of willingness and ability to pay is constructed from appropriate income estimates, combined with reliable figures on rents or occupancy costs.

In conducting research on affordability, the measure of income chosen is crucial. The disaggregated results of early World Bank-financed experimentation with urban housing show that housing expenditures are least responsive to the measure of income originally favored—wages of household head—and considerably more responsive to other income components. As we have emphasized, most important for project design purposes is total household income, including "unearned" as well as earned income sources. Total household income comprises a more encompassing definition of family purchasing power, which reduces the risk of screening out some of the people who should and can be helped by housing programs. Also contrary to original expectations,

total household income is less subject to variation than is wage income

taken alone. This measure of income must still be used with care, and

in constructing such measures attention must be paid wherever feasible

to the distinction between transfers that are stable components of

income and those that are not. Data collected as part of the Evaluation

Program, initiated and partly funded by the World Bank, make it possible

to provide reliable guidance on this subject.

The other main lesson is that, if available, measures of

permanent income should be used in calculating "a". While the World

Bank's project staff are unlikely to have access to the type of panel

data necessary for such calculations, there is available the alternative

discussed above of using consumption expenditures as a proxy for

permanent income, and such figures are frequently available. It appears

that total household income, including transfers, may in most months

closely approximate "permanent" income in that a major function of

transfers is to smooth out income fluctuations.

Plotting rents (or occupancy costs) against total income for

the selected distribution will give the locus of values for "a". World

Bank evaluation studies and comparable recent research have found that

"a" has the following characteristics: It basically declines as income

rises, because housing is a necessity. The elasticities estimated for

the various cited studies of housing consumption are strikingly similar,

falling within quite a narrow range. This does not imply identical

values of "a" among countries and cities. In fact, the values of "a"

appear to vary considerably among countries and also according to city

size. In addition, "a" varies with other factors, including household

characteristics, and nature of tenure. Owners tend to consume considerably more housing than do renters, and, as income rises, the ratio of owners' to renters' consumption rises. Even if we adjust the calculation for owners to ensure strict comparability by adding implicit rent to their incomes so that, for owners, $a = \frac{R}{Y+R}$, only part of the discrepancy disappears. This furnishes some evidence that homeowners own their homes not just for the annual housing services provided, but for some combination of other reasons, including use of (part of) the premises to earn income, and expected capital gains.

Affordability Considerations in Project Design: Practitioners in the field need reliable estimates of "a" to work with. [1] Just at the moment these are only available for a very few countries [2] and cities. As mentioned, research currently underway will add substantially to this list during the coming 18 months. Once this larger selection is available, practitioners should in most instances be able to transfer existing parameter estimates from comparable environments or to select appropriate values of "a" through a process of interpolation. [3]

Until that time, and in some instances thereafter, it may be necessary to estimate the parameter ("a") using data from the site. In

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[1] Presented, as in this paper, as plots of a against Y.
[2] Colombia, El Salvador, Korea and perhaps one or two others.
[3] When outside estimates from other data sources are used in the comparison of project costs to the income disribution of the target population, the use of consistent definitions is crucial. If outside estimates of "a" are to be used, how that value of "a" was determined should be ascertained. Specifically, it is necessary to know whether the calculation relies upon the same components of costs and income as the C and Y to be used in the affordability calculation.

such instances, it is advisable to apply insofar as possible the

approach outlined in this paper. This means, again insofar as possible,

combining decent data on rent (or occupancy cost) and income for the

same sample population, which should be "comparable" $\underline{1}/$ to the target

population for the project. Rather than using "inappropriate" data, $\underline{2}/$

practitioners should (preferably) return to the list of available

parameter estimates for other countries/cities and make informed guesses

as to the value(s) of "a" to use; alternatively they should swallow (or

induce the borrower to swallow) the costs of conducting appropriate

small surveys and estimating "a" directly. Sometimes it may be

particularly worthwhile to do this, because the survey is required, or

may serve a number of additional purposes -- and the delay entailed can

be endured. $\underline{3}/$

Occasionally, projects should be used to generate new samples

in any case. The ultimate objective should be to persuade national sta-

tistical agencies systematically to generate a set of micro-data,

including periodic household sample surveys, with geographical

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1/ The following should suffice to meet the definition for
comparable: for upgrading or sites and services projects, a city-
wide sample, or frequently a national urban sample -- where the
practitioner/analyst would select that part of the overall
distribution which pertains to the sample population; for upgrading
projects, samples of the same area or similar areas; and, for sites
and services projects, a sample of some sub-sample of the entire
distribution which covers more-or-less the target income range.

2/ Data of poor quality or data for a sample population that is not
reasonably comparable to the target population (actual or assumed).

3/ In such cases, research advice on designing and conducting the
survey should be obtained. This advice should be extended to the
creation and clearing of the data tapes as well as to their storage
for future use.

breakdowns, such as urban/rural, as well as by major cities. [1]

Appropriately planned and executed such a program will greatly reduce

the need to generate new survey data for specific purposes and

populations.

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[1] Colombia and Korea currently do this; Kenya and the Philippines are
on the verge of doing so; and a number of other countries have
begun undertaking such surveys on ad hoc bases.

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Harold B. Dunkerley, coordinating editor, with the assistance of Christine M.E. Whitehead

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