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There's More Than One Way to Get a House: Housing Strategies in Panama

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Abstract

Throughout Latin America the politics of housing clearly assigns renting an inferior status despite the fact that little is known about household preferences regarding housing tenure or about the strategies households use to get access to ownership. While the literature on self help housing has long emphasized the importance of low income owners in Latin America's cities, the econometric literature that has quantified important aspects of housing demand has not fully incorporated this strategy of progressive construction into the analysis of tenure choice. This paper uses household data from two cities in Panama to evaluate the determinants of the tenure decision in the context of two models. In the first model, households choose between renting and owning; while in the second model, households choose between renting, buying with savings and credit, or obtaining a site and progressively building their home over time. The study shows that the key factors explaining the decision to rent or own are those associated with the family's lifecycle while the choice between buying a complete house and progressive building is affected primarily by income and assets. The results suggest that in countries like Panama that have relatively unfettered land markets, low income households are readily able to become owners because of the alternative strategy of progressive building and this has a positive impact for accommodating growth.

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Introduction

The choices facing low-income households lie at the heart of housing policy in Latin America. How much to spend? Where to live? What services are important? Assumptions about household responses to these questions determine housing policies, but these assumptions are often implicit, only rarely based on reliable empirical evidence. Understanding the choice between renting and owning is particularly important. Throughout Latin America the politics of housing clearly assigns renting an inferior status. "A nation of owners" is a slogan that, with local variations, has captured many housing ministries. And resources have followed these slogans. Public housing projects and public housing banks have been used, at great expense, to help some selected households become owners. Yet little is known about the factors that affect household preferences regarding tenure, and the strategies used by households for getting access to ownership have not been adequately analyzed.

To unravel these household strategies, this study argues for a significant addition to the established models of housing demand in developing countries. When analyzing tenure choice, these models have generally used a straightforward dichotomy between renting and owning. In doing so, they follow a literature that evolved out of the work done on housing markets in developed economies. However, becoming an owner-occupier, does not necessarily involve the same process in Panama as it does in the United States. We focus on a highly salient difference. In the United States, the construction of new sub standard housing is virtually impossible. In Panama, it is the way that more than half the housing stock is built. In the United States, a minimum cost threshold "truncates" the market for owner-occupiers. In Panama, households can occupy an undeveloped site and build a shack that meets no formal definition of adequate urban or housing norms.

The market for housing ownership thus looks very different in these two countries and by extension in industrialized and developing countries. In the industrialized world there is one basic route to becoming an owner-occupier: accumulate the savings and achieve the minimum income level required to qualify for a mortgage and buy a complete standard house. In Panama however, this route is open to no more than 40% of the population. For the majority, the route to becoming an owner involves the gradual construction of a house over an extended time, approaching standards of adequacy (in so far as is possible) toward the end, not the beginning of the process. The initial cost threshold is much lower and hence the distortion introduced by truncation less important.

To model the choices faced by households in such a market, we propose a two-stage analysis. In the first stage households choose between owning and renting. In such a dichotomous model, household lifecycle (age, number of children) is shown to be more significant than income in determining choice. In the second stage, we introduce a multinomial model so those households that have decided to become owners choose between building their house gradually and buying a complete unit. Here, as might be expected, income becomes more significant and lifecycle variables less so.

The paper begins with a brief overview of the literature on tenure choice in developing countries, showing that the self build route to ownership is a central element in a sociological tradition of analysis, though it has not yet been fully incorporated into economic analyses of housing demand. The next section discusses the basic debates regarding tenure choice in developing countries, and is followed by a presentation of the key features of Panama's housing market and our data set. The following section explores the data to evaluate a story of how household preferences change over the lifecycle and how households that buy complete units differ from those who build their own homes. Then, two formal models of tenure choice are presented to analyze the impact of income, education, age, children, gender and marriage, on household tenure decisions. Next, the results of estimating these models are presented and discussed. The final section discusses the broader conclusions and policy implications of the study.

Tenure choice in developing countries: an overview

The literature on housing in developing countries has bifurcated into two traditions that pay relatively little heed to each other. The first tradition is sociological and derives from the seminal model presented by John Turner in the 1960s. The second more econometric tradition was launched in the late1980s by a World Bank team led by Malpezzi and Mayo. In this paper we propose to use key insights from of the sociological tradition to formulate an econometric model of tenure choice that enhances our understanding of household decision making.

Turner's highly influential model was embedded in his understanding of the broader process of urbanization in developing economies. The protagonist, in his account of housing strategies, was the rural immigrant coming to the city to find work. Initially these migrants rented rooms in the cities' central zones where casual labor was most readily to be found. As these households accumulated the capital, skills and information needed to become owners, they would shift to the urban periphery and begin to construct a house of their own (Turner 1967 and 1968). Thirty years of research have not exhausted the potential of this fertile vision (Klak and Hotzclaw 1993 provide a summary of this daunting literature) but a key proposition was largely implicit: most low-income households prefer to be owners. The assumption, in other words, was that renting was the result of poverty or of some other constraint.

Within this tradition, a re-assessment of rental housing did take place in the 1990s. Eckstein (1990) argued that the benefits of ownership in peripheral areas had been overstated while the disadvantages of rental housing in the city center had been assumed without much evidence; she concluded that some households prefer to rent. Gilbert (1991) argued that households need a range of alternatives and that for some households renting better fitted their needs. Van Lindert and van Westen (1991) showed that renters in the central areas of La Paz actually had incomes higher than those of owner households in more peripheral locations. Nevertheless, in a survey that emphasized the variety of factors that could lead households to prefer renting, Rakodi (1995: 799-780) summarizes the

literature as showing that "Long term tenancy may, therefore, be increasingly a result of the commercialization of property markets, low and declining real incomes and failures of government policy…"

In the economic tradition pioneered in Mayo and Malpezzi (1987) housing demand was initially analyzed separately for owners and renters since owners tended to consume more housing services than did renters of similar income levels. When the analysis explicitly compared the two forms of tenure, income was generally found to be a significant factor, with higher incomes increasing the probability of becoming an owner. (Ahmad, 1994). In the most recent of these studies Arimah (1997) found that. in the city of Ibadan, Nigeria, while income was statistically significant in determining tenure, the magnitude of the income coefficients was very small. Daniere (1992) anticipated in some respects the approach taken in the present study by explicitly taking "squatting" into account as a separate form of tenure. The results from Manila showed that formal owners had higher income levels than did squatters but that squatters had higher incomes than did renters.

Because of the methodological gulf separating these traditions, little effort has gone into seeing how they might be used to mutually strengthen our understanding of housing markets in developing countries. Here we can only begin the process by making two fundamental points. First, some key variables show up as significant in both traditions, and these robust results are worth emphasis. Life cycle variables, particularly age and household size, are consistently significant in the econometric models: renters tend to be younger, smaller households. The sociological literature has provided a rich account that links these housing choices to labor market opportunities and household priorities as well as to conditions within urban land and housing markets themselves.

The second point concerns the role of income in tenure choice. In both traditions the results are weak or ambiguous. The sociological literature undoubtedly began by seeing renting as the tenure of the very poor, but a number of studies showed renters with higher incomes than owners. From the perspective of the econometric tradition, the weak effect of income is not entirely surprising, since the literature draws on structurally similar models from developed economies, particularly the United States.

Henderson and Ioannides (1983) present a model in which this ambiguity regarding the impact of income results from the interaction of several factors. They demonstrate that owning is always preferable to renting unless there are uncertainties in housing asset values or public policy and institutional factors are at play (such as tax incentives or credit market imperfections). Consequently, under certain conditions higher income households will be more likely to rent, largely due to the fact that their demand for housing services may exceed their demand for housing investments in their asset portfolio. They also argue that young individuals with higher education are more likely to rent because they can expect much higher incomes in the future with which to better balance their housing service and housing investment needs; while young households with large inherited wealth are likelier to own than rent.

Furthermore, the empirical literature demonstrates that becoming an owner involves a high transaction cost in developed economies. Overcoming this transaction cost requires either higher permanent income (Struyk and Marshal 1974), or higher current assets (Cooperstein 1989). Either way households must accumulate the resources to make a down payment and meet the income underwriting standards required by mortgage lenders. If purchase of a complete standard house were the only route to ownership in developing countries, low GNP per capita, very unequal income distribution, and thin financial markets would exclude most households (and all low-income households) from becoming owners. Income and asset variables would then be of overwhelming significance in determining tenure choice in developing countries.

In this respect, the sociological tradition started with a key insight. The explicit thrust behind Turner's work was the conviction that low-income households could become owner-occupiers if they had access to areas where they could build their own houses in defiance of conventional construction and planning codes (1967:167 et ff). Access to land with sub standard services was identified as a necessary condition if these households were to have the option of becoming owners by constructing their own house. (Gilbert 1990). Most important of all, these households are not condemned to a lifetime in severely sub standard housing. Rather, ownership gave them the means to invest savings and labor in improvements to the size, materials, and service connections of the house so that it was gradually shaped to their long-term preferences.

There are, then, not one but two routes to becoming an owner. The first route, buying a completed house, comes with a high minimum entry cost, and hence is likely to exclude low-income households. The second route to ownership, constructing a house over time, can have a much lower minimum cost. In one sense, the second route does mimic the first: both allow the household to spread payments over time. For most households that buy completed houses in developed countries, this is accomplished through the mediation of a financial system that provides mortgage loans. For households taking the second route, the spread over time is accomplished by initially occupying a sub-standard unit and progressively building improvements and expansions.

From this perspective, building over time is essentially a financial option that reduces the initial entry cost of ownership. This reduction will be particularly significant for low-income households. In contrast to developed countries and other developing regions where evictions and land controls appear to be more strictly applied, Latin America has in fact been relatively tolerant of substandard housing and this may account for Latin America's higher rates of ownership.[1] In those countries that are willing to accommodate housing that is initially substandard, low-income households will have greater opportunity to become owners.

[1] See data in U.N. Centre for Human Settlements, 1993.

Panama's housing market

Panama's housing market has functioned very well along a variety of dimensions. Construction of new homes has not only kept pace with the formation of new households, but has actually reduced the number of people per residence. The evidence also shows that substandard houses in Panama are not evidence of large-scale "hardcore" poverty. It is true that many homes, at any one time, are inadequate. However, the prevalent strategy of progressive building is quite active, and as a result, substandard houses are regularly upgraded over time.[2]

Housing Demand

Between 1980 and 1990, Panama's total population grew at a rate of about 2.1% (reaching 2.4 million in 1990) but the urban population increased at a 2.9% rate. The urban housing stock grew even faster at a rate of 3.9% per year. As a result the number of people per house dropped from 4.8 to 4.2 over the decade. This suggests that the market for additional housing was able to accommodate not just the demand driven by the migration of rural population into the cities, but also a higher rate of household formation. The fact that the increase in the stock of houses outpaced the increase in population is the first piece of evidence that the urban housing market functioned reasonably well.

The kind of housing acquired as additional households entered the market depended significantly on the income and assets they possessed. In the absence of data on assets, we can use the income distribution of urban households in 1990 together with the requirements of formal housing finance, to get a sense of how this demand might be usefully disaggregated.

Table 1
Income Distribution in Panama For Urban Households
(US$ 1990 per month)

< $130	14%
$130 - $300	20%
$301 - $600	23%
> $601	43%

It is no surprise that higher income families in Panama have access to mortgage financing, but the level at which mortgage financing becomes difficult is less apparent. The banking industry is relatively well developed in Panama, and interviews with the mortgage departments of commercial banks suggested that households with total monthly incomes of $600 or more would have little difficulty in qualifying for a mortgage.[3] These households, making up more than 40% of urban households, are generally in a position to

[2] This section will focus on the production and occupancy of homes, and therefore will deal primarily with the build or buy strategies. Discussion of the incidence of renting will be taken up in following sections.
[3] Interviews were conducted during several trips to Panama in 1994.

take the "buyer" route to ownership. At the other extreme, the households with monthly incomes of $300 or less (more than a third of the total) are apparently excluded from formal housing finance and are very likely to be "builders" if they choose to owners. The housing they initially acquire will often be substandard, only reaching the desired quality after a process of improvement. As a result, for these households the housing market cannot be understood simply as the acquisition of a unit, but also encompasses the process of improvement.

While it is more difficult for households with incomes below $600 per month to get approval for a mortgage, income is not the only relevant variable. Banks in Panama generally require borrowers to have mortgage payments deducted directly from their paychecks. Households with "formal" sector employment may thus have better access to mortgage financing than households with higher but less well-documented income. As a result, the 23% of households who have incomes between $600 and $300 per month can best be characterized as occupying a "gray" intermediate zone. Close to the upper bound of this zone, some of these households will have access to commercially produced housing. As households approach the lower bound their housing acquisition will presumably come to resemble that of low-income households.

The Supply of New Housing

Table 2 summarizes information on the different sources of supply for new housing in Panama. The data presented here generally refer to averages from 1990 and 1994[4]. While we have argued that owners should be characterized as either builders or buyers, the data on housing production do not have exactly comparable categories. As an initial step, formal production can be defined as housing for which building permits are obtained. Such formal production accounts for some 5,100 houses per year. These houses are generally in full compliance with regulatory standards. Whether the builder is a household or a firm, someone planning to invest substantial amounts of capital in constructing a house will generally require the security that only compliance can ensure. On the other hand, data from the financial sector suggest that no more than 2,500 mortgages are issued each year, so that nearly 2,000 formal units are not financed with mortgages. It is likely that some of the latter, although fully compliant with regulatory standards, would be classified as "builders" -- households undertaking their own construction. Since these "builders" largely come from the upper half of the income distribution, they are primarily financing the investment from savings and personal loans. Conversely, it is likely that at least some of the 6,900 houses constructed informally, that is, without any building permits, would in fact comply with the standard levels of service quality. Such households would qualify as "builders" although they have not occupied substandard housing as described in the preceding section.

[4] Overall housing production is assumed to maintain the rate observed from 1980 to 1990. This may be a conservative estimate since a) it assumes that there will be no further decrease in average household size and b) there is evidence that formal housing production accelerated after the invasion of Panama by the USA removed the military regime and allowed a more stable democratic government to take office.

Table 2 Annual Production of Urban Houses in Panama					
		No. Units	**Average Unit Cost**	**Household Income**	**Observations**
1	Formal Production Total	5,100			Formal defined as houses built with construction permits
2	Private Sector Total	4,400	$12,000		Luxury Market: 10% Total Units: Average cost $170,000 Middle Market: 30% Total Units: Average Cost $ 40,000 Low End Market: 60% Total Units: Average Cost $10,000
3	Priv. Financed by Mortgage	2,500	$50,000	Generally > $600/Mo	Average Loan for Residential Mortgage $40,000 Lower bound of mortgage access $300 - $400 /month
4	Priv. Without Mort. Financing	1,900			
5	Public Sector	700	$7,700	$450/Mo	Public Programs to contract construction of houses and apartments; Average Unit cost refers to sales price; full cost in excess of $12,000
6	Informal Production Total	6,900			Informal defined as houses built without construction permits
7	Private	4,900	$500 - $2,000	Generally < $300/Mo	
8	Public Sector	2,000	$2,700	$290/Mo	Public Program providing up to $1,500 of building materials; household provides land and labor.
9	Total Annual Production	12,000			

Notes on Sources and Estimations: All data are rounded averages from 1990 – 1994 unless otherwise noted. Sources include IDB 1996; Panamanian Chamber for Construction Industry (CAPAC), Statistical Bulletin, 1993, 94, 95; interviews with bank managers; and construction firms; and Census of Population and Housing, 1990.

In spite of these caveats regarding the interpretation of the data, the overall picture is both plausible and instructive. Expanding at a rate of 3.9% per year, the housing sector produces a total of some 12,000 units per year. Although Panama does have a relatively well developed financial industry, little more than 20% of the annual production of housing is apparently acquired through the conventional "buyers" route of using mortgage financing for the purchase of a completed house. More than 40% of total production seems to require the "builder" process of acquiring a sub-standard unit for subsequent improvement over time. Another 20% of total production is accounted for by the public sector[5]. The character of the remaining 20% of production is less clear but it seems likely to correspond to a process of "building" by relatively prosperous households.

[5] It is worth emphasizing that the public sector's production came in two very different forms. The first consisted of completed apartments and houses built under contract by commercial developers. The 700 units produced each year involved large subsidies for each household and considerable production inefficiency. The second form consisted of a program that provided about 3,000 low income households each year with building materials. The beneficiaries hauled the materials from the warehouse, and provided the land and construction labour. The program was well targeted and only cost the government some $1,500 per household. For an evaluation of these programs see IDB 1996, Annex II.

The Supply of Housing Improvements

The process of constructing housing improvements overtime that is intrinsic to the "builder" route to ownership is informal almost by definition; and it is not recorded in annual production data. Some feeling for its aggregate impact can be deduced from census data. Table 3 below compares the quality of the housing stock in 1980 and 1990. Interpreting this data, three points stand out. The first is that the average intercensal increase in houses with piped water (9.2 thousand per year) is almost as large as the total annual increase in urban houses (9.4 thousand). This indicates that the water utility agencies were able to extend the network of potable water and increase the number of household connections at the same pace as the urban expansion. The second point concerns the provision of sanitation services. Sewage connections (3.0 thousand per year) were less than a third of the increase in urban housing. Faced with this institutional failure on the supply side, household demand for these services drove investment in on-site facilities. Commercial developers were probably responsible for many of the septic tanks installed, while individual households were probably responsible for the construction of 3.2 thousand latrines per year. Finally, the impact of investment in housing improvements can be glimpsed in the data on the quality of floors and walls. The output of houses with walls and floors made of permanent construction materials exceeded the production of housing in total indicating an absolute reduction in the number of houses with unsanitary earthen floors or flimsy walls.

Table 3 Improvement in Housing Stock Occupied Urban Houses 1980-1990			
	(Thousands)		Average Annual Increase
	1980	**1990**	**1980 -1990**
Urban Population	970	1,233	2.9%
Urban Houses	201.3	295.1	3.9%
Urban Pop/House	4.8	4.2	
Urban Houses			**9.4**
Urban Houses with:			
Piped Water	195.7	287.5	9.2
In House Connection	141.8	212.6	7.1
Sewer Connection	123.4	153.4	3.0
Septic Tank	21.2	51.0	3.0
Latrines	53.8	86.0	3.2
Permanent Walls	131.6	239.5	10.8
Constructed Floor	189.3	285.6	9.6

Source: Census, 1980, 1990

Traditionally, these data have been used to estimate "deficits" in housing quality, with the focus on the large number of households that lack water, adequate floors or walls, etc. However, the homes that lack a particular service in 1990 are not the same as those who lacked that service in 1980. To illustrate the role of progressive improvements, consider the case of sanitation services. In 1980 there were 2,900 urban houses without any sanitation services. It is possible that none of those households was able to improve their services over the following 10 years, while an additional 200 houses, built between 1980 and 1990, were added to the pool of substandard units. A similar "deficit" scenario, in which all or most of the substandard units from 1980 go unimproved while some of the newly constructed houses are added to the stock of substandard units, can de devised for each service. It is more likely, however, that many of the houses that were inadequate in 1980 were improved by 1990. Households following this "builder" strategy, then, may endure severely substandard services for only a limited time and the larger number of

inadequate homes would be indicative more of a more dynamic pace of household formation and construction than of absolute and continuing deprivation.

Table 4 demonstrates that, in fact, house upgrading occurs quite extensively. Although the numbers refer to the national rather than the urban housing stock (census data do not provide the same breakdown for urban housing), there is every reason to believe that the effect would be more marked in urban areas where the scope for improving household income is much greater. Nevertheless, the conclusion is clear enough. The most recently built houses tend to be substandard at a much higher rate than houses built earlier. Given the increase in the absolute number of houses meeting each quality standard between 1980 and 1990, the data support the dynamic scenario by which low income households become owners of acceptable housing through a gradual process of constructing and financing improvements. [6]

Table 4
Quality of National Housing Stock by Date of Construction

	Total Stock 1990	Date of Construction			
		Before 1980	1980 – 1985	1986 – 1990	Un - Known
Total Stock (1,000s)	524.3	277.2	110.0	99.9	37.2
Without sanitation	12%	6%	13%	26%	13%
With Earthen Floor	18%	11%	22%	41%	***

Note: Data refer to national not urban housing stock.
Source: Census 1990.

The growth in the housing stock, the fall in the number of people per house, and the improvement in housing quality over the last decade must be attributable in great part to the performance of the land market. A number of factors contributed towards its efficient operation. Physically, the principal cities appear to have ready access to land suitable for construction. Public policy, however, was probably more important. Consensual purchases of land, even without formal title or registration, could get official recognition through municipally issued documents that validated the owners' rights. These documents, though not acceptable for mortgage financing, could be held as collateral for personal

[6] In Latin America it is still common for ministries to define their goal as the elimination of the housing "deficit". There are many reasons why the "deficit" is a feeble way to define the problems of the housing sector, but this data demonstrates one of its most serious weaknesses. The "deficit" is defined at any one time by the sum of houses needed to alleviate overcrowding plus the sum needed to replace substandard units. But the housing market is not a static pool of substandard houses that constitute a potential target for a one-shot eradication program. Each year households new to the ownership begin with substandard units, and each year large numbers of houses move toward standard quality as owner-builders invest in improvements. In a growing housing market dominated by "builders", the deficit is very likely to increase, even if the market is performing as well as in Panama. It is true that a core of "chronically" poor households will be trapped in very poor housing conditions and that policies to help them are justified. However, this core group is quite different from the mainstream occupants of substandard houses observed at any one time. Moreover, the actions needed to support this group, are likely to be quite different from those that would provide the most effective help to the wider group of building households.

loans and give a high degree of security. Moreover, evictions, even for occupying public lands, occurred rarely if at all. The water utilities (with some help from commercial developers that sank wells to service their developments) were generally able to keep up with the expanding demand for connections, hence removing one of the key constraints on the ability of the housing market to accommodate expansion efficiently. Finally, governments followed the general pattern in Latin America of not enforcing land use regulations that might otherwise have restricted access of low-income households to land.

The Data for the Study

The data for this study came from a survey taken in 1994 of 1,427 households in Panama City and David, with 916 and 511 households in each, respectively.[7] The metropolitan area of Panama City is by far the largest urban area in the country, accounting for more than 60% of the urban population. Among the country's 32 secondary cities, David was selected as a fairly typical city whose housing market is not tightly linked to the metropolitan area because of its distance. The survey was originally aimed at understanding housing demand among low and middle-income families, so the sample was selected to be representative of census tracts in each of these cities in which more than 50% of the households had monthly household incomes between $125 and $506. The lower cutoff was used to exclude areas that were likely to have a high degree of government assistance; including such areas would have distorted the findings because supply of housing in these areas is determined by government policy and demand is heavily influenced by the structure of public subsidies.[8] The upper limit is equal to the 60th percentile urban household income according to the 1990 census and was set in order to oversample the population that was of direct interest. As it turned out, the sampling approach did not oversample lower income families, and the sample population was quite similar to the total urban population in a number of dimensions (see Table 5). This particular sampling approach means that the study's results must be interpreted appropriately. Specifically, the estimates of behavioral parameters are representative of people living in census tracts with these characteristics. Nevertheless, we believe that the sampling frame is not so restrictive that it invalidates the basic conclusions.

Table 5 shows the basic characteristics of the sample in Panama City and David, and compares them with features of Panama's urban population at the time of the 1990 census. The basic household characteristics such as household size and age of head of household are very similar in the Panama City and David samples, and are not very different from the country's overall urban areas. Mean income is also similar across the two samples, but somewhat lower than in all urban areas. Interestingly, the median wage is higher in the samples than in all urban areas – indicative that our sample is made up of families living in neighborhoods with relatively more homogeneous incomes. The share of female-headed households is significantly smaller in the sample than in the urban areas reported by the 1990 census. By tenure, the city of David had somewhat more "unregistered occupants",

[7] For details on the sampling process, see Urban Institute (1996), available from the authors.
[8] Local experts identified neighborhoods within the sampling frame that had large amounts of publicly assisted housing and these neighborhoods were also dropped form the sampling frame.

that is, people who consider themselves owners but who have no formal registration or document to prove title. It is difficult to compare these disaggregations of tenure with the 1990 census because of differences in definitions. Nevertheless, the samples and the urban areas all show a relatively high rate of formal ownership, ranging from 62% in David, to 65.9% for all urban areas, and 67.5% in Panama City.

Looking at the combined sample by income, we can see that average household size increases with income, a finding that is at odds with the trend in most Latin American countries in which household size decreases as income rises (see Table A.1 in the appendix).[9] Other characteristics do not differ significantly by income except for the share of households headed by women (who are overrepresented in the poorest category) and the share with formal employment (which is lower in the lowest income group).

Despite these broad similarities, Panama City and David differ markedly with regard to the strategies people used to get a home. Roughly the same proportion of households reported that they built their unit, 73% in Panama City and 60% in David, but more than half of the households in Panama City who constructed their unit relied on family labor, while only about 35% did in David. Hired labor was used by only 39% of the households who built their houses in Panama City, but by more than 60% in David. Futhermore, only 16% of the households in Panama City used formal loans to finance their acquisition of a home; compared to almost 32% in David. Apparently, families in David have had greater access to credit, or more reason to use it, than those in Panama City. (See Table A.2 in the appendix).

[9] For a discussion of household size and income in 14 Latin American countries, see IDB (1998).

Table 5 Household Characteristics and Tenure			
	Panama	**David**	**Total Urban**
Household size (persons)			
Mean	4.4	4.4	4.2
Median	4	4	4
Age of head (years)			
Mean	47	47	44.6
median	45	44	42
Households headed by women (%)	15.8	16.6	27.5
Monthly income (PN$)			
mean	599	583	643
median	480	460	400
Distribution by Tenure (%)			
Owner	67.5	62	65.9
unregistered occupant	6.9	15.5	*no category
renter	18.6	19	25.3
rent-free	7.1	3.5	*no category

Source: Tabulation from survey data, except "Total Urban" which is taken from the 1990 census.

Choosing a Housing Strategy: The Role of Income and Age

This section provides an initial look at the factors that influence housing preferences. To make these snapshots as clear as possible, we will generally exclude households with ready access to mortgage financing will generally be excluded. This leaves only two income groups:[10] households with total monthly income of less than $300, who thus have no access to formal housing finance; and households with total monthly income of between $300 and $600 who might qualify for a mortgage at the lower end of the formal housing market. We start with the choice between renting and owning and then discuss how owners choose between building and buying.

Dividing housing tenure into renting and owning is a useful conceptual device, but it simplifies a multitude of arrangements. Ownership, in developing countries, is particularly hard to pin down. In part this is a legal issue. Few owners have officially registered title

[10] Excluding the upper income group and splitting the remainder into two somewhat arbitrary categories makes the story more graphic at the cost of creating more uncertainty about the general validity of the results. The econometric model presented in the following sections will test the significance of the same variables as those described here, using data from all the households in the sample. In short we hope both to have our graphic cake and eat its statistical significance.

deeds and most ownership is illegal in the sense that either the land or its improvements are held in contravention of some formal regulation. At one extreme of illegality there is the de facto occupation of property belonging to other households or private corporations. In most countries in Latin America only a small percentage of the housing stock is in this situation. Most households occupy property through some kind of consensual transaction, sometimes related to family or employment networks, often through straightforward purchase. Fortunately, for our purposes, these distinctions are not relevant from the perspective of housing strategies. A household that acquires a plot of land, even without formal registration, has made a decision to invest capital in an asset they expect to continue to call their own. Therefore, households that reported themselves as being renters were classified as such; the remainder were classified as owners whatever the degree of informality in their property rights.

Renting versus Owning

What then determines a household's choice between owning and renting? Household income has surprisingly little impact given the expectation that ownership is likely to be constrained by the substantial transaction costs associated with obtaining a home (See Table 6).

Table 6
Housing Tenure by Total Household Monthly Income (US$)

Tenure	Less than $300	$300 - $600
Owner	73%	71%
Renter	27%	29%
Total	100%	100%

Clearly, owning is the dominant form of tenure for all households but the share of renting is in fact slightly lower in the lower income group. This result is not an artifact of the choice of income categories. Inspection of households at or below the poverty line of $130 income per month shows that they rent even less frequently – only 21% of these households choose to rent compared with 29% of households in the $300-$600 category. These results match those in the sociological literature sketched earlier, where it was found that among low-income neighborhoods the average income of renters often exceeded that of owners. Anecdotal evidence in Panama suggested that a proportion of owners in peripheral informal neighborhoods had switched from renting when loss of employment meant they could no longer meet the inexorable monthly outlay of cash required of renters. Nevertheless, for the highest income group (households with incomes of more than $600 per month) conventional expectations are reinstated and for these households with more financial options for becoming owners, the proportion that rented fell to 19%.

If income has a relatively modest impact, what drives the choice between renting and owning? The single clearest factor is age. Table 7 shows that among households in the lower income category nearly half of the households rent when the head of the household

is 38 years old or younger; while the proportion of renters falls sharply to 16% for those households whose head was 39 years or older.

Table 7
Housing Tenure by Income and Age of Household Head
(%)

Tenure	Less than $300		$300 - $600	
	38 Yrs or less	39 Yrs or more	38 Yrs or less	39 Yrs or more
Owner	52	84	57	79
Renter	48	16	43	21
Total	100	100	100	100

The very robust impact of age suggests that there is a change in preferences associated with stages in the household lifecycle. As households become older they have more stable expectations about the future –income prospects, employment prospects, and their own family needs. This allows them to choose a place to live over a sufficiently long time horizon to justify incurring the transaction costs of acquiring a home.

This interpretation is supported by the impact of another variable: household size. For young households with no more than 3 members, the share of renting was 51%; whereas when the household had 5 or more members the share of renting fell to 35% (See Table 8)

Table 8
Housing Tenure by Household Size
For Young Household Heads

Tenure	Household Size	
	3 or less	5 or more
Owner	49	65
Renter	51	35
Total	100%	100%

Note: For households whose head is 39 years or older and with household incomes below $600 per month.

This relationship between household size and tenure does not show up for older households. As households have children they often become owners; but, later in the household life cycle, when children leave home and household size shrinks, the parents very rarely switch back to owning. This view of the "stickiness" of ownership is illustrated by data comparing households' current tenure with the tenure they occupied in their previous house: most current owners had previously been in rental housing (67%), but very few current renters had previously been owners (only 17%).

Why do young households with more children switch from renting to owning? It seems that rented housing is smaller, that is, on average rented housing has fewer rooms than does owner occupied housing (See Table 9). It is not obvious why this should be the case across the whole housing market but it implies that households requiring additional space face a market where the marginal cost of an additional room may be higher for rented than

for owner occupied housing. From this perspective, those young households with smaller families who nevertheless are owners, may be anticipating future increases in family size.

Table 9
Housing Tenure by Number of Rooms for Young Household Heads

Tenure	Number of Rooms	
	2 or less	4 or more
Owner	37	86
Renter	63	14
Total	100%	100%

Renting is not a choice dictated by simple poverty. If anything, renters in low-income groups may have slightly more disposable income than owners. Renting is an option exercised by young households whose uncertainty concerning the future (job location, family requirements) makes the transactions cost of ownership unattractive. Their income bears relatively little on the choice of renting versus owning. Nevertheless, due to the low obstacles to ownership in Panama for low-income households, income does bear on the choice of building or buying.

Building versus Buying

The description of Panama's housing market made clear that the number of houses purchased each year with mortgage financing is considerably smaller than the total number of houses constructed. This suggests that a very large number of households each year will not be able to buy a completed house in a single financial transaction, but will have to build their houses over time, financing the investment by means of savings – in cash, kind or labor. For the purposes of this study, "buyers" are defined as households who acquired their current house by purchasing a complete unit. "Builders" are defined as those households who acquired a site, a site with services but no housing, or a site with an incomplete unit.

Table 10 shows that 20% of households in the higher income group were "buyers", able to purchase a complete unit. Only 14% of households in the lower income group were buyers, suggesting the "building" route to ownership is more important for households that cannot qualify for formal housing finance.[11] The importance of income in determining this choice is underlined by noting that for households with incomes above $600 per month, the proportion of buyers rose to 25%. Overall, it is clear that building is the most important route for all income groups, but higher income groups are associated with higher shares of buying.

[11] Initially it seems unusual to see any "buyers" in the low-income category; however there are several reasons that current household income may not be a good measure of the households long-term earning capacity. Two possible examples include pensioners and young adults from wealthy families.

Table 10 Ownership Strategies by Total Household Monthly Income (US$/month)		
Strategy	Less than $300	$300 - $600
Builder	86	80
Buyer	14	20
Total	100%	100%

The effect of age on this choice is weaker than that of income. In fact, households in the lower income group, the effect is negligible: 15% of the younger households and 14% of older households were buyers. Among the higher income group, however, age did make some difference, with older households more likely to be buyers (See Table 11).

Table 11 Ownership Strategies by Household Income and Age of Household Head				
Strategy	Less than $300		$300 - $600	
	38 Yrs or less	39 Yrs or more	38 Yrs or less	39 Yrs or more
Builder	85	86	75	82
Buyer	15	14	25	18
Total	100%	100%	100%	100%

In sum, when choosing between renting and owning, households respond more to age than to income; when choosing between buying and building, the pattern is reversed and income is more significant than age. More generally, we may interpret age as a proxy variable for a number of lifecycle issues while income performs as a proxy for a variety of financial factors. A reasonable story emerges in which young couples start their lifecycle as renters and become owners as they get older and their families increase in size. When the building strategy is available, income is not a barrier to ownership; however, income and other financial factors do affect the decision whether to build or buy.

Housing Strategies: A Formal Model

The purpose of this section is to formalize a model of housing tenure that can be used to test some of the hypotheses regarding the decision to rent or own, and to test the value of incorporating the rich sociological literature on housing strategies into analyses of housing demand. It can be skipped by nonspecialists who are interested only in the findings presented in the next section.

One of the best formal models of tenure choice can be found in Henderson and Ioannides (1983) and focuses on the dual nature of housing – as both a service and an investment. For simplicity, the model developed here ignores the investment "side" of housing and focuses, instead, on household characteristics. Nevertheless, by incorporating variables that may be related to financial assets, income, and education, the next section will be able to confirm several of the hypotheses generated in that article.

We begin by characterizing the household's utility function as:[12]

$$U = U(X, H)$$

where U is utility, X represents a vector of consumption goods, and H represents a vector of housing characteristics. H would probably include such features of housing services as total space, quality of the house, distance from jobs, and neighborhood amenities. The vector of housing characteristics chosen could, itself, be a function of age, sex, number of children, number of adults, and family structure – such as whether there is a married couple heading the family, whether the family is headed by a woman without other adults present, and whether the household contains a nuclear family or is extended to other relatives.

This utility function would be maximized by the household subject to the constraint of its income (Y) and prices (P^H representing the vector of prices for housing characteristics and P^X representing prices of other goods).

In this simple model, the household's decision requires only that they compare the relative cost of renting and owning. Let Rt represent the household's tenure at time t, such that Rt takes the value 0 when the household rents and 1 when the household owns its house. Then the family decision can be characterized as:

$$\begin{bmatrix} R_T = 0 \text{ if } NPV(r_{T+t}) < NPV(m_{T+t}) + TC_T \\ R_T = 1 \text{ if } NPV(r_{T+t}) > NPV(m_{T+t}) + TC_T \end{bmatrix}$$

where r is the rental payment at time T+t, m is the mortgage payment (or opportunity cost of capital) at time T+t, TC is the transaction cost incurred at time T in the purchase of a home, and NPV is the net present value operator.

This simple model is inadequate to fully characterizing the housing tenure decision for at least two important reasons: it doesn't address the relationship between housing tenure and housing features nor does it sufficiently address the effect of time on the housing tenure choice.

First, the vector of housing characteristics, H, may itself be a function of housing tenure. For example, as noted earlier, large homes are not readily available in the rental market, thereby skewing the tenure choice in the direction of ownership for anyone who has a

[12] For the purposes of this model, we will simplify the household decision-making process by treating it as a monolithic unit with a single utility function. Although this is not an appropriate assumption for many purposes, we do not believe that the complexity of including the intra-household decision-making process into the model would be worthwhile relative to the marginal contribution it would make to understanding housing tenure strategies at this level. This study initially hypothesized that the more adults in the household would increase the probability of building a house (substituting own-labor for monetary resources); however, this variable was never significant in any of the estimations.

strong preference for a lot of space. Similarly, certain locations (such as downtown areas) may not have a large supply of housing available for purchase, but may have rental units available.[13] This can be introduced into the model by recognizing that H may be a function of R.

The second issue is more complex. The housing tenure decision involves choices about future streams of housing payments and housing services, and ownership provides an individual with collateral. The ability to borrow against that capital may make it possible to smooth consumption of housing services over the lifecycle. If we introduce this time dimension and the ability to borrow, then the household's optimization strategy can be characterized as:

$$\underset{X,H,R,B}{\text{Max}} \sum_{t=T}^{\infty} \delta_t U_t(X, H(R))$$

subject to the intertemporal budget constraint:

$$\text{s.t. } \sum_{t=T}^{\infty} \delta_t \left[\left(P_t^X X_t + P_t^H(R) \cdot H(R) \right) + \lambda \left(i \sum_{t=0}^{T-1} B_t - B_T \right) \right] \leq \sum_{t=T}^{\infty} Y_t$$

where we have introduced * as the discount rate; Bt as the amount of borrowing (or savings if negative) at time t; and i as the interest rate or opportunity cost of capital. Additionally, 8 has been added as a parameter to represent access to credit – when 8 is 0, the household has no access to credit and the entire term drops from the equation; and when 8 is 1, the household can access credit to the full extent of its lifetime earnings. Furthermore, the price of housing has to be modified as:

$$P_t^H = R_t r_t + (1 - R_t) \cdot m_t + \nu TC$$

in which the parameter n takes on the value 1 only for the period in which transaction costs are incurred, and is 0 otherwise.

At any point in time, the household's optimal utility will be a function of the exogenous parameters for prices, discount rates, interest rates, and access to credit, as well as endogenous factors of housing characteristics, consumption of other goods, tenure, and borrowing (savings). The tenure choice can then be characterized by noting that in equilibrium, the household will rent if and only if:

$$\sum_{t=T}^{\infty} \delta U_t^*(X^*, H^*(R, B^*) | R = 0) > \sum_{t=T}^{\infty} \delta U_t^*(X^*, H^*(R, B^*) | R = 1) \quad . \qquad (1)$$

[13] In equilibrium, one would expect the relative supply of units for rent and housing to match the distribution of preferences. Under reasonable conditions related to information costs, appreciation of capital, and legal constraints, this may not be the case.

This incorporates the effects of tenure decisions on the marginal cost of housing attributes (such as rooms and location); the marginal utility of the particular housing attributes to the household; and the relative net present value of housing costs (monthly rental payments versus transaction costs and a mortgage or foregone interest on savings). The equation can be estimated by standard logit methods.

The model assumes that the household is in equilibrium, which may be problematic for several reasons related to information costs, uncertainty, and transaction costs. Although we do not judge these factors to be critical to estimating the model, we are concerned that the model presumes knowledge of the entire vector of current and future goods, housing services, and income. In particular, the data set contains information on current household income that may or may not be correlated with either the net present value of all future earnings or the expectation of future earnings at the time an owner chose to purchase a house. These qualifications should be kept in mind in interpreting the results below.

Thus far, we have looked only at the binary choice between renting and owning. As pointed out earlier, there is substantial evidence that housing tenure decisions in Latin America are more complex due to the availability of a second route to ownership. In particular, if people also have the option of purchasing land informally and progressively building their home, then access to credit may not be as much of an impediment to ownership. The model above can be extended to incorporate this second route by adding a third tenure choice. When R is 0 it still indicates that the household rents. However, for households that own their home, R is 1 when the household purchased the house on credit or with savings ("buyers"), and R is 2 when the household acquired the house through progressive building ("builders"). While deciding to buy is affected by mortgage payments (or the opportunity cost of capital) and transaction costs in the formal market, the decision to build is affected by the opportunity cost of household labor, different transaction costs, and a discount for the uncertainty of unregistered ownership.

This leads to a household problem that can be summarized as:

$$\underset{X,H,B,R}{\text{Max}} \quad \sum_{t=T}^{\infty} \delta U_t(X, H(R,B)),$$

in which the household maximizes its utility by choosing an optimal path of consumption of non-housing goods (X) and housing goods (H) which are themselves affected by the choice of tenure (R=0,1,2, i.e., owning, building or buying) and borrowing (B) subject to the intertemporal budget constraint described earlier.

This model can be estimated with standard multinomial logit techniques. Thus, either in the binary or multinomial framework, we can test the determinants of tenure (1) as a direct result of the demand for housing characteristics (affected by age, sex, number of children, etc.), and (2) as the result of access to credit (using non-housing assets as a proxy for δ). Furthermore, we can compare the binary and multinomial specifications to see whether the 3-way characterization of the tenure decision is preferred to the binary one.

Determinants of Tenure: the Life Cycle and Financial Resources

This section estimates the formal model discussed above. The variables utilized in the analysis are summarized in Table 12. The first estimates are for those in which households are presumed to choose only between renting and owning. For this purpose, the household was classified either as a renter or as an owner according to the information provided by the survey. Specifically, a household was classified as a renter or owner based on a question that asked the individual to classify the household within 8 categories. Five of the categories were owners of different status (formal, informal, etc.), while 3 categories were renters. Later, builders and buyers were distinguished on the basis of whether they acquired a completed unit at the time they occupied it.

Most of the other variables are self-explanatory. Heads of household were classified in educational categories based on the highest level of education that they attained. Those who had no education or did not complete primary school were the excluded category in the estimations. The durable goods measure is a dummy constructed from a question asking whether the family has such goods as refrigerators, radios, and televisions. From an original sample of 1427 households, 87 were dropped because of missing information. The final sample, then, included 1340 households for whom summary statistics are presented in Table 13.

Table 12 Variables Utilized in the Analysis	
Variable	**Definition**
Own-Rent	Owning versus Renting: 0 = owner, 1=renter
BuildBuyRent	Buying, Building, Renting: 0=Buyer, 1=Builder, 2=renter
David	City: 0 = Panama, 1=David
Hhage	Age of Head of Household
HHage2	HHage squared
Children	Number of children in household
Married	Head of household is married: 0=no, 1=yes
HHGender	Sex of Head of Household : 0=male, 1=female
HHIncome	Monthly income of head of household
HHIncome2	HHIncome squared
Primary	Only completed primary education: 1=yes, 0 otherwise
Secondary	Only completed secondary education: 1=yes, 0 otherwise
Tertiary	Some or completed tertiary education: 1=yes, 0 otherwise
Interest income	Interest income received by head of household
Durable Goods	Durable goods: 0=few durable goods, 1=many durable goods

Table 13 Summary Statistics for the Sample		
Variable	Mean	Std. Dev.
Children	1.5	1.4
HHage	47.2	14.4
HHincome	319.2	317.8
Primary	0.4	0.5
Secondary	0.1	0.3
Tertiary	0.1	0.3
David	0.4	0.5
Married	0.8	0.4
HHGender	0.2	0.4
Interest Income	1.7	21.0
Durable Goods	0.0	0.2

Table 14 reports the results of a binomial logit model that correctly predicts the household's tenure choice for about 80% of the sample. The main variables of interest are those related to the family lifecycle, including age, marital status, and number of children, along with those related to income and access to credit. The results support the notion that the household's stage in its lifecycle has a strong impact on the tenure decision. The number of children, the age of the household head and its square, and marital status increase the probability of owning a home, with coefficients that are statistically significant. Under a variety of specifications, children and age of the household head were always statistically significant. Furthermore, the age of the head of household had the largest impact of any single variable on the probability of renting versus owning. Number of children had a smaller but still significant effect. By contrast, marital status was not as robust to alternative specifications. Interestingly, another measure that is often associated with household preferences, the gender of the head of household, does not have a

significant impact on the tenure decision in this binary choice model. In none of the specifications that were tested was the gender of the household head significant.

Income appears to have only a small impact on the tenure decision, despite the descriptive data that showed that a slightly higher portion of higher income households rent (see Table 6). Income and its square are statistically significant, but affect the probability of renting by very little compared to the lifecycle variables discussed above. In fact, after controlling for other factors, mainly lifecycle variables, the estimates in Table 14 indicate that higher incomes are associated with a somewhat lower probability of renting. A 50% increase in age from the sample mean reduces the probability of renting from 21% to only 15%, while an increase in income of 50% reduces the probability of renting from 25% to 22%. Alternative specifications of income were tested, using categorical variables and removing the quadratic term, and occasionally the statistical tests showed the coefficients to be insignificant in this dichotomous model.

Table 14
Renting Versus Owning: Logit Model
(Ratio of Probability of Renting to Owning)

Variable	Probability Ratio	Std. Err.	P>|z|	Joint Hypothesis Tests – Chi2
Age				**52.64(2)**
Hhage	**0.878**	**0.025**	**0.000**	
Hhage2	**1.001**	**0.000**	**0.001**	
Child	**0.864**	**0.046**	**0.006**	
Married	**0.599**	**0.144**	**0.033**	
HHGender	0.772	0.212	0.345	
Income				**11.26(2)**
HHIncome	0.999	0.001	0.092	
Hhincome2	1.000	0.000	0.858	
Education				**26.02(3)**
Edu2	1.758	0.300	0.001	
Edu3	3.360	0.814	0.000	
Edu45	2.122	0.574	0.005	
Asset proxies				**11.45(3)**
Interest Income	1.007	0.004	0.073	
Durable Goods	**0.354**	**0.170**	**0.031**	
David	**0.703**	**0.103**	**0.016**	
N = 1340		chi2(13)	145.38	
Log Likelihood = -680		Prob > chi2	0	

Notes: Variables that are significant at the 5% level are indicated in boldface.

Three variables were introduced which can be considered as proxies for assets or access to credit. The head of household's interest income was considered a proxy for interest bearing assets, while the number of durable goods were considered a proxy for savings potential. A dummy variable for the city of David was included, originally to characterize

the difference between the Panama City and David housing markets. However, the only significant difference that we detected between the samples in Panama City and David was that households in David made much greater use of formal and informal credit to purchase their homes. Therefore, we have interpreted this regional dummy to reflect what appears to be a significant difference in access to credit in the two cities.

Of these asset or credit proxies, the durable goods and city variables were statistically significant, while interest income was not. The three variables together were jointly significant. However, these variables need to be interpreted with care for several reasons. First, they were not always significant under alternative specifications. Second, they are poorly measured and may be weak proxies for what we are actually trying to measure. Third, in the case of David, the variable may be representing some other difference in the local housing market related to land use, relative scarcity, or different preference structures for people who have chosen to remain in a smaller city.

Education is a very robust variable and has a strong impact on the probability of renting. Curiously, more educated household heads are more likely to rent. This relationship, which contradicted our expectations, is also found in the literature on United States housing markets. Henderson and Ioannides (1983) demonstrate that young individuals with more education and, consequently, expectations of more steeply rising earnings in the future are likely to rent because their consumption demand for housing is higher than their investment demand.

The relationship between education and tenure, then, can be understood by recognizing that this educational effect occurs after *current* income and age are included, and the measured effect of education on the rent-own decision is related to something other than the effect of education on current earnings.[14] Estimating the two-way model without education reduced the explanatory power of the income variable. Current income has a small influence on the rental decision while permanent income and, more specifically, expectations of steeply rising future earnings have a large impact. The evidence is consistent with the notion that the combination of current income and education variables (as proxies for permanent income) allows the model to more accurately distinguish the effects of two different time dimensions of earnings.

The fact that the sex of the head of household had no significant impact on the tenure decision bears on a longstanding expectation that households headed by women are more likely to prefer renting. This expectation was based on the notion that female headed households are more vulnerable to income shocks, less stable, or need close proximity to other social resources. Particularly for women bringing up children without a partner, this

[14] There are a variety of other possible explanations for the importance of education which we considered to be less likely, including: a) preferences (more educated people like to live in areas of the city that are primarily available for rent), b) that educated people are more mobile (therefore less willing to pay transactions costs for what could be a temporary stay), and c) educated people delay decisions due to the length of time in school – so that they are effectively 5 – 10 years behind others in a standard lifecycle pattern.

preference might be linked to access to childcare. Another hypothesis linked the preference for renting to women having less experience with construction. The first rigorous examination of household demand for housing found no such preference (Malpezzi, Mayo, and Gross, 1987). More recently Arimah (1997) did find that the sex of the household head was significant in predicting tenure choice in Nigeria. However, no such effect was observed in any of the models tested for Panama. This suggests that while female headed households are more likely to be poor and to lack access to credit in Panama, their housing decisions are like those of other households in similar circumstances.

The robustness of this specification was evaluated by estimating the model with several variables included or excluded. Age of household head and number of children continued to be significant factors; while income and assets were occasionally insignificant The same model presented in Table 14 was also estimated excluding all the renters who, oddly enough, reported paying no rent.[15] Again, this had no effect upon the main conclusions.

This estimate would be appropriate if the only housing strategies available to households in Panama were to rent or own. However, as noted earlier, households become owners in two very distinct ways: by buying and by building. Table 15 presents the results of estimating a multinomial logit model in which households are assumed to choose between renting, buying and building. This classification was made in two stages. First, those who listed themselves as renters were considered to be renters. Second, the remaining households were divided between those who said they acquired a completed house and those who reported acquiring a partially completed house or site. If the household owns its home and the house was complete when they purchased it, then they are classified as "buyers". If the household owns its home and they initially purchased a partially completed house or just a site, then they are classified as "builders".

[15] These may be families who are living with relatives in an informal "rental" arrangement, whether because they are newly formed or in transition. If this is so, then they would correspond to the "*allegados*" or "attached" families who are identified in the literature on Chile.

Table 15
Building, Buying, and Renting: Multinomial Logit Model
(Ratio of Probability of Renting or Buying to Building)

Variable	Probability Ratio	Std. Err.	P>|z|	Joint Hypothesis Tests – Chi2
Buyer				
Age				2.63(2)
HHage	0.952	0.035	0.182	
HHage2	1.001	0.000	0.140	
Children	0.975	0.057	0.662	
Married	0.850	0.260	0.595	
HHGender	1.082	0.377	0.821	
Income				**12.52(2)**
HHIncome	**1.002**	**0.001**	**0.001**	
HHincome2	**1.000**	**0.000**	**0.031**	
Education				**11.90(3)**
Edu2	**1.742**	**0.351**	**0.006**	
Edu3	**2.599**	**0.787**	**0.002**	
Edu45	1.697	0.528	0.089	
Asset Proxies				**29.99(3)**
Interest Income	0.969	0.020	0.129	
Durable Goods	1.875	0.687	0.086	
David	**2.331**	**0.380**	**0.000**	
rent				
Age				**49.94(2)**
HHage	**0.870**	**0.026**	**0.000**	
HHage2	**1.001**	**0.000**	**0.000**	
Children	**0.860**	**0.047**	**0.006**	
Married	**0.577**	**0.145**	**0.028**	
HHGender	0.783	0.223	0.389	
Income				**6.34(2)**
Hhincome	0.999	0.001	0.239	
Hhincome2	1.000	0.000	0.762	
Education				**32.65(3)**
Edu2	**1.923**	**0.334**	**0.000**	
Edu3	**4.174**	**1.073**	**0.000**	
Edu45	**2.304**	**0.644**	**0.003**	
Asset Proxies				5.16(3*)*
Interest Income	1.006	0.004	0.130	
Durable Goods	0.392	0.193	0.058	
David	0.858	0.130	0.313	
N = 1340		chi2(26)		218.31
Log Likelihood =	-1163.92	Prob > chi2		0.0000

Notes: Variables that are significant at the 5% level are indicated in boldface.

Consistent with our model, the amount of total assets and income are the only variables that explain the difference between builders and buyers in most regressions. The only other significant variables are the education dummies. The three variables representing asset and credit proxies are associated with a higher probability of being a buyer rather than a builder; yet in this three-way model they have no significant impact on being a renter. In other words, the existence of two routes to home ownership in Panama means that income and assets – both critical to mobilizing the resources and financing for purchasing a home – make little difference to the decision of renting versus owning. However, they significantly affect the choice between strategies for acquiring a home once the family has reached the decision to cease renting and "settle down".

Once again, the education variables are also significant and have large effects on the probability of renting versus owning *and* on the probability of buying versus building. Following our earlier discussion, these results are consistent with the notion that education variables are acting as proxies for permanent income and expectations regarding future increases in income.

The relative magnitudes of the lifecycle and income effects can be seen in Figures 1 and 2. The effects of changing the household head's age and income were simulated for the sample, and the resulting changes in the magnitudes of the probabilities were calculated. In Figure 1, changes in the household head's age can be seen to have a more significant impact on the probability of renting than changes in income. By contrast, Figure 2 shows that the impact of age on the probability of buying versus building is smaller and significantly less than the impact of income. The actual estimates can be seen in Table A.3 in the appendix.

Figure 1

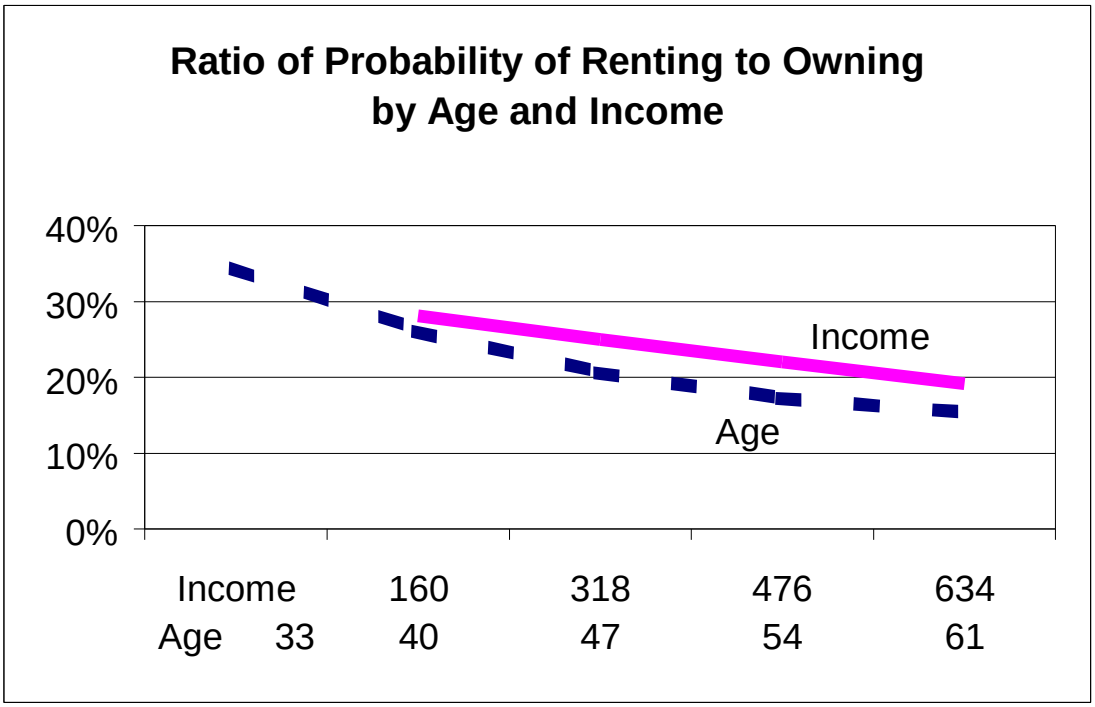
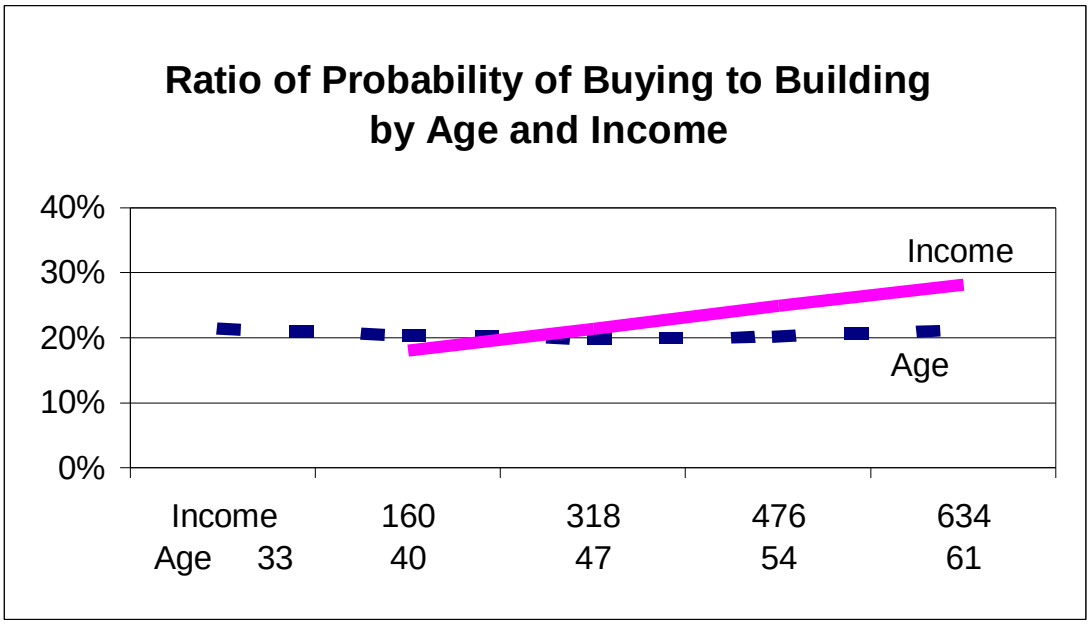


Figure 2



The main variable that accounts for the effect of the asset proxies is the regional dummy for David. It was shown previously that people who live in David had a bigger probability of being a buyer than a builder. This finding could be a simple indication that relative prices favor ownership by purchase in David (e.g. land prices may be low). However, it is also true that in tabulations of the samples in each city, the only significant difference was the share of households who used credit to acquire or improve their homes. This share was 32% in David compared to only 16% in Panama City (See Table A.2 in the appendix). If the credit market functions differently in David – either because supply is greater or enforcement of repayment is facilitated by better communication, networks, or reputation effects in a smaller town – then it may account for the significant difference in the probability of home ownership in David.

The variables that significantly influenced the probability of being a renter in this three-way model are the same ones that were significant in the binomial model, with some minor differences. In particular, the income variables lose some of their statistical significance, and the Durable Goods and David variables are no longer significant. In other words, the multinomial model reproduces the binomial results with the additional value of allowing us to distinguish statistically significant differences between buyers and builders.[16] Furthermore, it allows us to demonstrate that the main reason that income and assets were important to the renting versus owning decision is due to the contrast between renters and buyers. By contrast, income and asset variables have no explanatory power to distinguish renters from builders. Robustness was tested by using different specifications, excluding age, and excluding renters who reported no rental payments. Again, the main findings were confirmed.

In sum, the estimation confirms that for Panama, a three-way choice model is more useful for understanding tenure choice than a dichotomous model focused on renting and owning. The three-way choice model not only provides evidence to support the notion that two distinct strategies for acquiring housing exist in Panama, but also makes it possible to more clearly distinguish the different impact of lifecycle and wealth on these tenure choices. Specifically, the decision to own appears to be heavily influenced by lifecycle variables, whereas the choice of building versus buying seems to be strongly affected by wealth, income, and access to credit.

Conclusions

The quantitative estimates of the tenure models confirm that households view buying and building as two independent alternatives to renting. As a result, household decision making can be best conceived as a two-stage process. In the first stage, households choose

[16] A formal test for the Independence from Irrelevant Alternatives (IIA) assumption was conducted by comparing the coefficients from all pairwise combinations. The coefficients were statistically different when alternatives were grouped (buyers with builders, builders with renters, buyers with renters). This demonstrates that the alternatives are independent and that the specification is appropriate. For details on the issue of IIA see Amemiya (1985).

between renting and owning. Here, financial constraints have a limited impact and lifecycle issues primarily age and the number of children -- both of which affect the stability of household preferences and expectations -- dominate the decision.

Lifecycle factors probably affect the tenure decision in two ways. First, the existence of transaction costs means that individuals who are not certain about how long they will be residing in a particular location will be less likely to choose to own their home. If they move shortly after becoming an owner, they would have to amortize those transaction costs over a shorter period and this raises the net cost relative to renting. Consequently, younger households are likely to rent or find other, more temporary, arrangements, and only seek to own their home when they are older and have more stable expectations regarding their work and family life. The second factor is the way the household lifecycle affects the demand for housing attributes that have different relative prices in the housing market. Households with more children generally seek larger housing. However, in Panama, the rental market is largely reserved for apartments, for which the marginal cost of an additional room is high compared to the cost in separate houses. Therefore, as the family passes through its lifecycle, the net benefit of owning a house rises relative to renting because of this feature of housing supply.

In the second stage of the decision process, households choose between buying and building. Here the key factors are financial, with income and perhaps a household's assets as the key variables. These factors determine whether a household has access to mortgage financing and this, for most households, determines whether they can get immediate access to a complete house, or whether they will need to take the time to build a house themselves.

More broadly, the study suggests that income is not as critical to the decision to own precisely because the relatively unfettered activity of the housing market gives low income households a route to ownership that is not available in developed economies. Building is the dominant route to ownership for all income groups but it is overwhelmingly significant for the poor. As a result, many houses are initially occupied in severely sub-standard conditions. Nevertheless, for these substandard homes, the process of getting a house does not conclude when it is first acquired. Households invest in improvements, and the aggregate effect on the quality of the housing stock is significant. By implication, in countries or cities where this route to ownership is constrained (whether due to topography or policies of violent eviction), tenure decisions will be more strongly determined by income.

Regarding other findings, the study suggests that neither marital status nor the sex of the household head has much impact on housing decisions. Marital status did show up as significant in some analyses, but the results were not robust. Sex, on the other hand, was consistently insignificant throughout the study. Even when marital status was removed from the equations, it did not affect this result. What characterizes women headed households is that they are, in many countries including Panama, more likely to be poor and to lack access to credit. Where land markets and other factors do not exclude the very

poor from ownership, it seems likely that women will choose to rent and own in ways that differ little from the choices made by other poor households.

Education was strongly significant in both models and the results were robust in all specifications. In the absence of any compelling explanation for why education would have a strong direct impact on tenure decisions and housing strategies, we explored the hypothesis that its significance is linked in some fashion to income. By considering alternative specifications, with and without education, it appears that education may be relevant in these models as a better proxy for permanent income that is more relevant to long-term housing decisions.

Policy Implications

The findings in this paper have implications for housing policy in Panama and in other developing countries. The implications apply to policies regarding the rental market, subsidies for ownership, and land markets.

Rental Housing. The standard recommendations to avoid actions that damage the private supply of rental housing are not contradicted by this study. Other studies have shown that regulations that attempt to control rents, or that prevent households from offering rooms to tenants, are likely to be damaging (World bank 1993; Gilbert 1991). In developed countries, public housing policies have often been two-faced – encouraging home ownership among the affluent through tax breaks or infrastructure subsidies, while supporting low income housing through rental units, directly supplied through public housing projects or with some form of rent support. In these countries housing markets are truncated so that there is little or no private supply of new low-cost housing. The focus on rental subsidies for the poor is justified if it is evident that such policies are more cost-effective than those that could be aimed at encouraging home ownership. By contrast, in Latin American countries where housing markets are less truncated and both renters and owners come from all income levels, it is difficult to imagine good reasons for policies that specifically subsidize renters.

Subsidies to Owners. Traditionally public policy in Latin America public has sought to encourage home ownership among the poor through direct construction of units that are distributed below cost to the lucky few. This has generally proven to be extremely inefficient.[17] More recently, public policies have promoted home ownership through targeted demand subsidies. If governments wish to subsidize ownership in some fashion, young households with two or more children are likely to benefit the most from help in moving out of rental housing because the subsidy may make a difference in the "timing" of the switch from renter to owner. For older households, and those with few or no children, the effect of a subsidy is not clear given the long-term impact of the tenure decision. Indeed since the decision to rent or own does not seem to be sensitive to financial constraints, it is perhaps less likely that the decision to own would be distorted by the offer of a subsidy. However, further research is required to investigate the effect of the

[17] See IDB 1996 for an analysis of the performance of public production of housing in Panama

size of a subsidy on tenure decisions. Subsidy programs that focus not so much on getting households out of rental housing but rather on helping low income "builders" improve their housing conditions (particularly with respect to hooking up to water and sanitation utilities), may well shorten the period that these households spend in substandard housing. Such targeted subsidies might be an efficient way to improve welfare, particularly if they can be designed to avoid displacing the expenditures that households would have made otherwise.

Efficient Land Markets. Low-income households are very dependent on the building strategy for becoming owners, and this route is itself very dependent on the performance of the urban land market, particularly on the periphery of growing cities. At present, many builders are forced to operate covertly. Measures that make land purchases and title registration easier would reduce transactions cost and increase security of tenure for all income groups, but the poor would benefit more than proportionally. Policies that promote more complete and competitive land markets are likely to be the most cost efficient way of improving the quality of housing for low-income households. Three kinds of measures seem promising. First, investment plans for water utilities and roads can be explicitly designed to open up new areas to occupation, helping households leapfrog blocks of land held by owners who choose not to subdivide or sell their properties. Second, lands already in public ownership can be put on the market in an orderly fashion, rather than being monopolized for public housing projects. Finally, in most countries a review of land use regulation, at both the national and local levels, would probably detect a variety of standards and enforcement mechanisms that create obstacles to the efficient development of the housing market, and which need to be overhauled.

The performance of the housing market in Panama is a powerful argument in favor of deregulating land markets. In developed countries, the regulatory controls that truncate the housing market by preventing the construction of substandard housing, are, presumably, justified by the public good aspects of land use and housing regulations. Moreover, the incidence of the welfare losses has traditionally been offset, at least in part, by the housing subsidies for low-income households mentioned above. By contrast, for developing countries, the situation is radically different. Many authorities have argued that in these countries, engineering, service, subdivision, and housing standards are generally set too high.[18] The current inability of city and national governments to enforce these standards is thus very fortunate. Enforcement would result in a more distorted, less efficient market, which would directly harm the poor. However, the de facto policy of unenforced regulations is no more than a clumsy second best. Policies that encouraged the orderly legal supply of unserviced but subdivided land parcels would be considerably more efficient since they would reduce the cost of an ex-post introduction of infrastructure. Such policies would also be equitable in that improved access to legal land would give particular help to low-income households that have the most to fear from the insecure status that prevails in many countries. The substantial upgrading of the housing stock over the past decade in Panama is testimony to the powerful effects that can result from a

[18] For example, Malpezzi and Mayo 1997 examine the cost of regulation in some East Asian markets.

combination of secure (if not registered) land title and the benign neglect of land use regulation.

Putting together these specific policy implications, governments would do well to explicitly focus on making life less difficult for low income "builders". In Latin America, it is still common for ministries to define their goal as the elimination of the housing deficit – which is clearly misleading. Construction programs that produce costly units that can only meet a fraction of the annual demand for additional houses certainly waste resources that could be better used if put directly in the hands of households following the "building" strategy. If investment in urban infrastructure takes the "building" strategy into account, it will not only accelerate access to services, but also improve its cost-effectiveness. Ironically, it may be the least costly policies that can have the most effect. Land use policies that force households following the "building" path to ownership to act illegally and land-titling procedures that deny them secure tenure or collateral can be reformed at very little cost but with the widest possible impact.

Appendix

Table A.1
Household Characteristics by Income Group

Household Characteristics	Monthly Income <300	301-600	>600
Number of Households	366	537	487
Share of sample	26.4%	38.7%	35.0%
Share of all urban/1	40.6%	25.8%	33.6%
Household size (persons)			
mean	4.0	4.4	4.8
median	4.0	4.0	4.0
Age of head			
mean	48.6	45.7	47.6
median	46.0	43.0	45.0
Households headed by women (%)	25.4	13.4	11.5
Formal employment/2 (%)	41.6	59.9	57.8

1. Based on census data. All other figures are from the sample.
2. Head of household is currently employed by a private enterprise or the government.

Table A.2
Unit and Land Acquisition in Panama and David: Owners
(%)

	Panama	David	Panama and David
Status of unit at acquisition			
complete unit	16	29.8	21.1
partial unit	7.8	9.8	8.5
plot with a least some services	9.6	23.8	14.7
plot with no services	66.7	36.6	55.6
Method of obtaining unit			
built unit	73.1	60.4	68.4
purchase from private entity	16.2	19.4	17.4
government	4	2	3.2
inherited	4.8	17.7	9.6
other	1.9	0.5	1.4
Method of obtaining land (a)			
purchase from private entity	36.1	77.4	49.5
MIVI	3.4	4.6	3.8
municipality	39.2	1.3	26.9
inherited	9	13.4	10.4
other	12.2	3.3	9.4
Who constructed the unit?* (a)			
family	54.2	34.7	47.9
friends	13.7	22.2	16.4
hired labor	39	60.3	45.9
Financing method (b)			
only savings	69	45.6	#NA
formal loans	16.1	31.6	#NA
other	14.9	22.8	#NA

(a) Population limited to those who built unit. Note that many households responded that a combination of family, friends and hired labor performed the construction. A household using all three labor sources would be counted in each of the three categories.
(b) Population limited to owners with initial purchase price between $6000 and $10000.

Table A.3
Probability of Different Forms of Tenure by Various Factors

	Three-Way Model			*Alternatives*	
	Buy	Build	Rent	Rent vs. Own/1	P(Buy|owner)/2
Age					
33	14.3%	51.3%	34.4%	34.4%	21.3%
40	15.1%	58.8%	26.1%	26.1%	20.2%
47	15.9%	63.5%	20.6%	20.6%	19.9%
54	16.9%	66.0%	17.2%	17.2%	20.2%
61	18.2%	66.4%	15.4%	15.4%	21.3%
Income					
160	12.8%	59.0%	28.2%	28.1%	18.0%
318	16.1%	58.9%	25.0%	25.0%	21.4%
476	19.5%	58.5%	22.0%	22.0%	24.9%
634	23.1%	57.9%	19.0%	19.2%	28.2%

Note: The values chosen for illustration represent the mean value for the sample plus and minus 1/2 and 1 standard deviation, except in the case of education.

1. Probabilities estimated from the two-way model.
2. Probability of buying conditional on owning from a two-way model for buyers and builders.

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