DVARA RESEARCH

Simulating Housing Choice for Low-Income Urban Households

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Abstract

It has been argued theoretically that the nature of risks confronting low-income households - income volatility, wealth allocation and the need for mobility - makes them unsuited to mortgage-based ownership housing. Testing this theory by mathematically simulating the effect of these risks on the wealth of a stylised urban low-income household over a twenty year period, we find that rental housing minimises the risk of undesirable wealth fluctuations of the households and is a much more appropriate housing proposition for low-income households, thus corroborating the theoretical arguments. In view of our results, we believe that the policy environment must incentivise the creation of rental housing solutions for low-income households.

1. Introduction and Objective

India is estimated to have an urban housing shortfall of 24.71 million, with 99% of the shortage pertaining to the Economically Weaker Sections (EWS) and Low Income Groups (LIG) (Report of the Working Group on Financing Urban Infrastructure, 2011). The lack of affordable housing solutions has led to the burgeoning of slums in India's cities, with almost a quarter of all urban households living in slums. Policy responses to India's affordable housing challenge have historically emphasised ownership housing. This has led to the share of rental housing in Indian cities falling from 54% in 1961 to 31% in 2011 (Gandhi et al., 2014).

Considering the unique characteristics of low-income households including income volatility, wealth allocation and the need for mobility, we argue that housing policy for low-income households ought to incorporate rental housing solutions, and that the current focus purely on ownership housing yields sub-optimal outcomes for these households. In this paper, we provide a detailed mathematical illustration of how a low-income household's wealth changes under the dual options of ownership and rental housing. We undertake this exercise to verify if the theoretical rationale for rental housing for low-income households is in fact corroborated by the results of a rigorous simulation exercise.

Specifically, the objective of this paper is to draw out the various paths that a household's wealth can take over a 20 year time frame under different housing arrangements. Household wealth paths will depend upon the trajectories of income and routine expenses, and subject to uncertainties surrounding health, death, employment and large one-time expenses such as weddings. We examine the wealth paths of the household under each of two scenarios: (i) when the household makes an investment in a house and (ii) when the household rents a house, and attempt to understand the nature of disparities in the observed household wealth paths.

2. Theoretical Rationale

Our arguments supporting rental housing for low-income households are centred on the nature of risks confronting them: the fundamental uncertainties around the quantum and timing of income flows, the optimality of wealth allocation into a fixed asset such as housing, and the demonstrated need for mobility on account of economic opportunity. Our earlier paper (Sahasranaman, 2012) provides a more detailed discussion of the arguments in this section.

<u>Low income households exhibit significant uncertainty in both the quantum and timing of income streams, and this makes long-term investments in housing fraught with risk:</u>

Households at very low levels of income are confronted with high levels of uncertainty surrounding this income on account of the largely informal nature of their occupations, but despite this uncertainty, at the very least, each household would in its hierarchy of expenses attempt to meet its basic needs of food, shelter and clothing. It is, for instance, known that that 92% of India's overall workforce is in the unorganised sector - with most employment being in the nature of casual wage labour and those that are self-employed (Report of the National Commission for Enterprises in the Unorganised Sector, 2007). This fundamental absence of job security is directly correlated to the uncertainty of their income streams. The informality of their employment, and the absence of meaningful labour laws offering them even minimal protections, means that both the quantum and timing of their income streams is fraught with uncertainty. In this context, a long-term investment in housing ends up adding considerable leverage on top of an already risky income profile, considerably exacerbating the precarious financial situation of such a household.

Ownership housing forces the household to invest in an illiquid asset closely correlated to the local economy and therefore leads to a concentration of the household's risks:

Once the basic consumption needs of a household are taken care of, financial theory tells us that the household will need to: (i) save for expected needs; (ii) invest in protection for times of adversity; and (iii) plan for growth of household wealth (Ananth and Shah, 2013). Therefore, it is only once the household has managed to set aside enough for consumption, savings, and insurance, and still has surplus left, can it plan for investment and increasing the household long-term surplus. While the specifics of investment strategies will depend on a case-to-case basis, low-income households ought to build stores of value in assets that offer good liquidity, good risk-adjusted return possibility, and good diversification away from local risks. In this context, it has been argued that low income households would do better to invest in lower risk and more liquid financial assets such as mutual funds or bonds rather than focusing their wealth on a single un-diversifiable asset such as housing (Goetzmann and Spiegel, 2000).

Low-income households need to be mobile in order to respond to employment opportunities, and cannot afford to be rooted geographically due to home ownership:

In view of the income uncertainty and wealth allocation risks confronting the household, the mobility of low-income households and their ability to seek opportunities in new geographies becomes critical to their survival. It has been found, for instance, find that prospects for better job opportunities are a major determinant of migration (Mitra and Murayama, 2009). Additionally, there is research which reveals that places with high home ownership rates also seem to have high rates of unemployment[1].

Keeping these theoretical arguments in mind, we turn to simulating the wealth paths of a stylised low-income household and analyse how these paths diverge under ownership and rental housing.

3. Household Profile

Demographics and Income:

We assume a five member household with two earning wage members, a male and a female, with two children, and one senior citizen. This is in keeping with average household size in India - the Max New York Life-NCAER India Financial Protection Survey estimates that average Indian household has 5 members and the average urban Indian household 4.81 members. By definition, the Low Income Group comprises those households whose income is no more than Rs. 2,00,000 per year (Task Force on Promoting Affordable Housing, 2012). The demographic and income profile of the household we consider is described below:

Members	Gender	Age	Marital Status	Expected Monthly Income
Member 1	M	40	Married	9,000
Member 2	F	35	Married	7,000
Member 3	M	8	Single	
Member 4	F	13	Single	
Member 5	M	64	Single	
Average Monthly Income				16,000
Expected Annual Income (Full Emp.)				192,000

Table 1: Demographic and Income Details

The two wage earners both work as informal construction labourers with the male earning Rs. 9,000 per month of work, and the female earning Rs. 7,000. This economic profile has been predicated on research which has shown that in developing countries, construction provides much needed work opportunities for some of the poorest and most marginalized sections of society; and that within the construction workforce in India, close to 90% of men and 97% of women are employed informally without contracts and any sense of job security. Additionally, despite the fact that women comprise half the construction workforce, they are systematically paid less than men, earning 10-20% less for the same work (WIEGO, 2011).

Expenses:

The Max New York Life- NCAER India Financial Protection Survey (2008) provides a break-up of the expenses of households on 'routine' and 'non-routine' items. Routine items comprise the basic needs of a household, while non-routine expenses comprise substantial one-time expenditures such as weddings and health emergencies. Based on estimates from the report, we calculate the routine expenditures for our household.

Expense	Share (% of routine expenditure)	Share (% of income)	Total Household Expenditure	Expenditure per Capita
Food	45.40%	27.69%	53,172	10,634
Housing	5.90%	3.60%	6,910	1,382
Health	4.60%	2.81%	5,388	1,078
Transport	11.10%	6.77%	13,000	2,600
Education	8.70%	5.31%	10,189	5,095
Clothing	6.80%	4.15%	7,964	1,593
Durable Items	5.00%	3.05%	5,856	1,171
Others	12.50%	7.63%	14,640	2,928
	100.00%	61.00%	117,120	26,481

Table 2: Routine Expenditures

The routine expenses we consider for our analysis are those relating to food, education, health, clothes and transport (housing is yet another critical expenditure, which we will come to later). These are fundamental expenses for the basic existence of any household. We assume that since these are the minimal expenditures critical to the fundamental well-being of the household, the wage earners will make all efforts to ensure that they are adequately met and thus not compromise on the household's fundamental needs. For our analysis, we calculate these basic household expenditures as growing over the 20 year period at the rate of inflation.

$$RE_y = (E_{fy} + E_{hy} + E_{cy} + E_{ey} + E_{ty}) * I_{fy}$$

where,

RE_y is the total annual routine expenditure for the year Y; $E_{fy}, E_{hy}, E_{cy}, E_{ey}, E_{ty}$ are the annual routine expenses on food, health, clothes, education and transport for the year Y; and I_{fy} is the inflation factor adjusting for the overall inflation from the base year to current year Y.

As for the rate of inflation, we have calculated the average inflation rate over the period 1983 to 2012 (μ) and the standard deviation (σ) of inflation over this period. We then simulate calculate future annual inflation, for each of the next 20 years, assuming inflation to be a normally distributed variable with mean μ and standard deviation σ. We apply the inflation

rate both to the monthly wages and to all expenses incurred by the household each year. Using the rates of inflation simulated, the Inflation Factor I_{fy} is calculated as follows:

$$I_{fy} = (1 + I_y) * (1 + I_{y-1}) * (1 + I_{y-2}) * .... * (1 + I_2) * 1$$

where, I_{y-1}, I_{y-2} are the inflation rates for the years Y-1, Y-2 etc.

We now turn to the quantification of the risks confronting the household.

4. Risks Confronting the Household

For our analysis, we consider the four primary risks that a household is confronted with, and the impact that these risks could have on the long-term wealth of the household.

Employment Risk:

The spectre of unemployment, and therefore income uncertainty, is a very real problem confronting low-income households on an ongoing basis. An unpredictable employment situation leads to volatility in household income over time, which makes it very difficult for the household to plan for savings, investments and growth. Depending upon the severity of unemployment and access to savings, low-income households could even find themselves at the cusp of poverty.

For the purposes of our analysis, we model the uncertain nature of informal construction employment by assuming that each working member of the household can be employed anywhere between 6 months and 12 months each year in their job, and earn Rs 9,000 and Rs 7,000 respectively for each month they are employed (also called Base Monthly Wages, or BMW)[2]. We assume that both working members of the household are employed for a minimum of 6 months each year. The model assumes an increasing probability of unemployment for each additional month. For instance, the probability that an individual is employed for 7 months is 0.857, while the same probability for 12 months is 0.143. In the months that an individual is not employed, we assume that he or she has zero income. This helps us simulate the variations in income produced by the inherent instability of informal sector unemployment over time. Table 3 represents the probability distribution for the number of months employed in any year.

Months - Employed	Probability
6	1.0000
7	0.8571
8	0.7143
9	0.5714
10	0.4286
11	0.2857
12	0.1429

Table 3: Period of Employment and Probabilities

Therefore, the annual income of the household for any year (Y) is:

$$AI_y = (N_1 * BMW_1 + N_2 * BMW_2) * I_{fy}$$

where,

AI_y is the Annual Income in year Y; N_1 is the number of months that the male wage earner is employed for that year; BMW_1 is the base monthly wage of the male wage earner when employed; N_2 is the number of months the female wage earner is employed that year; BMW_2 is the base monthly wage for the female wage earner when employed; and I_{fy} is the inflation factor for year Y.

Health Risk:

As Table 2 shows, the household expenditure survey data indicates that routine medical expenditures constitute 4.7% of total routine expenditures. However, low-income households are especially vulnerable to health shocks that could be catastrophic and require hospitalisation, as such a situation not only impacts the short term economic situation of the household, but depending on the severity of the event, can also influence the long-term wealth of the household. In fact, studies have found that catastrophic health expenditure could be the primary reason why households fall into poverty (Krishna, 2010). Low-income households also have little or no access to health insurance that can help offset the costs of hospitalisation and wage loss[3].

Based on data from the 60th round of the NSS, 2.4% of the households surveyed reported a hospitalisation event in a one year period, with an average expense per hospitalisation event of Rs 9806. We use this probability distribution to simulate annual hospitalisation events for the household for each year of the 20 year analysis. In the case of a hospitalisation event, the household incurs a cost of:

$$EHE_y = 9806 * I_{fy}$$

where,

EHE_y is the emergency hospitalisation expenditure for year Y and I_{fy} is the inflation factor for year Y. Therefore, the total health expenditure for the household is a combination of the routine health expense and the cost of hospitalisation in case of a catastrophic health event.

Death Risk:

The other important risk confronting the household is the death of the breadwinners and the impact that this can have on the long term well being of the household. The Committee on Financial Sector Reforms (2009) contends that low-income households have very limited participation in life insurance, meaning that in the event of untimely death of a breadwinner, the family is left with no financial protection - only 14% of the households in the lowest income quartile and 26% in the second quartile have access to life insurance.

The Mortality Table published by the Institute of Actuaries of India (2013), provides the benchmarks for the probability of death of an individual in the current year, given the current age of the individual. Based on this data, we simulate the life/death of each household member for each year of the 20 year period. The simulation returns a binary result for each year, where 1 indicates that the member is alive and 0 indicates death. In case any member of the household dies at some point in the twenty years, the income and expenses due to that individual will cease to be reflected in the overall household income and expenses from that point in time.

Wedding Expenses:

One-time expenses such as wedding expenses can be a tremendous strain on the low-income household's overall wealth, and depending on the financial situation of the household, drive it

deep into debt or even poverty. We assume marriageable age to be 21 years, and that once a member is married, he or she moves on to a new household and hence no longer forms a part of the household in question. All incomes and expenses of these members, once married, will not be part of the household's overall income and expenditures.

The household incurs a one-time fixed marriage expense which varies depending on the gender of the person married. It is estimated that mean wedding expenditure borne by households for the wedding of a daughter is Rs 95,956 (Desai and Andrist, 2010). We assume that the wedding expenditure for the son is 25% that of the daughter's wedding expenses. Therefore,

$$WE_{dy} = 95956 * D_y$$
$$WE_{sy} = 23989 * S_y$$

where,

WE_{dy} and WE_{sy} stand for Wedding Expenses for daughter and son respectively in the year Y; D_y is 1 if the daughter is 21 in year Y and 0 otherwise; and S_y is 1 if the son is 21 in year Y and 0 otherwise.

5. Housing Options

Now that we have defined the items of income, routine expenditures and underlying risks that determine the wealth of the household over the 20 year time-frame, it is time to consider the housing options available and attempt to draw conclusions on the suitability of rental housing vis-a-vis ownership housing for the low-income household.

Ownership Housing:

It is a broadly accepted benchmark that the Equated Monthly Instalment (EMI) paid by households on their mortgage not exceed 40% of their monthly income (Ministry of Housing and Urban Poverty Alleviation, 2011). For the household under consideration here, where the monthly income when both wage earners are employed is Rs 16,000, this maximum EMI works out to be Rs 6,400. If we consider a mortgage of Rs 5.75 lakhs at an effective interest rate of 12% for a 20 year period, the EMI works out to Rs 6331.

Loan	575,000
Interest Rate (fixed)	12%
Period of Loan (months)	240
EMI	6,331
EMI/Income Ratio	39.6%

Table 4: Mortgage Details

Assuming that banks provide mortgage financing for 75% of the value of the house, with the expectation that the house buyer brings in the remaining 25% as equity, a mortgage of Rs 5.75 lakhs indicates that the value of the house purchased is Rs. 7.2 lakhs[4]. At extant market prices, this would mean a house size of 175 square feet for a household of five members[5].

For the case of ownership housing, our analysis includes the EMI payment, which is a fixed payment of Rs 6,331 per month over the 240 month period, as the final item of expense before

calculating the annual surplus for each year. While the household is expected to meet its EMI commitment every year, our model also takes into consideration the possibility that the household might be unable to make the EMI payment or make only a partial payment in a given year. For this purpose, we assume that the household makes a mortgage payment only if the surplus (before housing expenses) for that year is positive. If this surplus is greater than or equal to the mortgage due for that year, the household makes a full payment; otherwise, the household only makes a partial payment equivalent to the extent of their surplus (before housing expenses).

If the household makes a partial or no payment in a the year Y-1, then,

$$MD_y = EMI * 12 + 1.24 * B_{y-1}$$

where,

MD_y is the mortgage due with ownership housing for the year Y; EMI is the monthly EMI payment constant, 6,331; B_{y-1} is the Balance amount due from the partial or non-payment in year Y-1; 0.24 is the rate of interest charged on the balance amount due[6]. $B_{y-1} = MD_{y-1} - MP_{y-1}$, where MP_{y-1} is the mortgage paid for the year Y-1. Additionally, the mortgage paid in year Y (MP_y) will first go towards the repayment of any accumulated balance on the mortgage due in Y-1. Only if the balance due ($B_y = 1.24 * B_{y-1}$) is completely paid off, will the mortgage paid in a particular year go towards regular EMI payments (EMI * 12).

The annual net surplus for the household in case of ownership housing is:

$$S_{oy} = AI_y - RE_y - EHE_y - WE_{dy} - WE_{sy} - MP_y + S_{oy-1}$$

where,

S_{oy} is the annual surplus with ownership housing for year Y; AI_y is the annual income for the year Y; RE_y is the total routine expenditure for the year Y; EHE_y is the emergency hospitalisation expenditure for the year Y; WE_{dy} is the wedding expense for daughter in year Y; WE_{sy} is the wedding expense for the son in year Y and MP_y is the mortgage paid for year Y; and S_{oy-1} is the annual surplus (if positive) left after making the mortgage payment for year Y-1.

We also estimate the net surplus of the household, inclusive of the household's share of ownership housing equity:

$$W_{oy} = S_{oy} + HE_y - B_y$$

where,

W_{oy} is the accumulated surplus under ownership housing in year Y; S_{oy} is the surplus accumulated in year Y; HE_y is the housing equity owned by the household in year Y; and B_y is the balance left on the mortgage in year Y.

For the purpose of calculating HE_y, we assume that every household holds a 20% stake in the house (equivalent to the down-payment made at the beginning) at any given point in time. For every successful EMI payment, the household gains an additional 4% stake in the house (modelled in this manner, the household gains the residual 80% stake in the house over a period

of 20 years). In the case of partial payments, the household does not acquire additional equity in the house until the balance mortgage due for a particular year (B_y) is zero. Furthermore, we assume that the total value of the house in the market appreciates at a rate of 8.07% per annum. This is based on the Residex, the housing index developed by the National Housing Board, which finds that the Compound Annual Growth Rate (CAGR) on residential properties for 26 Indian cities between 2007 and 2014 was 8.07%.

Due to a number of reasons including paucity of data, we have not modelled additional features of a standard home loan contract like pre-payment of the loan and foreclosure into the model. The model currently assumes, in the extreme, that a household can miss every EMI instalment until the 19$^{\text{th}}$ year and still gain 100% equity in the house by repaying the balance on mortgage in the 20$^{\text{th}}$ year. For a variety of operational and procedural reasons, banks might not tolerate this level of delinquency in reality and may decide to foreclose the house in the event of continuous non-repayment.

Rental Housing:

For the case of rental housing, we assume that the household lives in the same house as in the ownership housing case, but pays a monthly rent instead of an EMI. Based on data available (Global Property Guide) for the Indian cities of Bangalore and Delhi, we are able to calculate that the average EMI to Rent ratio for properties in Bangalore is 2.89, while that for Delhi is 2.70, and in the absence of other data points, we assume a Rent to EMI ratio of 2.75. Using this ratio, the monthly rent equivalent to an EMI of Rs 6,331 is Rs 2,302. Based on our assumptions, this level of rent amounts to an annual rental yield of 3.84%, well above the rental yields reported in the city of Mumbai where yields dropped from 3.5% in 2009 to 1.5% in 2011 (Task Force on Rental Housing, 2013).

In addition, another aspect of rental housing that we need to capture is the flexibility it offers, not only in the case of migrations in search of opportunity but also in cases of economic stress, when the household would be best suited by moving to cheaper accommodation. To capture this flexibility, we assume that the household has the option to move into an accommodation where monthly rent is Rs 1,000, in case it is unable to afford its normal rent payments. We assume that the rent of Rs 1,000 is the absolute minimum available in the market and that the household must pay this rent if it is to live in the city. This would entail the household moving to a house measuring approximately 85 sq. ft.

EMI to Rent Ratio (initial)	2.75
Monthly rental payment	2,302
Annual rental payment	27,627
Monthly Minimum Rental Payment	1,000
Annual Minimum Rental Payment	12,000

Table 5: Rental Payments

$$HR_y = REMI * 12 * I_{fy} \ if \ (S_{y-1} + AI_y - RE_y - EHE_y - WE_{dy} - WE_{sy}) \geq REMI * I_{fy}$$

$$HR_y = MinR * 12 * I_{fy} \ if \ (S_{y-1} + AI_y - RE_y - EHE_y - WE_{dy} - WE_{sy}) < REMI * I_{fy}$$

where,

HR_y is the rental expense for the year Y; REMI is the rent equivalent of EMI, Rs 2,302; and MinR is the minimum rent, Rs 1,000; and I_{fy} is the inflation factor for year Y.

The annual cumulative surplus for the household in case of rental housing is:

$$W_{ry} = W_{ry-1} + AI_y - RE_y - EHE_y - WE_{dy} - WE_{sy} - HR_y$$

where,

W_{ry} is the annual surplus with rental housing for year Y; and W_{ry-1} is the annual surplus with rental housing for year Y-1.

6. Simulation and Results

With the model constructed using the variables and formulae described above, we run one-thousand simulations of the 20 year wealth path of the household for both rental and ownership housing. Based on these simulations, the plot of household wealth for each year over the 20 year period clearly indicates that the low-income household is much better off under rental housing than in ownership housing.

Let us first, however, consider the ability of households to service mortgage debt over the 20 year life of the mortgage.
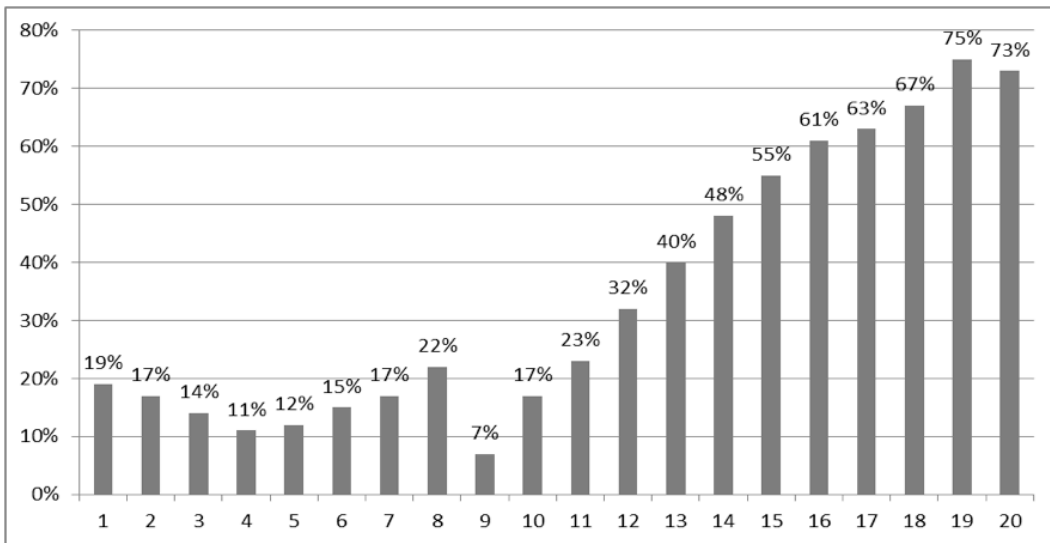
Figure 1: EMI repayment over the life of the mortgage

The inability of the household to service the EMI on a mortgage loan is illustrated in Figure 1. Figure 1 depicts the percentage of households that are able to service their mortgages each year in a trial of one thousand simulations. For example, it shows that only 19% of households are able to service their mortgages in the first year of the loan. A majority of the households consistently fail to pay their mortgages until year 15, when 55% of households service their mortgage. As the figure makes clear, this mortgage is therefore a clear recipe for loan default by the low-income household and grounds for repossession of the house by the lender. The

fundamental uncertainties surrounding the income and wealth of the household make it unsuited for ownership based housing.

Another useful visual representation to consider is the wealth envelope of the household. The wealth envelope is a representation of the best case and worst case wealth paths of the household, with the area in between these two paths representing the universe of possible wealth paths for the household.
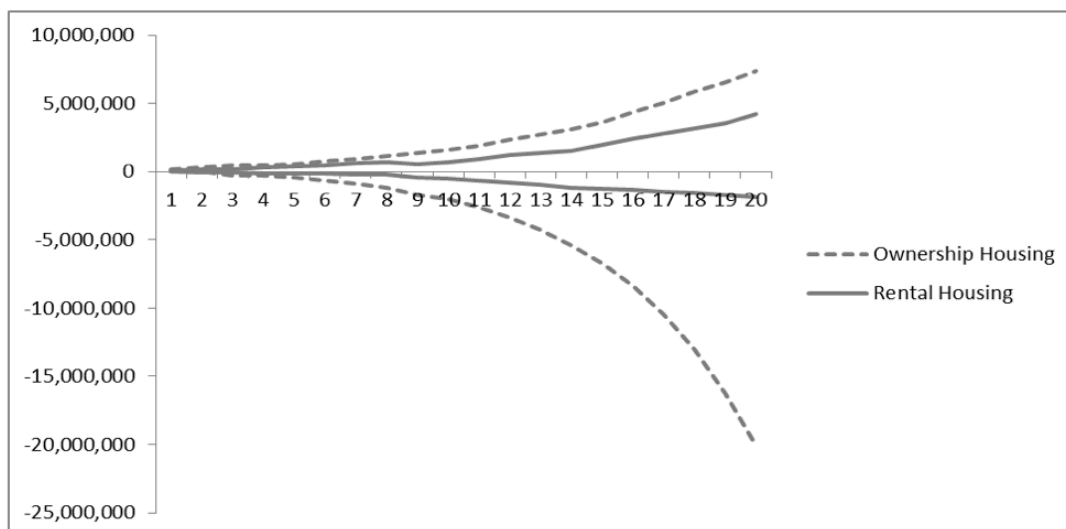

Figure 2: Wealth Envelope under ownership and rental housing

The dotted lines portray the maximum and minimum wealth paths under the case of ownership housing and the solid lines the maximum and minimum wealth paths under rental housing. Figure 2 clearly establishes that while the best case of surplus accumulation is better under ownership housing, the downside risk of ownership housing is large and potentially devastating for the low-income household. Remember that wealth under ownership housing is inclusive of equity in the house while rental housing makes no assumptions about the investment of surpluses by households.

The area under the ownership wealth envelope below the zero wealth line is substantially greater than the corresponding area for the rental wealth envelope. This indicates the significantly higher probability that a given wealth path under ownership housing will lead to negative wealth at the end of 20 years than in the case of rental housing. In fact, the rental wealth envelope has a very small area below the zero wealth line, and almost a zero probability that the wealth at the end of 20 years will be below zero, i.e. in almost all scenarios the household exhibits positive wealth after 20 years. Only 0.70% of households had negative surpluses at the end of the 20th year under rental housing as opposed to 21.60% under ownership housing.

In addition, the gap between the maximum and minimum wealth envelopes under both scenarios is of interest to us. The gap under ownership housing is significantly larger than the gap under rental housing, pointing to the high level of volatility in opting for a long-term mortgage-based loan. The rental housing option, on the other hand, is relatively less volatile with a high probability of the household having a positive value of accumulated surplus at the end of 20 years.

With the array of risks buffeting the low-income household, there is tremendous value in minimizing the risk that the long-term wealth of the household dips below zero, and prevent a

possible fall into poverty. Our analysis of the wealth envelopes clearly indicates that rental housing is the obvious risk minimising strategy for the low-income household. The results of the simulations clearly point to the unsuitability of ownership based housing for low-income households. They strongly support the arguments on income volatility, wealth allocation and mobility of low-income households, and make a compelling case for the need for low-income rental housing.

7. Conclusion

Mathematically simulating the uncertainties surrounding low-income households, it appears that rental housing is the more appropriate option for such households - this supports the theoretical arguments around the income volatility, wealth allocation and the need for mobility of low-income households. Based on our results, we believe it is imperative that sustained policy attention be paid to rental housing in urban India.

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Notes

[1] This is based on research conducted by Andrew Oswald of the University of Warwick and quoted in Barbara Kiviat's article in Time magazine, "The case against home ownership".

[2] According to the Task Force on Promoting Affordable Housing (2012), Low-income Group (LIG) households are defined as those households that have annual income between Rs 100,000 and Rs 200,000 per year, while Economically Weaker Sections (EWS) have annual incomes lower than Rs. 100,000.

[3] The Report of the Committee for Financial Sector Reforms (2009) states that vulnerability reducing financial services such as crop and life insurance are the most important financial services for the poor. However, it also

notes that significant expansion in access to these products is required for the vulnerability of a majority of low-income households to actually decrease.

[4]In reality, this is a price point that even most affordable housing companies are finding difficult to meet, as reported by Business Today magazine in the article, "No-frill Houses".

[5]Based on Gandhi (2012), we assume a property rates equal to Rs. 4,100 per sq. ft. The rates are calculated based on zonal property rates for Mumbai and the rates assumed pertain to Zone 6- Ghatkopar, Bhandup and Mulund.

[6]The rate of interest is based on actual market rates. See: http://www.hdfc.com/sites/all/themes/hdfc/images/pdfs/MITC_Final.pdf