

Estimating Home Values

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Information on home values is crucial for researchers and policy makers interested in analyzing and implementing well-informed public policies in the areas of taxation and infrastructure provision. The repeat sales methods, such as the S&P/Case-Shiller index, that are commonly used in the United States

to study house price dynamics are not feasible in many developing countries, where declared transaction prices for homes are often underreported for various reasons.

Homeowners also need a trustworthy measure of their home value to aid personal decision making such as retirement (Lusardi and Mitchell 2007), consumption (Campbell and Cocco 2007), savings (Juster et al. 2005), and the debt composition of the household (Disney, Bridges, and Gathergood 2006).

We have assessed the reliability of household survey data on homeowner estimates of home value in Mexico and argue that on average the estimates of short-tenure owners tend to be reasonably unbiased and precise. Homeowner estimates of property market price obtained through such surveys may be the most convenient and reliable means of tracking home values under some circumstances.

Valuing Homes in the United States

All major household surveys in the United States—the decennial census, the Panel Study of Income Dynamics, the American Housing Survey, and the Survey of Consumer Finances—ask a question such as: “*What is the value of this property; that is, how much do you think this property would sell for if it were for sale?*” The main argument favoring the use of such a question on home valuation is its ease of collection. It is also crucial to assess the reliability of these self-reported home valuations against other measures.

In Kish and Lansing (1954), homeowners in U.S. cities were asked to estimate the market value of their homes, and estimates for the same homes were later made by professional appraisers. The main finding was that the average bias in people’s estimates was around zero. That is, although individuals’ estimates could be quite different from the appraised values, the errors seemed to cancel out on average. This was an important finding, and it justifies the continued use of the question in large surveys. When the researchers focused on different subgroups, they found that new homeowners made the most precise estimates of their home value.

Housing built by a construction company in Acayucan, Mexico



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in Mexico

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There was no increase in accuracy if the respondent was the household head or had more education, or if the appraiser was able to enter the property during the appraisal.

Using the same methods and similar data, Kain and Quigley (1972) confirmed that errors were largely offsetting, but were correlated with the socioeconomic characteristics of the respondent. More education was associated with a smaller positive bias in the homeowner's estimate. This research also inquired into the determinants of nonresponse to the question, and found that those with higher incomes and education but shorter tenure in the home were more likely to provide an estimate of their home value.

Because the ideal estimate of the market price of a house is the most recent sale price, some studies have compared sales data for recent transactions with owners' estimates. Goodman and Ittner (1992), for example, compare owners' estimates with subsequent sales prices for the same property using the 1985 and 1987 American Housing Survey. They find that the average U.S. homeowner overestimates the home value by 6 percent above its sale price, and that the average absolute error is around 14 percent. The error is largely unrelated to the characteristics of the owner, the house, or the local market.

Another approach is to compare tax assessments with homeowner self-valuations (David 1968). The obvious problem with using tax assessments is that they may not be updated constantly to reflect current market conditions, resulting in a flawed impression of housing value. Overall these U.S. studies have found that, on average, owners tend to overestimate the value of their homes by around 5 percent. This overvaluation is unrelated to owner and home characteristics other than the length of tenure in the home. Such studies can thus be used reliably to obtain reasonable estimates of home valuation at a very low cost in U.S. housing markets.

Housing Markets in Developing Countries

In developed countries, access to land occurs mainly through formal purchases, while in developing countries it is not uncommon for a substan-



Self-built housing in Acayucan, Mexico

tial proportion of urban growth to occur through squatting, especially by low-income groups. They can organize themselves and invade government lands, protected areas, and even private property. By the time tribunals establish the illegality of such actions, some politicians may find it useful to provide protection and services to the squatters in exchange for their votes and political support, rather than removing them from the invaded land.

In some cases, local governments engage in expropriation of land that is later transferred to political constituents. Those who acquire their property under such conditions have a harder time determining the monetary value of the property since they did not pay for it initially. Sometimes the property cannot be sold easily since it lacks a valid title.

Another distinction of housing markets in developing countries is the large proportion of self-built housing stock where families acquire a home by building it themselves or hiring friends and family to help them over long periods of time. The prevalence of self-built homes, instead of housing developments by specialized construction companies, occurs in part because the financial system is underdeveloped, and mortgages are either nonexistent or very expensive. The lack of developed mortgage markets can force families into inefficient construction methods, because

the house is built in stages using whatever building materials are affordable and available at the time. These constraints can generate unnecessarily high construction costs, as well as unregulated and inefficient building practices. If people estimate their home's worth as the sum of the expenses incurred in building it, those homeowners in areas without mortgages would be more likely to value their self-built homes at a higher value because of their sweat equity.

Self-building can also influence access to information about the current market value of that property. Housing developments built by a construction company generally have a high degree of homogeneity, so house sales in the neighborhood will generate information on the current value of the surrounding properties. When housing is self-constructed, this information channel disappears, because such homes are not an adequate proxy for the value of another home in the neighborhood.

Jimenez (1982) provides one of the few studies of home values in a developing country. Using data from an impoverished neighborhood in the Philippines, he finds that the mean values of owner and appraiser estimates are not statistically distinguishable. His Philippine sample compares well with Kain and Quigley's (1972) results for St. Louis, Missouri, in terms of differences in average valuations.

Self-built housing in Acayucan, Mexico



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However, Jimenez finds the average absolute value of the differences between individual owner estimates and appraiser valuations to be approximately 55 percent of the mean appraised value, while the comparable figure for Kain and Quigley is approximately 20 percent.

Household Survey and Appraisal Data

Our analysis uses data from a household survey and appraisals for the same homes by an appraiser who is also a real estate agent. The survey, conducted between mid-February and mid-March 2006, included approximately 1,200 dwellings in the outskirts of the city of Acayucan, in the state of Veracruz in central Mexico.

The sampled homes were in the poorer districts of the city, where streets are not paved and many homes lack vital water and sewer services. The average house in the sample has 2.5 rooms. Only 63 percent of the dwellings have an indoor bathroom, and 60 percent have a roof made out of metal sheets, asbestos, or palm leaves. Further, 12 percent of homeowners reported they did not have a property title.

The interviewed families were the owner-occupants, not renters, and most of them lived in small, single-floor homes on a well-delimited lot. Among the housing questions in the survey was: "Approximately how much money do you think this house would sell for nowadays?" The average owner's estimated home value is \$19,948, while the average appraisal is only \$12,123 (all figures in 2006 U.S. dollars). The median difference, although much smaller (\$1,545), and the mean log difference are also significant for both measures. (See González-Navarro and Quintana-Domeque [2007; 2008] for a detailed description of the survey.)

The other source of data is the set of housing value assessments produced by a trained appraiser and real estate agent. Having only one person perform all the assessments minimized the risks of subjective decision making and varied assessment practices. The appraiser visited one out of every two homes where residents had been interviewed, and the assessments were performed within two months of the household survey, thus reducing concerns about house price inflation or volatility.

In the completed surveys, the response rate for the question on the owner's estimate of the home value was approximately 74 percent. One important advantage of this study's two-part procedure

TABLE 1
Average Bias and Inaccuracy of Homeowners' Estimates of Home Value

	All Owners in Sample	Tenure 1 year	Tenure 2 years	Constructed Neighborhood
Self-Assessed Home Value (P_s)	\$19,948 (0.00)	\$14,848 (0.00)	\$14,625 (0.00)	\$26,903 (0.00)
Appraised Home Value (P_a)	\$12,123 (0.00)	\$14,189 (0.00)	\$12,972 (0.00)	\$25,039 (0.00)
Error (bias) ($P_s - P_a$)	\$7,825 (0.00)	\$659 (0.83)	\$1,652 (0.39)	\$1,864 (0.50)
Percentage Error ($(P_s - P_a)/P_a$)	1.24 (0.00)	0.21 (0.42)	0.36 (0.11)	0.11 (0.32)
Absolute Error (inaccuracy) $P_s - P_a$	\$13,517 (0.00)	\$7,371 (0.00)	\$6,462 (0.00)	\$8,019 (0.00)
Absolute Percentage Error $(P_s - P_a)/P_a$	1.59 (0.00)	0.58 (0.01)	0.69 (0.00)	0.33 (0.00)
Clusters	52	11	16	1
Sample Size	267	12	23	14

is the ability to investigate appraised home values for the 26 percent of respondents who did not answer the question about home value. Hence, unlike any previous study, we look at whether non-response to that question by the owner is related to the home value as measured by the appraiser.

We found evidence that the average appraised value is equal for respondents who did and did not provide a home value estimate. Additionally, age, sex, household head status, and having a property title and tenure are not related to the probability of response. This suggests that homeowners who do not provide an estimate of home value are a random subset of the sample. This is an important finding if homeowner valuations are to be used in other studies to estimate average home prices in a locality in developing countries.

We assume that the appraiser's valuation is very close to the market value of the house. We also think it is reasonable to interpret the discrepancy between home values obtained from the owners and the appraiser as originating from homeowner's misperceptions about market value. There are several reasons justifying such an interpretation. First, the appraiser is likely to have a more accurate estimate than the owners of the lot size (one of the most important determinants of home value). Second, the appraiser can infer other housing characteristics accurately. Third, he is likely to be cognizant of the market forces involved in home valuation in the city.

The Relationship Between Owner and Appraiser Estimates

Table 1 shows the average degree of error and lack of precision or accuracy in the owners' estimates for several subsamples. As in previous studies, our results are shown for different measures of bias (the difference between the owner's and appraiser's home value estimates, and the percentage difference in terms of the appraiser's estimate) and inaccuracy (the absolute difference and the absolute percentage difference).

Among all owners in the sample the average difference between the owner's estimate and the appraised value is around \$7,800, indicating that owners tend to overestimate the value of their homes. The mean percentage difference is 124 percent of the appraised value. In terms of inaccuracy or lack of precision, the mean absolute difference is approximately \$13,500, reflecting how different the appraiser's estimates are from those of the homeowner's. On average, the owners in the sample have an unrealistically high estimate of the value of their home.

These results contrast with the available evidence for the United States and the Philippines. Both Kain and Quigley (1972) in St. Louis and Jimenez (1982) in the Philippines report a mean percentage difference of less than 0.5 percent. In terms of precision, we also find very different results. In our sample, the absolute percentage difference is estimated to be more than 150 percent,



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while it is approximately 55 percent in the Philippines and 20 percent in St. Louis. On the other hand, the error and inaccuracy results for short-tenure owners (less than two years) are statistically close to zero. The same result holds for mean percentage error; and the absolute percentage error is reduced by more than 50 percent.

As mentioned earlier, one of the differences between developed and underdeveloped housing markets is the lack of home construction by specialized companies and the lack of information about the distribution of home prices. The last column of table 1 isolates the set of homes that were constructed rather than self-built. For this

subgroup, the mean error and the mean percentage error are not statistically different from zero, while the absolute percentage error (33 percent) is the smallest of the four groups. This may suggest that owners of self-built homes provide upwardly biased estimates because self-building over time is more expensive than purchasing an already constructed house.

Determinants of Individual Bias and Inaccuracy

The results suggest that long tenure is responsible for the bias and inaccuracy in homeowners’ estimates. In González-Navarro and Quintana-Domeque

TABLE 2
Estimates of Mean Home Values at the Census Tract Level

Census Tract	Average Appraiser’s Estimate	Average Owner’s Estimate	Average Short-tenure Owner’s Estimate
1	\$9,789	\$26,406	\$12,636
2	7,045	14,072	3,636
3	21,221	27,480	37,576
4	8,724	21,127	9,091
5	10,743	14,321	14,318
6	12,395	15,680	10,152
7	9,583	14,613	13,636
8	14,082	14,267	16,667
9	11,074	12,215	3,030
Mean Difference (bias)		\$6,169	\$1,787
Mean Percentage Difference		0.63	0.07
Mean Absolute Difference (inaccuracy)		\$6,169	\$4,831
Mean Absolute Percentage Difference		0.63	0.38

Note: The means are calculated over the census groups in the top panel.

(2009), we show that neither the discrepancy in the lot size estimate nor the socioeconomic characteristics of the respondent seem to be correlated with the error or the lack of precision of homeowners' estimates. Only tenure is a significant correlate of bias and lack of precision.

Given these results, we subsequently estimated average home values at the census tract level to study the performance of the self-reported value depending on tenure status. As we argued earlier, self-reported value among homeowners with short tenure provides a more accurate estimate of average home value. One important issue with using only recent homeowners is the small sample size. Table 2 shows that the two measures of bias (mean difference and mean percentage difference) for short-tenure homeowners provide a less distorted estimate of the mean home value, as do the measures for mean absolute difference and mean absolute percentage difference.

Although we made every effort to obtain market prices to benchmark the professionally appraised values, the search proved elusive. This fact underscores the importance of assessing the reliability of self-reported home values in developing countries, where homeowners' estimated market values seem to be the most available measure of home value.

Conclusion

In our sample, the valuation bias associated with longer tenure is positive, confirming the results found for recently transacted homes in several U.S. studies. Our main finding is that the tenure-driven bias is potentially much larger in a developing country context. Owners with long tenure largely overestimate the value of their homes, with a mean absolute percent error on the order of 150 percent. However, families with tenure of two years or less have reasonably accurate and unbiased estimates of the value of their homes. A cluster of similar homes built by a specialized construction company shows zero bias and dramatically more precise estimates with respect to the other subgroups.

We find nonresponse to the question of home value to be uncorrelated with the appraised value of the house and other demographic characteristics of the homeowner. This suggests that unbiased estimates of the average value of groups of homes can be obtained through household surveys. Additionally, bias and inaccuracy are not robustly related to socioeconomic characteristics, such as family

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income or level of education of the respondent. To summarize, the results of this study caution against using homeowner estimates for analysis of individual behavior, but suggest that these estimates can be used to reasonably approximate mean home values for clusters of homes. If the objective is to estimate average home value, then the answers from homeowners with short tenure may be used successfully in future surveys in developing countries. ■