Chapter 7

REPORTED PRICES AND RENTS OF HOUSING: REFLECTIONS OF COSTS, AMENITIES OR BOTH?

Alan Heston and Alice O. Nakamura[1]

1.   Introduction

For the official economic statistics of nations, it is important that temporal and spatial variations in the cost of dwelling services are carefully measured.[2] Housing services often account for a quarter or more of reported consumer expenditures. The costs of owner occupied and rental housing services have important roles to play in both the Consumer Price Index (CPI) and the System of National Accounts (SNA).

For official statistics purposes, often an index of market rents does double duty as an index for the user cost of the services of rental occupied housing (ROH) and owner occupied housing (OOH).[3] This treatment of the cost of OOH services is referred to as rental equivalence. On theoretical grounds, the rental equivalence approach is often said to be equivalent to the user cost approach, and both approaches are in use by official statistics agencies.[4] However, this paper raises questions about the presumption that the approaches can be viewed as equivalent in

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practice, and more fundamentally about the presumption that shelter in a rented dwelling versus shelter in an otherwise similar owned dwelling are the same product.

The U.S. Bureau of Labor Statistics (BLS) incorporates changes in the cost of owner occupied housing (OOH) into the CPI using the rental equivalence approach. Also, the guidelines for the 1993 and the new 2008 SNA specify that a rental value of the housing stock should be included as part of the aggregates for personal consumption, personal income, income of proprietors and value added for the real estate industry.[5] The U.S. national accounts imputation for OOH services is obtained by applying to the stock of owner occupied housing the ratios of rent to property value (rent-to-value ratios) obtained from *tenant* occupied housing.[6]

The underlying economic theory is clear on how the discounted present value of a stream of rent payments relates to the price of a dwelling given frictionless markets.[7] However, in the real world, are the services that renters and owner occupiers get from otherwise similar dwellings the same, or in some sense sufficiently comparable? The results of the empirical portion of this paper lead us to believe that the answer to the above question is "no." In our view, too little attention has been devoted to the implicit assumption that housing cost information for *either* renters or owner occupiers can be suitably adjusted for use in assessing movements over time and space in the cost of housing for *both* renters and owners.

2.   Evidence of Patterns in Owner and Renter Valuations

The U.S. Bureau of Labor Statistics (BLS) asks owner occupiers the following question in the Consumer Expenditure Survey (CES):

> *"If someone were to rent your home today, how much do you think it would rent for monthly, unfurnished and without utilities?"* [8]

The BLS uses responses to the above question in determining the CPI weight for OOH versus ROH services. Note that in table 1, based on the 2002 CES, owner occupiers are found to devote a lower percentage of household expenditures to shelter than renters, and to have a higher average income.

Table 1. Household Expenditures (Actual and Imputed) for Owners versus Renters, 2002

	Total expenditures ($)	Shelter ($)	Shelter (%)	Average income before tax ($)
Homeowner	46,908	8,458	18.0	59,345
Renter	28,372	6,458	23.2	30,386

Source: Based on CES data.

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[5] See McBride and Smith (2001), and also Katz (2009), on the rent-to-value ratio approach.

[6] The European Commission (2001, p. 68) recommends: "In the case of privately rented dwellings constituting less than 10 percent of the total dwelling stock by number *and* where there is a large disparity between private and other paid rents (say, by a factor of three), as an alternative objective assessment, the user-cost method may be applied."

[7] Katz (2009, appendix A) and Diewert and Nakamura (2009) provide summaries of this theory.

[8] See BLS, 12/4/2003 at bls.gov/cex/csxann02.

Implicit assumptions commonly made in compiling housing statistics are that renters and owner occupiers value housing services in equivalent ways, *and* that the populations of available rental market and owner occupier housing units span the same quality universe. We can think of five reasons to question these assumptions:

R1. People, in the United States at least, seem to prefer to own their accommodations. Higher income people (e.g., Senator McCain and his wife) can better afford to indulge this preference. This situation could cause the rental market to be increasingly thin, moving up the income distribution, for rental dwelling units that are truly equivalent to those owner occupiers inhabit. Moving up in quality, the people who can afford to own may be increasingly uninterested in rental accommodation. Sometimes, however, higher end homes must be rented. For instance, an executive with a luxury home who is given an overseas assignment expected to last a year or so might choose to rent out their home in their home country while on that assignment as a way of reducing the risk of the home being robbed. Also, luxury homes are sometimes rented for periods of a year or so when there has been a death or a divorce but the division of property is still pending.

R2. The list of characteristics used in classifying homes omits many factors that could affect market values.

R3. Renters and owners may not have the same sorts of information. Homeowners may, on average, make more effort to learn about their homes before buying them than prospective renters make before signing rental agreements. Invoking an asymmetry of information framework, one might expect rentals entering the market to be of lower quality than owner-occupied units for features that cannot be readily measured.

R4. Owners may care more about certain amenities than renters because the average owner moves less often.

R5. We thought that owner pride might be a factor too. For example, we thought that a property owner might place greater value than the market would on, say, a purple bathroom with hot tub that they had designed.

Further study is needed of how owners and renters in different income and wealth groups value and purchase housing services. Here we take a small step toward trying to fill this need. The empirical work reported below is based on a survey of federal government employees conducted as part of a Safe Harbor process regarding the Cost of Living Allowance (COLA) program administered by the United States Office of Personnel Management. This program began in 1948 and pays an allowance above the federal salary schedule in three geographic areas (Alaska, the Caribbean and the Pacific) based on prices in these COLA areas relative to the Washington D.C. housing area. The program came under litigation. As a by-product, research was undertaken to improve the methodology of the comparisons. COLA survey data include a large number of dwelling characteristics, and both renters and owner occupiers were asked the CES question (reproduced at the start of this section) about what they believe their dwellings would rent for.[9] In compiling the CPI, the BLS only uses the CES information for renters and for

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[9] This program is directed at comparing the costs of living for federal employees in the non-continental United States to Washington D.C. area. Housing is one of the most important and most difficult of the comparisons required under this program. The COLA areas include Alaska, Guam, Hawaii, Puerto Rico, and the U.S. Virgin Islands: a very diverse range of climates and housing needs.

owner occupiers for determining the expenditure share weights for the rental and OOH index CPI components. However, this information can also be used to examine issues such as rent-to-value patterns, as we do in this study.

In the COLA sample, 82 percent of the respondents were homeowners, which is well above the 66 percent average for the United States as a whole.[10] Sample characteristics, including the average for rent as a percentage of the price of a dwelling, are given in table 2.

Table 2. COLA Program Results

	Number	Monthly Rent ($)	CV of Rent	Floor Area	Rent/Price (%)
Owners	3564	1308	0.38	1763	6.61
Renters	748	918	0.44	1295	5.97

A semi log regression was estimated using observations on both rented and owner occupied dwellings in the three COLA regions and the Washington D.C. housing area.[11] In table 3, the coefficients in rows a and b have been converted to index form, with the average rent of owner occupiers in the Washington D.C. area set equal to 100.[12] For the Caribbean, for example, the entry of 75.4 in row b means that, controlling for the other included factors (see appendix A), OOH rent equivalents are estimated at 75.4 percent of the Washington D.C. area level.[13]

Table 3. Rent Indexes for Owners and Renters
(with the average for Washington D.C. area homeowners is set equal to 100)

COLA AREA	Alaska	Washington	Caribbean	Hawaii-Pacific
a. Renters	98.4	86.2	68.5	113.2
b. Homeowners	117.9	100.0	75.4	109.9
c. Owner premium [(b/a)-1]*100	19.9	15.9	10.1	3.0

Note: The table entries are based on the relevant coefficient values from the pooled regression for which results are shown in appendix A.

The estimated percentage premiums for homeowners versus renters are shown in row c.[14] The premium is only 3 percent for the Hawaii-Pacific area, but is roughly 10 to 20 percent for the other areas. The implications of the owner premium figures in table 3 differ depending on the cause. The values are large enough to merit concern and further investigation.

Though the results do not seem to be widely known outside of official statistics circles, other analysts have reported declines in the rent-to-value ratio as the average house price

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[10] For the CES data, homeowners exhibited a larger standard deviation ($500 compared to $404 for renters).

[11] See appendix A for the list of included explanatory variables and the full regression estimation results.

[12] Goldberger's (1968) adjustment was used, adding half the standard error to a coefficient before exponentiating it.

[13] The D.C. housing area includes the District of Columbia and adjacent areas of Maryland and Virginia.

[14] As a further test of the direction of the premium, three pairwise regressions of the COLA areas with Washington were also estimated, all using the same specification as the pooled regression in the appendix.

increases (e.g., Garner and Short, 2001 and McBride and Smith, 2001). The rent-to-value ratios reported are about 17 percent for dwellings under $20,000 and 6 percent for dwellings in the $200,000-300,000 class in the early 1990s. Indeed, this is why the BEA now calculates rent-to-value ratios for dwellings grouped by value class.[15]

This effect can be explored with the COLA data because both owner occupiers and renters were asked to estimate the market values of their dwellings. The simple group averages display the same basic pattern found by others. To further investigate home value related, and also possible owner versus renter, differences in rent-to-value ratios, the following semi log regression was run using COLA data:

(1) $\quad \text{Log(Rent / Value)} = \alpha \text{Value} + \beta_i O_i + \lambda_i R_i,$

where $i = 1, \ldots, 4$ represents Alaska, the Caribbean, the Pacific and Washington, respectively; O is a dummy variable set equal to 1 for owners and equal to 0 otherwise; and R is a dummy variable set equal to 1 for renters and equal to 0 otherwise. (The omitted variable is for owners in the D.C. housing area.) Table 4 shows the predicted rent-to-value ratios in percentage terms, obtained using estimated equation (1), for four selected dwelling values and each of the COLA areas and the D.C. housing area, for renters (columns 1-4) and for owners (columns 5-8).[16]

Table 4. Estimated Rent-to-value Ratios (as Percentages)

	Renter				Owner			
	Alaska	Wash D.C.	Carib	Hawaii-Pacific	Alaska	Wash D.C.	Carib	Hawaii-Pacific
Value($)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
50,000	13.0	8.9	6.3	6.9	10.1	8.8	7.6	7.3
100,000	12.0	8.2	5.8	6.4	9.3	8.1	7.0	6.8
200,000	10.2	6.9	4.9	5.4	7.9	6.9	6.0	5.7
500,000	6.2	4.3	3.0	3.3	4.8	4.2	3.7	3.5

We see from table 4 that the rent-to-value estimates from the estimated equation (1) decline by more than 50 percent moving down the columns from a $50,000 to a $500,000 dwelling. Thus, we find that the rents that properties can command on the market decline

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[15] The BEA derives its estimate of the flow of rental services for OOH from the Census of Population and Housing and the Rental and Vacant Property Questionnaire of the Residential Finance Survey (RFS). For the RFS, property owners or their agents provide gross rental receipts from their units, excluding any extra services and estimate the selling price of the property. From these data, a table is produced of rent-to-value ratios by 15 value classes that BEA collapses to 11 classes. The total value of housing in each class is then derived from the American Housing Survey (AHS) that in turn depends on the estimate of the sale value of houses from those surveyed, about 50 to 60,000 units every two years. Total rental services are the product of value ratios in a benchmark year times the number of sample units in each value class. The average value over all value classes provides an average rent estimate in a benchmark year, which can be applied to the total of OOH. Between census years, this average rent must be updated taking into account improvements in quality of owned dwellings and any inflation in rents. The quality of the benchmark estimates depends on the stability of the rent-to-value ratio over time and across space.

[16] The equation statistics are $\text{adjR}^2 = .528$ with an F ratio of 494.6, with most of the explanatory power attributable to the value of the property. The coefficient on value was -.1629 per 100,000 value with a standard error of .0042.

dramatically as a percent of the dwelling values. These results seem most compatible with a market-driven cause like R1 above.

The answers that renters and owner occupiers provide for the CES question quoted at the start of this section are used by the BLS in estimating the expenditures of renter and owner occupier households on different categories of goods and services. A decline in rent-to-value ratios as property values rise will not necessarily lead to a bias in the CPI (because the rates of growth could still be the same). However, the documented decline could make the weighting factor for OOH too low, which could contribute to an underestimation of the level of OOH housing services and the level of total consumption. This effect also flows from an opportunity or user cost framework where elements in the calculation, like the cost of fund or expected return, are systematically related to income (see Diewert 2003 and Katz 2009).

How do our COLA estimates compare with other sources? In 2003, a report was prepared comparing estimates of the components of consumer expenditure based on the BLS Consumer Expenditure Survey and on the BEA consumer expenditure (CE) headings. Using additional information from the CES, Garner, Janini, Passero, Paszkiewicz, and Vendemia (2006) replicate the BEA rent-to-value ratio results. More specifically, they find that the rent-to-value ratio is 13.2 percent for a $50,000 home and 6 to 7 percent for a $200,000 home: roughly the same gradient we obtained using COLA data (table 4).

3.   Concluding Remarks

Controlling just for the physical features of owner occupied and rental dwellings, homeowners are found to put a premium on the housing services provided by their dwellings versus what renters would pay. However, the rent-to-value ratios are found to also differ by location and by the value of the property. We find, moreover, that when we allow for location and especially for home value, there no longer is evidence of a systematic premium for how owners value the housing services of their dwellings compared with renters.

For both owner occupiers and renters, we show that rent-to-value ratios fall moving from relatively low to relatively high value homes. This result is obtained for multiple locations, and using large sized data samples for different years.

For a nation like the United States, the services of owner occupied housing are measured to be more than a quarter of consumer expenditures, so it is very important that temporal and spatial variations in OOH costs are carefully measured. It does not seem to us that statistical authorities devote the proportion of resources to housing as to other categories of expenditure based on relative importance in the consumer budget. We feel this situation reflects, in part, a failure on the part of those controlling the budget allocations for the official statistics agencies to recognize the need for providing funding so that the statistics agencies can afford to improve their housing sector measures of inflation.

Appendix A. Hedonic Regression Results

Pooled Regression of Ln Rent on Rent Determining Variables, GLM Procedure, Homeowners and Renters Distinguished

Variable	Coefficient estimate	Standard error	t value	Pr> |t|
Intercept	6.220476	0.05531	112.47	<.0001
Renter in Alaska	-0.03601	0.038923	-0.93	0.3549
Renter in Caribbean	-0.39842	0.039631	-10.05	<.0001
Renter in Hawaii	0.07808	0.03247	2.4	0.0162
Renter in Washington	-0.17505	0.054213	-3.23	0.0013
Owner in Alaska	0.15516	0.019234	8.07	<.0001
Owner in Caribbean	-0.29388	0.02336	-12.58	<.0001
Owner in Hawaii	0.11526	0.018133	6.36	<.0001
Owner in Washington	0			
Number of bathrooms	0.118175	0.008976	13.17	<.0001
Number of bedrooms	0.02459	0.007363	3.34	0.0008
Number of other rooms	0.021024	0.006099	3.45	0.0006
Above average condition	0.0619482	0.011052	5.61	<.0001
Close to school	-0.04191	0.013467	-3.11	0.0019
Close to park	0.03844	0.013427	2.86	0.0042
Traffic or crime problem	-0.10042	0.03213	-3.13	0.0018
Parking available	0.05048	0.019688	2.56	0.0104
Cable available	0.05236	0.012741	4.11	<.0001
Deck	0.059659	0.011099	5.38	<.0001
Room air conditioning	0.055859	0.013413	4.16	<.0001
Age*Own 0	-0.002	0.001018	-1.96	0.05
Age*Own 1	0.000715	0.000397	1.8	0.0714
Area squared	-3.4E-08	1E-08	-3.17	0.0015
Area in sq. feet	0.000247	4.08E-05	6.07	<.0001

Notes: The omitted dummy variable is for owners in the D.C. housing area. The equation was run with separate coefficients for the age of the house of owners and age of house of renters to illustrate the differential effect. 4,312 observations were read; 4276 observations were used. The R-Square for the estimated equation is .4294, with a coefficient of variation of 4.666 and a Root MSE of .328384. The F Value for the equation as a whole is 145.48, with 22 degrees of freedom in the numerator and 4253 degrees of freedom in the denominator.

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