Chapter 7

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

Alan Heston and Alice O. Nakamura[1]

1.   Introduction

For many statistical purposes it is assumed that an index of market rents can do double duty as an index of the rental value of owner occupied housing (OOH). This rental equivalence approach is attractive in part because it parallels the user cost treatment of assets in the economics literature on investment and capital.[2] But in practice, the correspondence between the predictions of the rental equivalence and user cost approaches is not close.[3] On theoretical grounds, either approach could serve as a basis for rent indexes over time or across space, and for the weights of owner occupied housing used in the national accounts and the consumer price index. However, this paper raises questions about both approaches, and about the interrelationships between them.

For modern nations, it is important that temporal and spatial variations in costs for comparable dwelling services are carefully measured.[4] The costs of owner occupied as well as rental housing have important roles to play in both the consumer price index (CPI). Surveys of international practice report that (in addition to ignoring OOH as some official statistics institutes do) four different CPI approaches are in use: (1) rental equivalence, (2) user cost, (3) payments,

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[1] Alan Heston is with the Economics Department at the University of Pennsylvania, and can be reached at aheston@sas.upenn.edu. Alice Nakamura is with the School of Business at the University of Alberta and can be reached at alice.nakamura@ualberta.ca. This paper builds upon previous work of others, many of whom, but probably not all, are cited. In addition the paper has benefited from discussions with a number of people including Bettina Aten, Stan Austin, Thesia Garner, Eva Jacobs, Rocky Kochar, Don Paquin, and Harold Watts. Support from NSF Grant SES 0317699 is gratefully acknowledged. This paper draws on experience gained from the Cost of Living Allowance (COLA) program of the Office of Personnel Administration of the U.S. Government. As part of research under this program Rakesh Kochar of Joel Popkin and Company in Chapter 3 of their report evaluated housing based on a 1998 survey of employees.

[2] See Diewert (1974, 2003). See also Katz (2007, appendix A) and Diewert and Nakamura (2008, section 3) in this volume for brief expositions of this theory.

[3] See, for example, Verbrugge (2006) and also Garner and Verbrugge (2008) in this volume.

[4] Fortunately there are two recent papers that lay out the basic issues. One by Erwin Diewert (2003) provides a theoretical treatment of the user cost of both housing and other durables. While Diewert focuses on temporal indexes in the context of consumer price indexes, his framework is perfectly general. The other by Sergey Sergeev (2004) presents a well argued practical application to spatial estimates of housing services for Europe. Sergeev has provided a detailed discussion of many of these problems as they have emerged during the work on integrating many of the formerly planned economies into the European Comparison Programme (ECP) and International Comparisons Programme (ICP) framework.

and (4) acquisitions approaches.[5] The U.S. Bureau of Labor Statistics (BLS) incorporates changes in the cost of owner occupied housing (OOH) into the CPI via a reweighted rent index. Hence the United States is classified as using the rental equivalence approach.[6]

The guidelines for the 1993 System of National Accounts (SNA93) 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.[7] The U.S. national accounts imputation for the services of OOH is obtained by applying to the stock of owner occupied housing the ratios of rent to property value for tenant occupied housing (rent-to-value ratios).[8] This U.S. Bureau of Economic Analysis (BEA) practice is categorized by Diewert (2003, p. 29) as a simplified user cost approach.

Diewert (2003, p. 29) also classifies Iceland as using a simplified user cost approach for incorporating OOH services into both their national accounts and CPI. House price values from sales of new and used dwellings, as reported to the Icelandic Land Registry, are the main data use in the Icelandic methodology for allowing for OOH services: information having to do almost entirely with owner occupied housing units. The stated reason why Iceland does not use the rental equivalence approach is that only about 20 percent of the dwellings in the country are rental units.[9] The thinness of rental markets is why many of the new entrants to the European Union also have adopted the user cost approach.[10]

The differences among the payment, acquisitions, rental equivalence and user cost approaches have attracted a great deal of attention.[11] In contrast, very little attention has been devoted to an underlying commonality of practice: the implicit assumption that housing cost information for *either* renters or owner occupiers can be used for assessing movements over time and spatial differences in the cost of housing for *both* renters and owners, after allowing for

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[5] See Eiglsperger (2006) and Christensen, Dupont and Schreyer (2005) for surveys of international practice. See also (2008) in this volume for more on the nature of these four approaches and a new approach suggested by Diewert (2006).

[6] See Crone, L.I. Nakamura and Voith (2008) in this volume on the methods of the U.S. Bureau of Labor Statistics (BLS) for dealing with OOH in the CPI.

[7] See McBride and Smith (2001), and also Katz (2008) in this volume, on the rent to value ratio approach of the U.S. Bureau of Economic Analysis (BEA) uses for the U.S. national accounts.

[8] In the United States the Bureau of Economic Analysis 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). From the RFS, property owners or their agents provide gross rental receipts from their units, excluding any extra services. The respondents are then asked to 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 2 years. Total rental services are then 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 then 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 for dwellings of given quality. The inflation factor is based on the OOH rent component of the CPI, while the quality change is based on an internal BEA estimate. The quality of the benchmark estimates depends on the ability of landlords to estimate the value of their rental properties, and more importantly on the stability of the rent to value ratio over time and across space.

[9] See Guðnason, R. and G. Jónsdóttir (2008) in this volume.

[10] See Katz (2007) in this volume.

[11] See Christen, Dupont and Schreyer (2005) for references.

differences regarding payment for taxes and certain ongoing expenses such as insurance and utilities. It is common practice to view as a choice, based largely on practical data collection issues, whether to collect dwelling cost data from renters, from owner occupiers, or from both.[12]

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.[13] But in the real world, are the services that renters and owner occupiers get from their dwellings comparable? It is recognized that, in addition to shelter, owner occupiers get investment services from the dwellings they own. Land lords also get investment services from the rental properties they own, and these are not expected to be equivalently reflected in the rents of renters. But is this the *only* major way in which the services differ that renters and owner occupiers derive from their dwellings?

Also, for both renters and owner occupiers, are there place-related differences in the services they derive from their dwellings? And if so, what are the implications for official statistics making?

These are the questions raised by the selected empirical results presented in this paper. Final answers to these questions await future research.

Section 2 presents empirical evidence that homeowners get higher value from their dwellings than what would result from applying rental rates for observationally equivalent units. Section 3 examines the behavior of the rent to value ratios by home value and geographic region. Questions are raised about the reasons for observed spatial and temporal variations. The implications of these findings are briefly considered in section 4. Section 5 concludes.

2. Evidence of Owner Pride and Other Differences in Owner versus 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?"* [14]

The BLS uses responses to this question in determining the CPI weight for OOH versus rental housing. Summary statistics for total expenditure and shelter expenditure for homeowners and renters are shown in table 1.

CES data for December 2002 also show that, as of when that data was collected, OOH accounted for 72.1 percent of household expenditures on shelter, shelter expenditures accounted for 19.2 percent of total household expenditures, and homeowners were 66 percent of all respondents. Based on this data source, the average percent expenditures on housing for owners

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[12] The European Commission (2001, p. 68) recommends that: "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."

[13] Katz (2007, appendix A) and Diewert and Nakamura (2008) in this volume provide summaries of this theory.

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

was more than five percentage points lower than for renters, while their average income before taxes was about twice that of renters: $59,345 versus $30,386.

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

	Total expenditures ($)	Shelter ($)	Shelter (%)
Homeowner	46,908	8,458	18.0
Renter	28,372	6,458	23.2

Source: Based on CES data.

The assumption commonly made in compiling housing statistics is that the services of OOH can be imputed from reported rents for renters, controlling for measured physical and location characteristics of the dwellings, or alternatively that owner occupant provided current market estimates of the rent ("rental equivalents") or sale values of their dwellings can be used. Either way, the implicit assumption is that renters and owner occupiers value housing services in equivalent ways. It seems plausible, however, that owners might place above market values on special features of their dwellings, especially if they created those themselves. For instance, in responding to the CES question asking them to guess what their homes would rent for, a property owner might place greater value than the market would on, say, a purple bathroom with hot tub that they had designed and installed. An *owner pride factor* could lead OOH rent equivalents to be higher, on average, than market rents, controlling for the observable dwelling attributes.

Also, the list of characteristics used in classifying homes does not include many factors that could affect market values.[15] Owned dwellings may have different distributions for unmeasured dwelling characteristics compared with rental units. Additionally, renters and owners may not have the same sorts of information. Housing involves many features that are not immediately obvious. It seems likely that homeowners may, on average, make more effort to learn about their homes before buying them than prospective renters make before signing rental agreements. Yet another possible source of valuation differences for owner occupiers versus renters could be that the average owner moves less frequently and is more likely to consider the locality where they live as a "permanent," or anyway as a longer term, choice. Hence owners may care more about certain amenities than renters do.

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[16] -- Alaska, the Caribbean and the Pacific -- based on prices in these COLA areas relative to the D.C. housing area.[17] The program came under litigation. As a by-product, research was undertaken to improve the methodology of the comparisons. COLA survey data

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[15] For a discussion and evidence on related issues, see Follain and Malpezzi (1981).

[16] 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.

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

include a large number of dwelling characteristics, and both renters and owner occupiers were asked the BLS question about what they believe their dwellings would rent for.

Sample characteristics, including the average for rent as a percentage of the price of a dwelling, are given in table 2. 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.[18]

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.[19] In table 3, the coefficients have been converted to index form, with the average rent of owner occupiers in the Washington D.C. area set equal to 100.[20] For the Caribbean, for example, the entry of 75.4 in row b means that, after 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.

In table 3, the estimated percentage premiums for homeowners versus renters is shown in row c.[21] There appears to be a 3 to 20 percent premium that owners put on their homes, with an average of about 14 percent. (The housing areas are arranged, from left to right, in declining order by the premium size.) The standard errors are in the 2 to 5 percent range, so we can have confidence in this result: a result suggesting substantial owner pride effects or effects of uncontrolled for attributes of dwellings that tend to raise the valuations of owners versus renters.

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.

[18] Regarding the answers to the CES question, homeowners exhibited a larger standard deviation ($500 compared to $404 for renters). However, the coefficient of variation was less for homeowners, so it is not clear that homeowners exhibit more uncertainty about the rental value of their housing, as had been expected.

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

[20] The Goldberger (1968) adjustment has been used, adding half the standard error of each coefficient before exponentiating the coefficient.

[21] As a further test of the direction of the premium, 3 pairwise regressions of the COLA areas with Washington were also estimated, all using the same specification as the pooled regression in the appendix. Again all premiums were positive and the six coefficients averaged the same premium as in the pooled regression.

3. Home Value and Location Specific Patterns in the Rent to Value Ratio

Many analysts have reported declines in the rent to value ratio as the average house price increases (e.g., Garner and Short, 2001 and McBride and Smith, 2001). 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. For example, the average rent to value ratios are 17.1 percent for dwellings under $20,000 and 6.1 percent for dwellings in the $200 to 300 thousand class.

To further investigate home value related, and also owner versus renter differences, in rent to value ratios, the following semi log regression was run on the 3528 observations:

$$(7\text{-}1) \quad \text{Log}(\text{Rent}/\text{Value}) = \alpha \text{Value} + \beta_i O_i + \lambda_i R_i$$

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.)

The estimate of α for the specified regression is negative as expected based on the findings of others. Table 4 shows the predicted rent to value ratios in percentage terms, obtained using estimated equation (7-1), 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).[22]

Table 4. Estimated Rent to Value Ratios (as Percentages)

Value($)	Alaska Rent	Wash Rent	Carib Rent	Hawaii-Pacific Rent	Alaska Owner	Wash Owner	Carib Owner	Hawaii-Pacific Owner
	(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

For all areas and for both renters and owners, we see from table 4 that the values predicted by equation (7-1) decline by more than 50 percent moving down the columns from a $50,000 to a $500,000 dwelling.[23] There are differences as well among areas. Except for the Washington D.C. area, there are also pair-wise significant differences between the estimates for renters and owners in each housing area, but these differences are not all of the same sign. Indeed, after controlling for location and for the property value, it is only for the Caribbean and

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[22] 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 of a property with a standard error of .0042.

[23] Garner et al. (2003) using other data sources report rent to value percentages, by home value, as being 13.2 percent for a $50,000 home, 7 percent for a $200,000 home, and about 6 percent for top end dwellings. These roughly correspond to the gradient for the COLA sample.

the Hawaii-Pacific areas where the values for the owner occupiers are higher than for the renters. So, from these results it is clear that the rent to value ratio varies considerably, but it is not clear that the variations are significantly different for owners versus renters. There is a need for more research to understand the factors determining the rent to value ratios and the differences in the responses of owner occupiers versus renters.[24]

4.   Prices and Rents of Housing: Reflections of Costs, Amenities or Both?

Some of the uses that are made of statistics on housing services costs reflect assumptions about the comparability of rental and owner occupied housing services that are implicit in the manner in which nations like the United States incorporate OOH into their official statistics. Private and public employers often claim to, or actually do, try to take into account differences in housing costs in determining salaries and special allowances. For example, the Florida Price of Living Index (FPLI) is used to allocate education funds by county in order to compensate for housing related differences in the cost of living of teachers and other employees, who are the largest component of education expenditures.

The owner component of the FPLI is based on a construction firm's estimates of putting up a specific single family house in various counties, excluding the cost of land.[25]

Denslow and Scroggins (1997) criticize the renter sample for the FPLI and introduce a number of quality variables to try to pin down the value of location. The quality variables include distance from the coast which clearly adds to the rental value of a given apartment complex. Taking account of these amenities of location for renters and assuming larger lot sizes in counties with lower land prices would certainly move the FPLI in the right direction. However, even if the FPLI handled user cost estimates in the way suggested by Denslow and colleagues, there is still a problem if higher land prices reflect, in good part, amenities. For example, if one county has little waterfront property and the other has a great deal, then the higher land prices in the latter could be buying a view or recreational access to water. It is clear that the FPLI was not capturing this. Nor is it clear that even increasing lot sizes in the way Denslow and colleagues suggest will produce equity in terms of the welfare teachers can purchase across counties.

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[24] Diewert pointed out that the rent to value ratio for renters in Alaska is substantially above that of owners. He raised the issue that this might reflect higher heating bills. In private correspondence, Diewert wrote: "Heating is often included in rents and if tenants are asked to subtract heat and electricity from their gross rent, they may have no idea what the heating costs are .... The decline in rent to value ratios as the property becomes more expensive is quite striking (and explainable I guess by supply and demand factors; i.e., rich people are not willing to pay the true financial opportunity cost of an expensive property (they are rich enough to be able to afford to own) and so if an owner of an expensive property wants to rent it for whatever reason, the amount people are willing to pay is lower than the financial opportunity cost. Table 4 indicates that the rental equivalence approach to OOH will substantially underestimate true opportunity costs of OOH (which should be the max of the financial opportunity cost and the rental equivalent {which is low relative to the financial opportunity cost for all but the cheapest properties}). This need not lead to a bias in the CPI (because rates of growth may be the same) but it will lead to a weighting factor for OOH which is too low and it will lead to an underestimate of the level of OOH housing services! Hence the rental equivalence treatment of OOH will tend to understate the real level of consumption."

[25] Costs per unit of land varied from a high of an average of $4 a square foot in Dade county to under $ 0.10 per square foot in some rural counties. See Denslow et al. (1996) for more details on the FPLI.

If labor is mobile, the wage differentials should adjust to compensate for place specific amenities (e.g., Gerking and Weirick, 1983), with this adjustment taking place through some combination of employer adjustments of wage levels, land lord adjustments of rental rates, adjustments in real estate price levels, and worker choices to move into or out of a locality. Studies in this literature that explicitly treat house prices as a variable partially signaling desirable city characteristics suggest the ambiguous role of housing as a factor entering into cost of living measures (e.g., Stover and Leven, 1992). In the case of the FPLI, the mobility of teachers and their freedom to choose where they live seem like reasonable assumptions. In that case, there may be no justification for housing allowances in addition to salary.

On the other hand, in designing programs for the poor, it cannot be assumed that they are able to move. The recommendation of the National Academy of Science Panel is perhaps reasonable that the poverty line in the United States should be adjusted for regional differences in the cost of living, with priority given to housing.[26] There certainly are regional differences in the measured cost of living even within the continental United States.[27]

Based on BLS findings regarding inter-area price differences (Kokoski, Cardiff and Moulton, 1994), Aten (1996) estimates that the 1987 poverty basket would cost 66 percent less in the Dakotas than in the New York City area. However, any move to take account of amenity values of housing would also raise questions about the treatment of amenities (or rather the neglect of amenities) more generally in the national accounts and other economic statistics.

5.   Concluding remarks

Evidence is presented suggesting that for similar measured features of housing, what homeowners believe their homes would rent for is about 14 percent above market rents for comparable dwellings. Presumably this premium is attributed to an unknown mix of owner pride and unobserved quality differences for owner occupied versus rental dwellings. The patterns of owner versus renter valuation of housing services seem to differ some. The rent to value ratio values seem differ as well depending on other factors including the value of the property and geographical location, and the owner versus renter differences no longer seem to display consistent patterns once other sources of variation are controlled for. Further research is needed.

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[26] For related discussion and evidence, see Garner and Rozalakis (2001).

[27] Malpezzi (1998, p.4) also discusses these issues.

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 of coefficient	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. This effect could also be estimated with only one coefficient that would be just significant at the 5 percent level. 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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