



The housing bubble and a new approach to accounting for housing in a CPI ☆

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ABSTRACT

Over the course of the recent house price bubble in the United States, the price of homes rose rapidly from 1999 Q4 to 2005 Q4 (11.3% annually as measured by the Case-Shiller index, and 8.4% annually as measured by the Federal Housing Financing Agency) but slowly as measured by owner equivalent rents (3.4%), so measured core inflation remained relatively docile during this period, since only rents are used to measure inflation for housing services in the United States. Over the last several decades, the US Bureau of Labor Statistics (BLS) has experimented with both rental equivalence and user cost approaches for accounting for owner occupied housing (OOH) services in the CPI. We explain the basics of these approaches, and outline the BLS experiences with using them. This assessment leads us to conclude that the time has come to try a new approach: the opportunity cost approach. We argue this approach has advantages over both the conventional rental equivalence and user cost approaches, though it embeds components of the measures for both those approaches and builds solidly on the research of Verbrugge and others at the BLS. Also, we take up empirical issues that must be faced regardless of which of the approaches discussed is adopted. We explain how the repeat-sales and various hedonic regression methods can be placed in a common framework, thereby facilitating understanding of the properties of and the tradeoffs between the methods. We also consider measurement complications that arise because the land and structure components of properties depreciate at different rates.

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1. Introduction

How is the cost of housing services changing over time for those living in their own homes? Good measures are needed by economic policy makers managing everything from the money supply to benevolent income transfer programs, but are hard to come by since homeowners do not actually pay themselves for the services of their owned homes.

Over the course of the recent house price bubble in the United States, the price of homes rose rapidly from 1999 Q4 to 2005 Q4 (11.3% annually as measured by the Case-Shiller index, and 8.4% annually as measured by the Federal Housing Financing Agency) but slowly as measured by owner equivalent rents (3.4%). One consequence was that measured core inflation remained relatively docile

during this period since only rents are used to measure inflation for housing services in the United States. Yet, as Gallin (forthcoming) and Crone et al. (forthcoming) have argued, rents and home prices are cointegrated over the long run. Moreover, Gallin has presented evidence that home prices tend to overshoot while rents tend to lag.

If the housing bubble took the form of unsustainable increases in home prices, the expectation that these increases could be sustained in the short run perhaps lead to a short run divergence between rents and home prices. If there is information about inflation trends in both rents and home prices, it might be useful to combine both types of measures. The opportunity cost approach which we develop combines information on home price change, as part of a financial user cost component, and information on rents as a rental equivalent component.

Over the last several decades, the US Bureau of Labor Statistics (BLS) (2007) has experimented with both rental equivalence and user cost approaches for accounting for owner occupied housing (OOH) services in a Consumer Price Index (CPI). We explain the basics of these approaches in Sections 2 and 3, respectively, and outline the BLS experiences with using them in Section 4. This assessment leads us to conclude that the time has come to try a new approach to accounting for OOH services costs in measures of inflation: a new approach that nevertheless builds on BLS expertise and research findings, especially including the work of Randall Verbrugge and his collaborators.¹

The opportunity cost approach, introduced in Section 5, was first suggested at a 2006 OECD Workshop by Erwin Diewert.² We argue this approach has advantages over both the conventional rental equivalence and user cost approaches, though it embeds components of the measures for both those approaches. Also, in Sections 6 and 7, we take up empirical issues that must be faced regardless of which of the approaches discussed is adopted. We explain how the repeat-sales and various hedonic regression methods can be placed in a common framework, thereby facilitating understanding of the properties of and the tradeoffs between the methods. We also consider measurement complications that arise because the land and structure components of properties depreciate at different rates. Section 8 concludes.

2. The rental equivalence approach

The rental equivalence approach values the services yielded by an owned dwelling at the corresponding market rental value for the same sort of dwelling for the same period of time. This is the approach used by the BLS at present for the CPI.³ The price data needed for the CPI rental equivalence component for OOH services are observations on rents paid by renters: the same price data also used by the BLS to compile the rental component of the CPI.

The location of each rental unit for which rent and other data are collected is unique. Empirical studies have shown location to be a key determinant not only of both rents and

residential real estate price levels, but also of the rates of change over time in the levels. Hence, after choosing a sample of dwelling units to use for the collection of rent data, the BLS repeatedly samples those units. It is assumed that the changes in owners' equivalent rents within small geographic areas (areas of 3–4 city blocks, sometimes called segments) will move similarly to changes in actual rents. (The nature of this rent data, and some of the main data sets for housing price data too, are why, in Section 6, we explore the relationship between the repeat sale and hedonic estimation methods.) Each rental unit that is priced does double duty: it represents the rents for renters within the segment, and it also separately represents the rent equivalents implicitly paid by owners within the segment.

3. The user cost approach

The only nations that use the user cost approach to account for the cost of OOH services in their official measures of inflation omit the property appreciation term.⁴ However, reports on the treatment of OOH by official statistics agencies, including the BLS, make frequent reference to the shared theoretical underpinnings for the user cost and the rental equivalency approaches, and it is the user cost, including the property appreciation term, that is relevant in this regard. The property appreciation term of the user cost formula also plays an important role in the research of Verbrugge and his collaborators. Hence, in this section, we describe the user cost approach and show why and how the property appreciation term enters into the user cost formula.

The user cost approach is routinely used in a variety of other measurement and accounting contexts too, such as in the capital asset pricing literature, in production function studies, in the measurement of total factor productivity growth, and in the analysis of tax depreciation rules. The underlying theoretical framework is provided by the fundamental equation of capital theory. According to this equation, in equilibrium, the price of a durable asset equals the present discounted value of the future net income that is expected to be derived from owning it. Thus, if the future income flow that an asset such as a machine can generate is known or can be readily forecast, then this information can be used to infer what the asset would be worth to a buyer. On the other hand, in the literature on inflation measurement for OOH services, what is directly observed are the purchase prices for houses and there are no observable transactions for the rent that owner occupiers implicitly charge themselves for use of their homes. Instead, the fundamental equation of capital theory is used to try to back out the period by period costs to the owner occupier of the OOH services they are using.

Diewert (1974, p. 504) sets out the user cost principles for consumer durables:⁵

⁴ See Diewert and Nakamura (2009) for summary information and references regarding the use of the user cost approach by Statistics Iceland and Statistics Canada.

⁵ Diewert (1974, 1980) followed Fisher (1897) and Hicks (1939) in deriving the user cost using a discrete time approach rather than the continuous time approaches used by Jorgenson (1963, 1967), Griliches (1963), Jorgenson and Griliches (1967, 1972) and Christensen and Jorgenson (1969, 1973). See also Schreyer (2009a,b).

¹ See Verbrugge (2008) and Garner and Verbrugge (2009), and also Poole et al. (2005).

² See Diewert (2006a).

³ This section draws on the US Bureau of Labor Statistics (BLS) (2007).

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