Available online at www.sciencedirect.com
ScienceDirect
Journal of Urban Economics 61 (2007) 193–217
JOURNAL OF Urban Economics
www.elsevier.com/locate/jue

Depreciation of housing capital, maintenance, and house price inflation: Estimates from a repeat sales model

John P. Harding [a], Stuart S. Rosenthal [b,*], C.F. Sirmans [a]

[a] *University of Connecticut, School of Business Administration, 2100 Hillside Road, Unit 1041, Storrs, CT 06269-1041, USA*

[b] *Department of Economics, Syracuse University, 426 Eggers Hall, Syracuse, NY 13244-1020, USA*

Received 21 October 2005; revised 6 July 2006

Available online 25 September 2006

Abstract

The rate at which physical capital depreciates is fundamental to investment in the economy. Nevertheless, although housing capital accounts for one-third of the total capital stock, the rate at which housing capital depreciates has only rarely been directly estimated, in part because prior studies do not control for maintenance. For that same reason, widely publicized measures of house price appreciation overstate the capital gain from homeownership.

Using data from the American Housing Survey we examine these issues. Over the 1983 to 2001 period, results indicate that gross of maintenance, housing depreciates at roughly 2.5 percent per year, while net of maintenance, housing depreciates at approximately 2 percent per year. Moreover, although the typical home appreciated at an annual real rate of roughly 0.75 percent, after allowing for depreciation and maintenance, the average homeowner experienced little capital gain.

1. Introduction

This paper examines two closely related issues. First, the rate at which housing capital depreciates is fundamental to investment in the economy. As shown in Table 1, estimates from the US Bureau of Economic Analysis (BEA) indicate that housing accounts for roughly half of all private fixed assets and one-third of the total capital stock.[1] Nevertheless, the rate at which hous-

* Corresponding author. Fax: +1(315) 443 1081.
E-mail addresses: johnh@business.uconn.edu (J.P. Harding), ssrosent@maxwell.syr.edu (S.S. Rosenthal), cf@business.uconn.edu (C.F. Sirmans).

[1] See also, Mills [16].

0094-1190/$ – see front matter
doi:10.1016/j.jue.2006.07.007

Table 1
US current-cost net stock of fixed assets and consumer durable goods (billions of dollars; year end estimates)

	2001	2002	2003
Fixed assets and consumer durable goods	31643.2	33098.4	34771.7
Fixed assets	28499	29829.8	31395.4
Private nonresidential	11054.3	11386	11776.8
Private residential	11464.8	12195.9	13125.4
Government	5979.9	6247.9	6493.2
Consumer durable goods	3144.2	3268.5	3376.3
Private residential share of private fixed assets	0.51	0.52	0.53
Private res. share of FA and consumer durables	0.36	0.37	0.38

Source: Table 1.1. Bureau of Economic Analysis; GNP website http://www.bea.gov/bea/dn/FA2004/TableView.asp?SelectedTable=16&FirstYear=2002&LastYear=2003&Freq=Year.

ing depreciates has only rarely been estimated, in part because prior studies do not control for maintenance. As a result, major federal data agencies such as the Bureau of Economic Analysis have been forced to use measures of housing capital depreciation rates that are based more on approximations than hard evidence in the data. Given the important role that such measures play in calculations of the stock and flow of capital in the economy, obtaining more reliable estimates of the rate at which housing depreciates is of considerable importance.

Second, although the belief that homeownership is an excellent investment is deeply entrenched in popular culture, the capital gain enjoyed by homeowners is likely less robust than often portrayed. That is because widely publicized repeat sales measures of house price appreciation do not control for the contribution of maintenance to house price appreciation (Case and Shiller [4], Case and Quigley [3]).[2] Although such indexes are appropriate for valuing portfolios of homes, we show that they overstate the capital gain from homeownership.

Understanding the role of depreciation and maintenance is especially important in the current social and political environment. Recent popular accounts, for example, credit house price appreciation with propping up the economy, while new government policy initiatives seek to boost homeownership, especially among low income and minority households.[3] To illustrate, Fig. 1 displays the growth of house prices in both real and nominal terms as reported by the National Freddie Mac Conventional Mortgage Home Price Index (also known as the Freddie Mac repeat sales index). Evident in Fig. 1, the growth in house prices has been particularly dramatic since the mid-1990s. Since that time, the Freddie Index has risen more rapidly than inflation at the same time that prices on financial assets have declined sharply. In response to these price patterns, the popular press has routinely touted housing as an outstanding investment. In March 2002, *The Economist* [22] ran a cover story entitled "The Houses That Saved The World" in which it argued that rising house prices had sheltered the world economy from deep recession by supporting con-

[2] See, for example, the repeat sales house price indexes at http://www.freddiemac.com/news/finance/data.html and http://www.ofheo.gov/HPI.asp. See also Geotzmann ans Spiegel [11] for related discussion of the role of home improvements in repeat sales models of house price appreciation.

[3] In various public statements by government officials, it is clear that one of the reasons policy makers hope to boost homeownership is to facilitate the accumulation of wealth among individual homeowners. In addition, however, it should also be emphasized that many other reasons contribute to recent efforts to raise homeownership rates. These include the hope that homeownership helps to stabilize and enhance neighborhoods, and also concerns that a legacy of discrimination has restricted access to mortgage credit among minority families.