

The Rise and Fall of Housing's Favored Investment Status

Patric H. Hendershott and Michael White*

Abstract

This article surveys and interprets a wide body of literature on the taxation and subsidization of investment in owner-occupied and rental housing, as well as the impact of and rationale for favorable treatment.

We find a broad increase in housing's favored status during the 1970s, a reversal in the 1980s, and a further decline in the 1990s. These shifts have two broad components. First, an endogenous component is caused by variations in the inflation rate. Because housing is the tax-favored asset, the higher are nominal returns, the greater is the tax advantage. Second, the exogenous component is largely reflected in lowering tax rates even below their 1970 levels and the weakening of the mortgage interest deduction in many countries. We attribute this component to the aging of the baby boomers, which first provided a constituency for more generous treatment of owner-occupied housing but now is working in the opposite direction.

Keywords: Housing; Subsidies; Taxation

Introduction

Homeownership is tax-favored in all countries because the return from the asset is largely not taxed. Most countries do not tax capital gains on houses, and the (imputed) rents that owners pay themselves rather than landlords are taxed lightly, if at all. Many countries favor homeownership in additional ways, some countries allowing mortgage interest to be deducted (the United States and many Western European countries but not the Commonwealth countries), some subsidizing the interest rate on new construction (e.g., Sweden), and some subsidizing first-time homeowners (e.g., Finland, Ireland, and Germany currently, and Australia and Canada during much of the 1980s).

Many countries also subsidize rental housing. Those subsidies include housing allowances or rent supplements;¹ below-market interest rates for new construction, including rehabilitation (again, Sweden is an example); and, in the United States during some periods, relatively low taxation of rental income. Some countries also have rent controls.² This article deals

* Patric H. Hendershott and Michael White are members of the Centre for Property Research in the Department of Land Economy at the University of Aberdeen, Scotland, United Kingdom.

Earlier versions of this article were presented at the 2000 American Real Estate and Urban Economics Association (AREUEA) Mid-Year Meetings and at the AREUEA International Meeting in Gavle, Sweden. The authors thank James Follain, Don Fullerton, Richard Green, Kenneth Gibb, and two anonymous reviewers for helpful comments and/or discussions on various issues.

¹ While most housing allowances are means tested and go to renters, they are also available for owners in some countries (e.g., France and Norway).

² While these are temporarily advantageous to sitting tenants, controls reduce the housing stock, as opposed to the subsidies listed above that tend to expand the stock, and thus are fundamentally detrimental to rental housing.

solely with housing investment, or “supply side” taxes and subsidies. Thus, housing allowances and rent controls will not be examined, nor will special subsidies for low-income housing.

In this article, we analyze the mechanism and rationale for these tax advantages and subsidies and discuss how the favorable treatment of housing investment has varied across countries and over time. The article is divided into five parts. We begin by providing a framework for the efficient or neutral taxation of structures and applying it to rental housing. We then consider the basic favorable tax treatment of owner-occupied housing. Next, we examine special subsidies to homeowners, especially first-time owners. Overall, we find a significant increase in the favorable treatment of housing during the 1970s and early 1980s but a more than full reversal since. Part of the swing is simply an endogenous response to the rise and fall of inflation, but part is caused by exogenous shifts.

Next, we take a broader perspective, considering whether favorable tax treatment leads to greater housing consumption or higher house prices, the role housing plays in the economy, and the positive and negative externalities associated with owner-occupied housing relative to renter housing. We close by summarizing and speculating on the cause of the exogenous component of the swing in subsidization of owner-occupied housing over the past quarter-century. We offer the aging of the baby boomers as a likely candidate.

The Correct Tax Treatment of Structures

The correct tax treatment of capital goods is a complex issue. The first question is whether the appropriate tax base is income or consumption. Given the choice of tax base, the second question is how to tax capital goods. Taxing only consumption suggests full expensing of structure investments—that is, allowing businesses depreciation deductions equal, in present value terms, to the full value of the investment. Taxing income requires careful measurement of income.

The United States has a hybrid system for taxing commercial properties, including rental housing. The rule seems to be present value expensing of roughly half the value of structure investment. Most European countries also allow tax depreciation write-offs for structures (Scholten 2000), but we know little about the specifics. Many European countries also have had substantial interest rate subsidies for new construction. For example, Sweden’s 1975 program had an initial interest rate of 2.7 percent, with only 0.25 percent annual increases. But these interest rate subsidies have been greatly reduced during the past decade.

Subsidizing rental housing investment through the tax code requires greater than neutral tax depreciation deductions and less than neutral capital gains taxation. Thus we begin with an analysis of the correct, or neutral, taxation of structures under an income tax. As we shall show, this treatment entails (under most circumstances) no tax depreciation allowances for structures. We then discuss tax depreciation in the United States, showing that the 1981 and 1986 tax depreciation changes were roughly consistent with equating the present value of tax depreciation allowances to the present value of economic depreciation. This is equivalent to setting the present value of tax depreciation allowances equal to half of the value of structure investment. Thus the United States effectively averages the current treatments under the consumption (full expensing) and income (no deduction) tax systems.

*The Correct Taxation of Real Income*³

The general efficiency rule is that taxes should be paid (or loss offsets should be given) on a correct measure of real economic income. The latter takes two forms, capital gains or changes in the value of the asset ($V_1 - V_0$) and realized cash flows. For an investor paying i on a debt level equal to D and earning a net cash flow (rent less operating expenses) of R , pretax (or taxable) income should be, ignoring inflation,

$$\text{Income} = V_1 - V_0 + R - iD. \quad (1)$$

Of course, $V_1 - V_0$ would be negative if economic depreciation were sufficient (or if a significant reduction in expected future real cash flows occurred). Correcting for inflation at rate inf (that is, adjusting the initial price for inflation and allowing the deduction of only real interest payments), we have

$$\text{Real Income} = V_1 - (1 + inf)V_0 + R - (i - inf)D. \quad (2)$$

This is the same result as equation 1 if the investor uses 100 percent debt financing (replacing D with V_0 , the two inflation terms cancel out). This provides the basis of our first principle.

Principle 1: If debt is widely employed and nominal interest is deductible, then nominal capital gains *should* be taxed—and equation 1 defines taxable income. But if the inflation premium in interest rates is not deductible (with only real interest deductible), then inflationary gains should not be taxed—and equation 2 defines taxable income.

Two aspects of the above income statements are worth further note. First, the appreciation and cash flow components of income are treated similarly—there is full taxation of accruing appreciation gains and current cash flows. Second, there was no need for depreciation expense. To the extent that depreciation occurs during the period, V_1 is less than it otherwise would have been—and, thus, so is taxable income. As a result, our second principle is formed.

Principle 2: Capital gains taxes should be levied as the gains accrue, not when they are realized, and at the full regular income tax rate.

Establishing a rationale for tax depreciation allowances takes some effort. First, assume that capital gains taxes (or loss offsets if the gains were negative) are paid only upon sale or realization. Second, assume that only real gains are taxed (and only real interest deductible) or that inflation is effectively zero and thus real gains on average are negative—they equal economic depreciation. Tax depreciation allowances are then a means of investors accelerating the write-off of capital losses from the sale date to the present. That is, depreciation allowances permit the investor to realize the tax loss as it accrues (the tax write-offs will be recaptured on sale, with no loss occurring then). Of course, if nominal capital gains tend to exist (appreciation more than outweighs depreciation), then tax depreciation allowances make no sense. They permit investors to take tax deductions when they should instead be making tax payments on capital gains. From this argument we derive our third principle.

³ For a rigorous analysis of capital income taxation, see Auerbach (1983).

Principle 3: In nonindexed realization systems (where taxes are levied on nominal capital gains when the asset is sold and nominal interest is deductible), a necessary condition for tax depreciation allowances is that the inflation rate be less than the economic depreciation rate (i.e., less than 3 percent for structures).⁴ That is, unless asset prices are falling, *no* tax depreciation should be allowed.

The previous discussion of capital gains taxation, interest deductibility, and tax depreciation is relevant to the taxation of business investments generally, not just housing. Thus our final principle follows.

Principle 4: All capital goods should be taxed similarly.

Note the potential conflict of this principle with the other three. More specifically, if owner-occupied housing is largely untaxed, as we shall argue, then other capital should also be lightly taxed.

Tax Depreciation in the United States

U.S. tax depreciation has always been based on *historic* cost (price in dollars at date of purchase). However, economic depreciation occurs on *replacement* cost (the structure price in dollars when depreciation is occurring). Say that a building is viewed as “wearing out” at d percent a year and that inflation is p percent annually. Economic depreciation per dollar of original investment in the t th year after the purchase is $DEPR_t = d(1 - d)^t(1 + p)^t$. While depreciation at historic cost decreases over time, the constant rate, d , being applied to a shrinking base, depreciation at replacement cost tends to increase, owing to inflation expanding the base (and indeed does rise if the inflation rate exceeds the depreciation rate— $p > d$). The present value of economic depreciation on a dollar of structure over its economic life is

$$\sum_{t=1}^{\infty} \frac{d(1-d)^t(1+p)^t}{(1+r)^t} = \frac{d}{r-p+d} \quad (3)$$

This present value is independent of inflation under the assumption of a constant real interest rate, $r - p$. With d equal to 0.035 and $r - p$ also equal to 0.035, the present value of economic depreciation on a dollar of structure is \$0.5.

In contrast to economic depreciation, the present value of tax depreciation, which is based on historic cost, varies with the inflation rate. Assuming straight-line depreciation over N years and trading (and redepreciation) at the end of the structure’s tax life, the present value is⁵

$$\frac{(1+r)^N - 1}{rN[(1+r)^N - (1-d)^N(1+p)^N]} \quad (4)$$

⁴ Note that equipment has a far higher rate of depreciation than structures and, thus, that tax depreciation allowances generally make sense for equipment.

⁵ The present value is the product of the present value of straight-line depreciation over N years and an infinite sum of the form $1 + X + X^2 + \dots$ where $X = (1 - d)^N(1 + p)^N / (1 + r)^N$. The infinite sum equals $1/(1 - X)$.

Setting the value of tax depreciation equal to the above-calculated \$0.5 value of economic depreciation and solving for the N s that are consistent with different p s, still assuming that both $r - p$ and d equal 0.035, gives the straight-line historic-cost depreciation tax life at these p s, consistent with economic depreciation.

The United States seems to have taken the view that the present value of tax depreciation should equal the present value of economic depreciation at replacement cost. With d and p equal, the present value of tax depreciation (from equation 4) is $1/rN$, and that of economic depreciation (from equation 3) is d/r . Equating the two and solving $N = 1/d$, which, with d equal to 3.5 percent, is 28.5-year straight line at historic cost or roughly the current U.S. tax depreciation schedule (allowing trading of properties and rebasing continues the depreciation forever). But this is only because p is low. A shorter historic tax life is implied by the higher inflation rates that existed during the late 1960s to mid-1980s, and a longer tax life by lower inflation rates. More specifically, equating equations 3 and 4, the straight-line historic-cost tax lives associated with different expected inflation rates are

Inflation rate	1.5	3.5	8	13.0	18.0	30
Tax life	37.0	28.5	21	16.5	14.5	12

To illustrate, the 13 percent inflation that existed in the United States in the early 1980s implies a far shorter tax life of 16.5 years, not far from the 15-year tax life adopted in 1981, which was far longer than that existing in the 1960s and 1970s. Follain, Hendershott, and Ling (1987) contend that the 1981 and 1986 changes in tax depreciation, respectively, were, in fact, responses to the sharp 1970s rise and 1980s fall in inflation.

Note the stark difference between this result—that depreciation tax lives are *more* generous when inflation is high—and the above result (principle 3) that tax depreciation allowances are appropriate *only* in very low (perhaps negative) inflation environments. This clear violation of principle 3 can be explained by the dominance of our principle 4, that all capital goods should be taxed similarly. If owner-occupied housing is broadly tax favored, as we argue in the next section, then rental housing and commercial structures should also be tax favored (rapid tax depreciation and light taxation of capital gains could be appropriate). Further, given that the tax subsidy to owner-occupied housing increases with inflation (Hendershott 1983; Hendershott and Hu 1983)—housing is relatively more tax favored as nominal yields rise—then greater tax depreciation (and lower capital gains rates) might be appropriate in higher inflation environments in this second-best world.

Fundamental Tax Advantages of Owner-Occupied Housing⁶

The primary tax advantage for owner-occupied housing is the generally low taxation of the return on the equity invested in the house. Virtually no European country taxes capital gains (France is an exception), and the United States excludes the first \$500,000 in gain. Further, imputed rents are taxed in only about half of the European countries, and these rents are

⁶ The logic of this section draws heavily on Hendershott (1983). See also Laidler (1969) and Woodward and Weicher (1989). Much of the data on European countries in this section comes from McCrone and Stephens (1995) and Scholten (2000).

taxed at lower effective rates than private market rents are taxed.⁷ For example, Spain and the Netherlands assume rents to be only 2 and 1.7 percent of value, respectively, which, with a 30 percent tax rate, means that annual taxes would be only approximately 0.5 percent of value.⁸

The deductibility of mortgage interest expense from the taxable income base is *not* the fundamental source of the tax subsidy to owner-occupied housing. In fact, if returns to housing were fully taxed, the deductibility of mortgage interest would not be considered a tax advantage, but rather an appropriate business deduction.⁹ Rather, the deductibility of interest is a means of extending the fundamental tax advantage of owner-occupied housing, the low taxation of the return on equity invested in housing, to the numerous less wealthy households who cannot finance their real assets entirely with equity.¹⁰ Because of this, most countries (not including most of the Commonwealth countries: Australia, Canada, New Zealand, and now the United Kingdom [UK]) allow a mortgage interest deduction, although many limit it to a fixed amount or allow the deduction to be taken only at a relatively low tax rate.

According to Scholten (2000), the amount of interest that can be deducted is limited by Austria, Belgium, Finland, France, Ireland, Luxembourg, Portugal, and Spain; the rate at which the interest is deductible is limited by Finland, France, Ireland, Italy, Norway, and Sweden. The UK is an especially interesting case. Beginning in 1983, the UK limited deductible interest to that on a maximum loan of £30,000. That limit was never raised, in spite of rising house prices, and the tax rate at which it was deductible has been progressively phased down since 1993 from 25 percent to zero currently (Gibb, Munro, and Satsangi 1999). Even in the United States, deductibility has been limited since 1986 for higher-income households (in 1999 for married couples with taxable income over \$124,500). For sufficiently high incomes, a fifth of the mortgage interest is nondeductible. Moreover, sufficiently low-income households will take the standard deduction, effectively forgoing the mortgage deduction totally (Follain, Hendershott, and Ling 1992; Ling and McGill 1998).

The amount of debt used and thus the loan-to-value ratio (LTV) is quite sensitive to the deductibility of interest. Capozza, Green, and Hendershott (1996) estimate, in two ways, the decline in mortgage debt that would occur in response to removal of the mortgage interest

⁷ On the other hand, a number of countries have property taxes (Sweden's is 1.7 percent of value), although often they are collected at the local level (the United States has a local 1 percent tax, on average). A property tax is equivalent to a uniform-rate tax on imputed rents, although if (as is true in the United States) the tax is deductible against the income tax base, the tax rate is effectively applied progressively.

⁸ Follain, Ling, and McGill (1993) and Bourassa and Hendershott (1994), respectively, show that a tax on imputed rent would be progressive for the United States and Australia.

⁹ Moreover, the mortgage deduction is of no value to some households. Consider a household whose marketable wealth equals or exceeds the value of its house and whose best investment alternatives are home mortgages of other households (e.g., Government National Mortgage Association securities in the United States). The ability to borrow mortgage money, the interest on which is deductible, to invest in mortgages, the interest income from which is taxable, is obviously of no value.

¹⁰ The deductibility is thus analogous to safe-harbor leasing in the United States in the early 1980s, which allowed firms without taxable income to pay lower effective equipment lease rates. That is, the tax credits and accelerated write-offs available to profitable and slowly or moderately growing firms were effectively made available to non-profitable and rapidly growing firms. The underlying tax credits and accelerated write-offs, not the leasing, are the fundamental source of the tax advantage. Safe-harbor leasing was adopted in 1981 but then repealed in 1982 (see Feldstein 1994, 26, for a discussion).

deduction in the United States.¹¹ First, they lower individual household mortgage-debt data from the 1989 Survey of Consumer Finance by the amount of household liquid assets. The result is a nearly 40 percent decline in mortgage debt. The decline is skewed toward higher-income (and older) households. Second, because Australia has not had a mortgage interest deduction, they estimate demand equations for households in the United States that are comparable to those estimated for Australia by Bourassa and Hendershott (1994) and contrast the results. The predicted U.S. LTVs for ages 25 to 29, 40 to 44, and 55 to 59 (with Australia in parentheses) are 0.56 (0.42), 0.34 (0.12), and 0.16 (0.01). Again, the result is an approximate 40 percent lower LTV where interest is not deductible (Australia).

Follain and Melamed (1998) estimate the impact of removing the mortgage interest deduction in the United States, both on the quantity of debt and Treasury tax revenue. Their simulation model of the demand for mortgage debt (based on the Follain and Dunsky [1997] estimates from an analysis of nearly 5,000 households in 1983 and 1989) predicts that removing the deduction would reduce mortgage debt by 40 percent and that the decline would be significantly more at higher income levels (only 18 percent at the \$22,500 level, but 54 percent at \$55,000, and 69 percent at \$110,000), results similar to those of Capozza, Green, and Hendershott. With lower mortgage debt, especially for those with higher income, Follain and Melamed estimate the increase in tax revenue caused by removing the deduction to be only a quarter to a third of what it would be without any pay down in mortgage debt. That is, the extension of the fundamental tax advantage of owner-occupied housing to the less wealthy is not nearly as costly as that given by official government calculations that do not allow for an obvious behavioral response of households.¹²

Whether a house is financed by equity or debt, the magnitude of the tax advantage is directly related to both the household's marginal tax bracket and the level of nominal pretax returns in the economy. The higher the tax bracket or the level of returns, the more valuable is the nontaxation of the returns. Because the tax advantage increases with the marginal tax bracket of the household, the demand for owner-occupied housing is greater the higher the tax bracket of the household. The tax advantage is clearly less in countries with flat (low) tax rate schedules. Shifting to a lower-tax rate income tax structure is the primary available avenue through which most countries can reduce the subsidy to owner-occupied housing.

The United States and most European countries have made this switch since 1980. The United States cut its maximum federal tax rate from 70 percent to only 31 percent in 1986, although since then it has risen to more than 40 percent when phaseouts are taken into account (the rate can approach 50 percent in some areas, owing to state and sometimes local income taxes). Sweden cut its rate from the high 70s in the early 1980s to 50 percent in 1991, although it has risen back to 60 percent. The maximum UK tax rate was cut from 83 percent in 1979 to 40 percent in 1988, where it remains today. Virtually all European countries have simplified their tax systems (gone to fewer tax brackets) and lowered their marginal tax rates.

¹¹ They also analyze the likely impacts of fundamental tax reforms on debt usage and speculate on the impacts of all these on house prices.

¹² For a general discussion of behavioral responses to tax changes in the context of the Tax Reform Act of 1986, see Auerbach and Slemrod (1997).

Other Ownership Subsidies

Young households with limited wealth for down payments have sometimes been the explicit targets of government policy. Assistance is most needed during periods of high inflation and thus nominal interest rates—when real mortgage payments are initially very high relative to income (the mortgage tilt problem)—because the wealth constraint is especially binding and households need to make greater than normal down payments to have affordable monthly mortgage payments. Four examples of special government assistance efforts are the First Home Owners Scheme (FHOS) adopted in Australia in 1983 and currently available in Ireland,¹³ the Registered Home Ownership Savings Plan (RHOSP) adopted in Canada in 1974, the Swedish interest rate subsidies for new construction initiated in 1975 (the other Scandinavian countries, France, and Austria also have interest rate subsidies for new construction),¹⁴ and the high-LTV, long-term Federal Housing Administration loans established in the United States in 1934.

Before describing these efforts, we look at evidence on the credit constraints and their impact on homeownership. Three influential papers were published in 1989. Linneman and Wachter (1989) and Zorn (1989) provided evidence that both down payment (no loans available with less than, say, 5 percent down) and income (no loans with payments greater than, say, 28 percent of household income) constraints reduced homeownership. Jones (1989) provided evidence solely on the impact of the wealth or down payment constraint.

Haurin, Hendershott, and Wachter (1997) extended the earlier analyses by treating household income and wealth as endogenous variables (households who want to become owners work longer hours and save more) and by allowing households to minimize the impact of these two constraints through choice of mortgage type and LTV. For more on choice of mortgage type and LTV, see Hendershott, LaFayette, and Haurin (1997). Although allowing households to choose mortgage type and LTV results in the constraints binding on fewer households, the estimated impact of constraints on ownership is increased.¹⁵ If a young household's probability of being an owner in the absence of being credit constrained is one-half, Haurin, Hendershott, and Wachter (1997) estimate that being constrained reduces the probability by two-thirds.

The Australian FHOS

When introduced in 1983, the FHOS provided first-time owners with nearly \$6,000 in present value of benefits if their taxable income was less than 130 percent of the average male's weekly earnings and the household head had two or more dependents. Without dependents, the benefit still exceeded \$4,000. The \$6,000 was roughly 8 percent of the mean value of a three-bedroom house. Borrowers could take the subsidy as an up-front lump sum, a cash flow

¹³ Ireland currently has roughly a 5 percent down payment subsidy for first-time home buyers.

¹⁴ Germany has a particularly novel scheme, where it allows the deduction of 38 percent of the structure value and half of the land value during the first eight years of ownership (McCrone and Stephens 1995). Because this is a once in a lifetime allowance, it is effectively a first-time home buyer subsidy.

¹⁵ Follain and Dunsky (1997) examine the demand for mortgage debt, but their emphasis is on the responsiveness of mortgage demand to the deductibility of interest, rather than to binding credit constraints.

subsidy declining over five years, or a combination. That is, the subsidy allowed households to relax the constraint (down payment or income) that was the more binding. Five-sixths of households chose the lump sum only.

The value of the subsidy was eroded by inflation during the remainder of the 1980s, and the program was eliminated in 1990. Bourassa et al. (1994) examine data from the Australian National Longitudinal Survey of Youth. They conclude that the program caused the ownership rate for 21- to 25-year-olds to rise from 28.5 to 37.1 percent. Put another way, it accelerated the time to first ownership by two years.

The Canadian RHOSP

In 1974 Canada introduced the RHOSP, which allowed a dollar-for-dollar deduction for savings targeted for a down payment. Further, interest on these accounts accumulated tax-free. The annual deduction was limited to \$1,000 (double for married couples), with a lifetime limit of \$10,000 for singles and \$20,000 for married couples. Engelhardt (1997, 227) computes that a married couple contributing the maximum amount for three years would have accumulated twice as large a down payment as they would have without the tax subsidy (or another 3 to 5 percent of the value of an average house). Given that first-time borrowers generally purchase below-average-valued houses, this likely understates the potential of the subsidy to finesse the down payment constraint.¹⁶ The value of the subsidy was eroded by inflation in the late 1970s and early 1980s, and the program was discontinued in 1985 as part of tax reform legislation.

Using individual household data from the Canadian Family Expenditure Surveys, Engelhardt (1997) finds that young (under age 45) households in higher income tax brackets were more likely to participate in the program than were households in lower income tax brackets and that young renting households generally were more likely to transition to homeownership the higher their income tax rate. Most important, the tax rate impact was greater when the RHOSP existed (1982 and 1984) than when it did not (1986). And this result is after inflation had significantly reduced the value of the subsidy. Engelhardt concludes that the program raised the annual rate of transition to homeownership by 20 percent.

Beginning in 1998, the United States has allowed tax-free, penalty-free withdrawals from IRAs for use as a down payment for first-time homeowners. This plan appears strikingly similar to the Canadian plan, with the withdrawal limited to \$10,000. There are, however, reasons to believe that the plan will have decidedly less impact on homeownership than the Canadian plan. First, tax-free status on the IRA can be achieved without using the funds for the purchase of a house. Second, the funds have to be in the account for five years for the withdrawal to be tax-free. In Engelhardt's sample the mean investment period in the tax-free accounts for first-time purchasers was only 1.5 years, even though contributions for up to five years were tax-free. The five-year restriction would therefore bind on many potential first-time buyers, causing their withdrawals to be taxable.

¹⁶ On the other hand, the assumed 44 percent tax rate of the household is greater than the sample mean of 36 percent, and the three years accumulating the down payment is almost double the sample mean of about 1.5.

Sweden's Construction Loan Subsidies

Sweden has subsidized new construction since 1975.¹⁷ Loans amounting to 95 percent of approved building costs were available for purchasers of new houses or major renovations that complied with government minimum and maximum standards (roughly 85 percent of new units qualified). The loans had an initial interest rate of 5.5 percent, which rose by 0.5 percent per year (the subsidy was intended to address the mortgage tilt problem during the 1975 to 1985 inflationary period).¹⁸ During the 1981 to 1992 period, market interest rates varied between 12 and 16 percent. The favorable financing transferred with the house when it was sold. Under plausible assumptions, the present value of the subsidy was 15 to 25 percent of house value.

Berger et al. (2000) estimate that the subsidy value was fully capitalized into house prices, providing substantial value to the original purchasers, even beyond their holding periods. Legislated increases (beyond scheduled increases) in the interest rate and declines in nominal market interest rates in the middle 1990s have substantially eroded this subsidy as well as other interest rate subsidies in Europe. The result, of course, was a reversal of the earlier rise in real house prices.

The U.S. Federal Housing Administration (FHA)

Rather than subsidizing first-time home buyers with grants or substantial below-market interest rates, many countries have established government-sponsored lenders to make or insure higher-LTV loans to alleviate the down payment constraint problem. These programs need not be subsidized, although often a shallow subsidy is involved. The U.S. FHA Mutual Mortgage Insurance Fund, which was established in 1934 to make high-LTV, long-term fully amortizing loans, is a prime example.

This insurance was designed to be priced fairly, but has periodically been under- or over-priced. When house price inflation accelerated during the 1970s, mortgage default rates declined, and the FHA insurance fund made substantial money on books of business insured. Retroactively, borrowers were overcharged. When house price inflation plummeted in wide regions of the United States during the 1980s, defaults surged and FHA took large losses. Borrowers were effectively undercharged. The losses were in fact so large that the FHA fund, while still solvent in 1989, was not deemed to be actuarially sound (Hendershott and Waddell 1992). In response, Congress passed legislation to substantially raise insurance fees (and to introduce risk-based pricing—higher insurance fees for higher-LTV loans). House prices have performed much better, and one can reasonably conclude, again retroactively, that 1990s borrowers were overcharged until recent reductions in insurance premiums.¹⁹

¹⁷ This paragraph is based on England, Hendershott, and Turner (1995) and Berger et al. (2000). Sweden taxed imputed rent, although rent was estimated to be only 1 percent for most households (it jumped to about 4 percent for quite large houses), until Sweden's recent switch to a property tax.

¹⁸ For rental housing, the initial rate started at 2.7 percent and rose by only 0.25 percent annually. The shallower interest rate subsidy for owner over renter housing was an attempt to counterbalance the nontaxation of the returns from owner-occupied housing so as to treat the two tenures neutrally.

¹⁹ The differential behavior of books of business originated during the 1980s and 1990s depended heavily on refinancing and the regular and streamline refinancing policies of FHA (Brickman and Hendershott 2000).

Broader Issues

Here, we consider three topics that are relevant to the optimal taxation/subsidization of housing: the impact of the subsidies on housing consumption and house prices, the role of housing in the economy, and the positive and/or negative externalities provided by owner-occupied housing relative to rental housing.

Housing Consumption or Price?

The favorable treatment of owner-occupied housing results in increased demand. The increased demand can lead to increased housing consumption and homeownership, but this need not be the case, owing to capitalization effects. Berger et al. (2000) provide evidence that the Swedish interest rate subsidies were fully capitalized into house prices (the original purchaser of the subsidized new construction captured the entire subsidy). Capozza, Green, and Hendershott (1999) argue more generally that all owner-occupied housing subsidies are fully capitalized into urban land prices. That is, declines in real after-tax interest rates, including those caused by the introduction of interest rate subsidies, would raise land prices, not housing consumption and the homeownership rate. Of course, their analysis would not hold in less urban areas where additional land can be readily developed.²⁰

The removal of subsidies would have the opposite effect in this framework. House prices, not housing consumption and homeownership, would decline. And the cuts in marginal tax rates that would occur in the movement to a flat tax (lower tax rate schedule, but fewer deductions) would also lower house/land prices, rather than housing consumption and ownership.

Housing and the Economy

Residential investment is a significant component of Gross Domestic Product (GDP), generally ranging from 4 to 8 percent of GDP in developed countries. Moreover, it is the most volatile component of investment, and total investment is far more volatile than consumption (seven times more volatile in the United States). With this greater volatility, we might expect that housing has a disproportionately large role in the business cycle.

Green (1997) examined the role of residential and nonresidential investment in the U.S. economy over the 1959 to 1992 period. More specifically, he tested (with quarterly data) whether these investment components caused movements in GDP or whether GDP caused movements in the investment components. He found that residential investment caused movement in GDP, not the reverse, but that GDP caused movement in nonresidential investment, rather than the other way around. Thus actions that would temporarily depress residential investment could easily trigger a recession, and those that would stimulate residential investment could unleash an inflationary boom. This suggests that severe short-run changes in housing subsidies should be avoided.

²⁰ For the more traditional view that quantity demanded would be reduced, see Bruce and Holtz-Eakin (1999). For early arguments that the United States overconsumes housing, see Hendershott (1987), Hendershott and Hu (1980), and Mills (1987).

We have performed somewhat analogous tests for the UK (see the appendix), using quarterly data from 1968 to 1998. We test whether GDP has a causal effect on house prices or the reverse. Our results are consistent with Green's in that the causation runs from house prices to GDP but not the reverse.

Attanasio and Weber (1994) have also examined the interaction between income expectations, financial deregulation, and real house prices. They suggest that higher real permanent income causes higher real house prices that in turn increase real GDP via increased real consumer expenditures. Berg (1994) obtained similar results for the Nordic countries. Financial deregulation and tax changes affected house prices in the late 1980s, which in turn altered consumption and thus GDP. Skinner (1994) surveys U.S. studies, arguing that the life-cycle model suggests a significant temporary increase in consumption in response to increases in real house prices. Empirically, Skinner finds the evidence to be mixed.

Which Tenure Should Be Subsidized?

A large body of literature has extolled the benefits of homeownership in the abstract. The positive externalities presumed to be associated with ownership include that owners better maintain their housing and neighborhoods, are better citizens in that they are more likely to support their local schools and to vote, and are superior at child raising. We have recently begun to see econometric tests of these presumptions. The tests are complicated because we need to hold household characteristics constant to compute the intrinsic impact of ownership. Researchers do this by adjusting for differences in income, race, gender, and educational background of parents. Kane (1994) finds that blacks are more likely to graduate from high school if their parents are homeowners and that both white and black high school graduates are more likely to enroll in college if their parents are owners. Similarly, Green and White (1997) find that children of homeowners stay in school longer than children of renters. They also report that daughters of homeowners are less likely to have children as teenagers than are daughters of renters. DiPasquale and Glaeser (1999) deduce that owners are more civic-minded.

While this evidence in support of the presumed benefits of homeownership provides a rationale for subsidizing it, it is uncertain whether homeownership really supplies these benefits or simply proxies for household characteristics that researchers have not been able to hold constant, in spite of heroic efforts. For example, some studies are unable to hold parental characteristics or location constant. Moreover, controlling for numerous characteristics is not sufficient; selection bias must be addressed directly.

However, because it controls for so many factors, a recent study of Haurin, Parcel, and Haurin (2000) on the effects of homeownership on a child's cognitive and behavioral development makes it even more difficult to reject the hypothesis of no impact of homeownership. Their data set, the National Longitudinal Survey of Youth (NLSY) augmented by the NLSY-Child Data, consists of more than 1,000 children, ages five to eight in 1988, who also were surveyed in 1990, 1992, and 1994. The child data are matched with extensive social, demographic, and economic data on parents, this information being first collected in 1979 and updated annually. Instrumental variable techniques are used to control for a myriad of factors.

They use a random effects econometric model to estimate the impact of homeownership on the quality of the home environment and the impact of home environment and homeownership on child development, finding substantial positive effects of homeownership on the home environment. Further, both increased quality of home environment and homeownership itself directly have statistically significant and positive effects on increasing child cognition and reducing child behavior problems. The math and reading achievements of children of owners increase 9 and 7 percent respectively, and child behavior problems are down 3 percent, all of these being statistically different from zero. Further, the longer parents own a home, the greater is their children's cognition and the lower are behavior problems.

On the other hand, work by Andrew J. Oswald (1996) suggests that a major negative externality may be associated with ownership: More specifically, higher unemployment seems to accompany or be caused by greater homeownership. Oswald's argument is that homeowners are less mobile than renters and thus less willing to move to jobs when they become unemployed. Oswald emphasizes a number of indirect effects. Areas with high homeownership rates have more restrictive planning laws and land development regulations, discouraging business start-ups. Because they must commute farther than renters, thereby enduring greater traffic congestion, the cost of having a job increases. Of course, the primary reason that owners are less mobile is that households with lower expected mobility are more likely to choose ownership because longer expected lengths of stay spread the one-time transaction costs of buying and selling over a longer period and thus lower their annualized user cost.

Housing economists might refer directly to the causes of unemployment increases—rising interest rates and falling real incomes—both of which lower house prices and reduce the mobility of homeowners. Lower prices make it difficult for owners who made low down payments to continue to be owners if they must move (Archer, Ling, and McGill 1996; Caplin, Freeman, and Tracy 1997). Instead, these households stay put and increase their saving to rebuild their equity (Engelhardt 1996). Rising interest rates also reduce the mobility of households with nonassumable mortgages because they are unwilling to give up below-market interest rates on long-term fixed-rate loans (Hendershott and Hu 1982; Quigley 1987).

Oswald (1996) provides an impressive array of data indicating a large, positive relationship between homeownership and unemployment: A 10 percentage point increase in ownership leads to a 2 percentage point increase in unemployment. The data supporting this finding are cross-sectional for countries (in both 1960 and 1990), for regions within countries (European regions and U.S. states), and for time series for countries (changes between 1960 and 1990) and for U.S. states (changes between 1970 and 1990). In effect, Oswald sees the rise in homeownership in Europe since 1960 as explaining the rise in unemployment, and current differences in homeownership rates across countries are seen to explain much of current differences in unemployment rates.

Green and Hendershott (2000) examine the U.S. state data in more detail, considering how the relationship between homeownership and unemployment varies by household type and age. These computations are based on 5 of 100 samples from the 1970 and 1990 U.S. censuses. As expected, the relationship is weaker for household heads than for the entire labor force, with household heads less likely to be deterred by ownership from moving in response to unemployment. Also, as expected, the relationship is weaker for households in ages categorized as young and old (under 35 and over 65). Because the young have had less time to

get attached to their geographic locale and have less wealth to carry them through periods of unemployment, ownership is less of a deterrent to moving. Of those in the category considered old, even renters have enough wealth to allow them to avoid relocating when they become unemployed.

To summarize, the Green and Hendershott analysis supports Oswald's hypothesis. His empirical finding does not, for example, seem to be the result of changes in the age structure of the population. This is certainly an area for further research, particularly with micro-economic data.

Summary

Worldwide, the fundamental subsidy to owner-occupied housing is that the returns—imputed rents and capital gains—are very lightly taxed. In countries allowing the home mortgage interest deduction, the tax advantage is extended to lower-wealth households who cannot finance their houses totally with equity. Many countries recognize the basic fairness in this extension, although most limit the deductibility for higher income (and perhaps wealthy) households by setting a maximum on the tax rate at which the interest can be deducted, on the total allowed deduction, or on both. Given the light taxation of owner-occupied housing, the only available way to limit the subsidy is to adopt a flatter tax rate schedule with fewer deductions. And given this favorable treatment of owner-occupied housing, efficient allocation of capital requires subsidies to other forms of investment in structures (tax depreciation allowances and favorable capital gains treatment).

A number of countries have provided additional subsidies to owners via below-market interest rates, one-time up-front grants, or regular cash payments (housing allowances). Such subsidies, which are sometimes targeted to first-time buyers or to new construction, were generally expanded in the late 1970s and early 1980s but have been substantially reduced in Western Europe and elsewhere during the past decade. A major problem for all owner subsidies to households in urban areas is the possibility that the subsidies are just capitalized into higher house (land) prices. This requires either a broad subsidy to all owners or a subsidy tied to specific houses (the Swedish new construction interest rate subsidy or below-market assumable mortgages). First-time owner subsidies that are not tied to specific houses should not be expected to be capitalized. To the extent that the subsidy is not capitalized and thus leads to greater homeownership in a country, the work of Oswald suggests that higher unemployment will result. At a minimum, both of these results argue for limiting ownership subsidies.

The most widespread rental subsidy is housing allowances targeted to lower-income households (often especially those including children or pensioners/retirees). Some countries have also subsidized new construction via below-market interest rates or through substantial tax depreciation allowances. Here, too, the subsidization of new construction has waned during the last decade. And the targeting of housing allowances has probably increased.

What explains the large swings during the past quarter-century in the favorable treatment of homeownership, and what is the future likely to hold? A substantial part of the swing was an endogenous one caused by the rise and fall of inflation. When inflation rises, so do nominal rates of return. Owner-occupied housing, being an untaxed capital good, benefits. And in the absence of indexation, rising inflation increases marginal tax rates for some, further increas-

ing the nontaxed asset's advantage. Of course, a fall in inflation reverses this increased advantage. But the rise in inflation also was accompanied by specific favorable actions, for example, the Australian and Canadian first-time ownership subsidies and the massive Swedish subsidies for new construction. These were all reversed during the 1980s and 1990s. Moreover, the reversals generally more than offset the 1970s increases in favorable treatment. We refer specifically to the sharp declines in marginal tax rates in most of North America and Europe, as well as the general erosion of the mortgage interest deduction.

In the United States, substantial concern has been expressed regarding the decline in homeownership during the 1980s, especially among the young. Follain, Hendershott, and Ling (1992, 262) note that the ownership rate for married couples under age 35 fell by more than 7 percentage points between 1980 and 1990. They also argue that the decline was largely a response to the demise of inflation and tax rate cuts rather than to reduced affordability. Green (1996) confirms this in his analyses of state data. His estimates of price-to-income and payment-to-income ratios of potential first-time owners fell in 42 and 47 states, respectively. In contrast to this general rise in affordability, expected user costs rose in 49 states.

The exogenous component of the swing toward favorable treatment of homeownership and then back correlates roughly with the shift of the baby-boomer cohort into, and out of, its years of increasing homeownership, ages 25 to 40 (in 1990 the U.S. rate rose from 18 percent for households under age 25 to 69 percent for households ages 35 to 44). The boomer cohort was born between about 1947 and 1962, so in the early 1970s it began turning age 25. By the late 1980s, the youngest of the boomers were reaching age 30 and the oldest had already passed through the years of rising ownership. By 2000, virtually all boomers were in their 40s and 50s. As this cohort was achieving ownership, it (and its parents!) was a major political force for subsidizing homeownership. By the late 1980s and 1990s, their concerns were shifting in other directions, such as shoring up their parents' retirement pensions (and their own future pensions). From this perspective, a return to the earlier substantial subsidies for homeownership seems unlikely.

Appendix

Granger Causality Tests for UK House Prices

Analyzing UK quarterly data covering the period 1968 to 1998 and employing the methodology developed by Granger (1969), it is possible to test whether GDP causes house prices and vice versa.²¹ A simple parsimonious approach is employed and the variables used are real GDP and real house prices (as an index). To test for Granger causality, it is necessary to test whether these variables form a cointegrating relationship, which itself requires a preliminary test to determine the orders of integration of the series. Unit root tests were therefore performed and suggested that both of these variables were I(1), stationary in first differences. The test results are presented in table A1.

²¹ Ball and Grilli (1997) also adopt the methodology of Granger causality testing. For most European countries they found that GDP was affected by housing investment and that housing systems in the long run were strongly influenced by the general performance of the economy. The latter point may suggest causality in two directions.

Table A1. Dickey-Fuller Unit Root Test Results

GDP	-4.139*
House prices	-3.906*

* Indicates significance at the 1 percent level.

The next step is to test for cointegration. Johansen's (1991) methodology was used to test for the presence of a cointegrating vector. These results are reported in table A2 where the null hypothesis of no cointegration could be rejected at the 5 percent level. One cointegrating equation was found to exist.

Table A2. Johansen Cointegration Test

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesis Number of Cointegrating Equations
0.151	20.574	18.17	23.46	None*
0.009	1.101	3.74	6.40	At most 1

* Indicates rejection of the null at the 5 percent significance level.

The next step is to test for Granger causality. Table A3 presents the results for pair-wise Granger causality tests. Ten lags of data were used in the test to permit ample time for feedbacks between the variables to be picked up.

Table A3. Granger Causality Test Results

Null Hypothesis	F Statistic	Probability
House prices do not Granger-cause GDP	2.112	0.031
GDP does not Granger-cause house prices	1.034	0.422

Note: 114 observations.

The results suggest that it is possible to reject the null hypothesis that house prices do not Granger-cause GDP. However, we cannot reject the null hypothesis that GDP does not Granger-cause house prices. Hence, Granger causality runs in one direction only, from house prices to GDP. This result also holds when examining changes in the value of these variables.

References

- Archer, Wayne R., David C. Ling, and Gary A. McGill. 1996. The Effect of Income and Collateral Constraints on Residential Mortgage Terminations. *Regional Science and Urban Economics* 26(3):235-61.
- Attanasio, Orazio P., and Guglielmo Weber. 1994. The UK Consumption Boom of the Late 1980s: Aggregate Implications of Macroeconomic Evidence. *Economic Journal* 104(427):1269-302.
- Auerbach, Alan J. 1983. Taxation, Corporate Financial Policy and the Cost of Capital. *Journal of Economic Literature* 21(September):905-40.

- Auerbach, Alan J., and Joel Slemrod. 1997. The Economic Effects of the Tax Reform Act of 1986. *Journal of Economic Literature* 35(2):589–632.
- Ball, Michael, and Maurizio Grilli. 1997. *Housing Markets and Economic Convergence in The European Union*. London: Royal Institute of Chartered Surveyors.
- Berg, Lennart. 1994. Household Savings and Debts: The Experience of the Nordic Countries. *Oxford Review of Economic Policy* 10(2):42–53.
- Berger, Tommy, Peter Englund, Patric H. Hendershott, and Bengt Turner. 2000. Another Look at the Capitalization of Interest Subsidies: Evidence from Sweden. *Journal of Money, Credit and Banking* 32(2):199–217.
- Bourassa, Stephen C., Donald R. Haurin, R. Jean Haurin, and Patric H. Hendershott. 1994. Independent Living and Home Ownership: An Analysis of Australian Youth. *The Australian Economic Review* (Quarter 3):29–44.
- Bourassa, Stephen C., and Patric H. Hendershott. 1994. On the Equity Effects of Taxing Imputed Rent: Evidence from Australia. *Housing Policy Debate* 5(1):73–95.
- Brickman, David, and Patric H. Hendershott. 2000. Mortgage Refinancing, Adverse Selection, and FHA's Streamline Program. *Journal of Real Estate Economics and Finance* 20(3):151–73.
- Bruce, Donald, and Douglas Holtz-Eakin. 1999. Fundamental Tax Reform and Residential Housing. *Journal of Housing Economics* 8(4):249–71.
- Caplin, Andrew C., Charles Freeman, and Joseph Tracy. 1997. Collateral Damage: Refinancing Constraints and Regional Recessions. *Journal of Money, Credit and Banking* 29(4):496–516.
- Capozza, Dennis, Richard Green, and Patric H. Hendershott. 1996. Taxes, Mortgage Borrowing, and Residential Land Prices. In *Economic Effects of Fundamental Tax Reform*, ed. Henry J. Aaron and William G. Gale, 171–210. Washington, DC: Brookings Institution Press.
- Capozza, Dennis, Richard Green, and Patric H. Hendershott. 1999. Tax Reform and House Prices: Large or Small Effect. In *NTA Proceedings of the 91st Annual Conference*, 19–24. Austin, TX: National Tax Association.
- DiPasquale, Denise, and Edward L. Glaeser. 1999. Incentives and Social Capital: Are Homeowners Better Citizens? *Journal of Urban Economics* 45(2):354–84.
- Engelhardt, Gary V. 1996. House Prices and Home Owner Saving Behavior. *Regional Science & Urban Economics* 26(3/4):313–36.
- Engelhardt, Gary V. 1997. Do Targeted Savings Incentives for Homeownership Work? The Canadian Experience. *Journal of Housing Research* 8(2):225–48.
- Englund, Peter, Patric H. Hendershott, and Bengt Turner. 1995. The Tax Reform and the Housing Market. *Swedish Economic Policy Review* 2(2):319–56.
- Feldstein, Martin. 1994. American Economic Policy in the 1980s: A Personal View. In *American Economic Policy in the 1980s*, ed. Martin Feldstein, 1–79. Chicago: The University of Chicago Press.
- Follain, James R., and Robert M. Dunskey. 1997. The Demand for Mortgage Debt and the Income Tax. *Journal of Housing Research* 8(2):155–99.
- Follain, James R., Patric H. Hendershott, and David C. Ling. 1987. Understanding the Real Estate Provisions of the Tax Act: Their Motivation and Impact. *National Tax Journal* 40(3):363–72.

Follain, James R., Patric H. Hendershott, and David C. Ling. 1992. Real Estate Markets Since 1980: What Role Have Tax Changes Played? *National Tax Journal* 45(3):253–66.

Follain, James R., David C. Ling, and Gary A. McGill. 1993. The Preferential Income Tax Treatment of Owner-Occupied Housing: Who Really Benefits? *Housing Policy Debate* 4(1):1–24.

Follain, James R., and Lisa S. Melamed. 1998. The False Messiah of Tax Policy: What Elimination of the Home Mortgage Interest Deduction Promises and a Careful Look at What It Delivers. *Journal of Housing Research* 9(2):179–99.

Gibb, Kenneth, Moira Munro, and Madhu Satsangi. 1999. *Housing Finance in the UK*. New York: MacMillan.

Granger, Clive W. J. 1969. Investigating Causal Relations by Econometric Models and Cross-Spectral Methods. *Econometrica* 37(3):424–38.

Green, Richard K. 1996. Should the Stagnant Homeownership Rate Be a Source of Concern? *Regional Science & Urban Economics* 26(3):337–68.

Green, Richard K. 1997. Follow the Leader: How Changes in Residential and Nonresidential Investment Predict Changes in GDP. *Real Estate Economics* 25(2):253–70.

Green, Richard K., and Patric H. Hendershott. 2001. Homeownership and Unemployment in the U.S. *Urban Studies*, forthcoming.

Green, Richard K., and Michelle J. White. 1997. Measuring the Benefits of Homeowning: Effects on Children. *Journal of Urban Economics* 41(3):441–61.

Haurin, Donald R., Patric H. Hendershott, and Susan M. Wachter. 1997. Borrowing Constraints and the Tenure Choice of Young Households. *Journal of Housing Research* 8(2):137–54.

Haurin, Donald R., Toby L. Parcel, and R. Jean Haurin. 2000. The Impact of Home Ownership on Child Outcomes. Working Paper. Ohio State University, Department of Economics.

Hendershott, Patric H. 1983. Government Policy and the Allocation of Capital between Residential and Industrial Uses. *Financial Analysts Journal* 39:3–8.

Hendershott, Patric H. 1987. Government Policy and the Allocation of Capital between Residential and Industrial Uses. In *The Effects of Taxation on Capital Formation*, ed. Martin Feldstein, 259–90. Chicago: University of Chicago Press.

Hendershott, Patric H., and Sheng Hu. 1980. Government-Induced Biases in the Allocation of the Stock of Fixed Capital in the United States. In *Capital, Efficiency and Growth*, ed. George von Furstenberg, 323–60. Cambridge, MA: Ballinger Publishing.

Hendershott, Patric H., and Sheng Hu. 1982. Accelerating Inflation, Nonassumable Fixed Rate Mortgages, and Consumer Choice and Welfare. *Public Finance Quarterly* (2):158–84.

Hendershott, Patric H., and Sheng Hu. 1983. The Allocation of Capital between Residential and Non-residential Uses: Taxes, Inflation, and Credit Market Constraints. *Journal of Finance* 38:795–812.

Hendershott, Patric H., William LaFayette, and Donald R. Haurin. 1997. Debt Usage and Mortgage Choice: The FHA-Conventional Decision. *Journal of Urban Economics* 41(2):202–17.

Hendershott, Patric H., and James Waddell. 1992. Changing Fortunes of FHA's Mutual Mortgage Insurance Fund and the Legislative Response. *Journal of Real Estate Economics and Finance* 5(2):119–32.

- Johansen, Soren. 1991. Likelihood-based Inference in Cointegration Vectors in Gaussian Vector Autoregressive Models. *Econometrica* 59(6):1551–80.
- Jones, Laurence. 1989. Current Wealth and Tenure Choice. *Journal of the American Real Estate and Urban Economics Association* 17(1):7–40.
- Kane, Thomas J. 1994. College Entry by Blacks since 1970: The Role of College Costs, Family Background, and the Returns to Education. *Journal of Political Economy* 102(5):878–907.
- Laidler, David. 1969. Income Tax Incentives for Owner-Occupied Housing. In *The Taxation of Income from Capital*, ed. Arnold. C. Harberger and Martin J. Bailey, 50–76. Washington, DC: Brookings Institution.
- Ling, David C., and Gary A. McGill. 1998. Evidence on the Demand for Mortgage Debt by Owner-Occupants. *Journal of Urban Economics* 44(3):391–414.
- Linneman, Peter, and Susan M. Wachter. 1989. The Impacts of Borrowing Constraints on Homeownership. *Journal of the American Real Estate and Urban Economics Association* 17(4):389–402.
- McCrone, Gavin, and Mark Stephens. 1995. *Housing Policy in Britain and Europe*. London: University College London Press Limited.
- Mills, Edwin. 1987. Has the United States Overinvested in Housing? *Journal of the American Real Estate and Urban Economics Association* 15(1):601–16.
- Oswald, Andrew J. 1996. A Conjecture on an Explanation for High Unemployment in the Industrialized Nations: Part I. Working Paper No. 475. University of Warrick.
- Quigley, John M. 1987. Interest Rate Variations, Mortgage Prepayments and Household Mobility. *Review of Economics and Statistics* 49:636–43.
- Scholten, Ulrich. 2000. The Euro and Owner-Occupancy Rates in Europe. Working Paper. University of Munich, Department of Economics.
- Skinner, Jonathan. 1994. Housing and Saving in the United States. In *Housing Markets in the United States and Japan*, ed. Yukio Noguchi and James M. Poterba, 191–213. Chicago: University of Chicago Press.
- Woodward, Susan, and John Weicher. 1989. Goring the Wrong Ox: A Defense of the Mortgage Interest Deduction. *National Tax Journal* 42(3):301–31.
- Zorn, Peter. 1989. Mobility-Tenure Decisions and Financial Credit: Do Mortgage Qualification Requirements Constrain Homeownership? *Journal of the American Real Estate and Urban Economics Association* 17(1):1–16.