HOME OWNERSHIP
AND REAL HOUSE PRICES:
SOURCES OF CHANGE, 1965-85

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ABSTRACT

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in the first half of the 1980s.   In the "standard view", the 1970s changes are
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home ownership, and real house prices are said to be determined largely by
supply (cost), not demand, factors.   This paper considers the data on home
ownership and real house prices and evaluates the standard view vis-a-vis its
challengers.   Data from the 1980s suggest that other factors (probably rising
income for ownership and negative construction productivity growth for real
prices) were responsible for at least half of the 1970s increase in ownership
and real price.

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Two phenomena characterized the housing market in the 1970s: a somewhat-disguised surge toward home ownership and a well-publicized sharp increase in the real price of housing. These movements were partially reversed in the first half of the 1980s. In the "standard view", the 1970s changes are attributed to an interaction of the tax system and rising inflation.[1] Given the disinflation of the 1980s, this explanation also seems consistent with the reversals in ownership and real prices.

Recent work challenges the standard view.[2] Inflation is said to disfavor home ownership [Follain (1985) and Gordon, Hines and Summers (1986)]. Moreover, real house prices are said to be determined largely by supply (cost), not demand, factors [Diamond (1984)]. This paper considers the data on home ownership and real house prices and evaluates the standard view vis-a-vis its challengers.

The paper is divided into three sections and a summary. Section I develops the familiar framework on taxes and the cost of owning and renting housing. Sections II and III use this framework to analyze changes in home ownership and the real price of housing, respectively, over the last quarter century.

I.   Taxes and the Annual Cost of Housing[3]

Owner-occupied housing is both a consumption and an investment good; each year the occupant anticipates receiving consumption services and capital appreciation. (The capital appreciation is, of course, less certain than the consumption component.) The cost of obtaining these two returns includes

maintenance and financing (the opportunity cost of investing one's own funds in the house and/or the cost of servicing debt). In contrast, when a household rents a house, only the consumption component is received.

Whether a household chooses to rent or own depends, largely, on whether the cost of obtaining the consumption services by renting (the rental payments are made to a landlord) is greater or less than the net cost of obtaining the services by owning (maintenance plus financing less expected appreciation). This net cost of owning is usefully viewed as the implicit rent one pays oneself as one's own landlord.

How much housing a household consumes -- how large a house the household owns or rents -- is determined by a comparison of the benefits (consumption services) provided by an extra dollar of house with the cost of the extra dollar of house (the market rent paid the landlord or the implicit rent paid to oneself). A household will purchase/rent sufficient housing such that the marginal benefit just equals the marginal cost. A benefit exceeding the cost dictates increasing housing demand until the benefit falls to the cost (the value of the consumption services exhibits declining marginal returns). A cost exceeding the benefit would lead to reduced housing demand.

The two calculations just discussed are usually termed the tenure and quantity-demanded decisions. They differ in an important respect. The tenure decision is a total one: does one own or rent the entire housing unit (is the average cost of owning greater or less than the average cost of renting)? The quantity decision is a marginal one: given that one owns or rents, does one demand an extra dollar of house (is the marginal gain from obtaining services from an extra dollar of house greater or less than the marginal cost)? For renting, the average and marginal costs are the same. For owning, they are generally different.

Implicit Rent on Owner-Occupied Housing

A few algebraic expressions are useful in seeing the role of taxes in these decisions. The net annual cost per dollar of owner-occupied housing is, to recapitulate, maintenance and financing costs less expected appreciation. With maintenance denoted by m, financing costs by the after-tax interest rate for the jth household $(1-\tau_j)i$, expected appreciation by p-d (p being the appreciation rate for new houses and d being the depreciation rate), and P_h/P being the ratio of house prices relative to prices generally, equality between the implicit rents the household earns and the net cost of obtaining these rents is given by

$$r_j = [(1-\tau_j)i - p + d + m]\frac{P_h}{P}. \qquad (1)$$

No tax rate is applied to the appreciation term (p) because of the gains rollover provision and the $125,000 gains exclusion for those over 55; implicit rents are also not taxed.

Note that the annual cost is lower for households in higher tax brackets. This feature of current law has long been criticized as both inefficient and inequitable. While a plausible case can be made for tax incentives to encourage homeownership, a persuasive case for subsidizing high-income households more than low-income households has not been made. The combination of low annual costs for high-income households and high costs for low-income households will lead to the production of large, underutilized houses for the former and small, overcrowded houses for the latter.

The appropriate tax rate to use in equation (1) depends on which housing decision is being investigated and how the housing is financed (Hendershott and Slemrod, 1983). If quantity demanded is at issue, then τ_j is either the rate at which the last dollar of interest paid is taxed (if the house is debt-financed at the margin) or the tax rate being applied to the last dollar of

interest that would have been earned on own-equity had it not been invested in the house (if equity was the marginal source of financing). That is, the household's marginal tax rate is relevant to this marginal decision. But when tenure choice is considered, τ_j is the average rate at which all the financing charges paid and the interest income forgone (owing to the investment of own-equity) would have been paid and taxed. In general, the average rate will exceed the marginal rate. However, the reverse can be true for high-income households whose nonhousing tax deductions (e.g., state and local income taxes) exceed their standard deduction.

Debt versus Own-Equity Financing

Under current law in the United States, the after-tax costs of debt and own-equity financing are roughly equal. To illustrate, a household with significant wealth can either finance its house purchase with a fixed-rate mortgage and put its own wealth into GNMA securities or it can simply put its money into the house (lend to itself). The tax consequences are the same. In Canada, such is not the case because mortgage interest is not tax deductible. There a household would not borrow and invest in mortgages; the interest income would be taxed, but the interest expense would not be deductable. Canada's law encourages own-equity finance.

It is worth emphasizing that Canada's system is biased against debt-financing; the United States system is not biased in favor of debt-financing of owner-occupied housing.[4] Thus proposals to remove (or reduce) the home mortgage interest deduction would not eliminate (or dampen) a pro-debt bias but would introduce an anti-debt bias.[5] An anti-debt bias would further penalize low-income, less wealthy households relative to higher-income, wealthy households. Not only would the former have a higher after-tax cost of own-

equity finance than the latter, owing to their lower tax rate, but the former would be forced to use the expensive debt alternative because they do have the wherewithall to totally own-equity finance their house purchase.

The Tax Advantage to Owner-Occupied Housing

Owner-occupied housing is often said (correctly) to have a tax advantage over business capital. To understand the advantage, an expression analogous to equation (1) needs to be introduced for the annual cost of business capital goods. The analysis is clearest if business capital is equated with rental housing. The taxation of rental housing is more onerous than that of owner-housing in that rental income is taxed at the regular income tax rate and realized net appreciation is taxed at the capital gains tax rate. Taxation is less onerous in that both maintenance and tax depreciation are deductible. If we let τ be the income tax rate of the marginal investor in rental housing, τ_g be his concurrent-equivalent capital gains tax rate, and d_x be the rate of depreciation for tax purposes, then

$$(1-\tau)r = [(1-\tau)i - (1-\tau_g)p + d + (1-\tau)m - \tau d_x]\frac{P_h}{P}. \qquad (2)$$

The central issue is the relationship between the rents that the business project must earn [r in (2)] and those owner-occupied housing must deliver [r_j in (1)]. The investment that can go forward with the lowest rents is the taxed-favored one.

To facilitate the comparison, I assume that a tax-adjusted Fisher's law holds for interest rates, i.e., interest rates rise by a multiple of an increase in expected inflation so that real after-tax interest rates are independent of expected inflation [$i = i_r + p/(1-\tau)$, where i_r is the after-tax real rate of interest]. With this assumption, owner-occupied housing is favored over rental housing ($r_j < r$) if

$$\tau_j i_r > (\tau - \tau_g - \tau_j) p/(1-\tau) + (d - d_x)\tau/(1-\tau). \tag{3}$$

Consider the case where tax depreciation equals economic depreciation at replacement cost ($d_x = d$). At zero inflation, owner housing is favored for all households paying taxes ($\tau_j > 0$). With inflation, owner housing is less favored. To illustrate, with 4% inflation, an after-tax real interest rate of 4%, a concurrent-equivalent capital gains tax rate of 6%, and rental landlords in a 50% tax bracket, owner housing is favored by households in the 29% tax bracket or higher. With rental landlords in the 40% bracket and the other variables unchanged, owner housing is favored by households in the 21% bracket or higher. With $d_x \neq d$, these indifference tax-brackets change. If tax depreciation is more rapid than economic depreciation, as it would be in a zero inflation world, then owner-occupied housing is less favored; if tax depreciation is less rapid, as it would be in a high inflation environment, then owner-housing is more favored.

In the more general case where no specific relationship between i and p is posited, the tax rate at which a household is indifferent between owning and renting is obtained by equating r_j and r in equations (1) and (2) and solving for τ_j. The result is

$$\tau_j^* = \frac{\tau - \tau_g}{1-\tau} \frac{p}{i} + \frac{(d-d_x)\tau}{(1-\tau)i}. \tag{4}$$

Numerous authors have examined the impact of increases in expected inflation on this tenure indifference tax rate and found that under plausible parameter sets inflation raises τ_j^* and thus lowers homeownership (Titman; Follain; and Gordon, Hines and Summers). This is true under both pre1987 tax law and a variety of tax reform proposals (Hendershott, 1987). More generally, the tax advantage of owner-occupied housing over business capital can disappear at a sufficiently high inflation rate.

To summarize, the tax advantage of owner-occupied housing stems from the zero taxation of its implicit rents and capital gains, not from the deductibility of home mortgage interest.[6] As noted, debt financing is not tax-preferred relative to own-equity financing; the deductibility of mortgage interest simply extends the tax advantage of household capital to less wealthy households.

II. Taxes and Home Ownership

Table 1 presents some basic census data on home ownership rates by age and family structure. Between the early twenties and late thirties, married couples sharply increase their propensity to own. Nonmarried households, who are far less likely to own in their twenties and thirties than marrieds are, exhibit a sharply rising propensity into their fifties. Table 2 contains more recent and detailed data from the Annual Housing and Vacancy Surveys. Within the nonmarried-couple household group, singles above age 34 are significantly less likely to own than are "others"; within others, females under 45 are less likely to own than are males.

The data in these tables indicate a minor move toward ownership in the 1960s and a substantial surge in the 1970s. For married couples, the increase was over 10 percentage points for all cohorts under age 65. For other male households, a sharp rise is also evident.[7] The data in Table 2 suggest that most of the other increase was by single households. In the 1980s, a partial reversal has occurred, at least for married couples under 45. Each age group has a lower ownership rate in 1985 than it had in 1975.

A natural question is why did the aggregate ownership rate rise so little between 1960 and 1980 ($2\frac{1}{2}$ percentage points) when cohort ownership rates jumped? The answer is twofold. First, the proportion of the population in the prime renting years surged (the baby-boomer effect); between 1962 and 1982, the percentage of the U.S. population in the 20-29 age cohort increased by 50%.

The sharp increase of the share of the population in their twenties acted to lower the aggregate ownership rate by 1.75 percentage points. Second, the composition of households shifted sharply from married couples to nonmarried households. The married-couple share of households under 35 fell by 25 percentage points and that in the 35-44 cohort declined by half as much. This shift to households with a lower demand for ownership lowered the aggregate ownership rate by 2.75 percentage points. Thus 4½ perentage points of a 7 percentage point shift to ownership were offset by changes in the age and household-type structures of the population.

Income, Age and Ownership

The ownership rate generally increases with both income and age. To illustrate this point, I have plotted the ownership rate (from the AHS) against real income for married households under 25, age 25-29, age 30-34, age 35-44, and age 45-64 for 1973 and 1983, in Figures 1 and 2. The real income values are based upon midpoints of the nominal income ranges given in the AHS; where the income range is unlimited (the highest class), 125% of the lower end of the range is used. The deflator is the CPI-U-X1 (the rental equivalent experimental measure that became the official method of calculating the CPI in 1983), equal to 1.0 in 1985.

The positive age-ownership relationship is indicated by age-ownership-income curves for younger households systematically lying below those for older households. In fact, only a handful of "crossovers" of these curves occurs in the entire ten years of AHS data. The positive income-ownership relationship is indicated by the positive slope of the curves.[8] Why do the systematic positive relationships hold? One explanation is that the annual cost of owner-occupied housing is lower for older, higher income households because they are in higher tax brackets and thus pay lower after-tax mortgage rates (and opportunity costs on own equity invested). Further, older households are

less mobile, on average, and thus the transactions cost of buying and selling a home and the up-front points and fees paid on a mortgage are less on an annual-equivalent basis than they are for younger, more mobile households.[9] Older households are also wealthier, and thus are less likely to be "affordability" (cash flow) constrained, and they likely have more certain income, and thus are more willing to commit to the ownership of housing.

The income/ownership profiles in 1973, 1979 and 1983 are listed in Table 3 for the five married household classes. For 1973 and 1983, these data are linear interpolations between the points plotted in Figures 1 and 2.[10] A similar procedure was used for 1979. As can be seen, ownership rates for any given age/income household rose between 1973 and 1979 and then declined through 1983. These movements are consistent with observed changes in the cost of owner housing relative to the cost of rental housing. Real after-tax mortgage rates, and thus the cost of owner housing, fell sharply over the 1973-79 period because pretax interest rates rose about one-for-one with expected general inflation. Moreover, the cost of owner-occupied housing fell even more sharply because house price inflation, and thus expected house inflation, increased more than general inflation. Conversely, between 1979 and 1983, real interest rates jumped, and house price inflation did not exceed general inflation. Rental costs, in contrast, changed little in either period.

Sample calculations, using equation (1), of the cost of owner housing illustrate this point. They are based on interest rates of 8, 10 and 13 percent, respectively, in 1973, 1979 and 1983; inflation rates of 3, 8 and 5 percent; a tax rate of 20 percent; the sum of depreciation and maintenance rates equal to 5 percent of house value; and a unitary price ratio. With these assumptions, the real after-tax interest rate declined from 3½ percent in 1973 to zero in 1979 and then rose to 5½ percent in 1983. Adding the 5 percent for depreciation and maintenance, the total annual cost of owning fell by 40

percent between 1973 and 1979 (8½ to 5) and then more than doubled by 1983 (5 to 10½). While real rents also declined between 1973 and 1979 and rose between then and 1983, the movements were much smaller (each less than 10 percent). Thus an increase and then decrease in ownership rates should have followed.

While the directional changes in ownership rates are fully consistent with the standard view, the magnitude of the changes raises some doubts about the view. Using the data from Tables 1 and 2, only about half of the increase in ownership between 1970 and 1980 was reversed in the 1980-85 period for married households under age 45 and hardly any was reversed for older and single households. The data in Table 3, which hold real income constant, have more of a reversal for married couples under age 35 -- about a full reversal except for high income young married couples. But the user cost calculations imply more than a full reversal. It seems as though some of the surge toward ownership in the 1970s must be attributable to other factors, such as rising real income.[11]

Another variable sometimes offered as a determinant of ownership is housing affordability -- roughly the ratio of mortgage payments on the median priced house, assuming a given loan to value ratio, to the income of the median household. This variable rose in the 1965-79 period, suggesting a decline in ownership just when it was surging, and rose further in the early 1980s before declining over the 1983-86 period. Even the further increase in the early 1980s is a problem because this suggests an even sharper decline in ownership than called for by the rising owner costs, and the implied decline is already greater than what was observed.

Comparison of Simulated and Observed Ownership Rates

Two recent simulation studies report computations on the relative attractiveness of owning versus renting during the last 20 years (Follain, 1985 and Gordon, Hines and Summers, 1986). In these studies, the costs of obtaining

owner and rental housing services are related to interest rates, inflation, tax

rates (of the property owners) and other rental housing tax provisions. The

tax rate of the owner-occupier who would be indifferent between owning and

renting is then computed (equation 4 is solved). Households in tax brackets

above this tenure-indifference tax rate should generally be owners; households

in lower tax brackets should generally be renters. Table 4 contains the

indifference tax rates for the two studies. Alternative sets of values

reflecting different assumptions are given for Hines, Gordon and Summers (HGS);

the rates listed first are based on "depreciation" rates comparable to those of

Follain.

Differences between the tenure-indifference tax rates of the studies are

striking, with Follain's rates being far lower than GHS's. To illustrate, GHS

obtain a tax rate of 0.59 for 1975, implying that virtually all households

would be renters; Follain's rate is only 0.12, implying the reverse. Follain's

lower indifference tax rate is roughly consistent with the current two-thirds

ownership rate in the U.S.; the high GHS tax rate implies a far lower

ownership rate. The difference in tenure-indifference tax rates is almost

certainly attributable to the posited tax rate of the rental landlord. Follain

assumes a 50 percent tax rate prior to 1981 and 45 percent afterwards; GHS

choose the higher maximum tax rate, 70 percent prior to 1981 and 50 percent

afterwards. With this higher landlord tax bracket, rent levels consistent with

the landlord earning the "market" rate of return are lower, and nearly all

households would rent.

While the simulation studies imply far different levels of ownership,

their implications for changes in ownership are roughly consistent. These

implications for the directional changes in ownership rates over the last two

decades are listed in Table 5. For comparison purposes, the observed

directional change in ownership is also listed. The difference between reality

and the simulation implications is startling. The simulation studies say
ownership should have declined somewhat between 1965 and 1980 and then risen in
the last five years, just the reverse of what actually occurred.[12] One source
of the divergence of the simulations from reality is that tenure decisions are
based on actual rent levels, not equilibrium rent levels.

According to Follain's analysis, the costs (equilibrium) of both owner
and rental housing fell sharply from the early 1970s to 1980 and then both rose
even more abruptly than the earlier decline. These movements were largely
governed by the decline and then increase in real after-tax interest rates.
The implied fall and then increase in ownership results from equilibrium rental
costs changing more than owner costs during both periods. However, actual real
rents (the rent component of the CPI deflated by the total CPI) moved far less
dramatically than equilibrium rents. While Follain's equilibrium cost of
rental housing fell by 65% and then rose by 200%, actual real rents fell by
only 8% between 1973 and 1980 and since then have risen by but 10%.

How might one have expected households to respond to the annual housing
cost changes that occurred in the 1970s and early 1980s? Consider three
household groups: newly formed units, existing renters, and existing owners.
Assume that households expected rents to move as they subsequently did. With
this perfect foresight, both new and existing-renting households should have
shifted to ownership in the second half of the 1970s, locking in low ownership
costs (an 8 to 10 percent fixed-rate mortgage). Thus, ownership should have
risen sharply, as it in fact did, even though the equilibrium cost of renting
fell relative to that of owning. This result would hold even if households
expected a somewhat more rapid decline in real rents than that actually
observed.

Turning to the 1980s, the sharp increase in real after-tax interest rates and the only gradual rise in real rents should have caused more newly-formed households to rent than was the case in the 1970s. Existing renters would not shift to owning, nor would existing owners with low fixed-rate loans be likely to switch to renting. Thus one would have expected a fall in the ownership rate for younger age groups, where new households are being formed, and little change in the ownership rate of older, existing households. This is, again, precisely the pattern observed.

A real puzzle is why have actual rent levels moved so little relative to the simulated equilibrium levels? The most likely answer is that equilibrium rents moved far less violently than the simulation studies imply. Owing to a 6 percentage point assumed rise in the expected inflation rate between the first half of the 1970s and the end of the decade, the real (before tax) mortgage rate in Follain's analysis shrank from 3½ percentage points to one point; the subsequent 6 percentage point decline in expected inflation (1981 to 1985) then raised the real rate to a full 8 percentage points. Say that investors in rental properties adjusted their inflation expectations more conservatively, the result being only a 3 point rise and fall in expected inflation. The changes in equilibrium rents would have been dampened considerably relative to those Follain reports. In fact, Hendershott's calculations (1980) show no downward trend in equilibrium rents between 1968 and 1978.

III. Taxes and The Real Price of New Single-Family Housing

Table 6 contains data on the percentage change in the real price (constant quality price deflated by the CPI-U-Xl) of newly-constructed single-family houses of constant quality. The data are given for both the total 1963-85 period and three subperiods (roughly the 1960s, 1970s and early 1980s). Moreover, percentage changes are computed for both the total United States and four broad geographic regions. The national figures suggest modest real

appreciation in the 1960s, substantial real inflation in the 1970s, and modest

real depreciation in the first half of the 1980s. Overall, real house prices

increased by 26.2 percent during this 22 year period.

As is generally well known, the most rapid regional real appreciation

occurred in the West in the 1970s: 57 percent over just eight years. However,

the Northeast's steady continuing real inflation gives this area the greatest

real appreciation over the full 22 years, 46.3 percent. Even with the

significant decline in real prices in the 1980s, the Midwest has a positive

14.6 percent real appreciation over the entire 1963-85 period, slightly less

than was experienced in the South.

In the long run, existing house prices are determined by reproduction

costs (the cost of building new houses), including land. In the short run,

temporary excess demand/supply could cause existing prices to rise/fall

relative to reproduction costs. A temporary excess demand will raise prices of

new houses (profit margins will expand), as well as those of existing houses.

A temporary excess supply may not be fully reflected in new prices, however;

profit margins will sink to a minimum, and new houses will be built only for

those with strong tastes for new construction. Thus real prices of existing

houses may have fallen by more in the Midwest in the 1980s than the 12.2% shown

in Table 6.

The annual cost of owner housing affects the real price of houses in two

ways. First, land prices equal the present value of the expected future

earnings from the land. The discount rate in the present value calculation

moves with the real after-tax interest rate that drives the annual cost of

housing. Thus the decline in the real after-tax rate in the 1970s should have

raised the real price of land, a component of the reproduction cost of houses.

Second, the decline in the annual cost of housing should have both shifted

households from renting to owning and increased the quantity of housing demanded per owner household. As a result, the price of single family houses should have risen above reproduction costs.

The coincidence of the decline in annual cost of housing and the rise in real house prices has led Summers (1981) to posit cause and effect and Poterba (1984) to develop a simulation model illustrating possible cause and effect. On the other hand, Hendershott and Hu (1983), citing evidence of lower productivity growth in the construction industry than elsewhere (Hendershott, 1980, Table 6), present simulations in which two-thirds of the real price increase is due to supply factors.

Table 7 contains an update of data on productivity growth in the construction industry and in all industries. As can be seen, productivity growth was strong for both all industries and construction in the 1948-65 period. Since 1965, productivity has slowed overall, especially after 1973, and that in the construction industry has been consistently negative. During this period, annual productivity growth in the construction industry averaged nearly 3 percentage points less than productivity growth overall.

The only econometric study that bears directly on the issue of the relative roles of supply and demand factors in the run up of real house prices in the 1970s is Diamond's (1984) analysis of regional changes in real house prices over the 1963-82 period. The four regions for which data were provided in Table 6 were subdivided into twelve subregions and annual real changes were explained. The explanatory variables included the owner cost of housing, regional single-family housing starts, dummy variables to reflect the growth in regulation in the 1975-78 period and the use of builder buydowns (whose value should be reflected in new house prices) in the early 1980s, and a constant that could reflect the relatively low productivity growth in the housing-construction sector of the economy. Diamond concludes that the decline in the

user cost explains only a quarter to a third of the rise in real prices in the 1970s. However, the increase in single-family housing starts over the period was itself partly attributable to the decline in owner costs that stimulated both greater ownership and more household formations (Hendershott and Smith, 1985). Allowing for this indirect link, the decline in owner costs likely would explain a third to a half of the rise in real prices.

Probably the clearest evidence that the rise in real house prices reflected more than the decline in the owner costs is data from the early 1980s. While the annual cost of owner housing has more than reversed its 1965-79 decline, only a sixth of the 30 percent increase in real house prices has been reversed. (Of course, if existing house prices have fallen more than new house prices, somewhat more of a reversal occurred.) Thus supply factors appear to have played a significant role in the 30 percent real price increase in the 1970s.

An illustrative example, which seems consistent with the data and Diamond's empirics, is the following. Low productivity growth in the construction industry has raised real house prices by 2 percent a year since 1970. The observed 28 percent increase in real prices in the 1971-79 period reflects this supply side effect (16 percent = 8 x 2) plus an additional demand side effect (12 percent) owing to falling owner costs. The observed 5 percent decline in real house prices so far in the 1980s equals the difference between a more than reversal of the demand side effect (-17 percent) less the continuing supply side force (12 percent = 6 x 2). In this scenario, over half of the 1970s increase in real house prices was due to supply factors. Moreover, one should expect further increases in real prices in the future unless relative productivity growth in the construction industry accelerates markedly.

IV. Summary

According to the conventional wisdom, accelerating inflation in the 1970s, combined with nonindexed tax brackets and a failure of interest rates to rise more than one-for-one with expected inflation, lowered real after-tax interest rates and thus raised the demand for owner-occupied housing. The result was an increase in home ownership and real house prices. This view has been challenged recently. An increase in expected inflation has been shown to lower market rents relative to the cost of owner housing in an equilibrium model and thus to decrease homeownership. Moreover, productivity growth in the residential construction industry has been lower than elsewhere in the economy, possibly due to increased regulation, and this could explain much of the rise in real house prices.

The facts on home ownership are inconsistent with the new view. Ownership surged in the 1970s. For both single and married-couple households, the ownership rate rose by 7 to 10 percentage points for all age groups under 65. The new view could be inconsistent with the 1970s data because a general increase in "expected inflation" and the associated rise in nominal interest rates may not have been the only source of change in equilibrium costs of owner and renter housing. For example, the tax bracket creep accompanying the inflation probably raised tax rates of moderate-income potential owners more than those of high-income real estate investors. Also, the expected inflation rate for owner-occupied housing could have risen more than that for rental housing. Finally, even if equilibrium rents fell more than owner costs in the 1970s (and rose more in the 1980s), actual rents did not, and households respond to the costs they pay, not to equilibrium rents or costs.

Data from the 1980s are not so kind to the conventional wisdom. While ownership and real house prices have fallen, the declines are not enough. Because the annual cost of owner housing rose even more (relative to actual

rents) in the early 1980s than it fell in the 1970s, one would have anticipated more than a full reversal in ownership rates and real house prices if the declining owner costs were responsible for the full 1970s increases. In fact, less than half the ownership increase has been reversed, and real prices have fallen by only 5 percent, far less than the 30 percent increase in the 1970s. It appears that other factors (rising real income for ownership and negative construction productivity growth for real prices) were responsible for at least half of the increases in the 1970s.

Footnotes

[1] See Diamond (1980), Hendershott and Hu (1979/1981), Hendershott and Shilling (1981) and Villani (1981) on homeownership and Poterba (1980/1984) and Summers (1981) on the real price of housing.

[2] Earlier challengers were Titman (1982) on ownership and Hendershott (1980) on real house prices.

[3] The same general analysis applies to consumer durables. For early analyses of owner-occupied housing, see Aaron (1970) and Laidler (1969). The analysis of rental housing is an application of the Hall and Jorgenson (1967) cost-of-capital framework.

[4] There is a slight bias for high income households to the extent that they can successfully arbitrage between taxable borrowing and tax exempt investing.

[5] Some of the recent tax reform proposals would have introduced an anti-debt bias. The Bradley-Gephardt tax reform plan would have taxed interest income at a 26 or 30 percent rate at the margin for many households but interest expense would have been deductible at only 14 percent. The reform plan passed by the Senate would also have taxed marginal interest income of households subject to the 5 percent surtax at the 32% rate, while interest expense would have been deductible at only the 27% rate.

[6] Contrast Linneman (1987, pp. 162-54).

[7] The decline in ownership for other males and females between 1960 and 1970 is a demographic quirk. In this decade the share of the population age 20-44 that was under 30 -- the share more likely to rent -- rose from 37 to 46 percent.

[8] I have only plotted ownership rates for households with incomes above 10,000 1985 dollars. At lower incomes the positive ownership-income relationship does not hold, probably because measured income is significantly less than permanent income for many such households. The same positive income-ownership relation also seems to hold for unmarried households under age 45 -- single and other, partitioned into male and female.

[9] An annual-equivalent "transactions cost" term should be added to the right-side of equation (1). This term would be larger the shorter the household's holding period. This point has been noted by Shelton (1968) and emphasized by Johnson (1981).

[10] Linear interpolations at incomes below $20,000 can give rise to substantial error because the curve is quite nonlinear; thus the lowest income level in the table is $22,500 (median incomes for owners in the four age classes are roughly $22,500, $30,000, $33,000 and $36,000).

[11] Boersch-Supan (1985) finds Americans to be less sensitive to owner costs than West Germans. Linneman (1987) reports that the tenure decision is independent of onwer costs (the tax rate of owners in a cross-sectional analysis), but he doesn't fully specify owner and renter costs and his tax rate is the marginal tax rate relevant to the quantity decision rather than the average rate relevant to the tenure decision.

[12] GHS suggests that their results are consistent with observed data; Follain does not.

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Table 1: Ownership Rates, 1960-80

	Married Couples			Other Male Households			Other Female Households		
	1960	1970	1980	1960	1970	1980	1960	1970	1980
Under 25	.229	.260	.368						
25-29	.440	.488	.584						
30-34	.620	.660	.752	.259	.248	.310	.270	.208	.258
35-44	.727	.771	.841						
45-64	.752	.811	.880	.278	.480	.529	.542	.547	.595
Over 64	.779	.788	.840	.619	.604	.612	.608	.606	.615

Source: 1960, 1970 and 1980 Census of Housing.

Table 2: Ownership Rates, 1975-85

Age	Married Households			Single Households			Other Male			Other Female		
	1975	1980	1985	1975	1980	1985	1975	1980	1985	1975	1980	1985
Under 25	.311	.349	.301	.066	.115	.107	.098	.126	.120	.043	.062	.066
25-29	.545	.582	.526	.128	.202	.187	.184	.288	.271	.197	.171	.160
30-34	.724	.747	.684	.230	.305	.291	.412	.404	.390	.306	.344	.297
35-44	.807	.833	.802	.284	.369	.392	.558	.556	.552	.431	.449	.453
45-64	.856	.878	.873	.483	.516	.536	.674	.667	.674	.664	.639	.641
65+	.827	.851	.874	.563	.592	.613	.751	.736	.758	.711	.712	.765

Source: <u>Annual Housing Survey and Housing Vacancy Survey</u> (data kindly supplied by
David Crowe of HUD).

Table 3: Ownership Rates (Percent) for Married Households
by Age and Real Income in 1985 Dollars

Income / Year	Under 25				25-29				30-34				35-44				45-64			
	22½	30	37½	45	22½	30	45	60	22½	30	45	60	22½	30	45	60	22½	30	45	60
1973	35	40	41	42	53	59	62	65	62	75	80	83	71	76	87	89	83	86	89	90
1979	41	48	50	53	54	65	75	80	68	78	86	89	75	84	90	93	84	88	93	95
1983	36	41	46	52	50	57	67	75	64	74	80	83	74	83	88	91	83	87	92	94

Table 4: Tax Rate of the Household That
Is Indifferent Between Owning and Renting
(higher tax-bracket households own; lower rent)

	Follain (1985)	Gordon, Hines and Summers (1986)
1965	12	64/0
1970	12	62/24
1975	12	59/59
1980	25	63/55
1985	17	23/11

Table 5: Predicted and Actual
Directional Changes in Home Ownership

	Predicted		Actual
	Follain (1985)	GHS (1986)	
1965 to 75	Constant	Constant or Down	Up
1975 to 80	Down	Constant	Up
1980 to 85	Up	Up	Down

Table 7: Productivity Growth in the Construction Industry

Relative to All Industries, 1948-83

| Period | Annual Rate of Productivity Growth | | |
	Construction	All Industries	Difference
1948-64	2.4	2.6	-0.2
1965-73	-1.0	1.7	-2.7
1973-79	-3.0	0.4	-3.4
1979-83	-1.5	0.1	-1.6

Source: Multiple Imput Productivity Indexes, American Productivity Center,

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Table 6
Percentage Changes in Real Prices of Newly-Constructed
Constant Quality (1982) Houses

	National	Northeast	Midwest	South	West
1963-71	4.0	16.7	3.0	4.2	-2.9
1971-79	27.5	11.5	26.9	19.8	57.0
1979-85	-4.9	12.4	-12.2	-3.4	-11.6
1963-85	26.2	46.3	14.6	20.6	34.8

Source: Price Index of New One-Family Sold (C27-86-Q* Series), U.S. Department
         of Commerce, Bureau of the Census and Consumer Price Index (CPI-U X1),
         U.S. Department of Labor, Bureau of Labor Statistics.
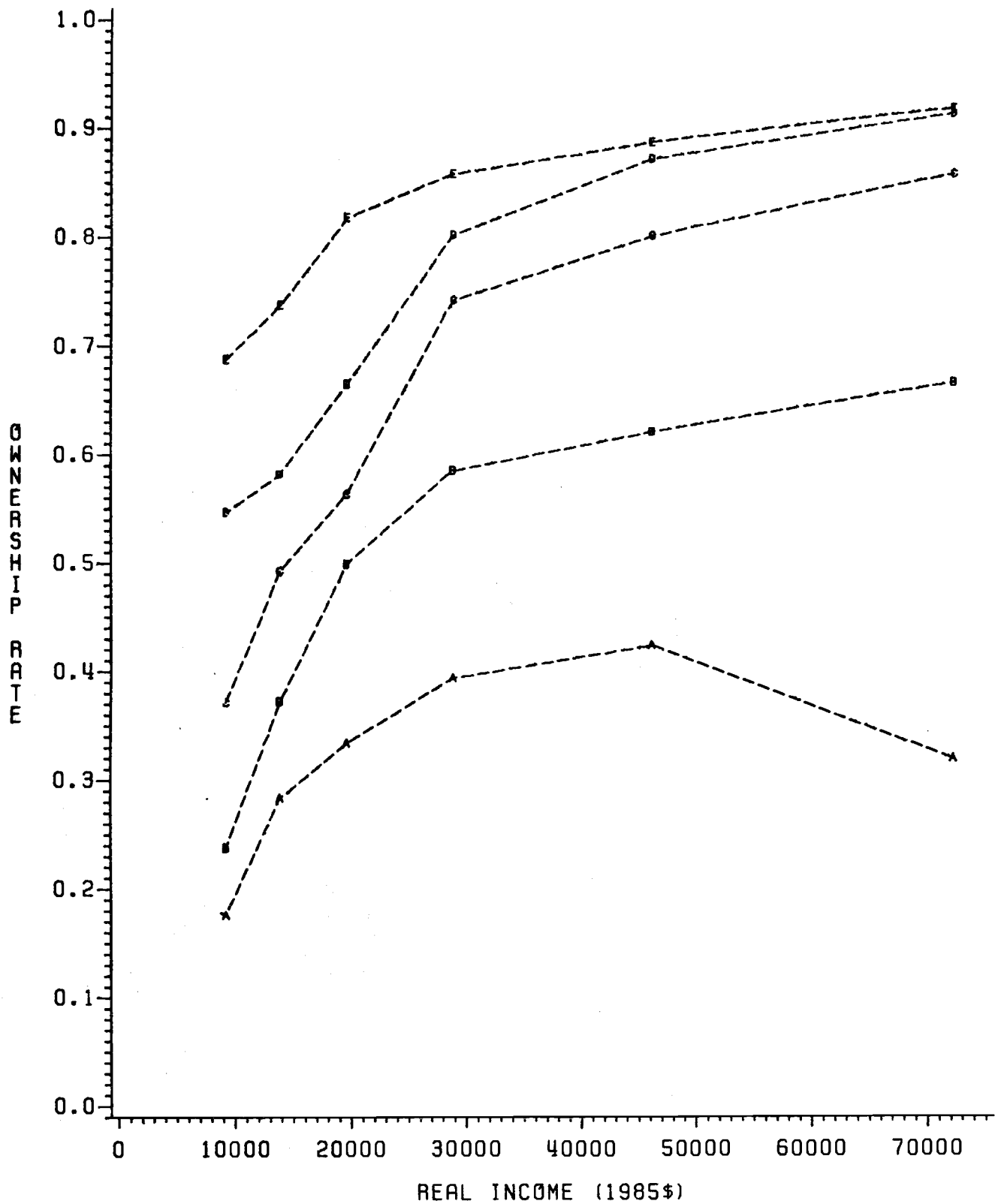
FIGURE 1: MARRIED HOUSEHOLDS,1973

FIGURE 2: MARRIED HOUSEHOLDS,1983