House Price Appreciation, Savings, and Consumer Expenditures

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Abstract

Since the late 1990s, consumer spending in the U.S. has been remarkably strong despite various shocks and the 2001-2002 recession. Chairman Greenspan of the Federal Reserve has attributed that strength to sharp increases in house prices and the propensity of homeowners to spend from housing capital gains. At the same time, the hope that homeowners accumulate wealth through housing capital gains has contributed to efforts to promote homeownership. This paper examines these issues using 1983 to 2001 data from the Survey of Consumer Finances, and 1990 to 2000 data from the National Longitudinal Survey of Youth.

We find that for each dollar of house price appreciation, households take on roughly 15 cents additional debt, nearly all of which is used to finance consumer expenditures as opposed to financial assets. The debt response to house price appreciation generally increases with age and income, but is markedly lower among individuals over age 65. In the year 2000, the average debt response of U.S. households would have been equivalent to 1.2 percent of GDP and 1.7 percent of consumer expenditures. That magnitude supports claims that spending out of house price appreciation has helped to prop up consumer spending. Equally clear is that homeowners save most of their housing capital gains. In 2000, saving out of house price appreciation accounted for roughly 49 percent of gross private savings.

I. Introduction

A remarkable feature of the U.S. economy since the late 1990s has been the strength in consumer spending despite various shocks and the 2001-2002 recession. In a recent briefing to Congress, Chairman Greenspan stated that:

> *"… the extraction of equity from homes has been a significant support to consumption during a period when other asset prices were declining sharply. Were it not for this phenomenon, economic activity would have been notably weaker in the wake of the decline in the value of household financial assets."*
>
> *Federal Reserve Chairman Alan Greenspan, testimony to the Joint Economic Committee, Congress, November 13, 2002.*

In these and related remarks, Chairman Greenspan has argued that consumer expenditures have remained high in part because families have been spending out of their housing capital gains following the run-up in real house prices that began in the mid-1990s.[1] The primary goal of this paper is to estimate the degree to which households adjust their consumer expenditures in response to housing capital gains, and further, whether that response differs for low- versus high-income families, and young versus old.

This paper will also shed light on the degree to which homeowners save out of their housing capital gains. Recent Federal programs have sought to boost homeownership, in part based on the hope that homeownership helps families to accumulate wealth.[2] The degree to which homeowners save from their house price appreciation has a direct impact on this issue. But the widespread availability of home equity lines of credit and frequent refinancing raise

[1] Between 1995 and 2001 real single family house prices increased over 20 percent based on the repeat sales house price index reported by Freddie Mac at their website.

[2] In November 2004, for example, the Department of Housing and Urban Development (HUD) established regulations calling for a significant increase in the percentage of Fannie Mae and Freddie Mac lending that must be targeted at underserved borrowers and communities. The new targets would require Fannie Mae and Freddie Mac to purchase a larger share of their loans from lower-income borrowers and in underserved areas.

questions as to whether homeowners will retain their housing capital gains as home equity, or cash out that newfound wealth and consume.[3]

Two sets of recent studies are especially important when considering these issues. The first are analyses of the propensity to spend out of house price appreciation. These are of two types, aggregate time series studies (e.g. Case, Quigley and Shiller (2003) and Benjamin, Chinloy, and Jud (2004)[4] and studies based on household-level data (e.g. Bostic, Gabriel, and Painter (2004), Lehnert (2005), and Juster et al (2006)). Of the former, Benjamin, Chinloy, and Jud (2004) conclude that the marginal propensity to consume out of housing wealth is roughly 15 percent, markedly higher than their estimate of the marginal propensity to consume out of financial assets which is just 2 percent. Case, Quigley, and Shiller (2005) examine these issues both for individual states throughout the U.S. and also across countries. In all of their specifications, and for both sets of data, they find that the elasticity of consumer expenditures with respect to housing wealth is much higher than the elasticity with respect to financial assets.[5]

Studies based on household-level data also report evidence that the marginal propensity to consume out of housing wealth is significant. However, differences in model specification and empirical design make comparisons across papers difficult. Juster et al (2006), for example,

[3] Efforts to promote homeownership have also been prompted by cultural norms that favor owning. This is clear in the title of the "American Dream Act," that was signed into law by President Bush in 2004. The Act provides downpayment assistance for first-time and low-income homebuyers. It has also been argued that homeownership is good for neighborhoods because homeowners invest in their communities (e.g. DiPasquale and Glaeser (1997), Rosenthal (2006)), while others have argued that homeownership improves child outcomes (e.g. Green and White (1997), Haurin, Parcel, and Haurin (2002). Dietz and Haurin (2003) summarize this literature).

[4] An early study by Peek (1983) also argues that failing to control for net capital gains of both housing and other durables causes one to mismeasure both household savings and the U.S. savings rate.

[5] Comparing across countries, Case, Quigley, and Shiller (2003) estimate that the elasticity of consumption with respect to housing wealth ranges from 0.11 to 0.17, while comparing across states, the range is 0.05 to 0.09. In a simple OLS model, the elasticity of consumption with respect to financial wealth is about 2 percent in the cross-country analysis and close to zero in the cross-state exercise. These estimates vary somewhat when alternative specifications are employed, but in all cases the elasticity of consumption with respect to housing wealth is markedly higher relative to the elasticity with respect to financial wealth.

examine the degree to which capital gains affect "active" savings – new contributions to assets or buying down of mortgage principal. Using household data from the Panel Study of Income Dynamics (PSID), they conclude that the decline in the personal saving rate since 1984 is largely a response to capital gains in corporate equities and that this effect is much stronger than the household response to housing capital gains. These findings are particularly pertinent to families that own stocks, but for most homeowners, housing wealth is the dominant asset in their portfolio. Bostic, Gabriel, and Painter (2004) use data from the 1998 Survey of Consumer Finances (SCF) in conjunction with information from the 1998 Consumer Expenditure Survey (CEX) to examine related questions. They match household cell types (e.g. region of the country, age, race, etc.) between the two surveys to impute consumption patterns for families in the SCF. Using these data, they conclude that the elasticity of consumption with respect to housing wealth is 4 percent, while the comparable elasticity with respect to financial wealth is just 2 percent. Lehnert (2005) uses PSID data and pays particular attention to the role of credit constraints. He concludes that the elasticity of consumption with respect to housing wealth varies across the life cycle. The highest values are recorded for young (families in their 20s) and near-retirement households: 4 percent and 8 percent, respectively.

A second group of recent studies pertinent to this paper address the determinants of mortgage refinancing (e.g. Hurst and Stafford (2004), Nothaft and Chang (2003), Canner, Dynan, and Passmore (2002).[6] Canner, Dynan, and Passmore (2002) pay special attention to individuals who cash out home equity. They find that cash-out refinancers use roughly 35 percent of the cash for home improvements, 26 percent to pay off other debt, 16 percent for

[6] Not surprisingly, both Nothaft and Chang (2003) and Canner, Dynan, and Passmore (2002) find that homeowners are far more likely to refinance when current mortgage rates fall below their contract mortgage rate.

consumer expenditures, and 11 percent to invest in stocks.[7] This suggests that when homeowners cash out home equity they do so primarily to finance consumer expenditures as opposed to investing in financial assets. Hurst and Stafford (2004) similarly find that liquidity-constrained cash-out refinancers convert roughly two-thirds of every dollar extracted from home equity into current consumption. These results suggest that, at least among families that refinance in order to extract home equity, the propensity to consume out of housing wealth is quite high. On balance, these patterns complement the results from Case, Quigley, and Shiller (2005) and Benjamin, Chinloy, and Jud (2004).

While much has been learned from this literature, each of the sets of studies above has its limitations. Refinance studies do not directly address the question implicitly raised by Chairman Greenspan: to what extent have expenditures out of recent housing capital gains boosted consumer spending?[8] Aggregate data analyses of the propensity to consume out of housing capital gains may overlook important household-level details and suffer from aggregation bias. In addition, previous household level studies of the propensity to consume out of housing capital gains do not address the possible endogenous character of housing capital gains. This is a concern because wealthy families not only have higher levels of consumption, but also tend to occupy more valuable homes. Because housing capital gains are proportional to house value, housing capital gains are likely simultaneously determined along with consumption, and failing

[7] The remaining 12 percent is allocated to real estate or business investment (10 percent) and taxes (2 percent).

[8] See also Chetty and Szeidl (2004) and Jones (1994) for a further discussion of related issues. Chetty and Szeidl (2004) use the Survey of Income and Program Participation and show that as families occupy more valuable homes, each one dollar increase in mortgage debt causes households to shift 50 to 70 cents from stock market assets to bonds, possibly because higher levels of long-term mortgage debt causes families to be more risk averse. Jones (1994) examines the degree to which homeowners take on more debt than is necessary to finance their home, and then use that extra debt to finance non-housing assets.

to control for that relationship could bias estimates of the causal impact of capital gains on consumer expenditures.[9]

This paper addresses these issues using two household-level surveys, the Survey of Consumer Finances (SCF) and the National Longitudinal Survey of Youth (NLSY). For the SCF, we pool data from separate surveys conducted in 1983, 1989, 1992, 1995, 1998, and 2001. Each of these surveys is based on a different cross-section of households and includes roughly 4,000 families.[10] The SCF over-samples high-income and high-wealth households, providing especially good opportunities to study these families. In addition, the SCF provides a level of detail on the household balance sheet that is unparalleled. The NLSY, in contrast, follows individuals over a 21-year history covering the period 1979 to 2000. The 1979 survey included over 10,000 respondents ages 14 to 21; we focus on the 1990 to 2000 surveys when respondents are ages 25 to 32. The NLSY survey is particularly valuable for studies of younger individuals. In addition, as with Juster et al (2006), the panel structure of the NLSY allows us to control for time-invariant person fixed effects, reducing the possible influence of unobserved factors.

Our empirical approach is guided by an accounting identity and patterns in the data. Families can use their house price appreciation to finance consumer expenditures in two ways: they can take on more debt or they can divert funds from financial assets, both of which serve to reduce net wealth less the value of the home – referred to hereafter as "non-housing net wealth." As noted above, recent evidence suggests that housing capital gains have little effect on a

[9] Juster et al (2006) discuss this issue and use person fixed effects in conjunction with the Panel Study of Income Dynamics to address the possibly endogenous character of capital gains. Although the inclusion of person fixed effects helps by stripping away time-invariant tastes for saving, temporal shifts in saving behavior remain a concern.

[10] A subset of the families surveyed in the 1983 SCF were revisted in 1989. That panel component was eliminated by the Federal Reserve after the 1989 survey.

household's financial assets. Results from the SCF presented later in this paper confirm that result. This implies that spending out of housing capital gains is primarily debt financed.

Based on these ideas we develop two approximations that are central to interpretation of our results. First, the impact of housing capital gains on non-housing net wealth is approximately equal to its impact on *consumption* – including consumption of non-durable goods plus the flow of services from durables (e.g. autos). Second, the impact of house price appreciation on debt is approximately equal to its impact on consumer *expenditures* – including purchases of non-durable plus durable goods. The precise conditions under which these approximations hold are outlined in Section 2 and Appendix A.

From a methodological standpoint, our primary challenge is to control for the possibility that the level of house price appreciation may be endogenous to non-housing net wealth and debt. As noted above, this is because wealthy families are more likely to occupy expensive homes that experience large capital gains (and loses). To allow for that possibility, we estimate all of our models by two-stage least squares treating the level of housing capital gains as endogenous. Our instrument for housing capital gains is the average annual rate of house price appreciation of the home, its square, and its cube. Provided that housing markets are efficient, arbitrage arguments suggest that house price appreciation rates should not vary systematically with house price levels, a principle that is supported by evidence presented later in the paper.[11] However, the rate of house price appreciation is strongly correlated with the level of housing capital gains, making it an attractive instrument.

[11] If this was not the case, investors would build disproportionately in segments of the market where house prices appreciate most rapidly, but such behavior would arbitrage away differences in returns. Of course, this argument implicitly assumes that the level of risk associated with investment in different segments of the housing market (e.g., low- versus high-priced housing) is similar. Otherwise, higher-risk segments could yield persistently higher return. Although we do not test that assumption, as an approximation it seems reasonable.

Based on data from the SCF, homeowners take on 12.6 cents additional debt for each dollar of additional housing capital gains. From the NLSY, the comparable estimate is 15.7 cents. Rounding to 15 cents, in 2000, this translates into roughly 1.2 percent of GDP, 1.7 percent of consumer expenditures, and 49 percent of gross personal savings. These magnitudes support claims that spending out of house price appreciation has helped to prop up consumer spending, and also that homeownership has helped families to accumulate wealth. We also find that the debt response to house price appreciation is generally larger among high income and older working-age families, although the debt response of retirees is markedly lower.

To clarify these and related results, the remainder of the paper is organized as follows. Section II outlines our analytical approach. Section III describes the data and presents summary measures. Section IV presents the results for the full sample. Section V considers how our estimates vary upon stratifying the sample by income and age groups. Section VI concludes.

II. Analytical Approach

We begin with an accounting identity. Non-housing net wealth, defined here and throughout the paper as net wealth less the value of the primary residence, is denoted by W_t^{NonH}. By definition, this is equal to the difference between non-housing assets and debt,

$$W_t^{NonH} = A_t^{NonH} - D_t \qquad (1)$$

where A_t^{NonH} denotes the current level of non-housing assets, and D_t denotes the current balance on all outstanding debt (including mortgage debt). Each of these terms is observable in our data, along with various sub-categories that make up the larger components of assets and debts.

Next, we define the capital gain on the home as the change in house value between the current survey date (*t*) and the last period in which the price for the home was reported (*t-k*). For the SCF, that prior period is the year in which the home was purchased and the previous price is the purchase price of the home. In the SCF data that we use, the median value for that elapsed period of time is ten years. For the NLSY, the prior period is the previous survey year and the previous price is the homeowner's assessment of house value in that prior survey year. The median value for the elapsed time between these price observations is two years.

Bearing these points in mind, housing capital gains between the prior period and the survey date are given by $Y^{H}_{t,t-k}$. Differentiating W^{NonH}_{t} with respect to housing capital gains,

$$\frac{\partial W^{NonH}_{t}}{\partial Y^{H}_{t,t-k}} = \frac{\partial A^{NonH}_{t}}{\partial Y^{H}_{t,t-k}} - \frac{\partial D_{t}}{\partial Y^{H}_{t,t-k}} \quad . \tag{2}$$

This says that the influence of housing capital gains on current non-housing net wealth is equal to the impact of housing capital gains on non-housing assets (first term) less the impact on debt (second term). As will become apparent, we are able to estimate each of the derivatives in equation (2). The question then is how to interpret these measures.

Estimates from equation (2) provide a direct measure of the impact of housing capital gains on non-housing wealth, non-housing assets, and debt. This is valuable. But it is also of interest to clarify the extent to which households spend out of house price appreciation. In considering this issue, recall that consumer *expenditures* include purchases of both non-durable and durable consumer goods. This is the focus of Chairman Greenspan's comments noted at the beginning of the paper. This differs from household *consumption*, which includes non-durable goods but only the flow of services from durables, not the stock.

Consider now the impact of house price appreciation on consumption (E^c) between periods *t* and *t-k*. In the Appendix, we show that this can be approximated by the impact of house price appreciation on the current level of non-housing net wealth adjusted for the impact on accumulated net income over the period,

$$\frac{\partial E^c_{t,t-k}}{\partial Y^H_{t,t-k}} = \left(\frac{\partial D_t}{\partial Y^H_{t,t-k}} - \frac{\partial A^{NonH}_t}{\partial Y^H_{t,t-k}} \right) + \left(\frac{\partial Y^A_{t,t-k}}{\partial Y^H_{t,t-k}} - \frac{\partial E^d_{t,t-k}}{\partial Y^H_{t,t-k}} \right) . \quad (3)$$

In equation (3), accumulated unearned income between *t* and *t-k* is given by $Y^A_{t,t-k}$ while accumulated debt payments are given by $E^d_{t,t-k}$. The second bracketed term in (3), therefore, represents the impact of housing capital gains on accumulated net unearned income between *t* and *t-k*. Note that when *k* is small, so too will be the second bracketed term. In that case, the impact of housing capital gains on consumption is approximately equal to the first bracketed term, the impact of house price appreciation on the current level of non-housing net wealth.

Consider next the impact of house price appreciation on consumer expenditures (X^c). In this case, it is necessary to decompose non-housing assets into financial ($A^{Financial}_t$) and non-housing non-financial ($A^{NonHDurables}_t$) assets. This is because the former is not counted as a consumer expenditure but it generates unearned income, while the reverse is true for the latter.[12] Decomposing in this manner and rearranging expression (3), we obtain,

$$\frac{\partial X^c_{t,t-k}}{\partial Y^H_{t,t-k}} = \left(\frac{\partial D_t}{\partial Y^H_{t,t-k}} - \frac{\partial E^d_{t,t-k}}{\partial Y^H_{t,t-k}} \right) - \left(\frac{\partial A^{Financial}_t}{\partial Y^H_{t,t-k}} - \frac{\partial Y^A_{t,t-k}}{\partial Y^H_{t,t-k}} \right) , \quad (4a)$$

[12] For example, suppose that a family uses their house price appreciation to debt finance the purchase of a new car. In equation (3), with *k* small, there is little impact on wealth and consumption because the car appears in the asset column of the family balance sheet and offsets the newly acquired debt. On the other hand, purchase of the car clearly counts as a consumer expenditure in the national income accounts.

where $X^{c}_{t,t-k} \equiv E^{c}_{t,t-k} + A_t^{NonHDurables}$ denotes consumer expenditures and $X^{c}_{t,t-k}$ is the accumulated spending on non-durable consumer goods between *t-k* and *t* (see Appendix A). This says that the impact of house price appreciation on consumer expenditures is equal to the impact on the current stock of debt less accumulated payments, less the impact on financial assets after subtracting off the impact on accumulated unearned income. In the empirical work to follow, evidence from the SCF suggests that housing capital gains have little impact on financial assets, consistent with several studies noted in the Introduction. This implies that the second bracketed term is close to zero. Moreover, note that when *k* is small, accumulated debt payments are few and the first bracketed term is dominated by the impact of house price appreciation on the current level of debt. Under these conditions, equation (4a) simplifies to,

$$\frac{\partial X^{c}_{t,t-k}}{\partial Y^{H}_{t,t-k}} \approx \frac{\partial D_t}{\partial Y^{H}_{t,t-k}} \quad . \tag{4b}$$

This says that the impact of house price appreciation on consumer expenditures is approximately equal to the impact of housing capital gains on the current level of household debt.

How accurate is the approximation in (4b)? As noted earlier, the median values for *k* in the NLSY and SCF samples are 2 and 10 years, respectively. Especially for the NLSY, this suggests that (4b) is a good approximation. For the SCF, because *k* is larger, accumulated debt payments between *t* and *t-k* will also be larger. To further refine our approximation, in the empirical work to follow, we control for the time since home purchase when using the SCF, and the time since the first available home price assessment in the NLSY. This controls for the tendency of households to pay down their mortgage debt over time. As an approximation, therefore, we are able to infer the impact of house price appreciation on consumer expenditures from the impact of housing capital gains on debt.

III. Data and Summary Measures

3.1 Data

As noted earlier, we use various years of the SCF and NLSY to analyze the influence of house price appreciation on household spending and saving. For the SCF, we pool data from the 1983, 1989, 1992, 1995, 1998, and 2001 surveys. Each of these surveys is based on a different cross-section of households and includes roughly 4,000 families.[13]

For the NLSY, surveys are annual through 1994, and biannual thereafter. The 1979 survey included over 10,000 respondents ages 14 to 21. The attrition rate has been only about 15 percent in the survey period. Blacks, Hispanics, and low-income households were over-sampled in 1979. Wealth data are reported beginning in 1986 except for the 1991 survey, which we omit. We begin our analysis in 1990 when respondents were ages 25 to 32, and the number of homeowners is sufficient for our analysis. Household mobility and related information on whether the reported house value refers to the same home as in the prior survey was identified by the Ohio State University Center for Human Resource Research (the survey home) based on a survey-to-survey comparison of geocoded respondent location.

Relative to the SCF, the longitudinal structure of the NLSY allows one to follow individuals over time. This permits the use of person fixed effects in the regression models. On the other hand, our data from the SCF extend back to 1983 compared to 1990 for the NLSY. This enhances the temporal variation in the SCF. The wealth data in the NLSY are in many ways comparable to that in the SCF, but the SCF offers more detail on the components of the household balance sheet. Importantly, the SCF permits one to do a very good job of measuring

[13] The exception is that a portion of the 1983 families are revisited in 1989 as noted earlier; we do not model that panel component.

total financial assets, but the limited detail in the NLSY preludes such efforts. The NLSY allows for a particularly careful analysis of young and lower-income households. In contrast, the over-sampling of high-wealth and high-income families in the SCF allows for more careful analysis of that segment of the population.

In both surveys, a wide range of standard demographic variables are available that help explain a family's level of wealth and portfolio composition. These measures include race, marital status, divorce status, age, gender, education, and earned income. In addition, the estimated models to follow control for the number of years since the first available assessment of house value during the current occupant's stay in the home. In the SCF this is equal to the number of years since home purchase because both purchase year and purchase price for the home are reported. In the NLSY, the year of home purchase and purchase price are not directly reported. However, given the panel nature of the survey, we can observe the survey year in which the homeowner first reports owner-occupying the home. In addition, in each survey year the homeowner reports their assessment of the home's market value. For the NLSY, therefore, we measure the number of years between surveys that report homeowner assessment of house value, contingent on the household remaining in the same house. These measures are important because mortgage debt tends to decline with the length of stay in the home as families pay down their mortgage. Finally, for both the SCF and NLSY, in all of the models we include fixed effects for the survey year in order to control for business cycle effects, interest rates, and other temporal phenomena that may affect household wealth and portfolio composition in different time periods.

We compute house price appreciation by differencing the reported value of the primary residence as of the survey date and the most recent previously reported price (assessment) on the

home. In all cases, all dollar-valued variables are specified in year 2001 dollars using the CPI-U as obtained from the Bureau of Labor Statistics (BLS) website. Note that 2001 is the last survey year in our samples for both the SCF and the NLSY.

For the SCF, we exclude families with wealth (including the value of the primary residence) greater than one million dollars or less than negative $250,000. Also excluded are families whose average annual rate of nominal house price appreciation since home purchase is less than negative 50 percent or greater than positive 50 percent. We further exclude families whose home purchase price was less than $1,000 (in year 2001 dollars), families for whom the current value of the home is less than $500, families that have been in the home less than one year, and finally, families for whom the current mortgage loan-to-value ratio is in excess of two. An analogous set of filters is used to drop observations from the NLSY.[14]

3.2 Summary Statistics

Table 1 provides summary measures on the distribution of values for several key variables used in the analysis to follow. Note that both here and in all of the tables to follow, we focus only on owner-occupiers. The first four rows of Table 1 report values for the NLSY sample. The second four rows report values for a subset of the SCF sample in which households are restricted to the same age-cohort as in the NLSY. The last four rows of the table report values for the full SCF sample. In all cases summary measures are not weighted and, for that

[14] Note also that the public use version of the SCF includes five implicates for the survey years from 1989 to 2001. Each implicate is essentially a replicate of the original data file, but select values of different variables have been imputed using slightly different imputation procedures. This helps to address missing values in the data, but especially, is used to obscure values that might reveal the identity of respondents. This is particularly important in the SCF because the survey over-samples high-wealth and high-income families and does not top code the data. To simplify use of the data, in all of the analysis to follow, we used just the first implicate of the data file. For the 1983 survey this issue does not arise since the implicate structure was adopted by the Federal Reserve beginning in 1989.

reason, are influenced by the different sampling strategies in the NLSY and SCF: the NLSY over-samples low-income and minority households, while the SCF over-samples high-wealth families. Recall also that housing capital gains in the NLSY are measured based on the change in house value between the current and prior survey years, while housing capital gains in the SCF are measured since home purchase.

Consistent with the sampling strategies in the two surveys, the SCF sample is wealthier, holds less debt, and occupies more expensive homes. In addition, families in the SCF report higher levels of housing capital gains. These differences are apparent in various places in Table 1.[15] Note, however, that when we restrict the SCF sample to individuals that belong to the same age cohort as in the NLSY, the summary measures for low wealth families are remarkably similar. This is apparent when comparing the 25th percentile for the SCF age-restricted sub-sample to the 25th percentile values in the NLSY. Non-housing net wealth in these groups are negative $60,070 in the NLSY and negative $48,050 in the SCF. Debt levels are roughly $40,000 in both cases, while non-housing assets are roughly $20,000 and house values are roughly $65,000. On balance, these summary measures make clear two key points that should be kept in mind as we go forward. First, the NLSY is a less wealthy, younger sample, and second, when the SCF is restricted to low-wealth families belonging to the same age cohort as in the NLSY the summary measures for the variables noted in Table 1a become quite similar.[16] Additional summary measures for the SCF and NLSY samples are provided in Appendix B.

[15] For example, for the full sample of the NLSY, the median level of non-housing net wealth is negative $24,990 as compared to positive $31,150 in the SCF.

[16] We attempted to run all of the SCF models restricting the sample to the same age cohort as in the NLSY. However, especially when we subdivided the sample by income groups in a manner to be indicated below, this resulted in very small sample sizes and unreliable estimates.

IV. Results

4.1 Endogenous Housing Capital Gains

Before turning to the regression results, the potentially endogenous character of house price appreciation must be addressed. This arises because homes that experience large capital gains and loses in levels (not percentage terms) tend to be expensive, and expensive homes are owned primarily by high-wealth families. To address this concern, we estimate all of our models by two-stage least squares (2SLS). For these purposes, our identifying instrument is the average annual rate of house price appreciation between the current and prior dates when house price is observed, the square of that measure, and its cube. The rate of house price appreciation is calculated by forming the difference in house values for periods when house value is observed, and then dividing by the number of years between the two dates. Under the assumption that housing markets are efficient, the average annual rate at which homes appreciate should be unrelated to house price levels. If this were not the case, high- and low-valued segments in the housing market would increasingly diverge in relative values. Moreover, investors would profit from investing primarily in that portion of the market that appreciates most quickly. Both phenomena seem at odds with the character of most housing markets.

As a check on the validity of our instrument, Table 2 presents R^2 values from regressions of house values and capital gains on a constant, the average annual rate of house price appreciation, its square, and its cube. The dependent variables are the level of housing capital gains and house value, all in year 2001 dollars. In addition, the regressions were conducted separately for the SCF and NLSY.

In Table 2, observe that for both the SCF and NLSY, the R^2 values for the regressions are relatively high when the dependent variable is the level of housing capital gains: the R^2 values

for the SCF and NLSY are 26.1 percent and 51.0 percent, respectively. This confirms that the average annual rate of house price appreciation is a strong predictor of housing capital gains, as would be expected. A completely different story is apparent when house value is regressed on housing capital gains. For these regressions, R^2 equals 6.3 percent and 4.6 percent for the SCF and NLSY surveys, respectively. These results confirm that there is little systematic relationship between the rate of house price appreciation and house value. This finding is consistent with the view that housing markets are largely efficient, and provides support for the use of the average annual rate of house price appreciation as the identifying instrument in the 2SLS procedure.

4.2 Regression results

Table 3 presents two-stage least squares regressions for the SCF and the NLSY. All of the NLSY models include person fixed effects.[17] In all cases, the t-ratios in parentheses are based on robust standard errors and separate regressions are reported for each of the following dependent variables: non-housing net wealth, debt, and non-housing assets. Note also that all of the regressions include controls for a variety of standard household socio-economic and demographic attributes, as well as survey year fixed effects that control for underlying business cycle effects that vary from year to year.

Several patterns are immediately apparent in the tables. We consider first those variables other than the house price appreciation. For both the SCF and NLSY samples, observe that the longer the family has been in their home, the lower their level of outstanding debt and the higher their non-housing net wealth. This reflects the strong tendency of households to pay down their

[17] When running the 2SLS person fixed effect models with the NLSY we pre-differenced the data, both for the first and second stages. We than ran 2SLS on the second stage and adjusted the standard errors for the implicit number of fixed effects.

mortgage debt as they remain in their home.[18] Observe also that non-white households have substantially less non-housing wealth as is well known. In addition, wealth increases with the age of the household head, male headed households have more wealth, as do households with higher levels of earned income. These results are all consistent with priors and robust across the two surveys.

In both the SCF and NLSY, the level of debt and non-housing assets increases with education. In the NLSY, those effects offset somewhat, resulting in an insignificant effect of education on non-housing net wealth. However, in the SCF, additional education has a positive and significant influence on the family's non-housing net wealth. In addition, in the SCF, married families have more debt, non-housing assets, and non-housing wealth, but in the NLSY married households have lower levels of non-housing assets and non-housing net wealth.[19]

Focus now on the coefficients on housing capital gains. In the far right columns, the point estimates of the influence of housing capital gains on total assets (less house value) are similar, roughly 5 cents to the dollar. These estimates, however, are not precisely estimated, with t-values of 1.26 and 1.40 for the SCF and NLSY, respectively. On the other hand, in the middle columns, the estimated influence of housing capital gains on total debt is larger and highly significant for both the SCF and NLSY. For the SCF, the coefficient is 12.6 cents to the dollar with a t-ratio of 5.55. For the NLSY, the comparable values are 15.7 and 7.56, respectively. From the budget identity, the influence of housing capital gains on net wealth (less the value of the home) is equal to the difference between the debt and non-housing asset response. These estimates and their corresponding t-ratios appear in the first pair of columns.

[18] This was confirmed directly by regressing total mortgage debt on the covariates in Table 3 for both the SCF and the NLSY.

[19] To the extent that marriage is initially costly but generates additional income in the future, these latter results could reflect the older age structure of the SCF.

The coefficients and t-ratios are -7.0 cents to the dollar and -1.58 for the SCF, and -11.1 and -3.4, respectively, for the NLSY.

How should these estimates be interpreted? The discussion from Section 2 suggests that the answer depends on the degree to which families use their housing capital gains to invest in financial assets. In the NLSY, it is not possible to adequately separate out total financial assets from total assets throughout the survey period. For this reason, we use only the SCF to consider this issue. Accordingly, Table 4 presents regression results of the influence of housing capital gains on three categories of financial assets: stocks, bonds, and mutual funds, IRA and Keogh accounts, and total financial assets. Each of these regressions is run separately, and each is estimated using only the SCF. All of the other covariates listed in Table 3 are included in the model but are not shown to conserve space.

In Table 4, observe that for each category of financial assets, there is virtually no evidence that families spend out of their housing capital gains to finance investments in financial assets. In each case the point estimates are small in magnitude and completely insignificant. Drawing on the discussion from Section 2, this suggests that the influence of housing capital gains on debt as documented in Table 3 is approximately equal to the influence of housing capital gains on consumer expenditures, consistent with the approximation in expression (4b). From the estimates in Table 3, this suggests that for each dollar of house price appreciation, on average, families spend roughly 15 cents on consumer goods.

4.3 Debt response by income and age groups: Theory

The discussion thus far assumes that the debt response to house price appreciation is identical across families after conditioning on the other control variables in the model. For a

number of reasons, this is likely not the case. We consider several arguments here and then stratify our regressions by income and age groups to investigate further.

To begin, implicit in the models estimated thus far is that households abide only by their intertemporal budget constraint. Under that assumption, permanent income/life-cycle models imply that individuals smooth consumption by borrowing early in life against higher future income. Suppose now that lenders are willing to issue more debt to high-wealth families. Moreover, suppose that some families with limited wealth are credit constrained, in the sense that they are unable to borrow against their future income to the degree desired. For these households, at the margin, an additional dollar of housing capital gains (and, therefore, wealth) should be entirely consumed in the current period (e.g., Hurst and Stafford (2004) or Lehnert (2005)). In contrast, for unconstrained families, the propensity to consume out of housing capital gains is equal to their discount rate multiplied by their marginal propensity to spend out of permanent income. Except for families with very high discount rates, this suggests that binding borrowing constraints should sharply increase the debt response to house price appreciation. To the extent that low-income and younger families are more likely to be wealth constrained, one would expect their debt response to house price appreciation to be higher.

It is also important to recognize that families have very different time horizons, and therefore, discount rates. Consider two individuals, one 30 years of age, and the other 80. Each receives the same level of housing capital gains, and assume that neither intends to leave a bequest. The older individual spreads out the windfall capital gain over a much shorter time horizon, and therefore, consumes much more of the housing capital gain in the current period. More generally, because younger individuals have longer time-horizons, they should have lower discount rates, and therefore, spend less out of their housing capital gains.

Yet another consideration is risk. Absolute levels of risk aversion are higher for lower income and lower wealth individuals. Risk aversion and related precautionary motives for saving, therefore, encourage households to spend less from their housing capital gains. Because younger households are typically of lower income and wealth, this suggests that their debt response to house price appreciation should be tempered by their heightened sense of risk. Similarly, because retirees living off of past savings are known to be especially risk averse, they too should consume less from their housing capital gains. Together, these arguments imply that risk considerations should elevate the debt response to house price appreciation of middle-aged individuals relative to both younger and older families.

A final argument concerns the tendency of households to move in-town as opposed to out of town when purchasing a more expansive home. Because house price movements are largely metropolitan wide, appreciation in the present home may imply similar levels of appreciation in the future home the family hopes to purchase. Equivalently, house price appreciation may be perceived as being offset by a comparable increase in the local cost of living. To the extent this occurs, families may not perceive their house price appreciation as affecting their real level of wealth, and therefore, consume little of it. This is likely to be most pronounced for those families who anticipate buying a larger house within the same market, or moving to an alternative more expensive market. That is likely more characteristic of younger families: younger families typically move into a larger home upon purchasing their second home, while recent work by Costa and Kahn (2000) and Rosenthal and Yong (2005) show that younger, more educated families are more likely to move to larger cities attractive to business.

For each of the four reasons above, it is likely that the debt response to house price appreciation may differ across broad income and age groups, although the nature of those

differences is ambiguous, a priori. Accordingly, we stratify the SCF and NLSY samples first by income (low-, middle-, and high-income), and then alternatively by age (young, middle-aged, and older). Summary measures for each of these subgroups are provided in Appendix B. Regressions for each of the subgroups are discussed below.

4.4 Debt response by income and age groups: Estimates

Table 5 presents estimates designed to explore the viability of using the average annual rate of house price appreciation as an instrument for housing capital gains for each of the income- and age-stratified sub-samples. Estimates in the table are analogous to those reported for the full samples in Table 2. The important point to note in Table 5 is that, as before, the average annual rate of house price appreciation is a poor predictor of house price levels, but is strongly correlated with the level of house price appreciation. This holds for each of the sub-samples in both the SCF and NLSY.

Table 6a next presents regressions analogous to those in Table 3 using the income-stratified samples for both the SCF and the NLSY. As before, the dependent variables are non-housing net wealth, debt, and non-housing assets. The sub-samples in Table 6a are those for which total household annual income is less than $25,000, $25,000 to $50,000, and over $50,000, where all values are in 2001 dollars. Table 6b presents analogous estimates for the age-stratified sub-samples: under age 35, 35 to 44, 44 to 55, 55 to 65, and 65 and over. Because of the young age of NLSY respondents, there are no observations in the age 44 and older samples.

Reviewing the various results in the two tables, two important general points are important to emphasize. First, the overall character of the results for the full samples appears to carry over to the individual income- and age-stratified samples. Second, the debt response to

house price appreciation among working age families (under age 65) increases with income class and age group. Note, however, in Table 6b, that among individuals in the SCF age 65 and over, the debt response is sharply lower, just 4 cents per dollar of capital gains compared to 22 cents for families age 55 to 64.

Table 7 presents estimates of the influence of house price appreciation on financial assets for each of the subgroups. These regressions are analogous to those in Table 4. As before, there is little evidence that housing capital gains affect investment in financial assets.

Considering the estimates from Tables 6 and 7 together, once again it appears likely that most of the debt families take on in response to housing capital gains is used to finance consumer expenditures. Moreover, the increased debt response among older working-age and higher income families is likely to result from the combined effects of shorter time horizons, lesser absolute risk aversion, and a lesser tendency to save for a more expansive home purchase in homeowner's current metropolitan area. Retirees, in contrast, exhibit a sharply lower debt response to house price appreciation. Very likely, this reflects the well known tendency of retirees to be very risk averse.[20] As the baby boomers begin to retire, this may result in a lesser level of spending out of house price appreciation for the economy overall.

4.5 Magnitudes

To what extent have recent sharp increases in house prices contributed to consumer expenditures? What fraction of recent household savings has been in the form of housing capital

[20] Note also, that retirees tend to downsize their homes and have shorter time horizons. These factors should increase the debt response to house price appreciation for reasons outlined earlier and, therefore, cannot explain the lower debt response of retirees. The absence of binding credit barriers would further reduce the degree to which retirees spend out of their house price appreciation. But it seems unlikely that this mechanism could account for the sharp drop in the debt response of retirees relative to the age 55 to 64 group, from 22 cents to just 4 cents on the dollar (as shown in Table 6b).

gains? Our estimates allow us to assess these effects. To be concrete, consider the year 2000. In that year, there were 115,904,641 households,[21] of whom 66.2 percent owned homes.[22] The median house value in 2000 was $119,600.[23] Over the 2001:Q1 to 2005:Q1 period, the annual nominal rate of U.S. house price appreciation was 8.4 percent.[24] Multiplying these values together, house price appreciation among owner-occupiers totaled roughly $769.00 billion in the United States in 2000 (in year 2000 dollars).

Consider next various measures from the national income and product accounts. In 2000, personal consumption expenditures totaled $6,739.4 billion,[25] GDP was 9,817.0 billion,[26] and gross private savings were $1,334.1 billion.[27] Assuming 15 percent of house price appreciation is used for debt-financed expenditures (consistent with Table 6), then house price appreciation in 2000 would have led to an increase in debt holdings of $115.3 billion. In percentage terms, this increase in debt is equivalent to a 1.7 percent increase in consumer expenditures, or 1.2 percent of GDP. At the same time, households would have saved $653.7 billion of their housing capital gains, roughly 49 percent of gross private savings. These large magnitudes clearly speak to the important influence of house price appreciation on the economy.

[21] United States Census, www.census.gov, Table 1, c2kbr01-13.pdf .

[22] United States Census, www.census.gov, Table1, c2kbr01-13.pdf.

[23] United States Census, www.census.gov, Figure 2, c2kbr-20.pdf.

[24] Feddie Mac Conventional Mortgage Home Price Index (CMHPI).

[25] Bureau of Economic Analysis, www.bea.gov, http://www.bea.gov/bea/dn/nipaweb/TableView.asp#Mid.

[26] Bureau of Economic Analysis, www.bea.gov, gdplev.xls.

[27] Bureau of Economic Analysis, http://www.bea.gov/bea/dn/nipaweb/TableView.asp#Mid.

V. Conclusions

Prominent government officials have pointed to sharp increases in house prices as an important factor underlying the strength in consumer spending in the U.S. since the late 1990s. For this to be true, homeowners must spend out of their housing capital gains. At the same time, aggressive Federal programs have sought to boost homeownership, in part based on the hope that homeownership will help families to accumulate wealth (e.g. the recently passed American Dream Downpayment Act). This requires that homeowners save from their housing capital gains. This paper considers these issues by examining data from 1983 to 2001 using two major household-level surveys, the Survey of Consumer Finances, and the National Longitudinal Survey of Youth.

Results support both arguments. Our estimates suggest that households take on and spend roughly 15 cents additional debt for each dollar of house price appreciation. In 2000, this translates into roughly 1.2 percent of GDP and 1.7 percent of consumer expenditures, consistent with the idea that house price appreciation and related spending by homeowners has helped to prop up consumer expenditures. Spending out of house price appreciation also is more pronounced among higher income and older working-age families, but sharply lower among retirees. It is possible, therefore, that as the baby boomers begin to retiree, spending out of house price appreciation will begin to diminish. Moreover, the dominant behavior among homeowners of all income and age groups is to save the great majority of their house price appreciation. Indeed, saving out of house price appreciation in the last several years has accounted for roughly 49 percent of gross private savings.

References

Benjamin, John D., Peter Chinloy, and G. Donald Jud (2004), "Why Do Households Concentrate Their Wealth in Housing?" *The Journal of Real Estate Research*, 26(4), 329-343,.

Bostic, Raphael, Stuart Gabriel, Gary Painter (2004), "Housing Wealth, Financial Wealth, and Consumption: New Evidence from Micro Data," University of Southern California, working paper.

Case, Karl, John Quigley, and Robert Shiller (2005) "Comparing Wealth Effects: The Stock Market versus the Housing Market", *Advances in Macroeconomics*: 5(1), Article 1. http://www.bepress.com/bejm/advances/vol5/iss1/art1 .

Canner, Glenn, Karen Dynan, and Wayne Passmore (2002), "Mortgage Refinancing in 2001 and Early 2002," *Federal Reserve Bulletin*, (December), 469-481.

Chetty, Raj, and Adam Szeidl (2004), "Consumption Commitments and Asset Prices," University of California – Berkeley, mimeo.

Costa, Dora L. and Matthew E. Kahn (2000), "Power Couples: Change in the Locational Choice of the College Educated, 1940~1990". *The Quarterly Journal of Economics*, 1287-1314.

Dietz, Robert and Donald R. Haurin (2003), "The Private and Social Micro-level Consequences of Homeownership," *Journal of Urban Economics*, 54, 401-450.

DiPasquale, Denise and Edward L. Glaeser (1999), "Incentives and Social Capital: Are Homeowners Better Citizens?" *Journal of Urban Economics*, 45, 354-384.

Green, Richard K. and Michelle White (1997), "Measuring the Benefits of Homeowning: Effects on Children," *Journal of Urban Economics*, 41, 441-461.

Haurin, Donald R., Toby Parcel and R. Jean Haurin (2002), "Does Home Ownership Affect Child Outcomes," *Real Estate Economics*, 30 (4), 635-666.

Hurst, Erik, and Frank Staford (2004), "Home is Where the Equity Is: Mortgage Refinancing and Household Consumption," *Journal of Money Credit, and Banking*, 36(6), 985-1014.

Jones, Lawrence (1994), "Home Mortgage Debt Financing of Non-housing Investments," *Journal of Real Estate Finance and Economics*, 9 (2), 91-112.

Juster, Thomas, Joseph Lupton, James Smith, and Frank Stafford (2006), "The Decline in Household Saving and the Wealth Effect," *Review of Economics and Statistics*, 87(4), 20-27.

Lehnert, Andreas (2005), "Housing, Consumption, and Credit Constraints," Board of Governors of the Federal Reserve System, working paper.

Nothaft, Frank E., and Yan Chang (2003), "Refinance and the Accumulation of Home Equity Wealth," Freddie Mac Working Paper (McLean, Virginia, Freddie Mac).

Peek, Joe (1983), "Capital Gains and Personal Savings Behavior," *Journal of Money Credit and Banking*, 15 (1), 1-23.

Rosenthal, Stuart (2005), "Old Homes and Poor Neighborhoods: A Dynamic Model of Urban Decline and Renewal." Syracuse University working paper.

Rosenthal and Yong (2005), "Local Amenities and Life Cycle Migration: Do People Move for Jobs or Fun?" Syracuse University working paper.

Table 1
Distribution of Wealth, Portfolio Composition, and Housing Capital Gains Among Owner-Occupiers in the SCF and NLSY
(Dollar values are in year-2001)

	Percentiles and Mean	Net Wealth Less House Value in $1,000	Total Debt Owed in $1,000	Total Assets Less House Value in $1,000	House Value in $1,000	Housing Capital Gains Since Last Price Observation in $1,000	Percent Avg. Annual Rate of House Price App. Since Last Price Observation
NLSY Full Sample (Obs = 9,752)	25th	-60.07	41.24	18.13	63.29	-6.96	-3.88
	50th	-24.99	75.26	38.07	97.83	-0.73	-0.57
	75th	8.02	115.20	80.82	148.81	9.00	6.04
	Mean	-18.59	85.51	66.92	112.86	1.61	1.36
SCF Restricted to NLSY Age-Cohort (Obs = 1,474)	25th	-48.05	38.22	22.38	70.00	-5.70	-1.53
	50th	-2.96	83.51	64.10	113.60	5.08	1.18
	75th	65.66	131.60	168.82	180.00	23.22	6.25
	Mean	35.54	98.79	134.33	141.40	12.23	3.34
SCF Full Sample (Obs = 10,401)	25th	-14.07	1.85	25.04	65.79	-11.95	-1.32
	50th	31.15	35.91	79.41	107.12	3.91	0.49
	75th	159.35	93.26	222.52	177.81	29.30	3.66
	Mean	95.33	65.23	160.57	140.27	11.94	2.06

Table 2
Goodness of Fit (R^2) In Regressions of Housing Capital Gains and House Value on the Annual Rate of House Price Appreciation (Estimating Equation: $Y = \beta_0 + \beta_1 g + \beta_2 g^2 + \beta_3 g^3$)[a]

Housing Capital Gains		House Value	
SCF	**NLSY**	**SCF**	**NLSY**
0.261	0.510	0.063	0.046

[a]Y denotes the dependent variable, either housing capital gains or house value, while *g* denotes the average annual rate of house price appreciation between current and prior price dates.

Table 3
The Influence of Housing Capital Gains – 2SLS Estimates
(Dollar values are in year-2001; t-ratios are based on robust standard errors)

	Net Wealth Less House Value in $100,000		Total Debt Owed in $100,000		Total Assets Less House Value in $100,000	
	SCF	NLSY[b]	SCF	NLSY[b]	SCF	NLSY[b]
Housing Capital Gains ($100,000)	-0.070	-0.111	0.126	0.157	0.056	0.047
	(-1.58)	(-3.40)	(5.55)	(7.56)	(1.26)	(1.40)
Years since home purchase	0.013		-0.016		-0.003	
	(6.06)		(-22.30)		(-1.40)	
Years since first assessment		0.034		-0.034		0.000
		(8.43)		(-13.29)		(-0.02)
African American	-0.497		-0.035		-0.532	
	(-10.52)		(-1.77)		(-11.79)	
Hispanic	-0.423		0.041		-0.383	
	(-5.67)		(1.05)		(-5.11)	
Other Non-White Race	-0.348		0.208		-0.140	
	(-2.70)		(2.87)		(-1.11)	
Married	0.284	0.081	0.065	0.028	0.350	0.108
	(5.59)	(1.42)	(2.93)	(0.97)	(6.83)	(2.02)
Divorced	-0.058	-0.042	-0.014	-0.055	-0.072	-0.098
	(-1.03)	(-0.66)	(-0.57)	(-1.47)	(-1.24)	(-1.69)
Age of Household Head	0.038	0.048	-0.001	0.023	0.037	0.071
	(19.94)	(8.17)	(-1.70)	(6.47)	(19.16)	(12.20)
Male Household Head	0.269		0.029		0.298	
	(5.72)		(1.53)		(6.24)	
Head Has High School Degree	-0.396	0.167	-0.251	0.041	-0.648	0.207
	(-9.33)	(2.25)	(-15.31)	(0.62)	(-14.96)	(2.27)
Head Has Less Than High School	-0.938	0.319	-0.263	0.125	-1.201	0.444
	(-18.87)	(2.49)	(-15.13)	(1.52)	(-23.88)	(3.25)
Household Earned Inc. ($100k)	0.395	0.168	0.624	0.244	1.019	0.411
	(5.79)	(1.87)	(15.42)	(5.71)	(14.42)	(4.53)
Earned Income Squared	-0.027	-0.008	-0.043	-0.028	-0.070	-0.036
	(-3.00)	(-0.58)	(-5.14)	(-4.29)	(-5.96)	(-2.38)
Observations	10,401	8,831	10,401	8,831	10,401	8,831
Person Fixed Effects	-	3,691		3,691		3,691
Survey Year Fixed Effects	6	7	6	7	6	7
Root Mean Squared Error	1.837	0.456	0.774	0.266	1.856	0.451

[a]Instruments in the first stage include all of the exogenous variables plus r, r^2, and r^3, where r is the average annual rate of house price appreciation experienced by the homeowner.

[b]NLSY estimates include person fixed effects and were obtained by differencing the data in the first and second stages and then running 2SLS. Robust standard errors were then adjusted for the number of person fixed effects.

Table 4
The Influence of Housing Capital Gains on Financial Assets
SCF Sample - 2SLS Estimates
(Year-2001 $100,000 units; t-ratios are based on robust standard errors)[a]

	Stocks, Bonds, Mutual Funds	IRA and Keogh Accts.	Total Financial Assets
Housing Capital Gains in $100,000	0.017	-0.005	0.001
(Obs: SCF = 10,041)	(0.49)	(-0.56)	(0.02)

[a]Instruments in the first stage include all of the exogenous variables plus r, r^2, and r^3, where r is the average annual rate of house price appreciation experienced by the homeowner.

Table 5
Goodness of Fit (R^2) In Regressions of the Annual Rate of House Price Appreciation on Housing Capital Gains and House Value
(Estimating Equation: $Y = \beta_0 + \beta_1 g + \beta_2 g^2 + \beta_3 g^3$)[a]

	Housing Capital Gains		House Value	
	SCF	**NLSY**	**SCF**	**NLSY**
Income < $25,000	0.181	0.341	0.065	0.066
Inc. $25k to $50k	0.228	0.473	0.073	0.064
Income > $50,000	0.327	0.621	0.059	0.033
Age < 35	0.188	0.466	0.072	0.023
35 ≤ Age < 44	0.401	0.564	0.060	0.074
44 ≤ Age < 55	0.407	-	0.073	-
55 ≤ Age < 64	0.354	-	0.101	-
Age ≥ 65	0.225	-	0.055	-

[a]Y denotes the dependent variable, either housing capital gains or house value, while *g* denotes the average annual rate of house price appreciation between current and prior price dates.

Table 6a
The Influence of Housing Captial Gains by Income Groups – 2SLS Estimates
(Dollar values are in year-2001; t-ratios are based on robust standard errors;
NLSY models include person fixed effects)[a]

	Net Wealth Less House Value in $100,000		Total Debt Owed in $100,000		Total Assets Less House Value in $100,000	
	SCF	NLSY[b]	SCF	NLSY[b]	SCF	NLSY[b]
Income < $25,000						
Housing Capital Gains in $100,000	0.036	-0.015	0.025	0.023	0.061	0.008
(Obs: SCF = 2,399; NLSY = 1,028)	(0.43)	(-0.12)	(0.76)	(0.24)	(0.72)	(0.06)
$25,000 <= Income < $50,000						
Housing Capital Gains in $100,000	0.038	-0.011	0.072	0.118	0.111	0.106
(Obs: SCF = 2,969; NLSY = 3,014)	(0.50)	(-0.18)	(2.68)	(3.05)	(1.38)	(1.80)
Income >= $50,000						
Housing Capital Gains in $100,000	-0.115	-0.151	0.155	0.168	0.040	0.016
(Obs: SCF = 4,990 ; NLSY = 5,710)	(-1.84)	(-3.86)	(4.48)	(6.71)	(0.67)	(0.41)

[a]Instruments in the first stage include all of the exogenous variables plus r, r^2, and r^3, where r is the average annual rate of house price appreciation experienced by the homeowner.
[b]NLSY estimates include person fixed effects and were obtained by differencing the data in the first and second stages and then running 2SLS. Robust standard errors were then adjusted for the number of person fixed effects.

Table 6b
The Influence of Housing Captial Gains by Age Groups – 2SLS Estimates
(Dollar values are in year-2001; t-ratios are based on robust standard errors;
NLSY models include person fixed effects)[a]

	Net Wealth Less House Value in $100,000		Total Debt Owed in $100,000		Total Assets Less House Value in $100,000	
	SCF	NLSY[b]	SCF	NLSY[b]	SCF	NLSY[b]
Young (Age < 35)						
Housing Capital Gains in $100,000	-0.019	-0.101	0.093	0.110	0.074	0.009
(Obs: SCF = 1,460; NLSY = 4,870)	(-0.12)	(2.09)	(1.34)	(3.61)	(0.45)	(0.19)
Middle-age (35 ≤ Age < 44)						
Housing Capital Gains in $100,000	-0.086	-0.116	0.072	0.194	-0.014	0.077
(Obs: SCF = 2,287; NLSY = 4882)	(-0.89)	(-2.34)	(1.41)	(6.12)	(-0.15)	(1.53)
Middle-age (44 ≤ Age < 55)						
Housing Capital Gains in $100,000	0.143	-	0.074	-	0.217	-
(Obs: SCF = 2,637 ; NLSY = 0)	(2.04)	-	(1.53)	-	(2.86)	-
Middle-age (55 ≤ Age < 65)						
Housing Capital Gains in $100,000	-0.168	-	0.221	-	0.053	-
(Obs: SCF = 1,652 ; NLSY = 0)	(-1.73)	-	(4.52)	-	(0.54)	-
Older (Age ≥ 65)						
Housing Capital Gains in $100,000	-0.150	-	0.041	-	-0.109	-
(Obs: SCF = 2,365 ; NLSY = 0)	(-1.58)	-	(2.11)	-	(-1.18)	-

[a]Instruments in the first stage include all of the exogenous variables plus r, r^2, and r^3, where r is the average annual rate of house price appreciation experienced by the homeowner.
[b]NLSY estimates include person fixed effects and were obtained by differencing the data in the first and second stages and then running 2SLS. Robust standard errors were then adjusted for the number of person fixed effects.

Table 7
The Influence of Housing Capital Gains on Financial Assets
SCF Sample - 2SLS Estimates
(Year-2001 $100,000 units; t-ratios are based on robust standard errors)[a]

	Stocks, Bonds, Mutual Funds	IRA and Keogh Accts.	Total Financial Assets
Income < $25,000			
Housing Capital Gains in $100,000	0.013	0.002	0.026
(Obs: SCF = 2,399)	(0.78)	(0.14)	(0.51)
$25,000 <= Income < $50,000			
Housing Capital Gains in $100,000	0.006	0.003	0.060
(Obs: SCF = 2,969)	(0.33)	(0.30)	(1.50)
Income >= $50,000			
Housing Capital Gains in $100,000	0.044	-0.001	0.007
(Obs: SCF = 4,990)	(0.66)	(-0.12)	(0.09)
Young (Age < 35)			
Housing Capital Gains in $100,000	-0.039	0.002	0.024
(Obs: SCF = 1,460)	(-1.61)	(0.22)	(0.40)
Middle-age (35 ≤ Age < 44)			
Housing Capital Gains in $100,000	-0.006	0.002	-0.077
(Obs: SCF = 2,287)	(-0.24)	(0.18)	(-1.39)
Middle-age (44 ≤ Age < 55)			
Housing Capital Gains in $100,000	-0.005	0.011	0.037
(Obs: SCF = 2,637)	(-0.27)	(0.67)	(0.81)
Middle-age (55 ≤ Age < 65)			
Housing Capital Gains in $100,000	0.007	-0.015	-0.047
(Obs: SCF = 1,652)	(0.16)	(-0.60)	(-0.54)
Older (Age ≥ 65)			
Housing Capital Gains in $100,000	0.254	0.003	0.203
(Obs: SCF = 2,365)	(1.12)	(0.15)	(0.82)

[a]Instruments in the first stage include all of the exogenous variables plus r, r^2, and r^3, where r is the average annual rate of house price appreciation experienced by the homeowner.

Appendix A
Measuring the Propensity to Consume Out of House Price Appreciation

This appendix clarifies the relationship between the impact of house price appreciation on household wealth and the impact of house price appreciation on household consumption. We begin by modeling the change in the level of household wealth (W) between the time the home was purchased and the current date. Let W_t be the level of net worth in the current period, while W_{t-k} denotes the level of net worth at time *t-k* when the home was purchased. Then,

$$W_t = W_{t-k} + \sum_{t-k}^{t} Y_s - \sum_{t-k}^{t} E_s \qquad \text{(A.1)}$$

where Y_s is total income in period *s* and is equal to the sum of earned and unearned income, including interest payments, capital gains, loses, and depreciation. The term E_s denotes expenditures in period *s*, and is equal to the sum of current consumption and payments on outstanding debt. Expression (A.1) is an accounting identity and says that the change in wealth between *t* and *t-k* is equal to the difference between all sources of income and expenditures over the period.

To highlight the influence of house price appreciation on (A.1), *Y* is decomposed into three parts, the appreciation on the home between *t-k* and *t*, the sum of unearned income from non-housing assets over the period (including capital gains, loses, and depreciation), and the sum of earned income over the period. We also decompose expenditures into debt payments (*d*) and consumption (*c*). This yields,

$$W_t = W_{t-k} + H_{t-k} g_{t,t-k} + \sum_{t-k}^{t} A_s a_s + \sum_{t-k}^{t} y_s - \sum_{t-k}^{t} d_s - \sum_{t-k}^{t} c_s \qquad \text{(A.2)}$$

where H_{t-k} is the value of the primary residence (in current dollars) at the time the home was purchased, and $g_{t,t-k}$ is the rate of house price appreciation between *t-k* and *t*. Non-housing assets

(*A*) vary from year to year as the household rebalances its portfolio and also because of interest payments, capital gains, loses, and depreciation. Income generated from these assets in a given year is given by $A_s a_s$. Income earned from labor effort in a given year is denoted by y_s.

To simplify notation, (A.2) is re-written as

$$W_t = W_{t-k} + Y^H_{t,t-k} + Y^A_{t,t-k} + Y^y_{t,t-k} - E^d_{t,t-k} - E^c_{t,t-k} \tag{A.3}$$

where Y^X and E^X correspond to their respective components of income and expenditures in (A.2).[28] It is also useful to recall that net wealth in period *t* includes the value of the home as of the purchase date along with housing capital gains, the sum of which is equal to current house value. Accordingly,

$$W_t = W_t^{NonH} + H_{t-k} + Y^H_{t,t-k} \tag{A.4}$$

where W_t^{NonH} is wealth in period *t* less the value of the primary residence. Subtracting H_{t-k} from both sides of (A.3), substituting from (A.4) and rearranging,

$$W_t^{NonH} = W_{t-k}^{NonH} + Y^A_{t,t-k} + Y^y_{t,t-k} - E^d_{t,t-k} - E^c_{t,t-k}. \tag{A.5}$$

This says that non-housing wealth in period *t* is equal to its level in *t-k*, adjusted for the different components of income and expenditures over the period.

Consider now the impact of housing capital gains on the change in non-housing wealth. This is obtained by differentiating (A.5) with respect to house price appreciation,

$$\frac{\partial \Delta W_t^{NonH}}{\partial Y^H_{t,t-k}} = \frac{\partial Y^A_{t,t-k}}{\partial Y^H_{t,t-k}} + \frac{\partial Y^y_{t,t-k}}{\partial Y^H_{t,t-k}} - \frac{\partial E^d_{t,t-k}}{\partial Y^H_{t,t-k}} - \frac{\partial E^c_{t,t-k}}{\partial Y^H_{t,t-k}}, \tag{A.6}$$

[28] To be precise, $Y^H_{t,t-k} = H_{t-k} g_{t,t-k}$, $Y^A_{t,t-k} = \sum_{t-k}^{t} A_s a_s$, and $Y^y_{t,t-k} = \sum_{t-k}^{t} y_s$.

where $\frac{\partial W_{t-k}^{NonH}}{\partial Y_{t,t-k}^{H}}$ equals zero since W_{t-k}^{NonH} is predetermined. From this expression, it is clear that the influence of housing capital gains on wealth can proceed through at least four different channels: the impact of $Y_{t,t-k}^{H}$ on investment in non-housing assets and related unearned income over the period from *t-k* to *t* ($Y_{t,t-k}^{A}$); the impact of $Y_{t,t-k}^{H}$ on labor supply and related effects on earned income ($Y_{t,t-k}^{y}$); the impact of $Y_{t,t-k}^{H}$ on the level of debt and related payments ($E_{t,t-k}^{d}$), and finally, the impact of $Y_{t,t-k}^{H}$ on consumption between *t-k* and *t* ($E_{t,t-k}^{c}$).

In our analysis, we do not measure $Y_{t,t-k}^{A}, Y_{t,t-k}^{y}, E_{t,t-k}^{d},$ and $\mathrm{E}_{t,t-k}^{c}$ although we do measure W_{t}^{NonH}. Absent additional information, the impact of housing capital gains on non-housing wealth reflects the sum of the four derivatives on the right-hand side of equation (A.6). However, it seems likely that labor supply is quite inelastic to housing capital gains. We tested that assumption with the SCF by estimating the impact of housing capital gains on current earned income. Results were consistent with our prior: among all but the highest earning families, house price appreciation does not have a significant influence on earnings. Among very high earning families, the relationship is small in magnitude and positive rather than negative. Based on this evidence, we set $\frac{\partial Y_{t,t-k}^{y}}{\partial Y_{t,t-k}^{H}}$ to zero and simplify (A.6) by expressing the influence of housing capital gains on non-housing wealth as,

$$\frac{\partial \Delta W_{t}^{NonH}}{\partial Y_{t,t-k}^{H}} = \left(\frac{\partial Y_{t,t-k}^{A}}{\partial Y_{t,t-k}^{H}} - \frac{\partial E_{t,t-k}^{d}}{\partial Y_{t,t-k}^{H}} \right) - \frac{\partial E_{t,t-k}^{c}}{\partial Y_{t,t-k}^{H}} \quad . \tag{A.7}$$

In viewing (A.7), the bracketed term represents the influence of housing capital gains on accumulated net income between *t* and *t-k*, equal to the impact of house price appreciation on unearned income less debt payments.[29] Substituting (2) from the text into (A.7) yields an expression for the impact of housing capital gains on consumption, as shown in equation (3) in the text.

[29] It is also important to recognize that debt is valuable to the household only to the extent that it facilitates current or future consumption. This implies that if $\frac{\partial E^{d}_{t,t-k}}{\partial Y^{H}_{t,t-k}}$ is positive, $\frac{\partial E^{c}_{t,t-k}}{\partial Y^{H}_{t,t-k}}$ will also be positive to the extent that the extra debt is used to finance consumption. Similarly, if the extra debt is used to finance investments in interest bearing funds (e.g. stocks and bonds) that ultimately are converted into future consumption (see Jones (1997), for example), the expected value of $\frac{\partial Y^{A}_{t,t-k}}{\partial Y^{H}_{t,t-k}}$ over time would also be positive.

Appendix B: Additional Summary Statistics

This appendix presents and briefly discusses additional summary measures of the data used in the analyses. Table B-1 provides sample means for the full samples drawn from the SCF and NLSY, as well as for the income- and age-stratified samples. Note that the NLSY households are much younger than in the SCF. For the full samples (the first two columns of the table), the average age of the NLSY household head is 34.5 years compared to 51.4 years in the SCF. In addition, note that African Americans and Hispanics account for 12.3 percent of the SCF sample (8.2 percent and 4.1 percent for African Americans and Hispanics, respectively). In the NLSY, these groups are equally represented and account for a total of 29.1 percent of the sample. Moreover, among low-income families, these differences become even more dramatic. In the NLSY, African Americans and Hispanics make up 45.3 and 32.9 percent of the low- and moderate-income subgroups, while in the SCF the analogous numbers are 18.9 and 13.2 percent.

Tables B2-a, B2-b, and B2-c provide summary measures from the NLSY and SCF for the three income subgroups analyzed in the text, households with real (year 2001 dollars) total income under $25,000, households with real total income $25,000 to $50,000, and households with income over $50,000 (analogous tables for the age-stratified samples are not presented to conserve space). Several points are worth noting. First, while many families enjoy positive real capital gains, many incur loses. Among low-income families (Table B-2a), for example, in the NLSY capital gains vary from - $6,960 at the 25th percentile to $4,710 at the 75th percentile. Analogous numbers for the SCF are - $14,130 and $16,630, respectively. Among high-income families (Table B-2c), in the NLSY capital gains vary from -7,550 at the 25th percentile to $11,030 at the 75th percentile. Analogous numbers for the SCF in this instance are – $11,380 and $40,360, respectively.

Observe also in Table B-2a that compared to the NLYS, the typical low-income family in the SCF is not poor. The SCF families have a median level of non-housing net wealth of $11,470, rising to $62,780 at the 75th percentile. In the NLSY, the analogous values are negative $9,950 and positive $3,370. Analogous differences are evident with regard to debt, non-housing assets, and house value as well. In comparison to the NLSY, low-income families in the SCF hold relatively little debt per dollar of income, and have relatively high levels of non-housing assets. The comparative wealth of low-income families in the SCF relative to the NLSY is explained by additional summary measures in Table B-1. In that table, observe that the average age among low-income SCF families is 60.9 years, while the average age in the low-income NLSY sample is 34.5 years. Thus, many of the low-income families in the SCF are retirees living on accumulated savings; low-income families in the NLSY are working poor at an early stage in their occupations.

A final point is that as income in the SCF increases from Table B-2a to Table B-2c, the level of non-housing net wealth, debt, and non-housing assets rises as well. In the NLSY, debt and non-housing assets also increase with income. But importantly, non-housing net wealth largely does not. This indicates that even among higher income families, in the NLSY most households simply do not have much wealth to draw upon. However, as income increases, families in the NLSY take on more debt and acquire additional non-housing assets.

Summarizing, the NLSY sample is relatively young, has little wealth, and contains a high share of minority households, even allowing for the fact that our sample is composed only of owner-occupiers. In contrast, the SCF sample is much older, has considerable wealth even among “low-income” families, and contains a much smaller share of minorities.

Table B1: Sample Means
(Dollar valued variables are in year 2001 dollars)

	Full Sample		Total Annual Income < $25,000		Total Annual Income $25,000 to $50,000		Total Annual Income > $50,000		Age < 35		Age 35 to 44		Age 44 to 55	Age 55 to 64	Age ≥ 65
	SCF	NLSY	SCF	NLSY	SCF	NLSY	SCF	NLSY	SCF	NLSY	SCF	NLSY	SCF	SCF	SCF
Capital gains ($1,000) since home purchase	11.94	1.61	0.73		6.80		20.32		7.29	-2.75	14.41	5.96	14.23	16.14	6.94
Capital gains ($1,000) since last assessment	11.94	1.61		-1.40		0.06		2.97	7.29	-2.75	14.41	5.96	14.23	16.14	6.94
Years since home purchase	13.82	4.40	19.56		13.96		11.02		4.11	3.96	7.63	4.84	12.07	17.46	25.18
Years since first assessment	13.82	4.40		4.02		4.31		4.32	4.11	3.96	7.63	4.84	12.07	17.46	25.18
White	0.850	0.657	0.790	0.511	0.844	0.629	0.882	0.700	0.848	0.670	0.847	0.645	0.835	0.826	0.886
African American	0.082	0.145	0.140	0.258	0.083	0.155	0.054	0.120	0.071	0.135	0.078	0.155	0.082	0.098	0.082
Hispanic	0.041	0.146	0.049	0.195	0.049	0.174	0.032	0.121	0.049	0.145	0.047	0.148	0.050	0.045	0.016
Other Non-White Race	0.028	0.051	0.021	0.036	0.024	0.042	0.033	0.059	0.032	0.050	0.028	0.053	0.033	0.030	0.016
Married	0.695	0.803	0.397	0.428	0.661	0.716	0.858	0.921	0.757	0.813	0.753	0.792	0.736	0.699	0.551
Divorced	0.099	0.080	0.147	0.226	0.142	0.122	0.052	0.031	0.052	0.063	0.116	0.097	0.141	0.111	0.058
Age of Household Head	51.37	34.53	60.93	34.46	50.86	34.19	47.13	34.70	29.86	31.66	39.23	37.40	48.71	59.44	73.72
Male Household Head	0.738	0.509	0.500	0.430	0.711	0.516	0.867	0.524	0.795	0.506	0.802	0.511	0.774	0.726	0.607
Head Has More Than High School	0.516	0.529	0.253	0.290	0.425	0.403	0.695	0.637	0.570	0.513	0.618	0.545	0.604	0.440	0.337
Head Has High School Degree	0.296	0.404	0.310	0.537	0.377	0.502	0.241	0.327	0.338	0.414	0.300	0.393	0.273	0.309	0.282
Head Has Less Than High School	0.188	0.067	0.437	0.173	0.197	0.095	0.064	0.036	0.092	0.072	0.081	0.062	0.123	0.251	0.381
Household Earned Inc. in $1,000	46.86	56.91	6.5	13.4	27.4	35.6	77.9	76.0	54.58	54.08	64.01	59.74	66.34	41.96	7.19
Year: 1983	0.198	-	0.221	-	0.214	-	0.180	-	0.267	-	0.185	-	0.170	0.217	0.186
Year: 1989	0.142	-	0.150	-	0.143	-	0.138	-	0.118	-	0.146	-	0.122	0.163	0.159
Year: 1992	0.152	0.122	0.155	0.113	0.145	0.136	0.155	0.110	0.138	0.236	0.154	0.007	0.148	0.137	0.173
Year: 1993	-	0.142	-	0.159	-	0.166	-	0.127	-	0.248	-	0.037	-	-	-
Year: 1994	-	0.166	-	0.182	-	0.171	-	0.169	-	0.250	-	0.081	-	-	-
Year: 1995	0.177	-	0.181	-	0.179	-	0.175	-	0.190	-	0.177	-	0.187	0.160	0.169
Year: 1996	-	0.183	-	0.181	-	0.183	-	0.180	-	0.182	-	0.183	-	-	-
Year: 1998	0.166	0.192	0.152	0.159	0.164	0.172	0.175	0.205	0.134	0.083	0.175	0.300	0.185	0.155	0.163
Year: 2000	-	0.196	-	0.207	-	0.173	-	0.209	-	-	-	0.392	-	-	-
Year: 2001	0.166	-	0.141	-	0.156	-	0.177	-	0.153	-	0.163	-	0.188	0.168	0.151
Number of Observations	10,401	9752	2,399	1,028	2,969	3,014	4,990	5,710	1460	4870	2287	4882	2637	1652	2365

Table B-2a
Distribution of Wealth, Portfolio Composition, and Housing Capital Gains Among Owner-Occupiers in the SCF and NLSY
Total Household Annual Income Less Than $25,000
(Dollar values are in year-2001)

	Percentiles and Mean	Net Wealth Less House Value in $1,000	Total Debt Owed in $1,000	Total Assets Less House Value in $1,000	House Value in $1,000	Housing Capital Gains Since Last Price Observation in $1,000	Percent Avg. Annual Rate of House Price App. Since Last Price Observation
NLSY Sample (Obs = 1,028)	25th	-40.49	6.85	4.27	21.47	-6.96	-8.65
	50th	-9.95	29.55	11.24	47.89	-1.16	-2.38
	75th	3.37	61.80	26.20	82.47	4.71	6.71
	Mean	-15.19	40.88	25.68	61.25	-1.40	-0.74
SCF Sample (Obs = 2,399)	25th	-1.24	0.00	6.44	34.86	-14.13	-1.53
	50th	11.47	8.43	22.37	64.27	0.55	0.08
	75th	62.78	19.69	72.05	100.98	16.63	2.55
	Mean	48.29	17.51	65.79	80.39	0.73	1.38

Table B-2b
Distribution of Wealth, Portfolio Composition, and Housing Capital Gains Among Owner-Occupiers in the SCF and NLSY
Total Household Annual Income $25,000 to $50,000
(Dollar values are in year-2001)

	Percentiles and Mean	Net Wealth Less House Value in $1,000	Total Debt Owed in $1,000	Total Assets Less House Value in $1,000	House Value in $1,000	Housing Capital Gains Since Last Price Observation in $1,000	Percent Avg. Annual Rate of House Price App. Since Last Price Observation
NLSY Sample (Obs = 3,014)	25th	-53.10	27.84	12.37	47.62	-6.17	-4.49
	50th	-23.88	55.12	23.12	76.40	-0.88	-1.00
	75th	2.26	82.14	42.70	105.43	7.02	6.18
	Mean	-22.84	59.52	36.68	81.92	0.06	1.05
SCF Sample (Obs = 2,969)	25th	-20.37	2.00	19.23	57.79	-11.09	-1.48
	50th	19.87	25.24	51.39	88.91	2.12	0.39
	75th	119.73	63.68	149.96	133.36	23.27	3.56
	Mean	73.25	41.57	114.82	107.49	6.80	1.85

Table B-2c
Distribution of Wealth, Portfolio Composition, and Housing Capital Gains
Among Owner-Occupiers in the SCF and NLSY
Total Household Annual Income Greater Than $50,000
(Dollar values are in year-2001)

	Percentiles and Mean	Net Wealth Less House Value in $1,000	Total Debt Owed in $1,000	Total Assets Less House Value in $1,000	House Value in $1,000	Housing Capital Gains Since Last Price Observation in $1,000	Percent Avg. Annual Rate of House Price App. Since Last Price Observation
NLSY Sample (Obs = 5,710)	25th	-69.05	62.89	30.90	87.63	-7.55	-3.66
	50th	-29.76	95.24	57.32	123.65	-0.27	-0.10
	75th	16.29	138.14	110.11	172.62	11.03	5.82
	Mean	-16.95	107.26	90.31	138.49	2.97	1.90
SCF Sample (Obs = 4,990)	25th	-21.64	28.26	61.79	99.97	-11.38	-1.13
	50th	68.56	77.12	153.90	151.07	7.92	0.85
	75th	250.87	135.80	348.48	232.42	40.36	4.21
	Mean	130.78	101.94	232.72	188.14	20.32	2.52