Housing Wealth Effects, Boomer Refinancing, Housing Debt, and Retirement Saving Adequacy—1989-2007

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Introduction

The housing boom that ended in 2006 spurred interest in the role of housing in retirement savings and retirement security, especially that of baby boomers on the verge of retirement (Lusardi and Mitchell 2007; Coronado et al 2006). The extensive literature on the adequacy of baby boomers' retirement preparation (CBO 2003; Love, Smith, and McNair, 2008; Butrica and Uccello 2004; Butrica, Toder, and Toohey, 2008; Gist, Ford, and Wu, 1999) has been divided as to whether and how housing wealth should be counted in retirement saving (Bernheim, 1993; Engel, Gale, and Uccello, 1999; Munnell and Soto, 2005; Munnell, Soto and Aubry, 2007; Venti, Wise and Poterba, Walker, 2004; Sheiner and Weil, 1992). Although earlier studies concluded that housing wealth is somewhat peripheral to retirement security, recent studies see a more instrumental role for housing, at least in rearranging household asset portfolios (Walker, 2004; Coronado, Maki and Weitzer, 2006; Sinai and Souleles, 2007).

This paper examines the effects that the recent housing bubble had on the household financial behavior of different birth cohorts and the consequences of those behavioral choices for boomers' projected retirement security. In Section II, we briefly review the literature on housing wealth effects and then in Section III examine and contrast boomer housing wealth and asset portfolios during the housing boom with those of the preceding generation. We will examine four birth cohorts, although boomers are a particular focus because of the size of the cohort, because they are either on the verge of retirement or preparing for it, because they control a large percentage of the nation's total net worth, and because they have been the object of considerable research attention regarding their retirement preparation. Section IV focuses on the refinancing of first mortgages and factors affecting decisions to refinance and cash out equity. Section V reports on how much equity was extracted from first mortgage refinancing by birth cohort and how it was used, and then broadens the analysis to second and third mortgages and home equity lines of credit (HELOCs). Section VI focuses on the implications of the increased debt for retirement saving. Section VII concludes.

Housing Wealth Effects and Refinancing Activity

Theoretically, increased income and wealth both increase consumption. Estimates of the effect of wealth on consumption (the "wealth effect") generally range between 3- and 7-percent (one dollar of added wealth increases consumption by three to seven cents) although some estimates range as high as 10 percent (see the survey of studies in Poterba, 2000; Maki and Palumbo, 2001; CBO, 2007; Belsky and Prakken, 2004; Coronado, Maki and Weitzer, 2006; Sinai and Souleles, 2006; Case, Quigley, and Shiller, 2004). One study has estimated different wealth effects for different assets, with a wealth effect of 19 cents for stocks, but an insignificant effect for housing and essentially zero for other capital assets (Juster, et al., 2001). In the recent, unprecedented, and ill-fated housing market boom of 1997-2007, housing became not only an increasingly valuable asset but a resource for adjusting personal finances (borrowing, shifting assets, etc.) and potentially for promoting increased consumption via the wealth effect.

Increasing stock wealth and housing wealth both produce wealth effects, but the housing wealth effect has been estimated to be somewhat larger and more immediate (Belsky and Prakken, 2004; Case, Quigley, and Shiller, 2005). This may seem surprising in view of the generally slower growth of housing values, but there are several reasons why housing can have a more potent wealth effect than equities.

First, housing is the most widely held form of wealth among Americans. The overall homeownership rate was 69 percent in 2007, compared with a rate of stock ownership (whether individually-owned or held in other accounts) of 51 percent (Bucks, et al., 2009). Only 18 percent of all households own individual stocks. Also, housing is a much larger share of net worth for most households than equity holdings. For those on the verge of retirement, housing equity represents about 40 percent of net worth (Sinai and Souleles, 2007, p. 8), the largest single item for most. Median housing value among homeowners was $200,000 in 2007, compared with under $17,000 for stocks (Bucks, et al., 2009). Even more important reasons for a strong housing wealth effect are that home prices are normally far less volatile than stocks (the late 1990s bubble, when stocks soared and then crashed in 2000, is a recent notable case and the housing bubble is a recent exception), so housing wealth is more likely to generate consumption because of greater confidence in its stability. Furthermore, the fact that house values are highly leveraged means that the effect of housing price increases is magnified because large gains can be generated from relatively small equity amounts. (Belsky and Prakken, 2004; Case, Quigley and Shiller, 2005).

The housing wealth effect occurs in one of three ways: 1) sales of homes and the realization of capital gains; 2) refinancing of first mortgages and the extraction of housing equity; or 3) home equity loans and lines of credit. Our focus in most of the paper is primarily on the second category—people who refinanced, how refinancing varied by cohort, who extracted housing wealth in refinancing, and how did they use that equity? We later expand the analysis to the third category of home equity loans and lines of credit. The volume of refinancing of mortgages during the boom reached unprecedented proportions. In 2003 alone, roughly 12 million mortgages were refinanced, after 8 million in 2002. Given nearly 75 million home-owning households and nearly six in 10 with mortgages, more than one in four mortgages was refinanced in 2003 alone (McConnell, Peach, and Al-Haschimi, 2003). According to a 2002

Federal Reserve study, about half of homeowners with mortgages refinanced their mortgages at least once after buying their homes (Canner, Dynan and Passmore, 2002).

The most commonly reported use (although not necessarily the most dollars) of extracted home equity as reported in previous Federal Reserve surveys was debt repayment, which is another form of saving (Canner, Dynan and Passmore, 2002; Greenspan and Kennedy, 2007). This was followed by home purchase or repair. Another possible use of housing equity, especially in a time of low mortgage interest rates and rising house prices, was to diversify wealth holdings by exchanging housing equity for other assets (Coronado, et al., 2006; Greenspan and Kennedy, 2007; Sinai and Souleles, 2007). A third possible use—increased consumption—was cited frequently and favorably by former Fed Chairman Greenspan as a source of sustaining household consumption levels during a sluggish economy in 2001-03.

The extent to which the housing wealth effect in fact sustained consumer demand in the early 2000s depends on what borrowers did with their home equity. To the extent they increased consumption, they may have also contributed to a decline in the U. S. saving rate and an increase in household debt. As former Fed chairman Greenspan has noted, "discretionary extraction of home equity accounts for about four-fifths of the rise in home mortgage debt since 1990" (Greenspan and Kennedy, 2007). Greenspan and Kennedy estimate that equity extraction lowered the saving rate by about 1.5 percentage points between 1998 and 2005, but that *if one treated debt consolidation as consumption* rather than saving, then total extractions lowered the saving rate by 2.5 percentage points (2007).

How much home equity refinancers cashed out, what they did with their home equity, and how that affected their overall net worth position are important questions for all households, but particularly for those nearing retirement, especially in view of the post-2006 plunge in housing values that may have left these households much more highly leveraged than they had anticipated or desired.

Our data source to analyze these questions is the Federal Reserve's Survey of Consumer Finances for 1983 and 1989 through 2007. The SCF is a triennial survey of wealth with approximately 4500 households or "primary economic units," (PEUs), about three-fourths of which are provided from a multi-stage area probability sample design, and the other fourth from a list of statistical records from the IRS of taxpayers who are likely to be relatively wealthy. The surveys from 1983, 1989 and 1992 are used for historical perspective to compare housing wealth among boomers with their elders, but data on refinancing were collected only in 1995 and after, on uses of cashed out amounts only in 1998 and after, and on dollar amounts cashed out only in 2004 and 2007.

How the 1997-2007 Housing Boom Affected Wealth and Asset Composition

Comparing Housing Wealth of Boomers and the Previous Generation

We first examine changes in the role of housing in the portfolios of the boomer generation (1946-64) compared with the previous (pre-war) generation (born from 1928 through 1946) as a result of the housing boom. Table 1 compares boomers at two time periods with the 1928-46 birth cohort at the same ages—boomers in 2001 and pre-war babies in 1983 (when both generations were aged 37-55) and boomers in 2007 and the pre-war cohort in 1989 (when both were aged 43-61) on housing and several wealth variables.[1] Recent research using the Health and Retirement Study has compared early boomers (born between 1948 and 1953) with older populations (Lusardi and Mitchell, 2007; Coronado, Maki, and Weitzer, 2006).

Boomers were about as likely to be homeowners in 2001 and 2007 as their elders in 1983 and 1989, with about three-fourths of both birth cohorts owning homes in those years. Boomers had about one-fifth more median net worth than their elders at ages 37-55 in 2001, but at ages 43-61, the two cohorts had comparable amounts of net worth. Although boomers had higher median home value than their elders at both ages, their median home equity was *less* in both 2001 and 2007 than that of the elder cohort at the same ages, and as a result boomers' ratios of home equity to home value in both years was well below that of their elders (by 24 percentage points at both ages). Not surprisingly, boomers' ratio of home equity to total net worth was also lower than that of their elders (also by 24 percentage points in 2001, but only 10 percentage points in 2007).

For boomers, therefore, other assets besides the home were a much larger share of asset portfolios. Median net worth other than home equity was more than twice as much for boomers as their elders at ages 37-55, and still one-third greater at ages 43-61. Likewise, financial assets and the ratio of financial assets to total net worth were substantially greater for boomers than their elders in both periods, although the gap was much larger at ages 37-55 than it was when both cohorts were aged 43-61.

Perhaps the most telling difference between boomers and their elders is that the household debt of boomers was much greater at ages 37-55, and the difference increased over time, as did the ratio of debt to household net worth. Thus, while the financial advantage that boomers had over their elders at ages 37-55 shrank by the time both reached ages 43-61, boomers had a large disadvantage relative to pre-war babies at ages 37-55, and this disadvantage increased by the time they reached ages 43-61. Increased debt has become the trademark of boomer households.

Table 1

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[1] One issue worth noting in this analysis is that the 1983 SCF used a different format from those after 1989, and there are some differences in the method of calculating net worth. However, we don't expect that this should create problems of comparability for the data elements we will be comparing.

In sum, boomers had more diversified asset portfolios than their elders at comparable ages, with the pre-war generation relying much more on home equity as the predominant source of wealth. While boomers also were heavily reliant on housing as a source of wealth, the concentration of housing wealth in their overall net worth was less than that of their predecessors, even after the most expansive housing boom in history.

The Housing Boom and Housing and Other Wealth Across Four Birth Cohorts

In this section we compare 10 financial measures for the total population divided into four large "birth cohorts"—pre-boomers (born before 1946), early boomers (born 1946 to 1955), late boomers (born 1956-64) and post-boomers (born after 1964)—across the 1989-2007 period using seven triennial Federal Reserve Surveys of Consumer Finances (1989 through 2007). We pay particular attention to the period from 1998 to 2007, which roughly coincides with the sustained boom in housing prices. Although we do not have longitudinal data, we create these artificial boomer and non-boomer "birth cohorts" to approximate the experience of entire birth cohorts over time (Deaton, 1985; Browning, 1985), to discern how the housing boom affected net worth, housing wealth, asset composition (housing v. other assets), and debt. Because we include only households headed by a person aged 25 or older, the post-boomer households (born after 1964) are too young to be included in the 1989 SCF survey (the oldest ones were only 24 in 1989) and so the post-boomer results start with the 1992 SCF, when the post-boomers ranged in age from 25 - 27. Table 2 shows the relative composition of households by birth cohort in the Federal Reserve surveys back to 1989.

Table 2

We use medians in Appendix Figures 1-10 because wealth variables have skewed distributions, which make means misleading. In Table 3 below, however, where we compare differences between years, we use means because medians are not additive. Figures 1-10 compare homeownership rates, median income, median net worth, median ratio of net worth to income, median home value, median home equity, median ratio of home equity to home value, median other (non-housing) net worth, median ratio of home equity to net worth, and median housing debt. However, we will focus mainly on the last six of these.

Figures 1-10

Briefly, homeownership rates (Figure 1) rose steadily over the period, reaching above 80 percent for pre-boomers and early boomers and nearly 75 percent for late boomers, but only 58 percent for post-boomers by 2007. Several of the dollar-denominated variables in Figures 1-10 show a dip in the first half of the period examined, reflecting the early-1990s recession, from which it took some time to recover. Real median incomes (Figure 2) fell during the early 1990s recession for pre-boomers and early boomers and have never recovered to the level they reached in 1989. Despite negative or slow income growth, pre-boomers and both early and late boomers experienced steep rises in mean net worth starting after 1992 (Figure 3), but growth was much more gradual for post-boomers. The ratio of net worth to income (Figure 4) grew sharply for pre-boomers, whose ratios were more than twice that of early boomers. Other cohorts' net worth to income ratios grew steadily if moderately over the period.

Both median housing value (Figure 5) and median home equity (Figure 6) displayed distinctive U-shape distributions over the period for the two older birth cohorts, declining fairly sharply in the early 1990s in real terms, so that housing had significant ground to recover to offset the losses incurred in the early 1990s. Median housing values and home equity (Figure 6) for pre-boomers and early boomers did not reach their 1989 levels until 2001, but they increased sharply from that point through 2007. Late boomers and post-boomers did not lose housing wealth after 1989, but home values and home equity were nonetheless flat until 1998, after which they rose gradually. The increase in median home value between 1998 and 2007 for pre-boomers of nearly $50,000 was exceeded by the increase in median home equity during that period ($50,000), suggesting that nearly the full appreciation in home value entered into net worth. For both early and late boomers, median home equity increased by three-quarters or more of median home values between 1998 and 2007. Post-boomers enjoyed the largest increase in median home value of all four birth cohorts between 1998 and 2007—nearly $100,000—but had the smallest increase in median home equity—$32,000 and their debt consequently increased.

The median ratio of home equity to home value (Figure 7) was 1.0 for pre-boomers for the entire period, indicating that most had no mortgage at all. The home equity ratio was virtually unchanged from 1989 to 1998 for boomers, but then increased by about .15-.17 for early and late boomer cohorts between 1998 and 2007. The median ratio for post-boomers was identical in 2007 to its 1992 value (.333), and dipped slightly between those points.

Median non-housing net worth (Figure 8) fluctuated over the entire period, reflecting the recession in the early 1990s, followed by the boom in the stock market in the late 1990s, which drove up non-housing wealth, followed by the stock market bust coupled with the housing boom which drove the share of wealth in housing up again. One exception to this pattern seemed to be the early boomers, whose median net worth other than home equity soared between 2004 and 2007, when housing equity seemed to eclipse other sources of wealth for other cohorts.

As Figure 9 shows, home equity relative to total net worth declined for all birth cohorts until 2001, after which the crash in stocks and the housing boom boosted the share of housing in total net worth for all birth cohorts. Nevertheless, all four cohorts had ratios of home equity to net worth that were lower in 2007 than they were in 1989, although higher than in 2001. Poterba, et al., found that, despite large increases in home equity over the past 20 years, "the ratio of home equity to total non-pension wealth remained remarkably stable" (2007). Our measure of total wealth includes defined contribution pensions and other financial wealth, although not defined benefit pensions. The stability that Poterba, et al., found with SIPP data cannot be said to characterize the patterns in Figure 9, except perhaps for pre-boomers.

As we saw in Figures 5 and 6, increases in home values and home equity were one-to-one for pre-boomers, but less than one-to-one for the other three birth cohorts, suggesting that homeowner debt increased for the other three birth cohorts. Figure 10 bears this out—pre-boomers' median housing debt was zero throughout the period, but housing debt for late boomers increased by $20,000 from 2001 to 2004 before declining by $7,000 by 2007. Early boomers' housing debt increased by $12,000 from 2001 to 2007. The largest increase occurred among post-boomers, whose housing debt soared after 2001 by $43,000.

Table 3 reports the change from 1998 to 2007 (roughly covering the housing boom) in six of the 10 financial variables in Figures 1-10. We use means rather than medians here in order to be able to capture change over time because medians are not additive.

Boomers in general, and early boomers in particular, enjoyed the largest increases in income, net worth, home value, home equity, and in other (non-housing) net worth during the housing boom. In general, the increase in home values was broadly comparable across the four birth cohorts, ranging from $118,000 to $146,000, but increases in home equity varied more directly with age, so that pre-boomer gains in home equity equaled 95 percent of the increase in pre-boomer home value. The comparable figure was 83 percent among early boomers, 75 percent for late boomers, but only 50 percent for post-boomers. Mean housing debt was inversely related to age of birth cohort, ranging from only $6,000 for pre-boomers to more than $70,000 for post-boomers. It is interesting to note that mean housing debt was stable or declined for all but the youngest cohort in the early 1990s when housing prices were declining (see Appendix Figure 10), but as housing prices increased beginning in 1997, housing debt also grew.

Decisions to Refinance First Mortgages and Cash Out Home Equity

In this section, we first examine the frequency of refinancing activity since 1995, then describe the characteristics of the refinancers and of those who took out equity, and finally model the decisions to refinance and to extract equity.

How Many Homeowners Refinanced?

The sharp increases in home values seen since 1997 spurred a refinancing boom. A 2002 Federal Reserve study found that about half of homeowners with mortgages refinanced their mortgages at least once after buying their homes (Canner, et al., 2002). The Survey of Consumer Finances began reporting refinancing activity in 1995 and has continued to do so in subsequent surveys through 2007. Mortgage refinancing activity was substantial during that period, averaging about one-third of mortgage holders from 1995 through 2001 and rising to 47 percent in 2004 before falling back to 42 percent in 2007 (Figure 11).

Early and late boomers and pre-boomers refinanced at rates between 30 and 40 percent between 1995 and 2001, but boomers had the highest rates after 2001, reaching above 50 percent in 2004 and 2007. Post-boomers refinanced under 20 percent until 2004, then rose to the same level as pre-boomers. Boomers continued to refinance at rates exceeding 50 percent in 2007.

The percentages of households cashing out equity followed a different pattern from refinancing activity (Figure 12). Theoretically, cashing out would be more likely among older than among younger households. In a time of rising home prices, housing becomes more valuable as an asset but also costs more as a consumption good, and in theory the increase in value matches the increased future rents, at least for households expecting to live in the home for

a long period. But, for older homeowners or those who expect to sell and move, the present discounted value of that increased cost of living in the house would be small relative to the positive wealth effect (Poterba, 2000; Munnell and Soto, 2008). This leads to the plausible speculation that older birth cohorts—pre-boomers and early boomers—would be more likely to cash out increases in the value of their homes. A majority of pre-boomers had no mortgage debt, and the growth in their housing equity might spur them to diversify their assets if housing became a larger than optimal share of their net worth. It would not decrease their net worth if they used the extracted cash to purchase other assets.

Figure 12

Cash outs among first mortgage refinancers went from 32 percent in 1995 to 44 percent in 2007, peaking in 1998 at 46 percent overall, quite close to the Fed 2002 survey findings that 45 percent of refinancers took the opportunity to cash out some of their home equity (Canner, et al., 2002). As theory would suggest, cashing out was more prevalent among the oldest (pre-boomer) cohort, especially in 1998 and 2001 when cashing out reached above 60 percent of all pre-boomer refinancers. Early boomer refinancers in turn cashed out equity slightly more often than late boomer refinancers, but cash outs among both boomer birth cohorts increased throughout the period, reaching above 45 percent and exceeding the rate of pre-boomers by 2007. As expected, the younger, post-boomer, cohort had historically lower cash-out rates than the other cohorts, but by 2007 all four cohorts were in the 40-48 percent range.

Who Refinanced and Who Didn't?

Table 4 below compares the characteristics of households with housing debt that refinanced first mortgages with those that did not, and the characteristics of those refinancers who also extracted equity in refinancing first mortgages and those that did not in 2007. Refinancers were more than 40 percent of all households with housing debt in 2007.

Table 4

Refinancers tended to be slightly older than non-refinancers, they were more likely to be college educated and half as likely to have less than a high school diploma, and were more likely to be white. In 2007, refinancers had 25 percent higher median incomes, 46 percent higher median net worth, 19 percent higher median home value, and 25 percent more median home equity than non-refinancers. In addition, refinancers realized increases in the value of their home since purchase that were almost three times as large as those who did not refinance. Refinancers had 15 percent more housing debt than non-refinancers,[2] about 30 percent more installment debt, and three times as much credit card debt as non-refinancers. They are slightly less likely to have an adjustable rate mortgage (ARM) loan, and just as likely to be carrying private mortgage insurance (PMI) on their housing loan. Interestingly, both assets and liabilities seem to correlate with the choice of refinancing first mortgages.

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[2] Given the nature of the SCF questions, it is not possible to tell whether the higher debt for refinancers is a cause or consequence of the refinancing.

Demographic and financial variable differences are smaller between those refinancers that cashed out and those that did not than they are between refinancers and non-refinancers. Income and net worth were slightly higher among those refinancers that cashed out than among those that did not, as was home equity, and the increase in home value since purchase was more than twice as great for those that cashed out as those that didn't. In one area—household debt— the differences were greater between those that cashed out and those that didn't than between refinancers and non-refinancers. Housing debt was 30 percent higher, installment debt was twice as high, and credit card debt was three and half times as large for refinancers who cashed out equity as those that did not.

What Factors Influenced Refinancing Decisions?

Given that not all mortgage holders refinanced, what factors led to the decision to refinance? A number of studies have examined the refinancing decision or the decision to extract equity from housing wealth (Brady, et al., 2000; Canner, et al., 2002; McConnell, et al., 2003; Munnell and Soto, 2008; Hurst and Stafford, 2005). Federal Reserve studies found that those who refinanced tended to have larger mortgage debt than those who didn't, presumably because they have more to gain by lowering their interest rates (Brady, et al., 2000; Canner, et al., 2002). Seeking lower interest rates is a logical financial motive to refinance in order to lower borrowing costs and therefore increase lifetime income. The same Fed studies also found that lower economy-wide interest rates, a high original mortgage interest rate, and an expectation of higher interest rates to come were important factors. Even in times of high or rising interest rates, refinancing may be a strategy to access home equity for those who are liquidity constrained (short of cash or unemployed) (Hurst and Stafford, 2005). Other factors cited by Fed studies included increases in the value of the home, general economic expectations, higher education, and having children under age 18. Munnell and Soto (2008) also identified risk aversion, credit constraints, and long planning horizons as important factors.

Although theory suggests that the increased value of the home as an asset is offset by the implicit future cost of housing as a consumption good (Buiter, 2008; Munnell and Soto, 2008; Campbell and Cocco, 2007; Poterba, 2000), the real cost of future housing consumption depends on how long the home owner plans to reside in the house. Those higher future costs would have a lower discounted present value for those who expect to remain in the home a shorter time (including older households) than those who plan to remain in the house for a long period. Therefore, any appreciation in the value of the home net of present value of future costs would be greater for older households (in the current instance the pre-boomers and older boomers), who would be more likely to consume out of increases in the value of their homes.

Based on these studies, we chose the following independent variables to model refinancing and cash out decisions:

1. Present discounted value of future rents over income: should be lower for older cohorts and should be negatively related to refinancing and cashing out;
2. Birth cohort (pre-boomers, born before 1946; early boomers, born 1946-55; late boomers, born 1956-64; and post-boomers, born after 1964): older cohorts more likely to refinance and cash out;

3. Appreciation in home prices since purchase would make refinancing and cashing out equity more attractive to homeowners;
4. The difference between prevailing interest rates and the mortgage rate would presumably make it financially advantageous to refinance;
5. Expectations that interest rates will rise might make refinancing now look more attractive;
6. Being turned down for credit in the previous five years should negatively affect refinancing;
7. Whether the household had an adjustable rate mortgage (ARM) should increase the likelihood of refinancing;
8. Whether the household had a debt burden exceeding 40 percent of income or had outstanding credit card debt should negatively affect refinancing;
9. Having available financial assets could have either a positive or negative sign because it might make refinancing easier, but also might make it less necessary;
10. Length of planning horizon: long-term planners more likely to refinance;
11. Willingness to assume risk should positively affect refinancing;
12. Higher levels of education should relate to better financial decisions, including refinancing.

We estimated a logit model of the household decision to refinance a mortgage, given that the household owns a home with a mortgage and has positive equity. Since more than half of the pre-boomers have no housing debt, this eliminates a large segment of that cohort from the analysis. We pooled the data from the 2004 and 2007 Federal Reserve wealth surveys because only in those years did the survey include questions about the amounts that households extracted from their home equity. Our sample includes more than 32,000 observations (even though each survey contains only about 4,500 households, and about 60 percent own homes with mortgages), because the survey provides five separate estimates (implicates) for each asset value, and all estimates are included in the SCF dataset, allowing for more efficient estimation of parameters.

The dependent variable in the refinancing model was coded as a "yes" if the mortgage was refinanced. The refinancing model coefficients are reported in Table 5, and the expected probabilities are plotted in Figure 13 in order of their influence on the probability of refinancing. All the variables, with the exception of debt to income ratio above 40 percent, are significant at the .05 level or less. The initial probability of refinancing was 32.3 percent. All those variables with an expected probability of greater than 32.3 raise the probability of refinancing to the level reported in column 4 of the table. The converse is true for those variables with expected probabilities below 32.3.

Table 5
Figure 13

The variable having the largest positive impact on the decision to refinance was whether the household had an adjustable rate mortgage (ARM). For the average household with mortgage debt, having an ARM raised the probability of refinancing from 32- to 71-percent, and ARM holders were 4.9 times as likely as standard mortgage holders to refinance. While

intuitively plausible, this result is surprising since ARMs were only slightly more common among refinancers in Table 4.

Compared with the average mortgage holder, being an early boomer raised the expected probability of refinancing from 32- to 50-percent, and being a late boomer raised it to 48 percent. Both early and late boomers were about twice as likely as post-boomers to refinance mortgages, controlling for other influences. Relative to the average mortgage holder, an increase in interest rates raised the probability of refinancing by 8.4 percentage points, being married increased it by 7 percentage points, having children increased it by 6.5 percentage points, having a long planning horizon, being a pre-boomer, or being a high risk taker increased it by 6 percentage points, and being college-educated increased it by 5 percentage points.

Several factors reduced the probability of refinancing: being turned down for credit (by 6 percentage points), being unwilling to take financial risks (by 7 percentage points), being nonwhite (by 8 percentage points), and having a short planning horizon (10 percentage points). Also, refinancing was 11 percentage points less likely in 2007 than in 2004.

Although both the present discounted value of future rents relative to income and the appreciation in home price relative to income both were significant, neither had any effect on the expected probability of refinancing a first mortgage.

What Factors Influenced Cashing Out in First Mortgage Refinancing?

We again pooled the 2004 and 2007 surveys to model the decision to cash out equity. The coefficients are reported in Table 6, and the expected probabilities are arrayed in order in Figure 14. The independent variables are the same as in Table 5. Of the 10,400 observations (again using Table 5 implicates) that reported refinancing first mortgages in Table 5, 2,346 cashed out some additional equity. Thus, the initial probability of cashing out was 2,346/10,400, or 22.5 percent.

Table 6
Figure 14

In this model all variables were significant at least at the .05 level except the year dummy, nonwhite, marital status, and presence of children (which was significant at the .10 level). Again, the ARM variable had the largest impact, increasing the probability of cashing out by 7.9 percentage points, and ARM holders were 50 percent more likely to cash out than holders of conventional mortgages. Unlike the refinancing model, in which the debt burden variable was not significant, it is now both significant and increases the probability of cashing out by 7.3 percentage points, second only to the ARM variable. Those having housing debt service burdens greater than 40 percent of income were 46 percent more likely to take cash out when they refinanced. Being an early boomer, late boomer, or a pre-boomer also increased the chances of taking equity by 6.9, 5.4, and 4.4 percentage points, respectively. The longer planning horizon, risk aversion, presence of children, being turned down for credit, interest rate difference, and appreciation in the home price all increased the chances of cashing out equity slightly.

The factor that most decreased the probability of cashing out was having a college education (by 7.9 percentage points), but having a high school education or less, marital status, a short planning horizon, present discounted value of future housing rents, and higher interest rate expectations also decreased the probability by between 3.6 and 1.1 percentage points.

To summarize the results from the refinancing and cash out models, older cohorts with ARMs and high interest rates were more likely to both refinance and cash out, as were those with children, those getting a lower interest rate and those willing to take financial risks. Other factors made both refinancing and cashing out *less* likely, such as being turned down for a loan or having less than a high school education. Certain factors influenced one decision but not both. Having a high-debt burden did not influence the decision to refinance, but it did increase the likelihood of taking out equity. On the other hand, being married and having a college degree both made it more likely people would refinance, but both made it less likely that they would extract equity.

Amounts and Uses of Extracted Home Equity

The impact of first mortgage refinancing on a household's financial situation depends both on the amount of their increased housing debt and on what refinancers did with the cash extracted.

How Much Did First Mortgage Refinancers Borrow?

Figure 15 shows the distribution of amounts cashed out for all who refinanced first mortgages and cashed out equity, by birth cohort. Perhaps reflecting the boom in housing prices, the amounts borrowed tended to be larger than found in earlier studies (Brady, Canner and Maki 2000) which found more than 40 percent of cash outs of less than $10,000, and only one-fourth with more than $25,000. We found fewer than 10 percent of cash outs were under $10,000 and nearly 40 percent took more than $30,000 of equity. More than 40 percent of all households and of each birth cohort cashed out amounts between $10,000 and $30,000. The distribution of amounts borrowed tended to be similar for the four birth cohorts, with the exception that the early boomers were twice as likely as other cohorts to borrow smaller amounts (under $10,000) and much less likely to cash out amounts in excess of $50,000.

Figure 15

We might expect that households extracting larger amounts of equity via refinancing would be those with higher incomes, greater amounts of home equity and net worth, and lesser amounts of housing debt because they have more resources and are more able to manage debt. On the other hand, if cashing out is a response to the need for greater liquidity, which is suggested by the importance of adjustable rate mortgages and the influence of the household debt burden, we might expect smaller cash outs from those with higher income, net worth, and home equity and larger amounts cashed out among those who have higher household debt.

Table 7

The descriptive data in Table 7 suggest we may have posed a false dichotomy because it tends to support both hypotheses. Both mean and median amounts borrowed varied directly with income, non-housing net worth, and home equity. Those in the highest income, home equity, and non-housing net worth quartiles borrowed more than twice as much as those in the lowest quartiles. At the same time, the amounts of equity cashed out were three times higher among those with the most household debt than among those in the lowest household debt quartile, suggesting a debt reduction strategy is at work. In addition, those with household debt burdens exceeding 40 percent of income borrowed substantially more than those with debt burdens below that threshold. Recall that Table 4 showed that those who refinanced and those that cashed out equity had both higher assets and higher debts than non-refinancers, suggesting that perhaps greater resources provide a greater willingness to take on debt, and a greater capacity to manage it as well. And unlike the prominent role that age of cohort played in the refinancing and cashing out models, the dollar differences in cash out amounts seem to follow no pattern by birth cohort, at least in the descriptive data where nothing is controlled for. In the next section we will see if this still obtains controlling for a number of factors.

Modeling the Amounts of Funds Cashed Out in First Mortgages

We modeled the amount that first mortgage refinancers cashed out in refinancing using OLS regression. As in Section IV, our sample includes all those homeowners with housing debt who took additional money out when they refinanced. Of 10,410 observations of first mortgage refinancers in the 2004 and 2007 SCF samples, 2,346 took additional cash out. Our variables are the same as the refinancing and cash out models in Section IV. The results are reported in Table 8.

Although most of the variables are again significant at the .05 level or less, several which were significant in the choice models are not significant predictors of how much equity refinancers extracted, including race, the ratio of debt to income >40 percent, planning horizon, having a high school education or less, being a high risk taker, expectations of higher interest rates, and an interest rate differential between the prevailing rate and the mortgage contract rate.

Just as older birth cohorts were more likely to refinance and to cash out equity, they also cashed out more dollars than younger cohorts. Using post-boomers as the base category for birth cohorts, the oldest group (pre-boomers) cashed out $26,000 more than post-boomers, and both boomer cohorts extracted at least $17,000 more than post-boomers. As with the refinancing and cash out models, having an ARM was significant—those households with an ARM took out nearly $59,000 more than those with conventional mortgages. Married couples extracted nearly $29,000 more than single households, and those with a college education extracted $63,000 more than those with only some college. These are interesting in light of the fact that being married and having a college education made it less likely that households would cash out, but those that did took out substantially more home equity than singles and those not college-educated. Households extracted $1,400 more in home equity for each $100,000 in financial assets. Households with credit card balances cashed out more than $1,500 per thousand dollars of credit card debt. An increase in home prices relative to income increased extraction amounts by almost $7,000.

Factors associated with smaller amounts of cash outs included having children (these households extracted $14,000 less than those without children), being turned down for credit (these households extracted $17,000 less than those who were not turned down), and the highly risk averse took out $21,000 less than those who aren't.

How Did First Mortgage Refinancers Use Extracted Funds?

Types of Uses of Funds

There is evidence suggesting that refinancers have used their home equity to realign their debt obligations rather than for consumption purposes. A New York Fed study (McConnell, Peach and Haschimi, 2003) found that, rather than decrease their net worth, consumers substituted low-cost mortgage debt for high-cost consumer credit, and presumably increased their lifetime income. A special Federal Reserve study on refinancers reported that about half of

those who cashed out home equity reported using the loans to pay other debts, while about 43 percent cited home improvements, one-quarter mentioned making consumer expenditures, and another 13 percent cited stock market or other financial investments (Brady, et al., 2000; Canner, Dynan and Passmore, 2002).[3]   However, of the *dollars* that were cashed out, home improvements became the largest category, accounting for 35 percent of the dollars cashed out, and debt repayment dropped to second place, with 26 percent of cashed out funds used to pay off debts. Only 16 percent of funds were used for consumption, and 21 percent was used for real estate, business, or stock market investments (Canner, et al., 2002). Another Fed report (which allowed for multiple choices) found 45 percent of cash outs going for debt repayment, 40 percent for home improvements, 39 percent for consumer expenditures, 12 percent for stock or financial investment and 10 percent for real estate or business investment (Brady, et al., 2000). In dollar terms, home improvement accounted for one-third, while one-fourth went to pay off other debt, one-fifth for consumption, and only 2 percent for stock investment.

Other studies have argued that consumption is more significant. Hurst and Stafford (2004) concluded that liquidity-constrained households used two-thirds of every dollar of extracted home equity for consumption. Liquidity-constrained households removed a median amount of $16,000 in home equity, whereas other refinancers removed a median amount of $11,000. Greenspan and Kennedy (2007) found that the two largest uses of the "free cash" generated by refinancing were home improvements (about one third) and repayment of non-mortgage debt (about one quarter), and only 17 percent of the extracted funds financed personal consumption. But, they then suggest that repayment of non-mortgage debt, which would normally be counted as a form of saving, could be considered personal consumption spending *if* installment debt serves as bridge financing for personal consumption. This allows them to conclude that consumption was a more significant use of extracted cash.

Other studies have found evidence of an exchange of housing assets for financial assets. Sinai and Souleles (2007) found that borrowing against home equity "may have been used to invest in other assets, however, since net worth rose more than home equity." Coronado, et al., (2006), focusing on home sales rather than refinancing, found that "a substantial fraction of older households do move, and in the process, they appear to liquidate some home equity, which they convert to financial assets." The figures in the Appendix suggest that both housing debt and net worth increased sharply after 2001, but other (non-housing) net worth rose since 2001 for early boomers, late boomers and post-boomers, and declined only for pre-boomers, so this might indicate some tradeoff of housing wealth for other forms of wealth.

The Survey of Consumer Finances began asking about the use of funds cashed out in refinancing in 1998, with nearly 100 uses identified in the survey instrument, although only 10 uses identified in the public use file. Only in 2004 did the Fed survey begin to ask and report the amount of home equity that was extracted in refinancing. The categories of use in the public use file are—(1) own home purchase or seasonal residence, (2) home improvements/repair, (3) car or utility vehicle, (4) home appliances, (5) home entertainment, (6) boat/airplane/motorcycle/other, (7) investments, (8) divorce/travel/wedding, (9) medical/dental/educational, and (10)

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[3] These percentages sum to more than 100 because multiple uses could be cited.

tax/insurance/legal/debt consolidation. We further consolidated these categories into four broader groups—(1) home purchase or repair, (1 and 2 above); (2) consumption, which adds categories 3, 4, 5, 6, 8, and 9 above; (3) investment, which is the same as category 7 above, and (4) debt consolidation, which is the same as category 10 above. For our purposes, the SCF category (10), which we label debt consolidation or repayment, is ambiguous because only part of it is debt consolidation. Some personal consumption, lending and gifts are included in that category, but there is no way to determine their share of the total.

Figure 16

Using these four categories, we report the distribution of household cash outs of first mortgages by birth cohort and the use of funds (Figure 16) and then report the dollars cashed out (Figure 17). Across all cohorts, home purchase/repair was the most frequent use of funds (44 percent). Debt consolidation was the next most frequent, accounting for 37 percent of all uses, followed by consumption (12 percent) and investment (7 percent). These are comparable to the earlier-cited Federal Reserve studies, which found that of the individual cash-out loans, more than 40 percent were used to pay other debts and nearly 40 percent were used for home improvements.[4] We repeat here the cautionary note that some of the dollars in the "debt consolidation" category actually belong in the "consumption" category because the public use file combines debt consolidation with some consumption items.

These percentages varied somewhat by birth cohort, with early boomers having the highest percentage (53 percent) of fund uses for home purchase and repair and the smallest percentage (29 percent) for debt consolidation. However, we found that using extracted funds for investment and consumption occurred only half as frequently in the Federal Reserve study.

Pre-boomers were least likely (36.2 percent) to use loans for home purchase or repair and early boomers were the most likely (52.5 percent) to do so. Debt consolidation was most common among post-boomers (48.8 percent) and least common among early boomers (28.6 percent). Pre-boomers were mostly likely to extract equity for investment purposes (11 percent) and post-boomers least likely (4 percent). Using cashed out amounts for consumption was also most common among pre-boomers (15 percent) and least common among post-boomers (7.5 percent).

Table 9

Table 9 reports greater detail on the distribution of loans by race, marital status, income, and financial variables. The largest difference in terms of race was that black and Hispanic households were substantially more likely (more than 50 percent each) than white or other households to use their equity for home purchase or repair. Not married households were more likely (51.7 percent) than married households (41.9 percent) to use funds for home purchase or repair, whereas married households were more likely (38.7 percent) to use funds for debt consolidation than were unmarried households (30.6 percent).

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[4] These percentages sum to more than 100 because multiple uses could be cited.

The relationships between financial variables and uses of funds were intuitively logical. The highest (fourth) quartile in terms of income, home equity, and other net worth were consistently the most frequent users of borrowed funds for home purchase or repair and they were the least frequent users of funds for debt consolidation. Conversely, the lowest quartiles of net worth and non-housing net worth were the most likely to use extracted equity for purposes of debt consolidation. Another pattern consistent with those above was that households in the lowest household debt quartile were much more likely than those in the highest debt quartile to use funds for home purchase or repair (57 percent compared with 34 percent), and much less likely to use funds for debt consolidation than those with higher debt (25 percent compared with 46 percent). It is also noteworthy that those with debt service burdens (debt relative to income) in excess of 40 percent were far more likely to use borrowed funds for debt consolidation than those with lower debt burdens (48 percent versus 34 percent) and much less likely to use for home repair (37 percent versus 46 percent).

Dollar Amounts Cashed Out by Uses of Funds

The SCF also reported the dollar amount extracted for each transaction in 2004. Because the SCF asks only about the primary use of funds, we cannot be certain that all dollars cashed out were used for a single purpose. With that caveat in mind, Table 10 compares the distribution of loan *dollars* among the four use categories by race, marital status, and financial variables, as contrasted with the distribution of fund uses in Table 9, again assuming all funds are used for the purpose mentioned by respondents. Figure 17 reports the distribution of dollars borrowed by birth cohort according to the purpose specified by the respondent.

Table 10 and Figure 17

The overall distribution of all extracted dollars from refinanced first mortgages in Figure 17 is similar to the distribution of uses in Figure 16. Approximately 80 percent of both dollars and loans went for either home purchase/repair or for debt repayment, and the split was roughly the same in each distribution. But, the distributions across birth cohorts differed markedly from the distribution of uses in some cases. Pre-boomers used funds for home repair 36 percent of the time, but used only 29 percent of extracted dollars for that purpose; they used funds for debt consolidation 38 percent of the time, but 47 percent of their dollars were for debt consolidation. Other patterns were less clear, except that those in higher debt quartiles and who had debt burdens in excess of 40 percent of income were more likely to use cashed out dollars for debt consolidation. With the exception of post-boomers, the percentage of dollars allocated to home purchase or repair decreased as age of cohort increased, and the percentage allocated to debt consolidation increased as age increased.

Equity Extraction Other than First Mortgages

Until now our analysis has focused on refinancing of first mortgages, but these accounted for only about half of the millions of extractions and about one-third of the hundreds of billions of dollars of extracted housing equity reported in the 2007 SCF. A total of 10.4 million households reported $410 billion of extractions through first mortgages in 2007. Including second and third mortgages and up to three home equity lines of credit (HELOCs) brings total extractions to 23.3 million households, which extracted about $1,270 billion of home equity as reported in SCF2007.[5] The number of first HELOCs alone was almost as large as the number of first mortgages.

Figures 18, 19 and 20 report, respectively, the distribution of all extractions, the distribution of all extracted dollars, and the mean dollar extractions for the four uses among the four birth cohorts. The overall distribution of extractions differs slightly from the distribution we found for first mortgages. For first mortgage refinancing, we found 81 percent of extractions used for either home purchase/repair (44.3 percent) or for debt consolidation (36.7 percent), and much smaller shares allocated to investment (7.4 percent) and consumption expenditures (11.5 percent). For the larger total of extractions, including HELOCs, uses of home equity (Figure 18) were weighted more heavily toward home improvement and repair (48 percent) and less heavily toward debt consolidation (29 percent). Consumption is slightly more frequent (14.6 percent v. 11.5 percent for first mortgages only) and investment was the least frequent use of extractions at 8 percent overall.

Figures 18-20

Extracted dollars were similarly distributed, with the notable exception that more dollars went for investment and fewer for consumption. About one-sixth of extracted dollars went to investment, and less than 10 percent went for consumption (Figure 19). Pre-boomers had lowest percentage of dollars extracted for home repair (35 percent) among the four cohorts and allocated 28 percent for debt consolidation. The latter is consistent with our analysis above, which suggested that pre-boomers had more housing equity and would have more reason to try to use home equity to reallocate their assets, which these results suggest they have done. Late boomers were also outliers in allocating 59 percent of home equity dollars to home repair and only 17 percent to debt consolidation.

Mean amounts of total extractions were similar for pre-boomers, early boomers, and late boomers, all between $56,000 and $59,000. Post-boomer extractions reached $46,000 (Figure 20).

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[5] As large as these numbers are, they represent a conservative estimate of dollars extracted because they do not count cases in which equity is extracted from the sale of a home and purchase of a new home. Greenspan and Kennedy (2007) estimate that the total amount of dollar extractions from home sales, home equity loans and lines of credit, and cash out refinancing averaged $530 billion annually from 1991-2005, and that sales of existing homes accounted for about two-thirds of the cash extracted, home equity loans and HELOCs for about one-fifth, and cash-out refinancings for about 13 percent.

Pre-boomers consistently had the highest percentage of uses of dollars for consumption and the highest percentages of dollars for consumption as well, both for first mortgages and extractions including HELOCs. However, the percentages of their total extracted dollars going to consumption never exceeded 13 percent of all dollars, underscoring the tendency for consumption to be a relatively infrequent use of home equity.

Impacts on Retirement Adequacy

As we noted in Section II, the impacts of cashing out home equity depend to a large extent on the use of the cashed out funds. Funds used for home purchase or repair would presumably increase the value of the home. If used to purchase other assets, they represent a swap of one type of asset for another. Taking on additional housing debt to pay off revolving debt would represent a form of saving by swapping debt with a higher interest rate for less expensive debt. Consumption of cashed out equity is the only use that unequivocally leaves households in a worse financial position, but we have seen that relatively few survey respondents say they use housing equity for consumption, and the dollars amounts used for consumption were relatively small.

As we have seen, most uses and most dollars extracted from home equity were used for investment in housing or for debt repayment—four-fifths of first mortgage extractions and dollars were used for either home repair/purchase or for debt repayment. When we examine a larger number of extractions, including lines of credit, we still find that at least three-fourths of households and dollars are used for housing or debt repayment. This broader set of extractions showed that as little as a tenth of extracted dollars are used for consumption.

However, some have suggested it is appropriate to count reduced debt as new consumption, even though from an economic standpoint reducing debt is equivalent to saving (Greenspan and Kennedy, 2007; Munnell and Soto, 2008). The choice of how to categorize debt repayment has significant implications for how we regard the behavior of equity extractors. As the data presented on refinancers and on all extractions in Section V have shown, the percentage of extractions or extracted dollars used for consumption as reported by survey respondents was consistently less than 15 percent of the total, whether the analysis was limited to first mortgages or all extractions. Aside from the issue of how debt consolidation is defined, trading credit card debt for mortgage debt would constitute a net gain for households if they swap high credit card rates for lower mortgage rates.

Figure 21 shows the impact that equity extraction and the consumption of home equity have had on home equity and the "wealth effect" between 2004 and 2007. Based on the 2007 SCF, home values increased by $3,158 billion between 2004 and 2007, and homeowners extracted nearly $1 trillion from that increase for various purposes—nearly 30 percent of home equity appreciation. SCF respondents report using about one-tenth of those equity extractions for our consumption category, which we will label "pure consumption." Thus, the impact of the increase in housing wealth on household consumption was $3,158 billion/$99 billion, or a wealth effect of about 3.1 percent. This figure is consistent with estimates at the lower end of those found in the literature.[6]

Figure 21

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[6] If we were to include all debt repayment in the calculation of consumption, following Greenspan and Kennedy (2007) and Munnell and Soto (2008), the estimated wealth effect would be about 12 percent, higher than most of the estimates in the literature.

However, as we noted earlier, the debt repayment category in the SCF is somewhat ambiguous because only part of it is debt consolidation. An indeterminate amount of personal consumption, lending and gifts are included in the SCF category that also includes debt consolidation, and there is no way to determine their share of the total. If, instead of using the "pure" consumption definition, we were to arbitrarily assume that half of the debt repayment category is spent on consumption, we obtain an estimate for a wealth effect of 8 percent, which is at the high end of the range of estimates found in the literature.[7]

Table 11

Table 11 shows the differences in equity extraction and wealth effects by birth cohort. Among pre-boomers, housing values actually declined between 2004 and 2007, so calculating a percentage consumed out of housing wealth is not meaningful. For the boomers and post-boomers, the percentage consumed out of home value increases with the age of the birth cohort—early boomers had a wealth effect of 8 percent compared with 3.5 percent for late boomers and less than one percent for post-boomers. If we arbitrarily count half of the debt consolidation category as consumption as suggested above, the overall wealth effect is 7.5 percent, and ranges from 20 percent for early
boomers to 2.6 percent for post-boomers.

To gauge the impact that home equity extractions had on retirement resources, we compare the amounts extracted for consumption with mean household net worth by birth cohort. The results are shown in Table 12. Relative to total net worth in 2007, the amount of home equity extracted for pure consumption purposes was less than one percent across all birth cohorts, and the percentage ranged from 0.6 percent for early boomers, 0.8 percent for pre-boomers and late boomers, and 1.6 percent of net worth for post-boomers. If we were to count half of debt consolidation as consumption, the overall percentage rises to 2.1 percent of net worth, and it ranges from 1.6 percent for early and late boomers to 4.9 percent for post-boomers.

Table 12

While average extractions are fairly large in dollar terms, averaging $50,000 across all households for 2004-07, the amounts and percentages that were used for consumption were fairly small relative to net worth—the overwhelming share of dollars went for investment or saving and did not detract from overall net worth. Moreover, it is useful to put these extractions into perspective relative to what happened to the housing market after 2007. Our estimates of aggregate housing value and home equity were based on the 2007 SCF, for which interviews were conducted mostly in the third quarter of 2007. National housing values began to fall starting in mid-2006, months before the 2007 SCF interviews were conducted, although housing values in the third quarter of 2007 were still above their 2004 level. Prices continued to decline in value through the fourth quarter of 2008, when the Standard and Poor's Case/Shiller National Home Price Index reached its lowest level since the third quarter of 2003. Housing prices fell by 22.6 percent from the third quarter of 2007 to the fourth quarter of 2008. According to the 2007

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[7] Counting the entire amount of debt consolidation as though it were "bridge financing" for consumption would put the wealth effect at 12 percent of housing wealth, well above the estimates in the literature.

SCF, housing values totaled $24 trillion in 2007 for all households. Pre-boomers' housing totaled more than $7 trillion in value, and the three other birth cohorts had housing worth between $5.3 and $5.7 trillion each.   In Table 13, we apply the Case/Shiller national average reduction in home value to the aggregate housing value reported in the 2007 SCF (approximately the third quarter of 2007), both overall and by birth cohort, and compare that to both the total housing equity extractions and the total extracted for consumption. The reduction in housing value since 2007Q3 was several times the reduction in home equity that resulted from the extraction by homeowners of housing equity, and it was 17 to 28 times the reduction in home equity due to extractions. In other words, the housing crash has done many times the damage to the housing share of net worth and retirement saving than households' refinancing and extraction of equity.

Table 13

Summary and Conclusions

This report analyzed the housing wealth effect in the late 1990s and early 2000s, how it affected refinancing activity, and what effects refinancing and housing wealth extraction in general had on the household balance sheets of different birth cohorts, with special focus on boomers.

Wealth Effects

We found that housing wealth has played a less prominent role in the asset portfolios of baby boomers than it did among their elders, although homeownership has remained high among all mature households. Boomers simply have more diversified asset portfolios than their elders. Nevertheless, there seemed to be a convergence over time between boomers and their elders in terms of asset composition, although boomers had accumulated considerably more debt at comparable ages than their elders had.

Boomers in general, and early boomers in particular, had the largest increases in income, net worth, home value, home equity, and in net worth other than home equity during the housing boom. Homes increased in value broadly across the age spectrum, ranging from $118,000 to $146,000, but price increases were more likely to result in higher home equity the older the birth cohort. The oldest (pre-boomer and early boomer) cohorts tended to have smaller mortgage debt, so price appreciation would naturally result in greater shares of price appreciation going into their home equity.

Refinancing and Cashing Out First Mortgages

Refinancing activity increased from about one-third of households with mortgages between 1989 and 2001 to nearly one-half in 2004 and remained above 40 percent overall in 2007. Early and late boomers and pre-boomers refinanced at rates between 30 and 40 percent between 1995 and 2001, substantially higher than post-boomers, and refinancing rates increased sharply for all cohorts in 2004, reaching 50 to 55 percent for the boomer cohorts and more than doubling for post-boomers to 40 percent.

The rate of cashing out equity in refinancing also went from the 30 percent range to the mid-40 percent range over the period. As theory suggested, cashing out was more prevalent among pre-boomers, reaching above 60 percent in 1998 and 2001. Cash outs among both boomer birth cohorts increased throughout the period, reaching above 45 percent and exceeding the rate of pre-boomers by 2007.

Having an adjustable rate mortgage (ARM) had the largest positive impact on the decision to refinance, more than doubling the probability from 32 to 71 percent, and ARM holders were 4.9 times as likely as standard mortgage holders to refinance. The next most important factors were being a boomer, which raised the probability of refinancing to nearly 50 percent. Among refinancers, an ARM had the largest impact on the probability of cashing out equity. Although the household debt burden variable was not significant in the refinancing model, in terms of cashing out it was both significant and increased the probability of cashing

out by 7.4 percentage points, second only to the ARM variable. The three older birth cohorts were all more likely to cash out equity, and a longer planning horizon, risk aversion, presence of children, being turned down for credit, interest rate difference, and appreciation in the home price all increased slightly the probability that the refinancer would cash out some equity.

The factor that most decreased the probability of cashing out was having a college education, but so did having a high school education or less, being married, a short planning horizon, present discounted value of future housing rents, and higher interest rate expectations.

Amounts cashed out were larger than in previous studies—more than 40 percent of cash outs were for amounts between $10,000 and $30,000, nearly one-quarter were between $30,000 and $50,000, and another 15 percent were for more than $50,000. Amounts did not vary greatly by birth cohort, except among early boomers—they took nearly twice as many cash outs for under $10k and nearly half as many for more than $50k. The mean amounts cashed out varied directly with income, home equity, and other net worth, but also with amount of household debt.

Consistent with theoretical expectations, the cohorts with lower discounted present values of future rents cashed out more—pre-boomers (the oldest) cashed out $26,000 more than post-boomers (the youngest), and both boomer cohorts extracted at least $17,000 more than post-boomers. Married couples extracted more than single households, and households with more financial assets, larger credit card balances, and greater appreciation in home prices took out more than those who had less. The college-educated were more likely to refinance but less likely to cash out equity. However, those that did extracted $63,000 more than those with only some college, and those with an ARM took out nearly $59,000 more than those with conventional mortgages. On the other hand, households with children, those turned down for credit, and the most risk averse took out less equity.

Use of Extracted Funds

We found that home repair and debt repayment were the two largest categories of uses for first mortgage extractions (44 percent and 37 percent respectively) and accounted for about the same overall percentage of dollars spent (46 percent and 34 percent respectively). These two uses also predominated when we expanded extractions to include second and third mortgages and home equity lines of credit. Those with the highest incomes, home equity, and other net worth were most likely to use funds for home repair (investment) and least likely to use them for debt reduction (saving), whereas those with the lowest amounts of income, home equity, and other net worth were most likely to use extracted dollars for debt repayment. Households in the lowest household debt quartile were most likely to use funds for home purchase or repair, and much less likely to use funds for debt consolidation than those with higher debt. Those with high debt service burdens were far more likely to use borrowed funds for debt consolidation than those with lower debt burdens and much less likely to use for home repair.

With the exception of post-boomers, the percentage of dollars allocated to home purchase or repair decreased as age of cohort increased, and the percentage allocated to debt consolidation increased as age increased. The oldest birth cohort (pre-boomers) allocated the smallest percentage (29 percent) of the four birth cohorts to home purchase/repair, but the highest

percentage to debt repayment. Conversely, late boomers allocated the highest percentage of the four cohorts to home repair (51.5), but the lowest (26.4) percentage to debt repayment. The oldest (pre-boomer) cohort used 47 percent of extracted dollars for debt consolidation, whereas late boomers used only 26 percent of their cash out dollars for debt consolidation.

Impact of Extraction on Retirement Saving

The effect of housing wealth increases on consumption depended on whether we counted only pure consumption (based on responses to the survey) or treated part of debt consolidation as consumption because it was not a pure debt repayment category. In the first instance the wealth effect was about 3 percent—the increase in housing value increased consumption by 3 percent—whereas the more inclusive definition of consumption resulted in a wealth effect of 7.5 percent. These two estimates represent roughly the bottom and the top of the range of housing wealth effects reported in the literature. But the wealth effect varied substantially by birth cohort, and early boomers had an 8 percent housing wealth effect using the pure consumption definition and more than 20 percent using the more expansive definition.

However, in terms of their impact on overall net worth, the mean amount of pure consumption was equal to only about 1 percent of mean net worth overall, and the mean amount of expanded consumption was about 2 percent of overall mean net worth. These percentages were higher for the youngest birth cohort, the pre-boomers.

These extractions were measured relative to housing values in the 2007 SCF, and values have fallen by nearly 23 percent nationally since then. Comparing the impact of the decline in home values from 2007Q3 through 2008Q4 to the impact of extractions from home equity, we found that price declines had 5.5 times as large an impact on housing value as *all* extractions (the amount varying by cohort), and the decline in home prices had about 23 times the impact on housing values that the consumption of home equity did (again varying by cohort), even using the more expansive definition of consumption.

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