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"How Do Pension Changes Affect Retirement Preparedness? The Trend to Defined Contribution Plans and the Vulnerability of the Retirement Age Population to the Stock Market Decline of 2008-2009"

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This document has two parts. The first part presents background information on trends in pensions drawn from our forthcoming book, *Pensions in the Health and Retirement Study*. Using data from the Health and Retirement Study (HRS), trends in pensions are described among three cohorts: those aged 51 to 56 in 1992, called the HRS cohort; those 51 to 56 in 1998, called the war baby cohort; and those 51 to 56 in 2004, called the early boomer cohort. The second part is a paper which deals with the likely effects of the stock market decline on those approaching retirement age.

The background data show that pension coverage is much more extensive than is usually recognized. Coverage of those approaching retirement age comes not only from plans on current jobs, but also from pensions held from previous employment. In the most expansive definition of coverage, if pension coverage is measured at the household level, so that individuals whose spouse is covered by a pension are also said to be covered, over three quarters of the *households* with a person ages 51 to 56 in 2004 are currently covered by a pension, or have enjoyed pension coverage in the past. This is in contrast to the usual measure of coverage – typically reporting that 50 or 60 percent of current *employees* are covered by a pension.

Second, the background data also show that pension wealth accounts for about a fifth of the total wealth of the early boomer households, exhibiting a slight downward trend from earlier cohorts.

Third, the trend to defined contribution plans is readily apparent in the HRS data. However, detailed data on job and pension tenure by plan type also show that defined contribution plans remain immature. As a result, over 60 percent of pension wealth held by those 51 to 56 in 2004 is in the form of a defined benefit plan.

Fourth, reflecting major changes in the level and continuity of their labor force participation, women from the early boomer cohort are more likely to be covered by a pension than are women from earlier cohorts, and their pensions are more valuable than the plans held by women in the original HRS cohort.

Pension trends, in turn, play an important role in determining how the stock market decline of 2008-2009 affects those who are approaching retirement. The second part of our analysis, contained in a paper entitled "The Retirement Age Population and the Stock Market Decline", deals with that issue.

That paper focuses on the early boomer cohort, those 51 to 56 in 2004, the group closest to retirement as the recession unfolded. We find those nearing retirement had only limited exposure to the stock market decline. Their pensions accounted for about a fifth of their total household wealth. However, because defined contribution plans remain immature for those approaching retirement age, less than forty percent of their pension wealth is in the form of a defined contribution plan. In addition, just over sixty percent of DC pension wealth is held in the form of stocks. When direct stock holdings, and stock holdings in IRAs, are added to stock holdings in DC plans, in 2006 total stock holdings of the early boomer cohort averaged 13.2 percent of total wealth. This greatly limits the direct exposure of the early boomer population to the decline in the stock market. We also show that as a result, despite speculation to the contrary, those approaching retirement are not likely to substantially delay their retirement in reaction to the stock market decline, probably postponing their retirement by no more than a couple of months. Similarly, we show that those approaching retirement are not likely to be greatly or immediately affected by the decline in housing prices.

The greatest worry is for those who lose their jobs, or are exposed to multiple hazards brought about by the recession. The HRS does not yet have evidence on the effects of layoffs on retirement. We note, however, that the effects of job loss on retirement are ambiguous, and might even result in earlier rather than later retirements. We turn now to the first of the two parts of our analysis.

I. Pension Trends in the Health and Retirement Study[2]

Here we review some key pension trends among cohorts of those ages 51 to 56 in 1992, 1998 and 2004 from the Health and Retirement Study. Evidence is presented regarding trends in pension coverage, plan type, plan values, and the share of total wealth accounted for by pensions and Social Security.

A. Trends in Pension Coverage

Table 1 shows pension coverage rates for 51 to 56 year old HRS respondents classified by pension status, by cohort. The categories defining pension status include whether the pension is from a current job, from a previous job and yet to enter pay status (dormant), is currently paying benefits (in pay status), is "live", defined as falling in any of the previous categories, and whether the respondent was at one time covered by a pension that is no longer live. It may have been cashed out, rolled over, or disposed of in some other way. From column1, row 4 of Table 1, in 1992, 52.7 percent of HRS age eligible *respondents* were participating in at least one live pension plan. Among those 51 to 56 years old in 2004, 68 percent of *respondents* report ever having a pension. Note that the crude rule of thumb for all *employees* is that about half have a pension, with about 60 percent of older *employees* having a pension on their current job. The

[2] The material in this section is drawn from our forthcoming book, *Pensions in the Health and Retirement Study*, Harvard University Press. We are grateful for support from NIA grants "Economic and Health Determinants of Retirement Behavior," IPOIAG022481, "Behavioral Analysis In Structural Retirement Models" R01 AG024337, "Integrating Retirement Models" R01 AG022956, and from subcontracts from the Health and Retirement Study to Dartmouth College (U01AG09740).

higher coverage rate among all *respondents* in HRS data is due both to the fact that pensions are aggregated over current and past jobs, including pensions that were cashed out, rolled over, or otherwise disposed of when the respondent left a previous job.

Table 1: Percent of Respondents Ages 51 to 56 with Any/Dormant/Live Pension from Current/Last or Previous Jobs by Cohort: Weighted

Pension Status	HRS 1992	War Baby 1998	Early Boomer 2004
Current pension	43.0	46.2	46.8
Dormant pension	10.3	13.6	15.9
Pension in pay status	5.0	5.0	3.5
Live pension	52.7	56.9	56.6
Ever held a pension	62.4	68.7	68.0

Source: Gustman, Steinmeier and Tabatabai (forthcoming), Table 5.11. Live pensions include any pensions on current jobs, dormant pensions, and pensions in pay status.

Table 2: Percent of Households and Respondents With Any Own/Spouse/Partner Pension from Current/Last or Previous Jobs by Cohorts: Ages 51-56 in 1992, 1998, and 2004- Weighted

Household Members	HRS	War Babies	Early Boomers
All Respondents	78.8	81.2	80.4
All Households	76.9	79.3	78.6
Couples	83.9	87.1	87.3
Males	74.8	76.4	74.4
Females	49.2	57.7	62.5
Singles	58.8	62.1	59.2
Males	64.8	62.8	61.1
Females	55.1	61.6	58.0
Number of Households	4533	2662	2770

Source: Gustman, Steinmeier and Tabatabai (forthcoming), Table 5.12. Note: Married respondents whose spouses were not interviewed are included in the couples' category.

Coverage Through a Spouse

Many couples have only one spouse working, or at least only one spouse with a prolonged history of labor market activity. It seems unreasonable to judge pension coverage for members of these households by focusing separately on each individual. Accordingly, in addition to own coverage, Table 2 reports a respondent as being covered or having been covered by a pension not only if the respondent was covered in his or her own right, but also if that respondent's spouse is or was covered.

By 2004, using that definition of coverage, over four fifths of HRS *respondents* in the early boomer cohort were covered or are covered by a pension. Over 78 percent of *households* were or are covered. Among couple households, again by 2004, 74.4 percent of the coverage comes from the man; 62.5 percent of women are covered based on their own work. By 2004, the difference in coverage between single men and single women, 61.1 percent for single men and 58.0 percent for single women, is much smaller than the gap between men and women in couple households. In both couple households and in single households, the gap in coverage between men and women has narrowed substantially over the 1992 to 2004 period.

B. Plan Type

The strong trend toward defined contribution plans among younger cohorts is easily seen by comparing values across the columns for any of the rows in Table 3. The columns report outcomes at ages 51 to 56, in the year each cohort entered the HRS. Members of the original HRS cohort entered the survey in 1992; those from the war baby cohort entered in 1998; and finally members of the early boomer cohort entered in 2004.[3] For example, the percentage with a *DB plan only* declines from 41% to 25% between the oldest and youngest cohorts, while the percent with a *DC plan only* increases from 30% to 46%.

[3] Members from younger cohorts with an older spouse may have entered the survey before they reached age 51. Our estimates carry forward and adjust values of pensions and Social Security for these younger spouses, including them with the majority of the members of their cohort who entered the HRS when they were 51 to 56 years old.

Despite the differences in plan type recorded by members of different cohorts, it is clear from the data in Table 3 that the transition to DC plans remains incomplete. Thus in row 4, column 3, among full time employees, as of 2004, 51 percent of the members of the Early Boomer cohort with a pension has at least one defined benefit plan.

Table 4 indicates the incomplete status of the transition to DC plans by comparing tenure on the job with tenure under the pension plan. There is a considerable gap between job tenure and pension tenure for those with a DC plan. There is very little gap for those with a DB plan. Most importantly, tenure under DC plans averages less than ten years, while tenure under DB plans averages over sixteen years. One reason for the immaturity of the DC plans is that the predominant form of the DC pension, the 401k plan, was not available in its current form until around 1982. It took a considerable amount of time for this innovation to spread. Thus the spread of the 401k plan lasted through the 1990s and past the turn of the century. In addition, the jobs held by members of HRS cohorts analyzed here, born in the 1930s and 1940s, are more likely to be in manufacturing and other old line industries, and in jobs covered by unions, where the 401k innovation spread even more slowly, if at all.

Table 3: Pension Plan Type Among Full Time Employees Ages 51 to 56 with a Pension: Weighted

Pension Characteristics	1992 HRS	1998 Warbabies	2004 Early Boomers
% with DB Plan Only	41	29	25
% with DC Plan Only	30	38	46
% with Combination/Both Plans	28	32	26
% with at Least One DB Plan	69	61	51
% with at Least One DC plan	58	70	72
% Who Respond Don't Know/Refused	2	1	3

Source: Gustman, Steinmeier and Tabatabai (forthcoming), Tables 6.2 and 6.3.

Table 4: Average Number of Years of Job Tenure and Pension Tenure by Plan Type and Cohort Ages 51 to 56 in 1992, 1998 and 2004: weighted

Cohorts	DB Plans		DC Plans	
	Job Tenure	Pension Tenure	Job Tenure	Pension Tenure
HRS	17.6 (1540)	16.4 (1540)	15.6 (1197)	8.1 (1197)
War Babies	18.5 (622)	17.4 (622)	14.2 (629)	8.4 (629)
Early Boomers	16.8 (755)	16.3 (755)	13.8 (990)	9.7 (990)

Source: Gustman, Steinmeier and Tabatabai (forthcoming), Table 6.4.

C. Plan Value

The slow pace of the transition from DB to DC plans means that a substantial fraction of those in the youngest HRS cohort is still covered by a DB plan. In addition, those who are covered by a DC plan have not been covered for their full work life. Because their plans remain immature, they are worth less that they would have been were those with DC plans covered over the full period of their employment tenure.

Table 5 cumulates pension wealth from current and previous jobs, and aggregates pension wealth by household. The four columns in the table report total pension wealth, total pension wealth due to DB plans, total pension wealth due to DC plans, and the share of the household's total pension wealth that is accounted for by a DC plan. As seen from row 3, column 4, 38 percent of the pension wealth owned by households with at least one person 51 to 56 in 2004 is in a defined contribution plan.

Table 5: Observed Plus Imputed Pension Values From Current, Past and Previous Jobs Per Household, by Source of Pension by Plan Type, 1992, 1998, and 2004 (in 1992 Dollars)- Respondent Data: Weighted

Cohorts	Total HH Pension	Total Pension Due to DBs	Total Pension Due to DCs	% of Total HH Pension Due to DCs
HRS: 51-56	149,753 (3003)	112,480	37,274	25%
WBs: 51-56	158,432 (1758)	103,230	55,202	35%
EBs: 51-56	163,642 (1709)	101,082	62,769	38%

Source: Gustman, Steinmeier and Tabatabai (forthcoming), Table 9.19.

Table 6: Observed Plus Imputed Pension Values From Current, Past and Previous Jobs Per Household, by Source of Pension by Gender, 1992, 1998, and 2004 (in 1992 Dollars)- Respondent Data: Weighted

Cohorts	Total HH Pension Wealth	Total Pension Wealth Due to Men	Total Pension Wealth Due to Women	% of Total HH Pension Wealth Due to Women
HRS: 51-56	149,753 (3003)	112,480	37,274	25%
WBs: 51-56	158,432 (1758)	114,997	43,435	27%
EBs: 51-56	163,642 (1709)	111,236	52,406	32%

Source: Gustman, Steinmeier and Tabatabai (forthcoming), Table 9.16.

Table 6 shows the share of household pension wealth due to men and women. It reports results for the three HRS cohorts at the time those 51 to 56 years old entered the survey. The last column of the table highlights the importance of the growth in pension wealth due to women in the household. The share of total pension wealth due to women in households with at least on person 51 to 56 increased from 25 percent in 1992 to 32 percent in 2004.

D. Total Wealth, Pension Wealth and Social Security Wealth Held by Members of Different Cohorts

The next step in our analysis is to examine the trends in the components of total household wealth among HRS cohorts. Table 7 compares values for total wealth, pension wealth and Social Security wealth for those 51 to 56 years old in the three HRS cohorts: members of the original HRS cohort who were 51 to 56 year old in 1992; members of the war baby cohort 51 to 56 in 1998; and members of the early boomer cohort 51 to 56 in 2004. All values are reported in 1992 dollars, so the values can be directly compared. To reduce measurement error, the top and bottom one percent of wealth holding households are eliminated.

Total wealth for the early boomer cohort is roughly 26 percent higher than the wealth of the HRS cohort (520,843/413,632). Pension wealth accounts for a slightly smaller share of total retirement wealth in 2004 (20.9 percent) than in 1992 (23.7 percent).[4]

The largest share of total wealth is accounted for by Social Security.[5] Social Security benefits have continued to grow. In 2004 Social Security wealth held by those ages 51 to 56 is higher than in

[4] Pension value is based on self-reported data. It includes pension values from any current/last and previous jobs. The pension value from a current job includes the calculated prorated projected pension value from the most important DB plan and current account balances from all DC plans. Households with top and bottom one percent of total wealth are excluded.

[5] Social Security wealth and wealth from defined benefit plans is calculated using the intermediate assumptions from the Social Security Administration, including a 5.8 percent nominal discount rate, 2.8 percent inflation and 1.1 percent real wage growth. Social Security wealth includes benefits based on own earnings, and if married based on spouse's own earnings, as well as spouse and survivor benefits if relevant. If respondents are retired, benefits are evaluated as if both spouses claim their benefits at the time of the survey. Benefits for respondents and their spouses who had already retired and started receiving benefits are based on their actual receipt. For households where one member was already receiving benefits at the time of the survey, and the other had not yet retired, their benefits are the sum of their actual claim and projected values. But for this group only, we were unable to include survivor benefits and top-up benefits based on spouse's earnings, causing a slight downward bias in estimated Social Security wealth. The basic data underlying these calculations was provided by Kapinos et al. (2008).

1992, not only in real dollars, but as a share of total wealth. In 1992 Social Security represented 30.9 percent of the total wealth of households, and 44.8 percent of the wealth of the median ten percent of wealth holding households. By 2004 the share of average wealth represented by Social Security increased to 36.5 percent of total wealth, and to 54.1 percent of the total wealth for the median ten percent of wealth holding households. Real Social Security benefits are 49 percent higher for households in the early boomer cohort than for households in the HRS cohort (190,060/127,627). Thus the rate of growth of Social Security wealth over the twelve year period exceeds the 25.9 percent growth rate of the retirement portfolio.

Increases in Social Security benefits can be traced to at least three factors, increases in the level of covered earnings, increases in the frequency of two earner households, and rising real wages. Covered earnings subject to the payroll tax, which in turn are used in determining benefits, have increased over time. As maximum covered earnings were increased, they provided additional revenues by taxing any earnings lying between the new and old ceilings. Although these additional taxes did not lead to an immediate increase in benefits, once the covered worker retires benefits will be higher because of the higher ceiling on taxable earnings.

To provide an example, early in their careers some members of the older HRS cohorts faced a maximum taxable earning of $4,000 or $5,000. Members of younger HRS cohorts had much higher maximums. Consequently, Social Security wealth has been increased for members of the younger HRS cohorts. As a result, when members of the youngest HRS cohort retire, those 51 to 56 years old in 2004, they will enjoy considerably higher Social Security benefits than the benefits received by households from older HRS cohorts who preceded them. It is not just very high earners who were affected by the rise in maximum covered earnings. The ratio of covered earnings to mean earnings was initially quite low, so increasing the ceiling had an effect on a significant fraction of the older worker population.

As we will see, the growing importance of Social Security as a source of wealth for the retirement age population is an important reason why the retirement age population will suffer only modest losses in their total retirement savings from the decline in the stock market.

Now consider separately the situation for one earner and two earner households, and the benefits attributable to men and women. The last three panels in Table 7 compare total wealth, Social Security wealth and pension wealth across households consisting of single males, single females and couples. Couple households have much higher wealth of all types than do single households, and single households with males have higher wealth than single households with females. The gap in wealth and the components of wealth between households with single males and single females is falling over the period 1992 to 2004.

E. Conclusion

Having reviewed the trend pensions, its changing role in wealth for the retirement age population, and the role of Social Security, we now turn to an examination of the effects of the decline in the stock market on the retirement age population. Those wishing more information on these trends and other pension related outcomes in the Health and Retirement Study are invited to examine our book, *Pensions in the Health and Retirement Study*.

Table 7: Total Wealth, Pension Wealth, and Social Security Wealth by Household Members: Ages 51-56 in 1992, 1998, and 2004- Weighted ($1992)

Household Members	HRS	War Babies	Early Boomers
All Households			
Total Wealth	413,632	463,358	520,843
Pension Wealth	98,150	109,161	108,798
SS Wealth	127,627	153,340	190,060
Number of HH	4442	2602	2708
One Member HH (Males)			
Total Wealth	283,025	284,804	314,386
Pension Wealth	78,962	59,021	52,912
SS Wealth	76,537	97,066	110,683
Number of HH	400	190	308
One Member HH (Females)			
Total Wealth	178,492	218,925	248,236
Pension Wealth	33,016	44,194	49,216
SS Wealth	54,246	70,828	87,202
Number of HH	796	384	613
Two Member HH			
Total Wealth	498,814	560,846	639,185
Pension Wealth	116,643	135,545	136,711
SS Wealth	152,988	185,543	234,993
Number of HH	3246	2028	1787

Source: Gustman, Steinmeier and Tabatabai (forthcoming, Tables 12.1B, C and D).
Note: Married respondents whose spouses were not interviewed are included in the two member household category. Households with the top and bottom one percent of total wealth are excluded.

"The Retirement Age Population and the Stock Market Decline"

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As we write this article, the financial decline and recession of 2008-2009 are in progress. The Dow peaked at 14,164 in October, 2007. As of tax day, April 15, 2009, it was just below 8000, a decline of 43 percent. Since then the stock market has recovered slightly, with the decline in the Dow amounting to about 36 percent by the end of July, 2009. This paper asks how the wealth of those approaching retirement age is likely to be affected by the stock market downturn, how any wealth loss is likely to affect their retirement behavior, considers exposure to the decline in housing prices, and discusses some issues confronting those designing policies meant to encourage delayed retirement.

Those approaching retirement age do not have much time to adjust their saving behavior to offset any realized capital losses and are therefore thought to be especially vulnerable to the stock market decline. There is concern that their vulnerability has been increased by the growth of defined contribution pensions (pension accounts such as 401k or 403b plans, established in the name of the worker, funded by contributions from the worker and/or the firm, and invested in assets including stocks), and the decline of defined benefit pensions (typically pension plans that provide yearly income for life, funded by the employer, where a formula determines the benefit based on earnings, age and service). There also has been speculation that the decline in the stock market will encourage many to delay their retirement.

The group we focus on includes members of the early boomer cohort of the Health and Retirement Study (HRS). They were born from 1948 to 1953, so they were 51 to 56 years old in 2004. As such they were just approaching retirement age as the stock market decline hit and are the members of the labor force who are most vulnerable to the stock market decline. Yet most members of this cohort are still in a position to delay their retirement, especially those who have not suffered a layoff. To examine the potential effects of the stock market decline on members of

the early boomer cohort, we use data from 2006, the latest year they are available from the HRS at the time of this writing.

It turns out that an assessment of the potential vulnerability of those on the cusp of retirement is quite informative. It suggests that a number of the concerns raised in the press and policy circles for those approaching retirement – predicting widespread asset losses and major delays in retirement – are often highly exaggerated. Similarly, despite concern about the effect of the growth in defined contribution pensions, the growth of DC plans has not left this population nearly as vulnerable to the decline in the stock market as some fear. As of 2006, 13.2 percent of their total wealth was invested in the stock market, through defined contribution plans, Individual Retirement Accounts and direct stock holdings. Thus even a high permanent decline from trend of fifty percent in stock prices would reduce the average wealth of those approaching retirement by roughly 6.6 percent, with the actual figure likely to be lower. While this is a significant average loss, and as we will see many will experience even larger losses, it is not life changing for most of those approaching retirement. An examination of the effect of the dot com bubble on retirement also suggests that stock price changes of this order of magnitude have only a modest effect on the retirement decisions of older persons, changing retirement age by only a few months on average.

Many of the assets held by the retirement age population will cushion them against the direct effects of the stock market decline. Most importantly, with household Social Security wealth having grown by almost fifty percent in real terms between 1992 and 2004, by 2006 Social Security represents over a third of total household wealth of the early boomer population. Also of importance, although defined contribution pensions have grown rapidly, for those approaching retirement age, defined benefit plans covering the early boomer population account

for almost two thirds of their total pension wealth. In addition, many more of these households than in the past have two earners, with both earners in jobs they held for many years, reducing their vulnerability to adverse events that affect one or another spouse. The labor market commitment of women has increased rapidly enough to raise the share of pension wealth in HRS households contributed by wives from one quarter in 1992 to almost one third in 2004.

Our estimates of the role of falling housing prices and mortgages and related debt are relatively rough. The good news here is that not many in the early boomer population will find their housing wealth under water, and that many in this population will have already paid off most or all of their mortgages. Moreover, most will not wish to cash out their home equity for many years to come, affording time for the housing market to recover (e.g., see Venti and Wise, 2004).

Not all of the effects of the recession will be so limited in their impact. Job loss will reduce incomes for the retirement age population. Moreover, wages and benefits lost during a limited period of unemployment may represent only part of the story. An older person who has experienced a layoff has a good chance of being forced into retirement, meaning that fewer resources will have to be spread over a longer retirement period, and even if the older individual finds another job, it will most likely be at a much lower wage than was earned on a long term job (Chan and Huff Stevens, 2001). The effects of layoffs induced by this recession are just playing themselves out. Given the very limited information we have at this stage, we do not estimate the effects of layoffs in this paper. Thus although we find the direct effects of the stock market decline will be more limited than many believe, the recession may nevertheless have a substantial negative effect on some who are approaching retirement age. With the stock market

losses having only a small effect on retirements, the net effect of the recession could even be to increase, rather than to decrease retirements.

Those subject to multiple shocks will be in a particularly bad position. New survey data collected by Hurd and Rohwedder (2009) for Rand suggests that some will be subject to the combined effects of layoffs and wealth losses. As a result they may be unable to meet mortgage obligations, and at the same time be unable to sell their homes in the required time frame.

Some adverse effects that may be realized with a lag are also not included in our discussion. For example, in the long term, retirement incomes from defined benefit (DB) plans may become more vulnerable to the financial downturn. Although most in the early boomer population will find their benefits to be fully insured, or guaranteed by a state or local government employer, some high wage workers whose private sector firms are in financial distress and terminate their plans will lose a part of their pensions above the maximum insured by the Pension Benefit Guarantee Corporation. These guarantees will certainly increase the tax burden. But from the perspective of most of those in their fifties who are approaching retirement, their DB benefits will remain largely intact.

Financial losses will differ greatly among members of the retirement age population. Heterogeneity in the incidence of adverse financial outcomes and related distributional issues are going to prove particularly vexing for policy makers. Most of those who suffer large financial losses will come from the upper part of the wealth distribution. This not only undermines the rationale for policy initiatives that would support any losers, but creates an additional issue in that the biggest financial losers are in a group the administration was hoping to tax to foster greater redistribution. It is also going to be difficult to design and implement effective labor market policies. Policy makers will find it particularly difficult to target any labor market and

related programs efficiently, so that benefits are confined to troubled individuals and do not spill over to the rest of the older population.

Section II will use HRS data collected in 2006, before the financial downturn, to estimate the vulnerability of the retirement age population to the stock market decline.[7] The likely effects of the stock market plunge on retirement behavior are discussed in Section III. Exploratory statistics relating the decline in housing prices to mortgage debt for those approaching retirement can be seen in Section IV; while Section V discusses policy implications and conclusions.

[7] Data from the 2008 wave of the HRS were not available at the time this article was written. Most, but not all, of the data collected in that wave were collected before the stock market began its sharp decline.

Table 1: Components of Wealth in 2006 For Households with at Least One Member Born from 1948 to 1953: Current Dollars*

Source of Wealth	Mean		Mean For The Median 10 Percent Of Wealth Holding Households	
	Value ($)	Percent of Total (%)	Value ($)	Percent of Total (%)
Total	870,991	100	659,516	100
Social Security Plus Pensions	482,257	55.4	439,738	66.7
Social Security	304,802	35.0	328,301	49.8
Pension Value	177,456	20.4	110,012	16.7
DB Value	115,638	13.3	79,865	12.1
DC Value	61,818	7.1	30,147	4.6
Current DC Balances	44,471	5.1	22,871	3.5
Current DC in Stocks	27,449	3.2	13,154	2.0
House Value	168,798	19.4	118,856	18.0
Real Estate	36,098	4.1	13,575	2.1
Business Assets	39,819	4.6	8,196	1.2
Net Value of Vehicles	17,662	2.0	20,392	3.1
Financial Assets	73,499	8.4	25,372	3.8
Direct Stocks Holdings	37,811	4.3	9,290	1.4
IRA Assets	52,858	6.1	33,386	5.1
IRA in Stocks Value	38,678	4.4	24,476	3.7
IRA Plus Stocks Holdings Plus DC in Stocks	115,382	13.2	51,780	7.9
Observations	2,492			

* Households with the top and bottom 1% of total wealth are excluded from the table. Missing asset values are imputed. Observations are weighted. Data on Social Security wealth is from an updated version of Kapinos et al (2008). Pension wealth is calculated by the authors from respondent reports of expected benefits, actual benefits and account balances. Share of DC pension wealth in stocks is imputed for each observation, including imputations for all DC plans from last or previous jobs. This creates a slight discrepancy between the total of holdings in stocks reported in the table and the share of holdings in stocks computed by multiplying the total DC value by the ratio of current DC in stocks to current DC balances. Other components of wealth are from the Rand HRS data file, including imputations of missing values.

II. Potential Losses from the Decline in the Stock Market

Our empirical analysis focuses on 2,492 members of the early boomer cohort in the Health and Retirement Study (HRS), consisting of those households with at least one member age 51 to 56 in 2004. Observations are from 2006, two years after most of those in the early boomer cohort entered the HRS survey.[8] The analysis eliminates those in the top and bottom one percent of wealth holding households.[9]

A. The Components of Total Wealth

To set the stage for the analysis of the vulnerability of the retirement age population to the decline in the stock market, household wealth is disaggregated into its basic components. In the initial description of the importance of different retirement assets, particular attention is paid to the roles of Social Security and pensions in retirement wealth.

By 2006, as seen in row 1 of Table 1, early boomer households had accumulated an average of $870,991 in total wealth, with the median ten percent of wealth holding households owning $659,516 in total assets. Social Security and pensions combined to account, on average, for 55.4 percent of total wealth. For the median ten percent of wealth holding households, Social Security and pensions together account for two thirds of total wealth.

As seen by comparing the value reported in row 3, column 1 of the table to the other values in column 1, the present value of Social Security is the single biggest asset.[10]

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[8] Some members of the early boomer cohort were first interviewed before the cohort entered the HRS in 2004. They are younger spouses from households where the older spouse qualified the household for inclusion in the HRS in either 1992 or 1998.

[9] We eliminate those in the top and bottom one percent of wealth holding households to reduce the effects of measurement error. By using the panel reported for older HRS cohorts, Gustman, Steinmeier and Tabatabai (forthcoming) identify a number of instances of apparent reporting error, including cases where yearly amounts are said to be received monthly, or an extra zero has been coded into the asset amount. Since the early boomer cohort is new and includes observations for only two years, we cannot use the panel feature of the HRS data to screen for reporting error.

[10] Social Security wealth and wealth from defined benefit plans is calculated using the intermediate assumptions from the Social Security Administration, including a 5.8 percent nominal discount rate, 2.8 percent inflation and 1.1

It represents over a third of total wealth (35.0 percent), and half (49.8 percent) of the total wealth of the median ten percent of wealth holding households. Pensions are the second largest asset. They account for over a fifth (20.4 percent) of average wealth.

Importantly, despite the rapid growth in coverage by defined contribution plans, DC plans held by the early boomer population account for only a little over a third (35 percent) of their total pension wealth, and 7.1 percent of their total wealth.[11] (Note in addition that wealth in Individual Retirement Accounts often originates in defined contribution pensions, so that some older DC pensions account for a part of IRA balances reported below.)[12] The finding that DC plans do not account for a major share of total wealth raises a question about the likely vulnerability of the early boomer population to the stock market decline.

The value of the home represents 19.4 percent of total wealth. (We will have a little more to say about the relation of home values to mortgage values below.) Real estate, business assets and vehicles account for another 10.7 percent of assets. Financial assets account for 8.4 percent of total wealth, with IRA assets accounting for the remaining 6.1 percent.

Comparing outcomes between couple households and households consisting of single males and single females, we see from Table 2 that total wealth is about $120,409 higher in couple households than in the sum of single male and single female households. Social Security

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percent real wage growth. Social security wealth includes benefits based on own earnings, and if married based on spouse's own earnings, as well as spouse and survivor benefits if relevant. If respondents are retired, benefits are evaluated as if both spouses claim their benefits at the time of the survey. Benefits for respondents and their spouses who had already retired and started receiving benefits are based on their actual receipt. For households where one member was already receiving benefits at the time of the survey, and the other had not yet retired, their benefits are the sum of their actual claim and projected values. But for this group only, we were unable to include survivor benefits and top-up benefits based on spouse's earnings, causing a slight downward bias in estimated Social Security wealth. The basic data underlying these calculations was provided by Kapinos et al. (2008).

[11] When the top and bottom one percent of wealth holding households are included, DC plans account for 38 percent of pension wealth, rather than 35 percent when they are excluded.

[12] For example, upon entering the Health and Retirement Study, 6.5 percent of those in the early boomer cohort reported they had rolled over a DC pension from a job held previously into an IRA, with the average value of the roll over equal to $78,405. Similarly, 2.4 percent of those in the early boomer cohort reported having rolled over a DB plan from a previous job into an IRA with an average value of $38,252. For further details, see Gustman, Steinmeier and Tabatabai (forthcoming, chapter 11).

wealth held by couple households is more than twelve percent greater than the sum of Social Security wealth in single male and single female households. Couple households also have much higher pension wealth ($216,000 vs. $167,000).

Table 2: Components of Wealth in 2006 For Couples And Single Males and Females with at Least One Household Member Born from 1948 to 1953: Current Dollars*

Source of Wealth	Couples		Single Males		Single Females	
	Mean Value ($)	Percent of Total (%)	Mean Value ($)	Percent of Total (%)	Mean Value ($)	Percent of Total (%)
Total	1,043,579	100.0	512,586	100.0	410,584	100.0
Social Security Plus Pensions	582,009	55.8	277,090	54.1	214,914	52.3
Social Security	365,438	35.0	185,883	36.3	138,673	33.8
Pension Value	216,571	20.8	91,208	17.8	76,242	18.6
Males	160,413	15.4	-	-	-	-
Females	75,670	7.3	-	-	-	-
DB Value	138,440	13.3	72,129	14.1	52,410	12.8
DC Value	78,131	7.5	19,078	3.7	23,832	5.8
Current DC Balances	57,106	5.5	10,198	2.0	15,782	3.8
Current DC in Stocks	35,531	3.4	6,839	1.3	8,279	2.0
House Value	195,908	18.8	98,581	19.2	105,167	25.6
Real Estate	45,284	4.3	22,514	4.4	8,162	2.0
Business Assets	49,734	4.8	15,558	3.0	15,661	3.8
Net Value of Vehicles	21,252	2.0	11,292	2.2	7,405	1.8
Financial Assets	87,377	8.4	53,640	10.5	30,883	7.5
Direct Stocks Holdings	45,779	4.4	22,670	4.4	15,679	3.8
IRA Assets	62,014	5.9	33,910	6.6	28,390	6.9
IRA in Stocks Value	45,513	4.3	22,479	4.4	21,694	5.3

IRA Plus Stocks Holdings Plus DC in Stocks	140,852	13.5	57,184	11.2	50,756	12.4
Observations	1,655		282		555	

* Households with top and bottom 1% of total wealth are excluded

Table 3: Distribution of Assets by Wealth Decile in 2006 For Households with at Least One Member Born from 1948 to 1953

Sources of Wealth	Average Asset Value for Respondents in Indicated Total Wealth Deciles										Total
	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	
Total Wealth ($000)	70.4	187.6	312.8	442.3	582.7	741.1	918.2	1,165.7	1,566.4	2,713.9	871.0
(Social Security Wealth +Pension Wealth)/Total Wealth	94.6	83.5	80.1	75.9	69.7	66.9	62.5	61.1	53.0	36.6	55.4
Social Security Wealth/Total Wealth (%)	90.9	78.0	71.5	62.2	53.6	47.7	41.9	37.1	26.4	16.3	35.0
Total Pension Wealth/Total Wealth (%)	3.7	5.5	8.7	13.6	16.2	19.2	20.5	24.0	26.6	20.3	20.4
DC Pension Wealth/Total Wealth (%)	1.0	2.6	3.0	4.7	4.8	4.9	6.7	7.4	8.1	8.9	7.1
DB Pension Wealth/Total Wealth (%)	2.7	2.9	5.7	8.9	11.4	14.2	13.8	16.5	18.5	11.4	13.3
IRA Wealth/Total Wealth (%)	0.9	1.1	1.7	2.1	3.7	5.0	5.6	5.6	6.4	8.7	6.1
Net Housing Wealth/Total Wealth (%)	5.7	11.0	12.8	15.0	16.8	18.7	20.0	20.1	21.0	21.0	19.4
Wealth Held Directly in Stocks /Total Wealth (%)	0.1	0.3	0.6	0.5	1.5	1.4	1.6	2.6	5.1	8.4	4.3
Total of Wealth Held in Stocks ($000)	0.8	4.6	11.1	21.7	40.2	62.9	90.7	121.8	237.1	561.0	115.4
Total of Wealth in Stocks/Total Wealth (%)	1.1	2.5	3.5	4.9	6.9	8.5	9.9	10.4	15.1	20.7	13.2

1. Households with top and bottom 1% of total wealth are excluded.
2. Values as of 2006 are reported in thousands of dollars.
3. Wealth in stocks includes share of DC accounts in stocks, share of IRA accounts in stocks, and direct stock holdings.

Table 3 indicates how assets are distributed for households falling within different wealth deciles. As seen in row 3 of the table, as total wealth increases, Social Security wealth declines as a share of total wealth, while row 4 indicates that pensions increase in importance. Together, the share of total wealth due to the sum of Social Security and pensions declines, but the decline is relatively gentle through the ninetieth percentile. Comparing rows 5 and 6, the share of total wealth due to both DB and DC pensions increases by wealth decile, but the share of wealth due to DC pensions rises more rapidly, until DB and DC plans are almost of equal importance for those in the highest wealth decile. The share of wealth held in IRAs and housing increases with wealth decile, with the only exception occurring for the share of wealth in housing for those in the top wealth decile. The share of total wealth held in stocks rises from 1.1 percent in the lowest decile, to 20.7 percent in the highest (still excluding the top one percent of wealth holding households).

B. Vulnerability to the Stock Market Decline

Having provided an overview of the components of wealth, we now focus on the vulnerability of households to the stock market decline. We use the share of wealth in stocks as an indicator of the household's vulnerability. Although the decline in the value of assets with the fall in stock prices will depend on the precise portfolio held by each household, the share of wealth in stocks should be a good initial indicator of the vulnerability of different members of the retirement age population to the stock market decline.

Consider first the total value of wealth in DC plans held in stocks. Of the $61,818 average balance in DC plans indicated in line 6 of Table 1, $44,471 comes from plans held on the current job. In 2006 the HRS reported that on average, almost 62 percent (27,449/44,471) of total assets held in pensions on current jobs was held in stocks. We will use the share of assets

from DC plans on *current* jobs held in stocks by each individual to approximate the share of total pension wealth from *current and past* jobs held in the form of stocks.[13] This yields a value of $39,561 for our estimate of the total value of DC balances held in stocks.

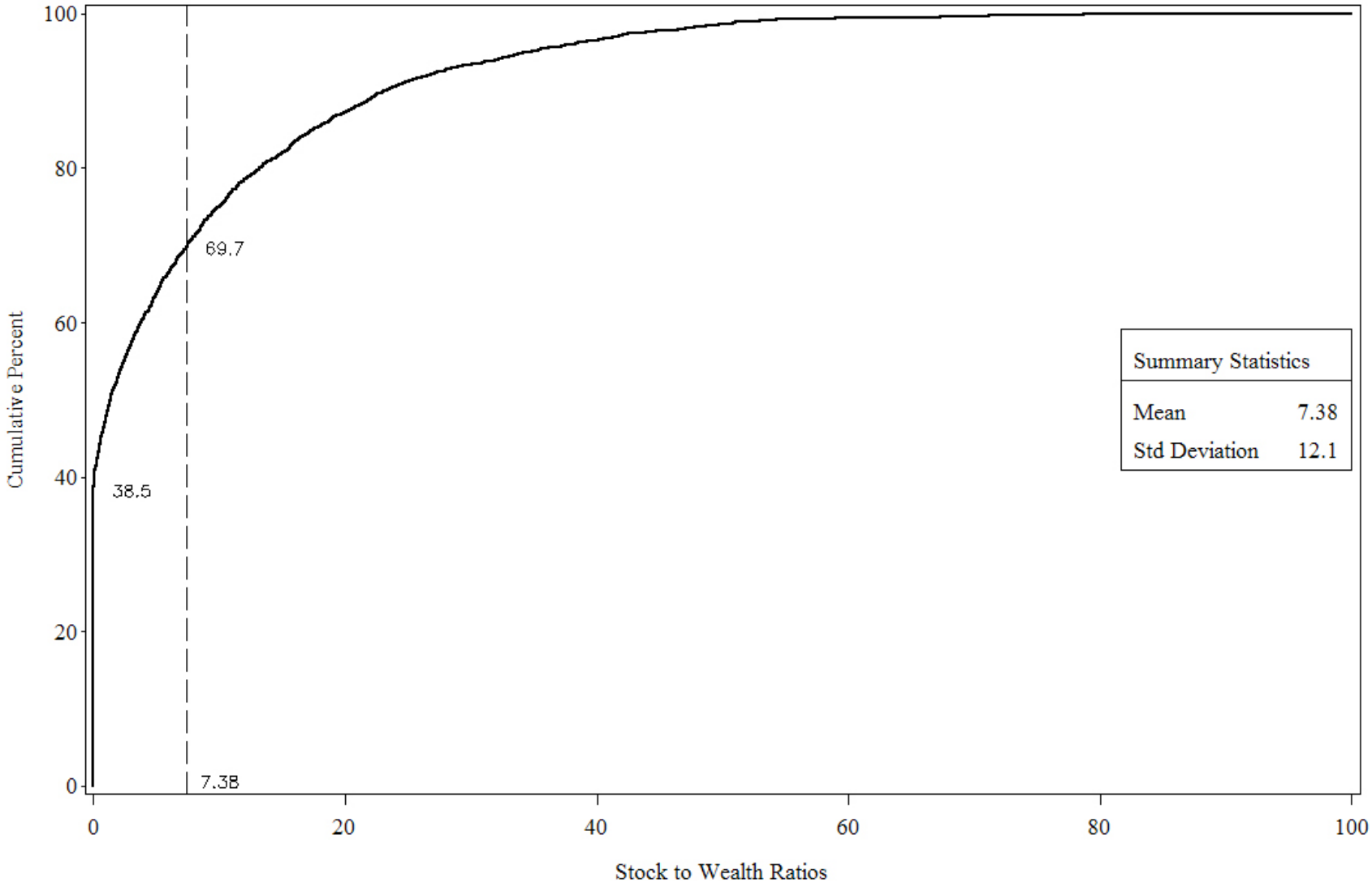
Individual Retirement Accounts are a second asset with direct holdings in stocks. On average, 6.1 percent of total wealth is in the form of IRA assets, with 73 percent (38,678/52,858) of IRA balances held in stocks. In addition, direct stock holdings represent 4.3 percent of total wealth. Taking the sum of DC accounts in stocks, IRA holdings in stocks, and direct stock holdings, that yields 13.2 percent of total wealth (115,382/870,991) held in the form of stocks.[14]

With only 13.2 percent of total wealth held in stocks, even if there were a 50 percent permanent decline in the stock market from its level in 2006, before it resumed trend growth, that would yield a loss of 6.6 percent of total wealth. This is, of course, a significant loss. But it is not life changing *for the average household*. We will return to the question of the distribution of losses below, but before turning to that issue, consider the reasons for the relatively small exposure to the stock market decline on average, with an even smaller potential loss of less than 4 percent of total wealth for the median ten percent of wealth holding households.

[13] Note that the share of DC plans held in stocks is reported only for those who report their DC plan separately from any DB plan they might hold. Such an individual may report holding two (or more) plans, a DB plan and a DC plan, or may report having only one or more DC plans. When a respondent is asked plan type and reports holding "Both" a DB and a DC plan as the initial response, the HRS does not ask about the share of pensions in the stock market in the DC plan. For these individuals, the share of the DC part of the account held in stocks is imputed. Similarly, the HRS does not ask about the share of pensions from previous jobs that are held in stocks. The share of assets in last or previous plans held in stocks is imputed from stock holding in pensions on current jobs.

[14] We do not adjust for changes in stock market prices between 2006 and 2009. For reference, in March of each year, the Dow is as follows: 2004 10,582; 2005 10,795; 2006 10,993; 2007 12,266; 2008 12,264; 2009 7,036. The only major growth over this period was an 11.5 percent increase from 2006 to 2007.

Figure 1. Cumulative Distribution Function of Stock to Wealth Ratios



One answer is that many households have chosen not to hold stocks in any form. As seen in Figure 1, 38.5 percent of households report no assets in stocks. When we average the ratios of stock value to total wealth, the mean is 7.38 percent, which is significantly below the ratio of total stock value to total wealth of 13.2 found in Table 1. About seventy percent of the households have a ratio of stock value to total wealth that falls below the mean of the ratios. A halving of stock values for these households would cause a loss amounting to less than 3.7 percent of their total wealth.

What explains why so few households have chosen to own stocks, and the share of total wealth in stocks is as low as it is? One answer is the continuing high value, and even increasing value of Social Security. Looking back over the three HRS cohorts that were 51 to 56 in the base years 1992, 1998 and 2004, Social Security has continued to grow in importance as a source of retirement support, with average household wealth from Social Security benefits increasing by half over this period (Kapinos et al., 2008).

In turn, the growing importance of women's earnings and the growth in two earner households is a likely reason for the increase in the value of Social Security wealth. Social Security is not a particularly good deal for a two earner household. One earner, couple households have a much higher return on their payroll taxes since nonearning spouses will accrue spouse and survivor benefits in any case.[15] Nevertheless, for any given level of earnings by a primary earner, retirement benefits are higher when there is a second earner in the household, and they grow with the earnings of that second earner.

[15] Indeed, Gustman and Steinmeier (2001) show that except for the tails, the rate of return to Social Security payroll taxes is almost constant across the lifetime earnings distribution when households are arrayed by total lifetime earnings from both spouses, and varies even less with lifetime earnings when earnings are measured by the lifetime earnings capacity of each household.

Another reason for the growth in Social Security wealth is the historic increase in the ceiling on maximum earnings covered by the payroll tax. Annual maximum taxable earnings have been indexed since 1975. Before that, they were increased on an *ad hoc* basis. There were a number of political reasons for keeping the earnings ceiling low. After the ceiling was increased, payroll tax revenues increased, helping to alleviate immediate financial pressures on the Social Security system. But increasing the maximum earnings subject to the tax also raised benefit entitlements in the future. Thus early in their careers, members of the older HRS cohort faced a maximum taxable earnings of $4,000 or $5,000, while members of later cohorts had much higher maximums. Those in younger cohorts with higher covered earnings caps had a greater share of their total lifetime earnings covered by Social Security and as a result are entitled to higher benefits.[16]

Another reason for the limited exposure of the retirement age population to the stock market decline is the incomplete status of the transition from defined benefit to defined contribution plans for the population now approaching retirement. Just over a third of the pension wealth of this population is held in a DC plan.

To further explain this finding, it is useful to consider in more detail how pension wealth is calculated in this study. The wealth equivalent of DB plans is calculated as the present discounted value of future benefits for current jobs brought back to 2006 at a 5.8 percent interest rate and prorated on the basis of work to date. For those expecting benefits from previous jobs, it is calculated as the present value of those benefits as of 2006. For those already collecting, it is

[16] Social Security also provides good news from an insurance perspective. Because Social Security benefits are based on the highest 35 years of earnings, and benefits are determined by a progressive formula, for most households Social Security benefits are relatively insensitive to any earnings lost due to layoffs late in the career. Of course, layoffs may induce early claiming, which reduces yearly benefits. But the value of Social Security wealth over the lifetime is not greatly affected.

the present value of remaining benefits as of 2006. Wealth in DC plans is measured by respondent reports of account balances. Altogether pensions account for 20.4 percent of the total wealth of the members of the early boomer cohort in 2006. Notice in Table 1, line 5, that 13.3 percent of total wealth is held in defined benefit plans. From line 6, only 7.1 percent of total wealth is held in DC accounts. (This, of course, understates the importance of DC plans in total wealth since some of the older DC pensions, and perhaps a few DB pensions, will appear as IRA wealth.) Despite the strong trend to DC plans over time, those approaching retirement age have little more than a third (34.8 percent) of their pension wealth held in DC plans. Their defined contribution plans remain immature. Thus for the early boomer cohort, pension tenure averages 16.3 years for those with a DB plan, while averaging 9.7 years for those with a DC plan (Gustman, Steinmeier and Tabatabai, forthcoming).

To be sure, defined benefit plans are becoming increasingly vulnerable. But in many circumstances, wealth in the form of a DB plan held by those approaching retirement age is less subject to change than are the DB benefits of younger workers. Older workers have often been grandfathered and exempted from major plan changes. Actuarial calculations that would induce firms to change their pensions often have built in lags, further postponing any action that might otherwise affect older workers. Many of those who are forced to retire early receive additional service and wage credits, mitigating any penalty for failing to stay until they qualify for early retirement benefits. Unless the firm is bankrupt, benefits cannot be reduced below the levels promised on the basis of work to date. In addition, benefits from private sector defined benefit plans are insured by the Pension Benefit Guarantee Corporation, although there is a cap on the insured benefit.

Thus the combination of high Social Security benefits, continued importance of DB plans, the immaturity of DC plans, and the failure of almost forty percent of all households to participate in the stock market, all account for the low exposure of the retirement age population to the decline in the stock market.

Now let us consider the distribution of wealth losses from the stock market decline in somewhat more detail. From the baseline data on the distribution of wealth held in stocks in the bottom row of Table 3, we have seen how the potential vulnerability to the stock market decline varies according to wealth decile. Exposure to stocks is very low for those in the bottom two thirds of the wealth distribution. The share of wealth held in stocks does not reach ten percent until the eighth wealth decile.

Again, Social Security plays a central role in the story. Those in the lower wealth deciles are heavily dependent on Social Security. Looking across row 3 of Table 3, Social Security wealth accounts for seventy percent or more of the total wealth of those in the bottom three deciles of the wealth distribution. In contrast, those in the top wealth decile have only 16.3 percent of their total wealth from Social Security.

The extent of exposure to stocks seems relatively modest even for those in the highest wealth decile. As seen in the bottom row, next to last column of Table 3, those in the top ten percent of the wealth distribution (with the top 1 percent having been removed) hold just about a fifth (20.7 percent) of their total wealth in stocks. From the perspective of policy this is both good news and bad news. The good news is that those who have been hurt by the stock market decline are among the wealthiest in the country and are able to absorb the losses without entering the ranks of the poor. Moreover, by at least some standards, their losses are modest. Even if one were tempted to help those with DC plans who were big losers, this would be a very

nontraditional group to support. The bad news is that the losses among those in the upper deciles of the wealth distribution are large enough to handicap efforts to redistribute wealth. There is less wealth to redistribute. In addition, there is a question about whether one wants to substantially raise the taxes of a group that has suffered a considerable financial loss. Indeed, with a halving of the stock market those in the upper ten percent of the wealth distribution (top one percent excluded) would lose over a quarter of a million dollars per household, almost a tenth of their retirement wealth.

Further details on how the share of wealth in stocks is distributed by household wealth decile are provided in Table 4. These distributions confirm there are very few from the lower part of the wealth distribution with a large share of their total wealth in stocks. These data also help to reconcile two different findings in Figure 1 – 38.5 percent of the population does not own stocks, but the share of total wealth in stocks is positive, even for those in the lowest wealth decile. The obvious answer is that the share of those who own no stocks declines as we move up the wealth distribution, but there are some stock holders in each wealth decile. Thus on the one hand, in the upper left hand corner of the table, 8.6 percent of the population fall both in the lowest wealth decile and has nothing invested in stock. On the other hand, in the lower right hand part of the table, 5.3 percent (2.1+3.2) of the population falls in the upper wealth decile and has a ratio of total wealth in stocks to total wealth that falls in the top two deciles of that distribution.

Table 4: Percent of Households With Deciles of Share of Stocks in Wealth By Wealth Deciles: Respondents Ages 53-58 in 2006

Share of Wealth in Stocks, Deciles	Wealth Deciles										
	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	Total
1-10	8.6	1.4	0	0	0	0	0	0	0	0	9.99
11-20	0	5.2	4.7	0	0	0	0	0	0	0	9.95
21-30	0	0	0.5	3.5	3.1	2.3	0.7	0	0	0	10.03
31-40	0.2	0.6	0.8	0.7	0.7	0.6	1.7	1.9	1.3	1.7	10.02
41-50	0.4	1.0	1.3	1.6	1.2	1.6	1.0	0.8	0.7	0.4	9.95
51-60	0.2	0.5	0.6	1.1	1.4	1.2	1.4	1.6	1.5	0.5	10.04
61-70	0.2	0.3	0.7	1.3	1.3	1.3	1.3	1.5	1.2	0.9	9.97
71-80	0.2	0.5	0.7	0.7	1.1	1.1	1.6	1.6	1.2	1.3	10.05
81-90	0.1	0.4	0.5	0.7	0.5	1.2	1.3	1.5	1.7	2.1	9.99
91-100	0.1	0.1	0.3	0.2	0.7	0.9	1.0	1.1	2.4	3.2	10.01
Total	9.96	10.0	10.03	9.99	9.95	10.05	9.94	10.00	9.98	10.05	100

III. Retirement and the Stock Market Bubble

It is too early to measure the effects on retirement of the stock market decline of 2008-2009. In some cases, the effects could last a number of years, and as of this writing the recession is less than one year old. Moreover, given the purpose of this paper, we would like to isolate the effects of the stock market decline on retirements from the effects of layoffs and high unemployment. With this goal in mind, we can predict the likely effects from our analysis of a similar experience, the dot com bubble. Stock prices increased rapidly in the late 1990s, followed by a sharp and unexpected decline. Using a structural model of retirement and saving estimated with data from the Health and Retirement Study, and using parameters fit from analysis of the boom in stock prices, it is possible to simulate the effects of changes in stock market prices alone. Wealth effects from unexpected changes in stock prices should lead to an increase in retirements during the boom, and a decline in retirements during the bust. The question is, how large will these effects be?

The model we use is a life cycle model with stochastic returns to wealth. Utility in each year is a function of leisure and consumption, and the model allows individual heterogeneity in both time preference and the preference for leisure vs. work. The heterogeneity in time preference allows the model to capture the wide variation in wealth even for individuals with similar lifetime earnings opportunities. The lifetime resources include earnings, Social Security, and pensions. The model is estimated from data in the Health and Retirement Study through 2000, which includes the stock market boom of the late 1990's. This data set is unique in that it contains, for most respondents, Social Security earnings records and pension descriptions from employers, both of which are used in the estimation. Financial wealth, including assets in defined contribution accounts, is presumed to be half in stocks and stock funds, roughly consistent with

HRS estimates for the middle part of the wealth distribution. The distribution of returns is presumed to be known and is taken from Ibbotson (2002) data, but of course individuals do not know future returns when they are making their retirement and savings decisions in a given year. For both estimation and simulation, the model is solved using a stochastic dynamic approach. Further details of the model and its estimation are found in Gustman and Steinmeier (2002).

In the five year period starting in 1995, the market rose by almost 21 percent per year compounded. Since inflation was relatively low at the time, almost all of this increase represents an increase in real value. Over the course of this five year period, a stock portfolio would have been worth about two and a half times as much at the end of the five years as at the beginning. Since annual stock returns exhibit very little serial correlation, it seems safe to assume that these returns were largely unanticipated. And then the bubble burst. During the period from the beginning of 2000 to the end of September 2002, the market fell by 13 percent per year. From the market peak until August 2002, the cumulative decline was 34 percent, so that a little more than a third of stock market wealth evaporated in two years.

We first consider the effects of the stock market boom on retirement. For this analysis, we will consider the boom to be the years 1995 through 1999. To simulate the effects of the boom, we do two simulations. In one simulation, normal returns are assumed for the years 2000 and beyond. In the other simulation, normal returns are assumed for the years 1995 and beyond. The only difference is in the years between 1995 and 1999, where one simulation assumes actual returns and the other assumes normal returns.

Figure 2 reports on the differences between these two simulations, which represent the effects on retirement of those five years of *high returns*. In this figure, the shaded parts of the bars indicate the increase in retirement by individuals who have not been previously retired. The

white parts of the bars indicate the increase in retirement caused by individuals staying retired rather than returning to work.[17] The total heights of the bars thus indicate the increase in retirement. The increase in new retirements is somewhat but not overwhelmingly more than the increase in retirement caused by individuals not returning to work.

The volume of retirements in Figure 2 increases more or less continuously during the period of the high stock market returns. At its peak in 1999, the percent retired in the sample is about 3.3 percentage points higher than it would be without the extra stock returns. The effect continues long after 1999, since the extra returns apply not just to those who retire during this period, but to individuals who would be retiring in the succeeding years. As time goes by, however, the effect of those returns gradually diminishes, both because individuals will have longer to adjust consumption to the higher levels of assets and because more and more of the sample would have retired anyway.

The effect on the average retirement age can be found by adding the effects at the various ages. When this is done, the conclusion is that the average retirement age for the entire sample is decreased by 0.25 years, or about three months. Considering that a large minority of the sample had no or only limited financial assets, the effect among the part of the sample with non-trivial assets would be considerably larger. Moreover, the magnitude of this effect appears reasonable. According to Venti and Wise (1999, Table 4), the average respondent had about $79,000 in financial and retirement assets in the first wave of the survey. The 1995-1999 surge in the stock market would cause a portfolio of 50 percent stocks to have risen by about 60 percent more than the usual increase, so the unexpected gain would have been around $47,000, or somewhat more than a year's worth of average earnings. The simulated decrease of 0.25 years in the average

[17] The model allows individuals previously retired to return to work either because of changed circumstances or because of changed preferences, such as might occur if retirement were not as pleasurable as anticipated.

retirement age indicates that respondents do take part of this unexpected gain in the form of increased retirement, but that the major part of it goes toward increased consumption.[18]

Figure 3 considers an analogous exercise to analyze the effects of the sharply lower stock prices in the early years of the new century. The figure again compares two simulations, one using actual returns until 2002 and normal returns thereafter and the other using actual returns until 1999 and normal returns thereafter. The difference is that one uses actual returns between 2000 and 2002, and the other uses normal returns in those years. The negative effects on retirement of the stock declines develop rapidly, reaching a 3.2 percentage point decrease in 2003. This is very nearly the same effect, though in the opposite direction, as the maximum effect of the previous stock market increase, which is somewhat surprising in view of the fact that retirement in this sample is much further along in 2003 than in 1999. However, when we standardize for the effects of the period during which the boom or bust occurs, the story presented in Figures 2 and 3 is not terribly much affected by the differential timing.

This story is that the extraordinary returns in the stock market in the late 1990's, which more than doubled stock prices and unexpectedly increased the value of a mixed portfolio by nearly 60 percent, increased retirement for the HRS sample of workers by over 3 percentage points by the turn of the century and would have decreased the average retirement age by about a quarter of a year if it had not been interrupted. The subsequent decline in the market, which very nearly wiped out the gains that had been made during the preceding surge, effectively neutralized the effect of the preceding stock market gains on retirement. The effects of the bubble were to increase retirement as long as the bubble continued, but the continuing effects of the bubble after its end are probably minimal.

[18] Others who investigated the effects of the dot com bubble on retirement reached similar conclusions to ours. See Coronado and Perozek (2003) and Hurd, Reti and Rohwedder (2009).

Based on these findings from the dot com bubble, we expect the changes in stock market prices from the bear market of 2008-2009 to have a slightly larger effect on retirement, given the larger change in stock market prices and greater accumulation of assets held in stocks in DC plans and IRAs. Nevertheless, our earlier findings suggest that by itself, the effects of the stock market bust on retirement will be relatively limited.

Once again, the above figures relate to the effects of unanticipated wealth changes and do not consider the layoffs that are created by the recession accompanying the decline in stock market prices. The retirements resulting from layoffs are in the opposite direction from the tendency of reduced wealth to reduce retirement. It is not just that higher unemployment rates depress the probability of finding a job. Even in a nonrecessionary period, most older workers who lose a job are unable to find employment paying anything near the wage they received from a long term employer. Using HRS data, Huff Stevens and Chan (2001) find, for example, “Four years after job losses at age 55, the employment rate of displaced workers remains 20 percentage points below the employment rate of similar nondisplaced workers.” They also find that these effects are not due changes in incentives from pensions or wages that are due to the layoffs.

Figure 2
Effects of 1995-1999 Stock Market Boom on Retirement

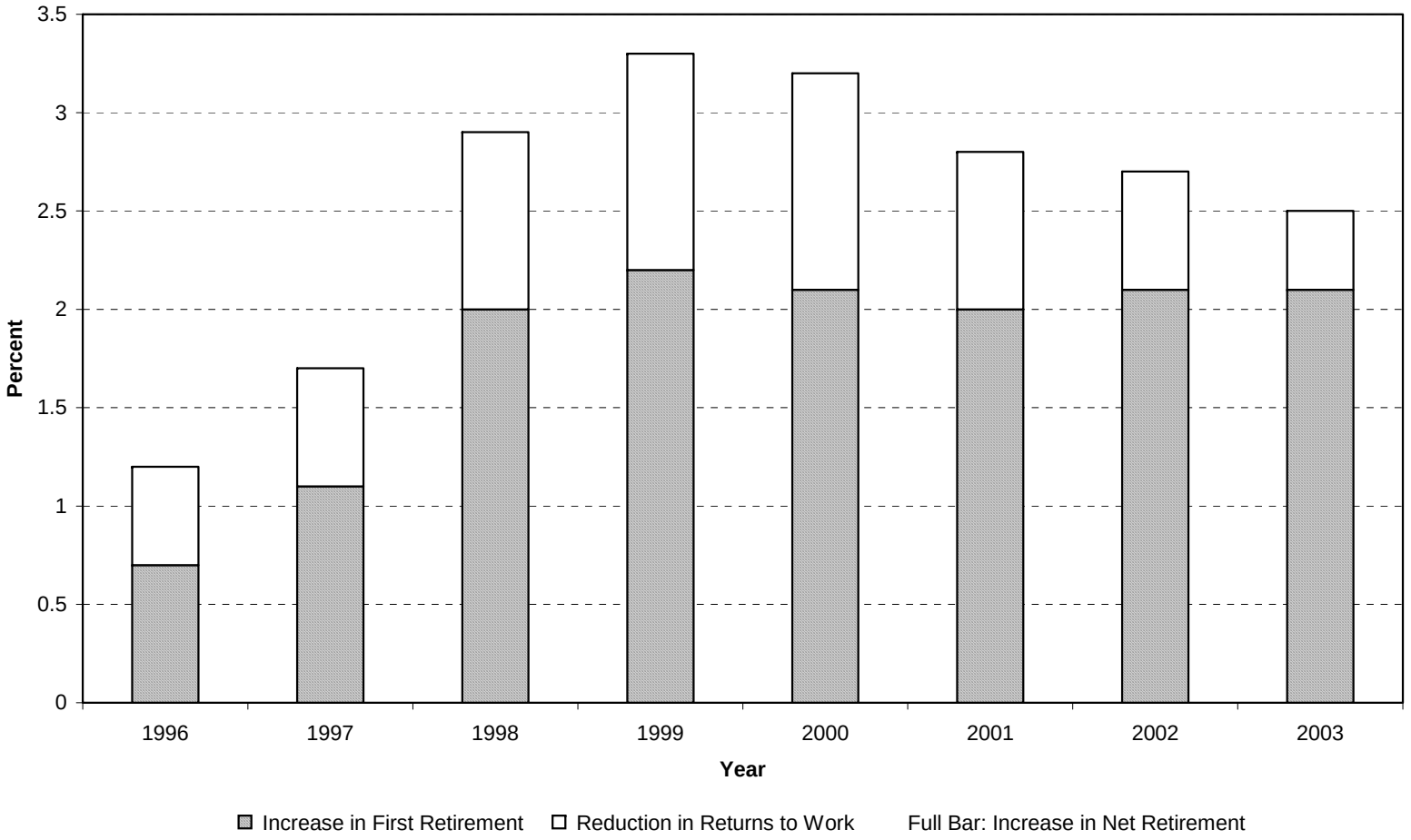
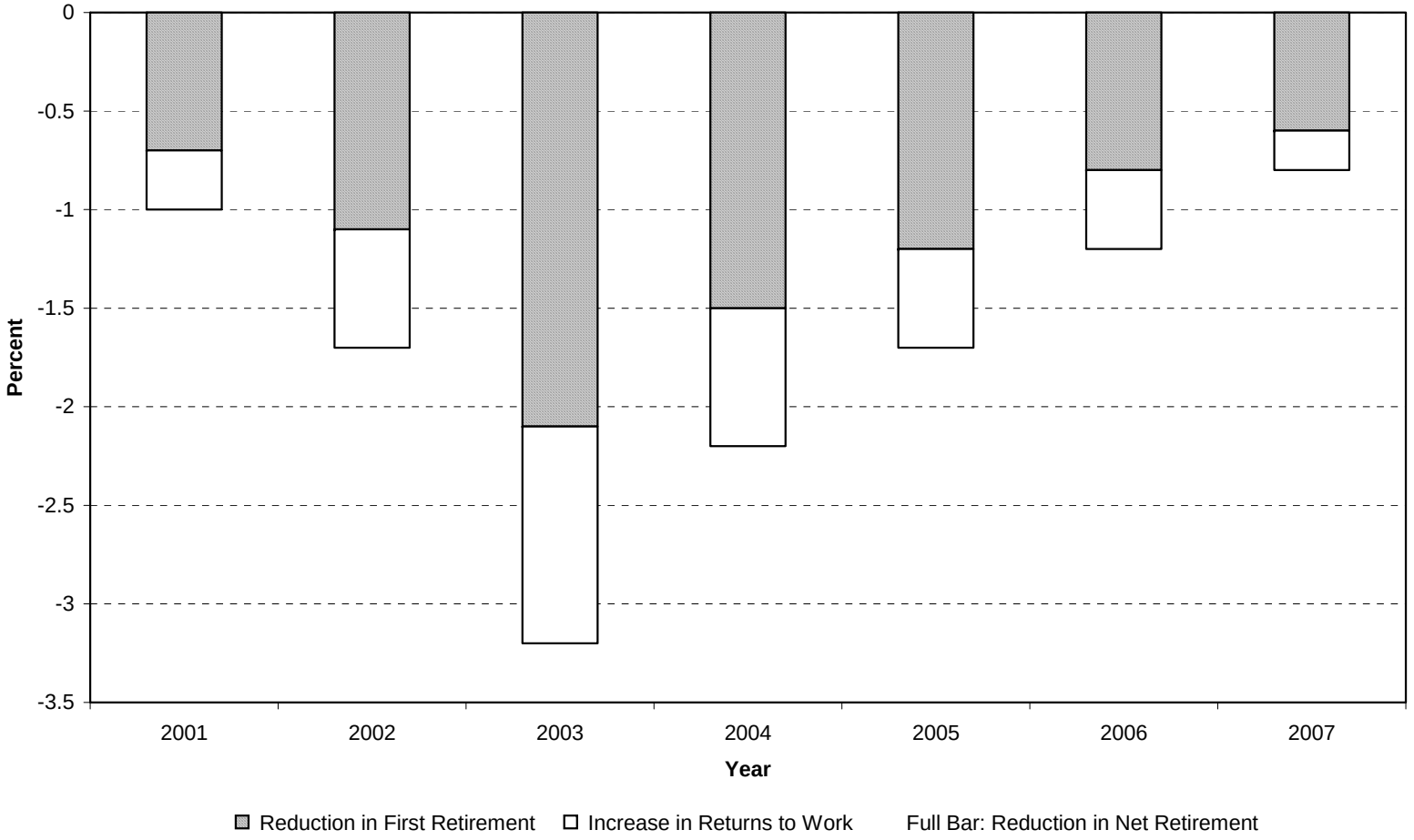


Figure 3
Effects of 2000-2002 Stock Market Bust on Retirement



IV. Potential Vulnerability to House Price Declines

Another factor that has received considerable attention is the decline in housing prices. To provide a basic indication of the vulnerability of the early boomer population to the housing price decline, Figure 4[19] shows the cumulative distribution of the ratio of mortgage value to house price as of 2006.[20] As seen on the y-axis, 46.5 percent of early boomer households had no mortgage.[21] One fifth of early boomer households (22.4 percent) had zero house value and were presumably renters.[22] For early boomers with a positive home value, the mortgage amounts to 29.5 percent of the home value. (The average of the ratios of mortgage to home value is 24.8 percent.) The dotted vertical line in Figure 4 at 100 represents a ratio of mortgage to house value of one to one. Only 1.6 percent of the early boomer households lie to the right of 100, and thus had a house value lower than their mortgage obligation, so they were underwater as of 2006. If housing prices declined by twenty percent to the vertical line at 80, 6.4 percent of the early boomer population would be in a position where their housing value on current markets would fall below what they owed on their mortgage. But for most of those who would be under water, the gap between their house value and mortgage would be relatively small.[23]

The population in deepest trouble will be those suffering multiple adverse events. In particular, those who lose a job and cannot meet their mortgage payments will be in the greatest danger of losing their homes. Moreover, job loss may trigger multiple adverse events. For

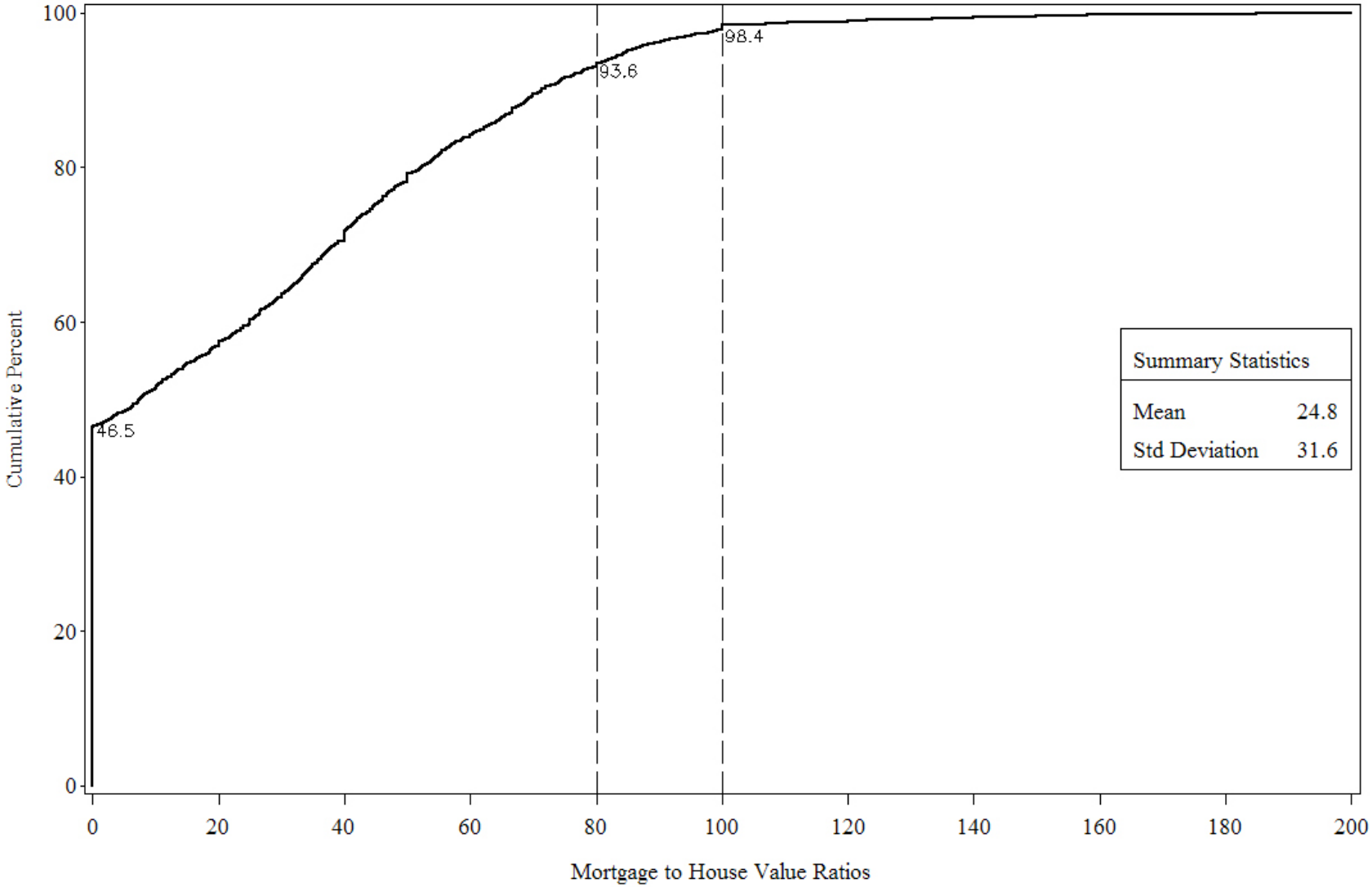
[19] The figures and related percentages and means are not weighted.
[20] Twenty households with a mortgage greater than 200 percent of the reported house value have been excluded from the figure.
[21] With weights, the percent of households without any mortgage is 43.3%.
[22] With weights, the percent of renters is 18.5%.
[23] Some geographical areas have been subject to major housing price declines, while in other areas housing prices have not declined significantly. A more precise analysis would allow for geographic variation in the decline in housing prices. Unfortunately, one cannot use the restricted HRS pension and wealth data and at the same time have access to geographic detail. For further discussion and findings, see Rohwedder (2009).

example, certain job losers who wish to move to a new job may not be able to sell their homes in a short time without heavily discounting the price.

Those experiencing layoff aside, some older workers may have had plans to sell and relocate their area of residence once they retire. But most people in their fifties are unlikely to sell their homes for many years -- until one spouse becomes ill or dies (Venti and Wise, 2004).[24] Thus, again with the notable and important exception of those who experience a layoff, a decline in housing prices may have a less immediate effect on the population approaching retirement age than the decline in other asset prices.

[24] With little direct need to be aware of housing prices, the prices reported by the retirement age population may not fully reflect current market prices. (See, however, Bucks and Pence [2006], who report that most people are well informed about their housing values.)

Figure 4. Cumulative Distribution Function of Mortgage to House Value Ratios



V. Policy Implications and Conclusions

The consequences of the decline in the stock market are serious for those approaching their retirement. But there is less reason for concern about the immediate adverse impact of the stock market downturn than many suggest. Similarly, there may be important problems created by the trend from defined benefit to defined contribution plans. However, despite their closeness to retirement, and with the trend to defined contribution pension plans notwithstanding, the average person approaching retirement age is not likely to suffer a life changing financial loss from the stock market downturn of 2008-2009. Indeed, if there is any evidence arguing for the maintenance of defined benefit plans, it is not that the retirement age population is heavily dependent on defined contribution plans and as a result is suffering from the decline in pension values with the decline in stock prices. Rather, the fact that defined benefit plans remain so important relative to defined contribution plans has cushioned the decline in wealth due to the stock market decline.

To be sure, there will be many who are adversely affected by the stock market decline, and they will come from across the wealth distribution, including many in academia. But those most affected by the financial downturn are likely to be from the upper part of the wealth distribution. This creates a major dilemma for anyone who would look to compensate the retirement age population for financial losses realized as a result of the stock market decline.

Many of those most severely damaged by the recession will be individuals laid off from a long term job while in their early fifties. Some have advocated resorting to labor market programs to compensate older workers who suffered from layoffs. Indeed, even before the recent increase in unemployment, there was a growing interest in policies that would encourage increased work by the baby boom generation as they approached retirement age. A natural solution to the surge in retirements by the baby boom generation, it has been argued, is to adopt labor market training and employment policies that would make older workers more attractive to employers, and would encourage older

persons to remain at work rather than retire.[25] The hope is to alleviate perceived labor market shortages created by the retirement of the baby boomers, as well as the financial problems created for Social Security, Medicare and other government programs by the size of the baby boom cohort. It is argued that job training programs would help to keep the older population technologically current and in the labor force. Other solutions have also been suggested to help those whose employers do not allow them to phase into retirement, those who are not allowed to draw a pension benefit while reducing hours at a long time employer, and others who would like to delay their retirement, but work fewer hours or in a less demanding setting, yet are limited by institutional constraints.

There are three fundamental problems facing employment and training programs targeted at older workers, and programs that would relax institutional constraints and federal pension regulations that limit the ability of older workers to phase into retirement by reducing hours of work.

First, it is very difficult to efficiently target job training and jobs programs on troubled workers in the retirement age population. There are many changes in the labor market activities of older individuals. Most of them look bad from the perspective of employment and earnings. Employment, wages and hours are declining. After decades of attachment to the labor market, careers are being terminated. But in the vast majority of cases, this is not the result either of layoff or of some market failure. These are changes in labor market status that have been foreseen and planned for over many years, although more successfully for some than for others. Retirement is a normal part of the lifetime employment cycle. Careers are normally concluded between the ages of 50 and 70. Even in the best of times those of retirement age are characterized by joblessness, earnings declines, or reductions in hours of work – all of the characteristics usually used to distinguish troubled workers eligible for unemployment insurance, job training and transfers.

[25] For example, see Poulos and Nightingale (1997). For further discussion, see Gustman and Steinmeier (2005).

Suppose that help were confined to those who have been laid off? In a period of high unemployment, it is particularly difficult to job test older persons. It will also be hard to prevent firms from laying off older workers who would benefit from extended unemployment programs so they could participate in these programs. Any policies aimed at the retirement age population are going to be subject to unusual target inefficiencies as efforts are made to distinguish between free riders who would have retired in any case, and those whose time in the labor force has been truncated by the effects of the decline in economic activity. Earnings tests will face similar problems.[26] Thus while the layoff of older persons creates major problems, many policies are going to be inefficiently targeted toward alleviating those problems.

Consider the effects of job training programs, hiring subsidies and other related labor market policies. These programs have a much lower payoff when applied to older workers. The worker's remaining time on the job is too short to permit job training and related programs to have a major return. Even with a ten percent annual return, it takes seven years just to break even on an investment in training. These are the same factors that foster exit from the labor force rather than extended and active job search once an older person is laid off.[27]

A third set of policies that has been suggested would encourage firms to relax minimum hours constraints, while fostering federal legislation to further ease restrictions on partial payment of pensions to eligible employees who continue to work at a long term employer on a part time basis, thus

[26] Although current labor market policies may screen eligible populations based on current income, current income is going to be a less reliable indicator of need for older than for younger people. Those who have left the labor market have zero current earnings, whatever their previous earnings. Those who are in partial retirement jobs have lower current earnings than they had in the past. But most of those with low current earnings will not have been in the bottom part of the income distribution throughout most of their work lives. Moreover, many will have accumulated retirement benefits, and other assets that reflect their past earnings histories. By screening on current income, employment services, training and perhaps even a job might be made available to a person who had a relatively high lifetime income. Yet such persons may have adequate retirement wealth to support themselves through retirement. When eligibility is based on current income, benefits may accrue to many who would not be considered to be economically disadvantaged were income judged from a lifetime perspective, or were pension and nonpension wealth included in the calculation.

[27] Since the remaining work life of an older individual is shorter, older workers will be less willing to expend funds in extensive job search. Moreover, if there are fixed costs of hiring or training, with a shorter payback period, firms may be less willing to hire an older individual than a younger one (Hutchens, 1986, 1987; Hirsch, Macpherson and Hardy, 2000).

further encouraging partial retirement. A person facing no minimum hours constraint will partially retire before the age he would otherwise have retired were such a constraint in place. He then will work longer than he otherwise would have had there been a minimum hours constraint. Thus the overall effect of a minimum hours constraint on hours of work is ambiguous, and therefore so is the effect of abolishing a minimum hours constraint. In practice, our estimates suggest that for older workers, the effect on hours of work from abolishing minimum hours constraints would be minimal, with the two opposing effects roughly offsetting each other (Gustman and Steinmeier, 2008).

None of these problems obviates the need for effective policies aimed at a segment of the population that has truly experienced an adverse event. But they do present challenges to the efficient design and delivery to older persons of labor market and related programs that are meant to provide a kind of insurance through job training and employment.

References

Bucks, Brian and Karen Pence. 2006. "Do Homeowners Know Their House Values and Mortgage Terms?" Washington, D.C.: Federal Reserve Board of Governors. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=899152

Coronado, Julia L. and Maria Perozek. 2003. "Wealth Effects and the Consumption of Leisure: Retirement Decisions During the Stock Market Boom of the 1990s". Federal Reserve Board Working Paper No. 2003-20. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=419721

Friedberg, Leora and Michael T. Owyang. 2004. "Explaining the Evolution of Pension Structure and Job Tenure". NBER Working Paper 10714. August.

Gustman, Alan L. and Thomas L. Steinmeier. 2001. "How Effective Is Redistribution Under The Social Security Benefit Formula?" *Journal of Public Economics* 82 (1): 1-28.

_____. 2002. "Retirement and the Stock Market Bubble". NBER Working Paper No. 9404.

_____. 2005. United States Department of Labor "Older Workers and the Labor Market/ Labor Market Policies for Older Workers," U.S. Department of Labor, Employment and Training Administration, Document No. ETA OP 2005-13. URL http://wdr.doleta.gov/research/keyword.cfm?fuseaction=dsp_resultDetails&pub_id=2385&mp=y

_____. 2008. "Projecting Behavioral Responses to the Next Generation of Retirement Policies. *Research in Labor Economics* 28: 141-196.

Gustman, Alan L., Thomas L. Steinmeier and Nahid Tabatabai. Forthcoming. *Pensions in the Health and Retirement Study*. Cambridge: Harvard University Press.

Hirsch, Barry T., David A. Macpherson and Melissa A. Hardy. 2000. "Occupational Age Structure and Access for Older Workers". *Industrial and Labor Relations Review* 53(3): 401-418.

Hurd, Michael D., Monika Reti and Susann Rohwedder. 2009. "The Effect of Large Capital Gains or Losses on Retirement". In David A. Wise, editor, *Developments in the Economics of Aging*. Chicago, University of Chicago Press for NBER: 127-163.

Hurd, Michael and Susann Rohwedder. 2009. "Effects of the Economic Crisis on American Households". Paper presented at National Bureau of Economic Research, Summer Institute, Aging Group. No URL available.

Ibbotson Associates. 2002. *Valuation Edition 2002 Yearbook*. Chicago: Ibbotson Associates.

Hutchens, Robert. 1986. "Delayed Payment Contracts and a Firm's Propensity to Hire Older Workers". *Journal of Labor Economics* 4(4): 439-457.

_____. 1987. "A Test of Lazear's Theory of Delayed Payment Contract". *Journal of Labor Economics* 5(4) part II: S153-S170.

Kapinos, Kandice with Charlie Brown, Michael Nolte, Helena Stolyarova and David Weir. 2008. "Social Security Wealth Measures". Ann Arbor: Institute for Social Research, Health and Retirement Study. No URL available.

Poulos, Stacy and Demetra Nightingale. 1997. "The Aging Baby Boom: Implications for Employment and Training Programs". Employment and Training Administration, U.S. Department of Labor. http://wdr.doleta.gov/opr/fulltext/document.cfm?docn=5895

Rand HRS data file. http://hrsonline.isr.umich.edu/modules/meta/rand/index.html

Stevens, Ann Huff and Sewin Chan. 2001. "Job Loss and Employment Patterns of Older Workers." *Journal of Labor Economics* 19(2): 484-521.

_____. 2004 "How Does Job Loss Affect the Timing of Retirement?" *Contributions to Economic Analysis and Policy* 3(1), article 5. http://www.bepress.com/bejeap/contributions/

Venti, Steven F. And David A. Wise. 1999. “Lifetime Earnings, Saving Choices, and Wealth at Retirement.” In James P. Smith and Robert J. Willis, Editors, *Wealth, Work and Health: Innovations in Measurement in the Social Sciences*. Ann Arbor, University of Michigan Press, pp. 87-120.

_____. 2004. “Aging and Housing Equity: Another Look”. In David A. Wise, editor, *Perspectives on the Economics of Aging*. Chicago, University of Chicago Press for NBER: 127-175.