

RETIREMENT OUT OF REACH

Financial markets will not generate adequate retirement income for average household

by Christian E. Weller

In March 2000, the biggest bull market in Wall Street's history came to a halt. With the stock market's slide, households lost more than \$5 trillion, or 18%, in financial wealth between March 2000 and the end of 2001, the largest nominal decline since 1952.¹ History suggests that the record-setting run-up in the stock market was so dramatic that the future inevitably holds in store further declines in the stock market and household wealth.

While household wealth continues its decline, debate has intensified over the future of America's retirement system. At the end of 2001, President Bush's Commission to Strengthen Social Security proposed to redirect large parts of Social Security into individual accounts. In the meantime, the scandals around Enron and other corporations that roiled financial markets in early 2002 have forced the public and policy makers to question the security of company savings plans. These new misgivings, however, have not stopped proponents of Social Security privatization from continuing to argue for greater reliance on financial markets, despite the obvious risk such misplaced trust poses to retirement income.

The risks of relying on financial markets for adequate retirement income are immediately apparent upon examining what has happened in recent years to retirement wealth for the average household.²

- Although the average household managed to increase its retirement wealth over the 1990s, it never reached a fully adequate level of retirement savings. Now the average household faces a loss of 43% of its retirement income as a result of the recent declines in the stock market.
- Despite an increase in household wealth relative to income, households did not build up enough of a buffer for weathering a market downturn. Most households used their new assets as collateral to increase their debt and to consume more.

- It will take the average household over 30 years to recover the wealth lost in 2000 and 2001.
- Since target levels for adequate retirement wealth increase with income gains, the average household has no chance of ever reaching adequate levels of retirement wealth if current trends continue.

Because the current system will not generate enough retirement savings for the average household, policies that expose households to more risk make little sense. But new policies are needed and could include mandatory coverage, direct or matching contributions by the government to retirement accounts, reduced risk exposure for retirement savings, and promotion of traditional defined-benefit plans.

Average household wealth is insufficient for decent retirement

After an unprecedented increase in the stock market during the 1990s, financial assets fell by \$4 trillion, and financial wealth dropped by \$5 trillion between March 2000 and the end of 2001 (BoG 2002). Moreover, by December 2001, the ratio of financial wealth to income — a reasonable measure of retirement wealth adequacy (Weller 2002) — fell to 269%, the same level as in September 1996, thereby erasing many of the gains made during the bull market.

Several studies have focused on adequate retirement wealth, which is usually defined as enough savings to provide retirees with about 80% of their average pre-retirement income. Such research assumes that, despite rising health care costs, retirees can afford to accept about a 20% reduction in income. Two general conclusions can be drawn from this research. First, average households had inadequate savings in 1992. Second, there is a wide variance among households, with a large minority of them having accumulated only a small fraction of what is needed for adequate retirement income. More recent research has found that both trends continued in the 1990s, with adequacy actually declining from 1989 to 1998, largely because retirement wealth became more unequally distributed (Wolff 2002a).

Past research findings can be used both to calculate the adequacy of retirement wealth for the average household from 1992 to 2001 and to forecast future retirement income adequacy.³ Past findings are used to establish target levels for adequate retirement wealth from 1992 to 2001. These target levels of wealth will allow the average household to generate the replacement ratio of 80% mentioned above. The level for adequate retirement savings for 1992 is adjusted each year for three demographic variables: age of worker, longevity, and share of population over 65. Then, the target levels are compared to the actual wealth-to-income ratios to understand the trends in retirement wealth adequacy during the 1990s. Next, the target and actual levels are extended beyond 2001 by using a standard forecasting technique known as a Monte Carlo experiment. The figures produced by this method reflect the probability distributions that arise from calculating 1,000 possible outcomes for each year over the next 50 years.

The readily available data on wealth-to-income ratios are a useful tool for gauging the impact of declining wealth on retirement income adequacy, because it allows us to relate changes in wealth to pre-retirement income. Pension wealth, whether through a traditional defined-benefit plan or a private savings plan—such as a 401(k)—is an obvious form of retirement wealth. Yet a substantial share of households is

not covered by any pension plan. Wolff (2002a), for instance, finds that more than one-fourth of households between the ages of 47 and 64 had no private pension plan in 1998, a slight increase from 1983. Consequently, all types of financial wealth can and will serve, out of necessity, as a source of retirement income for the average household, and are therefore included in this analysis.⁴

As a result, the ratio of total wealth relative to total income is important for understanding the full retirement wealth picture. For measuring retirement income adequacy, a household's wealth is calculated in relation to its average earnings over the working life of all the household's members. As incomes grow, wealth should grow, too, to provide the same level of retirement income adequacy, reflected in a constant wealth-to-income ratio. Assuming that the age earnings profiles (i.e., the earnings changes that a household experiences over time) remain constant over time, and that the relative share of workers in each age range stays the same, the simple total-wealth-to-total-income ratio can be used to measure retirement income adequacy.⁵

To illustrate the range of possible outcomes, two definitions of wealth are used—one that includes housing wealth and one that does not. For each of these definitions, two different starting levels of wealth adequacy are assumed. It is assumed that the level of financial wealth without housing wealth either provided 53% or 100% of adequate retirement income, depending on the definition of retirement income. Similarly, it is assumed that the level of total wealth (i.e., financial wealth plus housing wealth) provided either 67% or 100% of an adequate retirement income, again depending on the definition of retirement income.

The difference between the higher and the lower adequacy ratio results from a different treatment of inflation in calculating retirement income. If inflation is ignored, retirement savings in 1992 were generally adequate, but if future inflation is accounted for, the average 1992 household still had a long way to go in terms of retirement savings. Arguably, ignoring inflation in calculating retirement income will lead to a serious understatement of retirement income needs since retirees face rising prices for some items, especially medical expenses, that they cannot avoid as they get older. Consequently, the lower adequacy ratios that account for inflation offer a more accurate measure of the adequacy of retirement savings.

Under the most optimistic definition for adequate retirement income (i.e., one that assumes an adequacy level of 100% in 1992), the average household had what it needed to retire in 2001 with a decent standard of living: 8% above its target using the financial wealth-to-income ratio, and 6% above the target using the total wealth-to-income ratio (**Table 1**). These adequacy levels at the end of 2001 already reflect a decline in adequacy, the ratio of actual to target wealth of 22 to 36 percentage points from 1999. Put differently, the average household had lost 21-33% in terms of retirement income adequacy over the course of just two years. But if we start from more realistic adequacy ratios of less than 100%, the average household never reached its target throughout the period of strong stock market growth in the late 1990s and was, in fact, 29 to 43 percentage points below its target in 2001 (Table 1). Again, the adequacy ratios at the end of 2001 already incorporate a sharp drop of 15 to 20 percentage points since 1999. In other words, while an average household in 1992 would likely have enough retirement wealth to replace about 77% of its pre-retirement income—not counting housing wealth—an average household in 2001 could expect to replace only 57%.

TABLE 1
Comparison of actual wealth-to-income ratios with projected adequate ratios

Year	Financial and housing wealth to income		100% adequacy in 1992		100% adequacy in 1992		53% adequacy in 1992		67% adequacy in 1992	
	Actual at year end	Target at year end	Actual-to-target levels	Target at year end	Actual-to-target levels	Target at year end	Actual-to-target levels	Target at year end	Actual-to-target levels	
1992	236.17%	361.54%	100%	361.54%	100%	445.61%	53%	539.62%	67%	
1993	243.89	367.47	102	365.44	101	450.42	53	545.43	67	
1994	238.03	358.52	99	367.66	98	453.17	53	548.75	65	
1995	264.03	385.06	107	369.57	104	455.51	58	551.59	70	
1996	279.47	399.42	115	371.53	108	457.94	61	554.52	72	
1997	305.17	425.82	125	372.34	114	458.95	66	555.73	77	
1998	320.72	442.80	131	374.00	118	461.00	70	558.21	79	
1999	354.11	479.28	144	375.37	128	462.71	77	560.26	86	
2000	306.18	438.18	124	377.84	116	465.77	66	563.94	78	
2001	269.38	406.56	108	383.04	106	472.04	57	571.61	71	

Notes: All figures are in percent. Ratios of actual-to-target values of less than 100 indicate inadequate retirement savings. For methodology, please see the technical appendix.

Two points are important to bear in mind when looking at the data. First, the rise and fall in the pure financial wealth ratio is greater than in the total wealth ratio because stock prices were more volatile than housing prices during this period. That is, for home-owning households, the drop in financial markets was not quite as steep since their homes' value acted as a buffer. Second, despite their decline toward the end of the period, the retirement wealth figures for the average household increased overall from 1992 to 2000. This rise in the average was produced by dramatic gains at the very top of the income scale, but it obscures the fact that, because of growing wealth inequality, the retirement income adequacy of low- and middle-income households actually declined during the 1990s (Wolff 2002a).

With the stock market growing so much faster than income during the 1990s, households should have been able to amass adequate retirement savings. So why didn't they? Wealth rose 3.3% per year faster than income from 1992 to 2000, although the stock market grew by 13.9% and income by 5.2%. Several macro economic factors explain this divergence between the actual wealth-to-income growth rate of 3.3%, and a potential growth rate of 8.7% – the difference between the stock market growth rate and the growth rate of income.⁶ First, most household assets were not directly tied to stock prices, since households' direct and indirect equity holdings never amounted to more than 50% of financial assets (BoG 2002). Second, more wealth also provided households with more collateral to borrow against. Households increased their debt more than they raised their assets in 15 out of 33 quarters between December 1992 and March 2001, and in 13 out of 21 quarters from December 1995 to March 2001 (BoG 2002). The ratio of total household debt to personal income grew from 72% at the end of 1992 to 83% by March 2001 (BoG 2002). Third, more wealth also enabled households to increase their consumption, thereby reducing savings (a phenomenon also known as the “wealth effect”). On average, households contributed about 8% of personal disposable income (PDI) to their financial assets in the 1990s, the lowest savings rate of all post-war business cycles. Fourth, the wealth effect seems asymmetric. When the value of households' holdings was rising, they added, on average, 8.5% of their PDI to their financial assets; but when holding values were declining, households added only 6.5% (BoG 2001, Table F). In other words, during market downturns, households did not replenish their savings as fast as they depleted them during periods of market upturns. To some degree, the rapid run-up in the stock market and the equally rapid increases in financial assets sowed the seeds for substantially slower growth in the wealth-to-income ratio.

The future outlook is bleak

The drop in wealth obviously does not pose a major problem if households can expect to recoup their losses quickly. Thus, the key policy questions are how fast can households expect to recover their losses, and how long will it take them to accumulate adequate retirement savings? It is possible to simulate future outcomes in many ways, but one attractive way is by using the so-called Monte Carlo experiment. This method uses the experience of the past 50 years to randomly calculate a thousand hypothetical examples. The result is a probability distribution of possible outcomes in any given year for the next 50 years. Thus, the likelihood of reaching peak or target wealth-to-income ratios in any given year can be calculated. The target wealth to income ratios for the future are first simulated using a Monte Carlo

TABLE 2
Summary of simulation results, 2005 to 2050, based on full sample

Year	Financial wealth-to-income ratio			Financial and housing wealth-to-income ratio		
	Probability of falling below past peak	Probability of falling below target levels		Probability of falling below past peak	Probability of falling below target levels	
	Peak: 356.3% in March 2000	100% adequacy in 1992	53% adequacy in 1992	Peak: 482.6% in March 2000	100% adequacy in 1992	67% adequacy in 1992
2010	99%	54%	100%	100%	99%	100%
2020	86	57	100	100	99	100
2030	55	65	100	99	100	100
2040	22	67	100	86	100	100
2050	8	71	100	52	100	100

Note: All figures are in percent.

experiment based on two trajectories—one starting at 100% of adequacy in 1992 and the other at 53% adequacy for financial wealth (or 67% for total wealth). The actual outcomes are then simulated for the next 50 years. The simulations are first based on the experience with household wealth and its determinants since the 1950s. However, since the introduction of 401(k) plans may have significantly changed the way people save for retirement, the simulations are re-estimated based on trends since the 1980s.

The first set of results in **Table 2**, which extrapolates using trends since 1952, illustrates the risks of using private wealth as a vehicle for retirement income. The chance of not reaching the peak levels of retirement adequacy reached in March 2000 stays above 50% for the next 30 years. Furthermore, if the starting adequacy levels are lower, the chance of never reaching the target level is above 90%.

The fact that the average household has no realistic possibility of reaching its target level should not be surprising given the recent experiences with the stock market. Even with unprecedented increases in the stock market in the 1990s, the average household still did not reach adequate wealth-to-income ratios. The more reasonable adequacy ratios in Table 1 showed that households never reached adequate levels of retirement wealth at any time during the 1990s. Similarly, Wolff (2002a) found that, among households between the ages of 47 and 64, the share of them that could not replace at least 75% of their current income in retirement rose from 56% in 1989 to 61% in 1998. It is important to note that these trends in adequacy occurred during the biggest run-up on the stock market in history. During the 15 years prior to its peak in April 2000, the stock market grew in real terms a total of 405%, compared to 138% during the 15 years before its peak in October 1929. This unprecedented run-up in the stock market did not generate adequate retirement savings, even though it happened when a growing share of household financial assets was invested in stocks. It is no surprise that the Monte Carlo test shows that households cannot expect to reach adequate savings levels in the future.

TABLE 3
Summary of simulation results, 2005 to 2025, based on full sample after 1982

Year	Financial wealth-to-income ratio			Financial and housing wealth-to-income ratio		
	Probability of falling below past peak	Probability of falling below target levels		Probability of falling below past peak	Probability of falling below target levels	
	Peak: 356.3% in March 2000	100% adequacy in 1992	53% adequacy in 1992	Peak: 482.6% in March 2000	100% adequacy in 1992	67% adequacy in 1992
2010	68%	54%	90%	94%	87%	100%
2020	64	59	90	94	95	100
2030	65	66	95	99	100	100
2040	63	71	96	99	100	100
2050	62	74	97	100	100	100

Note: All figures are in percent.

To cross-check the validity of the simulation results in light of the introduction of 401(k) plans, the results are re-estimated using only the years since 1982. These results, shown in **Table 3**, paint a similar picture of the future. The chance of not reaching peak levels remains above 60% for the financial wealth-to-income ratio, and close to 100% when housing is added into the wealth computation. Similarly, when starting points of 53% and 67% of adequate wealth to income are assumed, the chances of staying below adequate levels remain above 90% and at 100%, respectively.

Policy lessons

It is very risky for households to rely on financial markets to provide adequate retirement income. By the end of 2000, the average household's wealth to income ratio was 22 to 34 percentage points below its target for meeting its realistic retirement income needs, and its chances are very low of recovering the lost wealth and reaching adequate retirement savings. Average households did not build enough retirement wealth during the boom years to see them through a falling market for reasons that have to do with the run-up in the stock market, too. Growing asset values gave households more collateral to borrow against and more money to use for consumption. Consequently, when the declining financial market wiped out trillions of dollars in household wealth, households' retirement savings fell further behind. Even in the best case scenario, it will take the average household more than 30 years to recoup the ground it has lost since the previous peak in wealth-to-income levels. Moreover, the average household has only a small chance to reach an adequate level of retirement wealth in the next 50 years.

All the evidence and trends in retirement wealth adequacy lead to two policy conclusions:

- First, relying on financial markets to generate adequate retirement savings within the existing institutional framework will most likely not work. Unless regulations change substantially, future generations will continue to retire with inadequate savings. Currently, the private retirement system is voluntary, employer based, and government subsidized. Possible institutional changes that could increase the adequacy of retirement savings would include making access to retirement savings mandatory (U.S. Congress 2002); making the system employee based in order to increase portability (Baker 1999; Calabrese 2001); or introducing direct or matching government contributions to retirement accounts instead of, or in addition to, current subsidies (Gebhardtshauer 1999; ABC 2000).
- Large booms in asset prices have allowed households to borrow and spend more, resulting in inadequate savings. Hence, retirement savings should be insulated from the financial market volatility as much as possible by reducing the risks in defined-contribution plans, such as 401(k) plans, or by making traditional defined-benefit plans more attractive (Weller and Eisenbrey 2002; Ghilarducci 2001; Gordon 2000).

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Technical Appendix

This paper uses the estimates from Gustman and Steinmeier (1999) and adjusts these to arrive at target wealth-to-income rates after 1992. Both a nominal replacement ratio of 86% and a real replacement ratio of 60% are considered as starting points for 1992. After making standard adjustments for the lower consumption needs of retirees, the nominal replacement ratio increases to 103%, and the real replacement ratio increases to 72% (Gustman and Steinmeier 1999). The replacement ratios are further adjusted to exclude housing and Social Security wealth. Housing wealth is 16% of total wealth and Social Security wealth is another 23.7%. The nominal replacement ratio, which included Social Security wealth, was 100% in 1992, compared to the real replacement ratio of 72%. Assuming that the remaining 28% would be covered by financial savings, private wealth would have to increase by 47%. Including housing wealth, private wealth was at 67% of where it should have been in 1992. As a result, the adjusted wealth-to-income ratio for 1992 was either 100%, 67% (for the real ratio including housing wealth), or 53% (for the real ratio excluding housing wealth) of its target.

To calculate the target values after 1992, the ratio for 1992 is adjusted for demographic changes, such as average age, life expectancy at 65, and the share of the population over 65.

$$\frac{\hat{W}_t}{Y_t} = \frac{W_{t-1}}{Y_{t-1}} * (1 + (age_{t-1}) * \alpha + \frac{(p_{t-1})}{\beta} - 65plus_{t-1}) \quad (1)$$

$$\alpha = (1 + r_{LT})^{(AGE_t - AGE_{t-1})} \quad (1)'$$

$$\beta = (1 + r_{LT})^{(LE65_t - LE65_{t-1})} \quad (1)''$$

The target wealth to income ratio, W/T , is equal to the adjusted wealth-income ratio of the previous period. It is adjusted for the percent increase in the age of the average worker, age (which itself is adjusted by an interest factor, α). A higher age means that fewer years are left to retirement, therefore requiring more wealth relative to income. Not only does the worker have to compensate for fewer working years, but also for the loss of compounded interest over those years. Equation (1)' shows that age is adjusted for the loss of long-term interest, r_{LT} , compounded for the number of years that the average age of workers, AGE , has changed. Also, the target wealth to income ratio grows with higher life expectancies at age 65, $65plus_t$, as longer life expectancies require more wealth to maintain the same income level in retirement. However, a worker can increase his or her wealth to income ratio partially due to compounded interest. Thus, the increase in the wealth-to-income ratio is reduced by a discount factor, β . Equation (1)'' shows that the adjustment is the long-term interest rate compounded over the additional years, $LE65$. Another adjustment is the change in the share of population over 65, $65plus_t$.

For the calculations, actual changes of the average age of workers, of life expectancy at age 65 (SSA 2000, 2001), and of the share of the population over 65 (IDB 2001) are chosen.

To evaluate what the future may hold, this paper uses a regression-based simulation. The regression model considers empirically relevant determinants of household wealth to income. To study the relative importance of each factor determining the wealth-to-income ratio, the following equation is estimated:

$$\begin{aligned} \ln \frac{W}{Y}_t = & \beta_0 + \beta_1 \ln \left(\frac{S \& P500}{CPI} \right)_t + \beta_2 \ln \left(\frac{Y}{CPI} \right)_t + \beta_3 \ln \left(\frac{E}{A} \right)_t + \beta_4 \ln \left(\frac{L}{Y} \right)_t \\ & + \beta_5 \ln \left(\frac{S}{PDI} \right)_t + \beta_6 \ln (LE65)_t + \beta_7 \ln AGE_t + \beta_8 \ln 65plus_t + \varepsilon \end{aligned} \quad (2)$$

where the wealth to income ratio, W/Y , depends on the real value of the S&P 500, on real income (both deflated by the consumer price index, CPI), on the share of equities out of financial assets, E/A , on the ratio of debt relative to income, L/Y , and on the savings rate out of personal disposable income, S/PDI . To control for demographic changes, the life expectancy at age 65, the average age of workers, and the share of the population over 65 are included. Also, ε is a normally distributed random error term. A logarithmic specification is used for each variable.

The expected signs of the explanatory variables are straightforward. The S&P 500, the savings rate, the

TABLE A-1
Regression estimates for financial wealth to income ratio

Explanatory variables	Full sample	1952 to 1982	1983 to 2000
$\ln(\text{S\&P500/CPI})_t$	0.05 (0.03)	-0.01 (0.03)	0.21*** (0.06)
$\ln(\text{E/A})_t$	0.42*** (0.04)	0.46*** (0.04)	0.33*** (0.08)
$\Delta \ln(\text{L/Y})_t$	-0.09 (0.06)	-0.15*** (0.05)	0.15 (0.17)
$\ln(\text{S/PDI})_{t-1}$	0.03*** (0.01)	0.01 (0.01)	0.02** (0.01)
$\ln(\text{Y/CPI})_t$	-0.38*** (0.09)	-0.54*** (0.07)	0.30 (0.24)
$\ln(\text{LE65})_t$	0.97* (0.52)	0.32 (0.50)	0.30 (0.72)
$\ln \text{age}_t$	0.96** (0.48)	-1.25* (0.74)	-1.89* (1.11)
$\ln 65\text{plus}_t$	0.60 (0.40)	0.60 (0.38)	-1.47*** (0.38)
Constant	1.69 (2.19)	14.14*** (3.83)	8.27*** (1.88)
N	193	119	72
Adj. R-squared	0.84	0.93	0.96
rho	0.94	0.86	0.51
Durbin-Watson	1.94	1.78	1.88

Notes: Standard deviations in brackets.

* indicates significance at the 10%-level;

** indicates significance at the 5%-level, and

*** indicates significance at the 1%-level.

equity share in households' portfolio, average age of workers, and longevity at 65 should all be positively related to the wealth-to-income ratio. By contrast, real income, liabilities, and the population over the age of 65 should have negative signs.

All economic variables are compiled from the *Flow of Funds Statistics for the United States* (BoG 2001), except the (seasonally adjusted) CPI, which is from the Bureau of Labor Statistics. The data for life expectancy are from the National Center for Health *Statistics' Life Expectancy by Race, Sex, 1970 to 1998 (at Birth, Age 65 and Age 85)*, and the *2001 Social Securities Trustees' Report* (SSA 2001). Average age is calculated as a weighted average of workers covered by Social Security (SSA 2000). Missing demographic data are interpolated.

For the regression, a few adjustments are made. The ratio of liabilities to income is nonstationary and hence differenced once. As the savings rate may be endogenously related to the dependent variable, it is instrumented by

regressing it on itself lagged once and on all other explanatory variables. To correct for autocorrelation, a Cochran-Orcutt regression is used.

The estimated coefficients have the expected signs or are insignificant (**Table A-1**). The determinants of financial wealth to income may vary over time. Thus, the sample is separated in 1982, which marks the beginning of 401(k) plans. The results show a significant effect of the stock market in the later period, but not in the earlier period. However, the regression results seem robust, and all explanatory variables are significant determinants at one time or another. The estimated coefficients are consequently used to simulate future wealth to income ratios.

Endnotes

1. This also includes the longest consecutive year-on-year quarterly declines in household wealth, as household wealth declined year-on-year for five quarters in a row from the fourth quarter of 2000 to the fourth quarter of 2001.
2. See the technical appendix for a detailed description of the methodology.
3. This implicitly assumes that households do not plan to leave anything for their heirs.
4. Even though households spend out of disposable income, retirement wealth needs to be seen in relation to personal income since retiree households still have to pay some taxes.
5. There are two micro economic reasons, too. First, despite the proliferation of personal retirement savings accounts, such as 401(k) plans, the share of households that are covered by private pension plans increased only marginally from 1983 to 1998 (Wolff 2002a). Second, retirement wealth, especially in personal retirement savings accounts, became more unequally distributed. That is, wealthy households gained disproportionately from the run-up in the stock market, and low- and moderate-income households were left behind (Wolff 2002a, 2002b).

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