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Common Objections to a Market-Based Social Security System: A Response

by Melissa Hieger and William Shipman

Executive Summary

The debate over whether Social Security needs to be reformed is largely over. The question now is what type of reform. Many experts suggest moving toward a saving and investment structure wherein some portion of the Social Security tax is invested in markets.

Opponents of privatizing Social Security, however, warn of numerous and formidable risks associated with markets. Among other issues, they raise questions of market risk, retirement benefits of low-income workers in a privatized structure, potential difficulties for unsophisticated investors in a market-based system, and the plight of survivors of deceased workers.

None of these objections survives a careful examination of the evidence. In fact, most represent a misunderstanding of financial markets and Social Security and how a privatized Social Security system would work. For example:

- Critics claim that private markets are dangerously risky and that only knowledgeable and experienced investors can successfully handle such risks. In reality, however, long-term investment in private capital markets is less risky than the current Social Security system and can be handled by even inexperienced investors.
- Because Social Security has a progressive benefit formula, some assert privatization would hurt low-wage workers. Moreover, others claim that a privatized system would appeal only to the wealthy and most savvy investors. However, because of its much higher returns, a privatized Social Security system would actually benefit low-wage workers and would appeal across all individual income and education levels.
- One of the most common criticisms of privatization is that private financial institutions would charge excessive fees, thereby reducing retirees' returns to unacceptable levels. However, actual fees and administrative costs for existing investments are generally well below 100 basis points (one percent). Assuming fees of this magnitude, yields would still be much higher than benefits currently provided by Social Security.
- Finally, critics claim that a privatized system could not provide survivors' benefits. In reality, a market-based retirement system would provide better survivors' benefits than the current system.

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Introduction

It is generally accepted that under present law Social Security taxes will not be adequate to meet promised Social Security benefits. This financial dilemma reflects a demographic reality: the available number of workers to be taxed will be insufficient to pay benefits at current levels to an ever-increasing number of retirees who are living longer. As our political, academic and business leaders wrestle with this problem, more and more often they suggest moving toward a saving and investment structure wherein some portion of the Social Security tax is invested in markets. Advocates of this view argue that because market returns are greater than those from the present pay-as-you-go system, tax increases or benefit cuts will be less onerous.

Opponents, however, warn of numerous and formidable risks associated with markets. Among other issues, they raise questions of market risk, retirement benefits of low-income workers in a privatized structure, potential difficulties for unsophisticated investors in a market-based system, and the plight of survivors of deceased workers.

This paper examines such common objections to privatization as:

1. Low-income workers will suffer because Social Security's progressive benefit formula will no longer apply.
2. Financial security in old age should not depend upon the participant being a knowledgeable investor.
3. Social Security is virtually risk-free because it is backed by the full faith and credit of the government. A market-based system, on the other hand, is inherently volatile. Moving toward a privatized system, therefore, subjects workers to risk which is unnecessary.
4. Although the stock market rises over the long term, it could collapse at the end of one's working career, leaving little or nothing for retirement.
5. Markets cannot handle the volume of investment capital that a privatized system would create. This inability could cause a near-term "speculative bubble" during the years baby boomers are paying into the system and then a market collapse as they withdraw funds in their retirement years.
6. Only the wealthy or the financially astute would choose the market-based system, leaving the financially less-well-off to fend for themselves in a system ultimately destined to unravel.
7. A market-based system would necessitate high administrative costs, reducing returns to unacceptable levels.
8. In many cases, Social Security pays benefits to survivors of deceased workers. In a privatized system, workers who die at an early age would not have amassed enough wealth to care for their family members, leaving them financially vulnerable.

None of these objections survives a careful examination of the evidence. In fact, most represent a misunderstanding of financial markets, Social Security, and how a privatized system would work. Compared with the current Social Security system, a market-based retirement system would incur less risk and offer more benefits to low-income workers.

Objection #1: Low-income workers will suffer because Social Security's progressive benefit formula will no longer apply.

Opponents of Social Security privatization worry that the level of benefits to low-income workers from a market-based system would be less than from present-day Social Security because Social Security redistributes wealth from high-income to low-income workers through a progressive benefit formula. It is true that the current benefit formula is progressive; that is, lower-income workers receive more for each dollar earned than do higher-income workers. However, whether the formula intended to achieve this actually results in a system that is progressive is subject to some disagreement.[1] But whatever the conclusion, a more fundamental question remains: is the objective of progressivity to level retirement benefits across income classes, or is it to lift the lot of low-wage earners? If it is the former, it is questionable whether Social Security is effective. If it is the latter, there is no question that Social Security is ineffective.

To calculate benefits the Social Security Administration adjusts the worker's wages (and self-employment income) earned prior to the year in which the worker turned 60 by inflation adjusting them using what is called the Average Wage Index.[2] Then the highest 35 years of earnings are added and divided by 420 (the number

of months in 35 years) to calculate the Average Indexed Monthly Earnings (AIME). The Primary Insurance Amount (PIA), which in most cases is one's initial monthly benefit if retiring at the normal retirement age, is then calculated using bend points, the primary determinant of the system's progressivity. As an example, a worker who turned 62 in 1996 would use the following formula to determine his initial monthly benefit:

- 90 percent of the first $437 of AIME, plus
- 32 percent of AIME in excess of $437 but not in excess of $2,635, plus
- 15 percent of AIME in excess of $2,635.

As is clear from the formula, benefits as a percentage of earnings fall as wages rise, yielding higher returns for lower-income workers. Table 1 shows this for low- and maximum-income workers born in 1930, 1950, and 1970.

Table 1

Progressivity of Social Security Benefits

Year of Birth	Year of Retirement	Annual Earnings Prior to Year of Retirement		Initial Monthly Social Security Benefit (NRA)		Benefit as a Percentage of Last Year's Labor Income	
		Low Wage	Maximum Wage	Low Wage	Maximum Wage	Low Wage	Maximum Wage
1930	1995	$12,539	$63,979	$581	$1,266	56%	24%
1950	2016	$14,897	$72,280	$668	$1,661	54%	28%
1970	2037	$17,867	$86,598	$799	$1,994	54%	28%

Note: It is assumed that each worker starts work at age 21 and retires at the normal retirement age (NRA) as stipulated by law (for the 1930, 1950, and 1970 birth years the NRAs are 65, 66, and 67, respectively).[3] Low wage is defined as 50 percent of the national average wage and maximum wage is the maximum earnings subject to the OASI tax. All figures have been converted to real 1997 dollars using actual and projected levels of the Consumer Price Index.[4]

Despite this, the system may not be as progressive as it appears. Some experts have pointed out that low-income workers start their careers at an earlier age than do high-income workers, and have a shorter life expectancy. Therefore, low-wage workers receive back fewer benefits over their lifetime compared to what they pay in than do wealthier workers.[5] The RAND Corporation found that while Social Security benefits retain some degree of progressivity, taking into account such factors as marital status and life expectancy shows that "the OASI system is not as progressive" as generally believed.[6] Indeed, the study found that for unmarried men, the rate-of-return among high-wage earners was actually higher than among low-wage earners, making Social Security regressive for that category of recipients.[7]

The RAND study also concluded that the current benefit structure disadvantages African-Americans, who have lower life expectancies and marriage rates. According to the study, whites consistently earn higher rates of return than blacks.[8] In fact, on a life-time basis, the income transfer from blacks to whites is as much as $10,000.[9]

Others counter by noting that the system retains its progressivity because lower-wage-earning workers tend to have more menial and physically stressful jobs, leading to higher rates of disability and, therefore, benefits. Also, their families often have just one wage earner, yielding higher spousal benefits. In addition, benefits are taxed using progressive income tax rates, leaving them with higher after-tax benefits because of their low, or even zero, marginal tax rate. Finally, given that benefits are based on 35 years of work history, low-income workers, who have more periods of unemployment, receive the same benefits as other workers with the same income but many more years of work. Whether these differing views of progressivity cancel each other out or not is subject to debate, but there is no question that the benefit formula itself is progressive. Because it is assumed that without redistribution lower-income workers would be worse off, the preference for redistribution is one of the arguments against market-based financing.

One test of this hypothesis is to compare Social Security benefits to simulated market benefits for the same low-income workers as above. We will assume that each individual starts working at age 21, retires at the normal retirement age (NRA), and lives to the average expected life span of the population aged 65.[10] Low-income is defined as annual earnings equal to half the national average wage, about $13,366 in 1997. For each worker only the combined employer and employee OASI tax stipulated by law is invested. These taxes are shown in Appendix A.

Market-based benefits assume the OASI taxes are invested exclusively in stocks or bonds. The stock portfolio contains 90 percent large capitalization stocks and 10 percent small capitalization stocks, comparable to the market's capitalization presently. The bond portfolio is an equal weighting of government and corporate bonds. Actual annual returns through 1996 were used. The average annual nominal

The RAND Corporation found that Social Security is not as progressive as generally believed.

Table 2

Comparison of Initial Monthly Social Security Benefit to Initial Monthly Capital Markets Benefit for Low-income Workers

Year of Birth	Social Security Benefit	Equity Portfolio Benefit	Bond Portfolio Benefit
1930	$581	$ 980	$ 469
1950	$668	$2987	$1076
1970	$799	$2744	$1123

Note: Constant 1997 dollars. Worker is assumed to retire at the normal retirement age (NRA). Equity portfolio is 90 percent large capitalization stocks and 10 percent small capitalization stocks. Bond portfolio is 50 percent government bonds and 50 percent corporate bonds. Calculations are based on figures in Social Security Administration, *Social Security Bulletin, Annual Statistical Supplement 1997* (Washington: Government Printing Office, 1997); *Stocks, Bonds, Bills and Inflation* (Chicago: Ibbotson Associates, 1997).

Table 3

Comparison of Initial Monthly Social Security Benefit to Initial Monthly Balanced Fund Benefit Net of Administrative Costs for Low-Income Workers

Year of Birth	Social Security Benefit	Balanced Fund Benefit
1930	$581	$ 605
1950	$668	$1514
1970	$799	$1431

Note: Constant 1997 dollars. Worker is assumed to retire at the normal retirement age (NRA). Administrative costs are assumed to be 100 basis points (1 percent of return) per year. Portfolio is 60 percent equities and 40 percent bonds as described on page 5. Calculations are based on figures in Social Security Administration, *1997 Trustees Report* (Washington: Government Printing Office, 1997); *Stocks, Bonds, Bills and Inflation* (Chicago: Ibbotson Associates, 1997). During the accumulation phase administrative costs are 1 percent. During retirement benefits are paid from a fund that earns 6.5 percent net of costs.

returns of these stock and bond portfolios from 1951 (the year one born in 1930 is assumed to start working) through 1996 were 12.6 percent and 5.9 percent, respectively. Future annual returns are assumed to be 10 percent for stocks and 7 percent for bonds. The rate for bonds reflects the approximate long-term interest rate that is presently available for the next 30 years. During retirement the nominal annual return and inflation are assumed to be 6.5 percent and 3.5 percent, respectively. Table 2 shows Social Security versus market benefits using the above assumptions.

In all cases but one, low-income workers earned greater retirement benefits from bonds and stocks than they did from Social Security. On average, the stock market provided more than a 100 percent increase in low-income workers' standard of living during retirement. These results are consistent with other studies showing higher retirement benefits from markets than from pay-as-you-go financing.[11]

But arguments frequently are made that future market returns may be lower than past experience. And portfolios will have a mixture of stocks and bonds, so a stock-only generated benefit, although accurate, is exaggerated. And there are administrative costs that would reduce returns, perhaps significantly.

In adjusting for these points more conservative assumptions were made. Savings are invested in a portfolio of 60 percent stocks and 40 percent bonds—commonly referred to as a balanced fund—each asset as specified above. The balanced fund's annual returns are those actually achieved from 1951 through 1996, averaging 9.92 percent. Starting in 1997, the assumed annual return is 8.8 percent.[12] Administrative costs are 1 percent, reducing the after-cost nominal annual return to only 7.8 percent. (Administrative cost assumptions are developed further in responding to Objection #7.)

Table 3 compares benefits received from Social Security to these more conservative portfolios. In each of the three cases the market affords low-income workers higher retirement benefits than does Social Security, on average 70 percent higher. Appendix B shows these results for low-, average-, high-, and maximum-wage workers born each year from 1930 through 1976.

The benefit increase for low-income workers is achieved without redistribution from high-income workers. However, if redistribution per se is a social objective, then a market-based system with redistribution will provide higher benefits to low-income workers than will a pay-as-you-go system with redistribution.

Low-income workers are some of society's neediest. Their pre-tax income of $13,366 makes it difficult to make ends meet. Some live close to the margin of subsistence. A small difference in income, even $50 a month, can make a meaningful impact on their lives. Yet, through Old-Age and Survivors Insurance (OASI), 10.7 percent (inclusive of the employer's portion) of their wages are taxed away and earn them a below-market return. With little or nothing left over after Social Security taxes—plus spending for food, shelter, and clothing—they effectively are precluded from investing in the capital markets for a more comfortable retirement. Whether from the point of view of economics, finance, or

compassion, it makes little sense to keep them from having the same opportunity that higher-income workers have to build wealth for their own retirement through savings and investing, and to be able to leave assets to their children.

Objection #2: Financial security in old age should not depend upon the participant being a knowledgeable investor.

Critics of privatization argue that individual investment knowledge is a necessary condition for adopting a market-based system. They then suggest that it is obviously unreasonable to submit that all workers have this knowledge. Their points taken together—the requirement for, yet absence of, investment knowledge—is an argument against a market-based system. This position is expressed in the *Report of the 1994-1996 Advisory Council on Social Security*:

> Investors need sophisticated knowledge to invest successfully, a sophistication millions of participants in Social Security lack. In order to do reasonably well over time—nothing is guaranteed—investors must be able to assess the value of the companies whose stocks and bonds are offered to them. But many, perhaps 100 million participants in Social Security, lack requisite knowledge, such as the market served by individual companies, ways of judging the competence of management, relevant changes in technology and whether an individual company is able to keep current, the competitive situation, both local and sometimes international, the company's unfunded promises to pay deferred compensation to highly paid employees, and many other factors.
>
> Some relevant issues will be included in the accounting statement in the company's annual report, but most retirees do not know how to interpret this information even if provided to them by purveyors of securities. Without adequate knowledge, privatization will leave many who are required to substitute investments for assured Social Security benefits without the ability to protect themselves against potential disaster.[13]

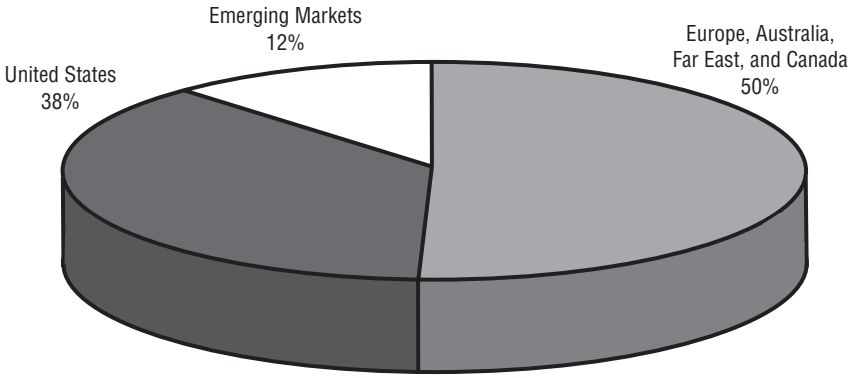
Contrary to the above assertions, it is not necessary that workers have such knowledge. A properly designed market-based system would build on the structures already developed for defined-benefit and defined-contribution plans prevalent throughout the United States today. These plans do not require their participants to be intelligent or knowledgeable investors. For decades, workers of all income groups in defined benefit plans have entrusted their pension benefits to sophisticated investors, who for the most part have done very well in fulfilling their fiduciary responsibilities. In defined contribution plans where *individuals* have more of the investment responsibility, evidence suggests that *they* invest intelligently if given proper investment guidance.

Under the type of privatized system likely to pass Congress, each individual would be free to hire the investment management firm of his choice. Congress will likely insist that such firms be licensed and regulated by the government, much as they are today. As a condition of authorization, however, assets would be managed based upon prudent investment guidelines determined by a Board of Trustees—investment professionals who have the knowledge and experience in dealing with these issues. Guidelines may include investing in only approved asset classes, imposing maximum percentage limits on each asset class, requiring necessary liquidity, and changing portfolio composition as retirement age nears. The objective of these constraints is not to limit choice, but rather to reasonably assure the building of wealth for retirement without incurring unnecessary risk.

In structuring portfolios, investment managers have many assets from which to choose. At year-end 1995, the global stock markets were valued at $17.7 trillion.[14] Figure 1 illus-

Low-income workers earned greater retirement benefits from bonds and stocks than they did from Social Security. On average, the stock market provided more than a 100 percent increase in low-income workers' standard of living during retirement.

Figure 1
World Equity Capitalization



Source: Emerging Markets Fact Book, 1996. International Finance Corporation

The benefit increase for low-income workers is achieved without redistribution from high-income workers.

trates the broad geographical distribution, with 64 countries having functioning stock markets.[15]

Given this broad selection, many different portfolios could meet the objectives of return, diversification, and liquidity. As just one example, 60 percent of the portfolio could be invested in United States stocks. This portion could contain any of about 3,100 different firms (with many of the stocks traded on the New York Stock Exchange), representing both large and small companies.[16] Another 10 percent of the portfolio could be comprised of equities of the developed world—the largest economies outside of the United States. This would account for another 1,100 stocks. U.S. and foreign corporate and government bonds, equally weighted, could make up an additional 25 percent. The corporate component would represent high-grade, low risk of default, bonds. The government bonds are backed by the full faith and credit of the sovereign country. The remaining 5 percent could be invested in money market instruments including highly rated commercial paper, certificates of deposit, U.S. government and agency obligations, and other low-risk, highly liquid paper.

Because returns of the five asset classes do not move identically and one asset may be more attractive from time to time, allowance for variance in the weights is desirable. The weight of each asset class can be changed as the investor nears retirement. For instance, reducing the stock component and increasing the money market allocation, a common practice as one nears retirement, would reduce risk. Altering weights is a trivial portfolio process that delivers non-trivial results.

Managing this diversity of instruments, representing more than 20 countries and thousands of securities, is a sophisticated process requiring experienced professionals. Yet, it is common and successfully practiced by pension funds and investment management firms around the world. There is no need for a worker who chooses the market-based system to know how markets work as long as the pension system is properly structured and sensible guidelines are followed. In fact, most proposals for a privatized national retirement system have regulatory elements that restrict investment strategies that are either too risky or that would be insufficiently aggressive to provide needed retirement benefits.

Objection #3: Social Security is virtually risk-free because it is backed by the full faith and credit of the government. A market-based system, on the other hand, is inherently volatile, subjecting workers to risk which is unnecessary.

Opponents of privatization often attempt to contrast what they present as a risk-free government Social Security system with an inherently risky market-based system. They note that the current Social Security system is backed by the full faith and credit of the U.S. government, whereas a market-based system entails all the risks associated with the volatile world of financial markets.

Moving to a privatized Social Security system is not risk-free. That should be readily apparent. But, the current Social Security system is also not risk-free. A comparison of the risks inherent in both systems shows privatization to be the safer alternative.

In a market-based retirement system workers face two different types of risk. One is the probability of accumulating the necessary wealth for a secure retirement through savings and investment. The other is the volatility of market returns during one's working career and retirement. In contrast, a government-mandated pay-as-you-go system subjects workers to the peril of political risk—that is, the probability that benefits will be cut or taxes will be increased. In both structures there is uncertainty.

At the inception of a pay-as-you-go system, such as our current Social Security system, risk is minimal. All workers begin to pay taxes. Some are young, just starting their careers; others are close to retiring. On average, they are at mid-career and pay taxes for half of their working lives. During the early stages the return on investment for older workers is high because they pay taxes for a short period but receive benefits throughout their retirement years. However, as years pass and the system matures, eventually all workers pay taxes for their entire careers. The return on taxes paid then falls as tax rates rise and as the periods during which taxes are paid also rise.

The decrease in return is exacerbated by the demographic reality of fewer workers supporting each beneficiary. This ratio has declined

from 16 to 1 in 1950 to only 3.3 to 1 today. The Social Security Administration estimates it will fall to only 2 to 1 by 2030.[17]

At this stage, political risk is no longer minimal; the possibility of increased taxes and decreased benefits looms. In 1950 the OASI tax rate was 3 percent of $3,000 of earnings for a maximum tax of only $90.[18] The rate in 1997 is 10.70 percent of $65,400. Even adjusting for inflation, this is a jump of about 1,200 percent. During this same period benefits increased only about a third as much. As in the past, the debate on how to save Social Security includes further tax increases and benefit cuts.[19] The risk of higher taxes relative to benefits in a government-mandated pay-as-you-go structure is real, significant and certain.

A privatized system also incurs risk, that is, uncertainty and volatility of returns. At first glance the stock market appears to be a hodgepodge: a roller coaster of up and down days that has no form, pattern, or logic. If this is all it is, then investing in the market for one's retirement would be a fool's decision—comparable to gambling, to which it has been equated. But gambling and investing are fundamentally different.

In gambling—whether horses, roulette, or the lottery—total winnings cannot exceed total wagers. Because the horse track, casino, and the state incur operating expenses associated with their betting games, winnings must be less than the total amount bet by the sum of the operating expenses. In other words, the bettor should expect to lose. For the bettor this is a negative-sum game.

Investing, on the other hand, is the owning of assets—such as construction equipment, computer software, or electrical power plants—that have the ability to make goods and services to produce wealth. The value of these assets, as represented by the stock market, fluctuates as investors change their views on the earning power of the assets. But over time, the stock market reflects economic growth and rising earnings, resulting in increased stock prices. For the investor this is a positive-sum game.

Stock prices, far from a hodgepodge, form patterns. The first is that over time, whether during prosperous periods or not, they tend to rise. From 1926 through 1996 the average annual nominal return from U.S. stocks was 10.89 percent, or 7.56 percent adjusted for inflation.[20] During this period we lived through the Great Depression, World War II, Vietnam, Watergate, spiraling then falling oil prices, war with Iraq, and the stock market crash on October 19, 1987—the worst single day since 1926.

Table 4

Worst and Best Average Annual Returns for Various Time Periods

Length of Time	Worst	Worst Interval	Best	Best Interval
20 years	3.36%	1929–1948	17.32%	1942–1961
25 years	6.00%	1929–1953	15.27%	1943–1967
30 years	8.53%	1928–1957	13.96%	1942–1971
46 years	7.32%	1929–1974	12.88%	1942–1987
63 years	9.72%	1929–1991	12.64%	1933–1995

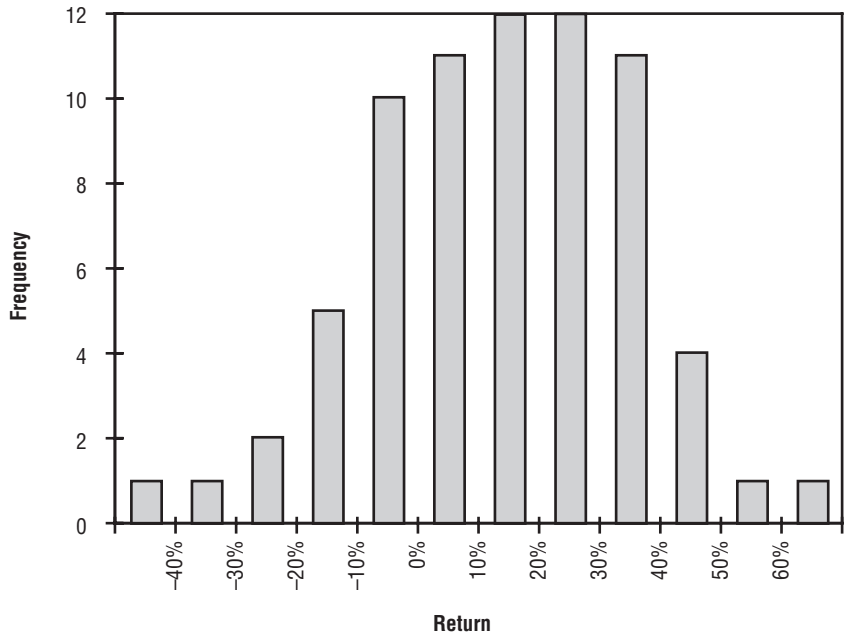
During shorter intervals, the upward bias in prices is also evident. This is true even during troubling times. Table 4 shows the worst and best 20, 25, 30, 46 and 63 consecutive years from 1926 through 1996. Forty-six years is chosen for it is the length of a working career starting at age 21 and ending at 67, the normal retirement age for workers born since 1960. At age 65 life expectancy is age 84. Thus, the period of 63 years, from age 21 to 84, is shown.

As will often be the case, lengthening the interval is consistent with its return being closer to the mean. This is important because the average market return during one's full working career determines the accumulated wealth at retirement—not a single year's change, whether it be high or low.

Although average returns in all cases were positive, there was volatility. Figure 2 shows this for the full period 1926 through 1996. It shows the distribution of annual returns of the U.S. market as defined above. The average of the annual returns is 13 percent. Most years clustered around the average plus or minus 20 percent. Only during very few years did the market do spectacularly well or poorly. This pattern of clustering around the average is common and is expressed using standard statistical techniques. (See Appendix C.) From this we estimate that about two-thirds of the time annual stock market returns were between –8 percent and 34 percent. Returns either side of this range occurred only 16 percent of the time. The pattern of historical returns is a reasonable starting point for estimating the probability that any future return will occur (Figure 2). But investors do not have to subject their retirement savings to any single market. Investing in many markets at the same time is a common way to reduce risk. Figure 3 is one illustration of this.

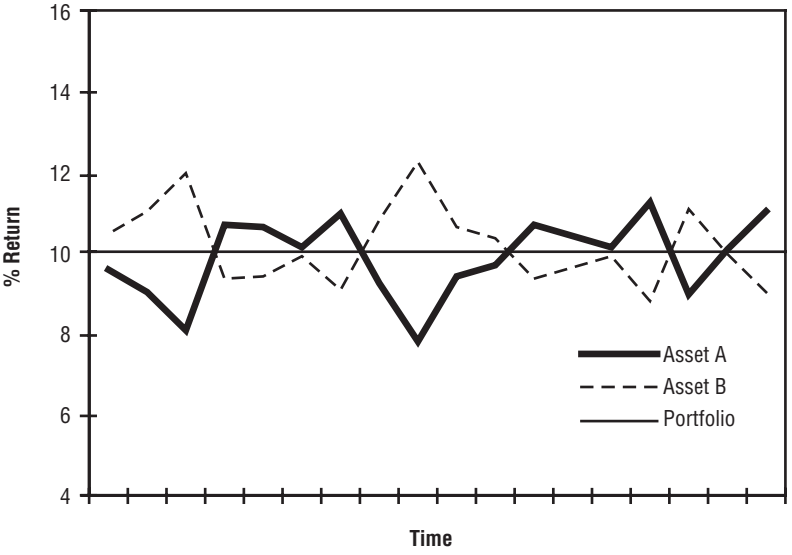
There is no need for a worker who chooses the market-based system to know how markets work as long as the pension system is properly structured and sensible guidelines are followed.

Figure 2
Distribution of Annual Returns of the U.S. Market



This is the annual return of a 90 percent large capitalization and 10 percent small capitalization equity portfolio. Data are from Ibbotson and Associates, *Stocks, Bonds, Bills and Inflation, 1997 Yearbook.*

Figure 3
Risk Reduced by Holding Two Uncorrelated Assets



The vertical axis is annual return and the horizontal axis is time. The bold line depicts a portfolio that averages a 10 percent return, but which is volatile. The dashed line is a portfolio that also averages a 10 percent return, except it moves in the opposite direction. An investment in either portfolio would earn a 10 percent return with volatility. But an equal investment in each portfolio would earn the same 10 percent with no volatility at all because of their perfect negative correlation.

It is common practice to construct portfolios using many different asset classes that are not highly correlated to achieve less risk for any given return. This diversification protects the investor from a dramatic fall in any single market. However, it also reduces the return to the portfolio from a single market's spectacular performance.

Given the financial structure of Social Security and the history of markets, one could reasonably estimate the future tradeoff between a pay-as-you-go and a market-based retirement system. The former will require tax increases and/or benefit cuts resulting in lower returns than projected under current law, which are already substantially below market rates for today's younger workers.[21] The latter would allow retirement benefits in excess of those from Social Security even if the stock market were to return only its worst long-run historical performance.

Objection #4: Although the stock market rises over the long term, it could collapse at the end of one's working career, leaving little or nothing for retirement.

Many critics of privatization admit that long-term private investment trends are positive, but warn that a short-term market drop could wipe out a retiree's gains just when he needs it most. History shows that short-term market drops can be significant. Tables 5–7 list the worst ten declines in percentage terms by day, month, and quarter from 1926 to 1996. Data are taken from S&P 500 1996 Directory.

As dramatic as they were, declines of this nature were infrequent. Figures 4 and 5 show the frequency of monthly and quarterly returns, respectively. The ten worst months, those with declines of 14 percent or more, represented only 1.2 percent of all months; and the ten worst quarters, declines of at least 18 percent, accounted for only 3.6 percent of the total.

Infrequent as they were, if one were unlucky enough to retire at such a time, the objection suggests that the worker would be financially devastated. At best, benefits would be less than those from Social Security.

To test this we assumed that low-, average-, high-, and maximum-income workers born from 1930 to 1976 invested all of their OASI taxes only in the U.S. stock market, earning actual annual returns through 1996 and 10 percent thereafter. One percentage point was deducted yearly for administrative expenses. Each starts working at age 21 and retires at the normal retirement age. Life expectancy is that assumed by Social Security.[22] Retirement benefits are adjusted to inflation and are exhausted at death. We then calculated how much the market would have to fall at the beginning of retirement so that benefits would equal those of Social Security. Figure 6 shows this for low-wage workers born from 1930 to 1976. (Columns labeled "Equity Market Crash Required to Equal Social Security Benefit" in Appendix B show this for all income workers.)

Contrary to the objection's implication, even if the stock market were to fall as dramatically as its worst day, month, or quarter in history, the market-based system, in every case but one, provides workers of all income levels and dates of birth substantially greater retirement benefits than Social Security.

Yet, it will always be possible to construct a scenario in which a worker is worse off in a market-based system.[23] Some analysts have posited this by assuming market rates of return will be dramatically less than the historical record while also assuming that Social Security taxes will not go up and that benefits will not go down.

Figure 7 shows nominal rates of return from markets and Social Security for low, average, high, and maximum wage earners born in 1976. The equity and balanced fund returns are from portfolios previously discussed, and assume returns during retirement of only 6.5 percent. Administrative fees of 1 percent are deducted every year. The first rate of return from Social Security is based on present law. The second assumes that benefits are cut enough to keep the system's cash flow in balance. For these workers, markets offer a rate of return, reasonably estimated to be higher than the government system. Social Security's returns have dropped as the system has matured: a certain characteristic of pay-as-you-go financing (see Appendix D). Yet, even assuming conservative market returns, Social Security earns consistently less, irrespective of one's date of birth or income.

Although most future market returns are inherently unknowable, high-quality long-term bonds presently yield between 7 and 7.75 percent. Also, the spread between stock and bond returns from 1926 to 1996 was about 5.5 per-

Table 5
Ten Worst Days—S&P 500 Total Return Index 1926–96

Rank	Day	Return
1	October 19, 1987	–20.47%
2	October 28, 1929	–12.34%
3	October 29, 1929	–10.16%
4	November 6, 1929	–9.92%
5	October 18, 1937	–9.27%
6	July 20, 1933	–8.88%
7	July 21, 1933	–8.70%
8	October 26, 1987	–8.28%
9	October 5, 1932	–8.20%
10	August 12, 1932	–8.02%

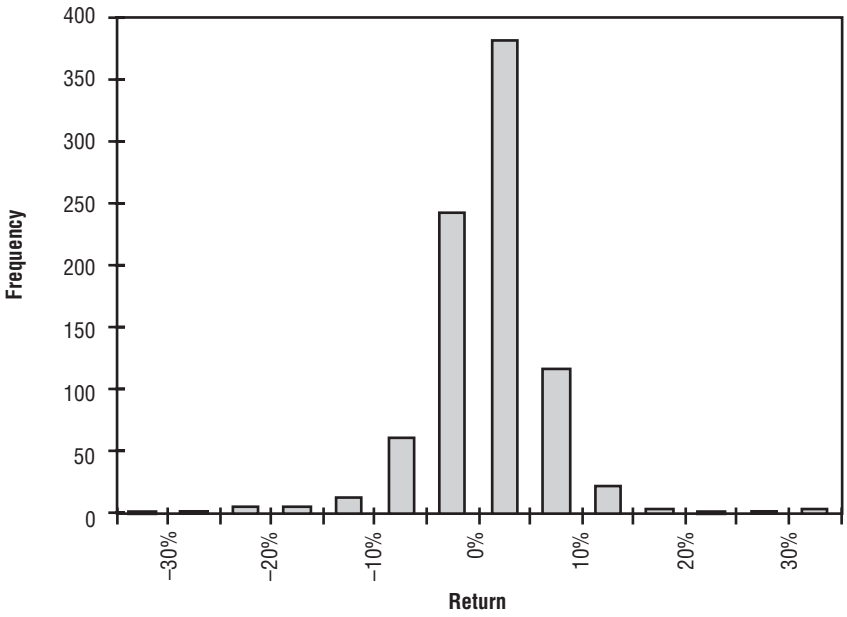
Table 6
Ten Worst Months—S&P 500 Total Return Index 1926–96

Rank	Month	Return
1	September, 1931	–29.73%
2	March, 1938	–24.87%
3	May, 1940	–22.89%
4	May, 1932	–21.96%
5	October, 1987	–21.52%
6	April, 1932	–19.97%
7	October, 1929	–19.73%
8	February, 1933	–17.72%
9	June, 1930	–16.25%
10	December, 1931	–14.00%

Table 7
Ten Worst Quarters—S&P 500 Total Return Index 1926–96

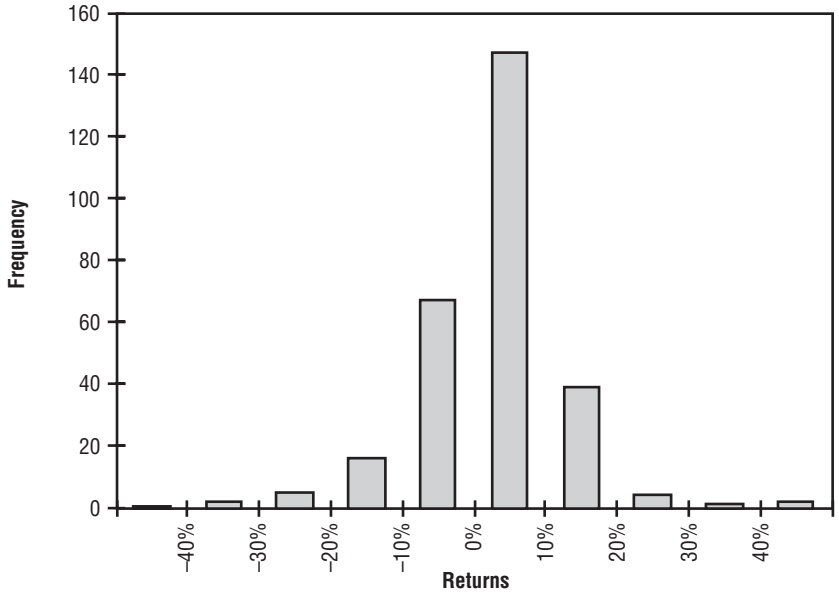
Rank	Quarter	Return
1	Second, 1932	–37.68%
2	Third, 1931	–33.61%
3	Fourth, 1929	–27.75%
4	Third, 1974	–25.16%
5	Fourth, 1987	–22.63%
6	Fourth, 1937	–21.40%
7	Second, 1962	–20.62%
8	First, 1938	–18.59%
9	Third, 1946	–18.04%
10	Second, 1970	–18.03%

Figure 4
Frequency of Monthly Returns



Note: Returns are calculated from the S&P 500 Total Return Index.

Figure 5
Frequency of Quarterly Returns



Note: Returns are calculated from the S&P 500 Total Return Index.

cent. Although the future stock premium may differ, the historical record suggests it will be positive: for all 30-year periods from 1802 through 1992, stocks outperformed bonds 99.38 percent of the time.[24] By using current market prices and established patterns that have existed for decades upon decades, it is reasonable to posit average annual equity nominal returns, over the long run, of 8 to 12 percent.

However, should some workers be influenced by an opposing view—that government-run Social Security would provide them higher returns and benefits than markets, even in the face of all the evidence to the contrary—then under most privatized structures they would have the right to stay in the system, as others would have the right to leave it so they can save and invest for themselves.

Objection #5: Markets cannot handle the volume of investment capital that a privatized system would create. This inability could cause a near-term "speculative bubble" during the years baby boomers are paying into the system and then a market collapse as they withdraw funds in their retirement years.

Critics of market-based Social Security have suggested that the flood of new capital as a result of privatization would cause a near-term "speculative bubble" during the years baby boomers are paying into the system and then a market collapse as they withdraw funds in their retirement years. However, the actual volume of new investment is unlikely to have a significant short-term impact on stock prices.

The 1997 taxable payroll subject to the Old-Age and Survivors Insurance tax of 10.70 percent is estimated to be $3.229 trillion.[25] The amount saved and invested depends on the market-based reform that is accepted, but it most probably would not exceed $346 billion (.107 × $3.229 trillion).

The impact of privatization on capital markets depends upon which markets receive the money and how liquid they are. To use a highly unlikely and restrictive case, assume that all the savings stayed in the U.S. and were invested only in stocks listed on the New York Stock Exchange (NYSE). For 1997 the NYSE is scheduled to be open 253 days, with minor exceptions from 9:30 AM to 4:00 PM. The average daily share volume during this year's first

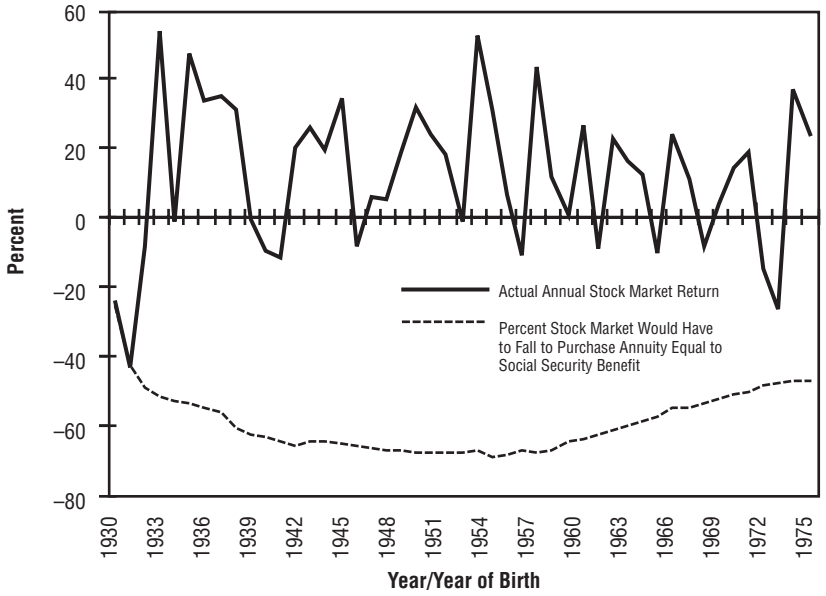
quarter was 517.4 million shares and the average price was $41.97. The average daily dollar volume was $21.7 billion. If the new savings were invested daily, then they would equal 6.3 percent of trading volume or only 25 minutes of the six and one-half hour trading day.[26]

As time passes they would account for even less. Social Security estimates that taxable payroll will increase in real terms by about 1 percent per year.[27] Holding the tax rate constant, the tax revenue to be invested would also increase by the same 1 percent. If the stock market's real annual return exceeds 1 percent—it has averaged 7.6 percent from 1926 through 1996—then the invested payroll tax becomes less and less a percent of the market. Assuming historical real rates of return, in 10 years the OASI tax would represent 16 minutes of daily trading (Figure 8).

The impact on the market would be less significant than the above analysis implies. Investment guidelines, as described in Objection #2, would require diversification across asset classes and borders. Assuming domestic stocks comprise 60 percent of portfolios, then related trading would account for only about 9 minutes a day in 10 years.

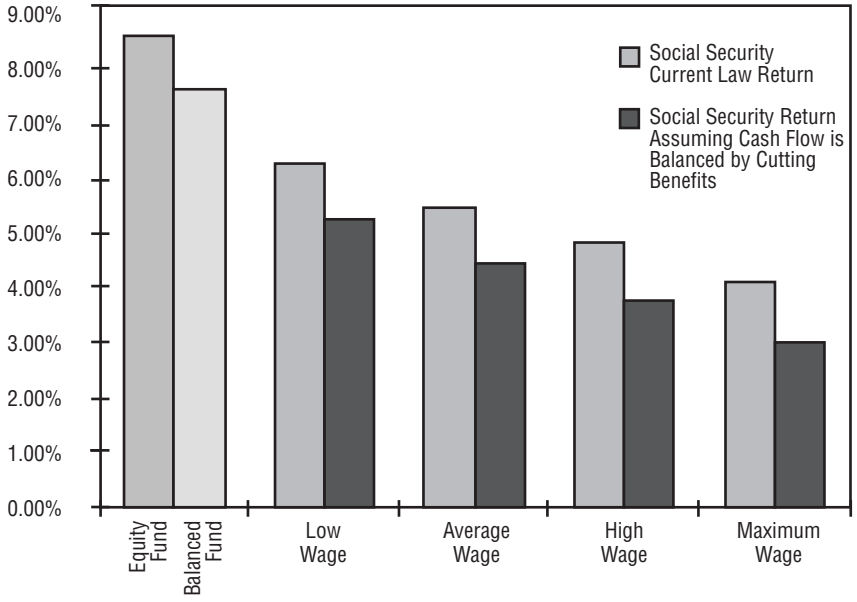
Beyond the issue of the OASI tax as a percentage of trading volume is the implication from the objection that money going into the market causes stock prices to rise. The common term for this purported causality is "buying power."[28] It employs the following logic: If Social Security taxes were to go into the market, and if the supply of stocks is relatively fixed, then by the law of supply and demand stock prices must rise. Given that for every buyer there is a seller, who with each transaction is taking money out of the market, then the logic could just as well be expressed from the seller's point of view, in this case referred to as "selling pressure." Specifically, with all the money coming out of the market, again assuming that the supply of stocks is relatively fixed, then by the law of supply and demand stock prices must fall. For any given transaction it can't be both. In fact, if all we know ahead of time is the money flows associated with a transaction, then we have no knowledge as to whether stock prices would go up, down, or stay the same. The change in stock prices is more reasonably caused by a change in information about the economic value of the firm or the market generally. The transactions then reflect readjustments of investors' asset class preferences; they are not the cause of the price change.[29]

Figure 6
Equity Market Crash Required for Market Benefits to Equal Those of Social Security for a Low-Wage Worker vs. Actual Annual Historical Returns



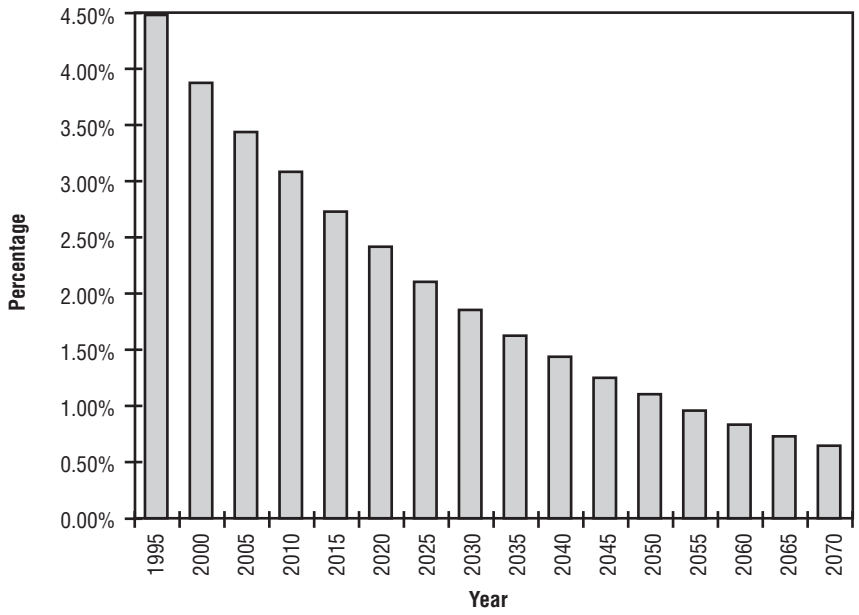
*Changes are Large Company Stocks Total Annual Returns from Ibbotson and Associates, *Stocks, Bonds, Bills and Inflation, 1997 Yearbook.*

Figure 7
Nominal Internal Rate of Return for Workers Born in 1976: Markets, Social Security under Current Law, and Social Security Assuming Cash Flow Is Balanced by Cutting Benefits



Internal rate of return calculations assume payments equal to OASI, employee and employer tax, and benefit payments from the normal retirement age to the Social Security Administration's projection of life expectancy at age 65. Market assumptions are the same as those used previously.

Figure 8
OASI Tax Flows as a Percentage of U.S. Market Capitalization



Moving to a privatized Social Security system is not risk-free. But the current Social Security system is also not risk-free.

Objection #6: Only the wealthy or the financially astute would choose the market-based system.

Some argue that a market-based system would appeal only to the wealthy, leaving the financially less-well-off to fend for themselves in a system ultimately destined to unravel. Because of the redistributive nature of the current Social Security benefit formula, the argument goes, high-income workers receive lower benefits per tax dollar paid than do low-income workers. Therefore, if high-income workers were allowed out of Social Security, the subsidy they are required to pay would end, leaving them better off at least by that amount. Lower income workers, on the other hand, would want to stay in Social Security because the subsidy they receive leaves them better off.

The argument is logical but incomplete. The relevant tradeoff is whether one is better off in Social Security, inclusive of subsidies paid or received, than in a market-based system without them. All workers, irrespective of income, will most likely choose the system that affords them the higher risk-adjusted benefits.

Unlike the pay-as-you-go structure where retirees' benefits are paid by workers' taxes, market-based benefits are determined by the savings rate during one's working years and the return on those savings. In estimating these benefits, we have assumed the savings rate to be the same as the combined employer and employee OASI tax rates listed in the 1997 Trustees Report. Simulated returns are from a stock portfolio and a balanced fund, both of which have been described.

As it turns out, the market-based system pays higher benefits to all workers irrespective of income, date of birth, chosen portfolio, or received subsidy. And low-wage workers' benefits average more than 100 percent higher than those from Social Security—without redistribution from high-wage workers. Both average and high-income workers do better as well. (See Appendix B.)

Our analysis suggests little to support the assertion that only high-income workers would choose a private alternative; workers of all income levels most likely would. It is important to note, however, that different savings rates or investment returns could materially change this conclusion. Yet, even at a 7 percent savings rate, benefits from investing in the stock market are significantly greater than Social Security's OASI benefits.[30]

Even though one would expect to receive higher benefits from markets, it is unknowable how many would choose to leave the current system. Whether because of inertia, being close to retirement, or for other reasons, some would stay. It is important that these individuals not be disenfranchised. They must receive the benefits they rightly have come to expect. The system will not unravel because too few or too many prefer the current system. Its future is ultimately dependent on whether benefits received are reasonable relative to taxes paid. On this score, Social Security's future is precarious.

Objection #7: A market-based system would necessitate high administrative costs, reducing returns to unacceptable levels.

One of the most frequently repeated objections to privatizing Social Security is that a market-based retirement system would have extremely high administrative costs. This is an important issue because even a small cost incurred annually can make a meaningful difference in accumulated wealth. For example, annu-

al savings of $3,000 over 46 years earning 10 percent per year accumulates to $2.9 million; at 8 percent the future value is only $1.4 million. What may appear to be an insignificant 2 percent difference actually reduces one's wealth by more than half.

The critics often seem to be trying to outdo each other in predicting astronomical fees and administrative costs. For example, consumer reporter Trudy Lieberman, writing in *The Nation*, suggests management and administrative expenses in excess of 13 percent![31] However, in reality, the administrative costs of a market-based system are not likely to be very high.

The costs associated with a market-based system are dependent on its structure. To get some approximation of what they may be, assume that all investments are in mutual funds, which are relatively high-cost investment vehicles.[32] Further, they are in five asset classes: U.S. stocks and bonds, developed world stocks and bonds, and money market instruments.

The term "expense ratio" is an expression of the costs charged by a mutual fund to its investors. These costs include investment advisory fees; deferred organizational costs; expenses for legal, auditing, and financial accounting services; administrative and custodian fees; as well as many others. Costs are deducted from the fund's return and they must be disclosed in the fund prospectus as a matter of law. An expense ratio of, say, 1.56 means that costs are 1.56 percent of the net asset value of the fund. Put differently, if the fund earned 10 percent, its after-cost annual return would be 8.44 percent.

There are many funds that invest in the five asset categories stated above. Table 8 gives one for each category and its expense ratio in 1997. Each fund is listed daily in the *Wall Street Journal*.

A portfolio containing the above funds, weighted as shown, would have a cumulative expense ratio of 37.9 basis points, or 37.9 one hundredths of one percentage point.

There may be other costs in a privatized system, but they likely would be a fraction of the expense ratio. But even if we assume they are high, total costs would be less than one percent of managed assets. The relevant consideration is not the expenses, per se, but the after-cost return to the investor. For most of the calculations of investment returns made in this paper, we have stipulated that expenses are one percent of managed assets. This assumption is liberal, therefore understating after-cost market returns.

Table 8
Expense Ratios for Various Mutual Funds and Their Theoretical Portfolio Weights

Type	Mutual Fund	Expense Ratio	Weight
U.S. Stocks	Vanguard Index 500	0.20%	60.0%
Foreign Stocks	SSgA Active International	1.00%	10.0%
U.S. Bonds	Dodge and Cox Income	0.54%	12.5%
Foreign Bonds	PIMCO Global	0.58%	12.5%
Money Market	SSgA Money Market	0.38%	5.0%

For support of these assumed weights, see Gordon P. Goodfellow and Sylvester J. Schieber, "Social Security Reform: Implications of Individual Accounts on the Distribution of Benefits," Pension Research Council of the Wharton School of the University of Pennsylvania, May 1997, pp. 36–38.

Objection #8: In many cases Social Security pays benefits to survivors of deceased workers. In a privatized system, survivors of the family wage earner would be left financially vulnerable.

Opponents of privatization point out that Social Security pays survivors benefits, suggesting that in a privatized system, a worker who dies before retirement would not have amassed enough wealth to care for his family members, leaving them financially vulnerable. However, a closer look at a market-based retirement system shows that such a system would, indeed, be able to provide for survivors.

One of the compelling arguments favoring a market-based system is the benefit of compounding investment returns: the concept of interest on interest. It is this phenomenon that allows—indeed, is necessary—for the buildup of wealth for a secure retirement. It is crucial in estimating benefits to survivors. Contrary to the above objection, in a market-based system most survivors, as defined by Social Security, will receive benefits equal to, or greater than, those from Social Security.

When one starts to collect Social Security benefits, one's spouse, assuming little or no earnings history, is eligible to collect about one half of the retired worker's full benefit. When the retiree dies his benefit ends, and the spousal benefit ends, but a new benefit is paid to the spouse that is ordinarily equal to the deceased worker's retirement benefit. This is called a survivor's benefit. At death, therefore, the total that

The risk of higher taxes relative to benefits in a government-mandated pay-as-you-go structure is real, significant and certain.

Even if the stock market were to fall as dramatically as its worst day, month, or quarter in history, the market-based system provides workers of all income levels greater retirement benefits than Social Security.

Social Security pays to this couple falls by one third: say from $1,500 to $1,000 per month. This category of survivors, aged widows and widowers, makes up approximately 85 percent of all survivors as well as their benefits.[33] They are not disadvantaged by a privatized system; in fact, they may be disadvantaged by Social Security. For in the former there is no necessary reduction in benefits as a consequence of death as there is in the latter. For these survivors—again, about 85 percent of the total—a market-based system offers greater retirement wealth than does Social Security.

The remaining 15 percent of survivors are largely disabled widows and widowers, children, and widowed mothers and fathers caring for child beneficiaries. Collectively, their annual benefits amount to about $13.7 billion, only 4.6 percent of fiscal 1996 total OASI benefit payments of $300 billion.[34] Children's benefits comprise $11.1 billion of the $13.7 billion.[35]

In some cases, the market-based structure would not be able to meet the financial burden resulting from an early death. Should this happen, remaining benefits could be financed through general revenues. It is important that no child left without a working parent because of tragedy be left without benefits. In other cases, such as when death occurs close to retirement—allowing for a significant accumulation of wealth—or when the survivors' ages are near the last year of eligibility (generally, eighteen years old), the amassed assets could finance most, if not all, of Social Security's equivalent survivors' benefits. The combined impact of these possibilities is that total government financing would be less than $13.7 billion. Beyond this, term life insurance can be purchased for individuals in their twenties for about $200 for $100,000 coverage. This is inexpensive protection during the time one is just starting out. Coverage can be reduced as assets are built.

Conclusion

The U.S. Social Security system is the largest government program in the world. For the most part it is highly regarded, and it touches the lives of millions of people. But it is no longer financially viable. A growing number of experts recognize that the only way to solve Social Security's problems is through harnessing the power of private capital markets.

As the debate over Social Security reform has moved to the mainstream, critics of privatization have raised a number of concerns that must be addressed before privatization can become a reality. However, a careful examination of these objections shows that they are not justified. Contrary to the critics' claims:

1. Low-income workers will benefit from privatization.
2. Ordinary Americans are perfectly capable of making the kind of investment decisions required under a well-structured market-based system.
3. While both a market-based retirement system and Social Security entail different types of risk, the former is actually less risky than the government system and should provide higher returns over the long run.
4. Given the estimated returns from a market-based system, a short-term market crash equal to the worst in history would not wipe out an individual's retirement savings.
5. The volume of new investment could easily be absorbed by financial markets without creating a speculative bubble.
6. A market-based system would appeal to individuals across all income, age, and education levels.
7. Administrative costs would not be excessive.
8. A market-based retirement system could provide survivors benefits equal to, if not greater than, the current Social Security system.

The privatization of Social Security is an idea whose time has come. While many issues of such a system's design, particularly transition measures, remain to be worked out, the most common criticisms of a market-based retirement system are unfounded and should not stand in the way of providing a better and more secure retirement program for today's workers.

Notes

The authors are grateful to Karl Borden, Peter Ferrara, Charlie Kenney, Larry Kotlikoff, Olivia Mitchell, Paul Schofield, and in particular Mike Tanner for his detailed comments and suggestions. We would also like to give special thanks to Bruce Schobel, whose contributions and extraordinary efforts greatly enhanced the quality of this work. As always, he was untiring in offering his time and wisdom. We take responsibility for all errors.

[1]For a detailed discussion of this issue, see Michael Tanner, "Privatizing Social Security: A Big Boost for the Poor," Cato Institute Social Security Paper no. 4, July 26, 1996.

[2]See *1997 Annual Report of The Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds*, p. 67, 208.

[3]Ibid., p. 185.

[4]Ibid., p. 178, and ANYPIA, Social Security Administration.

[5]See for instance Mitchell and Zeldes, "A Framework for Analyzing Social Security Privatization," *American Economic Review*, May 1996; Duggan, Gillingham, and Greenless, "Progressive Returns to Social Security? An Answer from the Social Security Records," unpublished paper, 1993.

[6]Constantijn W. A. Panis and Lee Lillard, "Socioeconomic Differentials in the Return to Social Security," RAND Corporation Working Paper Series no. 96–05, February 1996, p. 20.

[7]Ibid.

[8]Ibid., p. 14.

[9]Ibid., p. 20. The study also found a lifetime transfer of $50,000 from men to women.

[10]The age at which a person may first become entitled to unreduced retirement benefits. Currently age 65, but scheduled under present law to increase gradually to 67 for persons reaching that age in 2027 or later, beginning with an increase to 65 years and 2 months for persons reaching age 65 in 2003. (From *1997 Annual Report of The Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds*, p. 214.)

[11]See William G. Shipman, "Retiring with Dignity: Social Security vs. Private Markets," Cato Institute Social Security Paper no. 2, August 14, 1995. Also, Marshall N. Carter and William G. Shipman, *Promises to Keep: Saving Social Security's Dream* (Washington: Regnery Publishing, 1996), pp. 158–166.

[12]This assumes an equity return of 10 percent in the future and a bond market return of 7 percent in the future. Therefore a portfolio of 60 percent equities and 40 percent bonds yields an annual return of 8.8 percent under these assumptions.

[13]1994–1996 report of the Advisory Council on Social Security, p. 146.

[14]IFC Emerging Markets Factbook (Washington, D.C., 1996), p. 17.

[15]Ibid.

[16]See "Stocks, Bonds, Bills and Inflation" (Chicago: Ibbotson Associates, 1997), pp. 49–51 for a definition of small company and large company stocks.

[17]*1997 Annual Report of The Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds*, Table II.F19, p. 124.

[18]Ibid, Table II.B1, p. 34.

[19]*Report of the 1994–1996 Advisory Council on Social Security*, Volume I: Findings and Recommendations, Washington , DC, pp. 15–21.

[20]The stock portfolio computation, as well as all others in this paper, assume a portfolio of 90 percent large and 10 percent small company stocks. Historical returns are from "Stocks, Bonds, Bills and Inflation 1997 Yearbook," (Chicago: Ibbotson Associates), pp. 266–275, and are geometric means. A geometric mean takes into account the compounding of reinvested earnings and is always less than or equal to the arithmetic mean which is a summation of the individual annual returns divided by the number of returns. For a more formal explanation of the two concepts, see Z. Bodie, A. Kane, and A. Marcus, *Investments* (Boston: Irwin, 1996), pp. 775–778.

[21]See Appendix D or C. Eugene Steuerle and Jon M. Bakija, *Retooling Social Security for the 21st Century: Right & Wrong Approaches to Reform* (Washington, D.C.: The Urban Institute Press), Table A.9, p. 290.

[22]*1997 Annual Report of The Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds*, Table II.D2., p. 63.

[23]See Dean Baker, "Saving Social Security with Stocks: The Promises Don't Add Up," The Twentieth Century Fund/Economic Policy Institute Report, 1997.

[24]Jeremy J. Siegel, "Stocks for the Long Run" (Chicago: Irwin Professional Publishing), 1994, p. 31.

[25]*1997 Annual Report of The Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds*, p. 178.

[26]Data are from the NYSE Daily Market Summary Statistics at http://www.nyse.com/public/market/dmstoday.html.

[27]See 1997 Trustees Report, p. 178.

[28]For a more formal explanation of this issue, see R. David Ranson and William G. Shipman, "Institutional Buying Power and the Stock Market," *Financial Analysts Journal*, September–October 1981. Also see Jeffrey A. Frankel, *Financial Markets and Monetary Policy* (Cambridge, Mass.: The MIT Press), pp. 9–28.

[29]The authors are grateful to Karl Borden and Krzysztof Ostaszewski for their work on this issue. Note that this discussion does not include any effect of capital deepening, which will likely lead to long-term increases in both economic growth and stock prices. However, the gain from capital deepening is not the issue being raised by critics of privatization.

[30]Carter and Shipman, *Promises to Keep*, p. 169.

[31]Trudy Lieberman, "Social Insecurity: The Campaign to Privatize the System," *The Nation*, January 27, 1997, p. 12.

[32]For an extensive analysis of the administrative costs of various Social Security programs as well as potential costs of a private system, see Olivia Mitchell, "Administrative Costs in Public and Private Retirement Systems," NBER Working Paper #5734, 1996.

[33]*1997 Annual Report of The Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds*, Table II.C7., p. 52.

[34]1997 Trustees Report, p. 52.

[35]Ibid.

Although the future stock premium may differ, the historical record suggests it will be positive

Appendix A: Historical OASI Tax Rates (Employee and Employer Combined) and Tax Bases

Year	OASI Tax	Earnings Subject to Tax	Year	OASI Tax	Earnings Subject to Tax
1937	2.00%	$3,000	1967	7.10%	$6,600
1938	2.00%	$3,000	1968	6.65%	$7,800
1939	2.00%	$3,000	1969	7.45%	$7,800
1940	2.00%	$3,000	1970	7.30%	$7,800
1941	2.00%	$3,000	1971	8.10%	$7,800
1942	2.00%	$3,000	1972	8.10%	$9,000
1943	2.00%	$3,000	1973	8.60%	$10,800
1944	2.00%	$3,000	1974	8.75%	$13,200
1945	2.00%	$3,000	1975	8.75%	$14,100
1946	2.00%	$3,000	1976	8.75%	$15,300
1947	2.00%	$3,000	1977	8.78%	$16,500
1948	2.00%	$3,000	1978	8.55%	$17,700
1949	2.00%	$3,000	1979	8.66%	$22,900
1950	3.00%	$3,000	1980	9.04%	$25,900
1951	3.00%	$3,600	1981	9.40%	$29,700
1952	3.00%	$3,600	1982	9.15%	$32,400
1953	3.00%	$3,600	1983	9.55%	$35,700
1954	4.00%	$3,600	1984	10.40%	$37,800
1955	4.00%	$4,200	1985	10.40%	$39,600
1956	4.00%	$4,200	1986	10.40%	$42,000
1957	4.00%	$4,200	1987	10.40%	$43,800
1958	4.00%	$4,200	1988	11.06%	$45,000
1959	4.50%	$4,800	1989	11.06%	$48,000
1960	5.50%	$4,800	1990	11.20%	$51,300
1961	5.50%	$4,800	1991	11.20%	$53,400
1962	5.75%	$4,800	1992	11.20%	$55,500
1963	6.75%	$4,800	1993	11.20%	$57,600
1964	6.75%	$4,800	1994	10.52%	$60,600
1965	6.75%	$4,800	1995	10.52%	$61,200
1966	7.00%	$6,600	1996	10.52%	$62,700
			1997	10.70%	$65,400

Source: 1997 Social Security Trustees Report, Table II.B.1, p. 33.

Appendix B: Social Security Benefits vs. Market Benefits—Stock Fund

Maximum-Wage Worker ($65,400.00)
(Maximum Wage Subject to OASI Tax)
100% Equity Investment
Constant 1997 Dollars

						Replacement Rates			
Year of Birth	Year of Retirement	Age at Retirement*	Private Account Accumulations**	Private Annuity Monthly Benefit***	Social Security Projected Monthly Benefit	Private Annuity	Social Security	Increase in Private Annuity	Equity Market Crash Required to Equal Social Security Benefit****
1930	1995	65	$415,984.88	$2,566.81	$1,266.00	48%	24%	103%	51%
1931	1996	65	$545,539.41	$3,366.22	$1,287.00	64%	25%	162%	62%
1932	1997	65	$636,388.50	$3,909.33	$1,326.00	75%	25%	195%	66%
1933	1998	65	$665,819.62	$4,090.12	$1,318.00	77%	25%	210%	68%
1934	1999	65	$694,778.85	$4,249.17	$1,331.00	80%	25%	219%	69%
1935	2000	65	$726,234.93	$4,441.55	$1,352.00	83%	25%	229%	70%
1936	2001	65	$759,926.71	$4,627.23	$1,374.00	87%	26%	237%	70%
1937	2002	65	$794,289.36	$4,836.47	$1,393.00	90%	26%	247%	71%
1938	2003	65:2	$906,947.20	$5,490.46	$1,403.00	102%	26%	291%	74%
1939	2004	65:4	$958,443.25	$5,844.54	$1,422.00	108%	27%	311%	76%
1940	2005	65:6	$1,000,772.79	$6,093.76	$1,447.00	111%	27%	321%	76%
1941	2006	65:8	$1,046,085.41	$6,416.60	$1,468.00	116%	27%	337%	77%
1942	2007	65:10	$1,093,472.90	$6,757.29	$1,493.00	121%	28%	353%	78%
1943	2009	66	$1,129,985.86	$7,035.65	$1,520.00	120%	27%	363%	78%
1944	2010	66	$1,179,877.70	$7,346.29	$1,542.00	124%	27%	376%	79%
1945	2011	66	$1,234,058.67	$7,635.20	$1,562.00	128%	27%	389%	80%
1946	2012	66	$1,283,182.31	$7,939.13	$1,583.00	132%	27%	402%	80%
1947	2013	66	$1,335,085.77	$8,260.26	$1,604.00	136%	27%	415%	81%
1948	2014	66	$1,390,614.59	$8,603.82	$1,625.00	140%	28%	429%	81%
1949	2015	66	$1,445,046.28	$8,940.59	$1,644.00	143%	27%	444%	82%
1950	2016	66	$1,499,823.98	$9,197.07	$1,661.00	148%	28%	454%	82%
1951	2017	66	$1,554,791.31	$9,534.14	$1,679.00	152%	28%	468%	82%
1952	2018	66	$1,610,881.88	$9,878.09	$1,695.00	156%	28%	483%	83%
1953	2019	66	$1,657,202.26	$10,162.13	$1,711.00	159%	28%	494%	83%
1954	2020	66	$1,673,387.95	$10,261.38	$1,727.00	159%	28%	494%	83%
1955	2021	66:2	$1,833,585.91	$11,145.29	$1,742.00	171%	28%	540%	84%
1956	2022	66:4	$1,856,798.50	$11,369.30	$1,758.00	173%	28%	547%	85%
1957	2023	66:6	$1,878,115.51	$11,096.09	$1,774.00	168%	28%	525%	84%
1958	2024	66:8	$1,892,372.18	$11,761.15	$1,790.00	176%	28%	557%	85%
1959	2025	66:10	$1,886,487.09	$11,813.93	$1,808.00	175%	29%	553%	85%
1960	2027	67	$1,881,756.65	$11,766.34	$1,829.00	166%	28%	543%	84%
1961	2028	67	$1,861,867.29	$11,731.59	$1,845.00	164%	28%	536%	84%
1962	2029	67	$1,836,168.56	$11,569.66	$1,861.00	160%	28%	522%	84%
1963	2030	67	$1,810,305.90	$11,406.70	$1,877.00	157%	28%	508%	84%
1964	2031	67	$1,773,475.41	$11,174.63	$1,893.00	152%	28%	490%	83%
1965	2032	67	$1,742,302.23	$10,877.78	$1,910.00	147%	28%	470%	82%
1966	2033	67	$1,722,186.87	$10,752.20	$1,927.00	144%	28%	458%	82%
1967	2034	67	$1,700,534.82	$10,617.01	$1,943.00	135%	28%	446%	82%
1968	2035	67	$1,671,401.54	$10,435.13	$1,961.00	137%	28%	432%	81%
1969	2036	67	$1,651,314.17	$10,309.71	$1,977.00	134%	28%	421%	81%
1970	2037	67	$1,625,736.05	$10,013.59	$1,994.00	130%	28%	402%	80%
1971	2038	67	$1,600,316.75	$9,857.02	$2,012.00	126%	28%	390%	80%
1972	2039	67	$1,583,478.85	$9,753.31	$2,029.00	124%	28%	381%	79%
1973	2040	67	$1,565,715.39	$9,643.90	$2,046.00	122%	28%	371%	79%
1974	2041	67	$1,548,285.47	$9,536.54	$2,062.00	119%	28%	362%	78%
1975	2042	67	$1,540,093.85	$9,402.43	$2,079.00	116%	28%	352%	78%
1976	2043	67	$1,547,859.54	$9,449.84	$2,097.00	116%	28%	351%	78%
Average								395%	78%

*This is the Normal Retirement Age currently stipulated by law.

**Accumulations assume work from age 21 to retirement and contributions are equal to OASI employee and employer taxes. Returns are historical returns minus 1% from 1951 to 1996 and are assumed to be 9% net of administrative costs from 1997 forward.

***The annuity assumes a bond return of 6.5% each year and payments increasing at 3.5% each year and are made from retirement to the average life expectancy of a 65 year old as forecast by the Social Security Administration.

****This is the percent that the equity market would have to fall in the year of retirement to give an annuity benefit equal to that of Social Security.

Appendix B: Social Security Benefits vs. Market Benefits—Stock Fund (Continued)

High-Wage Worker ($42,770.94)
100% Equity Investment
Constant 1997 Dollars

						Replacement Rates			
Year of Birth	Year of Retirement	Age at Retirement*	Private Account Accumulations**	Private Annuity Monthly Benefit***	Social Security Projected Monthly Benefit	Private Annuity	Social Security	Increase in Private Annuity	Equity Market Crash Required to Equal Social Security Benefit****
1930	1995	65	$357,795.32	$2,207.75	$1,160.00	66%	35%	90%	47%
1931	1996	65	$465,675.57	$2,873.42	$1,173.00	85%	35%	145%	59%
1932	1997	65	$539,825.02	$3,316.14	$1,236.00	97%	36%	168%	63%
1933	1998	65	$561,389.71	$3,448.61	$1,187.00	100%	34%	191%	66%
1934	1999	65	$581,995.00	$3,559.40	$1,193.00	103%	35%	198%	66%
1935	2000	65	$604,843.70	$3,699.14	$1,204.00	107%	35%	207%	67%
1936	2001	65	$629,584.82	$3,833.57	$1,217.00	110%	35%	215%	68%
1937	2002	65	$654,540.49	$3,985.53	$1,228.00	113%	35%	225%	69%
1938	2003	65:2	$743,531.41	$4,501.18	$1,231.00	188%	35%	266%	73%
1939	2004	65:4	$774,540.39	$4,723.11	$1,242.00	132%	35%	280%	74%
1940	2005	65:6	$804,075.97	$4,896.06	$1,254.00	136%	35%	290%	74%
1941	2006	65:8	$835,961.05	$5,127.71	$1,264.00	141%	36%	306%	75%
1942	2007	65:10	$869,164.06	$5,371.14	$1,278.00	146%	36%	320%	76%
1943	2009	66	$901,033.70	$5,610.12	$1,294.00	145%	35%	334%	77%
1944	2010	66	$936,088.80	$5,828.38	$1,306.00	149%	35%	346%	78%
1945	2011	66	$974,613.26	$6,029.99	$1,318.00	153%	35%	358%	78%
1946	2012	66	$1,007,231.61	$6,231.80	$1,330.00	157%	35%	369%	79%
1947	2013	66	$1,041,729.60	$6,445.25	$1,341.00	161%	35%	381%	79%
1948	2014	66	$1,078,899.88	$6,675.22	$1,352.00	165%	35%	394%	80%
1949	2015	66	$1,113,859.75	$6,891.52	$1,364.00	169%	35%	405%	80%
1950	2016	66	$1,148,219.37	$7,041.00	$1,375.00	171%	35%	412%	80%
1951	2017	66	$1,181,663.27	$7,246.08	$1,388.00	175%	35%	422%	81%
1952	2018	66	$1,215,063.97	$7,450.90	$1,400.00	178%	35%	432%	81%
1953	2019	66	$1,237,464.58	$7,588.26	$1,412.00	180%	35%	437%	81%
1954	2020	66	$1,230,572.18	$7,545.99	$1,424.00	177%	35%	430%	81%
1955	2021	66:2	$1,328,291.05	$8,073.90	$1,437.00	188%	35%	462%	82%
1956	2022	66:4	$1,322,716.82	$8,099.08	$1,449.00	187%	35%	459%	82%
1957	2023	66:6	$1,315,312.25	$7,770.99	$1,462.00	178%	35%	432%	81%
1958	2024	66:8	$1,299,199.37	$8,074.57	$1,474.00	183%	36%	448%	82%
1959	2025	66:10	$1,280,191.43	$8,017.07	$1,489.00	180%	36%	438%	81%
1960	2027	67	$1,265,012.86	$7,909.93	$1,506.00	169%	35%	425%	81%
1961	2028	67	$1,242,509.04	$7,829.02	$1,518.00	166%	35%	416%	81%
1962	2029	67	$1,218,540.04	$7,677.99	$1,532.00	161%	35%	401%	80%
1963	2030	67	$1,198,764.45	$7,553.39	$1,545.00	157%	35%	389%	80%
1964	2031	67	$1,171,387.09	$7,380.88	$1,559.00	152%	35%	373%	79%
1965	2032	67	$1,148,199.74	$7,168.60	$1,572.00	147%	35%	356%	78%
1966	2033	67	$1,134,845.49	$7,085.22	$1,586.00	144%	35%	347%	78%
1967	2034	67	$1,118,843.02	$6,985.32	$1,599.00	140%	35%	337%	77%
1968	2035	67	$1,095,871.64	$6,841.90	$1,613.00	136%	35%	324%	76%
1969	2036	67	$1,081,036.71	$6,749.28	$1,628.00	133%	35%	315%	76%
1970	2037	67	$1,064,202.11	$6,554.87	$1,642.00	128%	35%	299%	75%
1971	2038	67	$1,047,751.06	$6,453.54	$1,656.00	125%	35%	290%	74%
1972	2039	67	$1,036,056.61	$6,381.51	$1,670.00	123%	35%	282%	74%
1973	2040	67	$1,025,811.81	$6,318.41	$1,685.00	121%	35%	275%	73%
1974	2041	67	$1,017,559.83	$6,267.58	$1,700.00	119%	35%	269%	73%
1975	2042	67	$1,013,352.12	$6,186.62	$1,714.00	116%	35%	261%	72%
1976	2043	67	$1,018,615.98	$6,218.75	$1,729.00	116%	35%	260%	72%
Average								329%	75%

*This is the Normal Retirement Age currently stipulated by law.

**Accumulations assume work from age 21 to retirement and contributions are equal to OASI employee and employer taxes. Returns are historical returns minus 1% from 1951 to 1996 and are assumed to be 9% net of administrative costs from 1997 forward.

***The annuity assumes a bond return of 6.5% each year and payments increasing at 3.5% each year and are made from retirement to the average life expectancy of a 65 year old as forecast by the Social Security Administration.

****This is the percent that the equity market would have to fall in the year of retirement to give an annuity benefit equal to that of Social Security.

Appendix B: Social Security Benefits vs. Market Benefits—Stock Fund (Continued)

Average-Wage Worker ($26,731.84)
100% Equity Investment
Constant 1997 Dollars

						Replacement Rates			
Year of Birth	Year of Retirement	Age at Retirement*	Private Account Accumulations**	Private Annuity Monthly Benefit***	Social Security Projected Monthly Benefit	Private Annuity	Social Security	Increase in Private Annuity	Equity Market Crash Required to Equal Social Security Benefit****
1930	1995	65	$255,657.93	$1,577.52	$905.00	75%	43%	74%	43%
1931	1996	65	$331,442.15	$2,045.14	$914.00	96%	43%	124%	55%
1932	1997	65	$382,270.16	$2,348.28	$933.00	110%	44%	152%	60%
1933	1998	65	$394,967.83	$2,426.28	$920.00	112%	43%	164%	62%
1934	1999	65	$406,433.16	$2,485.69	$922.00	115%	43%	170%	63%
1935	2000	65	$420,896.95	$2,574.15	$929.00	119%	43%	177%	64%
1936	2001	65	$435,981.51	$2,654.71	$936.00	122%	43%	184%	65%
1937	2002	65	$450,619.01	$2,743.84	$943.00	125%	43%	191%	66%
1938	2003	65:2	$508,958.53	$3,081.12	$942.00	139%	43%	227%	69%
1939	2004	65:4	$528,097.42	$3,220.31	$948.00	144%	43%	240%	71%
1940	2005	65:6	$545,176.31	$3,319.61	$955.00	147%	43%	248%	71%
1941	2006	65:8	$563,586.19	$3,456.99	$961.00	152%	43%	260%	72%
1942	2007	65:10	$581,897.35	$3,595.93	$969.00	157%	44%	271%	73%
1943	2009	66	$597,969.28	$3,723.14	$981.00	154%	42%	280%	74%
1944	2010	66	$615,814.84	$3,834.26	$990.00	157%	42%	287%	74%
1945	2011	66	$635,843.22	$3,934.00	$999.00	160%	42%	294%	75%
1946	2012	66	$654,636.30	$4,050.28	$1,007.00	163%	42%	302%	75%
1947	2013	66	$673,517.12	$4,167.09	$1,016.00	166%	42%	310%	76%
1948	2014	66	$695,836.78	$4,305.19	$1,025.00	170%	42%	320%	76%
1949	2015	66	$715,201.36	$4,424.99	$1,034.00	174%	42%	328%	77%
1950	2016	66	$732,595.68	$4,492.35	$1,043.00	175%	42%	331%	77%
1951	2017	66	$747,413.68	$4,583.22	$1,052.00	177%	42%	336%	77%
1952	2018	66	$762,901.76	$4,678.19	$1,061.00	179%	42%	341%	77%
1953	2019	66	$773,415.36	$4,742.66	$1,071.00	180%	42%	343%	77%
1954	2020	66	$769,107.61	$4,716.25	$1,080.00	177%	42%	337%	77%
1955	2021	66:2	$827,216.51	$5,028.16	$1,090.00	187%	42%	361%	78%
1956	2022	66:4	$824,310.23	$5,047.31	$1,099.00	186%	43%	359%	78%
1957	2023	66:6	$820,270.25	$4,846.24	$1,109.00	177%	43%	337%	77%
1958	2024	66:8	$810,797.98	$5,039.14	$1,118.00	183%	43%	351%	78%
1959	2025	66:10	$799,526.85	$5,006.96	$1,130.00	180%	43%	343%	77%
1960	2027	67	$790,633.04	$4,943.71	$1,145.00	169%	42%	332%	77%
1961	2028	67	$776,568.15	$4,893.14	$1,154.00	166%	42%	324%	76%
1962	2029	67	$761,587.52	$4,798.75	$1,164.00	161%	42%	312%	76%
1963	2030	67	$749,227.78	$4,720.87	$1,175.00	157%	42%	302%	75%
1964	2031	67	$732,116.93	$4,613.05	$1,185.00	152%	42%	289%	74%
1965	2032	67	$717,624.84	$4,480.37	$1,195.00	147%	42%	275%	73%
1966	2033	67	$709,278.43	$4,428.27	$1,205.00	144%	42%	267%	73%
1967	2034	67	$699,276.89	$4,365.82	$1,216.00	135%	42%	259%	72%
1968	2035	67	$684,919.78	$4,276.19	$1,227.00	136%	42%	249%	71%
1969	2036	67	$675,647.95	$4,218.30	$1,237.00	133%	42%	241%	71%
1970	2037	67	$665,126.32	$4,096.79	$1,248.00	128%	42%	228%	70%
1971	2038	67	$654,844.41	$4,033.46	$1,259.00	125%	42%	220%	69%
1972	2039	67	$647,535.38	$3,988.44	$1,270.00	123%	42%	214%	68%
1973	2040	67	$641,132.38	$3,949.00	$1,281.00	121%	42%	208%	68%
1974	2041	67	$635,974.89	$3,917.24	$1,292.00	119%	42%	203%	67%
1975	2042	67	$633,345.08	$3,866.64	$1,303.00	116%	42%	197%	66%
1976	2043	67	$636,634.99	$3,886.72	$1,315.00	116%	42%	196%	66%
Average								263%	71%

*This is the Normal Retirement Age currently stipulated by law.

**Accumulations assume work from age 21 to retirement and contributions are equal to OASI employee and employer taxes. Returns are historical returns minus 1% from 1951 to 1996 and are assumed to be 9% net of administrative costs from 1997 forward.

***The annuity assumes a bond return of 6.5% each year and payments increasing at 3.5% each year and are made from retirement to the average life expectancy of a 65 year old as forecast by the Social Security Administration.

****This is the percent that the equity market would have to fall in the year of retirement to give an annuity benefit equal to that of Social Security.

Appendix B: Social Security Benefits vs. Market Benefits—Stock Fund (Continued)

Low-Wage Worker ($13,365.92)
100% Equity Investment
Constant 1997 Dollars

Year of Birth	Year of Retirement	Age at Retirement*	Private Account Accumulations**	Private Annuity Monthly Benefit***	Social Security Projected Monthly Benefit	Replacement Rates: Private Annuity	Replacement Rates: Social Security	Increase in Private Annuity	Equity Market Crash Required to Equal Social Security Benefit****
1930	1995	65	$127,828.97	$788.76	$581.00	75%	56%	36%	26%
1931	1996	65	$165,721.07	$1,022.57	$587.00	96%	55%	74%	43%
1932	1997	65	$191,135.08	$1,174.14	$599.00	110%	56%	96%	49%
1933	1998	65	$197,483.92	$1,213.14	$591.00	112%	55%	105%	51%
1934	1999	65	$203,216.58	$1,242.84	$592.00	115%	55%	110%	52%
1935	2000	65	$210,448.48	$1,287.07	$596.00	119%	55%	116%	54%
1936	2001	65	$217,990.76	$1,327.36	$600.00	122%	55%	121%	55%
1937	2002	65	$225,309.51	$1,371.92	$604.00	125%	55%	127%	56%
1938	2003	65:2	$254,479.26	$1,540.56	$604.00	139%	55%	155%	61%
1939	2004	65:4	$266,479.47	$1,624.98	$608.00	145%	55%	167%	63%
1940	2005	65:6	$275,095.98	$1,675.07	$612.00	148%	55%	174%	63%
1941	2006	65:8	$284,380.29	$1,744.36	$616.00	153%	56%	183%	65%
1942	2007	65:10	$298,705.27	$1,845.90	$621.00	161%	56%	197%	66%
1943	2009	66	$298,984.64	$1,861.57	$629.00	154%	54%	196%	66%
1944	2010	66	$307,907.42	$1,917.13	$634.00	157%	54%	202%	67%
1945	2011	66	$317,921.61	$1,967.00	$640.00	160%	54%	207%	67%
1946	2012	66	$327,318.15	$2,025.14	$646.00	163%	54%	213%	68%
1947	2013	66	$336,758.56	$2,083.55	$651.00	166%	54%	220%	69%
1948	2014	66	$347,918.39	$2,152.59	$657.00	170%	54%	228%	69%
1949	2015	66	$357,600.68	$2,212.50	$662.00	174%	54%	234%	70%
1950	2016	66	$366,297.84	$2,246.18	$668.00	175%	54%	236%	70%
1951	2017	66	$373,706.84	$2,291.61	$674.00	177%	54%	240%	71%
1952	2018	66	$381,450.88	$2,339.10	$680.00	179%	54%	244%	71%
1953	2019	66	$386,707.68	$2,371.33	$686.00	180%	54%	246%	71%
1954	2020	66	$384,553.81	$2,358.12	$692.00	177%	54%	241%	71%
1955	2021	66:2	$413,619.19	$2,514.15	$698.00	187%	54%	260%	72%
1956	2022	66:4	$412,177.17	$2,523.79	$704.00	186%	55%	258%	72%
1957	2023	66:6	$410,168.50	$2,423.31	$710.00	178%	55%	241%	71%
1958	2024	66:8	$405,443.88	$2,519.85	$716.00	183%	55%	252%	72%
1959	2025	66:10	$399,820.03	$2,503.83	$724.00	180%	56%	246%	71%
1960	2027	67	$395,316.52	$2,471.85	$732.00	169%	54%	238%	70%
1961	2028	67	$388,284.08	$2,446.57	$739.00	166%	54%	231%	70%
1962	2029	67	$380,793.76	$2,399.37	$745.00	161%	54%	222%	69%
1963	2030	67	$374,613.89	$2,360.43	$751.00	157%	54%	214%	68%
1964	2031	67	$366,058.46	$2,306.53	$758.00	152%	54%	204%	67%
1965	2032	67	$358,812.42	$2,240.19	$765.00	147%	54%	193%	66%
1966	2033	67	$354,639.22	$2,214.13	$771.00	144%	54%	187%	65%
1967	2034	67	$349,638.44	$2,182.91	$778.00	135%	54%	181%	64%
1968	2035	67	$342,459.89	$2,138.09	$785.00	136%	54%	172%	63%
1969	2036	67	$337,823.97	$2,109.15	$792.00	133%	54%	166%	62%
1970	2037	67	$332,563.16	$2,048.40	$799.00	128%	54%	156%	61%
1971	2038	67	$327,422.21	$2,016.73	$805.00	125%	54%	151%	60%
1972	2039	67	$323,767.69	$1,994.22	$813.00	123%	54%	145%	59%
1973	2040	67	$320,566.19	$1,974.50	$820.00	121%	54%	141%	58%
1974	2041	67	$317,987.45	$1,958.62	$827.00	119%	54%	137%	58%
1975	2042	67	$316,672.54	$1,933.32	$834.00	116%	54%	132%	57%
1976	2043	67	$318,317.49	$1,943.36	$841.00	116%	54%	131%	57%
Average								184%	63%

*This is the Normal Retirement Age currently stipulated by law.

**Accumulations assume work from age 21 to retirement and contributions are equal to OASI employee and employer taxes. Returns are historical returns minus 1% from 1951 to 1996 and are assumed to be 9% net of administrative costs from 1997 forward.

***The annuity assumes a bond return of 6.5% each year and payments increasing at 3.5% each year and are made from retirement to the average life expectancy of a 65 year old as forecast by the Social Security Administration.

****This is the percent that the equity market would have to fall in the year of retirement to give an annuity benefit equal to that of Social Security.

Appendix B: Social Security Benefits vs. Market Benefits—Balanced Fund (Continued)

Maximum-Wage Worker ($65,400.00)
(Maximum Wage Subject to OASI Tax)
Balanced Fund Investment (60% equities and 40% bonds)
Constant 1997 Dollars

						Replacement Rates			
Year of Birth	Year of Retirement	Age at Retirement*	Private Account Accumulations**	Private Annuity Monthly Benefit***	Social Security Projected Monthly Benefit	Private Annuity	Social Security	Increase in Private Annuity	Equity Market Crash Required to Equal Social Security Benefit****
1930	1995	65	$334,064.11	$2,061.32	$1,266.00	39%	24%	63%	64%
1931	1996	65	$434,800.28	$2,682.91	$1,287.00	51%	25%	108%	87%
1932	1997	65	$475,980.79	$2,923.95	$1,326.00	56%	25%	121%	91%
1933	1998	65	$498,635.53	$3,063.11	$1,318.00	58%	25%	132%	95%
1934	1999	65	$521,121.15	$3,187.11	$1,331.00	60%	25%	139%	97%
1935	2000	65	$544,009.90	$3,327.09	$1,352.00	62%	25%	146%	99%
1936	2001	65	$567,535.80	$3,455.75	$1,374.00	65%	26%	152%	100%
1937	2002	65	$591,666.86	$3,602.69	$1,393.00	67%	26%	159%	102%
1938	2003	65:2	$666,136.29	$4,032.64	$1,403.00	75%	26%	187%	109%
1939	2004	65:4	$694,722.95	$4,236.39	$1,422.00	79%	27%	198%	111%
1940	2005	65:6	$722,935.57	$4,401.99	$1,447.00	81%	27%	204%	112%
1941	2006	65:8	$752,634.81	$4,616.60	$1,468.00	84%	27%	214%	114%
1942	2007	65:10	$783,514.11	$4,841.85	$1,493.00	88%	28%	224%	115%
1943	2009	66	$814,129.22	$5,069.02	$1,520.00	86%	27%	233%	117%
1944	2010	66	$845,500.60	$5,264.35	$1,542.00	89%	27%	241%	118%
1945	2011	66	$878,763.98	$5,436.97	$1,562.00	91%	27%	248%	119%
1946	2012	66	$908,862.12	$5,623.19	$1,583.00	93%	27%	255%	120%
1947	2013	66	$939,986.01	$5,815.75	$1,604.00	96%	27%	263%	121%
1948	2014	66	$971,886.88	$6,013.12	$1,625.00	98%	28%	270%	122%
1949	2015	66	$1,002,493.03	$6,202.49	$1,644.00	99%	27%	277%	122%
1950	2016	66	$1,033,566.22	$6,337.93	$1,661.00	102%	28%	282%	123%
1951	2017	66	$1,064,925.94	$6,530.23	$1,679.00	104%	28%	289%	124%
1952	2018	66	$1,096,271.09	$6,722.45	$1,695.00	106%	28%	297%	125%
1953	2019	66	$1,122,038.78	$6,880.46	$1,711.00	108%	28%	302%	125%
1954	2020	66	$1,134,884.93	$6,959.23	$1,727.00	108%	28%	303%	125%
1955	2021	66:2	$1,235,771.39	$7,511.53	$1,742.00	115%	28%	331%	128%
1956	2022	66:4	$1,253,309.18	$7,674.09	$1,758.00	117%	28%	337%	128%
1957	2023	66:6	$1,270,223.35	$7,504.60	$1,774.00	113%	28%	323%	127%
1958	2024	66:8	$1,283,793.71	$7,978.82	$1,790.00	119%	28%	346%	129%
1959	2025	66:10	$1,284,203.86	$8,042.20	$1,808.00	119%	29%	345%	129%
1960	2027	67	$1,279,639.36	$8,001.39	$1,829.00	113%	28%	337%	129%
1961	2028	67	$1,262,192.92	$7,953.05	$1,845.00	111%	28%	331%	128%
1962	2029	67	$1,245,102.04	$7,845.36	$1,861.00	109%	28%	322%	127%
1963	2030	67	$1,228,617.44	$7,741.49	$1,877.00	106%	28%	312%	126%
1964	2031	67	$1,205,651.03	$7,596.78	$1,893.00	103%	28%	301%	125%
1965	2032	67	$1,188,629.65	$7,421.02	$1,910.00	100%	28%	289%	124%
1966	2033	67	$1,179,404.87	$7,363.42	$1,927.00	99%	28%	282%	123%
1967	2034	67	$1,170,185.64	$7,305.86	$1,943.00	93%	28%	276%	122%
1968	2035	67	$1,156,267.28	$7,218.97	$1,961.00	95%	28%	268%	121%
1969	2036	67	$1,146,334.80	$7,156.96	$1,977.00	93%	28%	262%	121%
1970	2037	67	$1,134,591.08	$6,988.42	$1,994.00	90%	28%	250%	119%
1971	2038	67	$1,124,336.30	$6,925.26	$2,012.00	89%	28%	244%	118%
1972	2039	67	$1,118,632.58	$6,890.13	$2,029.00	88%	28%	240%	118%
1973	2040	67	$1,113,863.41	$6,860.75	$2,046.00	86%	28%	235%	117%
1974	2041	67	$1,109,809.75	$6,835.78	$2,062.00	85%	28%	232%	116%
1975	2042	67	$1,110,249.50	$6,778.18	$2,079.00	84%	28%	226%	116%
1976	2043	67	$1,118,023.48	$6,825.65	$2,097.00	84%	28%	225%	115%
Average								247%	116%

*This is the Normal Retirement Age currently stipulated by law.

**Accumulations assume work from age 21 to retirement and contributions are equal to OASI employee and employer taxes. Returns are historical returns minus 1% from 1951 to 1996 and are assumed to be 7.8% net of administrative costs from 1997 forward.

***The annuity assumes a bond return of 6.5% each year and payments increasing at 3.5% each year and are made from retirement to the average life expectancy of a 65 year old as forecast by the Social Security Administration

****This is the percent that the equity market portion of the portfolio would have to fall in the year of retirement to give an annuity benefit equal to that of Social Security.

Appendix B: Social Security Benefits vs. Market Benefits—Balanced Fund (Continued)

High-Wage Worker ($42,770.94)
Balanced Fund Investment (60% equities and 40% bonds)
Constant 1997 Dollars

Year of Birth	Year of Retirement	Age at Retirement*	Private Account Accumulations**	Private Annuity Monthly Benefit***	Social Security Projected Monthly Benefit	Replacement Rates: Private Annuity	Replacement Rates: Social Security	Increase in Private Annuity	Equity Market Crash Required to Equal Social Security Benefit****
1930	1995	65	$279,868.08	$1,726.91	$1,160.00	51%	35%	49%	55%
1931	1996	65	$361,877.11	$2,232.94	$1,173.00	66%	35%	90%	79%
1932	1997	65	$393,987.14	$2,420.26	$1,236.00	71%	36%	96%	82%
1933	1998	65	$410,559.64	$2,522.06	$1,187.00	73%	34%	112%	88%
1934	1999	65	$426,643.77	$2,609.29	$1,193.00	76%	35%	119%	90%
1935	2000	65	$443,032.28	$2,709.52	$1,204.00	78%	35%	125%	93%
1936	2001	65	$459,882.34	$2,800.25	$1,217.00	80%	35%	130%	94%
1937	2002	65	$477,079.84	$2,904.96	$1,228.00	83%	35%	137%	96%
1938	2003	65:2	$534,491.38	$3,235.69	$1,231.00	126%	35%	163%	103%
1939	2004	65:4	$554,583.19	$3,381.82	$1,242.00	94%	35%	172%	105%
1940	2005	65:6	$573,904.95	$3,494.54	$1,254.00	97%	35%	179%	107%
1941	2006	65:8	$594,373.38	$3,645.83	$1,264.00	100%	36%	188%	109%
1942	2007	65:10	$615,589.72	$3,804.13	$1,278.00	104%	36%	198%	111%
1943	2009	66	$636,128.14	$3,960.73	$1,294.00	102%	35%	206%	112%
1944	2010	66	$657,448.85	$4,093.48	$1,306.00	105%	35%	213%	113%
1945	2011	66	$680,212.82	$4,208.52	$1,318.00	107%	35%	219%	114%
1946	2012	66	$699,358.65	$4,326.98	$1,330.00	109%	35%	225%	115%
1947	2013	66	$719,052.23	$4,448.82	$1,341.00	111%	35%	232%	116%
1948	2014	66	$739,019.93	$4,572.36	$1,352.00	113%	35%	238%	117%
1949	2015	66	$757,060.20	$4,683.98	$1,364.00	115%	35%	243%	118%
1950	2016	66	$775,133.42	$4,753.20	$1,375.00	116%	35%	246%	118%
1951	2017	66	$792,932.86	$4,862.34	$1,388.00	117%	35%	250%	119%
1952	2018	66	$810,131.81	$4,967.81	$1,400.00	119%	35%	255%	120%
1953	2019	66	$821,141.54	$5,035.32	$1,412.00	119%	35%	257%	120%
1954	2020	66	$819,715.57	$5,026.58	$1,424.00	118%	35%	253%	119%
1955	2021	66:2	$883,816.46	$5,372.20	$1,437.00	125%	35%	274%	122%
1956	2022	66:4	$883,548.15	$5,410.02	$1,449.00	125%	35%	273%	122%
1957	2023	66:6	$882,712.82	$5,215.15	$1,462.00	119%	35%	257%	120%
1958	2024	66:8	$877,699.34	$5,454.93	$1,474.00	124%	36%	270%	122%
1959	2025	66:10	$869,096.62	$5,442.63	$1,489.00	122%	36%	266%	121%
1960	2027	67	$858,396.85	$5,367.43	$1,506.00	115%	35%	256%	120%
1961	2028	67	$840,899.23	$5,298.49	$1,518.00	112%	35%	249%	119%
1962	2029	67	$825,388.02	$5,200.75	$1,532.00	109%	35%	239%	118%
1963	2030	67	$812,868.87	$5,121.87	$1,545.00	107%	35%	232%	116%
1964	2031	67	$795,870.24	$5,014.76	$1,559.00	103%	35%	222%	115%
1965	2032	67	$783,130.94	$4,889.35	$1,572.00	100%	35%	211%	113%
1966	2033	67	$776,992.62	$4,851.03	$1,586.00	98%	35%	206%	112%
1967	2034	67	$769,953.95	$4,807.08	$1,599.00	97%	35%	201%	111%
1968	2035	67	$758,676.78	$4,736.68	$1,613.00	94%	35%	194%	110%
1969	2036	67	$751,253.40	$4,690.33	$1,628.00	93%	35%	188%	109%
1970	2037	67	$743,572.89	$4,579.98	$1,642.00	90%	35%	179%	107%
1971	2038	67	$737,026.36	$4,539.65	$1,656.00	88%	35%	174%	106%
1972	2039	67	$732,980.19	$4,514.73	$1,670.00	87%	35%	170%	105%
1973	2040	67	$730,687.16	$4,500.61	$1,685.00	86%	35%	167%	104%
1974	2041	67	$729,825.81	$4,495.30	$1,700.00	85%	35%	164%	104%
1975	2042	67	$730,801.21	$4,461.61	$1,714.00	84%	35%	160%	103%
1976	2043	67	$736,026.46	$4,493.52	$1,729.00	84%	35%	160%	103%
Average								198%	108%

*This is the Normal Retirement Age currently stipulated by law.

**Accumulations assume work from age 21 to retirement and contributions are equal to OASI employee and employer taxes. Returns are historical returns minus 1% from 1951 to 1996 and are assumed to be 7.8% net of administrative costs from 1997 forward.

***The annuity assumes a bond return of 6.5% each year and payments increasing at 3.5% each year and are made from retirement to the average life expectancy of a 65 year old as forecast by the Social Security Administration.

****This is the percent that the equity market would have to fall in the year of retirement to give an annuity benefit equal to that of Social Security.

Appendix B: Social Security Benefits vs. Market Benefits—Balanced Fund (Continued)

Average-Wage Worker ($26,731.84)
Balanced Fund Investment (60% equities and 40% bonds)
Constant 1997 Dollars

						Replacement Rates			
Year of Birth	Year of Retirement	Age at Retirement*	Private Account Accumulations**	Private Annuity Monthly Benefit***	Social Security Projected Monthly Benefit	Private Annuity	Social Security	Increase in Private Annuity	Equity Market Crash Required to Equal Social Security Benefit****
1930	1995	65	$195,946.49	$1,209.08	$905.00	58%	43%	34%	42%
1931	1996	65	$252,556.07	$1,558.38	$914.00	73%	43%	71%	69%
1932	1997	65	$273,918.76	$1,682.68	$933.00	78%	44%	80%	74%
1933	1998	65	$284,135.49	$1,745.44	$920.00	81%	43%	90%	79%
1934	1999	65	$293,720.53	$1,796.35	$922.00	83%	43%	95%	81%
1935	2000	65	$304,106.30	$1,859.87	$929.00	86%	43%	100%	83%
1936	2001	65	$314,384.06	$1,914.30	$936.00	88%	43%	105%	85%
1937	2002	65	$324,643.44	$1,976.77	$943.00	90%	43%	110%	87%
1938	2003	65:2	$362,053.23	$2,191.79	$942.00	99%	43%	133%	95%
1939	2004	65:4	$374,347.12	$2,282.75	$948.00	102%	43%	141%	97%
1940	2005	65:6	$385,538.22	$2,347.56	$955.00	104%	43%	146%	99%
1941	2006	65:8	$397,354.26	$2,437.34	$961.00	107%	43%	154%	101%
1942	2007	65:10	$409,144.01	$2,528.37	$969.00	110%	44%	161%	103%
1943	2009	66	$419,777.77	$2,613.67	$981.00	108%	42%	166%	104%
1944	2010	66	$430,655.08	$2,681.39	$990.00	110%	42%	171%	105%
1945	2011	66	$442,333.69	$2,736.75	$999.00	111%	42%	174%	106%
1946	2012	66	$453,244.84	$2,804.25	$1,007.00	113%	42%	178%	107%
1947	2013	66	$463,807.67	$2,869.61	$1,016.00	115%	42%	182%	108%
1948	2014	66	$475,524.13	$2,942.10	$1,025.00	116%	42%	187%	109%
1949	2015	66	$485,008.83	$3,000.78	$1,034.00	118%	42%	190%	109%
1950	2016	66	$493,634.72	$3,027.02	$1,043.00	118%	42%	190%	109%
1951	2017	66	$501,006.09	$3,072.22	$1,052.00	119%	42%	192%	110%
1952	2018	66	$508,415.09	$3,117.65	$1,061.00	119%	42%	194%	110%
1953	2019	66	$513,213.47	$3,147.08	$1,071.00	119%	42%	194%	110%
1954	2020	66	$512,322.23	$3,141.61	$1,080.00	118%	42%	191%	109%
1955	2021	66:2	$549,548.19	$3,340.38	$1,090.00	124%	42%	206%	112%
1956	2022	66:4	$549,944.49	$3,367.35	$1,099.00	124%	43%	206%	112%
1957	2023	66:6	$550,003.99	$3,249.48	$1,109.00	119%	43%	193%	110%
1958	2024	66:8	$547,470.14	$3,402.54	$1,118.00	124%	43%	204%	112%
1959	2025	66:10	$542,711.42	$3,398.67	$1,130.00	122%	43%	201%	111%
1960	2027	67	$536,498.03	$3,354.64	$1,145.00	115%	42%	193%	110%
1961	2028	67	$525,562.02	$3,311.55	$1,154.00	112%	42%	187%	109%
1962	2029	67	$515,867.51	$3,250.47	$1,164.00	109%	42%	179%	107%
1963	2030	67	$508,043.05	$3,201.17	$1,175.00	107%	42%	172%	105%
1964	2031	67	$497,418.90	$3,134.23	$1,185.00	103%	42%	164%	104%
1965	2032	67	$489,456.84	$3,055.84	$1,195.00	100%	42%	156%	101%
1966	2033	67	$485,620.39	$3,031.89	$1,205.00	98%	42%	152%	100%
1967	2034	67	$481,221.22	$3,004.43	$1,216.00	93%	42%	147%	99%
1968	2035	67	$474,172.99	$2,960.42	$1,227.00	94%	42%	141%	98%
1969	2036	67	$469,533.38	$2,931.46	$1,237.00	93%	42%	137%	96%
1970	2037	67	$464,733.05	$2,862.49	$1,248.00	90%	42%	129%	94%
1971	2038	67	$460,641.47	$2,837.28	$1,259.00	88%	42%	125%	93%
1972	2039	67	$458,112.62	$2,821.71	$1,270.00	87%	42%	122%	92%
1973	2040	67	$456,679.48	$2,812.88	$1,281.00	86%	42%	120%	91%
1974	2041	67	$456,141.13	$2,809.56	$1,292.00	85%	42%	117%	90%
1975	2042	67	$456,750.75	$2,788.51	$1,303.00	84%	42%	114%	89%
1976	2043	67	$460,016.53	$2,808.45	$1,315.00	84%	42%	114%	89%
Average								151%	98%

*This is the Normal Retirement Age currently stipulated by law.

**Accumulations assume work from age 21 to retirement and contributions are equal to OASI employee and employer taxes. Returns are historical returns minus 1% from 1951 to 1996 and are assumed to be 7.8% net of administrative costs from 1997 forward.

***The annuity assumes a bond return of 6.5% each year and payments increasing at 3.5% each year and are made from retirement to the average life expectancy of a 65 year old as forecast by the Social Security Administration.

****This is the percent that the equity market portion of the portfolio would have to fall in the year of retirement to give an annuity benefit equal to that of Social Security.

Appendix B: Social Security Benefits vs. Market Benefits—Balanced Fund

Low-Wage Worker ($13,365.92)
Balanced Fund Investment (60% equities and 40% bonds)
Constant 1997 Dollars

						Replacement Rates			
Year of Birth	Year of Retirement	Age at Retirement*	Private Account Accumulations**	Private Annuity Monthly Benefit***	Social Security Projected Monthly Benefit	Private Annuity	Social Security	Increase in Private Annuity	Equity Market Crash Required to Equal Social Security Benefit****
1930	1995	65	$97,973.25	$604.54	$581.00	58%	56%	4%	6%
1931	1996	65	$126,278.04	$779.19	$587.00	73%	55%	33%	41%
1932	1997	65	$136,959.38	$841.34	$599.00	78%	56%	40%	48%
1933	1998	65	$142,067.75	$872.72	$591.00	81%	55%	48%	54%
1934	1999	65	$146,860.26	$898.18	$592.00	83%	55%	52%	57%
1935	2000	65	$152,053.15	$929.94	$596.00	86%	55%	56%	60%
1936	2001	65	$157,192.03	$957.15	$600.00	88%	55%	60%	62%
1937	2002	65	$162,321.72	$988.39	$604.00	90%	55%	64%	65%
1938	2003	65:2	$181,026.62	$1,095.90	$604.00	99%	55%	81%	75%
1939	2004	65:4	$187,173.56	$1,141.38	$608.00	103%	55%	88%	78%
1940	2005	65:6	$192,769.11	$1,173.78	$612.00	105%	55%	92%	80%
1941	2006	65:8	$198,677.13	$1,218.67	$616.00	108%	56%	98%	82%
1942	2007	65:10	$204,572.00	$1,264.19	$621.00	114%	56%	104%	85%
1943	2009	66	$209,888.89	$1,306.83	$629.00	108%	54%	108%	86%
1944	2010	66	$215,327.54	$1,340.70	$634.00	110%	54%	111%	88%
1945	2011	66	$221,166.84	$1,368.37	$640.00	111%	54%	114%	89%
1946	2012	66	$226,622.42	$1,402.13	$646.00	113%	54%	117%	90%
1947	2013	66	$231,903.83	$1,434.80	$651.00	115%	54%	120%	91%
1948	2014	66	$237,762.07	$1,471.05	$657.00	116%	54%	124%	92%
1949	2015	66	$242,504.41	$1,500.39	$662.00	118%	54%	127%	93%
1950	2016	66	$246,817.36	$1,513.51	$668.00	118%	54%	127%	93%
1951	2017	66	$250,503.04	$1,536.11	$674.00	119%	54%	128%	94%
1952	2018	66	$254,207.55	$1,558.83	$680.00	119%	54%	129%	94%
1953	2019	66	$256,606.73	$1,573.54	$686.00	119%	54%	129%	94%
1954	2020	66	$256,161.11	$1,570.81	$692.00	118%	54%	127%	93%
1955	2021	66:2	$274,774.10	$1,670.19	$698.00	124%	54%	139%	97%
1956	2022	66:4	$274,972.25	$1,683.67	$704.00	124%	55%	139%	97%
1957	2023	66:6	$275,002.00	$1,624.74	$710.00	119%	55%	129%	94%
1958	2024	66:8	$273,735.07	$1,701.27	$716.00	124%	55%	138%	97%
1959	2025	66:10	$271,355.71	$1,699.34	$724.00	122%	56%	135%	96%
1960	2027	67	$268,249.02	$1,677.32	$732.00	115%	54%	129%	94%
1961	2028	67	$262,781.01	$1,655.78	$739.00	112%	54%	124%	92%
1962	2029	67	$257,933.76	$1,625.23	$745.00	109%	54%	118%	90%
1963	2030	67	$254,021.52	$1,600.58	$751.00	107%	54%	113%	88%
1964	2031	67	$248,709.45	$1,567.11	$758.00	103%	54%	107%	86%
1965	2032	67	$244,728.42	$1,527.92	$765.00	100%	54%	100%	83%
1966	2033	67	$242,810.19	$1,515.95	$771.00	98%	54%	97%	82%
1967	2034	67	$240,610.61	$1,502.21	$778.00	93%	54%	93%	80%
1968	2035	67	$237,086.49	$1,480.21	$785.00	94%	54%	89%	78%
1969	2036	67	$234,766.69	$1,465.73	$792.00	93%	54%	85%	77%
1970	2037	67	$232,366.53	$1,431.24	$799.00	90%	54%	79%	74%
1971	2038	67	$230,320.74	$1,418.64	$805.00	88%	54%	76%	72%
1972	2039	67	$229,056.31	$1,410.85	$813.00	87%	54%	74%	71%
1973	2040	67	$228,339.74	$1,406.44	$820.00	86%	54%	72%	69%
1974	2041	67	$228,070.57	$1,404.78	$827.00	85%	54%	70%	69%
1975	2042	67	$228,375.38	$1,394.25	$834.00	84%	54%	67%	67%
1976	2043	67	$230,008.27	$1,404.22	$841.00	84%	54%	67%	67%
Average								96%	79%

*This is the Normal Retirement Age currently stipulated by law.

**Accumulations assume work from age 21 to retirement and contributions are equal to OASI employee and employer taxes. Returns are historical returns minus 1% from 1951 to 1996 and are assumed to be 7.8% net of administrative costs from 1997 forward.

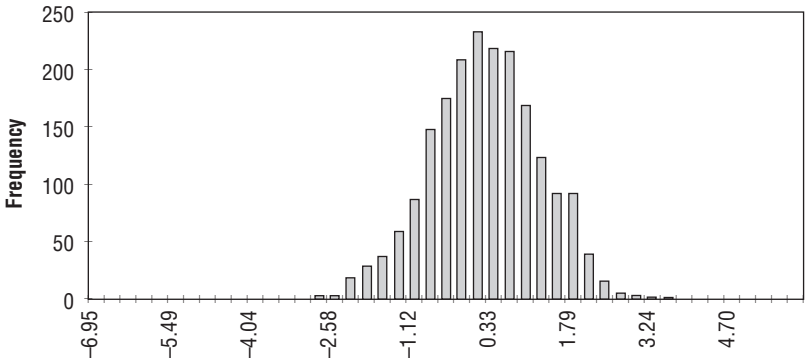
***The annuity assumes a bond return of 6.5% each year and payments increasing at 3.5% each year and are made from retirement to the average life expectancy of a 65 year old as forecast by the Social Security Administration.

****This is the percent that the equity market portion of the portfolio would have to fall in the year of retirement to give an annuity benefit equal to that of Social Security.

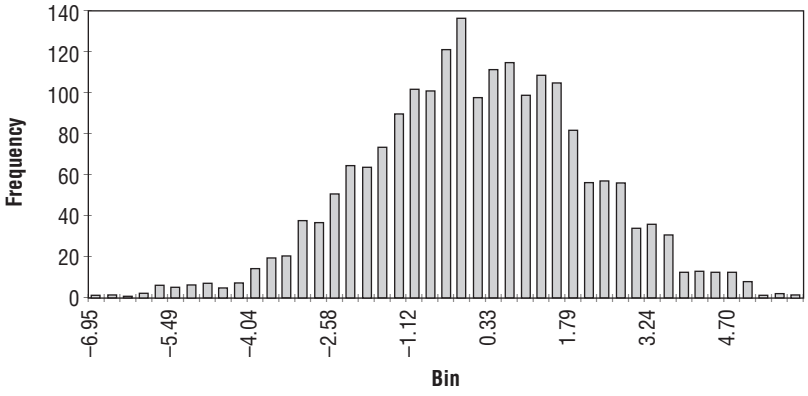
Appendix C: Standard Deviation

The standard deviation of a random variable is a measure of the dispersion of the observations. A larger standard deviation means that the observations are more dispersed. As an example, the following two diagrams show the actual observations of two sets of random variables. The first diagram shows 2000 observations randomly generated from a normal distribution with a mean of zero and a standard deviation of one. The second diagram shows a second set of 2000 randomly generated observations from a normal distribution with a zero mean and a standard deviation of two. As the diagrams show the observations in the second graph are more dispersed than in the first.

Standard Deviation = 1



Standard Deviation = 2



Appendix D:
Rates of Return: Social Security vs. Markets—Net of Administrative Costs

Low-Wage Worker ($13,365.92)			
Year of Birth	Social Security	Equity	Balanced
1930	8.46%	9.61%	8.64%
1931	8.38%	10.42%	9.46%
1932	8.29%	10.72%	9.56%
1933	8.07%	10.66%	9.52%
1934	7.93%	10.59%	9.47%
1935	7.84%	10.58%	9.47%
1936	7.73%	10.54%	9.43%
1937	7.62%	10.50%	9.40%
1938	7.46%	10.68%	9.55%
1939	7.32%	10.66%	9.49%
1940	7.22%	10.72%	9.54%
1941	6.95%	10.67%	9.49%
1942	6.67%	10.69%	9.45%
1943	6.67%	10.19%	9.03%
1944	6.60%	10.18%	9.02%
1945	6.54%	10.15%	8.98%
1946	6.48%	10.14%	8.95%
1947	6.42%	10.12%	8.93%
1948	6.36%	10.11%	8.91%
1949	6.31%	10.10%	8.88%
1950	6.26%	10.04%	8.81%
1951	6.21%	10.01%	8.77%
1952	6.17%	9.99%	8.73%
1953	6.14%	9.96%	8.69%
1954	6.10%	9.86%	8.61%
1955	6.29%	10.18%	8.93%
1956	6.22%	10.17%	8.93%
1957	6.15%	10.02%	8.80%
1958	6.07%	10.13%	8.93%
1959	6.01%	10.11%	8.93%
1960	5.99%	9.42%	8.29%
1961	5.98%	9.35%	8.21%
1962	5.97%	9.25%	8.12%
1963	5.96%	9.22%	8.10%
1964	5.97%	9.15%	8.03%
1965	6.01%	9.09%	7.99%
1966	6.01%	8.94%	7.84%
1967	6.02%	8.88%	7.79%
1968	6.03%	8.81%	7.73%
1969	6.04%	8.76%	7.69%
1970	6.09%	8.69%	7.64%
1971	6.10%	8.64%	7.60%
1972	6.02%	8.88%	7.79%
1973	6.03%	8.81%	7.73%
1974	6.04%	8.76%	7.69%
1975	6.16%	8.47%	7.51%
1976	6.16%`	8.46%	7.50%

Average-Wage Worker ($26,731.84)			
Year of Birth	Social Security	Equity	Balanced
1930	7.51%	9.61%	8.64%
1931	7.44%	10.42%	9.46%
1932	7.36%	10.72%	9.56%
1933	7.14%	10.66%	9.52%
1934	7.00%	10.59%	9.47%
1935	6.93%	10.58%	9.47%
1936	6.82%	10.54%	9.43%
1937	6.72%	10.50%	9.40%
1938	6.56%	10.68%	9.55%
1939	6.43%	10.63%	9.49%
1940	6.33%	10.69%	9.54%
1941	6.06%	10.64%	9.49%
1942	5.79%	10.61%	9.45%
1943	5.78%	10.19%	9.03%
1944	5.72%	10.18%	9.02%
1945	5.66%	10.15%	8.98%
1946	5.61%	10.14%	8.95%
1947	5.55%	10.12%	8.93%
1948	5.50%	10.11%	8.91%
1949	5.45%	10.10%	8.88%
1950	5.41%	10.04%	8.81%
1951	5.37%	10.01%	8.77%
1952	5.33%	9.99%	8.73%
1953	5.30%	9.96%	8.69%
1954	5.27%	9.86%	8.61%
1955	5.49%	10.18%	8.93%
1956	5.42%	10.17%	8.93%
1957	5.35%	10.02%	8.80%
1958	5.28%	10.13%	8.93%
1959	5.22%	10.11%	8.93%
1960	5.20%	9.42%	8.29%
1961	5.19%	9.35%	8.21%
1962	5.19%	9.25%	8.12%
1963	5.18%	9.22%	8.10%
1964	5.19%	9.15%	8.03%
1965	5.23%	9.09%	7.99%
1966	5.24%	8.94%	7.84%
1967	5.24%	8.88%	7.79%
1968	5.25%	8.81%	7.73%
1969	5.26%	8.76%	7.69%
1970	5.31%	8.69%	7.64%
1971	5.32%	8.64%	7.60%
1972	5.24%	8.88%	7.79%
1973	5.25%	8.81%	7.73%
1974	5.26%	8.76%	7.69%
1975	5.38%	8.47%	7.51%
1976	5.38%	8.46%	7.50%

Appendix D: (Continued)

High-Wage Worker ($42,770.94)				Maximum-Wage Worker ($65,400.00) (Maximum Wage Subject to OASI Tax)			
Year of Birth	Social Security	Equity	Balanced	Year of Birth	Social Security	Equity	Balanced
1930	7.08%	9.67%	8.72%	1930	6.55%	9.64%	8.73%
1931	7.01%	10.51%	9.58%	1931	6.47%	10.55%	9.65%
1932	7.03%	10.83%	9.68%	1932	6.37%	10.88%	9.75%
1933	6.68%	10.76%	9.63%	1933	6.11%	10.81%	9.68%
1934	6.53%	10.69%	9.57%	1934	5.93%	10.72%	9.61%
1935	6.44%	10.68%	9.56%	1935	5.84%	10.70%	9.60%
1936	6.33%	10.63%	9.51%	1936	5.72%	10.64%	9.53%
1937	6.21%	10.59%	9.47%	1937	5.60%	10.59%	9.48%
1938	6.05%	10.77%	9.63%	1938	5.42%	10.78%	9.64%
1939	5.91%	10.71%	9.57%	1939	5.27%	10.75%	9.57%
1940	5.81%	10.75%	9.58%	1940	5.18%	10.75%	9.56%
1941	5.51%	10.68%	9.52%	1941	4.85%	10.68%	9.48%
1942	5.22%	10.63%	9.47%	1942	4.52%	10.61%	9.42%
1943	5.19%	10.23%	9.06%	1943	4.54%	10.17%	9.00%
1944	5.12%	10.21%	9.03%	1944	4.47%	10.14%	8.97%
1945	5.05%	10.17%	8.99%	1945	4.40%	10.10%	8.91%
1946	4.98%	10.15%	8.96%	1946	4.34%	10.07%	8.88%
1947	4.92%	10.13%	8.93%	1947	4.28%	10.04%	8.85%
1948	4.87%	10.12%	8.91%	1948	4.22%	10.02%	8.82%
1949	4.81%	10.10%	8.87%	1949	4.17%	10.00%	8.78%
1950	4.76%	10.05%	8.81%	1950	4.11%	9.94%	8.71%
1951	4.71%	10.02%	8.77%	1951	4.05%	9.90%	8.67%
1952	4.66%	9.99%	8.73%	1952	4.00%	9.87%	8.63%
1953	4.63%	9.96%	8.69%	1953	3.95%	9.84%	8.59%
1954	4.60%	9.86%	8.61%	1954	3.91%	9.75%	8.52%
1955	4.79%	10.18%	8.93%	1955	4.17%	10.03%	8.80%
1956	4.73%	10.17%	8.93%	1956	4.09%	10.02%	8.81%
1957	4.68%	10.02%	8.80%	1957	4.00%	9.91%	8.70%
1958	4.62%	10.13%	8.93%	1958	3.92%	10.05%	8.86%
1959	4.57%	10.11%	8.93%	1959	3.86%	10.05%	8.87%
1960	4.56%	9.42%	8.29%	1960	3.83%	9.40%	8.27%
1961	4.56%	9.35%	8.21%	1961	3.82%	9.34%	8.20%
1962	4.55%	9.25%	8.12%	1962	3.81%	9.24%	8.11%
1963	4.55%	9.22%	8.10%	1963	3.81%	9.22%	8.09%
1964	4.55%	9.15%	8.03%	1964	3.81%	9.15%	8.03%
1965	4.60%	9.09%	7.99%	1965	3.86%	9.09%	7.98%
1966	4.60%	8.94%	7.84%	1966	3.87%	8.94%	7.84%
1967	4.61%	8.88%	7.79%	1967	3.87%	8.88%	7.79%
1968	4.62%	8.81%	7.73%	1968	3.87%	8.81%	7.73%
1969	4.63%	8.76%	7.69%	1969	3.88%	8.76%	7.69%
1970	4.68%	8.69%	7.64%	1970	3.94%	8.70%	7.64%
1971	4.69%	8.64%	7.60%	1971	3.95%	8.64%	7.61%
1972	4.61%	8.88%	7.79%	1972	3.87%	8.88%	7.79%
1973	4.62%	8.81%	7.73%	1973	3.87%	8.81%	7.73%
1974	4.63%	8.76%	7.69%	1974	3.88%	8.76%	7.69%
1975	4.75%	8.47%	7.51%	1975	4.01%	8.47%	7.51%
1976	4.75%	8.46%	7.50%	1976	4.01%	8.47%	7.50%

Internal rate of return calculations assume payments equal to OASI, employee and employer tax, and benefit payments from the normal retirement age to the Social Security Administration's projection of life expectancy at age 65. Market assumptions are the same as those used previously.

The actual volume of new investment is unlikely to have a significant short-term impact on stock prices.

The market-based system pays higher benefits to all workers irrespective of income, date of birth, chosen portfolio, or received subsidy.

Our analysis suggests little to support the assertion that only high-income workers would choose a private alternative.

aged widows and widowers are not disadvantaged by a privatized system; in fact, they may be disadvantaged by Social Security.

Administrative costs would not be excessive.