

SAVING SOCIAL SECURITY  
WITH STOCKS:  
THE PROMISES DON'T ADD UP

BY  
DEAN BAKER

A TWENTIETH CENTURY FUND/  
ECONOMIC POLICY INSTITUTE REPORT

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## EXECUTIVE SUMMARY

The headlines following the recent release of the report of the Advisory Council on Social Security trumpeted the group's agreement that investing some of the system's money in stocks might save it from an anticipated shortfall in the next century. Although the council split into three factions that supported widely divergent proposals, any change in Social Security involving investment in equities would constitute a fundamental transformation of the program.

This paper analyzes whether the claims in the Advisory Council report about the benefits to the Social Security system of investing in the stock market are consistent with the economic forecasts by the program's Trustees. Any significant inconsistencies between the Trustees' projections of economic growth and the Advisory Council's assumptions about future stock market performance would call into question the wisdom of their recommendations.

The central conclusion of this paper is that there are serious inconsistencies between the forecasts for the economy and stocks. If the projections for the stock market turn out to be right, the economy will have to grow much more rapidly than the Trustees predict. In this case, there would be no reason to change Social Security at all because payroll tax receipts would be sufficient to finance benefits. On the other hand, if the projections for the economy turn out to be right, the council's forecasts for the stock market are vastly overstated. In that case, diverting Social Security funds into stocks might leave most retirees worse off.

The main challenge facing Social Security is the increasing life expectancy of the population. Even though the system now accumulates surplus payroll taxes from workers well in excess of the benefits paid to today's retirees, and will continue to do so until the year 2012, the Social Security Trust Fund financed by those surpluses is projected to be depleted by 2029 because Trust Fund assets would be used to make up the shortfall between taxes and benefits as the ratio of retirees to workers increases. Thus, if the economic projections are correct, and if there are no changes in the program, the system would be unable to pay all retirees their benefits in full.

The mandate of the thirteen-member Advisory Council was to develop ideas for warding off that unthinkable scenario. A plurality of six members recommended incremental changes similar to those made in the past, and suggested that the possibility

of investing some of the Trust Fund's assets (now entirely in U.S. Treasury securities) in the stock market should at least be considered. Five members proposed replacing a portion of Social Security with government-mandated but privately managed Personal Security Accounts (PSAs) that individual workers would invest in a range of financial instruments. They also recommended a significant increase in the payroll tax to finance the new accounts while maintaining benefits for today's retirees. The other two members favored an alternative to PSAs that would offer workers a small selection of investment options managed by the government.

The attraction of equities as a partial solution to Social Security's future shortfall rests on a basic premise: stock market returns to investors have significantly exceeded those of alternatives in the past, and they can be expected to do so in the future.

But is that premise valid? This paper shows that it is not, if one accepts the economic forecasts of the Trustees.

### THE MAIN CONCLUSIONS:

- The claim that stock market returns will match past performance is inconsistent with the decline in economic growth predicted by Social Security's Trustees. The Advisory Council and others extrapolate from the past and project continuing 7 percent annual returns from stocks. But applying the past to the future is incompatible with the Trustees' forecast that annual economic growth will be more than 2 percentage points slower over the next seventy-five years than it has been during the past seventy-five years. If the Trustees' projections about the economy hold true, annual stock returns are more likely to decline to 4 percent than to continue at 7 percent.
- In order for stocks to continue to generate a 7 percent annual return under the Trustees' assumptions of economic growth, price-to-earnings ratios, now averaging an unprecedented high 20 to 1, would have to soar to an unheard of 34 to 1 in 2015, and an absurd level of 485 to 1 by 2070. If wages do not decline relative to profits, the forecasts of the Trustees and the assumptions of the Advisory Council depend upon sustaining nonsensical price-earnings relationships. On the other hand, if price-earnings ratios remain near their historical averages, wages would have to plummet to ridiculous levels: to just 18 percent of their currently projected level for the year 2055, and they would have to turn negative by 2070.

- The transaction and administrative costs of the new accounts could actually be more than twice as high as estimated by proponents of mandated savings accounts. The Advisory Council estimates that these costs would average 1 percent annually of the values of equities held in an account. But the cost of holding equity-based mutual funds in 401(k) plans currently averages about 2 percent a year. It is likely that greater regulation, insurance, and smaller average account sizes would raise costs further. Combine the lower estimates of stock returns with higher estimates of administrative costs, and the returns from mandated savings accounts plunge dramatically.

The greater life expectancy of workers retiring in 2040 means they will enjoy on average nineteen years in retirement. If mandatory savings accounts play a major role in Social Security, those years will be anything but golden. Such accounts would provide these retirees with less than 20 percent and at worst only 14 percent of their salaries at retirement, while Social Security currently promises low-income workers 56.7 percent of their salary at retirement for as long as they live.

In sum, realistic estimates of stock returns and administrative costs show that government-mandated savings accounts are not likely to offer workers better returns, on average, than the current Social Security system. And they would subject workers to enormous risk, making their retirement prospects far less—rather than more—secure.

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## INTRODUCTION

In recent years there has been growing interest in public policy circles in replacing partially or completely the existing Social Security system with a “privatized” system of government-mandated savings.<sup>1</sup> This interest was reflected in the disparate recommendations of the January 1997 report of the Advisory Council on Social Security. Under these proposals, the federal government would require workers to divert a portion of what they now pay as Social Security taxes into private savings accounts. These proposals have been promoted as a way of dealing with the stress that an aging population will place on the Social Security system in the next century. Proponents argue that retirees would receive a much higher rate of return on such accounts than they could expect to receive from the Social Security system as it is currently structured. But many of the claims about rates of return are highly unrealistic and exaggerate the benefits of government-mandated savings.

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This paper provides a range of estimates of the rate of return that can be expected from private savings accounts. It is divided into four sections. The first establishes a framework for evaluating the merits of such government-mandated savings plans. The second provides a set of estimates of stock market returns that are consistent with the rates of economic growth projected by the Social Security Trustees. The third estimates a range for the transactional and administrative costs likely to be incurred by government-mandated savings accounts. The fourth combines the estimates in the second and third sections to project the retirement income such accounts would generate.

The analysis in this paper loosely follows the outline of the Schieber-Weaver plan, one of the three proposals for reforming or transforming the Social Security system put forth by the divided Advisory Council. Sylvester J. Schieber, a benefits consultant, and Carolyn L. Weaver, director of Social Security and pension studies at the American Enterprise Institute, are both members of the council. While there are some differences

among the various plans for mandated savings programs, the analysis in this paper has clear implications for all of them.

## 1. WHY GOVERNMENT-MANDATED SAVINGS WON'T SPARK ECONOMIC GROWTH

When workers retire, they continue to require goods and services from the economy. Those goods and services must be subtracted from the amount available to the rest of the population regardless of how retirees pay for them. If, for example, retirees consume \$600 billion of goods and services in a given year (which is roughly how much they consume today), it makes no difference whether they pay for them with Social Security checks from the government or with stock dividends or interest from their private savings accounts: the drain on the economy will be the same. Piling up paper assets by itself will not help the country cope with the retirement of the baby-boom generation. The only way the United States can provide for our future is by building up its productive capacities so the economy as a whole grows more rapidly. (The sole exception to this rule is if the nation accumulates foreign assets, in which case goods and services would be provided by other countries' economies.) This increase in productive capacities can only be achieved by investing in public and private capital, and by creating a better-educated, more productive work force. This point must be kept in mind when evaluating the merits of any government-mandated savings proposal. Unless the plan will actually increase the productive capacities of the economy, it can only redistribute assets within or between generations—it cannot make everyone, or Americans as a whole, better off.

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For example, if a plan allows future retirees to benefit from stock market returns exceeding the projected benefits that Social Security would provide under the current system, but does not in any way increase economic growth, the plan must make those who are still working worse off. The most obvious way this could happen is if the loss of Social Security tax revenue, diverted to private savings accounts, tied to an increase in the annual federal budget deficit, and therefore to a larger debt burden. Eventually this would raise interest rates as well as taxes for future generations, because not only would the national debt be greater, but higher interest rates also would be necessary to entice investors to purchase that additional debt. Thus, the working population would have to pay more to the government in taxes and more to private lenders in interest on their mortgages and car loans. Those increased costs to workers would roughly equal the additional returns that retirees would obtain by investing in the stock market rather than Social Security.

It is possible that a shift to government-mandated savings could be accompanied by other policies that would promote more rapid economic growth. For example, if the switch were coupled with a tax increase, as in the Schieber-Weaver plan, the result could be a lower budget deficit, and therefore an increase in national savings. (National savings are the sum of corporate and personal savings minus the budget deficit, assuming the government runs one.) To the extent that a falling deficit and rising savings encouraged businesses to make bigger capital investments in plants, equipment, and research and development, this could lead to a somewhat higher rate of economic growth. However, the acceleration in the growth rate would be attributable to the tax increase, not to a government-mandated savings system. The same increase in savings and acceleration in growth would occur if the tax increase were instituted without switching to a government-mandated savings system. The switch might provide the political justification for a tax increase, but the tax increase, not the switch, would actually have the impact on growth. (Remember, investing in the stock market may increase the return on an individual's savings, but it does not necessarily encourage companies to invest in productive assets.)

Although it is possible that switching to government-mandated savings accounts might affect workers' incentives to save,<sup>2</sup> there is little evidence that such a change would be substantial, or even in what direction it would go.<sup>3</sup> It is entirely possible that mandatory accounts would encourage workers to reduce the amount they save in other forms.

It is also important to recognize the limited impact such policy changes can have.

The Congressional Budget Office (CBO) has estimated that moving from a budget path that projects deficits equal to approximately 3 percent of gross domestic product (GDP) to a path toward a balanced budget would increase the growth rate by approximately 0.1 percent a year.<sup>4</sup> The deficit reduction envisioned by the Schieber-Weaver plan would be less than half as large as the CBO balanced budget scenario, and could therefore be expected to have an effect on growth of less than 0.05 percent a year. By the year 2030, this would increase the size of the economy negligibly—by less than 2 percent compared with the current growth path projected by the CBO.<sup>5</sup> The links between deficit reduction, investment, and productivity growth are sufficiently tenuous that even this figure may be overstated, particularly if the deficit is reduced by cutting back public investment in physical and human capital.

It may still be desirable to adopt a system of government-mandated savings even if it has no positive impact on growth. If a system of mandated savings allows retirees to benefit from higher rates of return in private capital markets, it can finance their retirement. However, if the gains for retirees are not accompanied by an acceleration in the economy's rate of growth, those gains will be at the expense of the working population. And a system of mandated savings might well have a negative impact on growth, because in all likelihood it would be much more expensive to operate than the current Social Security system. The operating expenses of private life insurance companies are approximately 27 percent of benefits.<sup>6</sup> By comparison, Social Security's administrative expenses are less than 0.8 percent of benefits.<sup>7</sup> The increase in costs would be pure waste from the standpoint of the economy as a whole, and insofar as a system of mandated savings led to higher administrative costs, it would dampen economic growth. If the main concern of proponents of mandated savings plans is the well-being of younger generations, simply increasing returns for retirees is a move in the opposite direction.

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## 2. WHY THE STOCK MARKET CAN'T OUTPACE GROWTH FOREVER

The return on holding a share of stock consists of two parts: the dividend payout and the rise in the price of the stock. Both sources of return depend ultimately on the profits per share. The relationship between the dividend payout and profits per share is fairly direct. The amount of dividends a corporation can pay out to shareholders, after meeting its needs for investment capital, will depend largely on its profits. If profits rise, firms can afford to pay out larger dividends. (When profits fall, on the other hand, many firms are more reluctant to reduce dividends than to cut back on investment.)

The relationship of the rise in the share price to earnings is somewhat less direct. In principle, the current share price should reflect the value placed by the shareholder on the stream of future earnings expected from the share. However, research has shown that share prices fluctuate far more than actual earnings.<sup>8</sup> This means that the ratio of a stock's price to its earnings per share can change considerably over time; a stock's price does not necessarily rise at exactly the same rate as an increase in earnings per share. However, this research has also found that divergences between the growth rate in earnings and the growth rate of the share price tend over time to even out. For example, if the share price rises 50 percent in a year while the company's earnings rise by only 5 percent, it is likely that in subsequent years the share price will rise less rapidly than earnings. Similarly, a period in which the rise in a share's price lags behind the growth rate of earnings is likely to be followed by a rapid increase in the stock's price. This tendency for rapid growth in stock prices relative to earnings to be followed by slow growth, and for bursts in earnings relative to stock price to be followed by lulls, means that, over the long run, the rate of growth of a stock's price can be crudely predicted by the rate of growth of earnings.

Applying this logic to the stock market as a whole, it should be possible roughly to estimate the rise in the market over time based on projections of growth in corporate earnings. Because the 1995 report of the Social Security Trustees implicitly assumes that profits will grow at the same rate as the economy as a whole, its projections for GDP growth provide a basis for estimating the growth in corporate profits. (In estimating the future growth of wages, the Trustees assume that labor's share of output does not change, and therefore the corporate share of output also remains constant.)<sup>9</sup>

Table 1 shows the projected rates of economic growth in the Trustees' intermediate scenario, the consensus basis for policy projections. The growth rates are

calculated in real terms, ignoring increases in nominal value that result from inflation. The growth rate through 2005 is projected to average 2.0 percent a year.<sup>10</sup> It slows considerably over the next fifteen years, declining to just 1.3 percent by the year 2020. Growth is projected to remain slow for the rest of the seventy-five-year planning horizon, settling down at 1.2 percent by 2050. The average for the whole period is just under 1.5 percent. Using the Trustees' assumption that the profit share of income will remain constant, it is possible to take the GDP growth rates in Table 1 as proxies for growth rates for stock prices over the next seventy-five years.

**TABLE 1**  
**Social Security Trustees Projections of Annual GDP Growth**

1997-2006	2.00%
2007-2016	1.80%
2017-2026	1.30%
2027-2036	1.40%
2037-2046	1.40%
2047-2056	1.20%
2057-2066	1.20%
2067-2071	1.20%
Average	1.49%

*Source: Social Security Trustees, OASDI, Annual Report of the Board of Trustees of the Old-Age and Survivors Insurance and Disabilities Insurance Trust Funds (Washington, D.C.: U.S. Government Printing Office, 1995).*

To estimate the total return that shareholders can anticipate, it is necessary to add the annual dividends paid out to shareholders. At present, the average price-to-dividend ratio is 34.8 to 1.<sup>11</sup> (The price-to-dividend ratio is the ratio of the average price of a share of stock to its annual dividend payout.) This implies a return in dividend payouts that is equal to 2.87 percent of an average stock's price. The total return for holding a share of stock is simply the sum of the dividend yield and the growth in the stock's price, if the portion of profits paid out in dividends remains constant (an assumption that will be considered below), then the total return can be calculated by adding 2.87 percent to the GDP growth rates in Table 1. The implied average rates of return appear in Table 2.

The rates of return shown in Table 2 start at 4.87 percent and fall over the course of seventy-five years to 4.07 percent, following exactly the slowdown in growth

projected in the Trustees' report. The average return over the entire planning horizon is 4.36 percent.

This is not an economic model, of course, or an elaborate projection. It is a series of back-of-the-envelope calculations based on the Social Security Trustees' own assumptions and figures. But these numbers are far below the rates of return for stock holdings that are widely assumed by people working with the same Social Security data and projections. For example, the Advisory Council used an inflation-adjusted return of 7 percent as the central estimate in constructing its projections. This difference is extremely important because of the effect of compounding. If the stock market yields an average return of 7 percent, \$1000 will grow to nearly \$15,000 after forty years. If, on the other hand, the expected return is 4.37 percent, in forty years the same sum will grow to only \$5,530. Differences of this magnitude will be quite important to someone trying to plan for retirement.

**TABLE 2:**  
Projected Stock Returns

1997—2006	4.87%
2007—2016	4.67%
2017—2026	4.17%
2027—2036	4.27%
2037-2046	4.27%
2047-2056	4.07%
2057-2066	4.07%
2067—2071	4.07%
Average	4.36%

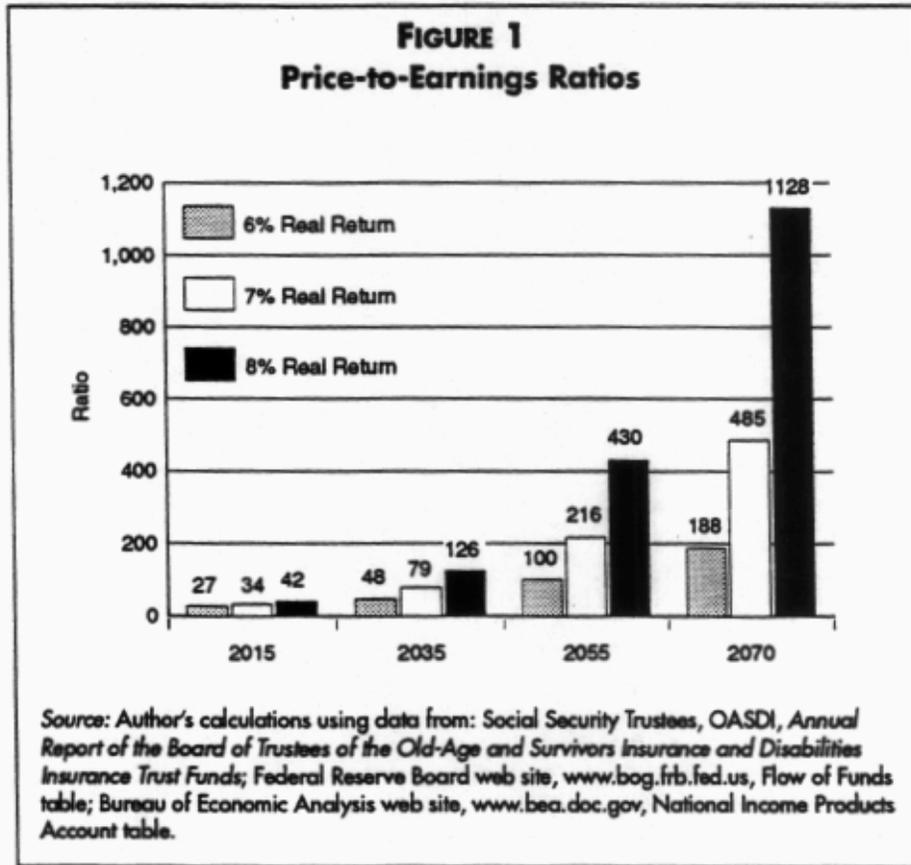
Source: Author's calculations using data from Social Security Trustees, OASDI, Annual Report of the Board of Trustees of the Old-Age and Survivors and Disabilities Trust Funds; Federal Reserve Board website, [www.bog.Frb.hd.us](http://www.bog.Frb.hd.us), Flaw of Funds table; Bureau of Economic Analysis web site, [www.bea.doc.gov](http://www.bea.doc.gov), National Income Products Account table.

The reasons for the large differences in these projections are very simple. The returns projected by the Advisory Council and in most other calculations are

extrapolations from the past. Over the past seventy-five years, the average real return to stockholders has been close to 7.0 percent. The Advisory Council has simply projected the same return into the future. However, over the past seventy-five years the average annual rate of economic growth has been approximately 3.5 percent. As noted earlier, in their intermediate scenario the Trustees project that the average rate of growth over the next seventy-five years will be less than 1.5 percent. If profits grow at the same rate as the economy (which has been roughly the case over the past seventy-five years), then the economy's growth rate over the past seventy-five years has supported an annual rate of growth in stock prices more than 2 percentage points higher than we can expect during the next seventy-five years.

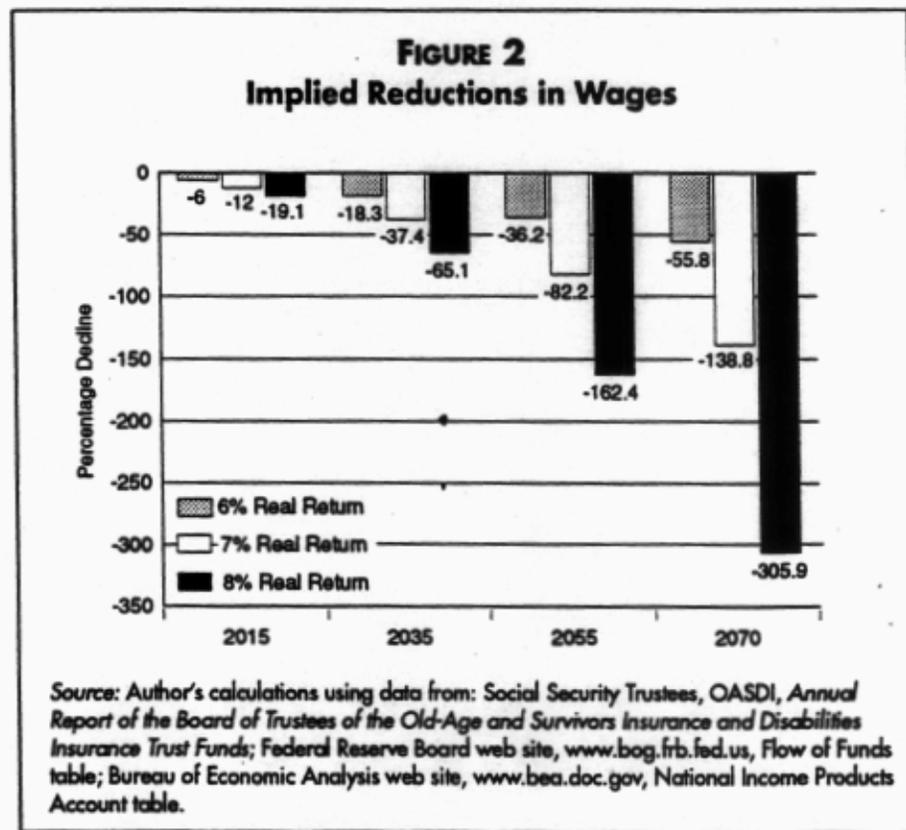
The other reason the returns shown in Table 2 are lower than the historic rate of return is the recent run-up in stock prices relative to earnings. Over the past eighteen years, the price of an average share of stock has risen from just nine times annual earnings to more than twenty times annual earnings.<sup>12</sup> Current stock prices are at record highs in relation to corporate earnings.<sup>13</sup> This rise in the price-to-earnings ratio has two effects. It raises the historic rate of return by adding to the growth in share prices, and it lowers the current dividend-to-price ratio. The current dividend-to-price ratio of 2.87 percent is nearly a full percentage point below the average of 3.65 percent from 1959 to 1995. This difference in dividend-to-price ratios is the other major factor explaining the lower rate of return projected for the next seventy-five years compared with the past seventy-five. Until and unless stock prices fall relative to dividends, the 2.87 percent dividend return will be 0.87 percentage points less than the average dividend return over the past forty years.

If the projections in the Trustees' report are accurate, the only way the stock market can generate higher returns than those shown in Table 2 is if the price-to-earnings ratio continually rises. Figure 1 shows the price-to-earnings ratios that would be necessary at various points in the future if the stock market were to yield real annual returns of 6 percent, 7 percent, and 8 percent. These calculations assume that corporate profits and dividend payouts both grow at the same rate as the economy as a whole. In the 7 percent scenario, the price-to-earnings ratio hits 34 to 1 in 2015, and 485 to 1 by 2070. The 8 percent scenario, which is suggested by some proponents of mandated savings, hits 126 to 1 by 2035. Even the 6 percent scenario hits an astronomical 188 to 1 by 2070.<sup>14</sup>



The assumption that average rates of return will exceed the sum of the growth rate and the dividend-to-price ratio (the projected returns in Table 2) requires that the price-to-earnings ratio rise continually, and at an accelerating rate. This can happen for a period of time. The history of capitalism is marked by speculative bubbles of this sort, dating from the tulip bulb mania in seventeenth-century Holland and the South Sea bubble in eighteenth-century England. The run-up of stock prices in the United States in the 1920s and in Japan during the 1980s are more recent examples. At some point such bubbles inevitably burst, and prices come crashing down to the point where they reflect underlying values.

As an alternative to soaring price-to-earnings ratios, let us consider the possibility that profits could rise enough to support returns of 6 percent, 7 percent, or 8 percent by some other means. But if we adhere to the growth projections of the Social Security



Trustees, such increases in corporate profits could be achieved only by reducing wages. Figure 2 shows the percentage of decline in wages, from their baseline growth path, that would be required to support each rate of return, assuming that the price-to-earnings ratio does not change.<sup>15</sup> Under these assumptions, in order to generate 7 percent returns to shareholders, wages would have to fall to just 63 percent of their currently projected level for the year 2035. By 2055, real wages would have to fall to just 18 percent of the levels projected in the Trustees' report, and by 2070 they would actually turn negative. Even a 6 percent return would imply an 18 percent reduction in wages by the year 2035. This decline in wages, of course, would create a major shortfall in anticipated collections from the Social Security payroll tax.

It is possible to construct a mixed scenario in which high rates of return in the stock market are obtained by a combination of record-high price-to-earnings ratios and declining wages, but that is neither a very pretty nor a plausible picture of the future. The

rates of return to stockholders that are assumed by the Advisory Council's proponents of government-mandated savings plans are simply inconsistent with the Social Security Trustees' growth projections. Yet those proponents and others use the Trustees' projections to argue that the Social Security system must be replaced.<sup>16</sup>

In fact, even the 4.36 percent average return shown in Table 2 is optimistic, given the growth assumptions in the Trustees' report. As noted before, the current price-to-earnings ratio of 203 to 1 is the highest since World War 11. Stock prices have seldom been so high relative to corporate earnings. The price-to-earnings ratio since 1959 has averaged 15.1 to 1. It was only because stocks maintained a lower price-to-earnings ratio

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in the past that they were able to sustain such high real rates of return. The cheaper the stock, the greater the potential return on investment. Low price-to-earnings ratios allowed for high dividend-to-price ratios. These higher dividends, coupled with the economy's 3.5 percent annual growth rate, made possible an average 7.0 percent annual return over the past seventy-five years. In order to sustain a comparable rate of return in a future with slower growth, it would be necessary for the price-to-earnings ratio to fall, not rise.

In the past, investors choosing stocks rather than bonds have sought a substantial premium. This has been partly to compensate them for the risk associated with holding stocks and partly for other reasons that have long puzzled many economists.<sup>17</sup> Current

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high stock values combined with growth projections for profits will almost certainly not allow for such premiums. The nominal yield on long-term Treasury bonds was approximately 7.0 percent at the end of the second quarter of 1996. The annual rate of inflation was approximately 2.7 percent, meaning that the real return was approximately 4.3 percent. This is only about 0.5 percentage points less than the yields that can be expected from stocks, assuming current economic growth projections and a constant price-to-earnings ratio. This compares with a historic premium of 6.0 percentage points. Unless investors have radically reassessed the relative risks associated with owning stocks and government bonds, the current price-to-earnings ratios are not sustainable. Stock prices will have to fall to restore some of the premium that existed historically.

In addition to the possibility that the price-to-earnings ratio may fall back toward its historic average, two other statistical relationships that deviate from the past also suggest that the returns shown in Table 2 may be overly optimistic. One, the capital share of corporate GDP—that is, the profits and interest earned by incorporated private businesses—is now 15.3 percent, its highest level since 1969. Since 1959, the capital share of corporate GDP has averaged 14.4 percent. Two, the 36.2 percent share of profits paid out in taxes is only slightly above the 34.2 percent low of the postwar period, and well below the 41.2 percent average since 1959. If any or all of these numbers revert to their averages since 1959, annual returns to stockholders will be even lower than the 4.36 percent shown in Table 2.

Table 3 estimates annual returns in the stock market if any or all of these possibilities actually occur over the next forty-five years, a period that corresponds roughly to a working lifetime. The numbers in the first column show the annual returns based on the assumptions in Table 2—that is, if the price-to-earnings ratio, the capital share of C3DP, and the tax share of profits all remain constant. The second column shows annual returns under all the same assumptions except that the capital share gradually falls back to its average over the past thirty-six years. The third column assumes that the capital share falls back to its average since 1959 and that the tax share of profits rises back to its average over the same period, while the dividend-to-price ratio remains the same. The fourth column assumes that the price-to-earnings ratio and the capital share of income gradually fall back to their average over the past thirty-six years, while the tax share and the dividend-to-price ratio gradually rise to their average levels.<sup>18</sup>

**TABLE 3**  
**Expected Annual Stock Returns**

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
1997	4.87%	4.73%	4.57%	3.92%	2.55%	4.17%
1998	4.87%	4.73%	4.57%	3.94%	2.59%	4.17%
1999	4.87%	4.73%	4.57%	3.95%	2.62%	4.17%
2000	4.87%	4.73%	4.57%	3.97%	2.66%	4.17%
2001	4.87%	4.73%	4.57%	3.98%	2.69%	4.17%
2002	4.87%	4.73%	4.57%	4.00%	2.73%	4.17%
2003	4.87%	4.73%	4.57%	4.01%	2.76%	4.17%
2004	4.87%	4.73%	4.57%	4.03%	2.80%	4.17%
2005	4.87%	4.73%	4.57%	4.05%	2.83%	4.17%
2006	4.87%	4.73%	4.57%	4.06%	2.87%	4.17%
2007	4.67%	4.53%	4.37%	3.88%	2.71%	4.17%
2008	4.67%	4.53%	4.37%	3.90%	2.75%	4.17%
2009	4.67%	4.53%	4.37%	3.91%	2.79%	4.17%
2010	4.67%	4.53%	4.37%	3.93%	2.83%	4.17%
2011	4.67%	4.53%	4.37%	3.94%	2.87%	4.12%
2012	4.67%	4.53%	4.37%	3.96%	2.91%	4.07%
2013	4.67%	4.53%	4.37%	3.98%	2.95%	4.02%
2014	4.67%	4.53%	4.37%	3.99%	2.99%	3.97%
2015	4.67%	4.53%	4.37%	4.01%	3.03%	3.92%
2016	4.67%	4.53%	4.37%	4.03%	3.07%	3.87%
2017	4.17%	4.03%	3.88%	3.55%	2.62%	3.82%
2018	4.17%	4.03%	3.88%	3.57%	2.66%	3.77%
2019	4.17%	4.03%	3.88%	3.58%	2.71%	3.72%
2020	4.17%	4.03%	3.88%	3.60%	2.75%	3.67%
2021	4.17%	4.03%	3.88%	3.62%	2.79%	3.66%
2022	4.17%	4.03%	3.88%	3.64%	2.84%	3.65%
2023	4.17%	4.03%	3.88%	3.65%	2.88%	3.64%
2024	4.17%	4.03%	3.88%	3.67%	2.93%	3.63%
2025	4.17%	4.03%	3.88%	3.69%	2.97%	3.62%
2026	4.17%	4.03%	3.88%	3.71%	3.02%	3.61%
2027	4.27%	4.13%	3.98%	3.82%	3.16%	3.60%
2028	4.27%	4.13%	3.98%	3.84%	3.21%	3.59%
2029	4.27%	4.13%	3.98%	3.86%	3.26%	3.58%
2030	4.27%	4.13%	3.98%	3.88%	3.31%	3.57%
2031	4.27%	4.13%	3.98%	3.89%	3.36%	3.56%

*(Continued on next page)*

**TABLE 3**  
**Expected Annual Stock Returns (Continued)**

	1	2	3	4	5	6
2032	4.27%	4.13%	3.98%	3.91%	3.41%	3.55%
2033	4.27%	4.13%	3.98%	3.93%	3.46%	3.54%
2034	4.27%	4.13%	3.98%	3.95%	3.51%	3.53%
2035	4.27%	4.13%	3.98%	3.97%	3.56%	3.52%
2036	4.27%	4.13%	3.98%	3.99%	3.61%	3.51%
2037	4.27%	4.13%	3.98%	4.01%	3.67%	3.50%
2038	4.27%	4.13%	3.98%	4.03%	3.72%	3.49%
2039	4.27%	4.13%	3.98%	4.04%	3.77%	3.48%
2040	4.27%	4.13%	3.98%	4.06%	3.83%	3.47%
2041	4.27%	4.13%	3.98%	4.08%	3.88%	3.44%
<b>Average</b>	<b>4.47%</b>	<b>4.33%</b>	<b>4.17%</b>	<b>3.89%</b>	<b>3.04%</b>	<b>3.82%</b>

Column 1 assumes constant price-to-earnings ratio and capital share  
 Column 2 assumes constant price-to-earning ratio and falling capital share  
 Column 3 assumes constant price-to-earnings ratio and rising tax share  
 Column 4 assumes falling price-to-earnings ratio and capital share and rising tax share  
 Column 5 assumes 1978 price-to-earnings ratio and capital and tax shares  
 Column 6 assumes Social Security Trustees' low-growth projections (see text for full explanation)

Source: Author's calculations using data from: Social Security Trustees, OASDI, Annual Report of the Board of Trustees of the Old-Age and Survivors Insurance and Disabilities Insurance Trust Funds; Federal Reserve Board web site, [www.bog.frb.fed.us](http://www.bog.frb.fed.us), Flow of Funds table; Bureau of Economic Analysis web site, [www.bea.doc.gov](http://www.bea.doc.gov), National Income Products Account table.

Think of the returns in the first column as a realistic, optimistic scenario, and of the returns in the fourth column as an intermediate scenario. To round out the picture, it is necessary to add a pessimistic scenario. Two possibilities appear in columns five and six. Column five shows rates of return if the price-to-earnings ratio and capital share of corporate GDP both gradually fall to their 1978 levels (8.8 to 1, and 14.2 percent, respectively), after the first oil shock and rising inflation sent the market reeling. This scenario assumes that the tax share of profits also returns to its 1978 level (43.6 percent), while the dividend-to-price ratio

Realistic projections of returns to stockholders radically reduce the estimates of retirement income that private savings plans can generate.

rises to its average since 1959 (3.65 percent). The returns shown in column six are based on the same assumptions as the calculations in column one, except they use the growth projections from the Social Security Trustees' pessimistic scenario. As noted before, the projections of economic growth in the intermediate scenario are already quite pessimistic, but many critics of Social Security, such as Concord Coalition founder Pete Peterson, have suggested that the pessimistic scenario may be more accurate. If this scenario is accepted as a basis for making policy decisions about Social Security, its implications must also be accepted in evaluating the benefits of mandated savings proposals.

The returns shown in Table 3 indicate that most calculations significantly overstate the retirement income that government-mandated savings would generate. Such calculations have generally assumed annual returns of 7 percent or more, but even the most optimistic scenario in Table 3 (column 1) projects returns averaging just 4.47 percent. And when all values—profit and tax shares, price- and dividend-to-earnings ratios—revert to their average over the previous thirty-six years in column 4, the returns average 3.89 percent. This scenario will be used as the intermediate scenario in subsequent calculations. In the scenario where values fall to their 1978 level, column 5, the average return is 3.04 percent. This scenario will be used as the pessimistic scenario in later calculations. These more realistic projections of returns to stockholders radically reduce the estimates of retirement income that private savings plans can generate.

It is also important to remember that all the scenarios in Table 3 are averages, not the actual returns a particular individual might receive. Actual

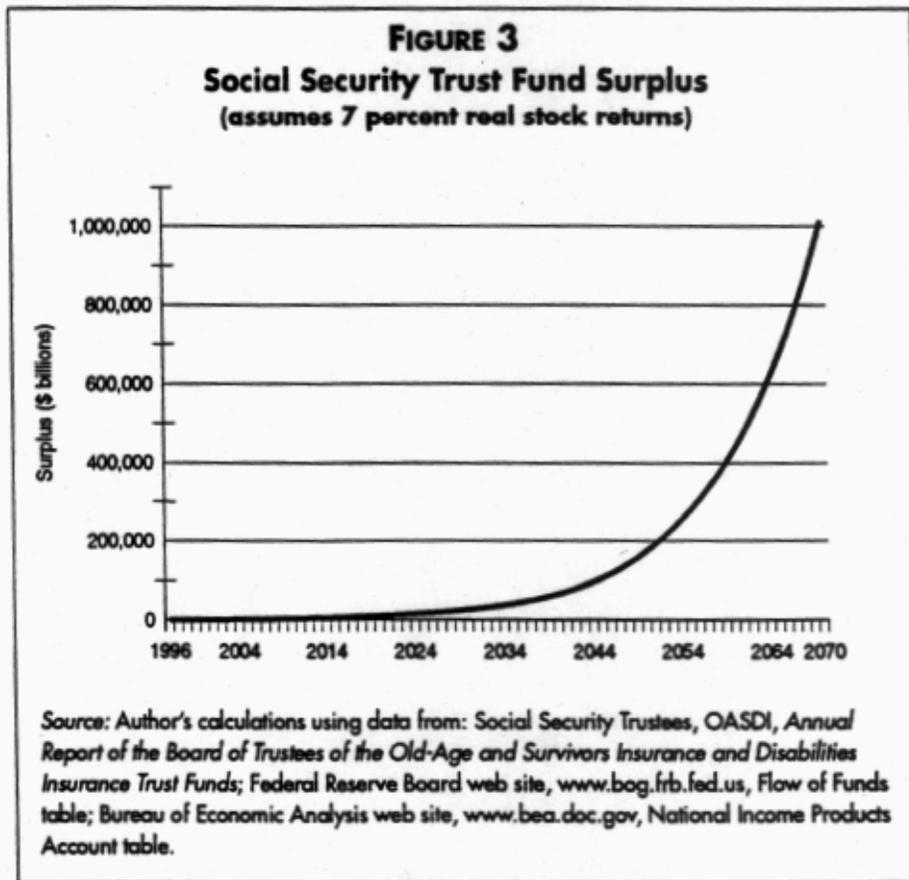


Figure 3 shows how it would swell if the economy grew fast enough to allow 7 percent returns while price-to-earnings ratios and the profit share of income remained constant. Instead of dipping below zero in 2029, the Fund would reach \$24.6 trillion, and by 2045 it would exceed \$100 trillion. In short, if the Advisory Council's stock market projections are accurate, there is no need to fix Social Security. The system will be solvent for at least another century.<sup>19</sup>

Trading securities and commodities drains more than \$100 billion in transaction costs from investors' returns each year.

### 3. THE HIDDEN COSTS OF PRIVATE ACCOUNTS

The returns in Table 3 could be used directly to project retirement income from mandated savings programs—if funds could be invested in the stock market free of charges and workers invested all their money in stocks. But maintaining individual accounts entails considerable costs, and most people will find it too risky to keep all their savings in the stock market throughout their working lives. These factors must be taken into account before estimating retirement income.

Trading securities and commodities drains more than \$100 billion in transaction costs from investors' returns each year. These costs are borne by holders of stock and other financial assets, and must be subtracted from their earnings to determine their actual return. The Advisory Council on Social Security estimates that these costs will average 1.0 percent of the value of equities held in personal savings accounts. This may significantly understate the true costs.

The average management fee of forty no-load mutual funds listed among “the best” in the growth and growth-and-income categories by Fortune magazine in 1996 was 0.98 percent.<sup>20</sup> But this figure includes only the cost of operating a fund, not the costs of trading stock. The average share of stock is traded every two years. Many funds trade far more actively, often turning over more than 100 percent of their portfolios in any given

Expenses may constitute a far greater percentage of the value of the newly created accounts for lower- and moderate-income workers than they do for the comparatively high-income individuals who own most accounts today.

year. When a share is traded, the agent executing the trade charges a brokerage fee, and the specialty trader who runs the market charges another fee. A recent estimate pegs these costs at approximately 0.50 percent of the transaction price for institutional traders.<sup>21</sup> However, since the sale of one stock is usually accompanied by the purchase of another, the fees per trade would come to 1.0 percent of the amount traded. If a fund turns over 50 percent of its stocks each year, the transaction costs would be equal to 0.5 percent of the fund's value. This makes the total cost of administering an equity fund approximately 1.5 percent annually.

Mandated savings accounts would require far more oversight and regulation than mutual funds, however. Existing 401(k) accounts, which receive special tax treatment,

may provide the best approximation; however, since these are voluntary, they should not require as much regulation as mandatory savings accounts. Plan Sponsor reports that the expense ratios for 401(k) plans holding mutual funds concentrated on equities average 1.44 percent a year.<sup>22</sup> Adding in the cost of trading stock pushes total administrative expenses to 1.94 percent a year.

The new accounts will also be considerably smaller, on average, than existing accounts. Many of the expenses for handling an account are fixed independently of the size of the account. This means that expenses may constitute a far greater percentage of the value of the newly created accounts for lower- and moderate-income workers than they do for the comparatively high-income individuals who own most accounts today.<sup>23</sup>

If the accounts are guaranteed in some manner, as many proponents of mandated savings accounts advocate, an additional fee will have to cover this expense.

It is also likely that many of the additional workers forced into the market for the first time will be less savvy in their choice of funds than experienced investors are. Many funds charge fees that are well above the average, including substantial up-front loads or redemption fees. This could cause the average expense ratio to rise.

Another factor to consider in estimating the fees associated with the proposed mandated accounts is insurance. If the accounts are guaranteed in some manner, as many proponents of mandated savings accounts advocate, an additional fee will have to cover this expense. Bodie and Merton estimated that the cost of the pension insurance provided by the Pension Benefit Guarantee Corporation is 0.15 percent of the assets for a fully funded program.<sup>24</sup> This guarantee covers only 70 percent of the specified level of benefits.

Clearly, there is considerable uncertainty about the fees that mandated savings accounts would entail, but it is possible to estimate these expenses within a range. At the low end, let us assume that expenses fall about 0.5 percentage points below the current average for 401(k) plans to 1.5 percent a year (including trading costs). A middle estimate assumes that the cost would remain about the same as the average cost of operating a 401(k) plan currently, 2.0 percent annually. The high-end estimate assumes that costs rise by 0.5 percentage points to 2.5 percent a year. Unless the government imposes regulations on fees, it is likely that lower-income workers will often end up near

the top of this range because the cost of administering their accounts will be higher in percentage terms. For purposes of this analysis, let us assume that the annual fees will be 2.5 percent for a low-wage worker (making \$12,000 a year), 2.0 percent for a middle-income worker (\$25,000 per year), and 1.5 percent for a high-income worker (\$50,000 per year).<sup>25</sup>

The last factor that needs to be considered in assessing the retirement income that mandated savings accounts could generate is the distribution of holdings among stocks and other assets. The calculations prepared for the Advisory Council assume that 50 percent of the holdings would be in stocks and 50 percent in bonds—roughly the mix today for people who have 401(k) retirement accounts. This is probably a reasonable assumption for projecting average returns, but it is important to note that many workers at present opt for much more conservative allocations and hold little or no stock.<sup>26</sup> This reduces risk but also lowers the expected return. Workers who follow this path will receive very low returns on their accounts and will not be able to accumulate much for retirement beyond the money they have actually set aside.

According to the Trustees' (and Advisory Council's) intermediate projections, the expected annual return from holding bonds is 2.3 percent. But holding bonds through a bond fund also entails expenses. The eight no-load bond funds listed by Fortune in 1996 averaged annual expenses of 0.72 percent. Although the commissions and spreads associated with bond trading are quite low, the turnover is enormous. Turnover in these bond funds averages more than 200 percent yearly. Let us estimate, very conservatively, that trading fees average 0.08 percent annually, raising total fees for bonds held in mandated savings accounts to an average of 0.8 percent a year.<sup>27</sup> The average fees associated with 401(k) plans holding bonds are actually somewhat higher. Plan Sponsor reported an average expense ratio, not counting trading costs, of 1.0.<sup>28</sup> For the analysis in the next section, let us assume that low-income workers pay total annual fees averaging 1.2 percent of their bond holdings, middle-income workers pay fees averaging 1.0 percent, and high-income workers pay fees averaging 0.8 percent.

## 4. RETIRING WITH A WHIMPER, NOT A BANG

Now the estimates of returns and holding costs for stocks and bonds can be combined to make back-of-the-envelope projections of the retirement income that mandated savings accounts could generate. The projections use the high-, middle-, and low-range scenarios for stock returns described in the second section of this paper. The return on bonds is the 2.3 percent projected by the Social Security Trustees. The annual holding costs for stocks and bonds follow the pattern described in the third section. The mix of assets is the same 50 percent in stocks and 50 percent in bonds assumed in the calculations prepared for the Advisory Council. The projections assume that workers' real wages will grow at the rate of overall wage growth projected in the Trustees' intermediate scenario, and also that a worker will be continuously employed during a working career of forty-six years. In every one of those years, workers will place 5 percent of their wages, as specified in the Schieber-Weaver proposal, in a mandated savings account.

Table 4 shows what a low-income worker now making \$12,000 a year, a middle-income worker with an annual wage of \$25,000, and a high-income worker with a salary of \$50,000 might expect to accumulate by the end of their working careers, and the average rate of return on their holdings in the low-, middle-, and high-range scenarios. It also shows the wage each worker can expect to be making in the last year of his or her career. All calculations are in 1996 dollars. The returns range from 2.2 percent for high-income workers in the optimistic scenario to just 0.8 percent for low-income workers in the pessimistic scenario.

Table 5 shows the number of years that these sums could support retirees with incomes that would be 30 percent, 50 percent, and 70 percent, respectively, of their last working year's wages.

<b>TABLE 4</b>				
<b>Lifetime Accumulations</b>				
	<b>Final Wage</b>	<b>Low Return</b>	<b>Mid Return</b>	<b>High Return</b>
Low Income	18,778	42,393	45,767	48,356
Middle Income	39,120	95,754	103,621	109,661
High Income	78,240	208,006	225,630	239,162
<b>Average Net Returns</b>				
		<b>Low Return</b>	<b>Mid Return</b>	<b>High Return</b>
Low Income		0.79%	1.21%	1.50%
Middle Income		1.14%	1.56%	1.95%
High Income		1.49%	1.91%	2.20%

*Source: calculations using data from Social Security Trustees, OASDI, Annual Report of the Board of Trustees of the Old-Age and Survivors Insurance and Disabilities Insurance Trust Funds.*

The calculations in Table 5 assume that workers receive a real interest rate of 2 percent on their accumulations after they retire.<sup>29</sup> In the high return scenario, the accumulation will be sufficient to support a low-income worker at 30 percent of final pay for 9.5 years. It will support a high-income worker at a 30 percent level for 11.5 years. At a 50 percent replacement ratio, a low-income worker would be supported for 5.5 years and a high income worker for 6.6 years. In the low-return scenario, a low-income worker would be supported at a mere 30 percent of final wages for just 8.2 years, and a high-income worker for 9.8 years.

**TABLE 5**  
**Years of Retirement Income**

<b>Low Return</b>			
<b>Percentage of Final Wage</b>	<b>30%</b>	<b>50%</b>	<b>70%</b>
Low Income	8.20	4.80	3.40
Middle Income	9.00	5.20	3.70
High Income	9.80	5.70	4.00
<b>Middle Return</b>			
<b>Percentage of Final Wage</b>	<b>30%</b>	<b>50%</b>	<b>70%</b>
Low Income	8.90	5.20	3.60
Middle Income	9.80	5.60	4.00
High Income	10.70	6.20	4.30
<b>High Return</b>			
<b>Percentage of Final Wage</b>	<b>30%</b>	<b>50%</b>	<b>70%</b>
Low Income	9.50	5.50	3.80
Middle Income	10.40	6.00	4.20
High Income	11.50	6.60	4.60

Table assumes 2 percent real return after retirement  
 Source: Calculations using data from Social Security Trustees, OASDI, Annual Report of the Board of Trustees of the Old-Age and Survivors Insurance and Disabilities Insurance Trust Funds.

But the Social Security Trustees estimate that the life expectancy of Americans who turn 65 in 2040 will be another 17.2 years for men, and 20.9 years for women. That is an average retirement of 19 years. Over that long a period of time, mandated savings plans could provide 19.0 percent annually of a high-income retiree's final salary in the optimistic scenario, and just 14.0 percent of a low-income retiree's wages in the pessimistic scenario. In the optimistic scenario, a worker earning \$50,000 a year at retirement would have an income of \$9,500 a year. In the pessimistic scenario, workers earning \$12,000 at retirement would receive \$1,680 annually from their accumulations.

The tax increases specified by the Schieber-Weaver plan and some other mandated savings proposals are of approximately the same magnitude as the tax increases, accompanied by some benefit reductions, that would be needed to keep Social Security in its current form solvent.

Social Security as currently structured promises to pay these low income workers an annual income equal to 56.7 percent of their final wages. Regardless of the scenario for return on investments or whether they live for nine, nineteen, or thirty more years. The middle-income worker will receive 43.9 percent of final salary, and the high-income worker 31.4 percent.<sup>30</sup> These numbers cannot provide a direct or fair comparison between mandated savings and Social Security, of course, because the Social Security program will require some combination of tax increases and benefit reductions to remain solvent. Also, most mandated savings proposals, like the Schieber-Weaver plan, provide for a poverty-level benefit of approximately \$5000 a year in addition to whatever money is accumulated privately. On the other hand, the tax increases specified by the Schieber-Weaver plan and some other mandated savings proposals are of approximately the same magnitude as the tax increases, accompanied by some benefit reductions, that would be needed to keep Social Security in its current form solvent.

Another important factor in evaluating alternatives is that Social Security provides its payout in the form of an annuity that continues for the life of the worker and is not diminished by inflation. Annuities are very costly in the private market, and insurance against inflation is generally unobtainable.<sup>31</sup> Therefore, the dollar sums provided by Social Security significantly understate the true value of the benefit for workers seeking a secure retirement.

That a system of government-mandated savings cannot, by itself, increase savings and economic growth is well known among economists. However, many economists have accepted the view that such a system can generate higher incomes for retirees by investing funds in the stock market. By now it should be clear that this view is false. Its advocates on the Advisory Council are hoist on the petard of the Social Security Trustees' own projections. The projected returns for stockholders are demonstrably inconsistent with projections for growth in the economy, and stock market returns that are consistent with projected economic growth will not provide current workers with a prosperous retirement.

## NOTES

1. In public discussions this option has often been referred to as “privatization.” This is inaccurate. Privatizing Social Security would mean assigning the management of the existing Social Security system to a private corporation.
2. See M. Feldstein, “Social Security and Saving New Time Series Evidence,” National Bureau of Economic Research Working Paper \* 5054, 1995.
3. Barry Bosworth and Gary Burtless, “Effects of Tax Reform on Labor Supply, Investment, and Saving,” *Journal of Economic Perspectives* 6, no. 1(1992), pp. 3—25.
4. Congressional Budget Office, *The Economic and Budget Outlook: An Update* (Washington, D.C.: Congressional Budget Office, 1995), p. 53.
5. By comparison, the Bureau of Labor Statistics (BLS) recently corrected an error in the methodology used to compute the consumer price index. This correction has led to an increase in the projected growth of real wages of 0.21 percent a year. Adjusting for this error raises the real wage projected for 2030 by 8.0 percent. This is more than four times the size of the gain resulting from the tax increase prescribed by the Schieber-Weaver plan. See Bureau of Labor Statistics, “Extending the Improvements in CPI Sample Rotation Procedures and Improving the Procedures for Substitute Items” (Washington, D.C.: Bureau of Labor Statistics, 1996).
6. American Council of Life Insurance, *1995 Life Insurance Fact Book Update* (Washington, D.C.: American Council of Life Insurance, 1995), p. 37.
7. Social Security Trustees, *OASDI, Annual Report of the Board of Trustees of the Old-Age and Survivors Insurance and Disability Trust Funds* (Washington, D.C.: US Government Printing Office, 1995), p. 54.
8. See, for example, Robert J. Shiller, “Who’s Minding the Store in The Report of the Twentieth Century Task Force on Market Speculation and Corporate Governance (New York: The Twentieth Century Fund Press, 1992); Robert J. Shiller, *Market Volatility* (Cambridge, Mass.: MIT Press, 1989); and W. DeBondt and R. Thaler, “Does the Stock Market Overreact?” *Journal of Finance* 39 (1985), pp. 793—805.
9. This assumption is made explicitly in Report of the 1994—95 Advisory Council on Social Security, vol.2: Reports of the Technical Panel on Trends and Issues in Retirement Savings and Presentations to the Council (Washington, D.C.: US Government Printing Office, 1996), p. 38. Although I use the term “profit share” here, it is only for simplicity. A more accurate term is “capital share of corporate GDP,” which I discuss later in this section.
10. The economic growth rates and the returns projected for stockholders are all real returns. This means that they subtract increases in price that are simply due to the effect of inflation.
11. This number is calculated by dividing the market value of domestic corporations (Federal Reserve web site, [www.bog.frb.fed.us](http://www.bog.frb.fed.us), Flow of Funds Table L213, line 18) by total dividend payouts (Bureau of Economic Analysis Web site, [www.bea.doc.gov](http://www.bea.doc.gov), National Income and Product Accounts table 1.14, line 25). The data used are for the second quarter of 1996.
12. These ratios were calculated by taking the Federal Reserve Board data on the market value of domestic corporations (Federal Reserve web site, [www.bog.frb.fed.us](http://www.bog.frb.fed.us),

Flow of Funds Table L213, line 18) and dividing by the after-tax profits including inventory valuation and capital consumption adjustments (Bureau of Economic Analysis web site, [www.bea.doc.gov](http://www.bea.doc.gov), National Income and Product Accounts table 1.14, line 20 minus line 23).

13. The numbers used in these calculations are based on stock prices at the end of the second quarter of 1996. Stock prices are more than 10 percent higher as of November 1996, with initial reports actually showing a small decline in earnings for the third quarter. This means that current price-to-earnings ratios would be more than 10 percent higher than the price-to-earnings ratio used in this analysis.

14. These calculations assume that in each year, the difference between the expected rate of return (6, 7, or 8 percent) and the dividend payout is made up by an increase in the share price. These numbers become explosive, because the rise in the share price outpaces the growth in dividends, thereby requiring larger percentage increases in share prices year by year.

15. These calculations assume that the share of profits paid out as dividends remains constant. This means that percentage growth in profits each year is the difference between the targeted rate of return and the current dividend-to-price ratio (2.87 percent). The percentage decline in wages is calculated by taking the implied increase in the capital share of income as a percentage of the current labor share.

16. Other factors could affect this basic picture, but it is extremely unlikely they would alter it in any fundamental way. For example, the nonfinancial corporate sector—that is to say, businesses other than banks, insurance companies, and so on—increased its net holdings of financial assets at an annual rate of \$36.6 billion in the second quarter of 1996 (Federal Reserve web site, [www.bog.frb.fed.us](http://www.bog.frb.fed.us), Flow of Funds Table F102 line 15). If this money had instead been paid out as dividends, it could have increased the dividend-to-price ratio by approximately 0.5 percent, raising returns by the same amount. However, net investment remains very low by historical standards, at less than 2 percent of GDP. If corporations were to raise the share of net investment in GDP back to just 3.0 percent, the level in the 1980s, dividend payouts would have to be cut and/or borrowing would have to rise. The former lowers dividends directly, the latter reduces the share of capital income that goes to profits, as more would be paid out in interest.

It is possible that profits could rise without higher growth or an increased capital share if interest payments fell. However, interest is already quite low as a share of capital income. Currently, just 17.4 percent of capital income goes to corporate interest payments, the lowest share since 1978. Since corporate debt continues to rise at approximately the rate of growth of corporate GDP, it is difficult to envision any significant reduction in this share.

Another possibility is that the profits of U.S. corporations could increase more rapidly than the overall rate of growth if American companies received a higher rate of return on foreign than on domestic investments. Although the return on foreign investments may be higher, the volume of foreign investment is still not very large relative to domestic investment. Also, an increasing portion of profits generated in the domestic economy is being taken by foreign corporations. These two trends tend to offset each other. The net international flow of profits (foreign profits of U.S. corporations minus U.S. profits of foreign corporations) has not increased relative to the size of domestic profits. In the second quarter of 1996, this net flow came to 11.8 percent of

capital income in the corporate sector. By comparison, the net flow was 12.0 percent in 1978 and 14.2 percent in 1988, the peak profit years of the last two business cycles.

One last possibility is that the growth of profits in the corporate sector could exceed the growth of the economy as a whole. In principle this could occur for a short period of time, but since the corporate sector already accounts for 63.7 percent of GDP, even a small difference in growth rates would quickly eliminate the rest of the economy. If growth in the corporate sector exceeded the overall growth rate by 1 percent a year, in forty-six years the government sector, the nonprofit sector, and the unincorporated business sector would completely disappear. There has been no clear trend in the corporate share of GDP over the postwar period, but the 63.7 percent share hit in the second quarter of 1996 is the highest level attained to date. This might make it more likely that the corporate share will decline in the future, rather than rise.

In all these instances, there may be some opportunities for profit growth to exceed GDP growth, but all of them are very limited. Furthermore, in each case recent trends indicate that these factors are at least as likely to depress corporate profits in the future, so that their growth rate may actually be less than the growth rate of GDP.

17. The large premium that has historically accrued to stockholders is discussed in N. Kocherlakota, "The Equity Premium: It's Still a Puzzle," *Journal of Economic Literature* 34 (1996), pp. 42—71.

18. These calculations assume that each of the four variables—capital share, tax share, dividend-to-price ratio, and price-to-earnings ratio—moves back to its average since 1959 at a constant pace. The averages are 14.4 percent, 41.2 percent, 3.65 to 1, and 15.1 to 1, respectively. This assumption does not exactly equalize rates of return over the period. Also, average returns would be affected by the timing of these movements. For example, average returns would much lower if the fall from the current price-to-earnings ratio of 203 to 1 to the longer-term average of 15.1 to 1 were to occur in the last year before retirement.

$$a_t = \sum_{i=0}^{17} (g_{t+i}^1 - g_{t+i}^0) / 18 = \text{increment to } c_t^0 \text{ at time } t$$

$$c_t^1 = a_t + c_t^0 = \text{new growth rate of costs at time } t$$

19. The following calculation was used to generate figure 3:

1) To measure additional value—The projected real growth rate used for all years was 4.14 percent (7 percent minus 2.86 percent). This was assumed to take the form of higher productivity and wage growth (wage growth equals productivity growth), not higher labor force growth. The ratio of Social Security tax revenue to payroll was assumed to be the same as in the Trustees Report.

2) approximate the impact of more rapid growth on social security costs in year  $t$ ,  $c_{1/t}$ , by adding an additional term  $a_t$  to the estimates of the growth rate of costs in the Trustees intermediate projections for time  $t$ ,  $c_{0/t}$   $g_{1/t}$  represents the higher growth rate of output at time  $t$  needed to maintain a 7 percent real return, and  $g_{0/t}$  the growth rate of output given by the Social Security Trustees intermediate cost projections.

The assumption is that approximately one-eighteenth of the beneficiaries of Social Security are new retirees each year (the current life expectancy at age 65 is about 17.0

years, but this will rise to about 20.3 years by the end of the planning horizon). The higher growth rate (if fully reflected in higher wages) will raise the benefits paid to new retirees by approximately the same amount, but leave the benefits for earlier retirees unaffected. Once eighteen years have passed, costs will be rising in step with the new, higher rate of growth. This formula ignores differences in the size of age cohorts and the actual differences in the way in which increased productivity growth might be translated into higher wages for each wage cohort. It probably understates the impact of the added growth on costs in the early years (when average life expectancies are slightly shorter than 18 years) and overstates it somewhat in later years.

3) The annual surplus is calculated by multiplying the cumulative surplus in the fund at the end of the previous year by the interest rates projections in the Trustees report and adding in the annual difference between revenues and costs, plus  $03 \times$  the projected interest rate  $\times$  the sum of the annual interest earnings and the current year difference between revenue and cost.

20. Andrea L. Prochnia, "The Best Mutual Funds For Reaching Your Goals," *Fomme*, August 19, 1996, pp. 142—54.

21. Pat A. White, Paul Kupiec, and Gregory Duffee, "A Securities Transaction Tax: Beyond the Rhetoric, What Can We Really Say?" *Finance and Economics Discussion Series* (Washington, D.C.: Division of Research and Statistics Division of Monetary Affairs, Federal Reserve Board, August 1990), p. 17.

22. Plan Sponsor, February 1996, p. 75, reprinted in Olivia Mitchell, "Administrative Costs in Public and Private Pension Systems," *National Bureau of Economic Research, Working Paper no. 5734*, 1996.

23. The appropriate analogy here is probably to the current practices of banks regarding checking accounts. There is usually a monthly service charge plus a charge per check for accounts that do not maintain a minimum balance over, say, \$3,000.

24. Z. Bodie and R. Merton, "Pension Benefit Guarantees in the United States: A Functional Analysis" in *The Future of Pensions in the United States*, Ray Schmitt, ed. (Philadelphia: University of Pennsylvania Press, 1992), p. 218.

25. The fee structure used in this analysis assumes that low- and moderate-income workers pay considerably less per account than high-income workers in absolute terms, even though the percentage charge is higher for the former. Assuming the accumulations are proportionate to their wages, a low-income worker will be paying roughly 40 percent as much as a high-income worker for each account, and a middle-income worker will be paying approximately 67 percent as much.

26. A recent study by the Employee Benefit Research Institute (EBRI) found that a significant percentage of participants in the retirement plans of three major corporations had accounts with little or no equity holdings.

27. A. Kling estimated that the bid-ask spread on long-term Treasury bonds averaged 0.063 percent, and 0.02 percent on Treasury bills. If a fund were evenly divided between the two assets and turned over 200 percent a year, total commissions would be 0.083 percent of the assets. See A. Kling, "Futures Markets and Transactions Costs" in *Financial Futures and Options in the U.S. Economy*, Federal Reserve System Staff Study (Washington, D.C.: Board of Governors of the Federal Reserve System, 1986).

28. Plan Sponsor, February 1996, p. 75, reprinted in Olivia Mitchell, "Administrative Costs in Public and Private Pension Systems," *National Bureau of Economic Research*,

Working Paper no. 5734, 1996.

29. The assumption of a 2 percent real return is probably somewhat high, given the earlier analysis, but applying a lower rate of return would not significantly alter the calculations.

30. These numbers assume that the worker is single.

31. A recent study found that insurers charge a yearly premium of between 4.21 and 6.13 percent on annuities. See B. Friedman and M. Warshawsky, "The Cost of Annuities: Implications for Saving Behavior and Bequests," *Quarterly Journal of Economics* 105 (1990), pp. 135—54. Insurance companies charge a substantial premium for issuing annuities because of the problem of adverse selection. If an average person at age sixty-five can be expected to live twenty years but the only people who buy annuities are ones who can expect to live twenty-five years based on their family histories, the insurance company has to charge fees consistent with a life expectancy of twenty-five years. This problem of adverse selection is likely to grow considerably worse in the future as developments in genetics allow individuals much greater knowledge of their life expectancy.

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## ABOUT THE AUTHOR

Dean Baker is a macroeconomist at the Economic Policy Institute. His recent publications include “Getting Prices Right: A Methodologically Consistent Consumer Price Index 1953—1994” (Economic Policy Institute, 1996); “Trends in Corporate Profitability: Getting More for Less?” (Economic Policy Institute, 1996); “Robbing the Cradle? A Critical Assessment of Generational Accounting” (Economic Policy Institute, 1995); and “The Myth of the Investment Led Recovery,” which appeared in the November—December 1994 issue of Challenge Magazine.

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