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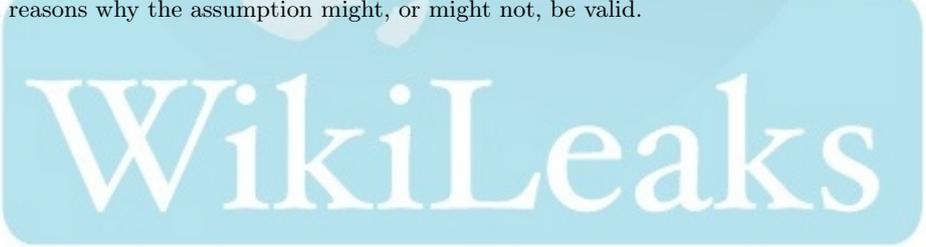
Report RL33007

Individual Accounts: What Rate of Return Would They Earn?

Brian W. Cashell and Marc Labonte, Government and Finance Division

July 25, 2005

Abstract. A recurring question in the debate on adding individual accounts (IAs) to Social Security is how large the typical account would be upon retirement. Making this calculation requires assumptions about the contribution rate, length of time the account was held, and rate of return earned on the account (net any administrative fees and taxes). Because of the power of compound interest, changing the rate of return on the account leads to greatly different outcomes. For example, \$1 invested every month for 40 years accumulates to \$1,526 if earning 5%, \$2,625 if earning 7%, and \$4,681 if earning a 9% rate of return. Many estimates of how large the IAs would be have assumed that assets in the account would earn a rate of return equal to the historical average. For example, in the official actuarial estimates of various IA plans, the Social Security Administration actuaries assume that equities will average a rate of return of 6.5% and government bonds will earn 3%. Some proposals assume that the accounts would hold equities (stocks), others bonds, and others some combination of the two. Since stocks historically have a higher rate of return than bonds on average, the rate of return earned by the IA's would increase as the fraction held in equities increased. But is the assumption that future rates of return will mirror historical rates of return a valid one? Or are there ways in which the future may differ from the past that will have a predictable effect on the rate of return? This report analyzes demographic, economic, and financial reasons why the assumption might, or might not, be valid.



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July 25, 2005

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Summary

It has been proposed to add individual accounts to Social Security in which investors could hold private securities. Calculations that project the earnings of individual accounts typically presume that they will earn a rate of return equal or close to the historical rate of return. But is there evidence that future rates of return will differ from history in predictable ways?

Since the mid-1990s, equity (stock) prices have been consistently above the historical norm in relation to corporate earnings and dividends. This implies that future rates of return would be below the historical average unless future earnings and dividends grow more quickly than they have been. One reason why current stock prices may be higher and future rates of return might be lower is because of a decline in the equity premium, which is the difference in rates of return between stocks and bonds that investors require to be willing to bear the additional risk of equities. Increasing rates of stock ownership and accessibility for the average investor have suggested to some that the equity premium may have fallen.

The projected decline in the growth of the labor force would reduce the economic growth rate, all else equal. Slower growth in the economy is likely to mean slower growth in corporate earnings, which could lower the rate of return. Ultimately, rates of return are determined by the equilibrium between saving and investment. Many have predicted that the saving rate will decline as the baby boomers begin to draw down their savings to finance their retirement. But at the same time, investment demand is likely to grow more slowly because of the decline in the growth rate of the labor force. If the growth in saving declines more quickly than the growth in investment, rates of return would rise. But the opposite is equally plausible and would lead to lower rates of return.

Under current policy, budget deficits would become much larger in the future, and this would be expected to increase rates of return as deficits “crowd out” private investment. Individual accounts could also influence the national saving rate. If they are deficit-financed, then public saving would fall and private saving would rise, leaving public saving — and, hence, rates of return — unchanged. If they are financed through higher taxes or lower spending today, then national saving would rise, and rates of return would fall. However, even if individual accounts left national saving and overall rates of return unchanged, they could push up the demand for stocks, thereby lowering their rate of return, while increasing the supply of U.S. Treasuries, thereby raising their rate of return.

Comparing the rates of return of equities and other securities directly is analogous to comparing apples to oranges. Standard risk adjustment techniques would set the rate of return on equities equal to U.S. Treasuries. This is the only way that a risky return can be directly compared to the risk-free Social Security benefit offsets that accompany the individual accounts. This report will not be updated.

Contents

What is the Historical Rate of Return?	1
Effects of a Changing Equity Premium	3
The P/E Ratio, P/D Ratio, and Future Rates of Return	6
Economic Growth and Rates of Return	10
Capital Income Growth Is Unlikely to Exceed GDP Growth	10
The Rate of Economic Growth Is Expected to Fall	12
Slower GDP growth and rates of return	15
Demography, Saving, and Investment	16
Interest Rates	23
Effect of Future Government Budget Deficits on Rates of Return	24
Effect of Individual Accounts on National Saving and Rates of Return ...	25
Effect of Individual Accounts on Relative Rates of Return	28
Conclusion	29

List of Figures

Figure 1: Price/Earnings Ratio and Price/Dividends Ratio, 1946-2004	8
Figure 2. Capital and Land Share of National Income	12
Figure 3. Demographics and Equity Prices	18
Figure 4: Change in Unified Budget Balance From Introducing Individual Accounts in Plan 2 (67% Participation Rate)	27

List of Tables

Table 1: Real Rates of Return for Equities Over Different Historical Periods ...	2
Table 2: National Income, 2004	11
Table 3: Productivity Growth, Selected Periods	14
Table 4: Long-Run Real GDP Growth Projections	15
Table 5: Percentage of Families Who Saved, by Age of Family Head, 2001 ...	19
Table 6: Household Wealth by Age Class, 2001	19
Table 7: Percent of Net Worth by Percentile Group, 2001	21

Individual Accounts: What Rate of Return Would They Earn?

A recurring question in the debate on adding individual accounts (IAs) to Social Security is how large the typical account would be upon retirement.¹ Making this calculation requires assumptions about the contribution rate, length of time the account was held, and rate of return earned on the account (net any administrative fees and taxes). Because of the power of compound interest, changing the rate of return on the account leads to greatly different outcomes. For example, \$1 invested every month for 40 years accumulates to \$1,526 if earning 5%, \$2,625 if earning 7%, and \$4,681 if earning a 9% rate of return. Many estimates of how large the IAs would be have assumed that assets in the account would earn a rate of return equal to the historical average. For example, in the official actuarial estimates of various IA plans, the Social Security Administration actuaries assume that equities will average a rate of return of 6.5% and government bonds will earn 3%. Some proposals assume that the accounts would hold equities (stocks), others bonds, and others some combination of the two. Since stocks historically have a higher rate of return than bonds on average, the rate of return earned by the IA's would increase as the fraction held in equities increased.

But is the assumption that future rates of return will mirror historical rates of return a valid one? Or are there ways in which the future may differ from the past that will have a predictable effect on the rate of return? This report will analyze demographic, economic, and financial reasons why the assumption might, or might not, be valid.

What is the Historical Rate of Return?

Before exploring factors that might influence the future rate of return, it is useful to discuss what the rate of return has been historically, and how much confidence we can have that the past is a useful guide to the future.² As can be seen in **Table 1**, the historical real rate of return is sensitive to the time period under consideration. The average rate of return over the past 20 years was quite a bit higher than over the past 50 years, so even periods of time as long as a decade can be unrepresentative for

¹ For more information on individual accounts, see CRS Issue Brief IB98048, *Social Security Reform*, by Dawn Nuschler; CRS Report RL31498, *Social Security Reform: Economic Effects*, by Jane Gravelle and Marc Labonte.

² This report considers only factors that would influence gross rates of return. Administrative costs, annuitization fees, taxes, and so on, would make the net rate of return on the individual account lower than the gross rates of return measured by the historical data presented here.

calculating an average return.³ For example, in the 1990s, the real rate of return on equities averaged an impressive 14.8%, but in the 1970s, it averaged only 1.4%. Not only are rates of return highly volatile, but they can be highly persistent: gains or losses can persist for several years, and take several years longer to be reversed. This implies that the retirement income of an individual whose IA was invested in equities could change significantly based on the market's performance in the period before retirement. For example, a worker who invested \$1 in 1959 and withdrew it upon retirement in 1999 would have had a balance of \$16.55, while a worker who invested \$1 in 1962 and retired in 2002 would have had a balance of \$8.05. In other words, average rates of return mask the wide range of returns that actual individual accounts (holding the same assets) would earn over time.⁴

Table 1: Real Rates of Return for Equities Over Different Historical Periods

Period:	Average Annual Real Rate of Return:
1994-2004	9.4%
1984-2004	9.9%
1974-2004	8.9%
1954-2004	6.7%
1925-2004	7.2%
1989-1999	14.8%
1969-1979	1.4%

Source: Ibbotson's; Haver Analytics

Notes: December 1925 is earliest available data. Data are calculated from December to December for each year.

While basing projections on 50 years of historical data or more may seem to imply a high degree of certainty, this evidence is actually less robust than one might expect. Because of the significant volatility in the annual data, the standard error associated with the data is very large. For example, Cochrane estimates that from 1946 to 1996, the 95 percent confidence interval for the average annual return would be between 3% and 13%. Over longer holding periods, the volatility diminishes, but then there are fewer observations from which to make statistical inference, which

³ The meaning of “long run” depends on the context. In some cases, it may simply refer to events that are independent of the fluctuations of the business cycle. In the case of capital stock adjustments the long-run may be as long as 30 years. With respect to technological progress it may be even longer. In this report, the long run is defined by the 75-year projections of the Social Security trustees.

⁴ For examples of how much IA performance would have varied historically, see CRS Report RL31324, *Social Security Reform: The Effect of Economic Variability on Individual Accounts and Their Annuities*, by Geoffrey Kollman, Dawn Nuschler, and Patrick Purcell.

increases uncertainty. For example, for the rate of return over 20-year holding periods, there are only five statistically independent observations over 100 years of data.⁵

Cochrane points out two other problems with extrapolations made from historical data. First, economic outcomes were much better here than abroad. A long-term average return based on a number of countries would be much lower than the average for the United States. In this sense, investors in U.S. stocks were lucky because U.S. stocks turned out to be less risky than in most other countries. That does not guarantee that the U.S. stocks will be luckier than foreign stocks in the future. Second, the data suffer from “non-normality” over the past 50 years. During that time, the United States has not experienced any rare calamities such as economic depression, natural disaster, or government breakdown that would bring down the average returns on equities. These rare events may not occur in the future either, but basing future projections on a historical experience that is not comprehensive of the entire range of possible experiences may not be suitably representative of the full range of possible outcomes that IA holders could face.

Effects of a Changing Equity Premium

There may be reasons to believe that the rate of return on equities relative to other assets could be different in the future than it has been in the past. (For a discussion of relative rates of return, see the text box on the next page.) The equity premium refers to the difference in average rate of return between equities and other assets. Siegel calculates that between 1802 and 1998, the *ex-post* equity premium averaged 3.5 percentage points using data for equities and long-term government bonds, and between 1946 and 1998, the premium rose to 6.5 percentage points.⁶

⁵ John Cochrane, “Where Is the Market Going? Uncertain Facts and Novel Theories,” *Economic Perspectives*, Federal Reserve Bank of Chicago, Nov./Dec. 1997, p. 3.

⁶ Jeremy Siegel, “The Shrinking Equity Premium,” *Journal of Portfolio Management*, Fall 1999, p. 12. The rise in the later period was largely because bond returns fell over that period while equity returns remained stable. The *ex-post* equity premium is measured by comparing actual equity returns to actual bond returns. Ideally, we would like to measure the *ex-ante* equity premium, the premium that investors expected before the fact when they made their investment, rather than the *ex-post* premium, but that is impossible.

Comparing Asset Returns Through Risk Adjustment

The fact that equities have a higher rate of return than bonds on average begs the question of why. If an IA held in equities would grow faster than an IA held in bonds, then why would anyone hold bonds? For that matter, why wouldn't investors holding bonds realize this, and trade all of their bonds for equities tomorrow? If market participants are rational, as economists believe, some factor other than rate of return must be holding investors back from converting all of their bonds into equities.

Economists explain the different rates of return offered by different financial instruments in terms of a risk-return tradeoff. Equities are more risky than corporate bonds because a bondholder is promised a specific rate of return, and bondholders are paid off before equity holders if a firm enters bankruptcy. Investors are willing to hold the securities of well-established firms at lower rates of return than "fly-by-night" firms because investors are more certain that well-established firms will meet the financial targets that they set. Investors will hold bonds of the federal government (U.S. Treasuries) at a lower rate of return than corporate bonds because only the federal government can levy compulsory taxes or print money to service its debt.

Thus, comparing the rate of return on different financial instruments, such as equities and bonds, is like comparing apples and oranges, since rates of return alone tell us nothing about risk. To make an apples to apples comparison, rates of return must somehow be adjusted to cancel out differences in risk between different financial instruments. This leads to an important insight: if individuals are rational, then the higher rate of return on equities than bonds is exactly equal to the loss in utility (happiness) that the average investor suffers from taking on the additional risk of holding equities rather than debt. If that is true, then all financial instruments earn the same rate of return on average after adjusting for risk. In other words, the average stockholder is no better off than the average bondholder even though the former can expect to receive a higher rate of return than the latter. If it were not true, and the utility enjoyed from earning a higher rate of return on equities exceeded the utility lost from the higher risk of holding equities, then investors would sell bonds, pushing their rate of return up, and buy equities, pushing their rate of return down, until the discrepancy no longer existed.

For that reason, in its analysis of individual accounts, the Congressional Budget Office (CBO) has assumed that individual accounts, regardless of what types of assets they hold, earn a rate of return equal to government bonds. This is the only way that the earnings on the account, which are uncertain, can be meaningfully compared to the benefit offsets proposed by the Administration and others, which are always the same no matter what the IA earns. (The Administration has proposed that Social Security benefits be offset by the amount of taxable payroll diverted to individual accounts, compounded at a rate of 3% a year.)

There is a vast literature in financial economics on an “equity premium puzzle.”⁷ This literature finds that the difference in average rate of return between equities and bonds is too great to be explained by any theoretical representation of risk aversion. In other words, the increased riskiness of equities compared to bonds is simply not great enough to merit the return premium on equities compared to bonds. Of course, economists use highly simplified models to quantify human behavior which nobody knows how to properly quantify, so the problem could be with the model, and not with human behavior.⁸ But if these models are correct, it suggests that investors’ fear of equities is irrationally high, and, by extension, standard risk-adjustment techniques are undercounting the gains to be had from holding equities if the rate of return on those equities is adjusted to equal the government bond rate.⁹

Regardless of what gains could be had from holding equities compared to bonds, historically investors have been indifferent between the two at prevailing interest rates, as irrational as that decision may have been. If they continue to be indifferent between the two in the future, it is difficult to see how the government can claim to “know better” than the individual about his investment decisions and eschew standard risk-adjustment techniques on the grounds that investors are irrational. But, again, this line of reasoning assumes that financial markets will operate the same in the future as they have in the past. What would be the implications for rates of return if the equity premium were smaller in the future, or had already become smaller, than it had been in the past?

Using historical rates of return in projections of IA earnings assumes that the historical equity premium will remain constant in the future. Yet it is well known that ownership of equities has changed markedly in past decades. Equities have become more attractive to small investors through innovations such as discount brokers and mutual funds, and the rise of defined-contribution pensions. All of these innovations have reduced the transaction costs associated with buying and selling equities for the average investor.¹⁰ In addition, there is at least superficial evidence from popular culture that the average investor’s fears of equities may have lessened (at least before the stock market crash of 2000). In 1989, 31.6% of households owned equities; by 2001, the figure had risen to 51.9%. Equities increased from

⁷ For a survey, see Narayana Kocherlakota, “The Equity Premium: It’s Still a Puzzle,” *Journal of Economic Literature*, vol. 34, no. 1, Mar. 1996, p. 42.

⁸ As Cochrane explains, if the economic models are calibrated to so that people are risk averse enough to generate the historical equity premium, then other variables in the model, such as interest rates, would fluctuate wildly, contrary to historical experience. John Cochrane, “Where is the Market Going? Uncertain Facts and Novel Theories,” *Economic Perspectives*, Federal Reserve Bank of Chicago, Nov./Dec. 1997, p. 3.

⁹ It also implies that the government could improve economic efficiency if the current share of wealth held in equities is inefficiently low at present, and individual accounts increase that share. This outcome is not a given, however, since no current proposal requires that a proportion of individual accounts be held in equities. Individuals may prefer to continue to hold the same share of their IA wealth in equities as they currently hold privately.

¹⁰ Some economists have argued that once transaction costs are netted out, the equity premium is lower than it first appears. If transaction costs have fallen, then gross returns relative to bonds would also fall.

33.7% of financial wealth in 1992 to 56.0% in 2001.¹¹ The generation that lived through the Great Depression may have become overly averse to investing in equities, but generations since then do not base their decisions on first hand knowledge of that experience. If equities have become relatively more attractive to investors, this could imply a lower equity premium moving forward.

If the equity premium has fallen, then the absolute rate of return on equities can be expected to fall and the absolute rate of return on less risky assets to rise, all else equal.¹² Were the equity premium to disappear entirely, the fall in equity returns, at the extreme, would be significant. The average annual return on equities from 1871 to 1993 was 3.9 percentage points higher than short-term commercial paper (a form of corporate debt), and in the absence of an equity premium it has been predicted that it would be only 0.1 percentage points higher.¹³

Is there any empirical evidence that the equity premium has fallen? Looking at average rates of return in recent years is not particularly useful because the stock market has gone through a sharp fall, followed by a relatively smaller (but still large) rebound. These short-term fluctuations probably give little evidence of longer term trends. What is needed is some reliable estimate of future expected returns. One possibility would be to see what professional forecasters are predicting for future returns, although few forecasts extend more than a few years. A recent Wall Street Journal article reported that a survey of 10 financial economists predicted that the average real return on equities from now to 2050 would decline to 4.8%.¹⁴ Global Insight, a private forecasting firm, provides a 25-year projection of equities, and predicts that they will rise 6.4% annually in real terms.¹⁵

The other possibility is to look at current valuations and attempt to estimate what they imply about investors' views on future valuations. This strategy will be explored in the next section.

¹¹ Board of Governors of the Federal Reserve, *2001 Survey of Consumer Finances*, Jan. 2003. Financial wealth does not include home equity.

¹² In the transition period to a lower equity premium, rates of return would be expected to temporarily be unusually high because prices would rise. Prices would rise because less-cautious investors would now be willing to pay more for a share of the same future earnings and dividends. At the time, many financial analysts argued that this could explain why rates of return were unusually high in the 1990s. If this transition period were included in the historical average, then the difference between the historical average and future returns would be even greater in the presence of a lower equity premium.

¹³ Nicholas Barberis and Richard Thaler, "A Survey of Behavioral Finance," in G.M. Constantinides et al., *Handbook of the Economics of Finance*, Elsevier Science, 2003, Ch. 18.

¹⁴ Mark Whitehouse, "Social Security Overhaul Plan Leans on a Bullish Market," *Wall Street Journal*, Feb. 28, 2005, p C1. Of the 10 economists surveyed, eight were private sector economists and two were academic economists.

¹⁵ Global Insight, *The U.S. Economy: The 25-Year Focus*, First Quarter 2005.

The P/E Ratio, P/D Ratio, and Future Rates of Return

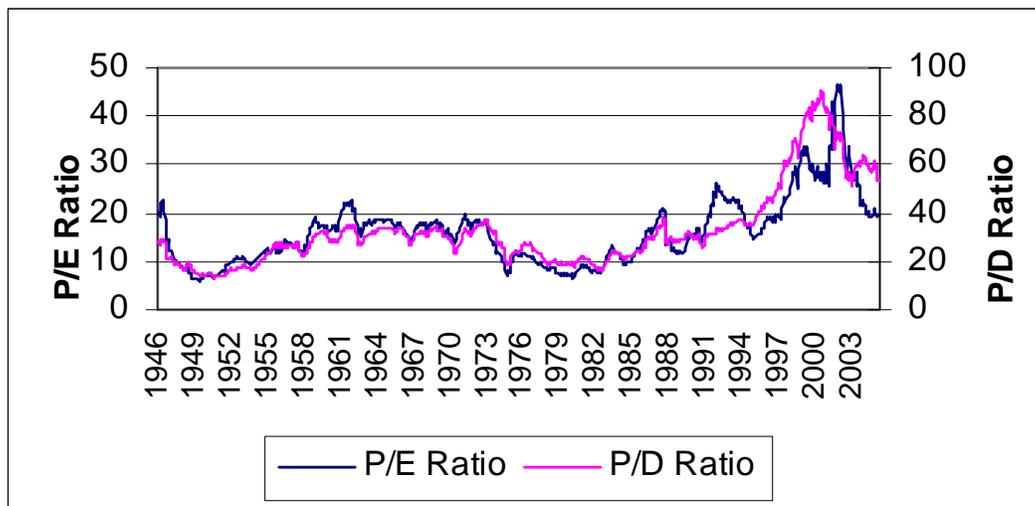
Standard financial theory defines current equity prices as equal to the present discounted value of future price appreciation and dividend payments. In other words, someone purchasing a stock today is purchasing the expected future capital gains and dividend payments associated with that stock, discounted to the present. Therefore, today's prices should reflect investors' expectations of future rates of return.

An important measure in determining future rates of return is future corporate earnings, since earnings can be used by the firm to either pay dividends, buy back its stock, reduce its debt, or increase the firm's capital stock; any of which could cause its stock price to rise. Unfortunately, there is no way to accurately predict the path of future dividends or future earnings — the higher one believed them to be, the higher the expected rate of return would be for a given stock price.

For analytical purposes, many financial analysts assume that future dividends and earnings will be equal to current dividends and earnings.¹⁶ By dividing share price by earnings per share, they calculate a price-earnings (P/E) ratio, and by dividing share price by dividends per share, they calculate a price-dividends (P/D) ratio.¹⁷ If the P/E ratio or P/D ratio rises today, and earnings or dividends remain constant in the future, then future rates of return will be lower.

¹⁶ This assumption would be unreasonable in a recession, since earnings are typically below average when aggregate demand is low. But since the economy has been growing robustly since 2003, it may be a reasonable assumption now.

¹⁷ A corporation can transfer earnings to an investor through either a dividend payment or by buying back stock, and the effect on the investor's rate of return should be exactly the same. Therefore, some analysts have argued that the P/D ratio will be incomplete if buybacks are not taken into account. If buybacks are constant over time, it would not be problematic to make historical comparisons using the P/D ratio. But many analysts argued that buybacks increased in the late 1990s, and this was one reason why the P/D ratio was rising. Unfortunately, historical data on the P/D ratio that controls for buybacks are difficult to find.

Figure 1: Price/Earnings Ratio and Price/Dividends Ratio, 1946-2004

Source: CRS calculations based on data from Haver Analytics

Notes: Ratios are calculated for Standard & Poor's 500 index stocks. Earnings are measured as four-quarter trailing earnings.

As can be seen in **Figure 1**, during the late 1990s, the P/E and P/D ratios were extremely high by historical standards. At the time, some skeptics argued that this meant that the stock market was experiencing a “bubble,” where stock prices could not be justified by any reasonable expectation of future dividends and earnings, and were unlikely to persist. In fact, the stock market fell 46% from peak to trough, and a strong case can be made that the skeptics were correct. However, as can be seen from the chart, although the P/E and P/D ratios are lower than they were in the late 1990s, they are still high compared to historical averages.¹⁸ Since the P/D ratio is also affected by firms' decisions whether to pay out their earnings as dividends, and dividend payouts have fallen over time, the analysis will focus on the implications of a high P/E ratio. There are a number of possible explanations for the currently high P/E ratio:

- Future earnings will be higher than current earnings, perhaps because productivity growth is now higher than it was in the past. This implies that equity returns could continue to match historical levels despite the higher P/E ratio.
- There is still a bubble in stock prices, and prices will have to fall further (or stay flat for a time) before prices reflect economic fundamentals. This implies below average equity returns for a

¹⁸ The Federal Reserve estimates a ratio of the market value of equities to a firm's net worth (assets less liabilities). This is similar to the economic concept known as Tobin's Q. A high value of the ratio would be associated with an overvalued market and imply low future rates of return, and vice versa. This ratio follows the same pattern over time as the P/E ratio, and prices are still relatively high by this measure as well, although a long data series is not available. From 1986 to 1990, the ratio equaled between 44.1% and 52.5%. In the 1990s, it rose rapidly, reaching 185.1% in 1999. In the last quarter of 2004, it stood at 96.4%.

period until the P/E ratio returns to historical levels, followed by equity returns equal to historical averages.

- Investors require a lower risk premium than they did in the past and will therefore pay more for a share of unchanged earnings. If so, future equity returns would be lower than historical returns.¹⁹

Clearly, these three possibilities have very different implications for the future earnings of individual accounts. The first possibility implies that the common assumption that individual accounts will earn the historical rate of return is the appropriate one. What this argument fails to explain is why current earnings are not already as high as the present discounted value of future earnings since productivity growth accelerated nearly a decade ago, unless one assumes that it will accelerate even further in the future. If current earnings are already growing as fast as future earnings will grow, then the P/E ratio should not be higher than its historical average. From 2001:4-2005:1, real earnings per share have grown by 4.5% per quarter — roughly three times the 1988-2005 average. It is difficult to see why earnings would grow even more rapidly in the future.

The second possibility suggests that while stock returns may equal the historical averages in the more distant future, in the short term returns could be well below average — although it is impossible to predict accurately how and when those below average returns will manifest themselves. Campbell and Shiller present evidence that when the P/E and P/D ratios have been high historically, it has typically been falling prices (the second scenario), not rising earnings or dividends (the first scenario) that has brought the ratios back to their historic average over the longer run.²⁰ This implies that early generations of IA holders may experience low or negative rates of return, while IAs would do well in the more distant future.

The third assumption suggests the historical average rate of return is higher than should be expected in the future, because attitudes toward risk are fundamentally different now than they were historically.

It is possible to derive a rough estimate of what the higher P/E ratio implies for future earnings. From 1950 to 1999, stocks averaged a real rate of return of 10.33%. Reichenstein breaks this return down into three parts — a dividend yield of 3.84%, earnings growth of 3.04% and an increase in the P/E ratio of 3.41%. This implies that if the P/E ratio remains constant in the future and dividends and earnings equal their levels from 1950 to 1999, the rate of return would equal 6.92%. This is similar to the Social Security actuaries' assumption that the rate of return will equal 6.5%. But dividend yields have been significantly lower than 3.84% in recent years. Unless earnings growth exceeds the historical average, then Reichenstein argues that at

¹⁹ This argument is made, for example, in Eugene Fama and Kenneth French, “The Equity Premium,” *Journal of Finance*, vol. LVII, no. 2, April 2002, p. 637.

²⁰ John Campbell and Robert Shiller, “Valuation Ratios and the Long-Run Stock Market Outlook,” *Journal of Portfolio Management*, Winter 1998, p. 11. The P/D and P/E ratios have not been accurate predictors of the movement of prices over short time periods in the past.

current dividend yields, the rate of return will fall to 4.78%, which he finds consistent with the view that there is now a lower equity premium. If the P/E ratio is to return to a level more in line with historical experience, however, the rate of return would be even lower. For example, if the P/E ratio were to fall from its recent average of approximately 20 to its 60-year average of approximately 16 over the next 10 years, it would reduce rates of return by 2.2%, based on Reichenstein's calculation.²¹

The Social Security Administration has explicitly linked the currently high P/E ratio and a lower equity premium to their decision to assume a rate of return in projections that is a little lower than the historical average:

...the long-term ultimate average annual real yield assumed for equities is 6.5 percent. This is somewhat lower than the historical real equity yield over the last several decades. A consensus is forming among economists that equity pricing, as indicated by price-to-earnings ratios, may average somewhat higher in the long-term future than in the long-term past. This is consistent with broader access to equity markets and the belief that equities may be viewed as somewhat less "risky" in the future than in the past. Equity pricing will vary in the future as in the past. Price-to-earnings ratios were very high through 1999, and are now lower. The average ultimate real equity yield assumed for estimates in this memorandum is consistent with an average ultimate level of equity pricing somewhat above the average level of the past.²²

Using the P/E and P/D ratios to project future returns depends crucially on the relationship between present and future earnings and dividends. Future earnings and dividends, and hence returns, will depend directly on future economic growth. The possibility of predictable changes in future growth is discussed in the next section.

Economic Growth and Rates of Return

Capital Income Growth Is Unlikely to Exceed GDP Growth. The future long-run rate of return on equity may be affected, in part, by the long-run rate of economic growth. Slower growth in national income would lead to slower growth in income from capital unless capital's share of income rises, which is equivalent to a corresponding decline in labor's share of income.

The historical record suggests that is unlikely. Estimates of income shares accruing to labor and capital vary slightly because of the ways in which income is attributed to human capital, but remain relatively stable over long time periods. Most mathematical models designed to explain economic growth assume that labor's and capital's income shares do not vary much over time.

The "functional distribution of income" describes how income is shared among the different factors of production; labor, capital, and land. If the argument that

²¹ William Reichenstein, "What Do Past Stock Market Returns Tell Us About the Future?" *Journal of Financial Planning*, vol. 15, no. 7, July 2002, p. 72.

²² Stephen Goss, Chief Actuary, "Estimated Financial Effects of The Progressive Personal Account Plan," memorandum, Social Security Administration, Dec. 1, 2003.

companies are increasing profits at the expense of labor is correct, then that should be reflected in the way income is distributed among these factors of production.

The income for each of these factors of production is determined by the quantity employed and the “price” for their use (for labor, wages; and for capital, the rate of return).²³ Relative income shares may vary either because of changes in the relative quantities employed, or in their prices. In the national income accounts published by the Bureau of Economic Analysis, income is accounted for as shown in **Table 2**.

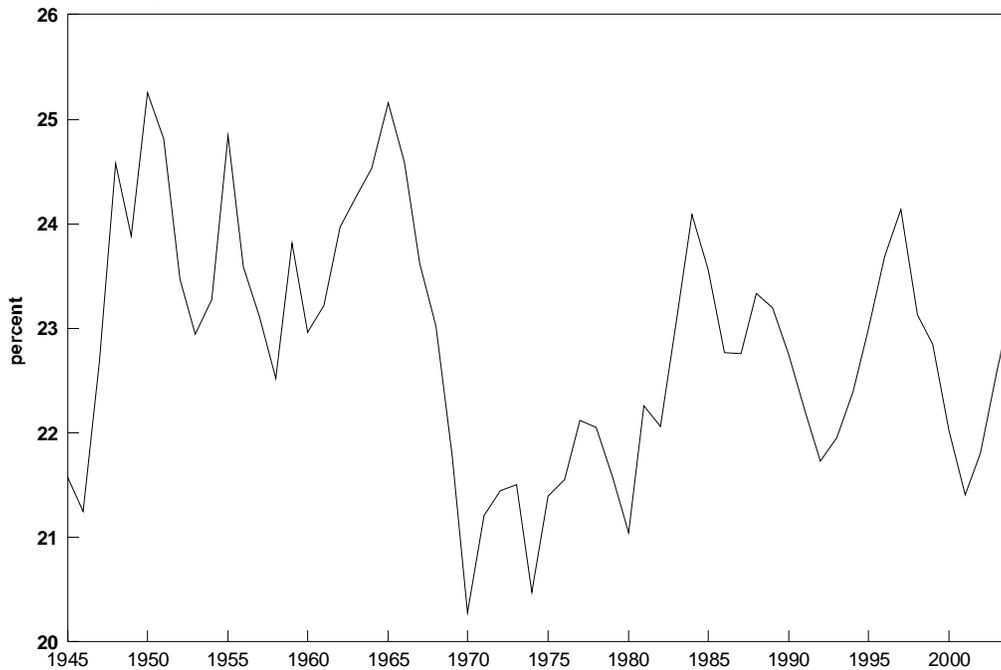
Table 2: National Income, 2004

	Billions of Dollars	Percent of Total
Total	8,841.0	100.0
Compensation of employees	6,289.0	71.1
Proprietors' income	834.1	9.4
Rental income of persons	153.8	1.7
Corporate profits	1,021.1	11.5
Net interest	543.0	6.1

Source: Department of Commerce, Bureau of Economic Analysis.

The amounts in **Table 2** account for all of the payments to the three factors of production; labor, capital, and land. Labor income is measured as compensation. Profits, rent, and interest measure payments for the use of capital and land. Proprietors' income reflects payments to all three factors. **Figure 2** shows estimates of the property (capital and land) share of income since 1945. This measure assumes that one-third of proprietor income is attributable to property. Income attributable to proprietorships has declined relative to total national income over the long run.

²³ Asset price appreciation is not included in BEA's measure of capital income. This makes a direct comparison to rates of return somewhat difficult.

Figure 2. Capital and Land Share of National Income

Source: Department of Commerce, Bureau of Economic Analysis.

If there is a discernable trend in these data, it is one of modest decline since the late 1940s, although there has been substantial variation and the share has risen from relatively low levels in the mid-1970s.²⁴ But capital's share of income has always been between 20% and 25%. This suggests that the effect of any lower GDP growth on capital income is unlikely to be offset by a rise in capital's share of income.

The Rate of Economic Growth Is Expected to Fall. Over the long run economic growth can be accounted for by growth in the labor force, changes in the hours worked by each worker, and the productivity (output per hour) of each worker. Over the very long run, say more than 50 years into the future, any economic projection might be characterized as speculation. In the nearer term, however there is at least some basis for making an educated guess what the prospects are for economic growth.²⁵

In the first place, the growth rate of the labor force can be estimated based on population growth trends and trends in labor force participation. For the next 20

²⁴ Poterba also finds little long-run change in the relative income shares of labor and capital, see James M. Poterba, *The Rate of Return to Corporate Capital and Factor Shares: New Estimates Using Revised National Income Accounts and Capital Stock Data*, NBER working paper 6263, Nov. 1997, 45 pp.

²⁵ Since the relevant time period with respect to Social Security is a very long one, short-term cyclical variations in the unemployment rate and its effects on output can be ignored. Long-run economic projections generally assume that the economy reaches and sustains full employment, on average, over the forecast period.

years or so, short of any dramatic change in immigration rates or in average retirement age, labor force growth can be predicted based on the current population and its age distribution. Beyond that, labor force growth will depend not just on current numbers of youth, but also on birth rates, mortality rates, and the chances that there will be other changes in immigration rates and retirement age increase.

Historically, variations in the growth rate of the labor force have been substantial. For example, from 1950 to 1960 the labor force grew at an annual rate of 1.1%. Between 1970 and 1980, it grew at an annual rate of 2.6%. The large increase was due both to the influx of baby boomers into the labor market, and also to a large rise in the labor force participation rate of women. Since then, labor force growth has slowed to a 0.8% rate between 2000 and 2004.

For the foreseeable future, labor force growth is expected to continue to decline, in large part because of the aging and retirement of the baby-boom generation. The intermediate projections of the Social Security trustees show the labor force growth rate falling to 0.5% by 2015. In the very long run, the labor force is expected to grow at a 0.2% rate between 2050 and 2080. Other things being equal, that would mean a decline of 0.6 of a percentage point in the rate of economic growth.

If workers worked more hours, that would offset some of the effects of slower growth in the labor force. But that is not likely to happen. Average weekly hours vary by much less than the size of the labor force and have a much smaller effect on variations in output growth. Between 1950 and 1980, average weekly hours fell at an average annual rate of 0.4%. After 1980, hours fell at an average annual rate of 0.1%. There is less basis for reliably projecting average hours than is the case with the labor force, but the Social Security trustees' intermediate projection assumes that average hours do not change, and have no effect on projected economic growth.

The third factor accounting for economic growth is average labor productivity. Simply put, average labor productivity is the quantity of output divided by the number of hours required to produce it (output per hour). Higher productivity growth could potentially offset the lower growth rate of the labor force, and keep GDP growth from slowing.

In order to make long-run projections of output, forecasters must make some estimate of what productivity growth is likely to be over the period being forecast. But the study of productivity has not advanced to the point where it can be projected based on what is known now about economic conditions. Most forecasts project productivity to continue at its current trend rate of growth; as discussed below, the Social Security trustees are a notable exception.

The trend rate of productivity growth at any given time can be difficult to discern because it is influenced in the short run by the business cycle. This makes it difficult to tell whether a change in the rate of productivity growth is temporary or indicative of a change in the long-run trend. Analysis of long-term trends indicates that in 1973 productivity growth slowed and that in 1995 it accelerated. The reasons for these changes are poorly understood, but it is widely believed that advances in the production of computers and related equipment, as well as increased investment in

computers have contributed to the post-1995 acceleration. **Table 3** shows how the trend rate of growth of productivity has varied over time.

Table 3: Productivity Growth, Selected Periods

	Annual Growth Rate of Output per Labor Hour
1947 to 1973	2.8
1973 to 1995	1.4
1995 to 2004	3.1

Source: Department of Labor, Bureau of Labor Statistics.

Although it is now clear that productivity growth picked up beginning in 1995, it was some time before this was thought to be part of a potentially durable shift in the long-run rate of productivity growth. Most economic forecasters, including the Congressional Budget Office (CBO) and the Office of Management and Budget (OMB), underpredicted real economic growth by an average of about 2 percentage points in each of the four years after 1995.²⁶

Now that the acceleration in productivity has survived the end of the last expansion and seems to be continuing into the present one, there is growing confidence that it will persist. Whether or not that confidence is misplaced, only time will tell. This is arguably the most important question for long-term growth projections. Higher productivity growth means higher real incomes, which in combination with progressive income tax rates yields higher federal revenues. As long as Social Security operates on a pay-as-you-go basis, higher productivity growth also extends the date of reckoning as far as the trust fund balances are concerned because the incomes of those paying Social Security taxes would grow more rapidly than the benefits. For example, if real wage growth increased from 1.1% to 1.6%, it would delay trust fund insolvency for six years.²⁷ Whether or not productivity growth continues at the rate it has since 1995 is a critical element in the trustees' projections of economic growth over the next 75 years.²⁸

The major difficulty in projecting productivity growth remains an imperfect understanding of the causes of past variations. Some of the sources of labor productivity growth are clearly understood. Increased investment and a growing capital stock (discussed in the next section) raise labor productivity. Increased education and training also contribute. But aside from the contributions of human and physical capital, much less is certain. To a great extent, projections of

²⁶ CRS Report RL30239, *Economic Forecasts and the Budget*, by Brian W. Cashell.

²⁷ Board of Trustees, Federal Old Age and Survivors Insurance and Disability Insurance Trust Funds, *Annual Report*, Mar. 2005, Table VI.D4.

²⁸ Paul W. Blauer, Jeffrey L. Jensen, and Mark E. Schweitzer, "Productivity Gains, How Permanent?" Federal Reserve Bank of Cleveland *Economic Commentary*, Sept. 1, 2001.

productivity still reflect the optimism or pessimism of the forecaster in the rate of technological progress.

The Social Security trustees' intermediate cost projection assumes that productivity will not continue to grow at the same rate as it has since 1995. They project that productivity growth will decline until about 2010, after which it will average 1.6% through the rest of the projection period ending in 2080.

The trustees' intermediate projections of no change in average hours, labor force growth falling to 0.2% and productivity growth falling to 1.6% imply long-run growth of 1.8% after 2050. If productivity growth continues at the pace of the last decade, that projection is likely to prove overly pessimistic. However, even if productivity growth remains at the post-1995 rate, growth would be lower than in the last decade because of slower growth in the labor force.

Table 4 compares the trustees' long-run projections with those of CBO, and of Global Insight, a private economic forecasting firm. The trustees publish three alternative projections. The intermediate-cost projection represents the trustees' best estimate of likely future demographic and economic conditions. The low-cost projection assumes more rapid growth, and the high-cost projection assumes the opposite. Global Insight projects out only 25 years, but over that period theirs is the most optimistic forecast. The CBO forecast is not as recent as that of the trustees, but it is similar to the intermediate cost projection of the trustees. All three forecasters expect that the rate of economic growth is going to decline over the very long run.

Table 4: Long-Run Real GDP Growth Projections

	Social Security Trustees			CBO	Global Insight
	Intermediate Cost	Low Cost	High Cost		
2005 to 2010	3.0	3.5	2.4	3.1	3.2
2010 to 2020	2.1	2.7	1.6	2.3	3.0
2020 to 2030	1.8	2.4	1.4	2.0	2.8
2030 to 2040	1.9	2.5	1.3	1.8	N.A.
2040 to 2050	1.8	2.6	1.2	1.9	N.A.
2050 to 2080	1.8	2.6	1.0	N.A.	N.A.

Sources: *The 2005 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds*; Congressional Budget Office, *The Long-Term Budget Outlook*, Dec. 2003; Global Insight, *The U.S. Economy The 25-Year Focus*, First Quarter 2005.

Slower GDP growth and rates of return. Lower GDP growth will lead to slower capital income growth unless capital's share of income rises, which is unlikely to persist indefinitely. Since capital income consists of some of the same factors — corporate earnings that are paid out in dividends or reinvested — that

determine the rate of return on equities, it seems likely that slower capital income growth would also result in lower rates of return. Real earnings growth and GDP growth have moved closely together historically.²⁹

Baker, DeLong, and Krugman argue that if the growth rate of the economy declines, as it is expected to, the return on stocks is likely to fall below the long-term historical rate.³⁰ Using theoretical models describing the connection between economic growth and assets returns, the authors argue that only under unlikely circumstances (e.g., a large shift in the distribution of income from labor to capital, or a shift from the substantial current account deficit to a surplus) would a drop in economic growth (caused by slower labor force growth) not cause asset returns to decline.

Baker, DeLong, and Krugman explain the rate of return on equity as a sum of the dividend yield, the rate of stock buybacks (companies buying their own stock back from shareholders), and the rate of growth of dividends. Assuming the first two remain constant, the authors consider it unlikely that a slowdown in capital income growth would not be reflected in the growth rate of dividends, otherwise the capital share of income would rise. If slower economic growth results in slower growth in income from capital and slower growth in dividends, they say the rate of return is also likely to fall.

Demography, Saving, and Investment

With given levels of technological progress and labor, most economic models assume that the return to capital declines as the capital stock grows. In other words, each new machine employed by a firm yields a smaller increase in production than the last one. In the jargon of economics there is a diminishing marginal product of capital. Thus the share of output that is saved and invested might be expected to have some effect on the rate of return on capital, and therefore individual accounts. This section examines the potential effects of upcoming demographic changes on the outlook for saving and investment.

One among many potential economic consequences some fear may result from the retirement of the baby-boom generation is a substantial decline in the stock market and, more generally, in the prices of all financial assets. This concern is the result of a presumption that the surge in retirements will result in a substantial sell-off of stocks and bonds as retirees draw down their wealth in order to maintain living standards in retirement.

²⁹ In a bivariate regression from 1998:2-2005:1, a one percentage point increase in GDP growth is predicted to lead to a 5.65 percentage point increase in real earnings. The result is statistically significant at the 1% confidence level and has an R-squared of 0.18. Data are based on S&P 500 earnings, inflation adjusted using the GDP deflator, from Haver Analytics.

³⁰ Dean Baker, J. Bradford DeLong, and Paul Krugman, "Asset Returns and Economic Growth," *Brookings Papers on Economic Activity 2005:1*, Forthcoming 2005.

From a theoretical standpoint, two common presumptions might support that conclusion. First, at the center of most economic models of personal saving is the assumption that individuals seek to avoid substantial fluctuations in their living standards over the course of their lifetimes. Second is the observation that individual incomes tend to rise during the course of their working lives and then decline after retirement. Taken together, these two considerations lead to the prediction that most people will tend to save relatively less when they are young and when they are retired, and save more when they are in their peak earning years.

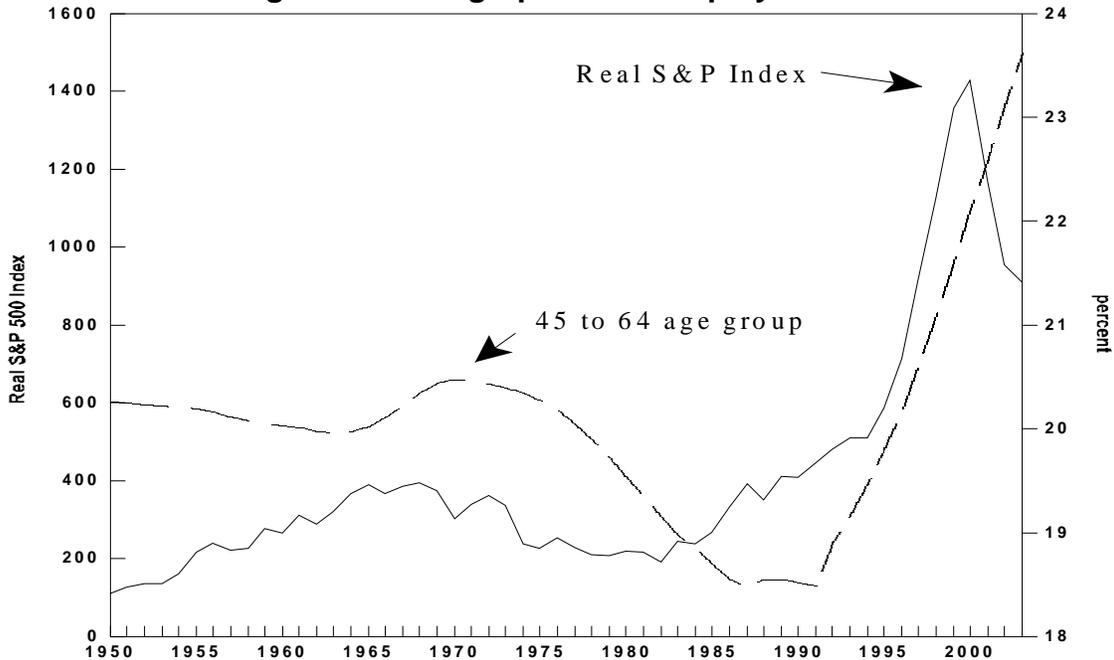
In this simple model, as baby boomers reach their peak earning (and peak saving) years, it might be reasonable to expect an increase in the demand for financial assets. But on retirement, they would gradually draw down their holdings of assets to finance consumption in order to maintain their standard of living. Thus, when retirements surge as the baby-boom generation ages, the increased sales of financial assets might be expected to drive down their prices substantially.³¹

Figure 3 plots the proportion of the overall population aged 45 to 64 since 1950. Also shown is the Standard and Poor's index of 500 stock prices, adjusted for inflation. The unadjusted S&P 500 index is set at 10 for 1941 to 1943, and here it is adjusted for inflation using the price index for gross domestic product. Anyone looking for evidence that there is a relationship between the two might not be disappointed. As the figure shows, it appears that, at times, the two series move together.³²

³¹ See, for example, Diane Macunovich, "Discussion," *Social Security Reform*, Federal Reserve Bank of Boston, Conference Series 41, June 1997, p. 64. See also Brooks, who derives a calibrated theoretical overlapping generations model in which the rate of return on equities and bonds falls about 100 basis points between 2010 and 2020, before rising about 50 basis points between 2020 and 2030. In this model, there are no bequests and retirees consume their savings before death. Robin Brooks, "Asset Market Effects of the Baby Boom and Social Security Reform," *American Economic Review*, vol. 92, no. 2, May 2002, p. 402.

³² The correlation coefficient between the two series is 0.603. As Poterba points out, this evidence is less statistically robust than it may initially appear to be: "...even if we have 80 years of very reliable returns data on equity markets in the United States, we do not really have 80 observations on demography and stock returns. We have one big baby boom that has made its way through the financial markets. So the effective amount of information in this case is much less than standard statistical procedures would suggest." James Poterba, "Impact of Population Aging on Financial Markets in Developed Countries," Federal Reserve Bank of Kansas City, *Economic Review*, 2004:4, p. 50.

Figure 3. Demographics and Equity Prices



Source: Department of Commerce; Standard and Poor's.

Recent developments give reason to doubt a unique connection between the age distribution and the saving rate. If those aged between 45 and 64 are, generally speaking, in their peak saving years, then a rise in the proportion of the population accounted for by that group might be expected to lead to an increase in the overall saving rate. Between 1990 and 2003, the share of those aged 45 to 64 increased by about five percentage points. Over that same period, the personal saving rate fell from 7.0% to 1.4%. It is clear that knowledge of prospective changes in the age distribution alone is insufficient to make predictions about saving behavior or asset prices.

There are, however, other factors that may affect saving in addition to the desire to smooth consumption over the course of one's lifetime. Some may save for precautionary reasons, for example, in order to insure against events less predictable than the drop in income experienced at retirement. To the extent that people accumulate precautionary savings, if they have a run of bad luck, or are faced with unexpected out-of-pocket medical expenses, those expenses need not force a cut in consumption. Those with children may have the additional motive of leaving a bequest. If these two motives have a substantial influence on saving behavior, wealth holdings might not be expected to decline after retirement.

Saving data by age are available from the Survey of Consumer Finances (SCF), conducted by the Board of Governors of the Federal Reserve. Among the questions asked in this survey is whether or not the responding family saved during the previous year. **Table 5** shows the results for the 2001 survey. These data also confirm the expected hump in the cross-section, with fewer of those families at the ends of the age distribution saving than those in the middle of working age.

Table 5: Percentage of Families Who Saved, by Age of Family Head, 2001

less than 35	35 to 44	45 to 54	55 to 64	65 to 74	75 and over
52.9	62.3	61.7	62.0	61.8	55.5

Source: Board of Governors of the Federal Reserve System.

While the data in **Table 5** seem to confirm the main idea of the life-cycle model which is that saving declines in retirement, more than half of families in the 75 and over age group still report that they are saving. If the reason for saving is to accumulate wealth, either to finance retirement or as a rainy day fund, then changes in wealth may be a more useful measure of saving. **Table 6** shows estimates of net worth by age group based on the results of the 2001 SCF.³³ The mean is the average wealth holding of each age class, and the median represents the mid-point of the wealth distribution for each age class, with half of each group having more than the median and half having less.

Table 6: Household Wealth by Age Class, 2001

Age of Head of Household	Net Financial Assets		Net Worth	
	Mean	Median	Mean	Median
20 to 24	\$26,330	\$-340	\$44,075	\$3,300
25 to 29	11,649	50	52,282	11,895
30 to 34	32,806	940	88,514	20,500
35 to 39	46,504	6,300	122,712	37,000
40 to 44	75,099	13,540	204,488	68,711
45 to 49	99,240	14,000	240,273	74,301
50 to 54	181,181	30,130	369,670	103,700
55 to 59	210,908	33,450	455,729	134,130
60 to 64	207,848	24,000	421,902	109,700
65 to 69	156,288	28,525	346,338	119,790
70 to 74	205,077	32,800	409,932	133,840
75 and up	174,308	27,835	310,900	114,000

Source: Poterba.

³³ These data are from: James Poterba, *The Impact of Population Aging on Financial Markets*, NBER Working Paper 10851, Oct. 2004, 48 pp.

As with any survey, there are errors associated with these estimates, the more so because of size of the age cohorts in the sample. Nonetheless, the figures show that both net financial assets and total net worth rise up through the group aged 55 to 59 and then drop off somewhat. What may be more significant, though, is that the drop-off in wealth for those groups that have largely retired is not as large as might have been expected. There is a sizable drop between the 60-to-64 and 65-to-69 cohorts, but the increase in net worth increases for the 70-to-74 age group suggests that some of that apparent drop may be due to sampling errors.

These data lend support to the idea that retirees finance their retirement, in part, by drawing down their wealth. But the more remarkable characteristic of these data may be that the decline in wealth of the very elderly is not as great as might be expected. That suggests that bequests and precautionary saving may be as important motives to save as retirement. That would make it less likely that there would be a massive sell-off of assets as the baby-boom generation retires.³⁴ On the contrary, Rogers et al. show that the decline in the share of people under age 34, who have the highest dis-saving rates, more than offsets the effect on saving of the increase in the share of people over the age of 64 between now and 2040. Therefore, demographic factors alone — assuming that future age cohorts had the same saving rate as today's age cohorts — would suggest that the national saving rate will rise between now and 2040.³⁵

The data in **Table 6** also hint at a wealth distribution that is significantly unequal. The ratio of mean to median is an indication of the degree of inequality in a given distribution. An increase in the share of total wealth held by the richest households in the distribution will increase the ratio of the mean to the median. In the case of net financial assets the ratio is 6 or 7 for most of the age classes, while for total net worth it is 3 or 4. That indicates that the distribution of net financial assets is more unequal than the distribution of total net worth. Part of the reason for that difference is the equalizing effect of including home equity.

Wealth is more unequally distributed than income. **Table 7** presents data from the 2001 SCF showing the degree to which the distribution of wealth is concentrated. The data show that those households in the top 1% of the wealth distribution account for nearly one-third of all wealth. The top 10% accounts for over two-thirds of total

³⁴ Abel argues that, on the contrary, even if the baby boomers do not rapidly draw down their assets in retirement, asset prices could still fall. See Andrew Abel, "Will Bequests Attenuate the Predicted Meltdown in Stock Prices When Baby Boomers Retire?," National Bureau of Economic Research, working paper 8131, Feb., 2001.

³⁵ Diane Lim Rogers, Eric Toder, and Landon Jones, "Economic Consequences of an Aging Population," Urban Institute, The Retirement Project Occasional Paper 6, Sep. 2000. Their unorthodox prediction that demographic change will cause private saving to rise between now and 2040 leads to surprising conclusions that, holding government saving equal, interest rates will fall and the growth rate of investment spending per capita will rise from current levels. However, the growth rate of income per capita still falls in their projection between now and 2040 because of the decline in the worker-dependent ratio.

wealth. According to Poterba, the top 1% accounts for nearly half of all equity wealth.³⁶

Table 7: Percent of Net Worth by Percentile Group, 2001

0 to 49.9	50 to 89.9	90 to 94.9	95 to 98.9	99 to 100
2.8	27.4	12.1	25.0	32.7

Source: Board of Governors of the Federal Reserve System.

It would seem plausible that households at the top of the distribution might not have to sell a significant fraction of their assets in order to maintain their standards of living upon retirement, and are motivated to save largely by factors other than the life-cycle factor. The more that is the case, the less reason there would be to expect a large increase in sales of assets as the baby boom generation begins to retire. Likewise, there is a significant minority of households without substantial financial asset holdings who would have little effect on financial markets when they retire.

Thus far, only cross-section data have been presented. Those data indicate how saving and wealth vary by age group at a single point in time. But they may not be sufficient to project how individuals will behave as they move up the age distribution. There may be important reasons *other than age* that determine how individuals approach the decision of how much to save and how much wealth to accumulate and hold over the course of their lives. For example, it may be that those who grew up during the Great Depression beginning in 1929 developed a different attitude about the importance of thrift from those who make up the baby-boom generation. If that is true it would be unreasonable to use the behavior of the current elderly population to predict the future behavior of baby boomers.

There is at least one reason to expect at least some asset sales as retirements increase that does not require predictions of individual behavior. A substantial number of workers are covered by defined benefit pension plans. A defined benefit plan is one under which pension payments are determined by such variables as age at retirement and length of employment. Firms that manage these pensions must maintain a fund from which to pay future pension benefits. As the baby-boom population entered the work force and the number of workers covered by these plans grew the funds accumulated more and more assets. As those baby boomers who are covered begin to retire the funds will need to increase sales of assets to meet their pension obligations. Scheiber and Shoven project that the pension system will begin to dissave in 2024 and dissave at a rate equal to 4% of payroll in 2065.³⁷

³⁶ James Poterba, "Impact of Population Aging on Financial Markets in Developed Countries," Federal Reserve Bank of Kansas City, *Economic Review*, 2004:4, p. 49.

³⁷ Sylvester Schieber and John Shoven, "The Consequences of Population Aging for Private Pension Fund Saving and Asset Markets," in Michael Hurd and Naohiro Yashiro, eds., *The Economic Effects of Aging in the United States and Japan*, University of Chicago Press, (Chicago: 1997), p. 111.

A lower household saving rate would tend to raise interest rates and reduce capital spending, all else equal. This would raise the rate of return on individual accounts (after any decline in equity prices caused by the initial baby-boom “sell-off.”) But in this case, all else would not be equal. At the same time that demographic change was reducing the supply of saving, it might also affect the demand for investment spending by firms. As discussed above, the aging of the U.S. population means that the labor force will grow less rapidly, slowing the growth in output as well. This means that the U.S. economy would not require the capital stock to grow as rapidly as it had previously, but it is difficult to speculate what will happen to investment growth relative to growth in the labor supply.

If firms want to keep the capital-labor ratio unchanged, then the growth in investment spending would decline as much as the growth in the labor force, and labor productivity growth would stay constant. If investment spending as a percentage of output remains constant, that would also result in slower growth in the capital stock, but the capital-labor ratio would rise. If the saving rate were constant, as in the Solow model, the capital-labor ratio and productivity would rise.³⁸ If there is not a strong relationship between saving rates and age, as the previous evidence suggested, then labor force growth may decline more quickly than the growth in saving, and the capital-labor ratio and productivity growth would rise and interest rates would fall.

Different general equilibrium models, which explicitly model endogenous saving and investment rates that are functions of the labor force, make different predictions about what happens to saving and investment rates when labor force growth declines. In a literature survey, Bosworth et al. conclude, “At this stage in the research, conclusions about the relative magnitude of the changes in rates of saving and investment remain very sensitive to modest changes in the research design and the data employed.”³⁹

Higgins, for example, suggests that the aging of the baby boom could cause the rate of investment to fall by more than the saving rate.⁴⁰ Higgins argues that investment demand has a cycle much like the life cycle plays a role in determining saving rates. But while the peak ages for saving may be in the late 40s and early 50s, the peak effect on investment demand is in the 20s when workers first enter the labor force. If that is the case, the decline in saving as the baby boomers age may lag the decline in investment demand. He estimates that national saving could fall by 1%-2% of GDP, while investment could fall 5%-6% of GDP. In that case, the changing age distribution would lead to a reduction (increase) in any current account deficit (surplus). Cutler et al. also argue that investment demand will fall sharply, and argue

³⁸ George Akerlof, “Comments and Discussion,” *Brookings Papers on Economic Activity* 1, 1990, p. 57.

³⁹ Barry P. Bosworth, Ralph C. Bryant, and Gary Burtless, *The Impact of Aging on Financial Markets and the Economy: A Survey*, Center for Retirement Research at Boston College, Oct. 2004.

⁴⁰ Matthew Higgins, *Demography, National Savings and International Capital Flows*, Federal Reserve Bank of New York Staff Report no. 34, Dec. 1997, 39 pp.

that the optimal response to demographic change is to lower, rather than raise, the national saving rate.⁴¹

Interest Rates. Interest rates (the return on financial assets) will depend on the equilibrium between saving and investment.⁴² If saving falls more than investment demand, then interest rates would rise, and vice versa. Thus, even if one were relatively certain that saving would fall as the baby boomers enter retirement, one cannot say which direction interest rates would move based on that information alone. If investment stayed constant as a share of GDP, then saving would fall more than investment and interest rates would rise. In the simple Solow model, where saving is constant, interest rates would fall.

The effect on interest rates will also depend on international capital flows. In an open economy, with international flows of both goods and capital, it is not necessary that any decline in domestic saving be exactly matched by a decline in domestic investment. By importing savings from abroad, domestic investment can exceed domestic saving. When the nation is a net importer of saving from abroad there is a corresponding gap between imports and exports of goods and services. The extent to which domestic investment exceeds domestic saving determines by how much imports of goods and services exceed exports. In other words, when investment demand is greater than domestic saving there is a current account, or trade, deficit. Since both saving and investment demand may fall when the baby boomers retire, it is not clear whether demographic change would lead to a larger or smaller trade deficit.

International capital flows do not depend on the United States alone. At the same time that the United States will be experiencing the retirement of the baby boomers, other industrialized nations will be experiencing a more drastic demographic shift. The other G-8 countries are projected to experience a larger decline in the worker-dependency ratio than the United States. Moreover, Germany, Japan, and Italy are projected to experience an absolute decline in their populations over the next 50 years.⁴³ Thus, assuming foreigners respond to the life-cycle model in the same way as Americans, the changes in saving and investment caused by demographic change would be global in nature, and not limited to the United States. This means that the effects of demographic change on our interest rates and investment spending are unlikely to be canceled out by an unlimited source of international capital flows from the rest of the industrialized world. It is harder to predict how much capital will flow to or from the developing world in the distant future.

⁴¹ David Cutler et al., "An Aging Society: An Opportunity or Challenge?," *Brookings Papers on Economic Activity* 1, 1990, p. 1.

⁴² Unless otherwise noted, discussions of the movement in "interest rates" or "rates of return" assumes that the absolute rate of return on all assets (including equities) will change equally. In other words, relative rates of return will remain constant.

⁴³ Richard Johnson, "Economic Implications of World Demographic Change," Federal Reserve Bank of Kansas City, *Economic Review*, 2004:1, p. 39.

Interest rates, and thus the return on individual accounts, will be affected by the savings-investment balance. But it is uncertain what effect the aging of the baby-boom generation will have on saving or investment. If there is a decline in domestic saving, it might prompt an increase in the inflow of foreign capital leaving domestic interest rates unchanged.

This section has considered the effects of demographic change on private saving and investment. But national saving consists of both public and private saving, and demographic change is projected to affect public saving as well. The next section explores how.

Effect of Future Government Budget Deficits on Rates of Return

Under current policy, spending on Social Security, Medicare, and Medicaid is projected to rise rapidly, and there is not projected to be any corresponding rise in revenues. As a result, budget deficits are forecast to rise very rapidly to unprecedentedly high levels.⁴⁴ Unless health care spending grows no faster than GDP and other spending falls as a share of GDP (the low cost scenario), CBO projects that deficits will reach 6.1%-12.3% of GDP by 2030 and 14.3%-34.5% of GDP by 2050.⁴⁵

Standard economic theory suggests that deficits this large would push up interest rates significantly (until they ultimately became unsustainable and led to debt default or accelerating inflation). That is because when the government borrows, it must compete with private companies trying to finance capital investment out of the pool of national saving. Government borrowing increases the demand for that pool of saving, and interest rates rise as a result. If the nation borrows from abroad in response to the budget deficits, that would take some upward pressure off interest rates by reducing the demands put on national saving. However, it is unlikely that deficits of the magnitude being discussed could be financed solely out of greater foreign borrowing. In that case, at least some of the effect of the deficit would be manifested in higher interest rates.

When interest rates rise, firms cut back on capital investment because it becomes more expensive to finance. They cut back to the point where the marginal product of capital matches the higher interest rate.⁴⁶ This means that the rate of return on future capital investments would be higher than it would have been if interest rates had not risen. The rate of return on equities must also rise if they are to continue to be attractive to investors, now that alternative investments, such as bonds and physical capital, are more attractive (because of higher interest rates). Or,

⁴⁴ For detailed analysis, see CRS Report RL32747, *Social Security and Medicare: The Economic Implications of Current Policy*, by Marc Labonte.

⁴⁵ Data from Congressional Budget Office, *The Long-Term Budget Outlook*, December 2003. All projections in this report come from this document unless otherwise noted.

⁴⁶ Economists assume that each additional unit of capital is less productive than the last because of the law of diminishing returns. Thus, when interest rates rise, firms will reduce their capital investment until the point when investment becomes profitable again.

more directly, equity returns rise because shareholders are owners of the firm, and the firm is now enjoying a higher rate of return on its capital investments. Thus, the long-term rate of return on equities, and hence individual accounts, would likely rise as budget deficits rise. But in the short run, the result would be the opposite — higher budget deficits would cause equity prices to fall. In theoretical terms, this would be because future earnings are now discounted at a higher rate, and therefore discounted more heavily. The short-term decline in equity prices allows the firm's equity to earn a higher rate of return when it makes additions to the capital stock in the future. This means that people holding individual accounts when interest rates rise and equity prices fall would be worse off, but people who begin contributing to individual accounts after the rise in interest rates would be better off than if interest rates had not risen.

The Social Security Administration's projections do not allow feedback between budgetary effects and the macroeconomy, and thus do not adjust for these possibilities. Moreover, it is highly likely that policy would be changed before the "worst-case scenario" occurred.⁴⁷ In that case, the effects on rates of return that current policy implies would not come to pass. Nevertheless, it may be useful to keep the implications of current policy in mind when forecasting rates of return for two reasons. First, analyses of Social Security are based on current policy, and that is the baseline by which proposed modifications to the program are compared. If current policy is the baseline for policy analyses, then an argument can be made that the implications of current policy should be incorporated in macroeconomic baseline projections. Second, reducing future budgetary shortfalls would require someone to be made worse off. Compared to current policy, either program beneficiaries would be made worse off by large benefit cuts or taxpayers would be made worse off by large tax increases. This suggests that reducing the future fiscal imbalance would be politically difficult. Therefore, it is not unreasonable to assume for political economy reasons that there is a very real possibility that, even after policy changes, budget deficits would be larger than they have been historically. If so, this would affect the rate of return on all assets.

Effect of Individual Accounts on National Saving and Rates of Return

The previous section considered the effect of current policy on national saving, and hence rates of return. But the individual accounts themselves may also affect rates of return through the same channels. Proponents of individual accounts claim that the existence of IAs that individuals can invest in U.S. private securities will boost economic growth and the stock market. If true, this would increase the resources available to the nation as a whole, making it easier to finance entitlement benefits for the baby boomers.⁴⁸ Opponents point to the effects of the transition costs of setting up the IAs on the budget deficit and claim that IAs will be detrimental to

⁴⁷ In the worst case scenario, where current policy was pursued until the point where the government defaulted on its debt, economic conditions would likely deteriorate to the point where equities would be expected to fall in value precipitously.

⁴⁸ See CRS Report RL30708, *Social Security, Saving, and the Economy*, by Brian W. Cashell.

economic growth and investment rates. Which view is accurate? The method for financing the transition costs turns out to be crucial in determining the effects on the economy and the rate of return.

The creation of so-called carve out individual accounts increases private saving by diverting part of the payroll tax into accounts that individuals are required to save. But that is not the end of the story. The payroll taxes that would be diverted to the IAs are currently financing Social Security and other government spending, and that spending would still need to be financed after the accounts are created. This is the essence of the transition costs. Thus, individual accounts can be financed in three ways: by reducing government spending, raising taxes, or borrowing (increasing the budget deficit).

If the transition costs are financed through higher taxes or lower spending, the creation of the IAs would not affect the budget deficit (government saving). Since private saving would rise and government saving would remain the same, national saving would rise and interest rates would fall. As a result, either private investment would rise or borrowing abroad (the trade deficit) would fall. If private investment rises, economic growth and future living standards would rise.⁴⁹ The future profits of corporations would rise since national saving would rise, interest rates would fall, and investment would rise. In that case, stock prices would immediately rise to reflect that change, causing the rate of return on equities to initially rise (assuming firms did not respond by issuing more equity). However, the rate of return would eventually decline below the original level to match the decline in the user cost of capital (interest rates) that results from a higher national saving rate. From the firm's perspective, when the saving rate increases, the cost of capital declines and the firm responds by increasing its capital investment. As a result, its output rises. The rate of return from that investment falls because there are diminishing marginal returns to investment for the firm.

If the rise in national saving is instead matched by a decline in borrowing abroad, then there would be no change in interest rates. With no change in interest rates, the rate of return on equities and IA holdings would not be expected to change. Whether higher national saving results in lower interest rates or lower borrowing abroad depends on how sensitive capital flows are to changes in interest rates, as opposed to other factors that determine capital flows.

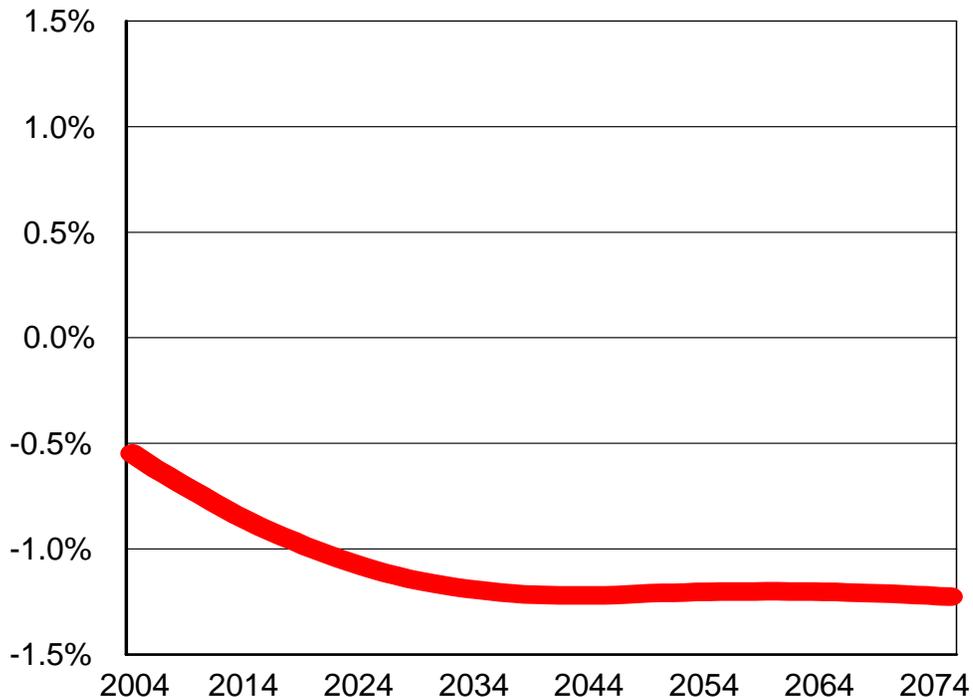
If the transition costs are instead financed through borrowing, the budget deficit would rise. For example, **Figure 4** illustrates the *increase* in the deficit (a decline in the surplus) caused by individual accounts in the President's Commission Plan 2 with 67% participation. (To isolate the effects of the IAs, it does not include the effects of unrelated benefit cuts on the deficit.) The rise in private saving would be completely offset by the decline in government saving, and national saving would remain constant.⁵⁰ There is no reason to think that the rise in private saving would

⁴⁹ These positive effects on the economy are not unique to the creation of IAs; any policy option that reduced the budget deficit would be expected to have the same results.

⁵⁰ In the long run, national saving would increase because, all else equal, the benefit offsets (continued...)

exceed the fall in government saving since, under current proposals, the IAs cannot be “topped up” by extra voluntary contributions from the account owners.⁵¹ In that case, private investment, foreign borrowing, interest rates, and economic growth would be unaffected by the creation of individual accounts. (Usually, budget deficits reduce national saving because they finance consumption; the result is different here because they are financing private saving.) Because interest rates are not changing, the rate of return on equities and earned by IAs would not be expected to change.

Figure 4: Change in Unified Budget Balance From Introducing Individual Accounts in Plan 2 (67% Participation Rate)



Source: Chief Actuaries of Social Security Administration, *Memorandum to President’s Commission to Strengthen Social Security*, December 2001, pp. 53-54.

Notes: Estimates based on Commission’s Option 2 reform plan with 66.7% participation rate. Estimate includes only the budgetary effects of the individual accounts and benefit offsets; estimate does not include the effects of any other changes to Social Security. It assumes accounts equal to 4% of payroll are introduced in 2004. A negative value connotes a larger deficit.

⁵⁰ (...continued)

would increase public saving, but these offsets would be negligible as a share of public saving for the first few decades after the individual accounts were created.

⁵¹ This assumes private individuals react to the creation of individual accounts by not altering their private saving behavior (since the individual accounts are offset by lower Social Security benefits, and therefore do not increase net wealth). If individuals instead react by saving less outside of Social Security, either because they incorrectly believe their net wealth has increased or because they believe they will receive higher lifetime benefits because the reform package reduces Social Security’s insolvency, then national saving could fall.

If the IAs were designed as “add ons” instead of “carve outs,” the macroeconomic effects would remain the same. Add-on accounts would be financed from general revenues rather than by diverting payroll taxes. If the general revenues used to finance the accounts were raised through higher taxes or lower government spending, then national saving would rise because private saving would rise and government saving would remain the same. This would cause interest rates, and the return on equities, to fall. If the general revenues were instead raised by increasing the budget deficit, the increase in private saving would be offset by the decrease in government saving. This would leave interest rates and rates of return unchanged.

Effect of Individual Accounts on Relative Rates of Return

Although borrowing to finance individual accounts would have no effect on aggregate saving and investment, and therefore overall interest rates, it is likely to affect relative rates of return within financial markets. Higher government borrowing would increase the supply of U.S. Treasury securities on the market. Unless the demand for Treasuries is infinitely elastic, a higher interest rate would be required for investors to be willing to hold more Treasuries. As investors shift into Treasuries and out of other assets, the rate of return on other assets would fall, leaving aggregate rates of return the same.

Just as the greater supply of Treasuries would affect their relative rates of return, the creation of individual accounts would be expected to change relative rates of return on any private assets that could be purchased by account-holders, such as equities and corporate bonds. For example, if the demand for equities rose, stock market prices would rise. The effect of higher equity prices on future rates of return would depend on whether or not the accounts were deficit financed. If they were, then saving would simply shift from the public to the private sector and investment and economic growth would remain unchanged. In that case, the future profitability of corporations and their ability to pay dividends would likely remain unchanged. Given an increase in equity prices, and an unchanged future stream of dividends, the rate of return on equities would be lower.

This is what one would expect in any market if demand rises and conditions on the supply side of the market remained unchanged. Again, these results assume that the demand for private securities is not perfectly elastic (meaning that the overall change in demand for equities does not fall in proportion to the increase in their price). Otherwise, investors outside of IAs could offset any change in relative rates of return by selling private securities and buying Treasuries, in which case current asset prices would not be affected by the creation of IAs.

The Social Security Administration does not adjust its projections to take these effects into account, although they acknowledge that the effects may not be negligible:

It should be noted that the precise effects on implementing a plan that would result in a large demand for equities and corporate bonds on the yields of these securities is not clear. This demand would likely be at least partially offset by reductions in demand for other investment mechanisms. For the purpose of these

estimates, it is assumed that there will be no net dynamic feedback effects on the economy or on the financial markets.⁵²

Conclusion

Estimates of how much individual accounts would earn typically assume that financial securities will earn a rate of return equal to the historical average. Behind this assumption lies the implicit belief that the future is likely to be similar to the past. This report concludes that there are economic variables that are likely to be different in the future from the past, and it reports that changes in those variables would have a predictable effect on rates of return. It finds:

- Today's high price/earnings and price/dividends ratio suggest that future rates of return will likely be lower. Dividends and earnings would have to grow unusually rapidly in the future to avoid this outcome.
- Historically, the equity premium that investors demand to hold equities rather than bonds has been inexplicably high. This premium may be smaller in the future, particularly since equity ownership is much more widespread and transaction fees lower than in the past. This would reduce equity returns.
- A lower future economic growth rate (as a result of slower labor supply growth) is likely to reduce corporate earnings, unless capital's share of income rises continually. This could reduce the rate of return on equities.
- A lower saving rate, as the baby boomers finance their retirement, would raise the rate of return. Asset prices would likely decline initially in order to achieve higher rates of return in the future. This effect is likely to be smaller than popularly imagined because of precautionary and bequest motives for saving, the unequal distribution of wealth, and fewer young dissavers in the future.
- At the same time saving is falling, a slower growing labor force would reduce investment demand, lowering the rate of return. It is uncertain which of these two effects would dominate, or how much both could be offset by international capital flows.
- Public policy directly alters the national saving rate through the budget deficit. Larger budget deficits lead to higher rates of return across all assets. Under current policy, budget deficits would become unsustainably large; for that reason, current policy may not be a good predictor of the future. However, the budgetary pressures

⁵² Stephen Goss, Chief Actuary, "Estimated Financial Effects of The Progressive Personal Account Plan," memorandum, Social Security Administration, Dec. 1, 2003.

facing policymakers in the future are large enough that an increase in budget deficits seems a predictable outcome.

- Deficit-financed individual accounts would leave the national saving rate unchanged while individual accounts financed through higher taxes or lower spending would raise the national saving rate. The current political debate is leaning toward individual accounts that would be deficit financed, at least initially. In any case, the increase in national saving that could result from IAs would, at best, be small compared to future budget deficits.
- While deficit-financed IAs would not change overall rates of return, it could change relative rates of return. The issuance of large additions to the public debt in order to purchase equities could alter the relative demand for those two assets, raising the rate of return on U.S. Treasuries and lowering the rate of return on equities.

None of these results is certain. On balance, they probably point to a lower rate of return in the future, but some factors point in the opposite direction, such as the effect of potentially higher budget deficits on the national saving rate. At the least, the results suggest that estimates of the earnings of IAs should be presented as a range of estimates rather than point estimates, and the range of plausible scenarios should be wide. Even if estimates were only based on historical data, the statistical certainty surrounding that data is much less robust than is typically realized, and so the range of plausible outcomes is relatively wide.

Estimates of individual account earnings can be misused to suggest that there is a “free lunch” if they stress the high returns of equities without acknowledging that ownership comes at the cost of higher risk. (Although investors’ appetite for the risk associated with equities seems irrationally low to many economists, their beliefs are notable.) In some contexts, risk adjustment that eliminates differences in rates of return between different types of securities is the only way to make meaningful comparisons. For example, in Social Security reform proposals in which individual accounts are offset by Social Security benefit reductions, the earnings of IAs can be meaningfully compared to the benefit offsets only if the rate of return on the IA is set to the risk-free rate of return since the benefit offset is, in essence, “risk free.”