

Federal Reserve Bank of Cleveland

The Recent Ascent in Stock Prices: How Exuberant Are You?

by John B. Carlson

"...how do we know when irrational exuberance has unduly escalated asset values, which then become subject to unexpected and prolonged contractions? ... We have not been able, as yet, to provide a satisfying answer to this question, but there are reasons in the current environment to keep the question on the table."

—Chairman Alan Greenspan

It has been almost three years since Chairman Greenspan posed the foregoing question and thereby launched the phrase "irrational exuberance" into the economic idiom. Since then, of course, some stock-price indexes have doubled, and the question still remains unanswered. Over the same period, favorable U.S. economic performance continued to surprise even some of the more optimistic prognosticators. Because stock prices are presumably forward looking, earlier exuberance appears, at least up to this point, to have been validated by experience.

Some analysts insist that the party will continue. Among the most ardent are James K. Glassman and Kevin A. Hassett, who argue that the market is rationally exuberant. Their assessment hinges on two key assumptions: first, that future earnings growth will continue at a pace comparable to the post–World War II experience, and second, that investors are demanding a smaller premium for stock returns relative to other financial instruments.¹ Glassman and Hassett assert this premium has permanently declined because investors have become "calmer and smarter." Moreover, they argue that the premium should be zero. This suggests that as investors become even calmer and smarter, stock

prices could increase—not just moderately but by threefold or more!

Whether one agrees with Glassman and Hassett or not, their perspective illustrates how sensitive stock prices are to key investor judgments. To appreciate this sensitivity, it is useful to review briefly the fundamentals of stock price determination. This is done in the following section. Each of the assumptions made by Glassman and Hassett will then be discussed in turn. We shall see that *given* their assumptions, their conclusions are not unreasonable. This is, of course, no endorsement for their assumptions. I will offer an array of valuations for the S&P 500 index given alternative sets of assumptions. Readers are left to make their own judgments.

■ The Fundamentals

Investors purchase stocks because they expect to receive some future income stream—either in the form of dividends and/or the proceeds from the eventual sale of the shares of stock.² The standard model of stock valuation posits that a stock's price equals the discounted present value of this income stream.³ Because the amount of income ultimately depends on the firm's potential to generate earnings, a key fundamental determinant of the stock's value will be *expected earnings growth*.⁴ The more a firm is expected to earn, the more investors will pay for its stock.

Future income from stocks must be discounted to compensate investors for assuming inherent risks and associated costs. The discount rate is the rate of return the investor demands as compensation. The higher the discount rate, the lower the price the investor is willing to

Stock prices have soared in the last few years, and the debate between those who claim that investors are paying too much and those who believe stocks are worth even more continues unabated. Because stock prices are determined by people's perceptions of their worth, and these, in turn, are based on their predictions for the future, the possibility that expectations will exceed reality always exists. While we cannot know for certain whether the market is over- or undervalued, we can clarify the factors that determine stock prices and discover the assumptions which underly our expectations. Assessing the consistency of our assumptions may keep our exuberance in check.

pay for the stock. The discount rate is commonly called the *expected return* because it is the return the investor earns *if the income stream is realized as expected*.

■ Expected Returns

In competitive financial markets, expected returns on stocks are linked to returns on alternative assets, including Treasury bonds and bills. Because stock returns are generally perceived as being riskier than those on "safer" instruments such as Treasury bonds and bills, investors typically exact a higher return. This extra return is called the "equity premium."

When thinking about stock returns, it is important to keep in mind the distinction between historical returns and expected returns. Historically, returns in stocks

have been quite stable over long horizons. Using U.S. data from 1802–1998, Jeremy Siegel computes returns for equity and alternative assets (see table 1).⁵ While real (inflation-adjusted) equity returns have been consistently around 7 percent for long horizons, returns on U.S. Treasury securities have varied substantially.

To those who view the stock market as relatively volatile, the stability of these measured historical returns is perhaps surprising.⁶ They clearly illustrate that a buy-and-hold strategy in stocks has paid off handsomely relative to “safer” alternatives. Since 1926, the equity premium has averaged around 6 percent.⁷

Optimists like Glassman and Hassett argue that for long-horizon investors, stocks are no more risky than the recently issued 10-year Treasury inflation protected security (TIPS), which currently yields around 4 percent. Thus, they view this yield as the appropriate (that is, rational) required return for a sufficiently diversified portfolio of stocks, such as an index fund.⁸ That is, they argue that there should be no equity premium. This view implies that the stock market has been historically undervalued. Thus, the recent bull market is seen as evidence that investors are becoming calmer and smarter.

One need not solely rely on the argument that investors are becoming calmer and smarter to explain why expected returns may have fallen. Siegel offers an alternative explanation. While he believes that 7 percent does approximate the real long-term return on equity indexes, it does not represent the realized return to the equity holder after expenses—such as transactions and management fees. Once one accounts for such costs, Siegel argues, realized returns were more like 5 percent for the typical investor.

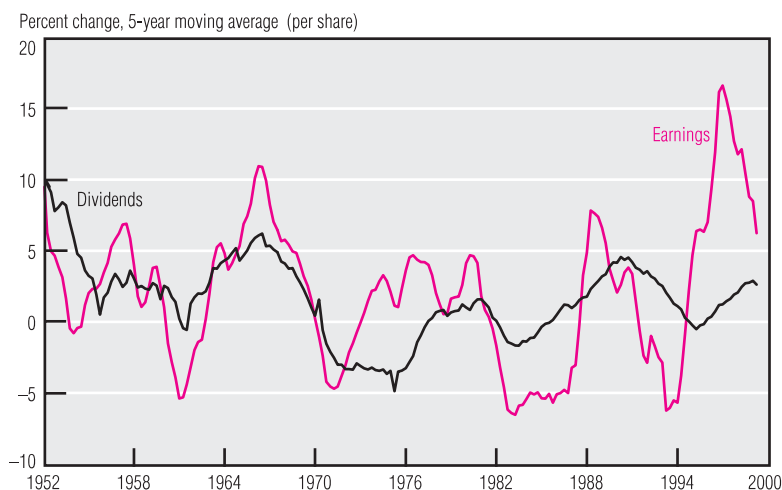
Siegel notes that recent innovations in financial instruments, such as the advent of index funds, have sharply reduced the costs of investing in diversified portfolios.⁹ Some index funds, for example, charge less than ¼ percent of asset value per year. Fees associated with standard mutual funds, on the other hand, often amount to more than 2 percent per year. Because lower investment costs allow investors to realize a greater portion of the income flows from holding stocks, one would expect measured stock returns (which are not net of costs) to fall. Siegel

TABLE 1 COMPOUND ANNUAL REAL RETURNS (PERCENT) U.S. DATA, 1802–1998

	Stocks	Bonds	Bills
1802–1998	7.0	3.5	2.9
1802–1870	7.0	4.8	5.1
1871–1925	6.6	3.7	3.2
1926–1998	7.4	2.2	0.7
1946–1998	7.8	1.3	0.6

SOURCE: Siegel (1999).

FIGURE 1 S&P 500 EARNINGS AND DIVIDENDS



SOURCE: Standard & Poor’s Corporation.

believes that current expected return on stocks is more in line with the historical “realized” return of 5 percent.

■ Earnings Growth

Even if the expected return were 5 percent, current market values of U.S. stock indexes would imply that equity holders expect earnings growth to exceed historical averages. Since 1871, earnings per share have increased at an average annual rate of 1.7 percent for S&P companies.¹⁰ Since the World War II era, earnings per share have grown at an average rate of over 3 percent. Figure 1 illustrates just how favorable earnings growth has been in recent years for S&P 500 companies. After declining over much of the 1970s and 1980s, earnings accelerated sharply in the 1990s.

As figure 1 illustrates, neither earnings nor dividends grow at constant rates. Rather, we observe that variations in the growth rates of both are quite persistent. Thus, it is plausible to argue that recent above-trend rates in earnings growth will persist for some time before settling

down to a rate more commensurate with historical averages.

Siegel makes a strong case for persistently (though not permanently) higher earnings growth. He notes that the United States has emerged as the leader in the fastest growing segments of the world economy, particularly in information technology and pharmaceuticals. He also notes that U.S. brand names such as Coca Cola, Procter and Gamble, Disney, and others have quite successfully penetrated the global market. Together, these factors could justify temporarily but persistently higher earnings growth for U.S. firms. It is clearly possible, though by no means certain, for earnings levels to double from current levels before resuming longer-term trend rates.¹¹

■ Putting It All Together

There are many reasonable explanations for why stock market indices should have accelerated in the 1990s. However, depending on one’s own assumptions, current index levels could be viewed as

TABLE 2 ALTERNATIVE VALUATIONS FOR S&P 500 INDEX

Earnings growth (percent)	Expected return (percent)			
	4.0	4.5	5.0	5.5
3.5	3912	2046	1384	1044
3.0	2085	1457	1119	871
2.5	1485	1111	887	737

SOURCE: Author's calculations. Values are obtained from the following formula:

$$P_t = E_t \left[\sum_{i=1}^8 \left(\frac{1}{1+R} \right)^i D_{t+i} \right] + E_t \left[\left(\frac{1}{1+R} \right)^8 P_{t+7} \right],$$

where $P_{t+8} = D_{t+8} / (R - G)$, where D is the level of real dividends, R is the assumed expected return, and G is the assumed growth rate of earnings per share. The path of dividends is derived assuming that earnings growth decelerates uniformly from 10 percent to assumed rate over seven years, and that the dividend payout ratio increases smoothly to 45 percent over the same period.

undervalued or overvalued. Table 2 provides alternative valuations of the S&P index that correspond to different assumptions about earnings growth and expected returns. Each valuation has been calculated using the present-value formulation for the levels given for each of the fundamentals. These computations build in an assumption that earnings decelerate smoothly from the recent five-year average rates to corresponding trend-rate assumptions.¹²

The table is intended to provide a simple consistency check between recent levels of stock prices and a level warranted by one's assumptions about earnings growth and expected returns. If, for example, one agrees with Glassman and Hassett that the appropriate expected return is 4 percent (recent yield on the 10-year TIPS), and if one assumes trend earnings growth of 3 percent, then the warranted value of the S&P index is 2085. This is well above recent levels of around 1300. On the other hand, if one believes that stocks are somewhat more risky than the TIPS and hence demands an expected return of 5 percent (1 percent equity premium), then the market is clearly overvalued under the assumption of 3 percent earnings growth. How exuberant are you?

Readers may also use the table to interpolate what approximate return they might expect from an S&P 500 index fund given their assumption about earnings growth. For example, if one believes that trend earnings growth is 3 percent, then this valuation exercise indicates that the current level of the S&P 500 is consistent with an expected return

of between 4½ percent and 5 percent. An expected return of 5 percent would imply a modest equity premium of 1 percent as measured against the TIPS yield. It should be evident from this exercise that it is difficult to justify expected returns above 5 percent unless one is extremely optimistic about trend earnings growth. Thus, the historical return of 7 percent on stocks is not a good projection for future returns.

■ Concluding Thoughts

We have seen how sensitive stock-index valuations are to key assumptions about earnings growth and expected return. Standard economic theory provides little guidance for pinning down precise values. One's assumptions must ultimately be based on judgment. This is why some readers undoubtedly will be exuberant while others will be leery. One inescapable conclusion, however, is that at today's prices, future long-term returns of 7 percent seem extremely unlikely.

Further, recent stock-price levels undeniably reflect a high degree of investor confidence. History reveals that sharp drops in stock prices occur spontaneously with no apparent change in fundamentals. The experiences of October 1987 and October 1997 offer two recent examples. Such events are viewed as unpredictable collapses in investor confidence. They are evident only in retrospect.

For buy-and-hold investors, such swings may be of little consequence. For investors with short horizons, on the other hand, it would appear unwise to count all recent paper gains as permanent until they are realized. Just as one cannot

know if investors are irrationally exuberant, one cannot know if a sudden drop in investor confidence is around the corner.

■ Footnotes

1. For a concise presentation of their arguments, see James K. Glassman and Kevin A. Hassett, "Stock Prices Are Still Far Too Low," *On the Issues*, American Enterprise Institute for Public Policy Research, April 1999. These arguments are developed in their book titled, *Dow 36,000: A New Strategy for Profiting from the Coming Rise in the Stock Market*, Washington, D.C.: American Enterprise Institute, 1999.

2. For the mathematically minded reader: $R_{t+1} = (D_{t+1} + P_{t+1})/P_t - 1$, where R_{t+1} is a one-period return, D_{t+1} is the dividend paid during the period, and P_t and P_{t+1} are the prices of the equity at the beginning and end of the period.

3. The present value formulation, as it is commonly known, is summarized by the following relationship: In its simplest form, a stock's price, P_t , is determined by the expected present value of future dividends, D_{t+1} , and of the expected present value of the terminal price for the holding period K , P_{t+K} :

$$P_t = E_t \left[\sum_{i=1}^K \left(\frac{1}{1+R} \right)^i D_{t+i} \right] + E_t \left[\left(\frac{1}{1+R} \right)^K P_{t+K} \right],$$

where R is the discount rate (expected return), assumed here to be constant, and E is an expectations operator. For a lucid treatment of standard valuation approaches, see John Campbell, Andrew Lo, and Craig MacKinlay, *The Econometrics of Financial Markets*, Princeton: Princeton University Press, 1997, especially chapter 7.

4. Earnings are either distributed as dividends or reinvested. Historically, firms have paid out about half their earnings in the form of dividends, although this payout ratio has varied substantially. Given some norm for the payout ratio, events that affect an investor's forecast of an earnings growth rate will also affect her expected dividend growth rate by the same amount.

5. These results are discussed in Jeremy Siegel, "The Shrinking Equity Premium: Historical Facts and Future Projections," in *The Equity Premium and Stock Market Valuations*, Conference Proceedings, April 30, 1999, Anderson School at UCLA.

6. Moreover, for horizons of 15 years or more, the S&P 500 index has always yielded a positive return. See Jagadeesh Gokhale and Kevin Lansing, "Social Security: Are We Getting Our Money's Worth?" Federal Reserve Bank of Cleveland, *Economic Commentary*, January 1, 1996.

7. Because standard economic theory cannot satisfactorily explain why stock returns have been so high relative to other instruments, this fact has become known as the equity premium puzzle.

8. Implicitly, Glassman and Hassett are assuming that the buy-and-hold investor is the marginal investor.

9. Though we focus on reduced transactions cost below, increased diversification also offers an important channel for reducing expected returns. For a general equilibrium analysis of this issue, see John Heaton and Deborah Lucas, "Stock Prices and Fundamentals," presented at the 1999 Macroeconomics Annual Conference, June 1999.

10. Earnings are based on the "survivor" companies. That is, firms that go out of business are replaced in the index by new, presumably healthier, firms. Hence, earnings (per share) growth rates for the index overstate the earnings of a comparable constant set of firms.

11. There are other explanations (related to accounting practices) for expecting persistent strength in measured earnings growth, but these are beyond the scope of this article.

12. Thus, they incorporate persistently higher earnings growth based on the case made by Siegel. See the source note in table 2 for more detailed assumptions about the relationship between dividends and earnings.

John B. Carlson is an economist at the Federal Reserve Bank of Cleveland. The author would like to thank Giuseppe Cinquemani for discovering a computational error in our earlier version.

The views stated herein are those of the author and not necessarily those of the Federal Reserve Bank of Cleveland or of the Board of Governors of the Federal Reserve System.

Economic Commentary is published by the Research Department of the Federal Reserve Bank of Cleveland. To receive copies or to be placed on the mailing list, e-mail your request to maryanne.kostal@clev.frb.org or fax it to 216-579-3050. Economic Commentary is also available at the Cleveland Fed's site on the World Wide Web: <http://www.clev.frb.org/research>.

We invite comments, questions, and suggestions. E-mail us at editor@clev.frb.org.

Now on our Web site! See a glossary of terms used in this *Economic Commentary* when you visit us online.

**Federal Reserve Bank of Cleveland
Research Department
P.O. Box 6387
Cleveland, OH 44101**

Return Service Requested:

Please send corrected mailing label to the above address.

Material may be reprinted if the source is credited. Please send copies of reprinted material to the editor.

**BULK RATE
U.S. Postage Paid
Cleveland, OH
Permit No. 385**