Stock Market Fundamentals

October. This is one of the peculiarly dangerous months to speculate in stocks in. The others are July, January, September, April, November, May, March, June, December, August, and February.

—Mark Twain,
Pudd'nhead Wilson

RECENT DEVELOPMENTS IN the stock market have attracted intense interest from individual investors and policymakers alike. The meteoric ascent of stock prices over the past two years has generated concern about whether prices are justified by the so-called fundamentals or whether they represent a speculative bubble. This concern grew considerably on October 27 when the Dow Jones industrial average fell 7 percent—the 12th largest one-day decline on record. Although the market has since stabilized, investor and policymaker concern apparently has not. Investors worry that if prices are a bubble and it bursts, their recent gains will evaporate. Policymakers worry about the market's effect on the economy and how to respond if any correction becomes a full-fledged bear market.

This article steps back from the market's recent day-to-day gyrations and puts the current bull market in historical and cross-country perspective. It also analyzes the major long-term determinants of stock prices and how well those fundamentals explain current market prices.

Chart 1
Recent Increases in the S&P 500 Look Spectacular On a Regular Scale...

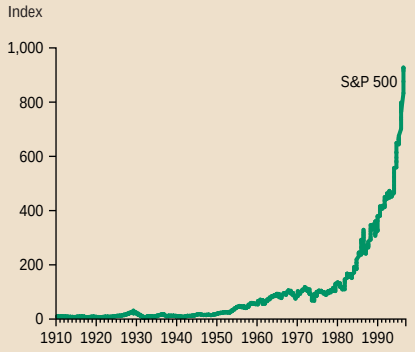
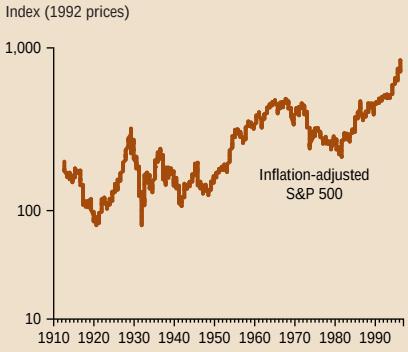


Chart 2
...But Look Less Unusual On a Log Scale and After Adjusting for Inflation



The Bull Market in Perspective

The news media and analysts often talk about the upward movement in stock prices over the past two years as if it were unprecedented. Viewed on a simple numeric scale, as in Chart 1, this rise in Standard & Poor's 500-stock index does look unprecedented. On this scale, a 5 percent rise in the index looks a lot bigger today than it did in, say, 1950, because a 5 percent rise today means a rise of almost 50 points, whereas a 5 percent rise in 1950 meant a rise of only 1 point. A more meaningful way to look at stock prices over the long term is on a logarithmic scale, on which a 5 percent rise in 1950 looks the same as a 5 percent rise today (*Chart 2*).

Viewed on a log scale, and after adjusting stock prices for inflation, the recent bull market does not look unusual at all. Chart 2 also shows that the last few years' increases are just a small part of a longer bull market that goes back to 1981, if one is willing to incorporate a number of temporary setbacks along the way. We can compare this longer term bull market with previous ones: for example, the one from 1950 to 1968 and the one from 1922 to 1929. In addition, there was an important bull market before the period shown on this chart, during roughly 1880–1910.

Table 1 summarizes some of the more salient characteristics of these four bull markets. Again, the central message is that the current bull market does not stand out from those that preceded it, in terms of either length or total return. Indeed, the current market ranks behind the other three in terms of real annual average return. The table also shows that these bull markets have occurred in different profit growth and real interest rate environments. For example, both profit growth and real interest rates were lower during the 1950–68 bull market than they have been in the current one.

Nor does the current U.S. bull market stand out in comparison with those in

Table 1
Bull Markets in U.S. History

	1880–1910	1922–29	1950–68	1981–97
Length (years)	30.0	7.75	19.0	15.75
Real return*	14.2	19.9	14.0	13.9
Real GDP growth*	4.0	6.0	4.2	2.8
Real profit growth*	N.A.	6.0	4.9	5.8
Real interest rates	3.7	4.5	1.6	5.6

* Average annual growth rates.
SOURCE: Federal Reserve Board.

Table 2
U.S. and Foreign Stock Markets, 1981–97

	U.S.	Germany	U.K.	Japan
Real market index*	9.9	11.7	7.3	4.0
Real GDP growth*	2.8	2.9	2.5	2.2
Real profit growth*	5.8	4.0	5.0	2.7
Real interest rates	5.6	5.2	5.9	4.2

*Average annual growth rates.

SOURCES: Federal Reserve Board; Bank of England; Bank of Japan; Deutsche Bundesbank.

The current bull market does not stand out from those that preceded it…nor does [it] stand out in comparison with those in other countries.

other countries. Table 2 shows that over the life of the current U.S. bull market, real price appreciation in the U.K. and German stock markets has come close to or exceeded our own. The major exception is the Japanese stock market, which suffered a severe asset price bubble that burst in 1990 and from which the economy has yet to recover. But at least compared with the U.K. and Germany, the United States does not appear unique.

All bull markets, of course, end at some point. Frequently, as with the 1880–1910 and 1950–68 markets, they end as a result of external shocks—war in the first case, stagflation in the second. In 1929, however, the market collapsed because it had overreached itself, and speculative excess led to stock prices unjustified by the fundamentals. The question is, Where are prices relative to fundamentals today?

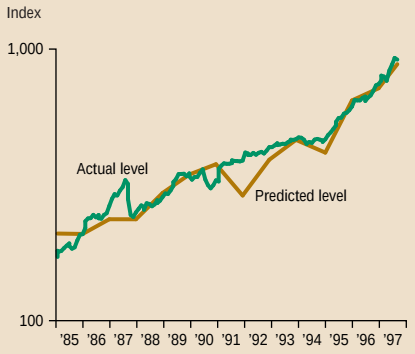
A Fundamentals-Based Model

A traditional discounted earnings model can be used to determine the extent to which the fundamentals justify the level of stock prices. This model assumes that investors value a firm's stock only as much as they value the firm's present and future earnings. The value of the discounted expected earnings stream, which should equal the current price of the stock, has two components. The first is the forecasted future earnings stream itself. The second is the interest rate used to discount forecasted earnings streams. This discount rate is the default-free real rate of interest—represented by the long-term government bond rate—plus an equity risk premium, which is the extra return investors require for holding risky stocks.

This model can be used to determine a "fundamental" price for the S&P 500, using three factors: forecasted earnings, the real interest rate on Treasury bonds and the equity risk premium. As a measure of future earnings streams for each company in the S&P 500, I use the consensus forecast for long-term profit growth (three to five years out) of I/B/E/S International Inc. For the discount rate I use the real 10-year bond yield as the riskless rate of interest, plus an estimated constant risk premium on equity. I use the model to calculate a predicted S&P 500 price for the period 1984–97.

Chart 3 plots this predicted price on a log scale against the actual S&P 500 price. As of October 31, the discrepancy between the two was about 3 percent. Given the imprecision inherent in all stock market models, this difference does not appear large enough to support claims of substantial overvaluation. Additionally, over most of the period the predicted price tracks the actual price quite closely, except for two peri-

Chart 3
Predicted Versus Actual Levels of S&P 500 Using Long-Term Earnings Forecasts



ods when the actual price was substantially above that predicted by fundamentals. The first was in mid-1987, when the actual price was about 30 percent above the predicted price, providing evidence that market prices were unjustified by profit forecasts and therefore constituted a bubble. The market itself came to believe that, and corrections in October 1987 brought actual prices down to the level predicted by the model.

The second period was 1991–92, when the economy was in its recession trough and actual prices were about 25 percent above those predicted by fundamentals. In this case, it was the analysts who were wrong about the strength of the recovery, not the market, and their profit forecasts were revised up sharply in 1993. As a result, predicted prices rose to the level of actual prices in 1993.

The main message from the model is that unlike 1987, current market prices are not built on air but appear to be based on actual current discount rates and profit expectations. The question this analysis begs, of course, is how realistic these profit expectations are. Stock market bulls and bears have different answers.

Bulls point to the recent strong profit growth of U.S. companies as evidence of the "new paradigm" economy, in which technological innovation and globalization of product and labor markets present vast opportunities to improve efficiency, increase productivity, lower production costs and ultimately generate stronger profits. These trends are aided by improved economic policymaking by the Federal Reserve and the government, which has resulted in lower federal budget deficits and lower inflation.

Bulls argue that these forces will continue to improve productivity and profits, and point to a number of striking trends. First, improvements in the production of computer power over the past 15 years have been immense. Second, the opening of the formerly closed economies of China, Russia and India will ultimately introduce more than 1 billion low-cost laborers and almost as many potential middle-class consumers onto world markets. These developments, bulls contend, cannot fail to vastly increase profit opportunities for companies worldwide.

Bears view these changes as evolutionary, not revolutionary. They see the recent strong profit growth as the result of other, temporary factors that may soon run their course. Thus, they are much less confident about future profit growth now that we are in the mature stage of a business cycle.

Are Analysts' Profit Expectations Realistic?

In evaluating the bulls' and bears' arguments, it's important to note that company analysts' current expectations for profit growth over the next three to five years *are* bullish. Analysts expect S&P 500 companies to average earnings per share (EPS) growth of almost 13 percent annually for the next three to five years. How realistic are these expectations? Table 3 compares analysts' long-term EPS forecast with EPS growth during 1981–97 and 1991–97, and with a separate forecast by DRI/McGraw-Hill Inc., a macroeconomic forecaster. While profits have surged by more than 17 percent annually since 1991, over the entire bull market their growth has been much more subdued. One reason, of course, is that 1991–97 represents the recovery from a recession trough—profit growth should be faster during this period than over the entire business cycle. Company analysts are currently forecasting future profit growth closer

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Table 3
S&P 500 EPS Growth In Perspective

	Annual growth rates
1981–97	6.7
1991–97	17.5
Current forecasts:	
Company analysts	12.9
Macroeconomic forecaster	6.0

SOURCES: I/B/E/S International Inc.; DRI/McGraw-Hill Inc.

Table 4
Accuracy of Analysts' Long-Term Earnings per Share Growth Forecasts

	Analysts' forecasts	Actual growth in next four years
1984	12.5	9.3
1986	11.3	10.6
1988	11.0	–5.3
1990	11.7	8.9
1992	12.0	19.4

SOURCES: I/B/E/S International Inc.; DRI/McGraw-Hill Inc.

to this rate than to the pace since 1981.

It's also informative to compare the analysts' forecasts with that of DRI/McGraw-Hill. The difference illustrates that "bottom-up" forecasts of S&P 500 profit growth, which build up from individual company forecasts, are almost always more optimistic than "top-down" forecasts, which are derived from forecasts of GDP growth and other macroeconomic aggregates. At first glance, neither method seems inherently superior. Bottom-up forecasts, such as those from I/B/E/S, might benefit from specific company knowledge that macroeconomic forecasters, such as DRI, do not have. On the other hand, bottom-up forecasters might assume that the individual company they are analyzing will make the next technological or market breakthrough. If only one company in the industry will benefit from the next breakthrough, but each analyst assumes that the company he or she researches will be the one to do so, then their aggregated forecasts will inflate aggregate profit growth. Thus, bottom-up forecasts might be subject to errors that make them too optimistic.

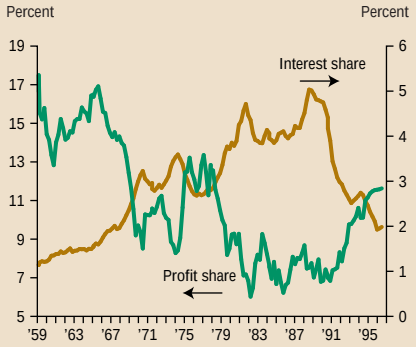
Table 4 presents evidence on the accuracy of analysts' previous long-term forecasts for EPS growth. It compares forecasts of three to five years of S&P 500 EPS growth with the S&P 500's actual EPS growth over the subsequent four years. Table 4 suggests that analysts' forecasts have generally been too optimistic, except for the period 1992–96, when they were substantially too pessimistic. This could result from analysts not foreseeing the recovery in 1992, or it could (as bulls might argue) be the result of their being surprised by the profit growth arising from technological innovations. Overall, however, analysts' forecasting record is decidedly mixed, with some tendency toward overoptimism.

In addition, bears are concerned that the strong profit growth over the past few years is due primarily to temporary or special factors, some of which have largely run their course. For example, financial-sector profit growth has been very strong, but this, bears argue, primarily results from restructuring activity by banks and other financial institutions that cannot continue indefinitely.

Chart 4 shows nonfinancial firms' total profits and net interest payments as a share of nonfinancial-sector GDP. Note that the increase in the interest share in the early 1980s—a decade of high corporate debt and high interest rates—coincides with a fall in profit share. And the marked fall in the interest share in the 1990s coincides with the recovery of the profit share. Bears claim that the future boost to profits from this source may be limited, since both deleveraging activity and declining market interest rates appear to have ended.

Bulls respond that it is a mistake to look at aggregate profits for the economy as a whole, since investors are pricing S&P 500 companies' earnings, not the earnings of the entire economy. S&P 500 companies are the ones most affected by the new-era forces of technological innovation and global trade. As shown in Table 5, the S&P 500 has a much greater weight of companies in innovative, high-tech, high-profit growth sectors than the economy as a whole. For example, technology-sector firms constitute more than 15 percent of the S&P 500 but only 3 percent of the aggregate economy, and they have experienced annual EPS growth of more than 40 percent since 1992.

Chart 4
Profit and Interest Share of Nonfinancial Firms as a Percent of Nonfinancial GDP



SOURCE: Federal Reserve Board.

The Bottom Line

What's the bottom line on the stock market? A simple model of stock price valuation suggests that if the market is overvalued relative to current discount rates and profit expectations, it is not overvalued by much. Thus, the current situation differs from that of 1987, when prices rose about 30 percent above those justified by profit forecasts and discount rates. However, the profit forecasts on which the model is based do look very bullish for this stage of the business cycle, and there is good reason to suspect that these expectations may go unrealized. If that happens, then stock prices would ultimately have to decline.

The wild card is when the new-era forces, which include a monetary policy environment that prevents rising inflation, will begin ratcheting up productivity and profits. Probably the only sure thing about the stock market debate is that the argument between the bulls and bears will continue to rage.

—Stephen D. Prowse

Table 5
Profit Growth by Sector

Sector	Percent of S&P 500*	Percent of economy*	Annual EPS growth**
Technology	15.7	3.0	41.7
Financials	15.9	6.5	21.6

*In 1997. **Average 1992–97.

SOURCES: Federal Reserve Board; *Wall Street Journal*, Sept. 22, 1997, p. A1.