

Federal Reserve Bank of Cleveland

A Retrospective on the Stock Market in 2000

by John B. Carlson and Eduard A. Pelz

When we look back at the 1990s, from the perspective of say 2010.... We may conceivably conclude from that vantage point that, at the turn of the millennium, the American economy was experiencing a once-in-a-century acceleration of innovation, which propelled forward productivity, output, corporate profits, and stock prices at a pace not seen in generations, if ever. Alternatively, that 2010 retrospective might well conclude that a good deal of what we are currently experiencing was just one of the many euphoric speculative bubbles that have dotted human history. And, of course, we cannot rule out that we may look back and conclude that elements from both scenarios have been in play in recent years.

—Federal Reserve Chairman Alan Greenspan

Excerpt from speech given to the Economics Club of New York on January 13, 2000

The stock market began 2000 the way it ended the decade of the 1990s, surging to new record heights (see figure 1). Because stock markets are by nature forward looking, it appeared as though investors were convinced that the economy would play out according to the first of the alternative scenarios posed by Chairman Greenspan in the quote cited above. The sharp acceleration in measured productivity in the late 1990s, no doubt, reinforced such optimism.

Nowhere was optimism more apparent than in the NASDAQ, which is dominated by large technology firms, especially those most likely to prosper from developments in e-commerce and the Internet.

In March, however, the mood shifted. The NASDAQ, which had surged past 5000, began a descent that would leave it about 50 percent below its peak at year-end. The S&P 500 finished the year down about 15 percent from its peak and about 10 percent below where it had stood at the end of 1999. Despite the sharp declines over last year, both indexes remain more than 400 percent above their 1990 levels.

What can account for such a wild swing, particularly in the NASDAQ? Was the rapid run-up and subsequent fall, as some have claimed, the bursting of a technology bubble?¹ Could one have known before the slump? This *Economic Commentary* addresses these questions. We begin by reviewing fundamentals and their implication for price-to-earnings ratios (P/Es).

■ P/Es and Fundamentals

Stock price listings in the business sections of most newspapers typically include both the firm's closing price and its P/E. The P/E is simply the ratio of a firm's stock price relative to its most recently reported earnings per share (current earnings). P/Es provide a sense of an investor's potential income from owning a stock. For example, consider two stocks that have the same current earnings and different expected future earnings but are otherwise identical.² Clearly, investors are willing to pay more for the stock of the firm that they anticipate will earn more in the future. In fact, P/Es are often quoted in terms of a multiple of earnings, for example, "10 times earnings."

The role of the path of future earnings in determining the P/E is straightforward. The rate of earnings growth determines a

Should the end of the bull market have come as a surprise?

firm's potential to provide returns to shareholders, either in the form of some future payout (such as dividends or stock repurchases) or through stock price appreciation. The faster earnings are expected to grow, the greater a firm's potential ability to compensate shareholders and the higher its price relative to its current earnings (that is, the higher its P/E).

Historically, the P/E of the S&P 500 index has averaged around 14 (see figure 2).³ During late 1998 and much of 1999, the P/E of the S&P 500 index reached unprecedented levels—indicating that many believed potential earnings from ownership of these firms had increased substantially. As of December 2000, it had fallen to just below 25.

Apart from optimistic earnings projections, there are a number of reasons why investors might have expected P/Es to rise to higher average levels. First, there is clear evidence that recent developments in information technology have sharply reduced shareholder costs. A decrease in shareholder costs allows more earnings to be passed along as income, and so has the same effect on P/Es as an increase in expected future earnings. Figure 3 illustrates the substantial decline in the annual total costs of holding an equity mutual fund. In an earlier *Economic Commentary*, we illustrated in some detail how declining shareholder costs affect stock

prices and expected future returns.⁴ We showed that seemingly small declines in shareholder costs can lead to large increases in stock prices.

Moreover, such technological improvements mean permanently lower costs and potentially higher diversification. Diversification allows investors to offset the risks associated with an individual stock, so-called *idiosyncratic risk*, by holding a portfolio of stocks that respond differently to economic phenomena, such as those of an oil-producing firm and an auto manufacturer. A number of analyses find that, together, lower transactions costs and greater diversification can account for some of the recent ascent in stock prices but not all.⁵ This evidence tends to support a substantively higher average P/E if we assume expected earnings growth to be around its historical trend.

Another factor that may account for higher P/Es in recent years is the potential for credible tax cuts. As the U.S. federal budget changed from chronic deficit to growing surplus, the prospect of future tax cuts became increasingly likely. It is impossible to know precisely what impact this expectation might have, but it seems reasonable that expected tax cuts, particularly those on capital gains, would push P/Es marginally higher.

■ The S&P 500

P/Es over 30 require a quite sanguine outlook for earnings growth for both the near and long term. Figure 4 illustrates why optimism in earnings may not have seemed outlandish. Earnings in S&P 500 companies grew at extraordinary rates over the last half of the 1990s. Moreover, at the beginning of 2000 analysts were projecting continued high growth over the next five years. By the second half of the year, it became clear that rapidly rising energy prices were likely to cut into corporate profits, despite a notably lower reliance on energy. Moreover, a decline in consumer confidence, coupled with a severely cold December, led companies to revise their reported earnings down sharply, which further damped earnings prospects.

In retrospect, the decline in the S&P 500 largely reflects a number of events that affected key fundamentals. On the basis of the S&P 500's performance in 2000, investors apparently got ahead of themselves. With a P/E currently around 25, the S&P 500 still embodies a fair

degree of optimism, but arguably not an unreasonable amount.⁶ The NASDAQ, on the other hand, tells a different story.

■ The NASDAQ

The NASDAQ, like the S&P 500, is a value-weighted index. This means that price movements in firms with large capitalizations can dominate index movements. In recent years many of the largest NASDAQ companies have been technology firms. Because of this, NASDAQ movements have largely been associated with developments in the technology sector. Indeed, the huge swing in the index during 2000 largely reflected the pattern of some of the largest technology stocks. So to better understand the rise of the NASDAQ's level and its subsequent decline, it is instructive to consider the P/Es of the largest firms in the technology sector.

A telling analysis of large-cap technology stocks appeared in an article by Jeremy Siegel in *The Wall Street Journal* near the market peak last March.⁷ Siegel focused on the 33 largest firms based on market capitalization—those with values greater than \$85 billion. Of these, 18 were technology stocks. Siegel noted that their market-weighted P/E equaled 125.9 on March 7, 2000. What's more, he notes, half of the large-cap technology stocks had P/Es over 100. For these stocks, the market-weighted P/E was 208.2.

Siegel then contrasts such P/Es with projected earnings growth rates from I/B/E/S International and historical experience. He finds that once a firm reaches large-cap status—ranked in the top 50 by market value—its ability to generate long-term, double-digit earnings growth slows dramatically. Moreover, he finds no example of a large-cap firm to ever justify, by its subsequent record, a P/E anywhere near 100. He concludes that the market for technology stocks has been driven to an extreme not consistent with historical experience.

Siegel does not deny that the excitement generated by the technology and communications revolution is fully justified. Rather, he emphasizes that this does not automatically translate into market value. His analysis does not preclude that in 2010, we may indeed look back on these times as an unprecedented period of prosperity. Siegel's point is simply that even if we are witnessing a substantial revolution, it is not clear that firms can continue to earn returns so far in excess of historical averages.

In the months that followed the market peak, it became clear that large-cap technology stocks were priced with no margin for error. That is, even if one believed that the technology sector of the economy had entered a regime that supports permanently higher stock prices and P/E ratios, it was further necessary to accept that these particular stocks could generate earnings growth at a faster pace and for a longer duration than any large-cap firm in history, in order to justify their valuations.

We conclude that the rise and fall of large-cap technology stock valuations—and their consequent impact on the NASDAQ—is compelling evidence of a bubble that was destined to burst. As Siegel's analysis demonstrates, one could rationally conclude prior to the peak that these valuations were vulnerable to any signs of near-term weakness.⁸ Fortunately, the euphoria was contained. The imprint of the bubble on the S&P 500, though significant, was muted. After taking account of the 15 percent decline off its peak, one is reminded that the S&P 500 remains 400 percent above its 1990 level.

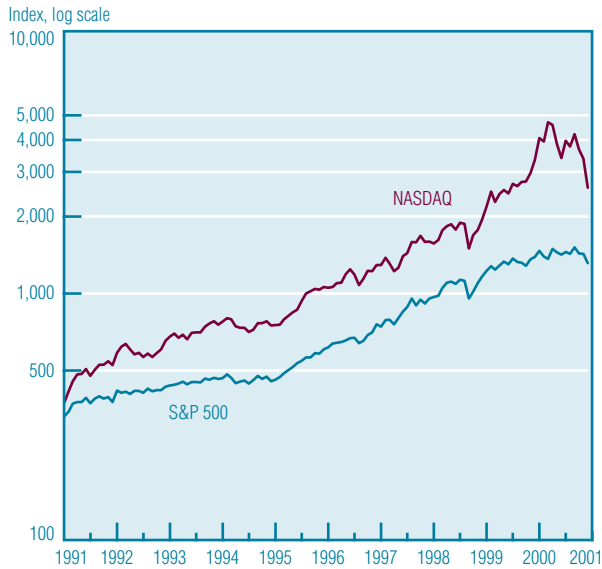
■ Concluding Thoughts

When looking back on 2000 from today's vantage, the recent exuberance in the technology-sector stocks was not validated by the economic news that unfolded over the balance of the year. Dampened consumer spending and the inevitable deceleration in computers and software investment that followed Y2K-related refurbishing and upgrading seemed to be less-than-fully anticipated. These events were enough to induce investors to adopt a more cautious perspective on profit growth.

This sharp decline in technology stocks should not be taken to mean that innovations in technology will fail to propel productivity and corporate profits forward to a pace not seen in generations. However, it is not just the prospect for growth that matters. Growth, if it occurs, must also generate sufficient profits to adequately recompense equity owners. Vast profit potential creates huge incentives for more entrants into new and lucrative markets, and competition tends to reduce the profit margins of individual firms.

We want to emphasize that the current vantage reveals very little about what one might expect to conclude in 2010. However, we suspect it probable that

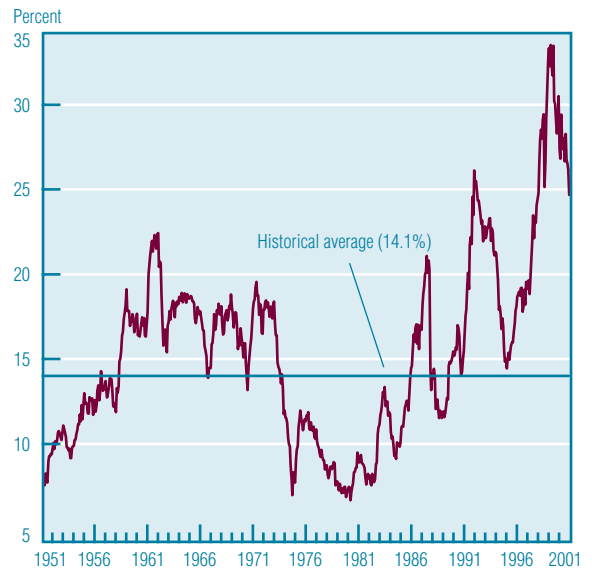
FIGURE 1 STOCK MARKET INDEXES



SOURCE: *The Wall Street Journal*.

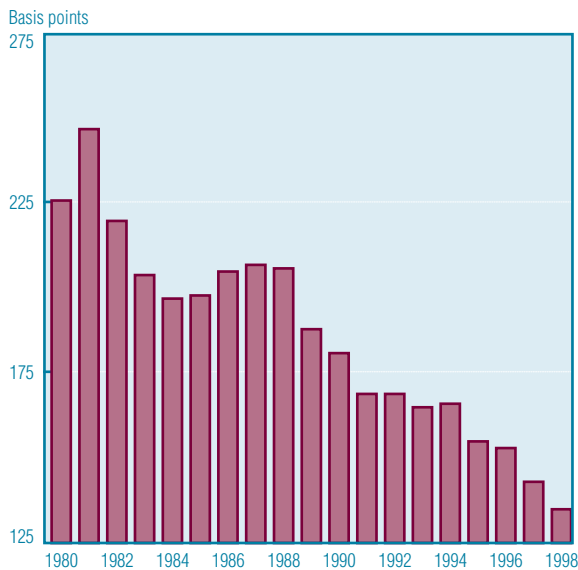
NOTE: The S&P 500 was developed with a base level of 10 for the 1941–43 period. The NASDAQ is indexed to 100 on February 5, 1971.

FIGURE 2 S&P 500 P/E RATIO (FOURTH-QUARTER TRAILING EARNINGS)



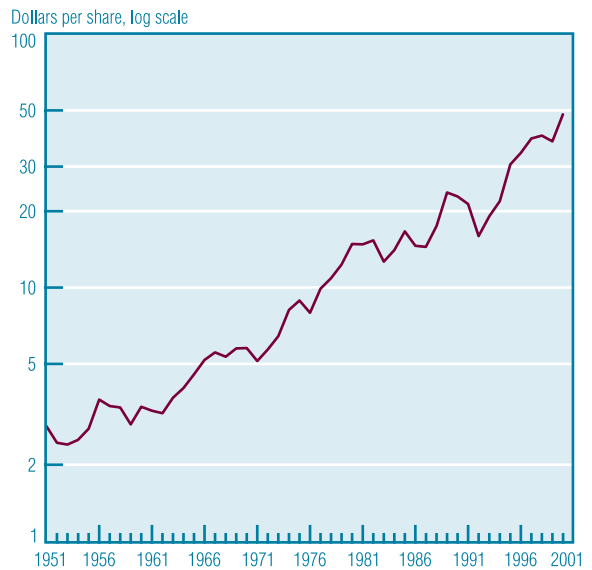
SOURCE: Standard and Poor's Corporation.

FIGURE 3 TOTAL SHAREHOLDER COST



SOURCE: Investment Company Institute.

FIGURE 4 S&P 500 AFTER-TAX EARNINGS PER SHARE



SOURCE: Standard and Poor's Corporation.

elements of both the Chairman's proposed scenarios were in play. The economy appears to have entered a period of sustained productivity growth, but one cannot know the extent to which it will persist. Stock valuations will hinge on investor confidence that strong productivity will continue. As we've seen, this confidence can swing wildly.

Footnotes

1. Here, we loosely define a bubble as the rapid increase of an asset's price such that the current value of the stream of expected future income is so high that there is little probability of making a profit given that valuation. Oftentimes, bubbles begin when legitimate profit possibilities cause prices to rise. Prices are then driven past valuations justified by economic

fundamentals, as speculators attempt to profit solely by trading the asset.

2. In terms of risk, dividend-payout ratio, tax treatment, and so on.

3. Calculation is based on monthly data from 1871–99, which are featured in Robert J. Shiller, *Irrational Exuberance*, Princeton, N.J.: Princeton University Press, 2000. These data are also available online at <http://www.econ.yale.edu/~shiller/>.

4. See John B. Carlson and Eduard A. Pelz, "Investor Expectations and Fundamentals: Disappointment Ahead?" Federal Reserve Bank of Cleveland, *Economic Commentary*, May 1, 2000.

5. See, for example, Jeremy J. Siegel, "The Shrinking Equity Premium," *Journal of Portfolio Management*, vol. 26, no. 1 (fall 1999), pp. 10–17; John Heaton and Deborah Lucas, "Stock Prices and Fundamentals," *NBER Macroeconomics Annual*, vol. 14, 1999, pp. 213–42, and Robert J. Shiller, *Irrational Exuberance*, Princeton, N.J.: Princeton University Press, 2000.

6. For a more detailed analysis of how plausible combinations of increases in expected earnings (dividend) growth and declines in the required rate of return (discount rate) can account for recent increases in the P/E ratio, see Nathan S. Balke and Mark E. Wohar, "Why Are Stock Prices So High: Dividend Growth or Discount Factor?" Federal Reserve Bank of Dallas, Working Paper no. 00-01, January 2000.

7. See Jeremy J. Siegel, "Big-Cap Stocks Are a Sucker Bet," *The Wall Street Journal*, March 13, 2000, p. A30.

8. We have not considered the traded prices of Internet startups, that is, the infamous dot-coms. There seems to be little dispute that their market values could not be justified on the basis of fundamentals.

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