

Has the Stock Market Become Too Narrow?

The price of equity has soared during the past five years—the value of the Standard & Poor’s index of 500 stocks, for example, tripled between December 1994 and December 1999, rising an average 25 percent annually. This rapid appreciation of equities, at a pace more than double previous postwar experience, has stoked concerns that stocks’ prices might have risen too far, too fast. These concerns became more pressing as the values of equities rose much more rapidly than earnings during 1998 and early 1999, lifting stocks’ prices to record highs relative to their earnings.

Although many indexes of stocks’ prices continued to rise sharply in 1998 and 1999, fewer stocks contributed to this performance, perhaps signifying cracks in the foundation of the current bull market. During these years, the market became more narrow as the running count of stocks whose prices were rising fell behind that for stocks whose prices were dropping. In 1999, the prices of just over half the stocks constituting the S&P 500 fell. For many companies, a bear market seemingly had begun.

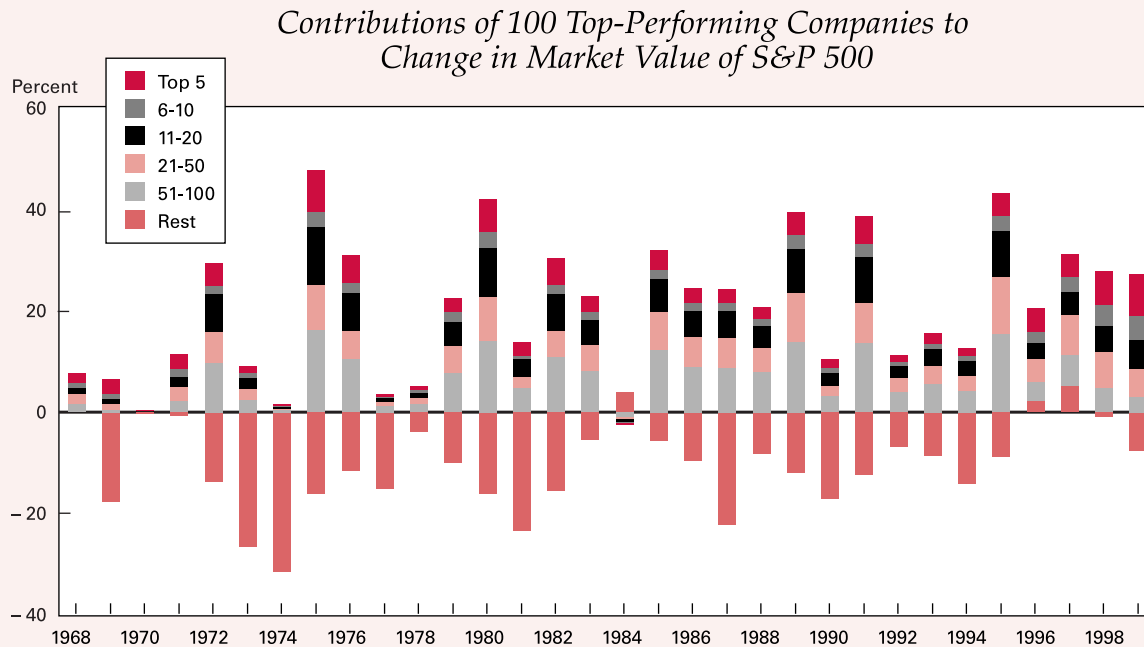
This article reviews the valuation of the equities constituting the S&P 500 index between 1968 and 1999. Although the ranks of the winners thinned and the gap separating the performance of the winners from laggards increased, the value of most equities remained high by historical standards. Even though prices for many companies’ stocks fell, they fell from very high levels, and they remained high relative to earnings across the S&P 500.

Despite the disparity in the performance of equities in 1999, the relatively high value of the S&P 500 index that prevailed through the fall of 2000 reflected shareholders’ optimistic view of earnings in coming years. This optimism might be the market’s principal weakness. For companies’ earnings to support the current valuation of equity, the economy must grow unusually rapidly for the next decade and beyond. Its potential rate of growth in coming years would need to be as much as one and one-half times its previous post-World War II average. Although recent experience suggests that potential growth has increased significantly, this evidence does not yet confirm that growth has increased sufficiently or will last long enough to pay the expected dividends.

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Figure 1



Source: Standard & Poor's Compustat and First Call Corporation.

The first section of this article analyzes the recent performance of the stocks that constitute the S&P 500, comparing the distribution of the annual rates of appreciation of the stocks, their price-earnings ratios, and forecasts of the growth of their earnings. The second section analyzes the price-earnings ratio for the S&P 500, describing the contribution of shareholders' required rates of return, the expected growth of earnings, and the growth of the economy to the valuation of the 500. The final section concludes the article.

I. The Wings of Hope

The strong performance of some popular indexes of stocks' prices masked a growing weakness in the prices of many companies' stocks in 1998 and 1999. In this regard, the stock market seems to have become more narrow. From 1994 to 1999, Standard & Poor's index of prices of 500 stocks rose, on average, 25 percent annually. During each of the first three years of this run, the prices of two-thirds of these stocks rose more than 10 percent, which was the average annual

increase in the index since the end of World War II. After 1997, however, the performances of the stocks that constitute the index varied more substantially. During 1999, the prices of more than one-half of the 500 stocks fell, even as the index rose 20 percent, and fewer stocks accounted for a larger share of the increase in the total market value of the S&P 500. Nevertheless, in spite of this apparent weakness, the value of equities remained generally high, anticipating a bright prospect for earnings.

Increasing Divergence in the Performance of Stocks

In 1999, the contribution of the top companies to the performance of the S&P 500 was greater than average (Figure 1). The five companies whose market value increased the most accounted for about 42 percent of the increase in the total market value of all 500 companies. This contribution exceeded its three-year average from 1995 to 1997 of 17 percent. It also exceeded its average since 1967, which was about 34 percent in those years when market value of the 500 rose. In 1999, the top 100 companies accounted for 139

percent of the increase in the total market value, well above the averages of 84 percent for 1995 to 1997 and 87 percent since 1967. Although the contributions of the top companies in 1999 were not record highs, their contributions in the past were much greater only in years when the total market value of the 500 did not increase very much.

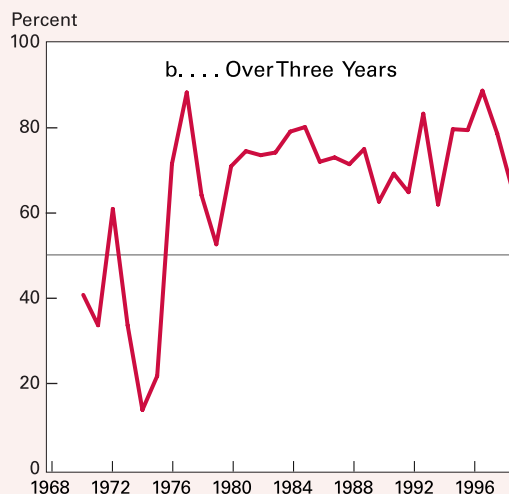
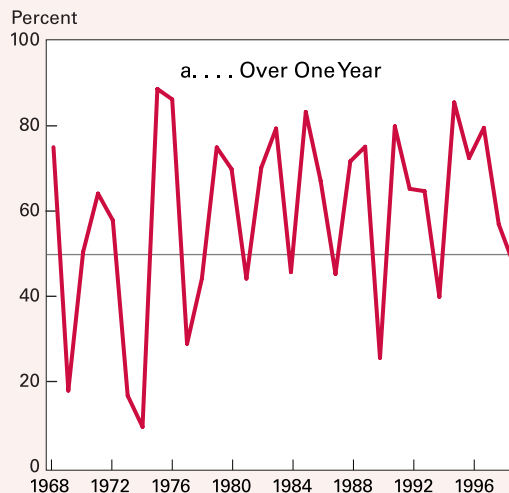
The prices of more than half the stocks in the S&P 500 fell in 1999, which helps explain why the top companies accounted for an uncommonly large share of the increase in the S&P's total market value (Figure 2a). The breadth of the performance of the 500 was remarkably good during most of the 1990s. In every year but 1994 and 1999, the prices of most stocks increased, and in all but three of the years from 1991 to 1999, prices increased for at least two-thirds of the companies. Although 1999's narrow performance might seem disappointing in this context, the prices for most of the 500 stocks fell every two and one-half years, on average, in the 1970s and 1980s.

Looking beyond the top companies, we can compare the rate of appreciation of stocks across all of the S&P 500 (Figure 3a). Ranking the companies by the appreciation of their equity each year shows that the performance of equities in all deciles rose and fell together until 1998. The median rate of appreciation for the top 50 typically exceeds that of the next lower group by a considerable margin. The median rate of appreciation for the bottom 50 (here always negative) fell below that of the next higher group by a considerable margin. Otherwise, until 1998, the differences between the performances of adjacent deciles were comparatively small. In 1998 and 1999, however, the performances of the 500 stocks diverged more substantially. The gaps separating the top companies from the remainder of the S&P 500 expanded significantly. As the median rate of appreciation of the top 50 rose sharply to 130 percent, the highest rate of the past three decades, the median rate of appreciation of the stocks in the lowest seven deciles generally fell considerably.

This narrow performance cannot be attributed to rotation. Companies' rankings often change from year to year. As last year's top performers slip into this year's middle deciles, their average rate of appreciation over time might match that of other stocks more closely. Taking a three-year view, prices for almost four-fifths of the S&P 500 rose on average between December 1994 and December 1997, a relatively favorable result in view of the experience of the past three decades (Figure 2b). But, in passing to 1999, this share

Figure 2

Proportion of S&P 500 Stocks Whose Price Increased . . .

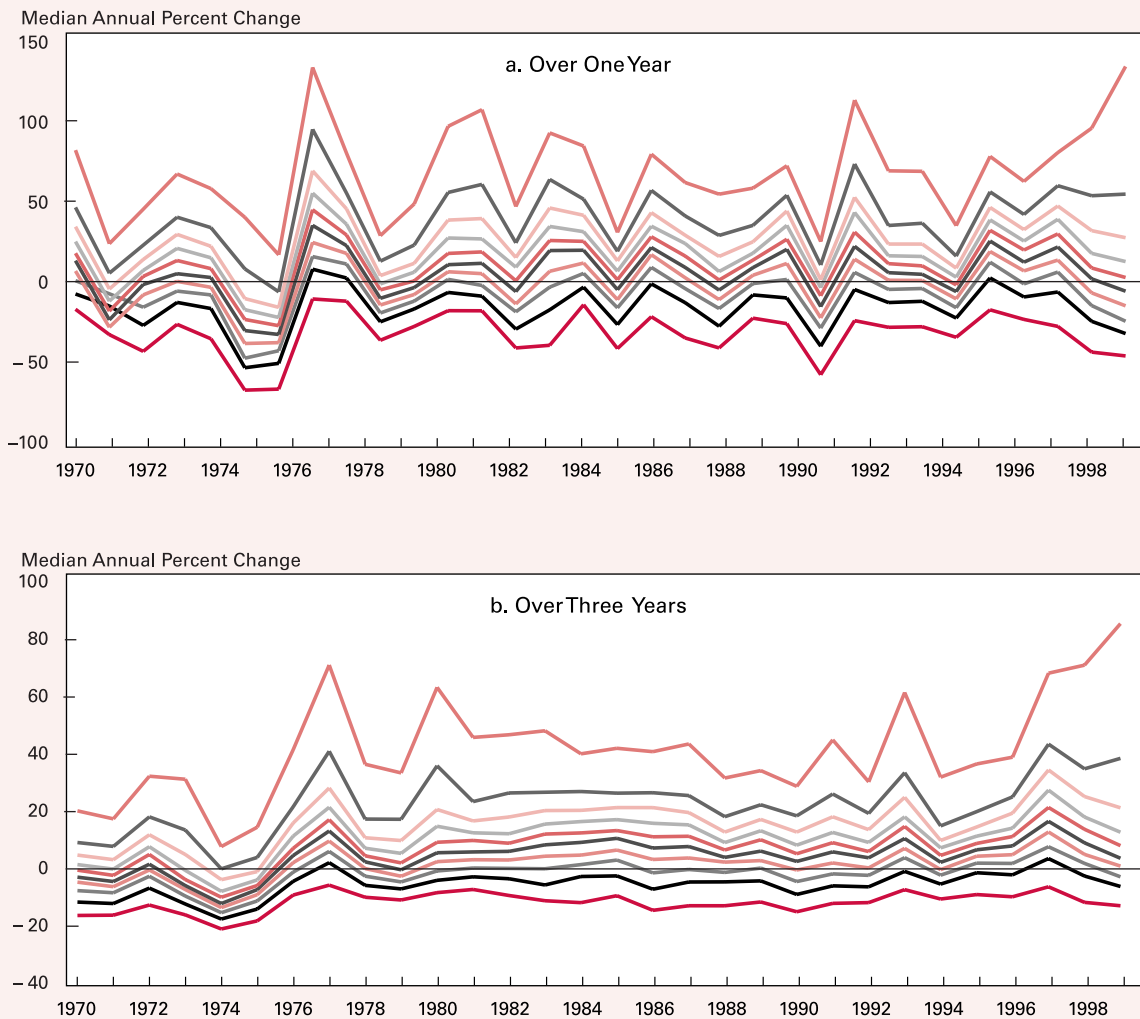


Source: Standard & Poor's Compustat.

fell nearly to three-fifths, a relatively low value for this bull market. Furthermore, the distribution of the appreciation of equities over three-year intervals is not very different qualitatively from the distribution of one-year results (Figure 3b). Here, too, ranking the companies by their appreciation over the preceding three years shows that the median annual rate of appreciation for the top 50 rose rapidly in 1998 and 1999, while that for each of the lowest seven deciles fell sharply.

Figure 3

Distribution of Rates of Appreciation of S&P 500 Stocks, by Decile



Note: The 500 stocks are ranked each period according to their rates of appreciation and then grouped by deciles from the 50 stocks that appreciated most rapidly to the 50 that appreciated least. The lines in the chart show the median rates of appreciation for each decile.

Source: Standard & Poor's Compustat.

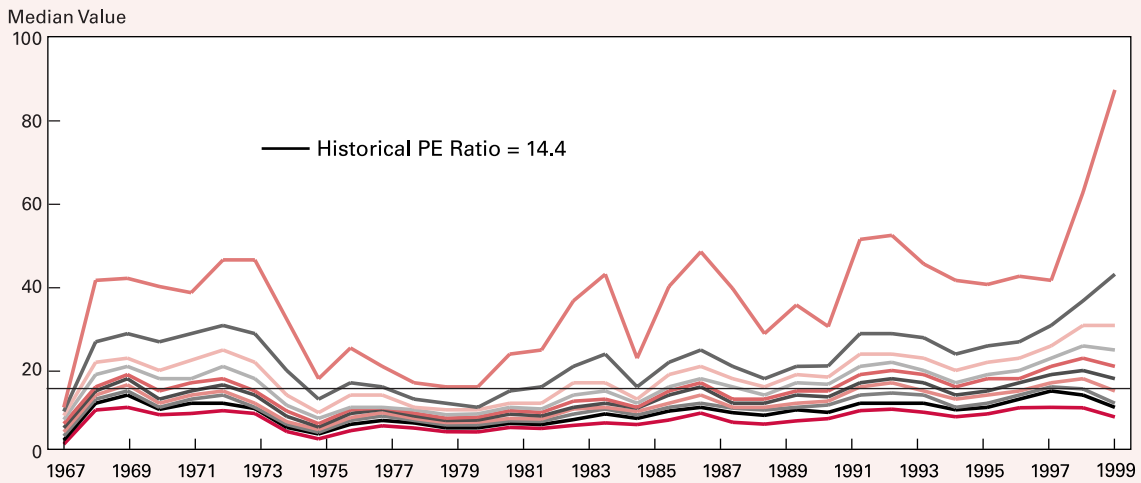
The Valuation of Earnings

As the distribution of returns widened in 1998 and 1999, so did the distribution of stocks' prices relative to earnings. This increasing dispersion of valuations, by itself, did not reflect a dimmer prospect for most companies' earnings. Although the prices of

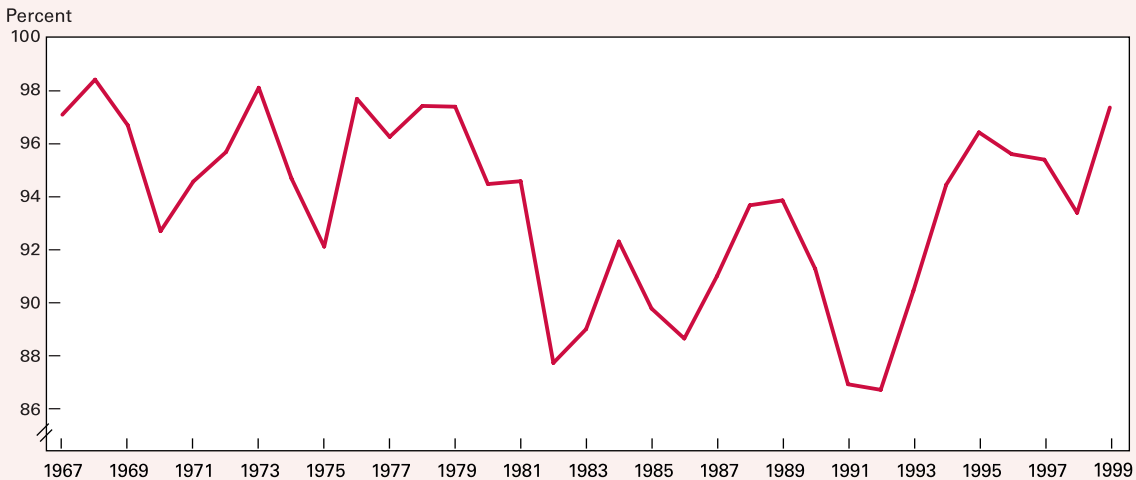
more stocks fell during in 1998 and 1999 than in any of the preceding seven years, these prices fell from uncommonly high valuations. The prices of most stocks at the end of 1999 were still high compared to their companies' earnings, indicating that analysts expected earnings for all tiers of the 500 to continue growing rapidly compared to previous experience.

Figure 4

Distribution of Price-Earnings Ratios for S&P 500 Stocks, by Decile



Proportion of S&P 500 Companies Whose Earnings Are Positive



Note: The S&P 500 stocks are ranked each year according to the ratio of their price in December to their reported operating earnings for the year. The lines in the chart show the median values of this ratio for each group of 50 stocks, ranging from the highest to the lowest values.

Source: Standard & Poor's Compustat.

One common measure of equities' valuations divides their prices by their operating earnings over the previous four quarters, their price-earnings ratio (Figure 4). Ranking the companies with positive operating earnings by their price-earnings ratios each year shows that the median price-earnings ratio for the top one-tenth of the companies typically is considerably

higher than that for the other deciles. Here, too, the dispersion of valuations became very large during the late 1990s as the price-earnings ratio for the top companies rose far above those for the other deciles. Unlike previous experience, the price-earnings ratios for stocks in the upper deciles rose in 1999 while those in the lowest deciles fell.

But, unlike the distribution for the appreciation of the prices of equities, the ratio of price to operating earnings rose for the top five deciles from 1994 through 1999. Consequently, the price-earnings ratios for half of the companies that reported positive earnings rose well above the S&P 500's three-decade average of 14.4. To varying degrees, shareholders valued a dollar of their operating earnings much more highly in December 1999 than in any previous December since the late 1960s.

Furthermore, the price-earnings ratios for companies in the lowest three deciles, even though they fell after 1997, remained high compared to their historical values and to the three-decade average price-earnings ratio for the S&P 500. At the end of 1999, shareholders valued a dollar of earnings for companies in these lower tiers about one-fifth higher than the average valuation over the previous three decades.

Price-earnings ratios generally reflect analysts' forecasts of companies' prospective earnings. The more rapidly shareholders expect their company's earnings to grow, the more they are willing to pay for a dollar of earnings today. Accordingly, the analysts surveyed by First Call/Thompson Financial expected earnings for the companies with the highest price-earnings ratios to grow much more rapidly than earnings for companies with lower ratios. The median price-earnings ratio for companies in the top decile was nearly 90 at the end of 1999, mainly because these analysts, on average, expected their earnings to grow more than 36 percent annually by the end of 2001. By contrast, analysts expected the earnings of companies in the lower three deciles to grow only about 8 percent annually. Despite this big difference in prospects for companies in the top and bottom deciles, the outlook for the companies in the lowest deciles was relatively bright from a historical point of view—analysts expected the growth of their earnings to match the average growth of earnings for the S&P 500 over the past four decades.

Analysts increasingly summarize the relationship between a company's price-earnings ratio and the prospective growth of its earnings by its PEG—defined here as its price-earnings ratio divided by the expected rate of growth of its earnings over the next eight quarters. Although, in theory, a company's price-earnings ratio is not simply proportional to the expected growth of its earnings over the next few quarters, many use measures like this PEG as a preliminary test of stocks' prices against the courses of their earnings.

The dispersion of PEGs in the late 1990s did not expand like that for the price-earnings ratios, tending to

confirm that the disparity of valuations reflected a similar dispersion of forecasts of companies' earnings (Figure 5). When high price-earnings ratios reflect forecasts of rapidly growing earnings, and when low price-earnings ratios correspond to forecasts of earnings that grow more slowly, the distribution of PEGs should remain relatively compact even as the spread among price-earnings ratios expands. Ranking companies by their price-earnings ratios each year (maintaining the same assignments to deciles as shown in Figure 4) shows that the median PEG for the top decile rose throughout the late 1990s, but did not exceed the PEGs of the other deciles very greatly. Nevertheless, the PEGs of the top four deciles exceeded those of the remaining six deciles in 1998 and 1999, suggesting that analysts expected earnings of these companies to grow more rapidly than average beyond the two-year horizon.¹

Price-Earnings Ratios by Industry and by the Value of Companies

Standard & Poor's assigns the 500 companies in its index to specific industries, numbering more than 100 by 1999. Ranking these industries by their price-earnings ratios each year shows that the recent sharp increase in the median price-earnings ratio for the top decile of industries is not so unusual (Figure 6). However, in the early 1980s and early 1990s, when the ratio for the top industries rivaled its value at the end of 1999, the economy was emerging from recessions. By contrast, 1999's high ratio appeared after the current economic expansion approached a post-World War II record for longevity.

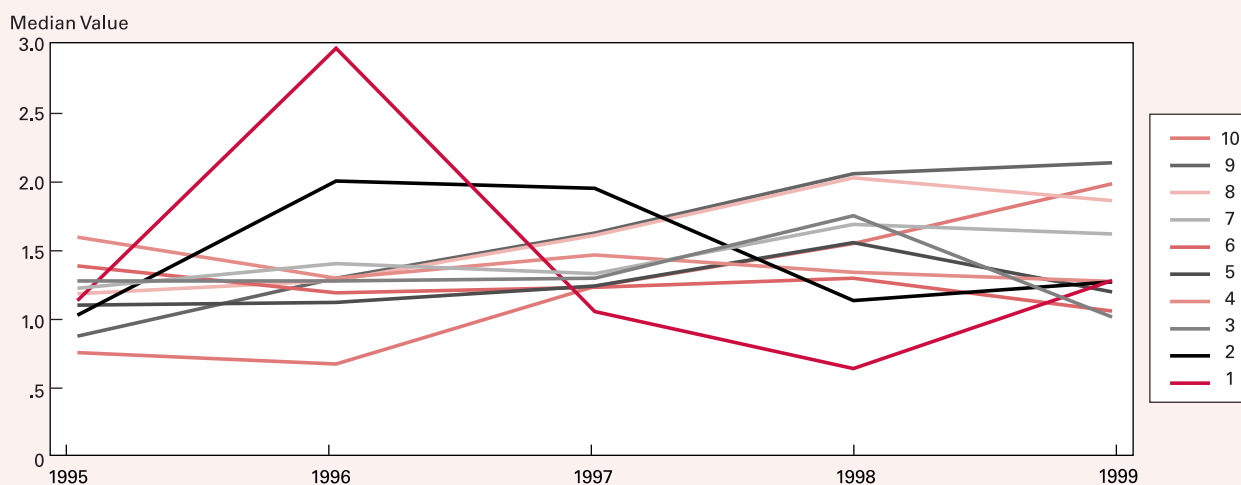
At the end of 1999, the price-earnings ratios for the top seven deciles of industries generally exceeded or nearly matched their previous highs of the past three decades. Although the ratios for the lowest three deciles fell in 1998 and 1999, they still exceeded their average values since the late 1960s, and they nearly matched their highs set before the 1990s.

During 1998 and 1999, shareholders valued large companies' stocks more than smaller companies' stocks by an increasing margin (Figure 7). Ranking companies by their market capitalization each year shows that the median price-earnings ratio for the 50 largest companies in the S&P 500 index rose to a

¹ The distributions of PEGs for each decile generally are diffuse. A company that promises rapidly growing earnings does not necessarily have a commensurately high price-earnings ratio if the company's odds of failing to deliver seem especially great. Similarly, PEGs can be comparatively high for companies that pose low risks.

Figure 5

PEG Ratios for S&P 500 Stocks, by Deciles of Price-Earnings Ratios



Note: The assignment of stocks to groups of 50 is the same as that in Figure 4. For each decile, the lines show the median value of the PEGs for their 50 stocks – their price-earnings ratios divided by analysts' estimates of the average annual rate of growth of their operating earnings over the next two years, as reported by First Call/Thompson Financial.

Source: Standard & Poor's Compustat, First Call/Thompson Financial.

record high in 1999. By contrast, the median ratio for the smallest 50 fell in 1998 and 1999. At the end of 1999, analysts expected earnings for the 50 largest companies to grow, on average, 14 percent by the end of 2001, while their forecast for the smallest tier was just over 2 percent.

At the end of 1999, the companies with the best prospects, more than before, were the largest companies. The gap between the valuations of the largest companies' and smaller companies' earnings was greater than it was in any year during the past three decades. While earnings for the two deciles of largest companies commanded high valuations at the end of 1999, the price-earnings ratios for the remaining deciles were generally no higher than they were in the late 1960s and early 1970s. Although companies promising greater growth tend to ascend the tiers as their market capitalization rises, in the past this bias did not carry as much force as it has recently. To a degree, the comparatively high price-earnings ratios for many of the companies with brighter prospects lifted their market values more than in the past. To a degree, these companies also used their higher valuations to acquire

smaller companies with the most promising prospects more than they had in the past.

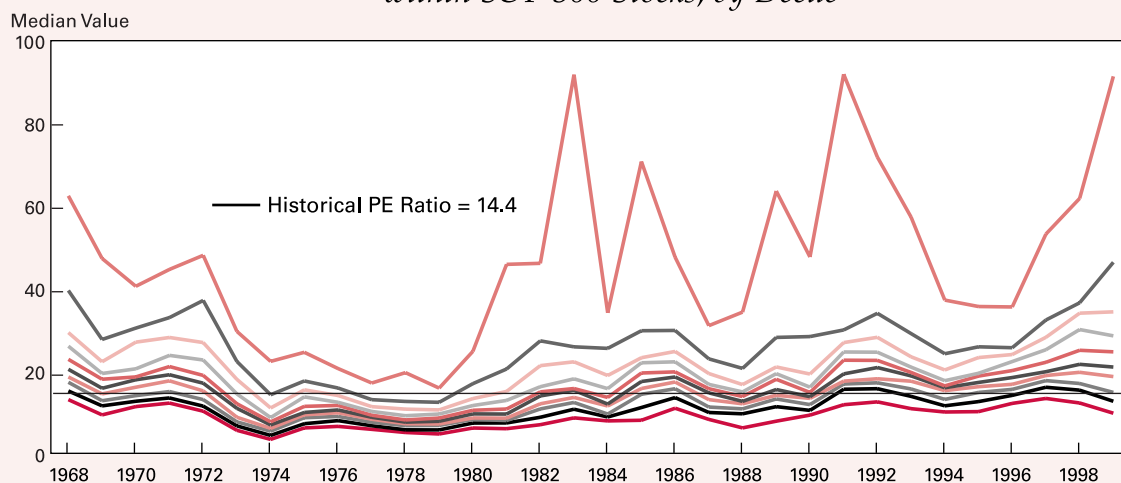
II. The Laws of Gravity

At the end of 1999, the value of equity anticipated a promising future. The relatively high price-earnings ratios across the S&P 500 indicated that analysts and shareholders expected companies' earnings to grow relatively rapidly. The growing disparity in the performance of equities and the divergence of price-earnings ratios, by themselves, did not necessarily portend any potential weakness in stocks' prices. Instead, the very promising view of future earnings might be a greater concern.

Since the 1950s, the ratio of price to reported earnings for the S&P 500 generally has varied with the growth of earnings over the subsequent two years (Figure 8). The value of the price-earnings ratio averaged approximately 15 over this interval. It exceeded 20 briefly in 1961 at the beginning of the country's second-longest postwar expansion. It then fell well

Figure 6

Distribution of Price-Earnings Ratios for Industrial Composites within S&P 500 Stocks, by Decile



Note: The 500 companies are assigned to industries as designated by Standard & Poor's. The industries are ranked each year according to the aggregate market values of their companies in December divided by the aggregate value of their operating earnings for the year. The lines in the chart show the median value of these ratios for each decile of the distribution of the industries' price-earnings ratios.

Source: Standard & Poor's Compustat.

below 15 during the 1970s and early 1980s, varying with the growth of future earnings but remaining at a lower level. During the late 1980s and early 1990s, the price-earnings ratio recovered, eventually rising to 26 at the beginning of the country's longest postwar expansion. After 1996, the ratio soared before the surge in earnings that occurred in the late 1990s, peaking at a postwar record high of 33 in the first quarter of 1999.

Behind the Price-Earnings Ratio

As of the last quarter of 2000, the price-earnings ratio remained high, near 27, principally because analysts expect earnings for the S&P 500 to continue growing very rapidly by historical standards—averaging as much as 13 percent annually over the next five years.² Suppose the growth of earnings complies, then falls gradually over the next five years to match the growth of nominal GDP, which this article assumes to be 7 percent annually. In this case, companies expand quickly over the first five years, because their return on equity is sufficiently high to finance a rapid growth of their capital. During the following five years, the

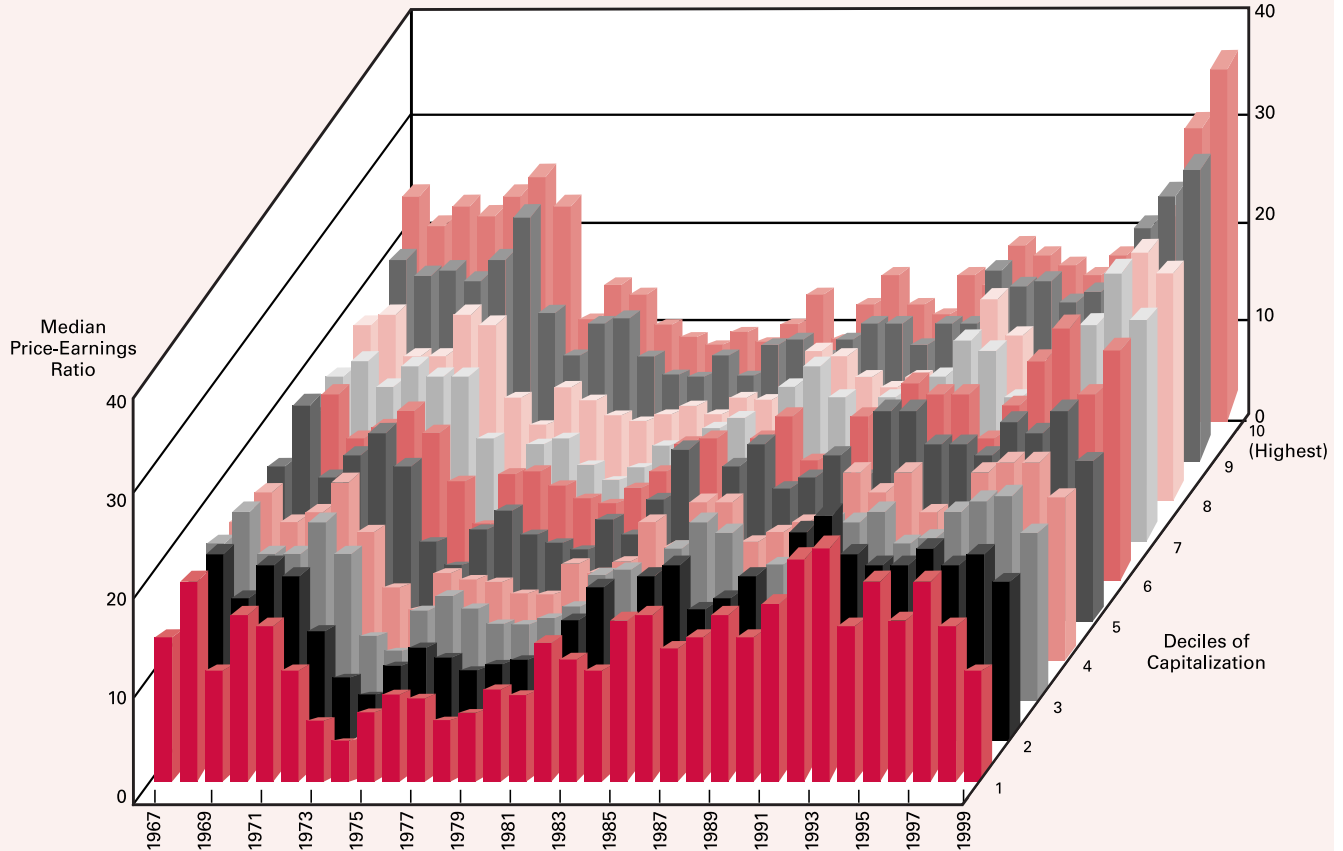
return on capital assets subsides. Companies consequently reduce their investment. By the end of the 10-year interval, companies earn a stable net return on equity, 15 percent annually, and the stock of capital grows at the same pace as GDP.³ During the first five years, companies distribute a constant 32 percent of their earnings as dividends; they retain the remainder to finance the rapid growth of their capital assets. During the next five years, the share of earnings that companies distribute as dividends rises steadily as the rate of growth of their stock of capital assets falls. After 10 years, the distribution of dividends remains constant at one-half of earnings.

In these circumstances, shareholders who pay 27 times earnings for the stocks earn an average rate of

² Strategists expect the earnings of the S&P 500 to grow 13.1 percent over this interval according to the consensus long-term growth forecast of those who contributed to Zacks Investment Research as of November 16, 2000. Earnings will grow 14 or 15 percent according to composites of analysts' forecasts for the constituent companies. In the past, these composite forecasts have tended to be overly optimistic.

Figure 7

Price-Earnings Ratios for S&P 500 Stocks Sorted by Total Value of Companies' Equity



Note: The 500 companies are ranked by the total value of their equity each year. The bars show the median price-earnings ratio (December price divided by operating earnings for the year) for each group of 50 companies.

Source: Standard & Poor's Compustat.

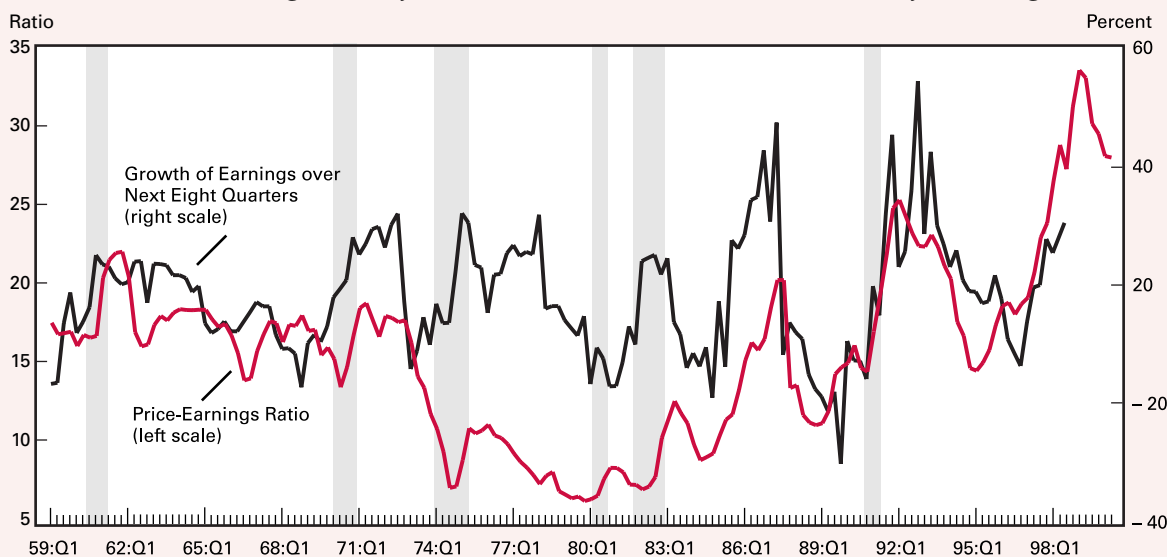
³ The 15 percent return on equity seems low given the data that many companies report in their financial statements. But, here, capital assets are valued at current replacement costs, which are higher than the net acquisition costs that companies commonly report. This difference increases capital consumption expenses and increases the value of capital against which earnings are compared. Taking these differences into account, a 15 percent return seems reasonable, if not somewhat high in view of past experience. A higher return would allow companies to pay greater dividends in the future. The dividends accompanying a 20 percent return, for example, would allow shareholders to value equity at 27 times earnings at a 10 percent, rather than a 9 percent discount rate.

The 15 percent return on equity corresponds to a real return of

12.5 percent if inflation averages 2.5 percent. Currently, the real yield on A-rated bonds is about 2.5 percent: a nominal yield of 8 percent less about 3 percent for income taxes and 2.5 percent for expected inflation (see footnote 6). Assuming that businesses finance 40 percent of their capital assets with debt, then the 12.5 percent real return on equity and the 2.5 percent real return on debt correspond to a real return on companies' tangible assets of about 8.5 percent. Currently, this return—the profits of nonfinancial corporations with inventory valuation and capital consumption adjustments less taxes plus net interest expenses divided by the replacement value of their tangible assets (including inventories)—is almost 7 percent. The current leverage of these corporations—the ratio of their net credit market liabilities to the replacement value of their assets—is nearly 40 percent.

Figure 8

Price-Earnings Ratio for S&P 500 and the Future Growth of Earnings



Note: The price-earnings ratio is Standard & Poor's composite – the ratio of stocks' prices in each quarter to earnings over the previous four quarters. The growth of earnings is the average annual rate of change in earnings after taxes for the composite over the next eight quarters.

Source: Standard & Poor's Compustat.

return of 9 percent annually in capital gains and dividends over the next 10 years and beyond. The dividend yield on equities rises from just over 1 percent to 2 percent, while the yield from capital gains gradually falls toward 7 percent. The 9 percent return, which exceeds the current yield on A-rated corporate bonds by about 1 percentage point, is less than the average return on equities before the late 1990s, which was about 12.75 percent.

The recent bull market has stirred some debate about the return that shareholders require of equities. High price-earnings ratios suggest that this return has become relatively low in recent years. Yet, the extraordinarily rapid appreciation of equities also suggests that shareholders could have expected relatively high returns. To the degree that shareholders have revised their forecasts of companies' earnings, repeatedly anticipating both higher earnings and more rapid growth of earnings during the late 1990s, the resulting appreciation of equities would overstate the return that they expected and required. At the same time, rising price-earnings ratios would overstate any drop in their required return. Indeed, the abrupt drop in price-

earnings ratios that follows cuts in forecasts of companies' revenues or earnings suggests that shareholders require higher rather than lower returns. Today's high valuations seem to rest more on the promise of rising earnings than on the low risk premiums required by more patient, tolerant shareholders. Accordingly, a reasonable estimate of the return that shareholders might require of their equities is likely to be no lower than 9 percent.

Stocks' prices are very sensitive to this required rate of return. For example, if shareholders required a yield of 10 percent, other things equal, the price-earnings ratio would drop to about 18—prices fall by about one-third—in order for equities to produce shareholders' expected return.⁴ Lower prices today would allow for somewhat greater capital gains during the next five years and raise dividend yields in every year. Over the next ten years, the dividend yield

⁴ This example also shows that the price-earnings ratios (and PEGs) of companies can diverge when shareholders discount their returns at different rates, as can be the case when companies pose different risks. Similarly, a company's price-earnings ratio can change over time when shareholders perceive its risks differently.

would rise to 3 percent, while capital gains stabilize at 7 percent.

The relationship between stocks' prices and the growth of earnings is more complex. The outlook for earnings in this scenario comprises two elements: the relatively rapid growth that lasts for much of the next 10 years, and the ensuing long-term rate of growth, which matches that of nominal GDP. Changes in the long-term outlook for earnings affect the current valuation of equity more forcefully than similar changes in the next five years.

Suppose, for example, shareholders foresee earnings growth of only 9 percent over the next five years. Then, the price-earnings ratio for equities must drop to about 23—prices fall by about 15 percent—for shareholders to earn a 9 percent return. By contrast, assuming that the short-term growth of earnings remains at 13 percent, a 1 percentage point drop in expected growth of long-term earnings would cause the price earnings ratio to fall to 21.⁵ In both of these cases, if shareholders also require a higher risk premium and expect a return of 10 percent, the price-earnings ratio would drop to about 15, its postwar average.

The Potential Growth of Earnings

The preceding analysis implies that the economy's potential growth must remain well above its previous postwar average to support the current price-earnings ratio for equity. In the long run, the growth of earnings essentially matches that of nominal GDP, which in turn is the sum of the growth of real output and inflation. Since 1950, earnings increased 7.2 percent annually on average, while nominal GDP increased 7.4 percent. Over the same interval, real output grew 3.6 percent, while inflation averaged 4 percent. Currently, most forecasts anticipate that inflation will remain near 2.5 percent in the future.⁶ If inflation does not increase significantly, then the growth of potential output must be nearly 4.5 percent for earnings and nominal GDP to grow as rapidly as 7 percent.

Although a higher rate of inflation could compensate for slower potential growth, higher inflation also would tend to raise both the inflation premium and

⁵ This second alternative highlights another limitation of using PEGs to explain fully the valuation of stocks. In this example, like the initial case, earnings grow 13 percent annually for the first five years; yet, the price-earnings ratio is 27 in the initial case and 21 in this second alternative. This difference reflects expectations of earnings over periods longer than five years.

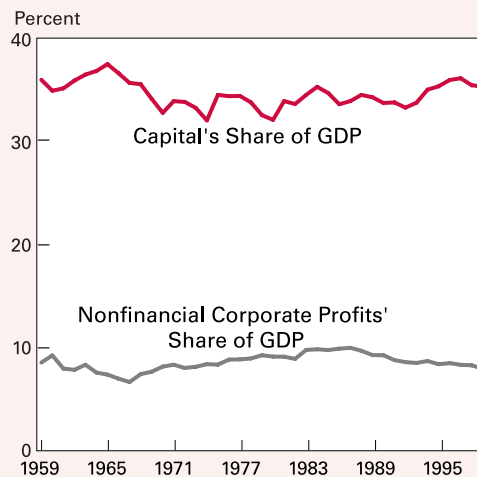
⁶ The Federal Reserve Bank of Philadelphia's Survey of Professional Forecasters, forecasts of long-term inflation taken in the third quarter of 2000.

the return that shareholders require of their investments. Suppose shareholders expect nominal GDP and earnings to grow 7 percent as a result of 3.5 percent inflation and 3.5 percent potential growth. In these circumstances, shareholders would not value equities as high as 27 times earnings, unless their required return remained at 9 percent—unless, that is, their required inflation-adjusted return fell 1 percentage point in order to offset the 1-percentage-point increase in their inflation premium.

In the United States over the past five decades, the growth of capital's income has essentially equaled that of the value of output (see the box). Consequently, the total earnings of capital have represented a relatively constant share of nominal GDP, about one-third (Figure 9). Companies' earnings essentially equal the return to capital assets less taxes, depreciation, and

Figure 9

Capital's Income Relative to GDP



Note: Capital's share of GDP is calculated by subtracting from one the ratio of labor income to total income, where labor income is defined as compensation of employees, and total income is the sum of labor income, corporate profits, net interest, rental income, and depreciation. Nonfinancial corporate profits' share of GDP is the ratio of corporate profits of nonfinancial corporations with inventory valuation and capital consumption adjustment to nominal gross domestic product. All data are from the National Income Accounts.

Source: U.S. Bureau of Economic Analysis.

Box: Productivity, Potential Output, and the Return to Capital

The Cobb-Douglas production function has long served as a useful device for describing the correspondence between output and the inputs of capital and labor:

$$Q = MFP_t \cdot K_t^\alpha L_t^{1-\alpha},$$

where Q is real output, MFP is multifactor productivity, K is the stock of capital, and L is labor's input.

According to this function, if capital and labor earn their marginal products, then capital's and labor's shares of output—the quantity of these factors employed times their respective real rates of pay (r and w)—are constant:

$$\begin{aligned} K \cdot r &= K \cdot D_K Q = \alpha \cdot Q \\ L \cdot w &= L \cdot D_L Q = (1-\alpha) \cdot Q \\ r &= \alpha \cdot (Q/K). \end{aligned}$$

Capital's share of GDP equals α , which is approximately one-third according to postwar data for the United States. When the stock of capital grows as rapidly as output, the ratio of output to capital is constant, and the return to capital also is constant. When the stock of capital grows more rapidly than output, the return to capital falls commensurately. In this case, capital's income still grows as rapidly as output as the more rapid growth of the stock is offset by its falling return.

$$\% \Delta(Q) = \% \Delta(MFP) + \alpha \cdot \% \Delta(K) + (1-\alpha) \cdot \% \Delta(L).$$

The economy's potential rate of growth is defined by the rates of growth of multifactor productivity and of labor input and by the rate of growth of the stock of capital that maintains a constant rate of return to capital (assuming that the cost of capital is constant). In the long run, the return to capital should neither rise nor fall without limit. When the rate of growth of the stock of capital equals that of potential output, capital's return is constant and potential output grows at the rate

$$\% \Delta(Q) = \% \Delta(MFP) / (1-\alpha) + \% \Delta(L).$$

The growth of potential output and capital, therefore, equals the growth of the supply of labor plus one and one-half times the growth of multi-

factor productivity. Because potential output grows faster than the labor force, the rate of growth of both output per unit of labor and the real wage of labor is one and one-half times that of multifactor productivity.

The Annual Growth of Multifactor Productivity (percent)	
1950-1970	1.5
1970-1990	.7
1990-1998	.9
1995-1998	1.3

The recent growth of multifactor productivity, in conjunction with forecasts that labor input (the quantity and the quality of labor) will grow about 1.4 percent in coming years, implies that the potential growth of output is approximately 3.4 percent annually. In these circumstances, capital's real income also increases 3.4 percent annually. If the growth of multifactor productivity rises to about 2 percent, then the growth of both potential output and capital's income rises to 4.5 percent.

If multifactor productivity remains near 1.3 percent, output can still grow as rapidly as 4.5 percent as long as the stock of capital grows 7.3 percent annually. In this case, however, the return to capital will fall about 2.8 percent annually. As a result, capital's real income will grow only as rapidly as output. This rapid growth of output and capital cannot be sustained, however, unless either multifactor productivity or labor input grows more rapidly. When the return to capital eventually meets or falls below the cost of capital, investment will abate.

As long as capital's share of output remains relatively constant, capital's income cannot grow very much more rapidly than output for long. If α increases, then for a time capital's income can grow faster than output as capital's share rises to attain its higher value. Afterward, capital's income and output once again will grow at the same, but more rapid pace, because $1/(1-\alpha)$ increases as α increases.

debt service. Given that the growth of capital's income is limited by the growth of GDP, companies' earnings can grow more rapidly than GDP for a time if taxes, depreciation, and debt service charges fall relative to GDP. Currently, the rate of capital consumption is increasing with the economy's greater investment in relatively short-lived equipment and software. Earlier

The experience of the past five decades indicates that companies' earnings can grow more rapidly than capital's income and nominal GDP for short periods, but over intervals longer than a decade, they tend to grow at very similar rates.

in this expansion, profits grew more rapidly than GDP as the burden of companies' debt service fell because of falling leverage and falling interest rates. Now, with the reversal of these trends, debt service charges have grown at least as fast as GDP.

The experience of the past five decades indicates that companies' earnings can grow more rapidly than capital's income and nominal GDP for short periods, but over intervals longer than a decade, they tend to grow at very similar rates. Although the claims of taxes, depreciation, and debt service have shifted many times in the past, these shifts have not lasted long enough to change profit's share of GDP very greatly.

III. Conclusion

The valuation of equities across the S&P 500 anticipates a bright future. Although the prices of many stocks have fallen recently and fewer stocks have accounted for a larger share of the increase in the total

market value of these companies, the value and expected growth of earnings remain relatively high for all tiers of the 500. Consequently, the recent disparity in the performance of equities, by itself, does not necessarily foretell weakness, unless it accurately anticipates the failure of many companies to fulfill shareholders' expectations.

The valuation of the S&P 500 in the final quarter of 2000 apparently anticipates that corporations' earnings will grow as rapidly as 13 percent annually over the next five years before diminishing gradually to match the growth of GDP. This forecast, in turn, depends on potential growth rising significantly, exceeding by as much as one-half the economy's average real rate of growth since World War II.

The recent growth of economic activity suggests that potential output has indeed accelerated. The year-over-year growth of real GDP has averaged more than 4 percent since 1996, while the growth of real output for nonfinancial corporations has averaged more than 6 percent. These data, however, are not decisive. Much of the recent surge in productivity and output seems to be related to cyclical factors. In particular, the stock of capital assets, especially producers' durable equipment and software, grew at a very rapid pace over the past two years, sufficiently rapidly to add as much as 2 percentage points to the growth of capacity. If the productivity of capital does not rise sufficiently rapidly to continue to support this rapid accumulation of capital assets, then the growth of output and earnings will subside.

Companies' financial reports should reveal whether productivity and earnings have increased sufficiently to support the current valuation of equities. If companies can maintain their margins and their returns remain above their cost of capital as their assets continue to increase rapidly, then prospects for sustaining a higher rate of growth remain promising. But if the persistent disparity in the performance of equities reflects a sizable erosion of margins and returns for many companies, then the economy's odds of sustaining sufficiently high growth of output and earnings diminish.

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