

## *Profits and Stock Prices: The Importance of Being Earnest*

**I**n recent months, popular indices of the prices of common stocks have surged to new peaks. At the same time, the profitability of nonfinancial corporations has foundered, and many question whether the rising tide of economic recovery can lift earnings to meet the value of equity.

Since 1982 stock prices have more than tripled, while the operating income of corporations has risen by less than one-half. In the last three years alone, prices have increased by more than one-half, while earnings have fallen. During January of this year, the price of equity for Standard & Poor's composite of 500 stocks exceeded 23 times earnings, a comparatively high multiple by historical standards. To some analysts, stocks are priced as aggressively as they were during the prosperity of the 1960s, but the performance of corporations appears to be languishing nearly as much as it did during the 1970s. Once the gap between the value of equity and the prospects of corporations became evident during the 1970s, the price of stocks fell from 17 times earnings in the late 1960s to less than 10 times earnings in the late 1970s. The rise and subsequent collapse of stock prices has been more abrupt during the last decade: the value of equity rose 30 percent from January to late August in 1987, then fell 30 percent from late August to late October.

While the prospect for equity values naturally concerns traders and investors, it also is a concern for public policy. Because investors' wealth depends on the value of corporate equity, the demand for consumption goods can vary with the price of stocks. Furthermore, the valuation of corporations' productive assets on stock exchanges influences businesses' willingness and ability to undertake new investments.<sup>1</sup> If the falling price of stocks should retard the pace of capital formation in the future, it also would retard the potential growth of output and living standards.

This article examines the relationship between the earnings of nonfinancial corporations and the value of their equity. It concludes that

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the price of stocks corresponds more closely to the earnings that companies disclose in their financial reports than it does to the earnings for nonfinancial corporations reported in the national income accounts. This unsurprising result is not necessarily reassuring. If corporations' financial reports overstate both the magnitude and the rate of growth of their earnings because of the biases arising from their reliance on historical book values, then the lower returns reported in the national accounts may represent the performance of these corporations more accurately.

This analysis also suggests that the value of equity does not necessarily reflect corporations' incentives for undertaking investments. Therefore, a revival of domestic capital formation does not necessarily require the Dow Jones industrial average to remain near its recent record high values. Since the late 1970s, for example, corporations' rate of return on surplus increased in part because their average tax burdens declined with the various tax reforms enacted in the 1980s. Stock prices rose with earnings. Because the tax reforms adopted in 1986 tended to maintain, for a time, a lower tax burden on existing corporate assets, while raising the burden on many new investments, rising stock prices during the late 1980s did not herald a commensurate improvement in incentives for investment. Conversely, should the rate of return on existing assets and surplus for domestic corporations fall with increasing foreign competition, the prices of stocks also may fall. But, if the opportunities for profitable growth, both here and abroad, remain sufficiently attractive, lower prices of stocks would not foretell a commensurate drop in corporations' capital budgets.

### *I. The Value of Equity*

Most descriptions of stock prices share a common pedigree: the value of common stocks essentially rests on the prospective earnings of the assets backing these shares. Some augment this fundamental description of stock prices by allowing for bubbles or fads, wherein prices can rise well above values supported by corporate earnings for an indefinite time.

Although stocks appear to be valued for both their dividend payments and their resale values, from the fundamental point of view the resale value of stocks must reflect the prospective value of subsequent dividends. To shareholders who anticipate owning stocks for one year, for example, the value of

this investment depends on dividend receipts during the year plus the proceeds from selling the stocks after a year has elapsed. In order to forecast this resale value, shareholders must anticipate the price that others would be willing to pay one year hence. If subsequent investors also hold the stocks for one year, then the current value of stocks depends on prospective dividends over the next two years and the proceeds from selling the stocks two years from now. Extending this chain of logic shows that

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the value of stocks ultimately depends on forecasts of dividends extending into the indefinite future, well beyond current shareholders' intended holding periods.

According to this view, the fundamental value of stocks depends on their stream of dividends, which, in turn, depends on prospective earnings. Share prices tend to rise when dividends increase or when prospective earnings promise a greater capacity for paying dividends in the future. The importance of rising earnings appears to be substantial. From 1982 to 1989, for example, the ratio of current dividends to stock prices generally varied around 4 percent, while the yields on corporate bonds averaged 11 percent.<sup>2</sup> If shareholders during the late 1980s had expected no growth in corporate earnings, stock prices would have to have fallen by two-thirds for the yields on equities to appear attractive to investors.

Not only do dividends depend on earnings, but earnings also depend on corporations' policies for paying dividends. Earnings per share of stock may grow either because the rate of return on the corporation's surplus increases or because the amount of

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<sup>1</sup> See Tobin (1969); von Furstenberg (1977); Ciccolo and Fromm (1979); Abel (1979); Yoshikawa (1980); and Hayashi (1982).

<sup>2</sup> This is the dividend-price ratio reported by Standard & Poor's for their index of 500 stocks. The bond yield is that reported by Salomon Brothers for new securities issued by industrial corporations bearing an A bond rating.

surplus backing each share increases. Other things equal, a corporation reduces its retained earnings when it increases its payment of dividends to shareholders. Conversely, lower dividend payments this year increase the surplus backing each share of stock next year, thereby raising earnings per share in the future.

When deciding the proportion of earnings to be distributed to shareholders as dividends, corporations must weigh the benefits of paying greater dividends this year against the benefits of paying greater dividends in the future. Some financial theories, resting on assumptions of perfect competition, constant returns to scale, or uniformity of information and beliefs among investors, conclude that dividends are either arbitrary or dictated by institutional details, such as the incidence of income taxes, bankruptcy costs, agency costs, or the need to signal investors.<sup>3</sup> Other approaches stress that the proportion of earnings to be distributed as dividends and, consequently, the rate of growth of earnings and dividends depend on the growth of profitable investment opportunities available to corporations.<sup>4</sup>

Retaining earnings, instead of paying dividends, ultimately benefits corporations and their shareholders only if the return on marginal investments is no less than the opportunity cost of capital. Should corporations earn a greater rate of return on their retained earnings than shareholders can earn on alternative investments, shareholders benefit when corporations retain their earnings. Conversely, should shareholders earn greater returns on alternative investments, they would benefit most when corporations pay greater current dividends.<sup>5</sup> If corporations distribute too little of their earnings to shareholders, they will expand too rapidly, thereby earning an inadequate return on their marginal investments, and their share prices may be depressed enough to invite a "takeover." If they distribute too much of their earnings, they risk either being displaced by competitors or relying too much on debt financing.

### *The Price-Earnings Ratio*

Stocks frequently are appraised as a multiple of their recent earnings, the price-earnings ratio. At the very least, this multiple depends on the shareholders' required rate of return, the prospective rate of growth of earnings, and the proportion of earnings that is distributed to shareholders as dividends. Other things equal, the lower the required rate of return,

the greater the growth of earnings, or the greater the ratio of dividends to earnings, the greater is the price shareholders are willing to pay per dollar of earnings for a corporation's stock.

If the rate of return on a corporation's surplus—the difference between the value of its assets and the value of its liabilities—is constant ( $r$ ) and the rate of growth of profitable investment opportunities is constant ( $g$ ), then the share of earnings distributed as dividends is

$$(1) \quad s = 1 - g/r.$$

The greater is the warranted rate of growth of surplus relative to the rate of return on surplus, the lower are dividends.

In a steady state, according to the fundamental view of stock pricing, the dividend-price ratio would be constant: in the long run, the dividend yield neither rises without limit nor falls toward zero. Consequently, the rate of appreciation of the stock equals the rate of growth of earnings and dividends ( $g$ ). The shareholders' rate of return equals the dividend yield (the ratio of dividends to the price of the stock) plus the rate of appreciation of the stock. If the shareholders' required rate of return on equity is  $\rho$ , then

$$(2) \quad \rho = \frac{D}{P} + g, \text{ implying } \frac{D}{P} = \rho - g.$$

Therefore, the steady state ratio of earnings to the price of the stock is

$$(3) \quad \frac{E}{P} = \frac{D/s}{P} = \frac{\rho - g}{s}.$$

The price of stocks can be a fallible indicator of corporations' incentives for undertaking new invest-

<sup>3</sup> See, for example, Taggart (1985); Modigliani and Miller (1958); Miller and Modigliani (1961); Jensen and Meckling (1976); Miller and Scholes (1978); Bhattacharya (1979); and the articles listed in Kopcke and Rosengren (1989).

<sup>4</sup> If corporations are oligopolistic competitors whose return on assets varies with their scale of operations, capital markets are not perfect, or investors are not homogeneous, then dividends also depend on the relative appeal of corporations' investment opportunities.

<sup>5</sup> This strategy is not equivalent to maximizing the price of stock. A corporation that maximizes the wealth of its shareholders essentially expands until the rate of return on its last investment project eventually falls low enough to equal its marginal cost of capital. Because this strategy does not maximize the average return on assets or on surplus, it entails corporations' expanding beyond the scale that maximizes share prices.

Table 1  
*Earnings, Dividends and Stock Prices for Ford Motor Company*  
 Millions of Dollars

Year	Earnings	Dividends	Total Value of Stock	Return on Surplus (Percent)	Ratio of Dividends to Earnings	Price-Earnings Ratio	Price-Dividend Ratio
1977	1,672.8	359.3	5,418.2	19.8	.21	3.2	15.1
1978	1,588.9	416.6	5,035.5	16.4	.26	3.2	12.1
1979	1,169.3	467.6	3,856.9	11.2	.40	3.3	8.2
1980	-1,543.3	312.7	2,411.5	n.a.	n.a.	n.a.	7.7
1981	-1,060.1	144.4	2,019.6	n.a.	n.a.	n.a.	14.0
1982	-657.8	0	4,687.9	n.a.	n.a.	n.a.	n.a.
1983	1,866.9	90.9	7,754.6	24.7	.05	4.2	85.3
1984	2,906.8	369.1	8,490.8	29.5	.13	2.9	23.0
1985	2,515.4	442.7	10,793.8	20.5	.18	4.3	24.4
1986	3,285.1	591.2	15,097.5	22.1	.18	4.6	25.5
1987	4,625.2	805.0	19,126.4	25.0	.17	4.1	23.8
1988	5,300.2	1,113.5	24,785.4	24.6	.21	4.7	22.3
1989	3,835.0	1,403.5	20,625.9	16.9	.37	5.4	14.7
1990	860.1	1,388.6	12,596.3	3.7	1.61	14.6	9.1

n.a. = not applicable.  
 Source: Compustat Data Base.

ments. Although the value of stocks tends to rise or fall with the prospective rate of growth of earnings, offsetting changes in the rate of return on surplus may break this relationship. The price-earnings ratio, for example, tends to rise when the rate of return on surplus rises relative to the rate of growth of profitable investment opportunities. Under these circumstances, the share of earnings distributed as dividends rises, (1), which tends to reduce the reciprocal of the price-earnings ratio, (3). Even if the warranted rate of growth should fall, the price-earnings ratio may, nonetheless, rise in the steady state if the return on surplus rises, thereby increasing dividends sufficiently. Both the price-earnings ratio and the level of stock prices can rise, if the return on surplus increases sufficiently when warranted growth declines.<sup>6</sup>

#### *Changes in the Return on Surplus*

The foregoing steady-state analysis, by itself, is not a complete description of stock prices in the short run. At the very least, the return on surplus and the potential for profitable investment opportunities vary from year to year.<sup>7</sup> Temporary changes in earnings and investment opportunities will affect the value of equities less than enduring changes. If, for example, a decline in earnings were regarded as fleeting,

perhaps likely to be offset by extraordinary earnings in the future, stock prices could fall less than earnings, and the ratio of prices to current earnings would rise as shareholders look forward to better years. If, however, the lower earnings were to persist, as assumed by the steady-state analysis, then stock prices would fall more than earnings.

In practice, shareholders seem not to regard fluctuations in business conditions as entirely fleeting. Consequently, year-to-year changes in performance can influence equity values greatly. Assessments of a corporation's long-run return on surplus and long-run growth may vary with current returns and investment opportunities. Moreover, temporary changes in a corporation's fortunes often are not reversed very quickly. When the shareholders' rate of discount ( $\rho$ ) is sufficiently great, these changes may

<sup>6</sup> In other words, the demand for capital does not necessarily correspond well with changes in Tobin's  $q$  (Hayashi 1982). The demand for capital also may not correspond closely with changes in marginal  $q$  (Pindyck 1991; Kopcke 1992).

<sup>7</sup> This long-run analysis breaks down when a corporation's warranted rate of growth exceeds shareholders' discount rates or when corporations pay no dividends. During business cycle recoveries, for example, investors may anticipate that the rates of growth of some businesses will exceed their discount rate ( $\rho$ ) for a time. Also, younger corporations may pay no dividends and promise extraordinary rates of growth for many years before they mature.

carry a weight approximating that of more lasting changes in performance.

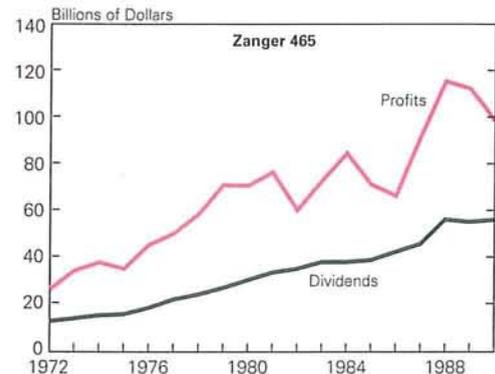
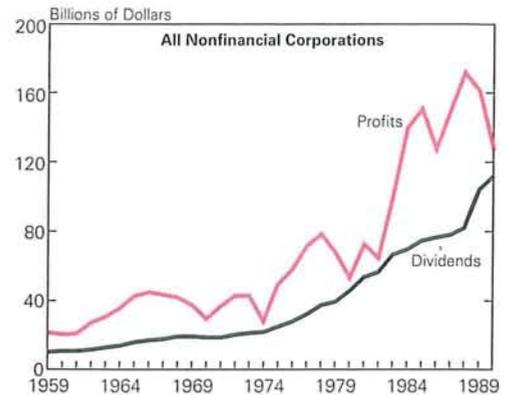
Ford Motor Company, for example, has been a prominent manufacturing corporation for most of this century. Because the demand for its principal products, motor vehicles, varies substantially with economic conditions, Ford's earnings, like the earnings of other manufacturers of durable goods, also vary over the business cycle. When Ford Motor Company's rate of profit fell from 20 percent on surplus in 1977 to 11 percent in 1979, its price-earnings ratio remained near 3 (Table 1). The attendant decline in the market value of Ford's equity agreed more with the consequences of a lasting deterioration in performance than with the consequences of a temporary slump. From 1983 to 1988, Ford's return on surplus averaged nearly 25 percent, and its price-earnings ratio averaged approximately 4. As its return on surplus fell to 4 percent by 1990, its price-earnings ratio rose to nearly 15. The higher price-earnings ratio implies that shareholders expected much of the 84 percent decline in earnings since 1988 to be temporary. Nevertheless, that the price-earnings ratio did not rise more, that the market value of Ford's equity fell by one-half, suggest that shareholders regarded much of the deterioration in performance as lasting rather than temporary.<sup>8</sup>

Annual changes in profits tend to be greater than the changes in dividends<sup>9</sup> (Figure 1). Dividends, unlike earnings, cannot fall below zero. Moreover, corporations prize a history of rising dividends; consequently, most adopt conservative strategies for paying dividends. As earnings rise, dividends often rise with a lag, protecting management from the need to cut dividends should earnings subsequently decline. When earnings fall, managers seem to gain little by reducing dividends immediately, unless they are convinced their earnings will be depressed indefinitely or they need to retain the cash to avoid financial duress. Managers may even issue debt in order to maintain dividends and meet their capital commitments when earnings fall. By reducing dividends, managers may fear tarnishing the appeal of their securities, thereby raising their cost of capital, or they may fear prematurely signaling substantial distress to "outsiders."

Whereas potential shareholders, as outsiders, may be inclined to bid cautiously for the stock of a corporation reporting new problems, managers, as insiders, have an incentive to avoid overreacting. Because stock prices can react more to annual changes in earnings than do dividends, prices may

Figure 1

### Profits and Dividends



Source: See the Appendix for definitions and sources.

appear to be too volatile compared to the behavior of dividends, perhaps suggesting that stock prices are not grounded firmly in fundamentals. However, when earnings fall more than dividends, the rate of growth of corporations' surplus also falls, thereby reducing the growth of future earnings and dividends.<sup>10</sup> When earnings rise more than dividends,

<sup>8</sup> This observation assumes that the shareholders' required rate of return for Ford is constant and that they do not expect the share of earnings distributed as dividends to change. If Ford now appears to be a more risky investment, the required rate of return may have increased. If so, the limited increase in the price-earnings ratio may be consistent with shareholders' regarding much of the decline in Ford's earnings as temporary rather than lasting.

<sup>9</sup> See Peter L. Bernstein, Inc. (1992).

<sup>10</sup> If corporations tend to maintain both their capital budgets and their distribution of dividends by borrowing, they may increase their marginal cost of debt financing, which also reduces their capacity for paying future dividends, other things equal.

corporations' surplus and capacity for paying dividends in the future tend to increase. The longer shareholders expect the change in earnings to endure, the greater is the initial change in the price-dividend ratio.

Much of the volatility of the price-dividend ratio, especially for specific stocks, might be attributed to the delayed adjustment of dividends to earnings. For example, Ford's dividends increased from 1977 to 1979 when its earnings and stock prices were falling (Table 1). Although the price-earnings ratio remained near 3 during these years, the price-dividend ratio fell from 15 to 8. Ford reduced its dividends after 1979 and did not increase them until earnings recovered in 1983. In 1983 Ford's price-dividend ratio was 85, and its price-earnings ratio was 4, as earnings increased more than dividends; in 1984, these ratios were 23 and 3, respectively, as dividends overtook earnings. Ford's dividend in 1990 exceeded its dividend of 1988, and its price-dividend ratio fell from 22 to 9 as its earnings fell significantly between these years. Dividends represented one-fifth of earnings in 1988, but in 1990 dividends exceeded earnings by three-fifths. By 1990 investors, forecasting lower earnings for Ford, regarded prevailing dividend payments as unsustainable.

### *Bubbles*

The fundamental description of steady-state equity values given above essentially assumes that the price of stocks increases at the same rate as corporate earnings. Other descriptions allow for bubbles, wherein shareholders expect stock prices to appreciate at a rate that exceeds the rate of growth of earnings or dividends.<sup>11</sup> Therefore, the price of a stock ruled by a bubble grows without limit relative to its price given by the fundamental model. From the bubble point of view, there may be no unique solution for either the current prices of stocks or the future course of these prices, because the prices of stocks are not bound to reflect the value of their future dividends.

For the bubble, like the fundamental model, the shareholders' rate of return equals the dividend yield plus the rate of appreciation of the stock. When the rate of appreciation exceeds the growth of dividends, the dividend yield approaches zero with the passing of time. In this case, the rate of appreciation must rise to compensate shareholders for the falling dividend yield. High and rising stock prices today are justified by the common expectation that they will be higher

and rise more rapidly next year, not by prospective dividend returns. Eventually, the rate of appreciation of stocks must approach shareholders' required rate of return ( $\rho$ ) as dividend yields become negligible. The rate of appreciation of stocks may even increase without limit in a bubble, if shareholders should perceive an increasing risk that the bubble might burst and their required rate of return increases with the size of the bubble. The expected rate of appreciation also may be very great when an extraordinary

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increase in the price of stocks (due to the prospect of greater earnings, perhaps) spawns expectations of exceptional rates of appreciation for the future, especially if investors, attracted by these potential capital gains, bid up the price of stocks sufficiently to sustain, for a time, these expectations of exceptional returns.

As bubbles inflate, price-earnings ratios will rise above those predicted by fundamental analysis. When they burst, price-earnings ratios may fall to those corresponding to fundamental analysis, but they need not do so. No theory seems to predict either the inception or the demise of bubbles.

The existence of bubbles is debatable. Should some investors believe that Ford Motor Company's return on surplus will recover to 30 percent and the corporation's share of the world automobile market will expand greatly over the next decade, the price-dividend ratio of its stock may rise as the rate of appreciation of its shares exceeds the rate of growth of its earnings during the next few years. Ford's shares may even appreciate more rapidly once the

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<sup>11</sup> For discussions of bubbles and the efficiency of prices in securities markets, see, for example, Shiller (1981); LeRoy and Porter (1981); Campbell and Shiller (1988); Fortune (1991); DeJong and Whiteman (1991); Fama (1991); Froot and Obstfeld (1991); Hsieh (1991); van Norden and Schaller (1991); and the articles listed in Dwyer and Hafer (1990). See also Kindleberger (1989) for descriptions of historical "bubbles."

nation's unemployment rate begins declining. Other investors who are less optimistic about Ford's prospects may believe that Ford's stock prices are ruled by a bubble.

The difficulty with finding bubbles may arise because investors are not certain about future business prospects and because investors' opinions can differ substantially. One investor's bubble or fad may be another investor's unsuccessful, but not necessarily unreasonable forecast. Should Ford prosper, history would report, in retrospect, no strong evidence of a bubble. Should Ford eventually achieve only a modest recovery of its fortunes, its stock prices during the 1990s may seem to have been ruled by a bubble, a conclusion not necessarily shared by those investors who held the unfulfilled forecast. Finally, should Ford's performance begin to recover only to collapse later and should more investors be attracted to Ford's shares during its recovery, then its shareholders may appear to have been absorbed by a fad or attracted to a bandwagon.

The surge in equity values in 1987, which subsided abruptly in the late summer and early fall of that year, and the recent record prices of stocks, coinciding with weak corporate profits and an uncertain recovery, suggest to some analysts that the prices of equities can stray from their fundamental values. The remainder of this article compares equity values with various concepts of corporations' earnings to assess the strength of the relationship between stock prices and corporate earnings.

## II. Earnings and Equity Values

The fundamental value of equity ultimately rests on corporations' prospective capacity for paying dividends which, in principle, depends on their earnings. From the shareholders' point of view, however, a corporation that reports greater earnings on the "bottom line" of its annual report may not necessarily possess a greater capacity for paying dividends. For instance, earnings may increase because of extraordinary, one-time transactions, or they may increase because accounting techniques understate the costs of doing business when prices are rising.

This section examines the correspondence between the ratios for nonfinancial corporations and the rates of growth of two separate measures of their earnings. The analysis describes this correspondence both for aggregates of company data and for a specific group of corporations.

### *Measuring Earnings*

The two concepts of earnings are different measures of operating profits. The first, "basic earnings," most closely reflects the profits reported by nonfinancial corporations. The second removes from basic earnings some of the biases that may arise because of the accounting for the value of goods in inventory, capital consumption expenses, or debt service expense. This second concept, recognizing that interest rates on corporations' outstanding debt may not correspond to prevailing rates of interest, also "marks" their interest expenses "to market." To the degree possible, these concepts of earnings are applied to the aggregation of domestic nonfinancial corporations reported in the national income and product accounts as well as to 465 nonfinancial corporations selected from the Compustat records, the "Zanger 465." (See the Appendix for a description of how the 465 corporations were selected.)

The national income and product accounts report profits after taxes (basic earnings) for nonfinancial corporations of \$136 billion in 1990. Because this concept of earnings is a first step toward measuring the value added to the assets of these companies, it does not represent the profit as reported by these corporations. National income accounting omits capital gains or losses and other elements of profit not arising from the current production of goods and services. It also omits income from foreign sources and removes from corporate income dividends re-

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*The fundamental value of equity ultimately rests on corporations' prospective capacity for paying dividends; this, in principle, depends on their earnings.*

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ceived from another domestic corporation. For the corporations selected from the Compustat records (Zanger 465), the concept of basic earnings is income before extraordinary items (as adjusted for common stock equivalents), the measure used by Standard & Poor's to calculate familiar price-earnings ratios. For the Zanger 465, earnings were \$99 billion in 1990.

These concepts of basic earnings tend to omit

nonrecurring revenues and costs so as to measure corporations' sustainable returns from operations, but the accounting techniques behind basic earnings may require further adjustments in order to better measure the fundamental returns from operations. National income accounting recognizes that profits do not reflect properly the cost of doing business; consequently, corporate income in these accounts includes inventory valuation and capital consumption adjustments. The Compustat data do not report corporations' inventories, stock of capital goods, or investment flows in sufficient detail to permit reasonably accurate estimates of inventory and capital consumption adjustments for the Zanger 465.

The first-in-first-out inventory accounting commonly used in business tends to understate costs when prices are rising.<sup>12</sup> Goods removed from inventory are valued at production costs that prevailed in the past, rather than current costs. The national accounts' inventory valuation adjustment deducted \$14.2 billion from the profit of nonfinancial corporations in 1990.

The rules governing the reporting of capital consumption expenses do not necessarily represent the actual decay of capital goods that are used in production. In the late 1970s, when the rules deferred the claiming of capital consumption allowances and the rate of inflation was substantial, the value of the decay of capital goods was understated in business accounts. After 1981, when allowances became more generous and the rate of inflation fell, the value of the decay of capital goods was overstated. As a result, in 1985 and 1986 the national accounts' capital consumption adjustment indicates that profits were understated by nearly \$50 billion. After the rules for reporting capital consumption allowances became less generous in 1986, the capital consumption adjustment fell to \$5.9 billion by 1990. For these reasons, the national accounts' adjusted measure of corporate profits better represents the fundamental returns from operations than the unadjusted measure.

Although the national accounts do not include capital gains and losses in order to measure more accurately the income from current production, this strategy introduces a bias that understates the income of borrowers when prices are rising. During periods of inflation, businesses that finance themselves with debt receive purchasing-power gains, as the real value of their debt obligations falls over the life of their loans. Creditors, who anticipate a matching real loss, may protect themselves by including an inflation premium in the rate of interest they require on

the loans that they write. Consequently, measures of income that ignore the purchasing-power gains accruing to businesses that rely on debt financing may understate corporate profits; this is especially important when the yields on debt fully compensate creditors for their losses. Earnings for the aggregate of nonfinancial corporations and for the Zanger 465 may be adjusted for estimates of these purchasing-power gains. In 1990, for example, these gains for nonfinancial corporations exceeded \$50 billion, because their net financial liabilities were approximately \$1 trillion, and the inflation rate exceeded 5 percent.

Because not all the debt of corporations bears the prevailing rate of interest, their earnings may be unusually low or unusually great for a time. A final adjustment to earnings replaces corporations' actual interest expense with the product of the prevailing rate of interest and the amount of their interest-bearing liabilities.

#### *Price-Earnings Ratios and the Growth of Earnings*

The first section of this article stresses the importance of the rate of growth of earnings in determining fundamental equity values. Foreseeing a greater growth of earnings in the short run, shareholders expect, at least, corporations' current dividend payments to be more secure. A greater return on surplus in the short run also may increase the odds of corporations' earning a greater return on surplus in the future, and shareholders may anticipate greater dividends, if not a higher rate of growth of surplus, earnings, and dividends, in the long run. In any case, because shareholders' required real rates of return may be as great as 10 percent, forecasts of earnings for the next few years can carry much of the weight of a long-run forecast.<sup>13</sup>

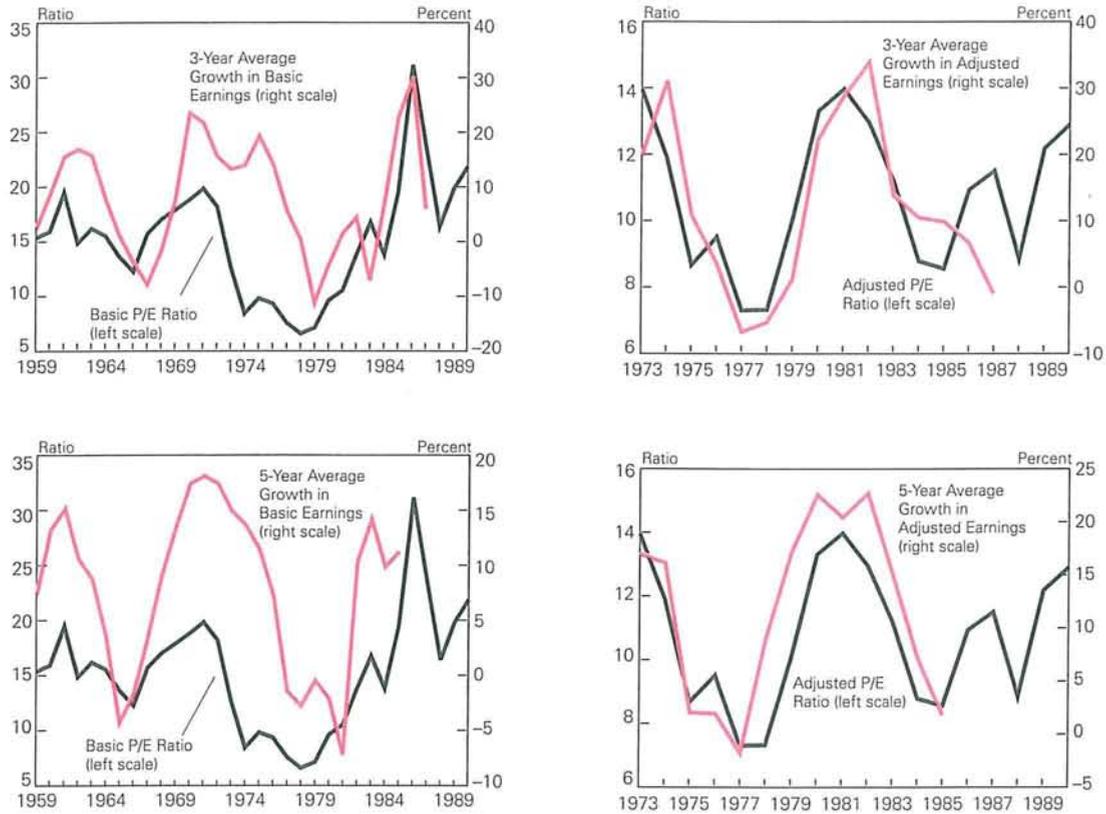
Analysts' recommendations on stocks can promote this tie between price-earnings ratios and the rate of growth of earnings. These reports commonly provide specific forecasts of companies' earnings for the coming year or two as well as general observations regarding the subsequent growth of earnings. These reports often project future prices of stocks by

<sup>12</sup> The U. S. Bureau of Economic Analysis estimates that only 45 percent of business inventories are covered by last-in-first-out (LIFO) accounting, rather than first-in-first-out accounting. In any case, LIFO accounting postpones rather than eliminates the misrepresentation of the cost of goods sold. Corporations using LIFO ultimately report "inventory profits" once their inventories of specific goods shrink.

<sup>13</sup> See Abel (1991); Peek and Rosengren (1988); Campbell and Shiller (1988).

Figure 2

### *Equity Value and Growth in Earnings for All Nonfinancial Corporations*



Source: See the Appendix for definitions and sources.

multiplying their forecasts of earnings by “customary” price-earnings ratios for the corporations in question. The analysis also may suggest that these projections understate or overstate future prices if the longer-run prospect for earnings warrants a multiple higher or lower than customary. When these reports foresee rising earnings, justifying higher prices of stocks in the future, they promote higher prices of stocks and higher price-earnings ratios today.

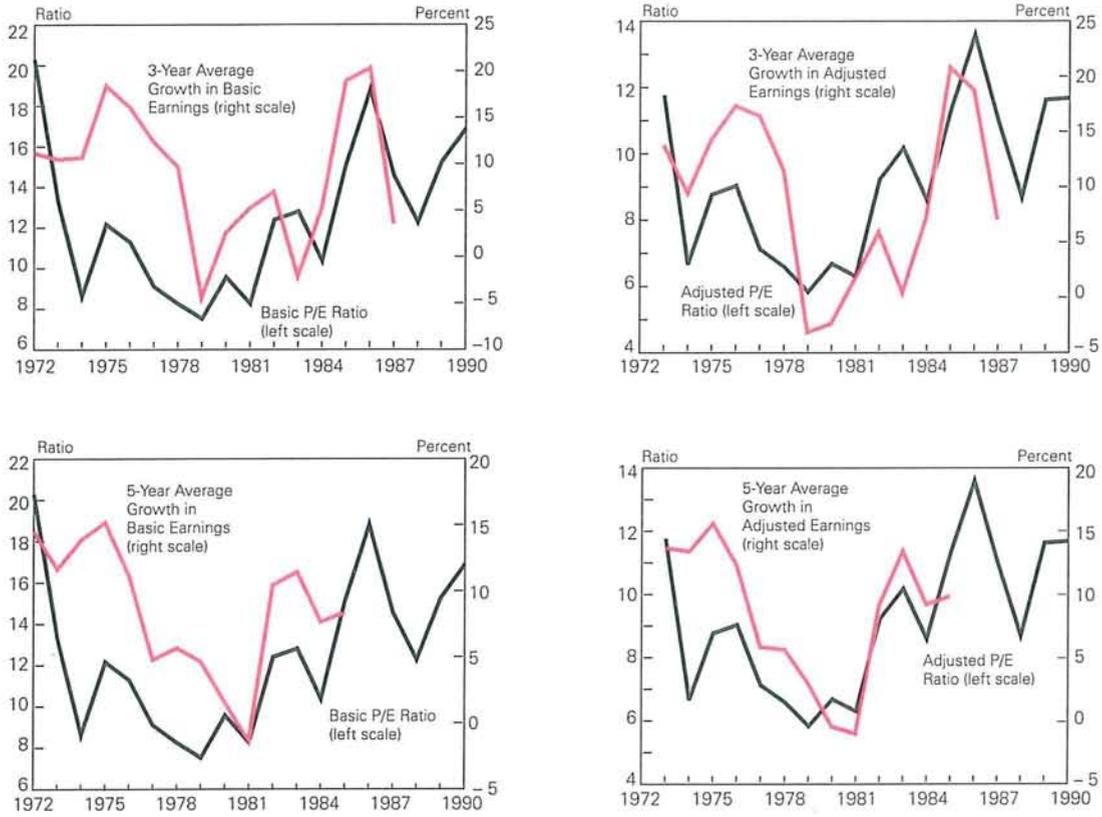
Figures 2 and 3 show the correspondence between equity values and short-term rates of growth of earnings. Figure 2, which shows the data for aggregated nonfinancial corporations, uses earnings data from the national income accounts and market values of equity from the flow of funds accounts. The

subsequent figure, which describes the data for the aggregate of the Zanger 465, uses data from the Compustat records. Appendix Tables 1 and 2 present the correlations between the price-earnings ratios and the growth of earnings shown in these charts.

In Figure 2, the price-earnings ratio for all nonfinancial corporations appears to anticipate changes in the short-run growth of earnings. The four panels show the value of equity relative to basic earnings and to adjusted earnings in each year, compared to the average annual rate of growth of those earnings over the subsequent three and five years. Between 1961 and 1966, equity multiples generally fell, while the future growth of earnings generally fell between 1962 and 1967. The subsequent rise in equity multi-

Figure 3

*Equity Value and Growth in Earnings  
for the Zanger 465*



Source: See the Appendix for definitions and sources.

ples between 1967 and 1971 corresponds to a period when the future growth of earnings increased. Between the early 1970s and the late 1970s, equity multiples fell while the growth of earnings slumped. Between the late 1970s and 1983, equity multiples rose, virtually recovering their values of the early 1970s; at roughly the same time, the future growth of earnings increased significantly.

During the 1980s, the two different concepts of earnings shown in Figure 2 tell different stories. Because adjusted earnings tend to exceed basic earnings, the price-earnings ratios for adjusted earnings tend to be lower. Furthermore, adjusted earnings tended to grow more rapidly than basic earnings during the 1980s; consequently, the equity multiples for ad-

justed earnings do not rise as much as those for basic earnings during the decade. Equity multiples tend to follow changes in the future rate of growth of basic earnings during the early 1980s, and the ratio of stock prices to basic earnings attained a peak in 1986 that was roughly one-half again as high as its values in the early 1970s and early 1980s. Using adjusted earnings, however, equity multiples appear to anticipate the growth of earnings more consistently during the early 1980s, but less consistently around 1987, and the peak price-earnings ratio in 1987 was approximately four-fifths of its values in the early 1970s and early 1980s.

The four panels of Figure 3 show that the pattern of the price-earnings ratios for the Zanger 465 also

frequently anticipates changes in the future growth of earnings. Here, as in Figure 2, the correlation is greatest between equity multiples and the five-year average growth of earnings. Unlike the case for all nonfinancial corporations, however, the price-earnings multiples for the Zanger 465 during the early 1980s did not rise greatly above their depressed level of the 1970s; only in 1986 and 1990 did the values of price-earnings ratios resemble their value in 1972. In Figure 3, price-earnings ratios for adjusted earnings are much lower than those for conventional earnings, because the inflation gains on net debt and the restatement of interest expense increased earnings.

### Price-Earnings Ratios and the Return on Surplus

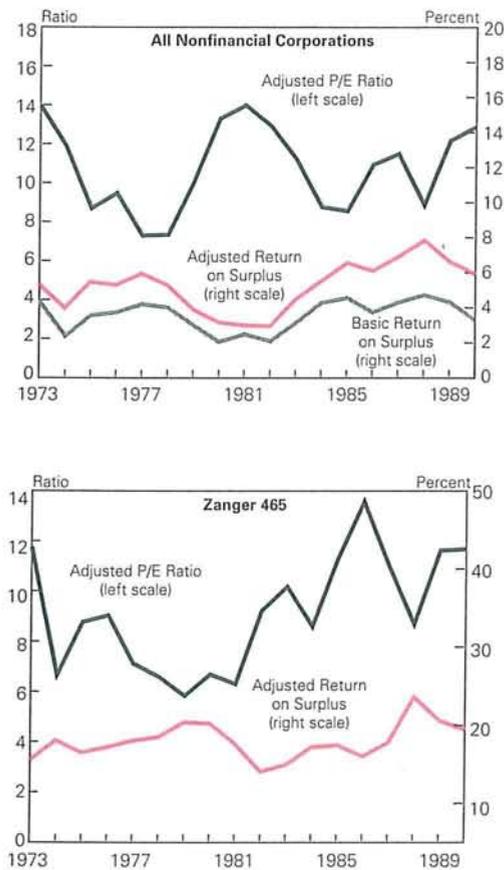
The correspondence between price-earnings ratios and the future growth of earnings, though not overwhelming, is remarkable nonetheless, because this relationship could break down for at least four reasons. First, even in the simple, steady-state model, equity values depend on shareholders' required rates of return and the ratio of the growth of the corporation to return on equity, as well as the growth of earnings. Variations in these other elements of equity valuation ought to disturb any simple correlation between price-earnings ratios and the growth of earnings. Second, to the degree that shareholders do not expect these determinants of equity prices always to vary according to the same pattern, the correlation between equity values and the growth of earnings over any fixed interval of time would suffer. Third, the value of equity can change when shareholders' income tax rates or capital gains tax rates change.<sup>14</sup> Finally, stock prices reflect forecasts of earnings, not actual earnings. Errant forecasts would diminish the correlation between equity values and the actual growth rates of earnings.

Figure 4 describes the correspondence between earnings and the value of equity from a different viewpoint. The price-earnings ratio tends to be correlated negatively with corporations' return on surplus. According to this view, when rates of return fall toward a local trough, the price multiple tends to rise as shareholders anticipate better times; prices fall less rapidly than earnings. When returns rise toward a local peak, multiples tend to fall as shareholders anticipate the ensuing decline in returns; prices rise less rapidly than earnings.<sup>15</sup>

The viewpoint of Figure 4 does not contradict the descriptions appearing in the previous two figures. The graph of the return on surplus vacillates between local peaks and troughs reasonably frequently, with-

Figure 4

### Equity Value and Return on Surplus



Source: See the Appendix for definitions and sources.

out remaining at these peaks or troughs for very long. Consequently, the high price-earnings ratios around troughs tend to precede years when the growth of earnings is especially high. Low price-earnings ratios tend to precede years when the growth of earnings is especially low.

<sup>14</sup> See, for example, Kopcke (1989).

<sup>15</sup> The apparent anticipation of rising or falling rates of return may be grounded in shareholders' constructive forecasts of future business conditions, or it may reflect a more passive reaction: the rate of return on surplus may be regarded as a simple statistical process. The current rate of return may be regarded as a function of past rates of return plus a random variable. The function may allow for (changing) deterministic trends; it may be a simple linear combination of past rates of return.

### Are Stocks Overpriced?

Recognizing that the previous analysis is not designed to find bubbles, especially those that might last less than a year, the data as presented appear to show no compelling need to consider the presence of bubbles between the early 1960s and the late 1980s. Nonetheless, recent record stock prices, in conjunction with the prospect of only a modest recovery of economic activity, suggest to some analysts that stocks now may be overpriced.

The previous figures demonstrate that high price-earnings ratios, anticipating improving business conditions, frequently accompany low earnings. Reasoning from the precedents shown in Figure 2, earnings of nonfinancial corporations reported in the national accounts should double by the end of 1993 if prices of stocks are to remain near their recent peaks. This finding generally is in accord with the fact that the price-earnings ratio for the Standard & Poor's composite of 500 stocks is now approximately 75 percent higher than its average value over the past four decades. Should earnings double, rates of return on surplus would approach their comparatively high values of 1988 as price-earnings ratios fall by almost half, a coincidence that would agree with historical patterns.

### III. Decomposing the Growth of Earnings

The price of stocks varies with the future rate of growth of earnings, which, in turn, varies with economic activity. That the simple relationship between stock prices and shorter-run changes in earnings has prevailed so well is one reason that the stock market appears to predict business cycles.<sup>16</sup>

Equity values currently appear to anticipate rapidly rising earnings over the next several years. Some analysts, questioning the pace of the business cycle recovery, also question this prospective surge in earnings. This section examines trends in the return on assets for nonfinancial corporations to evaluate the outlook for earnings.

#### The Total Return on Assets

Figure 5 shows the total return on the tangible assets of nonfinancial corporations, comprising the returns distributed to creditors as well as those accruing to shareholders.

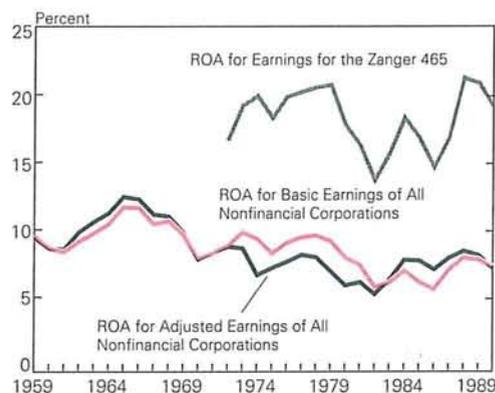
According to the national income accounts, this

return on assets peaked in the mid 1960s, then tended to decline until the early 1980s. During the 1980s the return on assets tended to increase somewhat. These trends are more pronounced when returns include the inventory valuation and capital consumption adjustments; without these adjustments, the cost of goods sold tended to be understated and profits tended to be overstated during the 1970s due to rising inflation. The return on assets also varies with business conditions, falling in years of recession, rising in years of recovery.

The pattern of the return on assets for the Zanger 465 is uniformly higher than that for the national aggregate, especially in the late 1980s. This difference

Figure 5

#### Return on Assets of Nonfinancial Corporations



Source: See the Appendix for definitions and sources.

in rates of return is due partly to differences in the valuation of total assets and partly to the accounting for profits. Businesses report assets at book values, which are most often depreciated acquisition costs. With rising prices of capital goods and business products, these book values tend to understate the current value of tangible capital goods and corporate surplus, thereby overstating the return on assets and surplus. On the other hand, the replacement value of the stock of tangible capital published by the U. S. Bureau of Economic Analysis is itself an estimate that may be prone to systematic measurement biases. Furthermore, the national accounts' omission of for-

<sup>16</sup> See, for example, Peek and Rosengren (1988).

eign income also introduces a potential bias: 281 corporations in the Zanger 465 reported foreign income amounting to two-thirds of their domestic income in 1988.

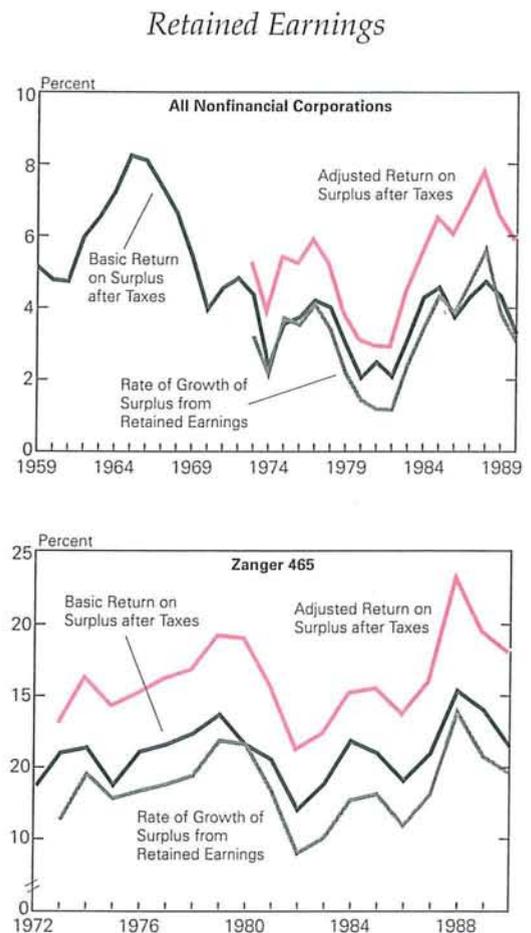
About one-half of the variation of the return on assets for both the national aggregate of nonfinancial corporations and for the Zanger 465 appears to be related to the business cycle (Appendix Table 3). According to this relationship, restoring the return on assets to its 1988 value would require that economic activity expand sufficiently quickly to regain a capacity utilization rate of 84 percent in 1993, which would require an average rate of growth of real gross domestic product exceeding 4.5 percent this year and next.<sup>17</sup>

### The Return on Surplus

Pretax earnings essentially equal total returns less net interest expense, and the rate of return on surplus, before taxes, is the ratio of these earnings to the value of tangible assets less net financial obligations. Consequently, variations in the total return on assets tend to be reflected in the return on surplus, albeit leverage magnifies these reflections and the image can change with a change in interest rates or leverage.

For the national aggregate of nonfinancial corporations, the course of the return on surplus shown in Figures 6 and 7 conforms closely to that of the return on assets. For these data, the consequences of lever-

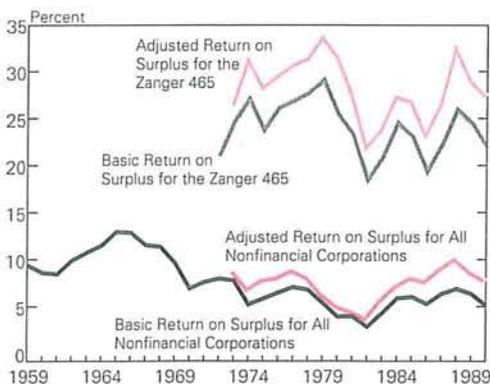
Figure 7



Source: See the Appendix for definitions and sources.

Figure 6

### Return on Surplus before Taxes



Source: See the Appendix for definitions and sources.

age are relatively small. Although debt obligations increased relative to assets during the 1980s, declining interest rates insulated earnings from the burden of this leverage. Accordingly, the return on surplus increased relative to the return on assets, especially for the measure of surplus adjusted for the inflation gains on net liabilities and prevailing rates of interest. The return on surplus also tended to increase after 1980 because the average rate of income tax paid by nonfinancial corporations during the 1980s was significantly lower than that of the 1970s.

The return on surplus for the Zanger 465 is both higher and more variable than that for the national aggregate. The greater return on surplus arises partly because the return on assets for the Zanger 465 is

higher and partly because their reported leverage is higher. For the same reason that using the book value of assets overstates the return on assets for the Zanger 465, using these book values also overstates both leverage and the return on surplus. Furthermore, as a result of this higher leverage, variations in the return on assets are magnified to a greater degree when they are translated into a return on surplus.

The return on surplus for the Zanger 465, like that of the national aggregate, increased relative to their return on assets during the late 1980s. Even in 1990, a year of recession, the return on surplus remained comparatively high compared to its values of the previous 17 years.

The high rate of return on surplus for the Zanger 465 is due principally to a high rate of return on assets and a declining average tax burden on their profits. Between the late 1970s and the late 1980s, the average tax rate on corporations' profits fell by approximately one-quarter.<sup>18</sup> This reduction in tax rates increased the rates of return on surplus, shown in Figure 7, by approximately 3 percentage points after 1987. Without this additional yield, the rates of return on surplus after taxes from 1988 to 1990 fell considerably compared to their values in 1979 and 1984, more closely resembling the pattern of the return on surplus before taxes, shown in Figure 6.

### *The Value of Equity*

The description of the performance of nonfinancial corporations presented in the national accounts differs substantially from that presented in companies' financial reports. The current value of equity and the current consensus forecast of a modest recovery in economic activity, taken together, are more easily reconciled with companies' financial reports than with the national accounts.

The simple description of equity pricing presented in the first section of this article stressed the contributions of the rate of return on surplus and the rate of growth of surplus to the value of stocks. As discussed at the end of the previous section, current equity values appear to anticipate that earnings for the national aggregate of nonfinancial corporations will double by the end of 1993. The return on surplus (for unadjusted earnings) should increase from less than 3 percent to nearly 5 percent in order to meet this target. Barring any tax cuts or any further reductions in interest rates, this increase in earnings requires that the rate of return on assets rise by nearly 1.5 percentage points. As noted above, this improve-

ment in performance might accompany a rate of growth of real output exceeding 4.5 percent over the next two years. In these circumstances, both earnings and the opportunities for profitable investment generally would improve sufficiently to ratify the prevailing price of stock.

According to the financial reports for the Zanger 465, business conditions need not improve so greatly to be reconciled with prevailing equity values. As shown in Figure 7, the rate of return on surplus has

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*The current value of equity and the current consensus forecast of a modest recovery in economic activity are more easily reconciled with companies' financial reports than with the national accounts.*

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been comparatively high during the last three years: using book values for assets, annual returns exceeded 15 percent, and the rate of growth of surplus exceeded 12 percent as a result of the retention of earnings. Because of this comparatively rapid growth of surplus, earnings for the Zanger 465 would increase by approximately one-quarter in two years even if their return on surplus remained unchanged. This recent performance, if it endures, not only produces greater earnings in the short run, it also would warrant greater price-earnings multiples. Even after considering the bias arising from using book values for assets, the rate of growth of surplus for the Zanger 465 may be nearly twice that reported for nonfinancial corporations in the national accounts and, therefore, may be much closer to typical estimates of shareholders' required rates of return (see footnote 13). This comparatively rapid growth of surplus would justify relatively high price-earnings ratios (see equation (3) in Section I). In turn, a modest economic recovery would sustain both the return on surplus and the growth of surplus needed to support the prevailing value of equity.

<sup>17</sup> See McNees (1991) for a discussion of the economy's potential rate of growth, and Okun's Law.

<sup>18</sup> In 1979, the average tax rate for basic earnings was 46 percent; for adjusted earnings it was 40 percent. By 1989 these rates were 35 percent and 30 percent, respectively.

#### IV. Conclusion

Many indices of the prices of common stocks recently have attained record high values, even though the profits of corporations have languished. Early this year, the price-earnings ratio for Standard & Poor's composite of 500 stocks exceeded 20, attaining values not commonly seen since the prosperity of the 1960s.

It is not surprising that high price-earnings ratios, anticipating improving business conditions, frequently coincide with periods of comparatively low earnings for nonfinancial corporations. Nevertheless, by historical standards, the prevailing value of equity appears to anticipate a doubling of corporations' earnings by the end of 1993.

According to the description of nonfinancial corporations reported in the national accounts, the economy may need to regain full employment during 1993 to achieve this doubling of earnings. The rate of return on assets, other things equal, would return to its comparatively high value of 1988 and real gross domestic product may need to grow more than 4.5 percent annually this year and next to fulfill the expectations embedded in the prevailing value of equity.

Current prices of stocks do not rest on such great expectations, according to corporations' financial reports. The current rate of return on surplus, which is considerably greater in companies' financial reports than in the national statistics, provides sufficient retained earnings to increase both surplus and earnings significantly by 1993. More importantly, even allowing for some decline in the rate of return on surplus, the promise of maintaining a relatively high rate of growth of surplus and earnings beyond next year may justify a comparatively high price-earnings ratio for equities.

That the prices of stocks correspond better to corporations' financial reports than to data reported in the national accounts is not surprising; analysts study the financial reports of Ford Motor Company much more closely than the national accounts when appraising Ford's stock. This finding is also not entirely comforting: if, because of their reliance on historical book values, biases in financial reports misrepresent corporations' performance, then the value of equity may be prone to a "correction."

This article stresses the relationship between the prices of stocks and corporations' earnings. But a resurgence of corporations' rate of return on surplus, by itself, cannot guarantee that the growth of surplus and earnings in the future will be sufficiently great to justify the current value of equity.<sup>19</sup> If opportunities to undertake profitable investments are wanting, corporations eventually will divert an increasing share of their earnings to the payment of dividends, thereby reducing retained earnings and the prospective rates of growth of surplus and earnings. In these circumstances, price-earnings ratios would decline; greater current dividends alone cannot compensate shareholders for the loss of opportunities for growth.

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<sup>19</sup> Greater earnings in the short run may not even be a necessary condition. Should corporations profitably finance a greater share of their new investments with debt rather than retained earnings for a time, then the growth of earnings may be supported first by rising leverage, then by the rising return on surplus that accompanies greater leverage (when debt can be issued on attractive terms). However, unless their return on surplus first increases substantially, corporations are not likely to be able to increase their leverage very much on acceptable terms. Growth financed through new issues of equity does not promise the requisite growth of earnings for existing shareholders, unless corporations' return on surplus increases.

## Appendix: Data Sources and Definitions

### Selection of the Zanger 465

The companies constituting the Zanger 465 were selected from the Compustat database, which maintains 20 years of annual data on 7,000 publicly traded companies. Those companies involved primarily in the financial, investment, or real estate industries, and utilities, were excluded. Of the remaining companies, all those ranked in the Fortune Industrial 500 or the Fortune Service 500 in either 1989 or 1990 that had reported total assets and stock prices continuously from 1972 to 1990 were selected, a total of 465 companies.

### Data for the National Economy

From the Board of Governors of the Federal Reserve System, Flow of Funds Accounts, Nonfinancial Business Sector:

Profits (Prof)  
 Taxes (Tax)  
 Inventory Valuation Adjustment (IVA)  
 Capital Consumption Adjustment (CCAdj)  
 Dividends (Div)  
 Market Value of Equity (MVE)  
 Total Assets (TotA)  
 Tangible Assets (TanA)  
 Total Financial Assets (TFA)  
 Total Liabilities (TotL)  
 Credit Market Instruments (CMI)  
 Net Debt (NetD) = TotL - TFA

From the National Income and Product Accounts, U. S. Bureau of Economic Analysis:

Net Interest of Nonfinancial Corporate Business (NetInt)

From the U. S. Bureau of Labor Statistics:

Consumer Price Index (CPI)

From Salomon Brothers Inc, *Analytical Record of Yields and Yield Spreads*, Part IV, Table 1:

Annual Average Yield on 6-Month Commercial Paper (6Mo)

### Compustat Data for the Zanger 465

Operating Income After Depreciation (OIADP) - Profits after depreciation, but before net interest expense or taxes are deducted.  
 Income Before Extraordinary Items Adjusted for Common Stock Equivalents (IBADJ) - Profits after depreciation, from which net interest expense and taxes have been subtracted.  
 Nonoperating Income (NOPI)  
 Interest Expense (XINT)  
 Cash Dividends (DV)  
 Total Taxes (TXT)  
 Total Assets (AT)  
 Inventories (INVT)

Property, Plant, and Equipment (Net) - Total (PPENT)  
 Total Debt (DT)  
 Total Liabilities (LT)  
 Market Value of Equity - Fiscal Year End (MKVALF)  
 Net Debt (ND) = LT - (AT - (PPENT + INVT))

### Figure 1

The upper panel of Figure 1 shows profits after taxes and dividends (Div) for all nonfinancial corporations, where:

$$\text{Profits} = \text{Prof} - \text{Tax} + \text{IVA} + \text{CCAdj}.$$

The lower panel shows profits for the Zanger 465 (IBADJ) and dividends (DV).

### Figure 2

The left side of Figure 2, upper and lower panels, shows the basic price-earnings ratio for all nonfinancial corporations and the subsequent 3- and 5-year average rates of growth of earnings where:

$$\text{Basic earnings} = \text{Prof} - \text{Tax}.$$

The price-earnings ratio is the market value of equity (MVE) divided by basic earnings.

The right side of Figure 2 shows the adjusted price-earnings ratio and the average rate of growth of adjusted earnings where:

$$\text{Adjusted earnings} = \text{Prof} - \text{Tax} + \text{IVA} + \text{CCAdj} + \text{inflation adjustment} + \text{interest rate adjustment}.$$

$$\text{Inflation adjustment} = ((\text{CPI}/\text{CPI}_{-1}) - 1) * \text{NetD}$$

$$\text{Interest rate adjustment} = ((\text{RZ465} - 6\text{Mo}) * \text{CMI})$$

$$\text{RZ465} = \text{XINT}/((\text{DT} + \text{DT}_{-1})/2)$$

### Figure 3

Basic price-earnings ratios (left-hand panels) for the Zanger 465 = MKVALF/IBADJ. The growth rates represent average growth in IBADJ over the subsequent periods. Adjusted earnings, on the right side of Figure 3, equal:

$$\text{IBADJ} + \text{inflation adjustment} + \text{interest rate adjustment}$$

$$\text{Inflation adjustment} = ((\text{CPI}/\text{CPI}_{-1}) - 1) * \text{ND}$$

$$\text{Interest rate adjustment} = (\text{RZ465} - 6\text{Mo}) * \text{DT}$$

### Figure 4

The price-earnings ratios are the same as those appearing in Figures 2 and 3. The returns on surplus are defined as follows:

For all nonfinancial corporations:

$$\text{Basic return on surplus} = (\text{Prof} - \text{Tax} + \text{IVA} + \text{CCAdj})/(\text{TanA} - \text{NetD})$$

$$\text{Adjusted return on surplus} = (\text{Prof} - \text{Tax} + \text{IVA} + \text{CCAdj} + \text{inflation adj} + \text{interest rate adj})/(\text{TanA} - \text{NetD})$$

For the Zanger 465:

$$\text{Basic return on surplus} = (\text{OIADP} - \text{TXT} - \text{Net Interest}) / ((\text{PPENT} + \text{INVT}) - \text{ND})$$

$$\text{Adjusted return on surplus} = (\text{OIADP} - \text{TXT} - \text{Net Interest} + \text{inflation adj} + \text{interest rate adj}) / ((\text{PPENT} + \text{INVT}) - \text{ND})$$

$$\text{Net interest} = \text{XINT} - \text{NOPI}$$

Figure 5

Figure 5 shows the return on assets for the Zanger 465 as well as the basic and adjusted return on assets for all nonfinancial corporations. For all nonfinancial corporations:

$$\text{Basic return on assets} = (\text{Prof} + \text{NetInt}) / \text{TanA}$$

$$\text{Adjusted return on assets} = (\text{Prof} + \text{NetInt} + \text{IVA} + \text{CCAdj}) / \text{TanA}$$

For the Zanger 465:

$$\text{Return on assets} = \text{OIADP} / (\text{PPENT} + \text{INVT})$$

Figure 6

For all nonfinancial corporations:

$$\text{Basic return on surplus} = (\text{Prof} + \text{IVA} + \text{CCAdj}) / (\text{TanA} - \text{NetD})$$

$$\text{Adjusted return on surplus} = (\text{Prof} + \text{IVA} + \text{CCAdj} + \text{inflation adj} + \text{interest rate adj}) / (\text{TanA} - \text{NetD})$$

For the Zanger 465:

$$\text{Basic return on surplus} = (\text{OIADP} - \text{Net Interest}) / ((\text{PPENT} + \text{INVT}) - \text{ND})$$

$$\text{Adjusted return on surplus} = (\text{OIADP} - \text{Net Interest} + \text{inflation adj} + \text{interest rate adj}) / ((\text{PPENT} + \text{INVT}) - \text{ND})$$

$$\text{Net interest} = \text{XINT} - \text{NOPI}$$

Figure 7

The returns on surplus are the returns (as defined for Figure 6) less taxes, divided by surplus. The rates of retention shown are the adjusted returns, less taxes and dividends, divided by surplus.

Appendix Table 1

*Correlation between Earnings-Price Ratios and Rates of Growth of Earnings*

The following regressions summarize the correlation between the earnings-price ratios and the rates of growth of earnings shown in Figures 2 and 3.

Dependent Variable	All Nonfinancial Corporations				Zanger 465			
	Basic Earnings-Price		Adjusted Earnings-Price		Basic Earnings-Price		Adjusted Earnings-Price	
	Annual 1959-1987	Annual 1959-1985	Annual 1973-1987	Annual 1973-1985	Annual 1972-1987	Annual 1972-1985	Annual 1973-1987	Annual 1973-1985
Constant	8.648 (.676)	9.780 (.681)	11.364 (.538)	12.633 (.625)	10.460 (.950)	12.093 (1.054)	14.067 (1.105)	15.759 (1.103)
3-Year Average Growth of Earnings	-.116 (.051)		-.129 (.031)		-.159 (.083)		-.218 (.093)	
5-Year Average Growth of Earnings		-.230 (.063)		-.229 (.043)		-.310 (.108)		-.370 (.111)
R <sup>2</sup>	.161	.345	.571	.716	.208	.409	.297	.503

Standard errors in parentheses.  
Source: Compustat Database

Appendix Table 2

*Distribution of Slope Coefficients and Coefficients of Determination*

Percent of All Firms

The following two panels describe the distribution of slope coefficients and coefficients of determination for regressions of the earnings-price ratios on the five-year average rates of growth of earnings for 425 of the Zanger 465. The results for similar regressions on two- and three-year average rates of growth of earnings tend to show both a more uniform distribution of slope coefficients and a distribution of  $R^2$  weighted more toward zero.

Basic Earnings-Price Ratios Regressed on Five-Year Average Rate of Growth of Earnings, Annual Data, 1972 to 1985

$R^2$	Slope								Total
	<-.15	-.15 to -.1	-.1 to -.05	-.05 to 0	0 to .05	.05 to .1	.1 to .15	>.15	
0 to .05	.7	.7	1.6	11.1	14.4	3.1	.7	.5	32.7
.05 to .10	.5	.7	2.4	4.0	3.1	1.2	1.2	1.2	14.1
.10 to .15	1.6	1.9	1.2	.9	1.2	.7	.7	1.4	9.6
.15 to .20	.7	.5	.2	1.6	.7	.5	.7	1.9	6.8
.20 to .25	1.2	.5	1.6	.7	1.2	.5	.5	.5	6.6
.25 to .30	3.3	.9	1.6	.7	.2	.9	.2	.9	8.9
.30 to .35	2.8	.5	0	.2	0	0	.5	.7	4.7
>.35	7.3	1.2	1.4	1.2	1.4	.7	0	3.3	16.5
Total	18.1	6.8	10.1	20.5	22.1	7.5	4.5	10.4	100.0

Adjusted Earnings-Price Ratios Regressed on Five-Year Average Rate of Growth of Earnings, Annual Data, 1973 to 1985

$R^2$	Slope								Total
	<-.15	-.15 to -.1	-.1 to -.05	-.05 to 0	0 to .05	.05 to .1	.1 to .15	>.15	
0 to .05	1.4	1.6	3.3	10.1	12.0	2.4	.9	.9	32.7
.05 to .10	2.4	.9	.7	2.6	1.6	1.6	.5	1.6	12.0
.10 to .15	3.5	.7	.7	1.2	.7	.7	0	2.6	10.1
.15 to .20	2.4	.9	.5	.2	.7	.2	.2	1.4	6.6
.20 to .25	1.4	.5	1.2	.5	.9	.5	.2	2.4	7.5
.25 to .30	1.9	.2	.9	.5	0	.5	.2	.9	5.2
.30 to .35	2.1	.5	0	0	.2	.2	.5	1.2	4.7
>.35	13.4	1.6	.7	.5	1.2	.2	.2	3.3	21.2
Total	28.5	7.1	8.0	15.5	17.4	6.4	2.8	14.4	100.0

Note: Figures may not sum to totals because of rounding.

Source: Compustat Database.

Appendix Table 3

*Correlation between Return on Assets and Capacity Utilization*

The following table describes the regression of the rates of return on assets shown in Figure 5 on capacity utilization.

Dependent Variable	All Nonfinancial Corporations		Zanger 465
	Basic Earnings	Adjusted Earnings	Basic Earnings
Frequency	Annual	Annual	Annual
Period of Observation	1959-1990	1959-1990	1972-1990
Constant	-.133 (.033)	-.151 (.042)	-.103 (.077)
Capacity Utilization Rate	.271 (.040)	.290 (.051)	.353 (.095)
$R^2$	.601	.522	.447

Standard errors in parentheses.

Source: Compustat Database.

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