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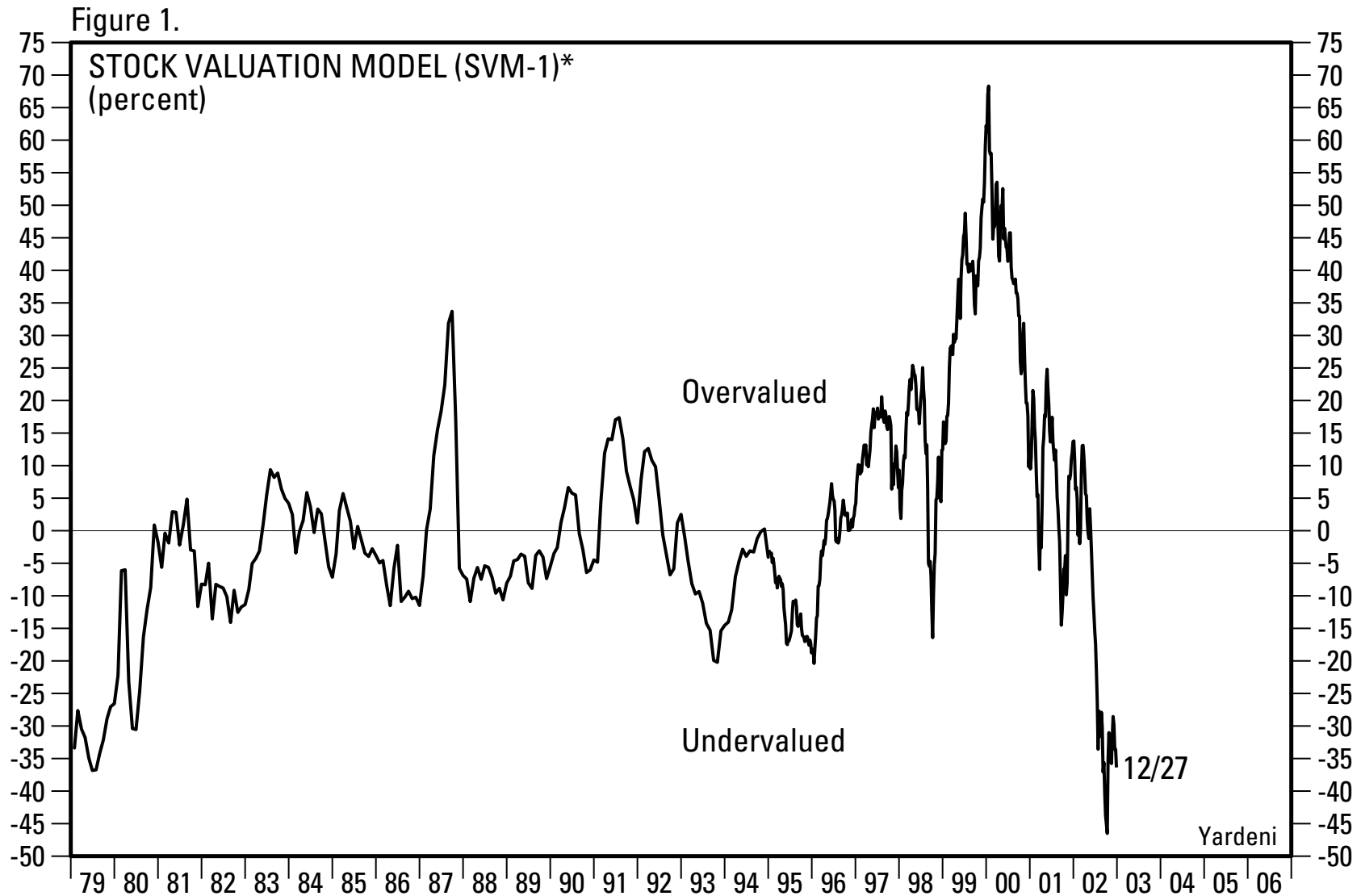
STOCK VALUATION MODELS (4.1)

*Topical
Study
#58*

*All disclosures can be found on the
back page.*

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* Ratio of S&P 500 index to its fair value (i.e. 52-week forward consensus expected S&P 500 operating earnings per share divided by the 10-year U.S. Treasury bond yield) minus 100. Monthly through March 1994, weekly after.

Source: Thomson Financial.

I. The Art Of Valuation

Since the summer of 1997, I have written three major studies on stock valuation and numerous commentaries on the subject.¹ This is the fourth edition of this ongoing research. More so in the past than in the present, it was common for authors of investment treatises to publish several editions to update and refine their thoughts. My work on valuation has been acclaimed, misunderstood, and criticized. In this latest edition, I hope to clear up the misunderstandings and address some of the criticisms.

I do not claim to have invented a scientific method for determining the one and only way to judge whether the stock market is overvalued or undervalued. Rather, my goal is to provide variations of a stock valuation model that can generate useful monthly and even weekly guidelines for judging the valuation of the stock market. Nevertheless, I believe valuation is a subjective art much more than it is a mathematically precise objective science.

In my earlier work, I focused on developing empirical methods for valuing the overall stock market, not individual stocks. Valuation is a relative exercise. We value things relative to other things or relative to a standard of value, like a unit of paper money (e.g., one dollar) or an ounce of gold. Stocks as an asset class are valued relative to other asset classes, like Treasury bills (“cash”), bonds, real estate, and commodities. In my valuation work, I focus primarily on the valuation of stocks relative to bonds. This means that the models can also be useful in assessing the relative value of bonds.

This fourth edition incorporates most of my analysis and conclusions from my previous research, which was based on 12-month forward consensus expected earnings for the S&P 500. The data are available both on a weekly and monthly basis. It is widely recognized that stock prices should be equivalent to the present discounted value of *expected* earnings, not trailing earnings. Yet a few widely respected investment analysts base their valuation work on trailing earnings and often derive conclusions that are quite different from the models based on forward expected earnings. As discussed below in Section V, I do monitor the backward-looking models, but I don't think they are especially helpful in explaining the valuation of expected earnings. The advocates of trailing earnings models do have the choice of using either reported earnings or operating earnings, i.e., excluding one-time writeoffs. Of course, the more pessimistically inclined analysts focus on reported earnings, the lower of the two measures. In either case, the data are available only on a quarterly basis with a lag of several weeks.

A similar data delay is experienced by analysts who believe that valuation should be based on quarterly dividends rather than forward earnings. I have added Section IV, which discusses the importance of dividends in assessing stock market valuation. I am amazed that critics of models based on forward earnings claim that they didn't work prior to 1979, which happens to be the first year that such data became available! As I will explain below, there is at least one good

¹ More information is available in *Topical Study* #56, “Stock Valuation Models,” August 8, 2002, *Topical Study* #44, “New, Improved Stock Valuation Model,” July 26, 1999 and *Topical Study* #38, “Fed's Stock Valuation Model Finds Overvaluation,” August 25, 1997.

reason to believe that dividends mattered more than earnings prior to the 1980s. Dividends may matter more again if the double taxation of dividends is either eliminated or reduced.

So how can we judge whether stock prices are too high, too low, or just right? Investment strategists are fond of using stock valuation models to do so. Some of these are simple. Some are complex. Data on earnings, dividends, interest rates, and risk are all thrown into these black boxes to derive a “fair value” for the stock market. If the stock market’s price index exceeds this number, then the market is overvalued. If it is below fair value, then stocks are undervalued. Presumably, investors should buy when stocks are undervalued, and sell when they are overvalued.

Previously, I examined a simple stock valuation model, which has been quite useful (Figure 1). I started to study the model after reading about it in the Federal Reserve Board’s *Monetary Policy Report to the Congress* of July 1997. I dubbed it the “Fed’s Stock Valuation Model (FSVM),” though no one at the Fed ever officially endorsed it. To avoid any confusion that this is an official model, in my recent research reports I have renamed it “Stock Valuation Model #1 (SVM-1).” This nomenclature is also meant to indicate that there are plenty of alternative SVMs as discussed in Section V.

Barron’s frequently mentions SVM-1, especially since 9/11. The cover page of the September 24, 2001, issue observed that the stock market was “the biggest bargain in years.” The bullish article, titled “Buyers’ Market” and written by Michael Santoli, was entirely based on the SVM-1, which showed that stocks were extremely undervalued when the New York Stock Exchange reopened for trading on September 17, 2001.

A model can help us to assess value. But any model is just an attempt to simplify reality, which is always a great deal more complex, random, and unpredictable. Valuation is ultimately a judgment call. Like beauty, it is in the eyes of the beholder. It is also a relative concept. There are no absolutes. Stocks are cheap or dear relative to other investment and spending alternatives. A model can always be constructed to explain nearly 100% of what happened in the past. “Dummy variables” can be added to account for one-time unpredictable events or shocks in the past. However, the future is always full of surprises that create “outliers,” e.g., valuations that can’t be explained by the model. For investors, these anomalies present both the greatest risks and the greatest rewards.

More specifically, most valuation models went on red alert in 1999 and 2000. Stocks were grossly overvalued. With the benefit of hindsight, it was one of the greatest stock market bubbles ever. Investors simply chose to believe that the models were wrong. The pressure to go with the flow of consensus sentiment was so great that some strategists reengineered their models to show that stocks were still relatively attractive. One widely followed pundit simply replaced the bond yield variable with the lower inflation rate variable in his model to accomplish the alchemy of transforming an overvalued market into an undervalued one.

During the summer of 1999, I did fiddle with the simple model to find out whether it was missing something, as stocks soared well above earnings. I devised a second version of the model, SVM-2. It convinced me that stocks were priced for perfection, as investors seemed increasingly to accept the increasing optimism of Wall Street's industry analysts about the long-term prospects for earnings growth. The improved model also demonstrated that investors were giving more weight to these increasingly irrational expectations for earnings in the valuation of stocks! As I will show, analysts have been slashing their long-term earnings growth forecasts since early 2000, and investors are once again giving very little weight to earnings projections beyond the next 12 months.²

The question during the fall of 2002 was whether investor sentiment had swung too far from greed to fear. According to SVM-1, stocks were 49% undervalued in early October. This was the most extreme such reading on the record since 1979. Despite an impressive jump in stock prices at the end of October and through November, SVM-1 has become quite controversial. The bears contend that the model is flawed. Stocks are not undervalued at all, in their opinion. They believe stocks are still overvalued and may fall much lower in 2003. Ironically, not too long ago, it was the bulls who declared that stocks were not overvalued, and offered lots of reasons to ignore SVM-1.

I believe that the model is still useful and should not be ignored. Nevertheless, it should be only one of several inputs investors use to assess whether it is a good or bad time to buy stocks. For example, while SVM-1 indicated that I should increase my recommended exposure to equities in June and July of 2002, I went the other way: I lowered my exposure from 30/70 bonds/stocks to 35/65 for a Moderately Aggressive investor. For a Moderate investor I changed my recommended cash/bonds/stocks allocation from 10/40/50 to 10/50/40. I did so because I concluded that investors might continue to worry about the quality of earnings after WorldCom disclosed on June 26, 2002, that the company's earnings for the past several quarters were overstated as a result of fraudulent accounting.

I have one more warning before proceeding: Neither SVM-1 nor SVM-2 is likely to work if deflation becomes a more serious problem for the economy and earnings. According to SVM-1, the fair-value P/E is equal to the reciprocal of the Treasury bond yield. So the P/E should be 25 now with the bond yield at 4%. But why would investors be willing to pay such a high multiple for the lackluster earnings environment implied by such a low bond yield? I believe we have a better chance of seeing a 20 multiple if the bond yield rises to 5% and stays there than if the bond yield remains at 4%. If instead, the bond yield continues to fall, suggesting that deflation is proliferating, then the valuation multiple might actually fall, too.

² In my *Topical Study #44*, "New, Improved Stock Valuation Model," dated July 26, 1999, I wrote, "My analysis will demonstrate that the market's assumptions about risk, and especially about long-term earnings growth may be unrealistically optimistic, leaving it vulnerable to a big fall. . . . The stock market is clearly priced for perfection. If perpetual prosperity continues uninterrupted, then perhaps the market's exuberant expectations will be realized. I, however, see more potential for disappointment, given the extreme optimism about long-term earnings growth embedded in current market prices."

II. SVM-1

After Fed Chairman Alan Greenspan famously worried out loud for the first time about “irrational exuberance” on December 5, 1996, his staff apparently examined stock market valuation models to help him evaluate the extent of the market’s exuberance. One such model was made public, though buried, in the Fed’s *Monetary Policy Report to the Congress*, which accompanied Mr. Greenspan’s Humphrey-Hawkins testimony on July 22, 1997.³ Twice a year, in February and July, the Chairman of the Federal Reserve delivers a monetary policy report to Congress. The Chairman’s testimony is widely followed and analyzed. Virtually no one reads the actual policy report, which accompanies the testimony. I regularly read these reports.

The model was summed up in its July 22, 1997, report, in one paragraph and one chart on page 24 of the 25-page report (Figure A). The chart showed a strong correlation between the 10-year Treasury bond yield (TBY) and the S&P 500 current earnings yield (CEY)—i.e., the ratio of 12-month forward consensus expected operating earnings (E) to the price index for the S&P 500 companies (P). SVM-1 is based on this relationship.

Figure A: Excerpt from Fed’s July 1997 Monetary Policy Report

The run-up in stock prices in the spring was bolstered by unexpectedly strong corporate profits for the first quarter. Still, the ratio of prices in the S&P 500 to consensus estimates of earnings over the coming twelve months has risen further from levels that were already unusually high. Changes in this ratio have often been inversely related to changes in long-term Treasury yields, but this year’s stock price gains were not matched by a significant net decline in interest rates. As a result, the yield on ten-year Treasury notes now exceeds the ratio of twelve-month-ahead earnings to prices by the largest amount since 1991, when earnings were depressed by the economic slowdown. One important factor behind the increase in stock prices this year appears to be a further rise in analysts’ reported expectations of earnings growth over the next three to five years. The average of these expectations has risen fairly steadily since early 1995 and currently stands at a level not seen since the steep recession of the early 1980s, when earnings were expected to bounce back from levels that were quite low.

Source: Federal Reserve Board, *Monetary Policy Report to the Congress*.

³ More information is available at <http://www.federalreserve.gov/boarddocs/hh/1997/july/ReportSection2.htm>

It is relatively easy to calculate 12-month forward earnings for the S&P 500. It is simply a time-weighted average of the current and next years' consensus estimates produced by Wall Street's industry analysts. Every month, Thomson Financial surveys these folks and compiles monthly consensus earnings estimates for the current and coming year. The consensus data for the S&P 500 companies are aggregated on a market-capitalization-weighted basis. To calculate the 12-month forward earnings series for the S&P 500, we need 24 months of data for each year. For example, during January of the current year, 12-month forward earnings are identical to January's expectations for the current year. One month later, in February of the current year, forward earnings are equal to 11/12 of February's estimate for the current year plus 1/12 of February's estimates for earnings in the next year (Figure B).

Figure B: Weights Used to Derive 12-Month Forward Earnings

	Current Calendar Year	Next Calendar Year
January	12/12	0/12
February	11/12	1/12
March	10/12	2/12
April	9/12	3/12
May	8/12	4/12
June	7/12	5/12
July	6/12	6/12
August	5/12	7/12
September	4/12	8/12
October	3/12	9/12
November	2/12	10/12
December	1/12	11/12

Source: Thomson Financial.

This method of calculating forward earnings doesn't exactly jibe with actual expectations for the coming 12 months. For example, half of forward earnings in July reflects half of the earnings expected for the current year, which is already half over. Furthermore, in this case, the other half of forward earnings reflects half of earnings expectations for *all* of next year. The problem is that there are no data available from analysts for the next 12 months. We can come close using quarterly earnings forecasts, which are also available from Thomson Financial. This is unnecessary, in my opinion. The method used by Thomson Financial should be a good enough approximation. The data start in September 1978 on a monthly basis (Figures 2 and 3). Weekly data are also available since 1994.

Because write-offs are one-shot events, analysts can't model them in their spread sheets. In other words, forward earnings are essentially projections of operating earnings. I use forward earnings, rather than either reported or operating trailing earnings, in most of my analyses because market prices reflect future earnings expectations. The past is relevant, but only to the extent that it is influencing the formation of current expectations about the future outlook for earnings.

Again, I believe the close relationship between the 10-year Treasury bond yield and the current earnings yield of stocks is impressive. The intuitive interpretation is that when Treasury bonds yield more than the earnings yield on the stock market, which is riskier than bonds, stocks are an unattractive investment. The average spread between CEY and TBY is only 26 basis points since 1979 (Figure 4). This suggests that the stock market is fairly valued when:

(1) CEY = TBY

It is undervalued (overvalued) when CEY is greater (less) than TBY. Another way to see this is to take the reciprocal of both variables in the equation above. In the investment community, we tend to follow the price-to-earnings (P/E) ratio more than the earnings yield. The ratio of the S&P 500 price index to forward earnings is highly correlated with the reciprocal of the 10-year bond yield, and on average the two have been nearly identical (Figure 5). This suggests that the "fair value" of the valuation multiple, using forward earnings, is simply one divided by the Treasury bond yield. For example, when the Treasury yield is 5%, the fair value P/E is 20. So in the Fed's valuation model, the "fair-value" price for the S&P 500 (FVP) is equal to expected earnings divided by the bond yield and the fair-value P/E is the reciprocal of the Treasury bond yield:

(2) FVP = E / TBY or,

(3) FVP / E = 1 / TBY

The ratio of the actual S&P 500 price index to the fair-value price shows the degree of overvaluation or undervaluation (Figure 1). History shows that markets can stay overvalued and become even more overvalued for a while. But eventually, overvaluation can be corrected in three ways: 1) interest rates can fall, 2) earnings expectations can rise, and of course, 3) stock prices can drop—the old-fashioned way to decrease values. Undervaluation can be corrected by rising yields, lower earnings expectations, and higher stock prices.

SVM-1 has worked quite well in the past, in my view. It identified when stock prices were excessively overvalued or undervalued, and likely to fall or rise:

- 1) The market was extremely undervalued from 1979 through 1982, setting the stage for a powerful rally that lasted through the summer of 1987.
- 2) Stock prices crashed after the market rose to an at-the-time record 34% overvaluation peak during September 1987.

- 3) Then the market was undervalued in the late 1980s, and stock prices rose.
- 4) In the early 1990s, it was moderately overvalued, and stock values advanced at a lackluster pace.
- 5) Stock prices were mostly undervalued during the mid-1990s, and a great bull market started in late 1994.
- 6) Ironically, the market was actually fairly valued during December 1996 when the Fed Chairman worried out loud about irrational exuberance, and stock prices continued to advance.
- 7) During both the summers of 1997 and 1998, overvaluation conditions were corrected by a sharp drop in stock prices.
- 8) Then a two-month undervaluation condition during September and October 1998 was quickly reversed as stock prices soared to a remarkable record 70% overvaluation reading during January 2000. This bubble was led by the Nasdaq and technology stocks, which crashed over the rest of the year, bringing the market closer to fair value in late 2000 through early 2002.
- 9) As noted above, the model suggested that stock prices were significantly undervalued immediately after the 9/11 attacks in 2001. As a result of the subsequent rally, they were fairly valued again by early 2002. But concerns about the quality of corporate earnings and the economic outlook drove stock prices back down through early October, when SVM-1 was undervalued by a record 49%. Then the market rallied.

According to Ned Davis Research, when the model has shown stocks to be more than 5% undervalued since 1980, the average one-year gain in the S&P 500 has been 31.7%. When the model has been more than 15% overvalued, the market has dropped 8.7%, on average, in the following year.⁴

III. SVM-2

The stock market is a very efficient market. In efficient markets, all available information is fully discounted in prices. In other words, efficient markets should always be “correctly” valued, at least in theory (i.e., the so-called Efficient Markets Hypothesis). All buyers and all sellers have access to exactly the same information. They are completely free to act upon this information by buying or selling stocks as they choose. So the market price is always at the correct price, reflecting all available information. In his June 17, 1999, congressional testimony, Federal Reserve Chairman Alan Greenspan soliloquized about valuation:

⁴ See “Good-Looking Models,” by Michael Santoli in *Barron's*, August 5, 2002.

The 1990s have witnessed one of the great bull stock markets in American history. Whether that means an unstable bubble has developed in its wake is difficult to assess. A large number of analysts have judged the level of equity prices to be excessive, even taking into account the rise in “fair value” resulting from the acceleration of productivity and the associated long-term corporate earnings outlook. But bubbles generally are perceptible only after the fact. To spot a bubble in advance requires a judgment that hundreds of thousands of informed investors have it all wrong. Betting against markets is usually precarious at best.⁵

This is another one of the chairman’s ambiguous insights, which may have contributed to the very bubble he was worrying about. He seems to be saying that the stock market might be a bubble, but since the market efficiently reflects the expectations of “thousands of informed investors,” maybe the market is right because all those people can’t be wrong. They *were* wrong, and so was the Fed chairman, about the judgment of all those folks. However, at the time, the available information obviously convinced the crowd that stocks were worth buying. The crowd didn’t realize that it was a bubble until it burst. In other words, efficient markets can experience bubbles when investors irrationally buy into unrealistically bullish assumptions about the future prospects of stocks.⁶

Of course, individually, we can all have our own opinions about whether stocks are cheap or expensive at the going market price. Perhaps we should consider replacing the terms “undervalued” and “overvalued” with “underpriced” and “overpriced,” respectively. I think in this way, we acknowledge that the stock market is efficient and that the market price should usually be the *objective* fair value. At the same time, the new terminology allows us to devise valuation models to formulate *subjective* opinions about market prices. If my model shows that the market is overpriced, I am simply stating that I disagree with the weight of opinion that has lifted the market price above my own assessment of the right price.

Now let’s formulate a new, “improved model” (SVM-2) that more explicitly identifies the variables that together determine the value of the stock market. If, for example, SVM-1 shows that stocks are 50% overvalued, we need to add variables that can explain why the aggregate of all buyers and sellers believe that the price is right. Once we agree on what is “in” the market, we can each make our own pro or con case, and invest accordingly.

SVM-1 is missing some variables, which might explain why the current earnings yield diverges from the Treasury yield. We clearly need to account for variables that differentiate stocks from bonds. If the government guarantees that stock earnings will be fixed for the next 10 years, then the price of the S&P 500 would be at a level that nearly equates the current earnings yield to the 10-year Treasury bond yield. But there is no such guarantee for stocks. Earnings can go down. Companies can lose money. They can also go out of business. Earnings can also go up. We need variables to capture:

- 1) Business risk to earnings.
- 2) Earnings expectations beyond the next 12 months.

⁵ More information is available at <http://www.bog.frb.fed.us/BOARDDOCS/TESTIMONY/1999/19990617.htm>

⁶ Perhaps the simplest and best explanation for bubbles is that they occur when we all foolishly invest in assets we know are overvalued, but we just can’t stand the mental anguish of seeing our friends and relatives getting rich.

The new, “improved” valuation model reflecting these variables (i.e., SVM-2), should have the following structure:

$$(4) \quad \text{CEY} = a + b \cdot \text{TBY} + c \cdot \text{RP} - d \cdot \text{LTEG}$$

CEY is the current earnings yield defined as 12-month forward earnings of the S&P 500, divided by the S&P 500 price index. TBY is the 10-year Treasury bond yield. The two new additional variables are the risk premium (RP) and long-term expected earnings growth beyond the next 12 months (LTEG). My assumption is that the current earnings yield (“the dependent variable”) is a linear function of the three independent variables on the right of the equation above. Obviously, there are several other ways to specify the model. But this should do for now.

How should we measure risk in the model? An obvious choice is to use the spread between corporate bond yields and Treasury bond yields.⁷ This spread measures the market’s assessment of the risk that some corporations might be forced to default on their bonds. Of course, such events are very unusual, especially for companies included in the S&P 500.

However, the spread is only likely to widen during periods of economic distress, when bond investors tend to worry that profits won’t be sufficient to meet the debt-servicing obligations of some companies. Most companies won’t have this problem, but their earnings would most likely be depressed during such periods. So the new, “improved” model can be represented as follows:

$$(5) \quad \text{CEY} = a + b \cdot \text{TBY} + c \cdot (\text{CBY} - \text{TBY}) - d \cdot \text{LTEG}$$

CBY is the corporate bond yield. Which corporate bond yield should we use in the model? We can try Moody’s composites of the yields on corporate bonds rated “Aaa,” “Aa,” “A,” or “Baa.” I found that the spread between the A-rated corporate composite yield and the Treasury bond yield fits quite well. This spread averaged 159 basis points since 1979. It tends to widen most during “flight-to-quality” credit crunches, when Treasury bond yields tend to fall fastest (Figure 6).

The final variable included in SVM-2 is one for expected earnings growth beyond the next 12 months. Thomson Financial compiles data on consensus long-term earnings growth for the S&P 500 (Figure 7). The monthly data start in 1985 and are based on industry analysts’ projections for the next three to five years (Figure B).

In equation (5) above, my presumption is that $a=0$ and $b=c=1$. So,

$$(6) \quad \text{CEY} = \text{CBY} - d \cdot \text{LTEG} \quad \text{or,}$$

$$(7) \quad \text{CEY} = \text{TBY} + \text{RP} - d \cdot \text{LTEG}$$

⁷ My models do not include the so-called equity risk premium, which is a fuzzy concept, in my opinion, and difficult to measure.

In other words, in this version of SVM-2, investors demand that the current earnings yield fully reflects the Treasury bond yield and the default risk premium in bonds, less some fraction of long-term expected earnings growth. In this model, the market is always fairly valued; the only question is whether the implied value of “d” and the consensus expectations for long-term earnings growth are too pessimistic (excessively cautious), too optimistic (irrationally exuberant), or just about right (rational).

We can derive “d” from equation (5) as follows:

$$(8) \quad d = (CBY - CEY) / LTEG$$

Plugging in the available data since 1985, “d” has ranged between -.0027 and +0.33, and averaged 0.13 (Figure 8). This means that on average investors assign a weight of 0.13 to LTEG. They don’t give it much weight because historically it has been biased upward (Figure B). They also don’t give it much weight because long-term earnings are harder to forecast than earnings over the coming 12 months.

Notice that in 1999 and early 2000, investors effectively gave LTEG a weight of 0.23, or nearly twice as much as the historical average. Actually, up until 1999, “d” averaged only 0.10. This supports my observation at the beginning of this study that investors were irrationally giving more weight to irrationally high long-term earnings expectations in the late 1990s. At the end of last year, “d” was back down around 0.05, near the bottom of its range.

We can derive fair-value time series for the S&P 500 and for the valuation multiple for different values of “d” using the following formula:

$$(9) \quad FVP = E / (CBY - d \cdot LTEG)$$

$$(10) \quad FVP / E = 1 / (CBY - d \cdot LTEG)$$

Obviously, to avoid nonsensical results like a negative fair-value price or an infinite P/E, $CBY > d \cdot LTEG$. We can draw fair-value price series for the S&P 500 using equation (9). We have data for all the variables except the “d” coefficient. Nevertheless, we can proceed by plotting a series for various plausible fixed values of “d”. Based on the analysis above, I’ve chosen the following values: 0.10, 0.20, and 0.25. Now we can compare the matrix of the three resulting FVP series to the actual S&P 500. During December 2002, the latest fair value, using $d = 0.10$, was 989. The S&P 500 was 9.1% below this level (Figures 9 and 10).

Figure C: Long-Term Consensus Expected Earnings Growth

In the long-run, profits don't, and can't grow faster than GDP. Historically, this growth rate has averaged about 7% annually. So, why do Wall Street's industry analysts collectively and consistently predict that corporate earnings will grow much faster than 7%? From the start of the data in 1985 through 1995, analysts estimated that S&P 500 earnings will grow between 10.8% and 12.1% (Figure 7). This range well exceeds 7%. The collective forecast of industry analysts for long-term earnings growth is obviously biased to the upside. Wall Street's analysts are extrapolating the earnings growth potential for their companies, in their industries. It is unlikely that most analysts will have the interest and staying power to cover companies and industries they believe are likely to be underperformers for the next several years. So naturally, their long-term outlook is likely to be relatively rosy. This bias is best revealed when the consensus data are compiled and compared to reality.

If the projected earnings growth overshoot is constant over time, then investors can make an adjustment for the overly optimistic bias of analysts, and invest accordingly. This is harder to do during a speculative bubble, when even the best analysts can get sucked into the mania. As stock prices soared during the second half of the 1990s, analysts became more bullish on the outlook for their companies. As they became more bullish, so did investors and speculators. Analysts increasingly justified high stock prices and lofty valuation multiples by raising their estimates for the long-term potential earnings growth rates of their companies.

Long-term earnings growth expectations for the S&P 500 companies started to rise steadily after 1995 up to 14.9% by the end of 1998. Then they soared through 2000, peaking at 18.7% during August of that year. Analysts, investors, and speculators ignored the natural speed limits imposed by the natural growth of the economy and earnings. They forgot that nothing on our small Planet Earth can compound at such extraordinary rates without eventually consuming all the oxygen in the atmosphere.

Once the speculative bubble began to burst in March 2000, analysts scrambled to reassess their wildly optimistic projections. Consensus long-term earnings growth expectations plunged to 12.8% for the S&P 500 by the end of 2002 from the all-time 18.7% peak the year before. The reversal for the technology sector of the S&P 500 was even more dramatic with growth expectations dropping to 16% at the end of 2002 from the 2000 peak rate of 28.7%.

Source: Dr. Edward Yardeni, Prudential Securities.

Notice that equations (9) and (10) describing the same SVM-2 both morph into SVM-1 when RP—the corporate bond’s default risk premium—is equal to the long-term earnings growth term $d \cdot \text{LTEG}$. Historically, on average, this is the case, which is why the simple version of the model has worked surprisingly well.⁸

In my *Topical Study #45*, “Earnings: The Phantom Menace (Episode I)” dated August 16, 1999, I observed that according to SVM-1, “. . . the market is extremely overpriced and vulnerable to a significant fall.” I also explained that the model uses the market’s earnings expectations, not mine. I argued again that the market’s expectations were unrealistically optimistic and that earnings were inflated by phantom revenues and unexpensed stock options:

A related problem is that many companies are overstating their earnings by using questionable accounting and financial practices. Some are significantly overstating their profits, and they tend to have the highest valuation multiples in the stock market. This suggests that investors are not aware that the quality of earnings may be relatively low among some of the companies reporting the fastest earnings growth.

This suggests an interesting twist on the valuation model. Let’s assume that the stock market is always fairly valued, i.e., the P/E is always equal to the reciprocal of the 10-year Treasury bond yield. Using SVM-1, we can easily calculate the market’s estimate of forward earnings (E) by multiplying the level of the S&P 500 (P) by the 10-year bond yield (E/P). Currently, with the S&P 500 closing price at 909 on January 2 and the yield at 4%, the market’s assessment is that earnings are actually \$37.00 per share, or 32.5% below the analysts’ consensus forecast (Figure 11).

Again, from this perspective, the market isn’t a screaming buy as suggested by SVM-1. Rather, over the past few months, it has adjusted to a lower and more realistic level of earnings. If this is correct, then the good news is that any downward adjustments made by companies and analysts may already be largely discounted.

The model can be used to assess several major overseas stock markets for which forward earnings data are available since 1989 (Figures 12 and 13). Not surprisingly, there is a high degree of correlation between the SVM-1 results for the United States and Canada (0.47), the United Kingdom (0.33), Germany (0.40), and France (0.53). The correlation is low with Japan (-0.36). The model doesn’t work for Japan because deflationary forces have pushed the 10-year bond yield to under 1.5% in recent years, which implies a nonsensical valuation multiple.

IV. Discounting Dividends

My focus until now has been entirely on earnings. Don’t dividends matter? They did prior to 1982, but seemed to matter less and less after that year. If the Bush administration succeeds in convincing Congress to eliminate the double taxation of dividends, then dividends should matter more again.

⁸ Since 1985, RP and $d \cdot \text{LTEG}$ have averaged 161 and 181 basis points, respectively—not an exact match, but close enough.

My views on this subject were heavily influenced by an excellent speech on “Corporate Governance,” presented by Federal Reserve Chairman Alan Greenspan on March 26, 2002, at New York University. Mr. Greenspan observed that shareholders’ obsession with earnings is a relatively new phenomenon:

Prior to the past several decades, earnings forecasts were not nearly so important a factor in assessing the value of corporations. In fact, I do not recall price-to-earnings ratios as a prominent statistic in the 1950s. Instead, investors tended to value stocks on the basis of their dividend yields.

Everything changed in 1982, according to the Fed chairman. That year, a simple regulatory move combined with the different tax rates on dividend income and capital gains—the marginal individual tax rate on dividends, with rare exceptions, has always exceeded the marginal tax rate on capital gains—put us on the path to the recent upheaval in the corporate world. In 1982, the Securities and Exchange Commission (SEC) gave companies a safe harbor to conduct share repurchases without risk of investigation. Repurchases raise per-share earnings through share reduction. Before then, companies that repurchased their shares risked an SEC investigation for price manipulation. “This action prompted a marked shift toward repurchases in lieu of dividends to avail shareholders of a lower tax rate on their cash receipts,” said the Fed chairman.

As a result, “The sharp fall in dividend payout ratios and yields has dramatically shifted the focus of stock price evaluation toward earnings.” The dividend payout ratios, which in decades past averaged about 55%, in recent years fell on average to about 35%. Dividend yields—the ratio of dividends per share to a company’s share price—fell even faster than the payout ratio, as stock prices soared over the past two decades. Fifty years ago, dividend yields on stocks typically averaged 6%. Today, such yields are barely above 1%. Contributing to the drop in both ratios has been the sharp drop in the percent of S&P 500 companies paying dividends from 87% during 1982 to 73% in 2001 (Figures 14 and 15).

Mr. Greenspan observed that earnings accounting is much more subjective than cash dividends, “whose value is unambiguous.” More specifically, “Although most pretax profits reflect cash receipts less out-of-pocket cash costs, a significant part results from changes in balance-sheet valuations. The values of almost all assets are based on the assets’ ability to produce future income. But an appropriate judgment of that asset value depends critically on a forecast of forthcoming events, which by their nature are uncertain.” So, for example, depreciation expenses are based on book values, but are very crude approximations of the actual reduction in the economic value of physical plant and equipment. “The actual deterioration will not be known until the asset is retired or sold.” Mr. Greenspan also takes a swipe at corporate pension plan accounting: “And projections of future investment returns on defined-benefit pension plans markedly affect corporate pension contributions and, hence, pretax profits.”

Because earnings are “ambiguous,” they are prone to manipulation and to hype. During a period of rapid technological change, innovative companies are likely to be especially profitable over the short-run. But, this tends to increase the incentive for competitors to enter the market and reduce profitability in the long run. Mr. Greenspan noted, “Not surprisingly then, with the longer-term outlook increasingly amorphous, the level and recent growth of short-term earnings have taken on especial significance in stock price evaluation, with quarterly earnings reports subject to anticipation, rumor, and ‘spin.’ Such tactics, presumably, attempt to induce investors to extrapolate short-term trends into a favorable long-term view that would raise the current stock price.” This has led to the current sorry state of corporate affairs, according to him:

CEOs, under increasing pressure from the investment community to meet short-term elevated expectations, in too many instances have been drawn to accounting devices whose sole purpose is arguably to obscure potential adverse results. Outside auditors, on several well-publicized occasions, have sanctioned such devices, allegedly for fear of losing valued corporate clients. Thus, it is not surprising that since 1998 earnings restatements have proliferated. This situation is a far cry from earlier decades when, if my recollection serves me correctly, firms competed on the basis of which one had the most conservative set of books. Short-term stock price values then seemed less of a focus than maintaining unquestioned credit worthiness.

Mr. Greenspan concluded his speech on an optimistic note, seeing signs that the market is already fixing the problem as the sharp decline in stock and bond prices following Enron’s collapse punished many of the companies that used questionable accounting practices. “Markets are evidently beginning to put a price-earnings premium on reported earnings that appear free of spin.” In other words, market discipline is already raising corporate accounting and governance standards. The Fed chairman endorsed any legislative and regulatory initiatives that provide incentives for corporate officers to act in the best interests of their shareholders. He warned against excessive regulation, which “has, over the years, proven only partially successful in dissuading individuals from playing with the rules of accounting.”

In my opinion, eliminating the taxation of dividend income should be a very effective way to fix most of the problems with the current system that the Fed chairman identified so brilliantly in his speech. Shareholders should be encouraged to act as owners of the corporations in which they invest. Managers should be encouraged to treat them as owners, too. It is the owners of the corporation who pay taxes on profits. Why should they be taxed again on their dividend income? I think this double taxation creates a tremendous incentive for management to retain rather than distribute earnings. It has given management a convincing story to tell shareholders: “Instead of paying you dividends, we will invest retained earnings on your behalf to grow our business even faster, and we will also buy back our stock to boost earnings per share.”

This system gives too much power to management and tends to effectively disenfranchise the shareholder, in my opinion. In other words, this system is prone to be abused and corrupted, as occurred during the previous decade. Without the discipline of dividend payments, management may have a great incentive to use every trick in the rule book and every conceivable accounting gimmick to boost earnings. Investors are forced to value stocks on easily manipulated and inflated earnings, rather than on the cold, hard cash of dividends.

If, instead, dividends were exempt from the personal income tax, then investors would tend to favor companies that pay dividends and have established a record of steadily raising their payouts to shareholders. Shareholders could then decide for themselves whether to reinvest their dividend income in the corporation based on the ability of management to grow dividend payments, rather than earnings. Obviously, dividends would grow at the same rate as earnings, assuming a fixed payout ratio. But dividends would discipline the accounting for earnings. Management can't pay cash to shareholders unless the cash actually is earned.

V. Other Models

SVM-1 is a very simple stock valuation model. It should be used along with other stock valuation tools, including SVM-2. Of course, there are numerous other more sophisticated and complex models. The SVM models are not market-timing tools. As noted above, an overvalued (undervalued) market can become even more overvalued (undervalued). However, SVM-1 does have a good track record of showing whether stocks are cheap or expensive. Investors are likely to earn below (above) average returns over the next 12 to 24 months when the market is overvalued (undervalued).

Both SVM-1 and SVM-2 are alternative versions of the Gordon discounted cash flow stock market valuation model.⁹ This model has long been used by many investors to determine valuation. The Association of Investment Management and Research—the organization that conducts the Certified Financial Analysts (CFA) program—recently published an authoritative and comprehensive text titled “Analysis of Equity Investments: Valuation.” The Gordon growth model is discussed in 20 pages of the book. The Dividend Yield is discussed in five pages. SVM-1 is briefly mentioned on pages 202 and 203 and is called the Fed Stock Valuation Model. SVM-2 is briefly mentioned on pages 203 and 204 and is called the Yardeni Model.

Tobin's q model is not mentioned at all in the CFA book. I studied under the late Professor James Tobin of Yale University. He was the chairman of my Ph.D. committee. In his model, q is the ratio of the market value of a corporation to its replacement cost. When q is greater than one, it makes more sense to rebuild it at cost than to buy it in the market. When q is less than one, it is cheaper to buy the corporation in the market than to build it from scratch. The model

⁹ Myron J. Gordon, *The Investment, Financing, and Valuation of the Corporation*. Irwin (1962).

appears logical, but empirically very questionable, since it requires data on the replacement cost of companies. While this exercise may be doable for an individual company, it also seems very questionable whether a realistic and accurate time series can be constructed for all the companies in the S&P 500.

Nevertheless, the credibility of this model received a big boost after the publication in March 2000 of *Valuing Wall Street* by Andrew Smithers and Stephen Wright. According to the book's Web site: "The U.S. stock market is massively overvalued. As a result, the Dow could easily plummet to 4,000—or lower—losing more than 50% of its value wiping out nest eggs for millions of investors. . . Using the q ratio developed by Nobel Laureate James Tobin of Yale University, Smithers & Wright present a convincing argument that shows the Dow plummeting from recent peaks to lows not seen in a decade."¹⁰

A Fed staff economist, Michael Kiley, wrote a research paper in January 2000 titled "Stock Prices and Fundamentals in a Production Economy." Based on a model that is more like Tobin's than Gordon's, he concluded that "the skyrocketing market value of firms in the second half of the 1990s may reflect a degree of irrational exuberance."¹¹ That was exactly the same conclusion that was suggested by both SVM-1 and SVM-2, which showed that the S&P 500 was overvalued by nearly 70% and 57%, respectively, at the time. The two models currently show that stocks are undervalued. Tobin's q is back down below one for the first time since 1994 (Figure 16).

Kiley's goal was to demonstrate that some of the more bullish prognosticators in the late 1990s based their conclusions on exuberant versions of the Gordon model. He specifically mentions *Dow 36,000* by James K. Glassman and Kevin A. Hassett (Times Books, 1999) who argued that stocks are much less risky than widely believed. So a lower equity risk premium justified higher P/Es. Kiley also mentions work by Jeremy J. Siegel. In the second edition (1998) of his widely read book, *Stocks For The Long Run*, the dust jacket claims that "when long-term purchasing power is considered, stocks are actually **safer than bank deposits!**"¹²

One of the most popular and simplest tools for gauging valuation is simply to compare the market's P/E to its historical average. These crude "reversion-to-the-mean" models are worth tracking, in my view, but they ignore how changes in interest rates, inflation, and technologies might impact valuation both on a short-term and long-term basis (Figure 17). Of course, Robert J. Shiller earned much fame and fortune with his 2000 book, *Irrational Exuberance*, in which he argued that the market's P/E was too high by historical standards.¹³

¹⁰ More information is available at <http://www.valuingwallstreet.com/>

¹¹ More information is available at <http://www.federalreserve.gov/pubs/feds/2000/200005/200005pap.pdf>

¹² Jeremy J. Siegel, *Stocks For The Long Run*, McGraw-Hill (1998)

¹³ Robert J. Shiller, *Irrational Exuberance*, Princeton University Press (2000)

VI. Greenspan On Valuation

Fed Chairman Alan Greenspan delivered his latest thoughts on the stock market, asset bubbles, and valuation on August 30, 2002.¹⁴ Much of the discussion of valuation seems to be based on a model that is very similar to SVM-2. In footnote 3 of his speech, Mr. Greenspan writes:

For continuous discounting over an infinite horizon, $k(E/P) = r + b - g$, where k equals the current, and assumed future, dividend payout ratio, E current earnings, P the current stock price, r the riskless interest rate, b the equity premium, and g the growth rate of earnings.

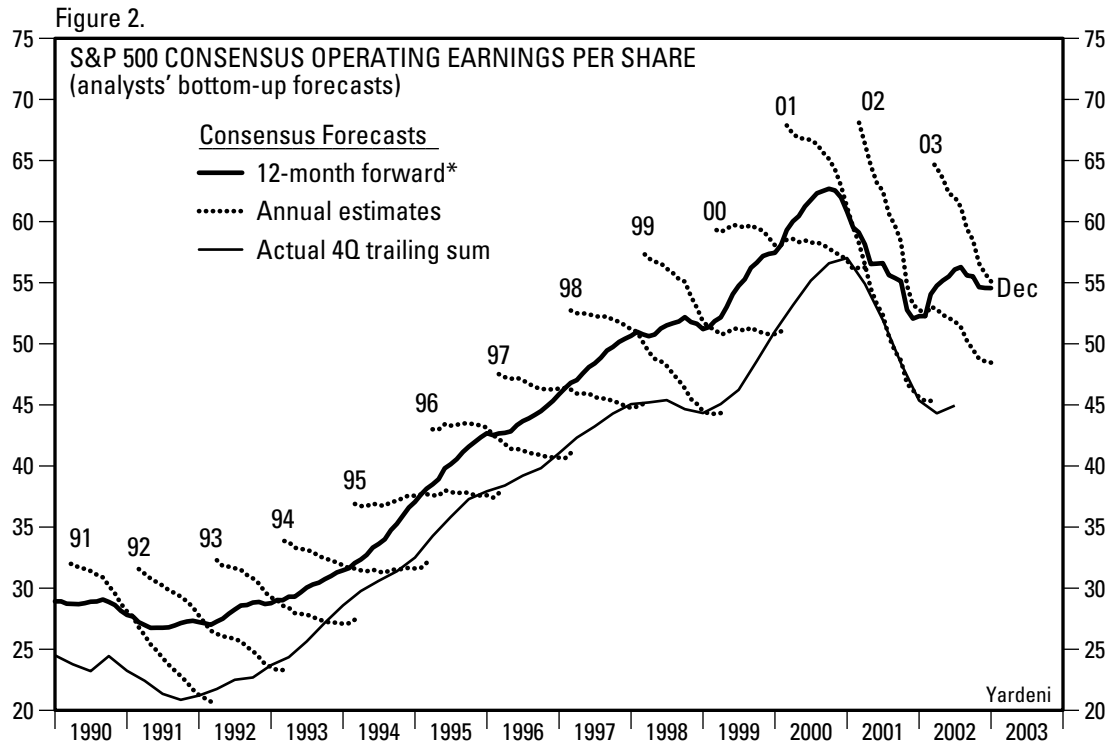
In my SVM-2 model, $k = 1$ because I believe that the market discounts earnings, not dividends. Furthermore, $r =$ the 10-year Treasury bond yield, $b =$ the default risk premium in corporate bonds, and $g =$ long-term expected earnings growth.

According to the speech, Mr. Greenspan has concluded that the Fed has no unambiguous tools to gauge whether stocks are overvalued or undervalued. Therefore, he believes that the Fed could do nothing about stock market bubbles, other than to wait to see if they burst! Unlike the Fed chairman, most investors must rely on valuation models to provide some guidance to their decision-making process. The models are not full proof and they are not great market-timing tools. However, they are useful, especially if used with other investment tools. For example, in my *Stock Market Cycles*, I present numerous charts relating key economic and financial indicators to stock price cycles.¹⁵ I found that consumer sentiment indicators are especially good at confirming major market bottoms (Figures 18 and 19). I am also fond of using technical indicators to supplement the insights from stock valuation models (Figure 20). In other words, the best approach for investing in the stock market is to use a number of disciplines.

* * *

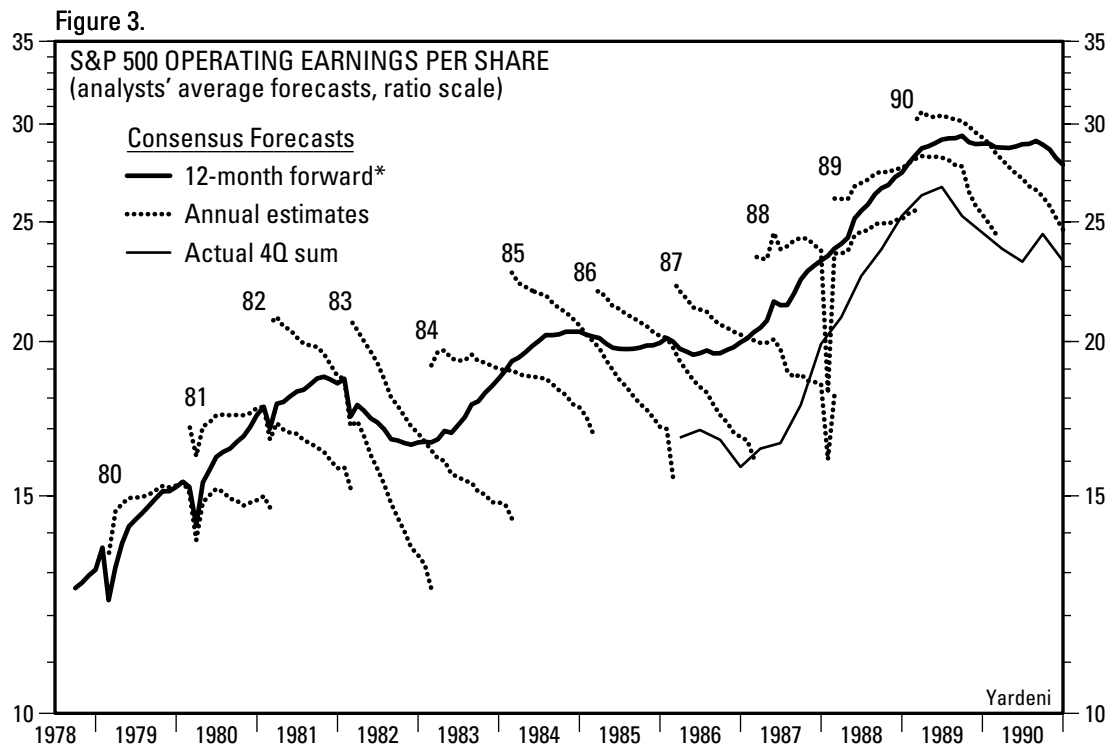
¹⁴ More information is available at <http://www.federalreserve.gov/boarddocs/speeches/2002/20020830/default.htm>

¹⁵ More information is available at <http://www.prudential-yardeni.com/public/cycle.pdf>



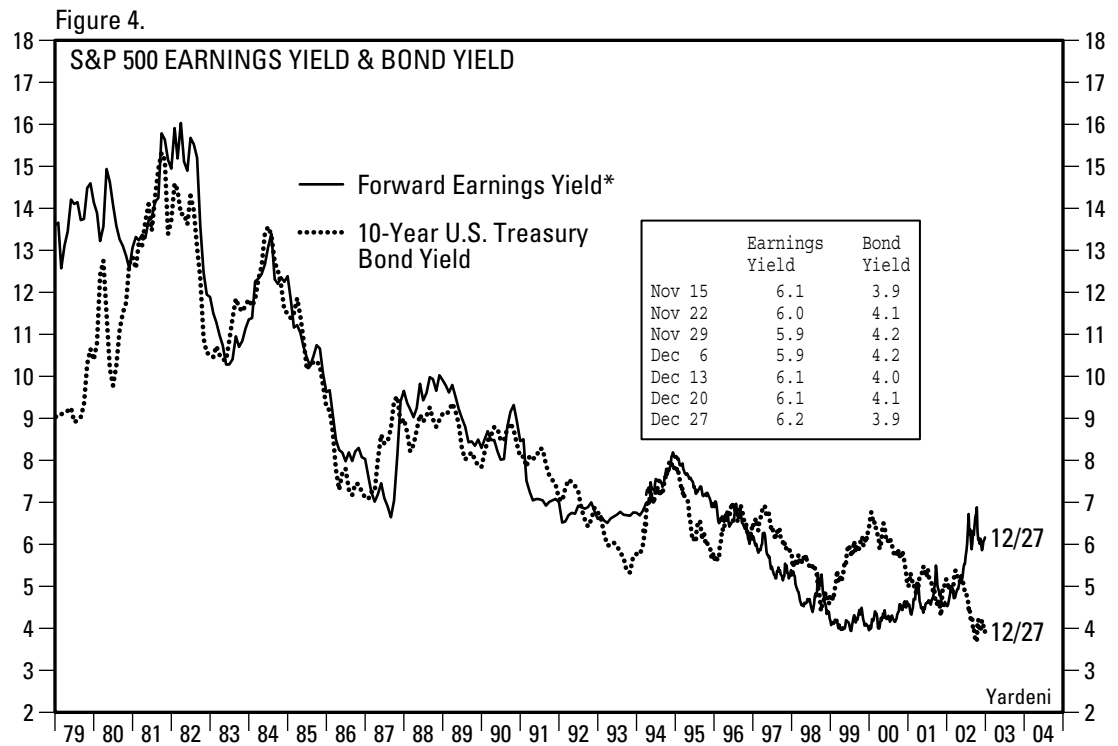
* Time-weighted average of current and next years' consensus earnings estimates.
Source: Thomson Financial.

Analysts tend to be too optimistic about the outlook for earnings in any one year. The stock market tends to discount forward earnings, the time-weighted average of the current and coming years' consensus expected earnings.



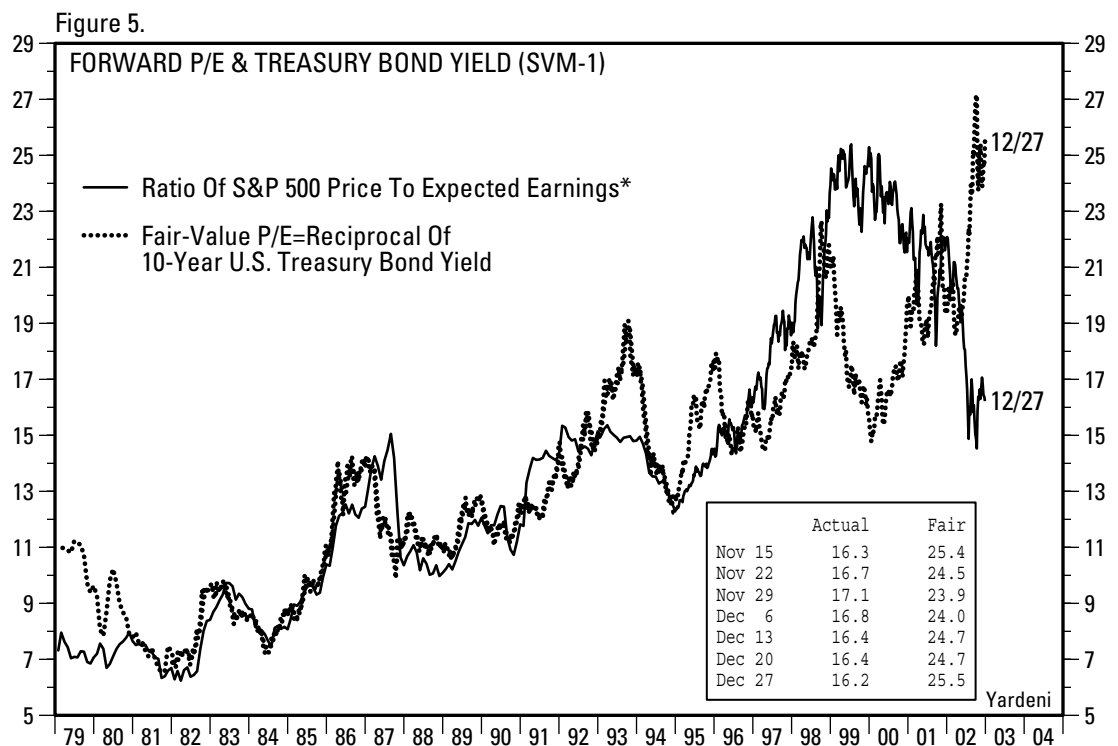
* Time-weighted average of current and next years' consensus earnings estimates.
Source: Thomson Financial.

Since 1979, when forward earnings data first became available, the forward earnings yield has tracked the 10-year bond yield very closely. Since 1998, the two series have diverged more.

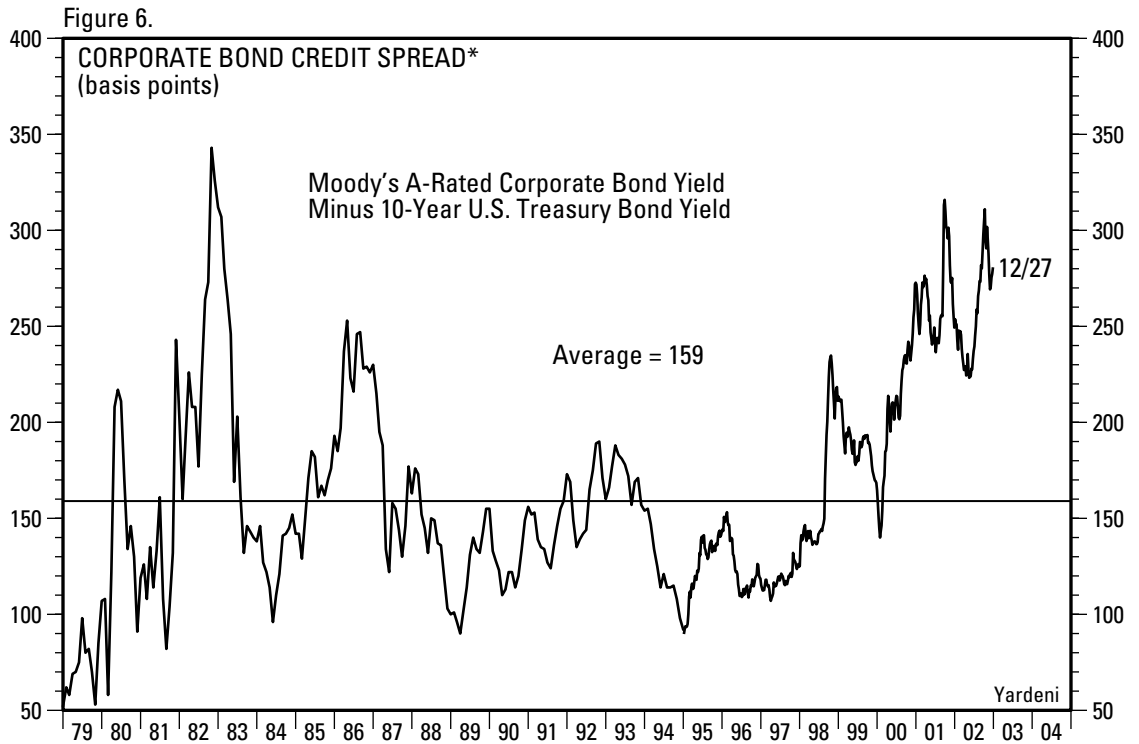


* 52-week forward consensus expected S&P 500 operating earnings per share divided by S&P 500 Index. Monthly through March 1994, weekly after.
Source: Thomson Financial.

SVM-1 shows that the reciprocal of the 10-year bond yield is a useful measure of the fair-value P/E.

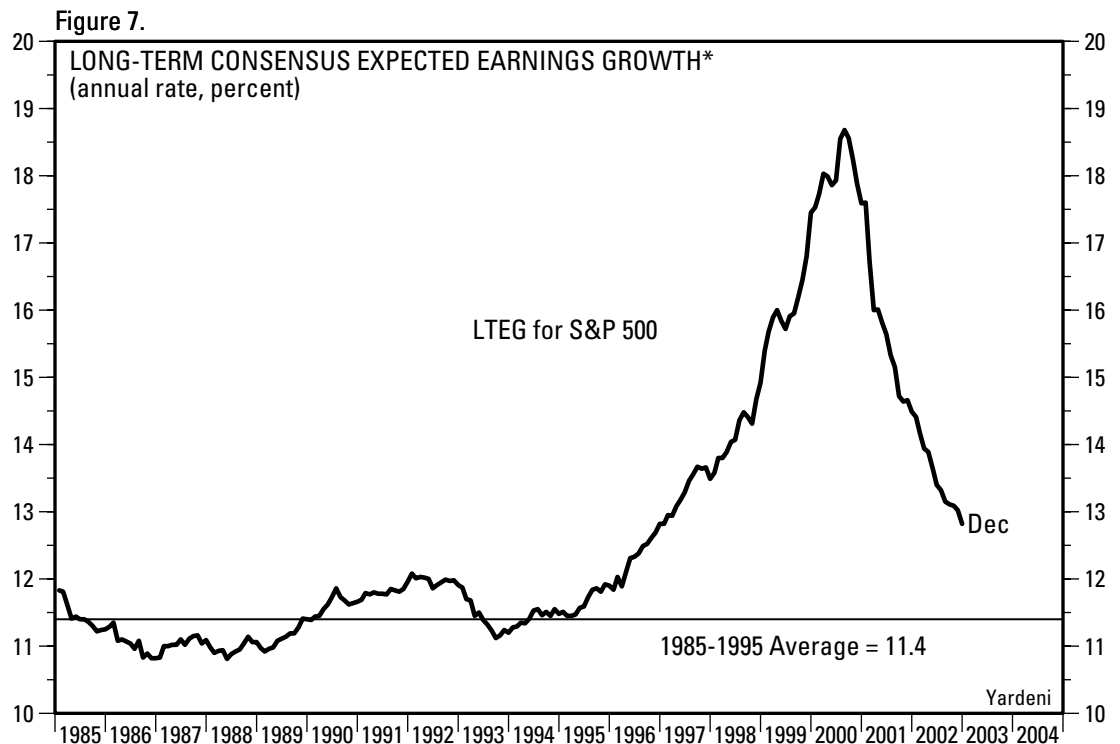


* 52-week forward consensus expected S&P 500 operating earnings per share. Monthly through March 1994, weekly after.
Source: Thomson Financial.



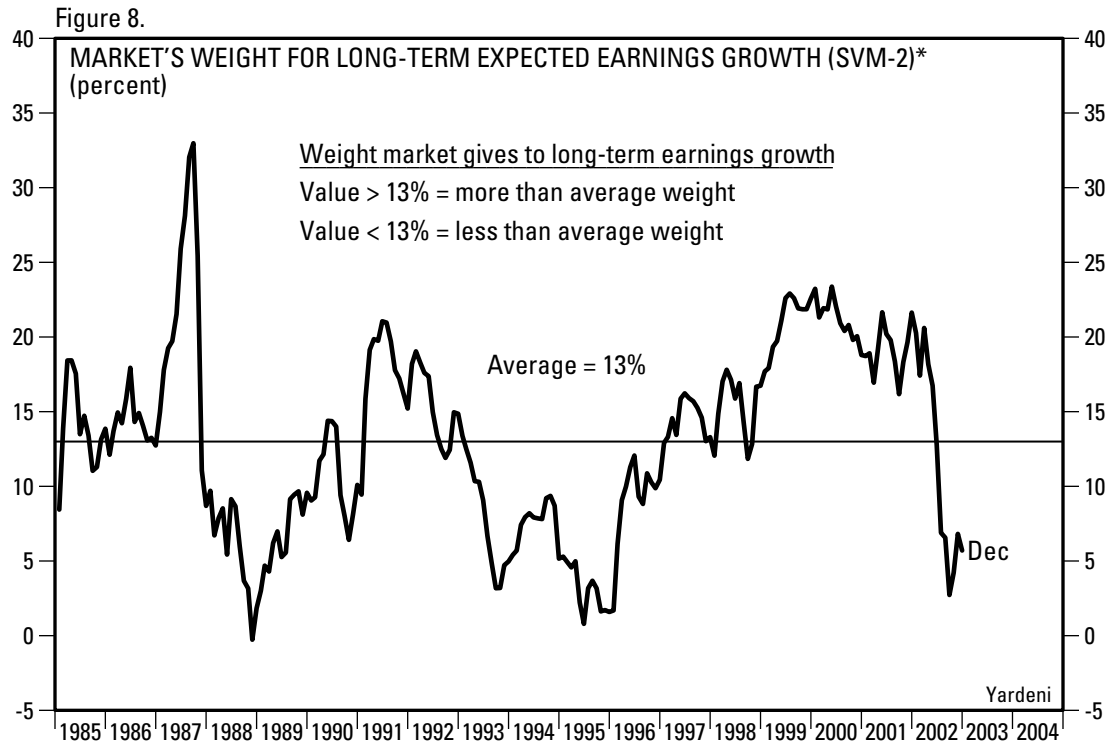
* Monthly through 1994, weekly thereafter.
Source: Board of Governors of the Federal Reserve System and Moody's Investors Service.

SVM-2 includes the corporate bond credit quality spread and long-term consensus expected earnings growth (LTEG). The spread remains wide, and LTEG is still falling back to the 1985-1995 level.



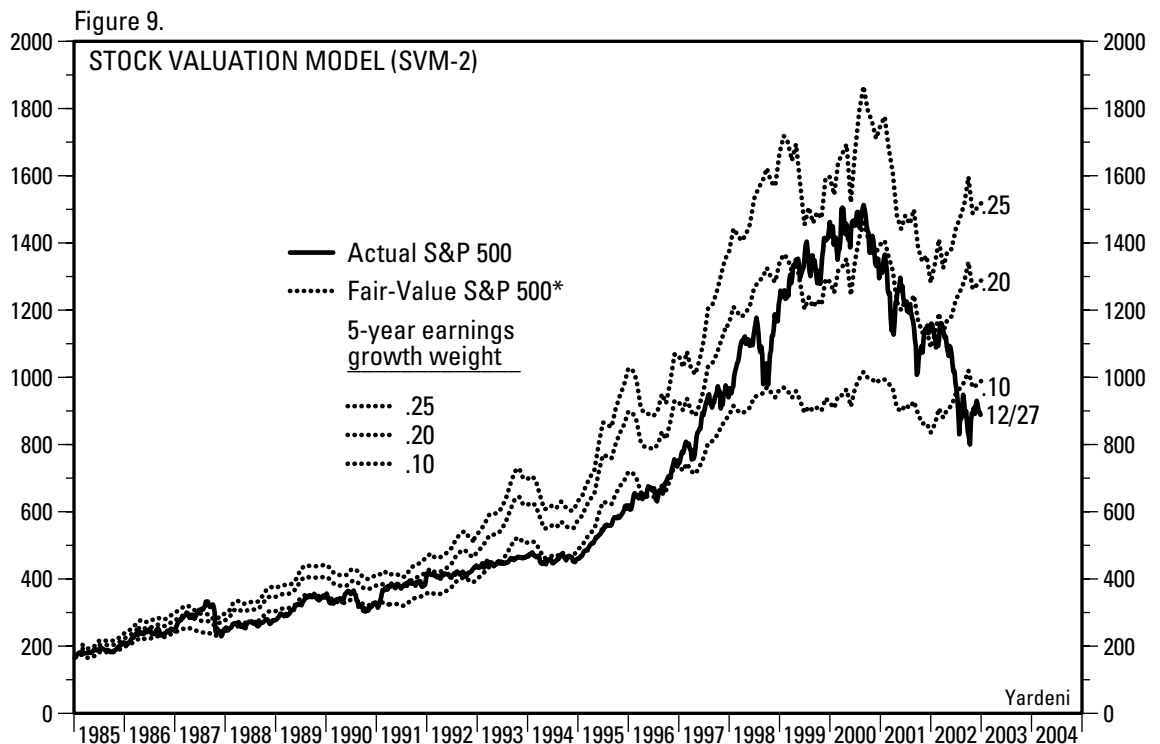
* 5-year forward consensus expected S&P 500 earnings growth.
Source: Thomson Financial.

The stock market is giving much less weight to LTEG, now that it is falling, than during the 1999-2000 Bubble, when it soared to record highs.



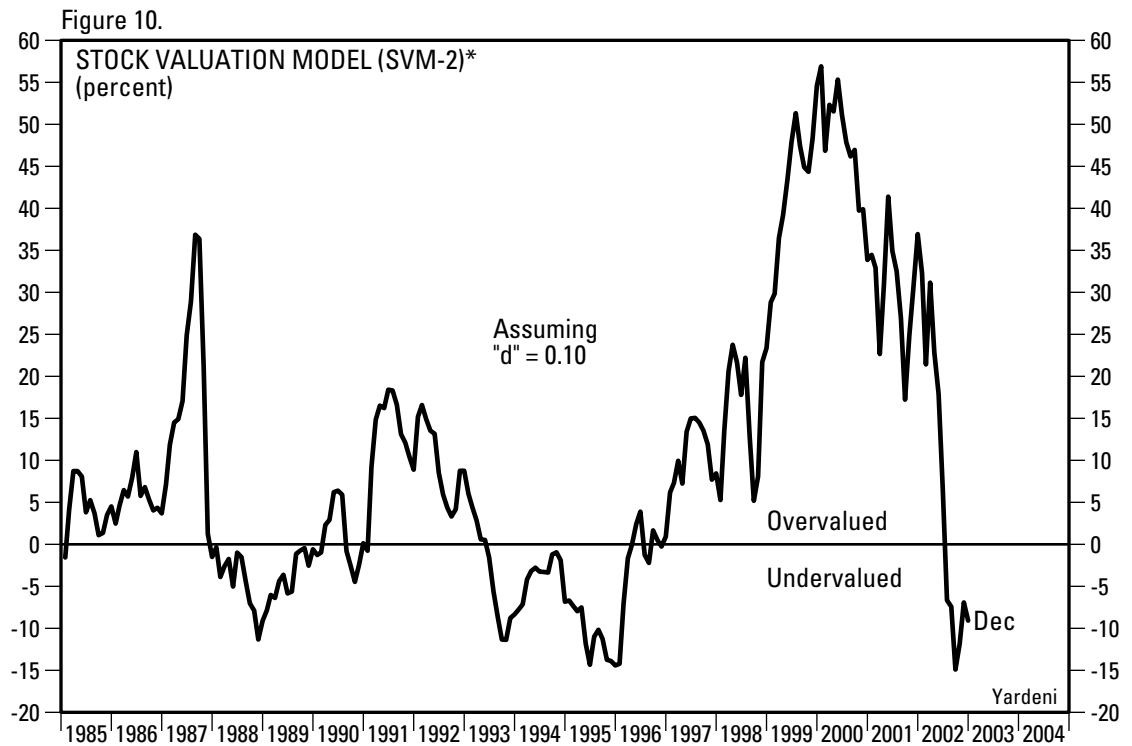
* Moody's A-rated corporate bond yield less earnings yield divided by 5-year consensus expected earnings growth.
Source: Standard and Poor's Corporation, Thomson Financial and Moody's Investors Service.

During the Bubble, investors doubled the weight they gave LTEG, which soared to irrationally exuberant new highs.



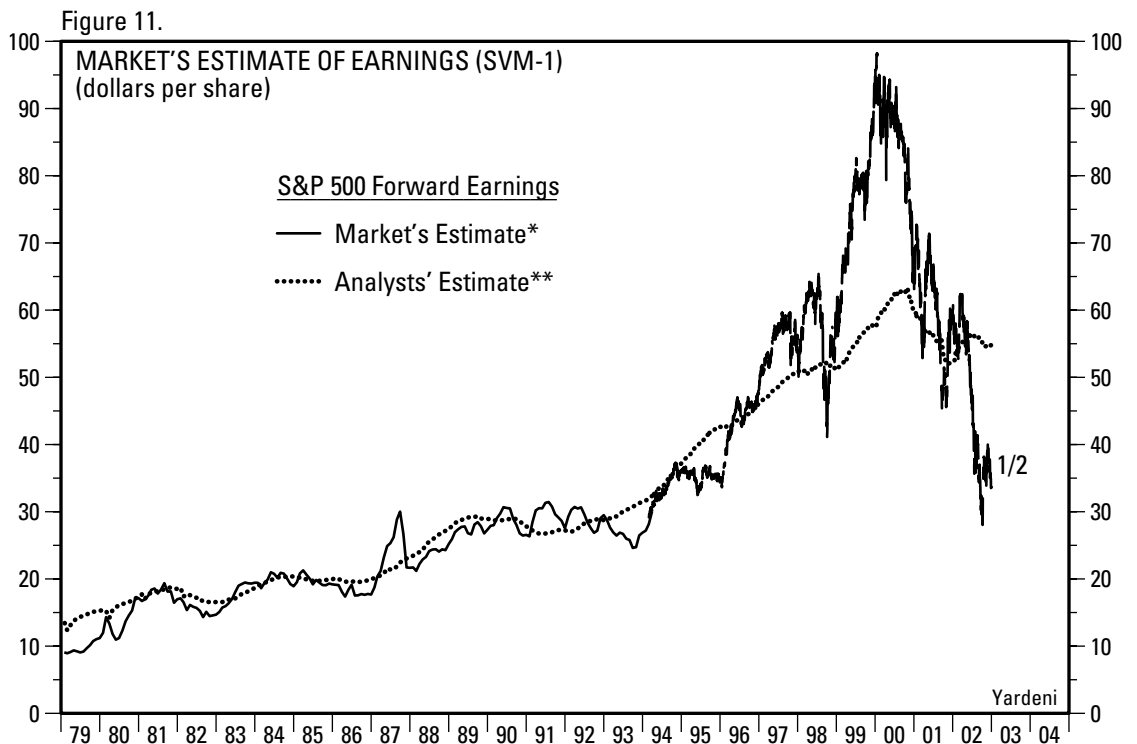
* Fair value is 12-month forward consensus expected S&P 500 operating earnings per share divided by the difference between Moody's A-rated corporate bond yield less the fraction (as shown above) of 5-year consensus expected earnings growth.
Source: Thomson Financial.

According to SVM-2, stocks were 9.1% undervalued during December.



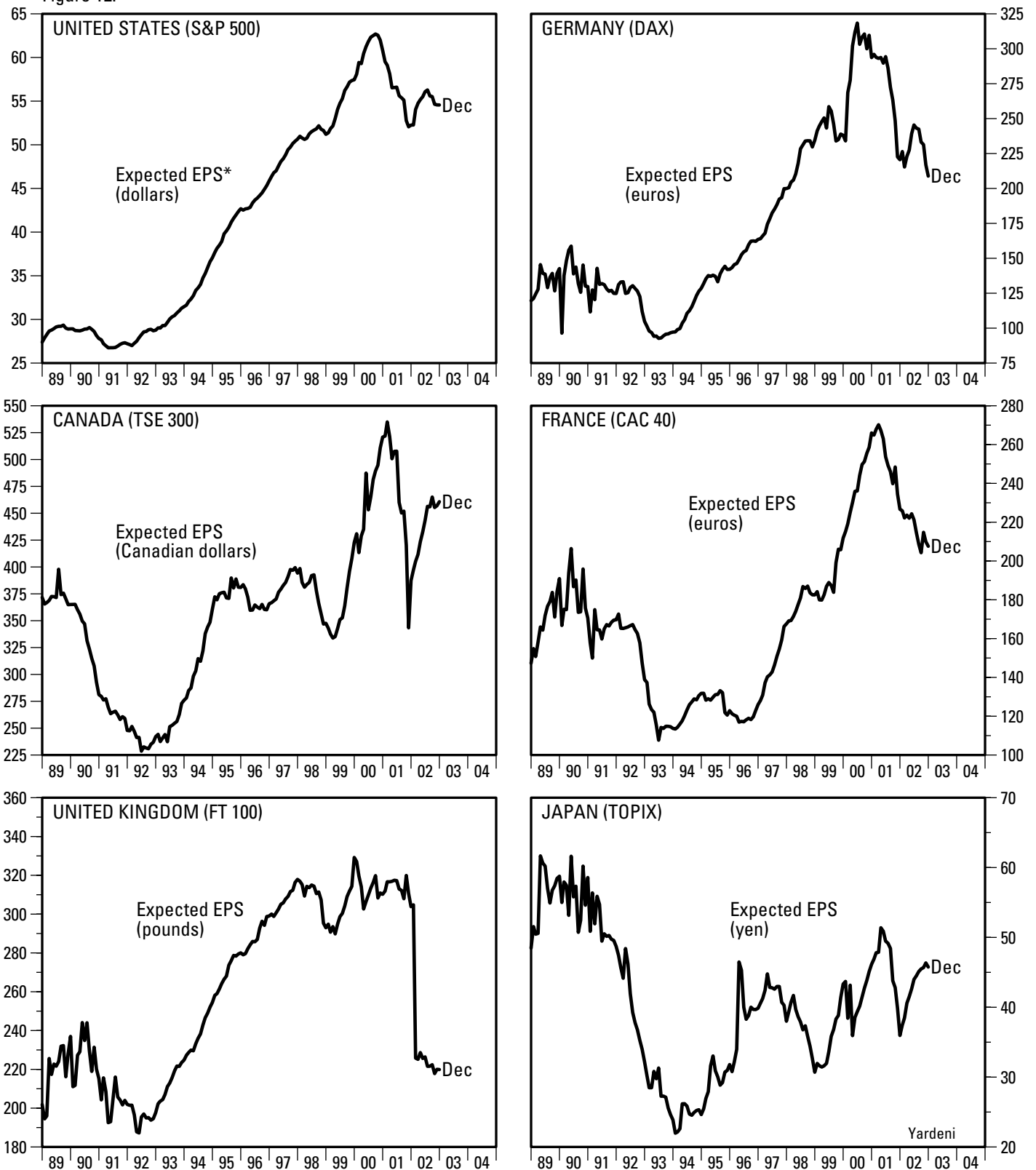
* Ratio of S&P 500 index to its fair value--i.e., 12-month forward consensus expected S&P 500 operating earnings per share divided by difference between Moody's A-rated corporate bond yield less fraction (0.10) of 5-year consensus expected earnings growth.
Source: Thomson Financial.

If stocks are always fairly valued, then the market's earnings estimate is currently 32.5% below analysts' consensus.



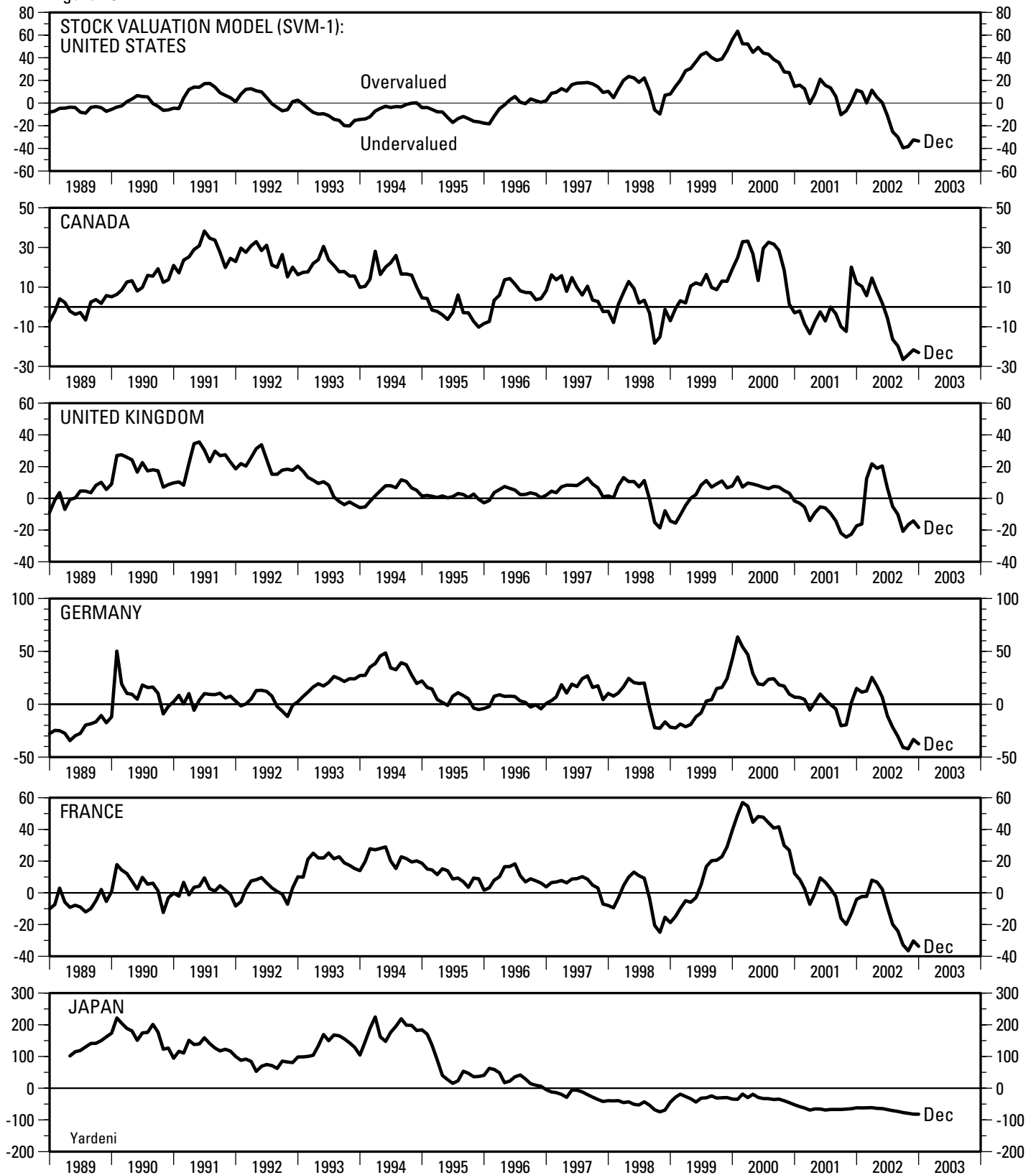
* S&P 500 index multiplied by ten-year government bond yield. Monthly through March 1994, weekly after.
** 12-month forward consensus expected S&P 500 operating earnings per share. Monthly through March 1994, weekly after.
Source: Standard & Poor's Corporation and Thomson Financial.

Figure 12.



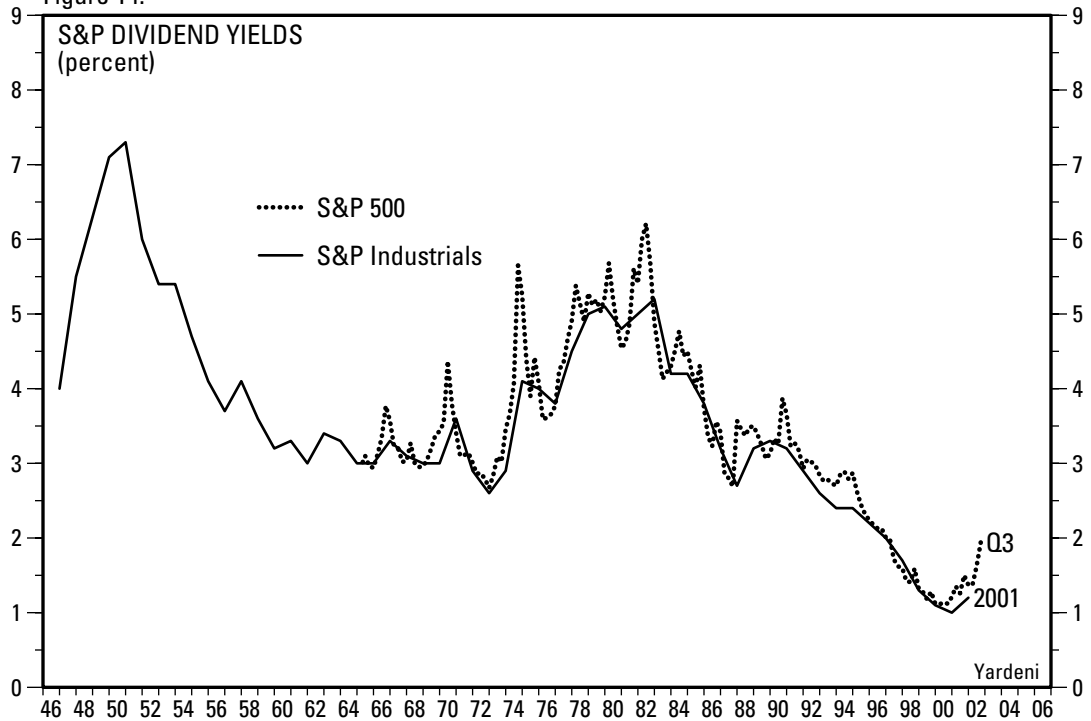
* 12-month forward consensus expected operating earnings per share.
Source: Thomson Financial.

Figure 13.



Source: Thomson Financial.

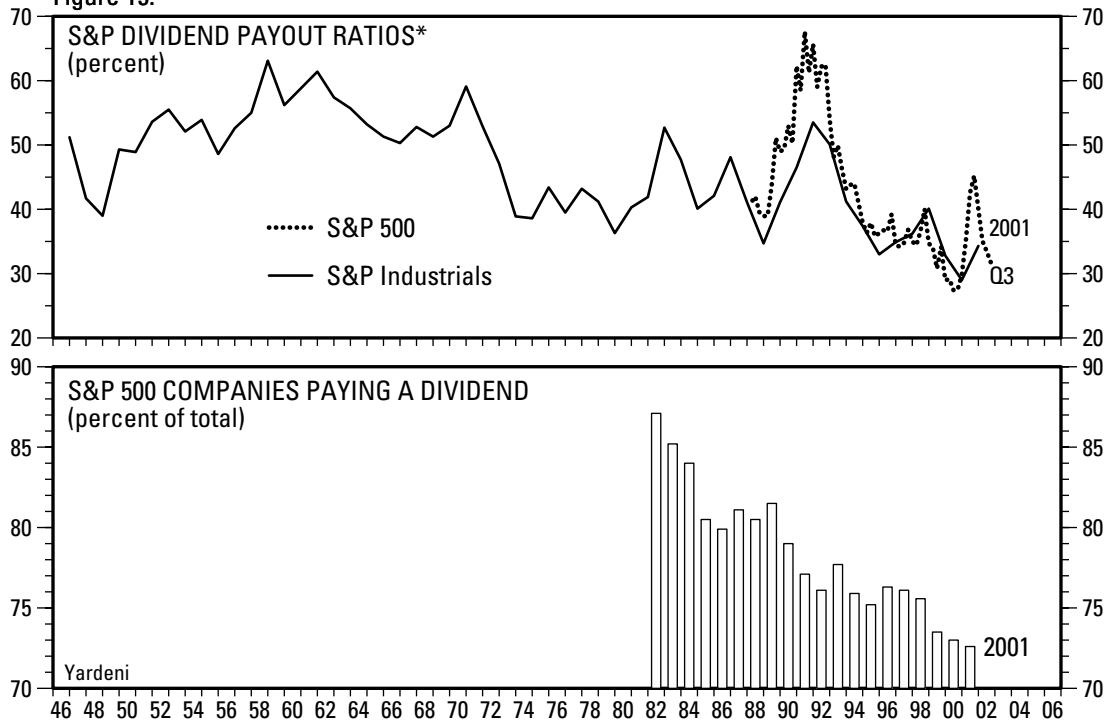
Figure 14.



Source: Standard & Poor's Corporation.

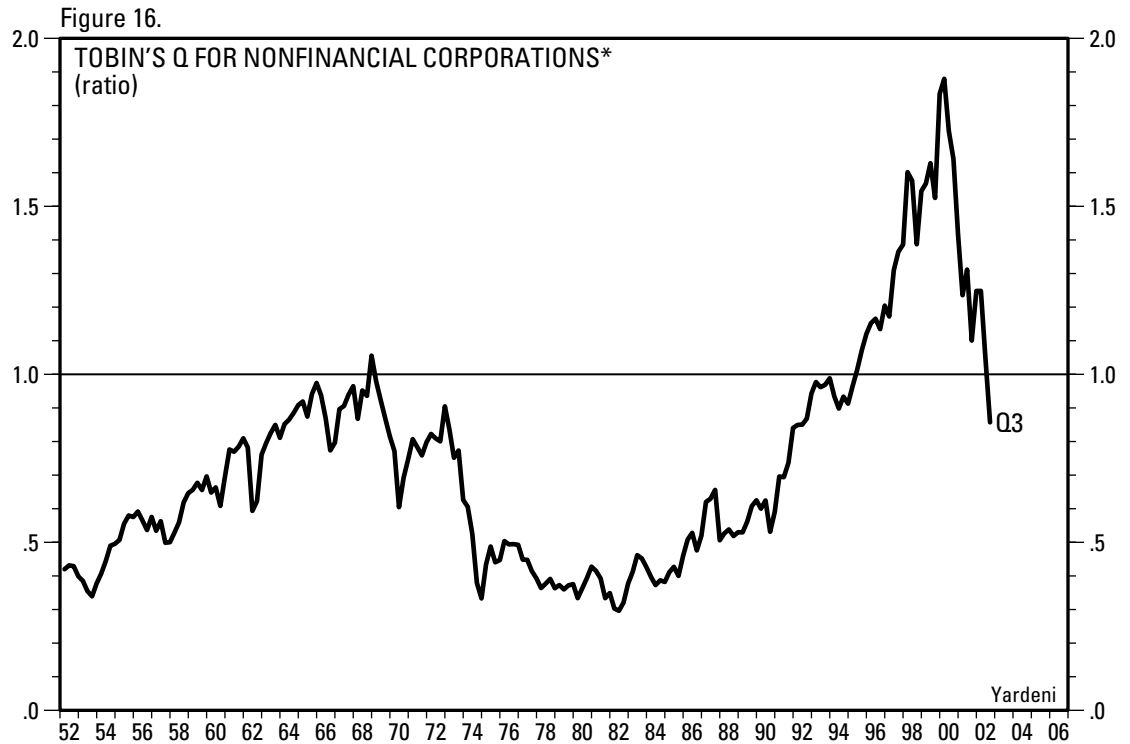
Dividend yield and dividend payout ratio fell sharply since the early 1980s partly because the percentage of S&P 500 companies paying any dividends at all dropped from 87% in 1982 to 73% in 2001.

Figure 15.



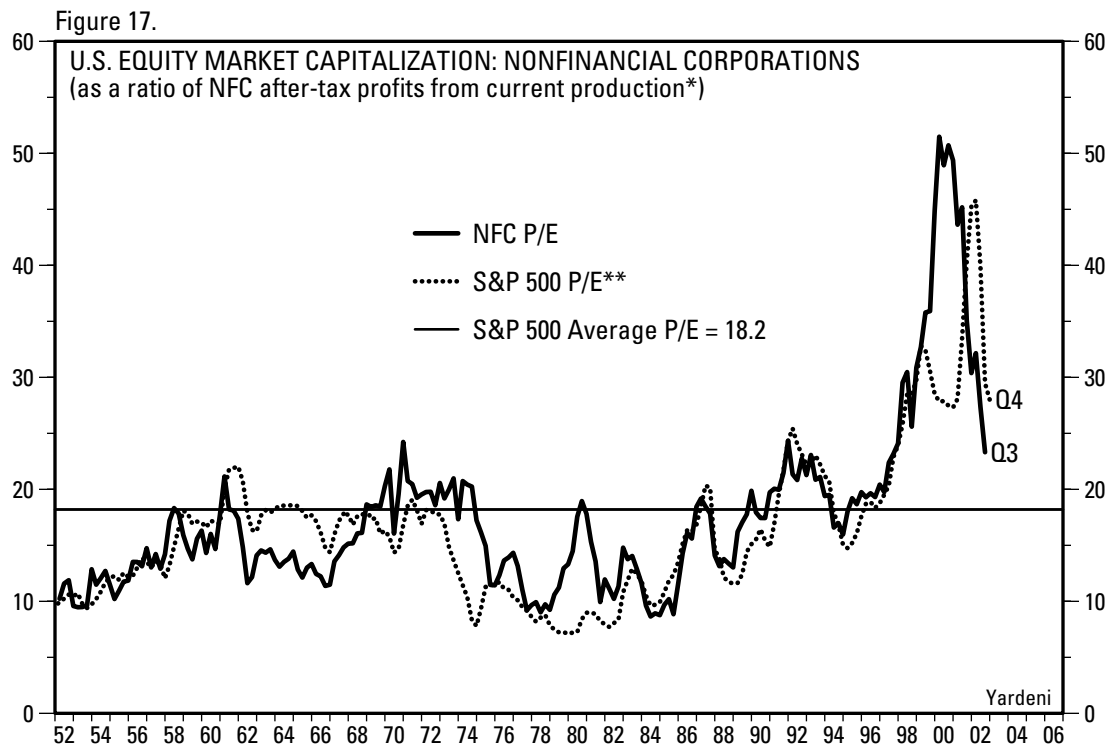
* Total dividends divided by total earnings.
Source: Standard & Poor's Corporation and FactSet.

Tobin's Q has limited value as a stock valuation model, though it did indicate significant overvaluation during late 1990s, as did SVM-1 and SVM-2.



* Ratio of market value of equities to net worth at market value, which includes real estate at market value and equipment and software and inventories at replacement cost.
Source: Federal Reserve Board, Flow of Funds Accounts.

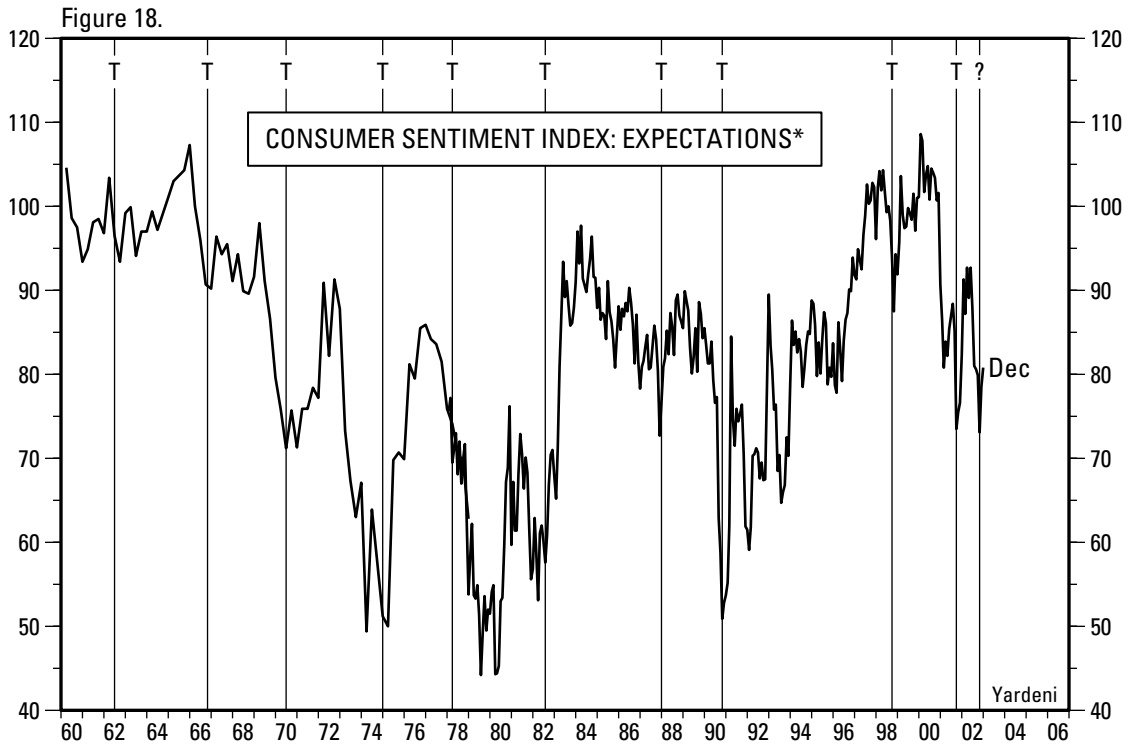
Reversion-to-the-mean models shouldn't be ignored.



* Including IVA and CCadj. These two adjustments restate the historical-cost basis used in profits tax accounting for inventory withdrawals and depreciation to the current-cost measures used in GDP.

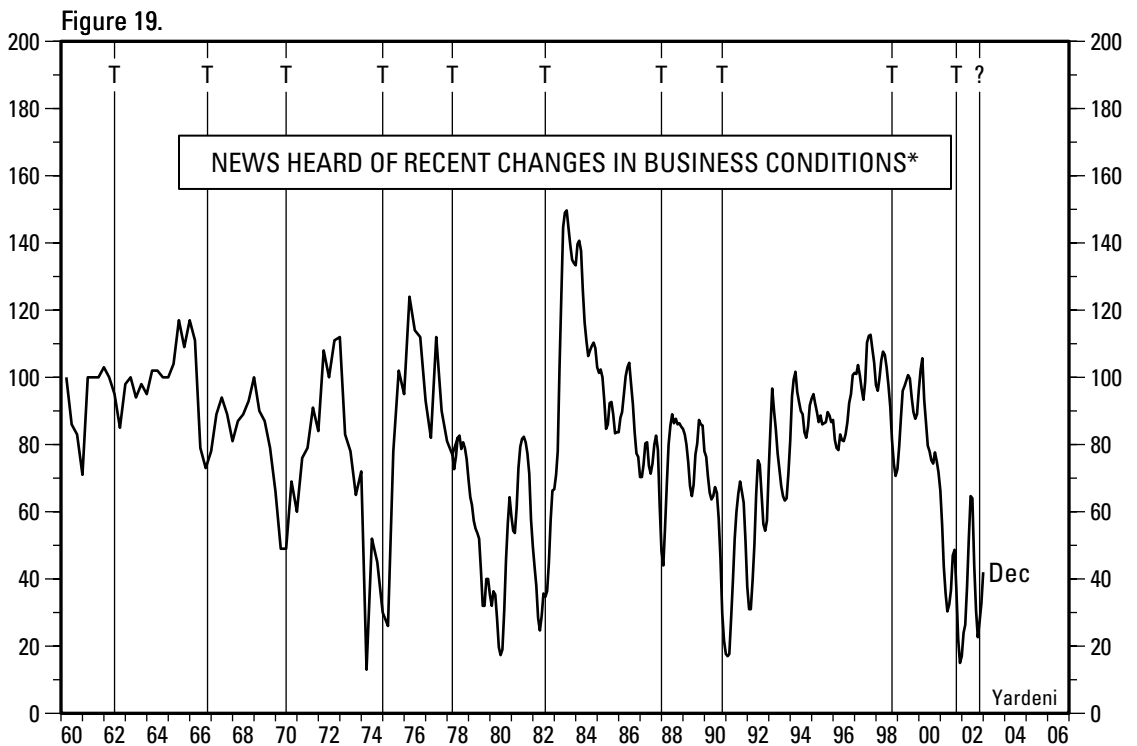
** Using four-quarter trailing reported earnings.

Source: Federal Reserve Board, Flow of Funds Accounts and Standard & Poor's Corporation.



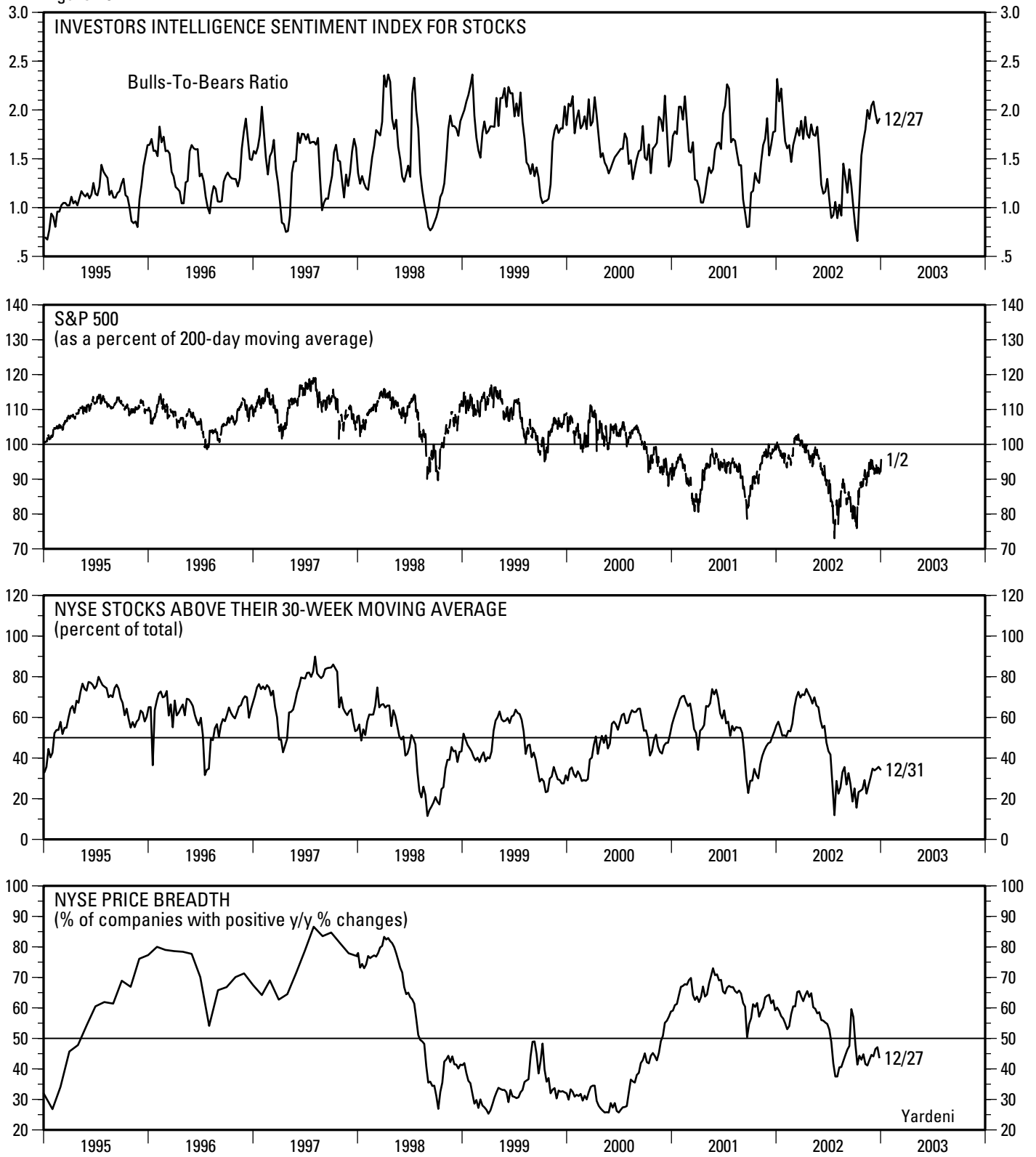
T = S&P 500 major cyclical trough.
 * Quarterly through 1978, monthly thereafter.
 Source: Survey Research Center, University of Michigan.

These two measures of consumer sentiment are especially good for confirming major market bottoms. Expectations are most depressed and news heard is most pessimistic at bottoms.



T = S&P 500 major cyclical trough.
 * Favorable minus unfavorable plus 100. Quarterly through 1977, 3-month moving average thereafter.
 Source: Survey Research Center, University of Michigan.

Figure 20.



Source: Standard & Poor's Corporation, Investors Intelligence, and FactSet.

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January 6, 2003