#45 Earnings: The Phantom Menace (Episode I)

#46 Irrational Exuberance: Earnings Growth & Stock Valuation

#47 The Technology Lottery

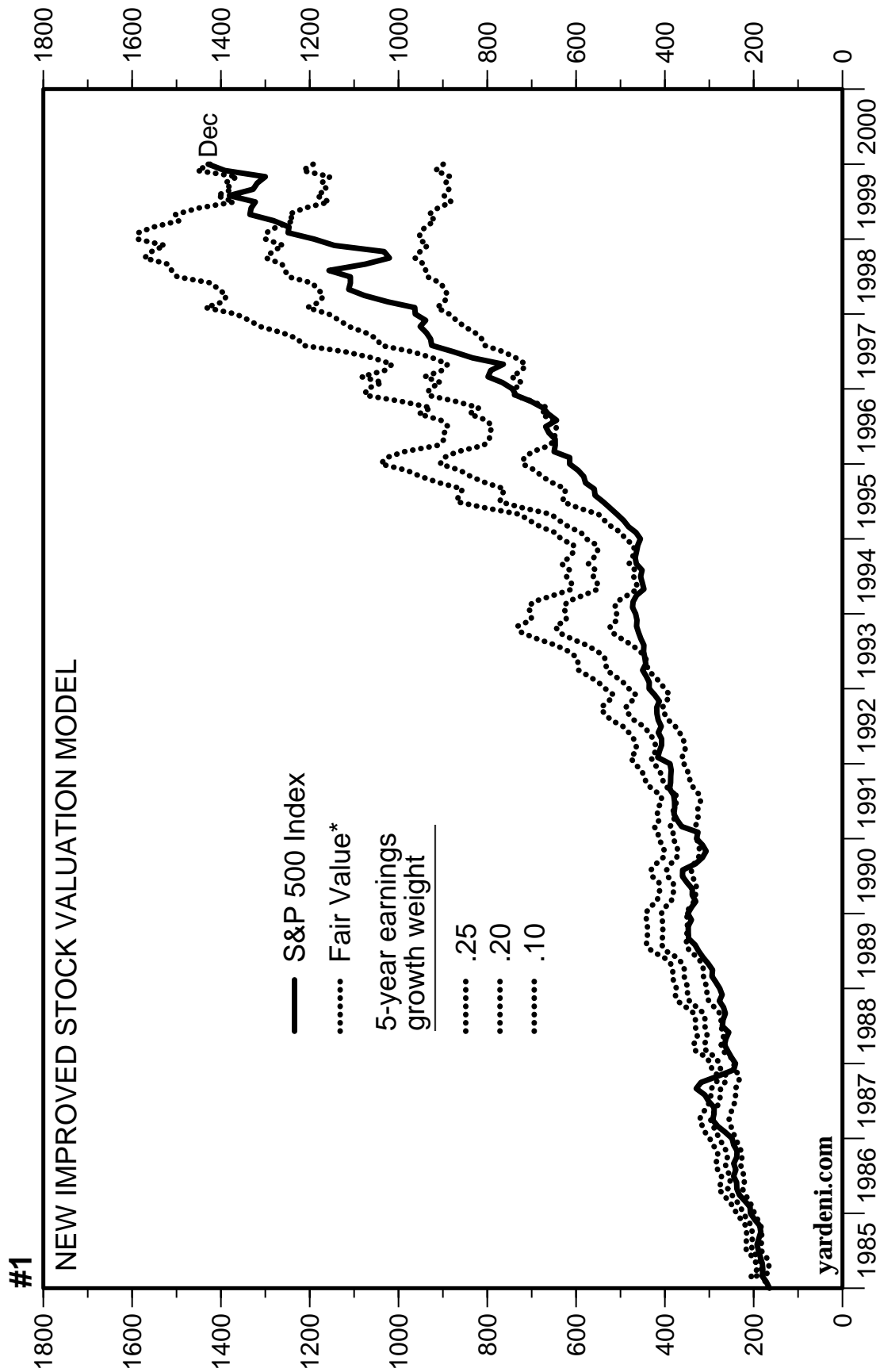#48 The Baby Boom Chart Book 2000

Topical Study #49

How To Value Earnings Growth

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#1 NEW IMPROVED STOCK VALUATION MODEL

Legend:
- S&P 500 Index
- Fair Value*
- 5-year earnings growth weight
  - .25
  - .20
  - .10

Dec

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* Fair Value is I/B/E/S forward earnings divided by difference between Moody's A-rated corporate bond yield and fraction (as shown above) of consensus 5-year earnings growth.

I. New Improved Valuation Model

The bears believe that the US stock market is overvalued. They see a speculative bubble. The bulls say that the bubble bears are using traditional valuation models which are irrelevant in the New Economy. Neither side has provided a very rigorous defense of their position, in my opinion. In this study, I will use a traditional valuation model to derive the explicit bullish assumptions embodied in stock prices. I will show that the market is fairly valued today only if record-high, long-term earnings growth expectations are realistic and should be given more weight than in the past (Exhibit 1).

The model can also be used to compare the market's actual price-to-earnings ratio to the theoretical relationship between earnings growth and valuation. Again, current ratios make sense only using some very bullish assumptions about the outlook for earnings growth.

The simplest model is the Fed's Stock Valuation Model (FSVM). This model is inspired by the close historical empirical relationship between the current earnings yield (CEY) of the S&P 500 index and the 10-year Treasury bond yield (TBY) (Exhibit 2). The current earnings yield is the 12-month consensus forward earnings expectations (E) divided by the S&P 500 index (P). The earnings data are compiled by I/B/E/S International. When the stock market's current yield is greater (less) than the bond yield, stocks are under- (over-) valued.

This simple model worked quite well in the past. It identified when stock prices were excessively overvalued or undervalued, and likely to fall or rise. It hasn't worked very well since May 1999, when the market surpassed its previous record 34% overvaluation peak just prior to the 1987 crash. Instead of falling, stock prices continued to soar. Today, the FSVM shows that stocks are more than 60% overvalued (Exhibit 3).[1]

The FSVM is missing variables reflecting that the current earnings yield is riskier than the government bond yield. Also missing is a variable for long-term earnings growth. The New Improved Model includes these variables as follows:

1)   **CEY = CBY – b ⋅ LTEG + residual**

where CBY is Moody's A-rated corporate bond yield. LTEG is long-term expected earnings growth, which is measured using consensus five-year earnings growth projections. These are compiled monthly by I/B/E/S International, and hit a record high of 15.7% during December (Exhibit 4). The "b" coefficient is the weight that the market gives to long-term earnings projections. It can be derived as -[CEY-CBY]/LTEG. Since the start of the data in 1985 until 1999, this "earnings growth coefficient" averaged 0.1 (Exhibit 5).

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[1] For more on the Fed's Stock Valuation Model, see my *Topical Study #44*, "New, Improved Stock Valuation Model," July 26, 1999 posted at www.yardeni.com/topical.asp

II. New Economy Assumptions

Equation 1 can be rearranged to produce the following equation:

2) $P' = E \cdot [CBY - b \cdot LTEG]$

where P' is the fair-value price of the S&P 500 index. Exhibit 1 shows three fair-value price series using the actual data for E, CBY, and LTEG with b = 0.1, b = 0.2, and b = 0.25. The market is fairly valued today if you agree with the consensus forecast that earnings can grow 15.7% per year over the next five years and that this variable should be weighted by 0.25, or two and a half times more than the average historical weight.

These are certainly New Economy assumptions. They raise two questions:

1) Can profits grow so rapidly over the next five years?

2) Should we give more weight than in the past to long-term earnings forecasts?

Previously, I showed that, on a trend basis, corporate profits have grown at the same pace as nominal GDP, i.e., revenues. The only way that profits could grow faster would be if the profit margin trended higher. This can happen on a cyclical basis, of course, but the historical trend has been a flat one for profit margins.[2]

I doubt that nominal GDP can grow faster than 5% to 6% per year over the next five years. This assumes that real GDP will grow 4% per year, with inflation between 1% and 2%. So how can profits increase 16% per year? The answer is it can happen because the GDP measure of profits is an unweighted aggregate, while the New Improved Model uses a measure that is market-cap weighted. In the New Economy's stock market, the stocks with the fastest earnings growth rates are the ones with the biggest and fastest growing market capitalization. This is a radical change from the past, when small companies had the fastest earnings growth.

Of the two New Economy assumptions, I believe that it does make sense to give long-term earnings expectations more weight in valuing stocks. The model I am using has no explicit risk premium factor for stocks versus bonds. It is partly reflected in the credit-risk premium in the A-rated corporate bond yield versus the Treasury bond. It is also implicit in the weight the market assigns to long-term earnings expectations. If recessions are likely to be less frequent and shallower in the New Economy, then we should give more weight to long-term earnings expectations.

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[2] See my *Topical Study #46*, "Irrational Exuberance: Earnings Growth & Stock Valuation," September 20, 1999 posted at www.yardeni.com/topical.asp.

III. How Much Is Growth Worth?

Equation 2 above can be rearranged to derive fair-value price-to-earnings ratios (P/Es):

3) $P'/E = 1/[CBY - b \cdot LTEG]$

Tables 1 and 2 and Exhibits 6 through 11 show these P/E ratios for various bond yields, earnings growth rates, and earnings growth coefficients. The current P/E, as of January 27, 2000, is 24.1, using 12-month forward earnings of $58.09 per share and an S&P 500 index of 1398.56. Is this too high? The tables show how difficult it is to answer this question. It all depends on how fast you think earnings can grow and how much weight you are willing to give your forecast. For example, a growth rate of 15% with a 7% corporate bond yield can be worth 18x earnings with a 0.1 weight or 40x with a 0.3 weight. You can drive a convoy of trucks sideways between those two points. A 10% earnings growth rate with a 7% yield can be worth 17x earnings with a 0.1 weight or 25x with a 0.3 weight.

Valuation, like beauty, is in the eye of the beholder. This exercise has demonstrated how widely valuation can vary with relatively small changes in the key variables. Valuation models are still useful for identifying the assumptions about earnings growth and risk that are embodied in stock prices. But, at the end of the day, we all have to judge on our own whether those assumptions are overly bearish or overly bullish. In my judgment, the overall market is probably fairly valued now. However, since the middle of 1998, the stock market has split into a small group of overpriced growth stocks and a big group of underpriced value stocks. This year, I expect a convergence of these valuation extremes.
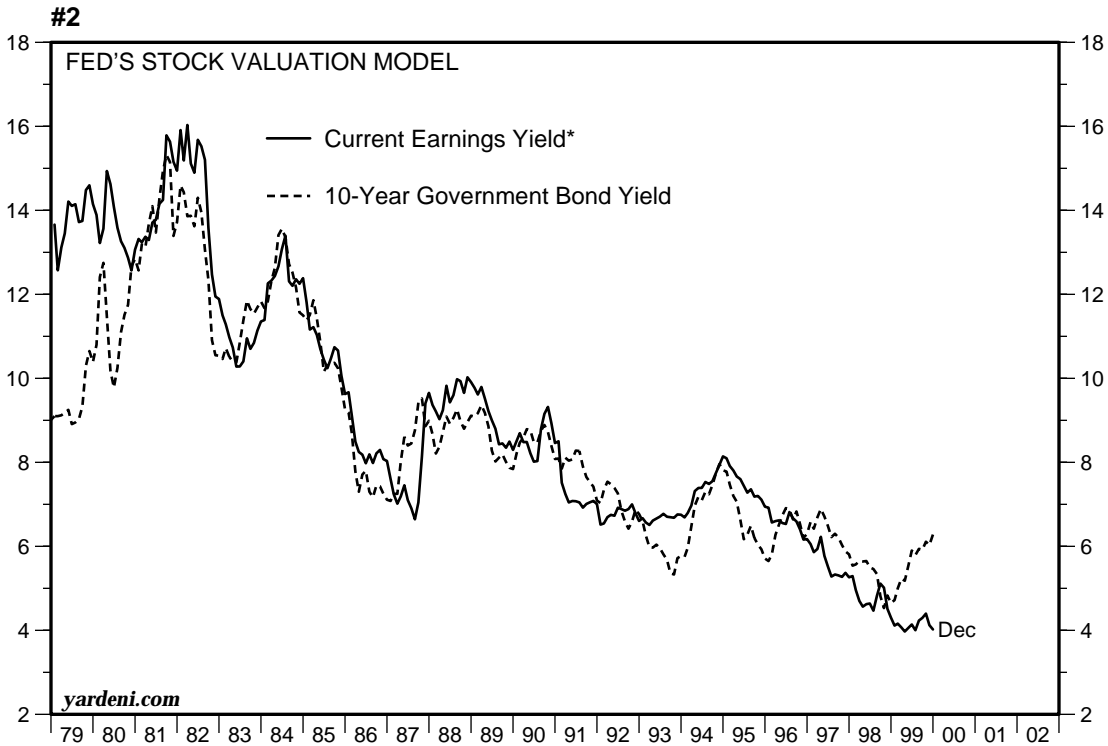
Table 1: P/E Multiples with an Earnings Growth Rate of 15%

Bond Yield	Earnings Growth Coefficient		
	0.1	0.2	0.3
3.0	66.7		
3.5	50.0	200.0	
4.0	40.0	100.0	
4.5	33.3	66.7	
5.0	28.6	50.0	200.0
5.5	25.0	40.0	100.0
6.0	22.2	33.3	66.7
6.5	20.0	28.6	50.0
7.0	18.2	25.0	40.0
7.5	16.7	22.2	33.3
8.0	15.4	20.0	28.6
8.5	14.3	18.2	25.0
9.0	13.3	16.7	22.2
9.5	12.5	15.4	20.0
10.0	11.8	14.3	18.2

Table 2: P/E Multiples with an Earnings Growth Rate of 10%

Bond Yield	Earnings Growth Coefficient		
	0.1	0.2	0.3
3.0	50.0	100.0	
3.5	40.0	66.7	200.0
4.0	33.3	50.0	100.0
4.5	28.6	40.0	66.7
5.0	25.0	33.3	50.0
5.5	22.2	28.6	40.0
6.0	20.0	25.0	33.3
6.5	18.2	22.2	28.6
7.0	16.7	20.0	25.0
7.5	15.4	18.2	22.2
8.0	14.3	16.7	20.0
8.5	13.3	15.4	18.2
9.0	12.5	14.3	16.7
9.5	11.8	13.3	15.4
10.0	11.1	12.5	14.3

- Stock Valuation -

#2

FED'S STOCK VALUATION MODEL

—— Current Earnings Yield*

---- 10-Year Government Bond Yield

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'79 '80 '81 '82 '83 '84 '85 '86 '87 '88 '89 '90 '91 '92 '93 '94 '95 '96 '97 '98 '99 '00 '01 '02

* I/B/E/S consensus estimates of earnings over the coming 12 months divided by S&P 500 Index.
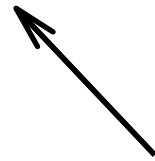
The simplest stock valuation model shows record overvaluation.

#3

FED'S STOCK VALUATION MODEL*
(percent)

Dec

Overpriced

Underpriced

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'79 '80 '81 '82 '83 '84 '85 '86 '87 '88 '89 '90 '91 '92 '93 '94 '95 '96 '97 '98 '99 '00 '01 '02
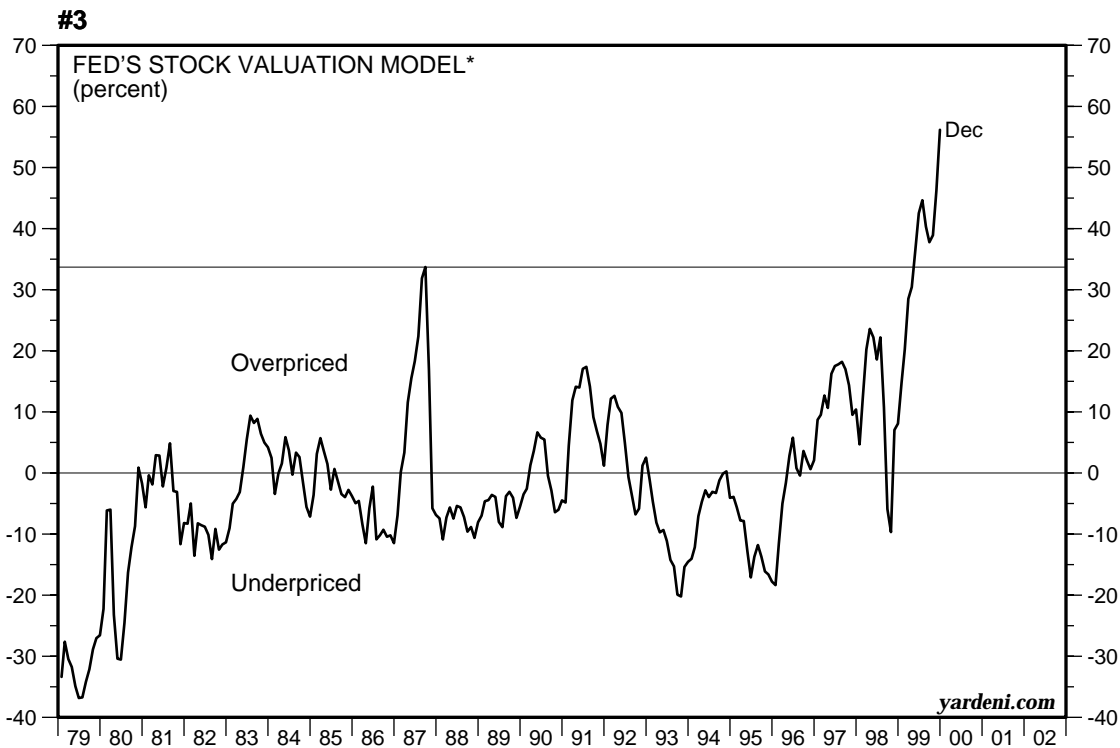
* Ratio of S&P 500 Index to I/B/E/S consensus estimates of earnings over the coming 12 months divided by the 10-year US Treasury bond yield minus 100.

- **Stock Valuation** -

#4

CONSENSUS 5-YEAR EARNINGS GROWTH
(annual average, percent)
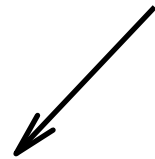
Long-term earnings growth expectations at record high.

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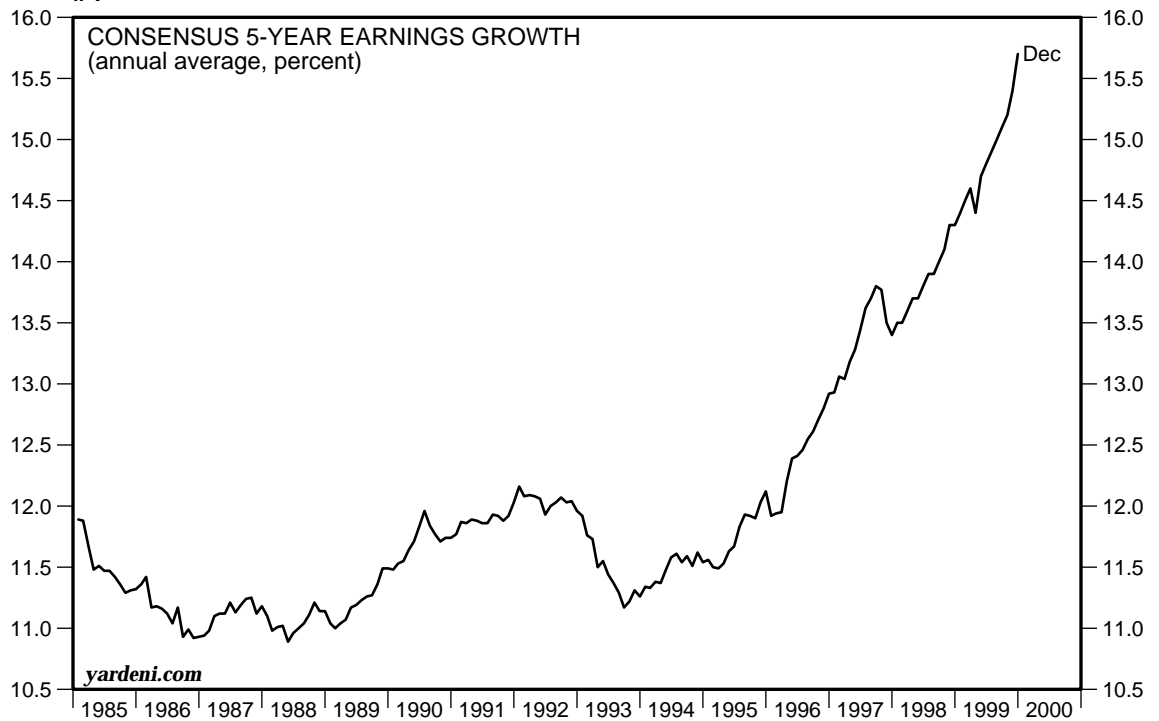
* Source: I/B/E/S International, Inc.

#5

MARKET'S WEIGHT FOR CONSENSUS 5-YEAR EARNINGS GROWTH*
(percent)

Investors have on average over time subtracted 10% of their long-term earnings growth expectations from the corporate bond yield to determine current earnings yield. Today, they are using a higher 25% weight.
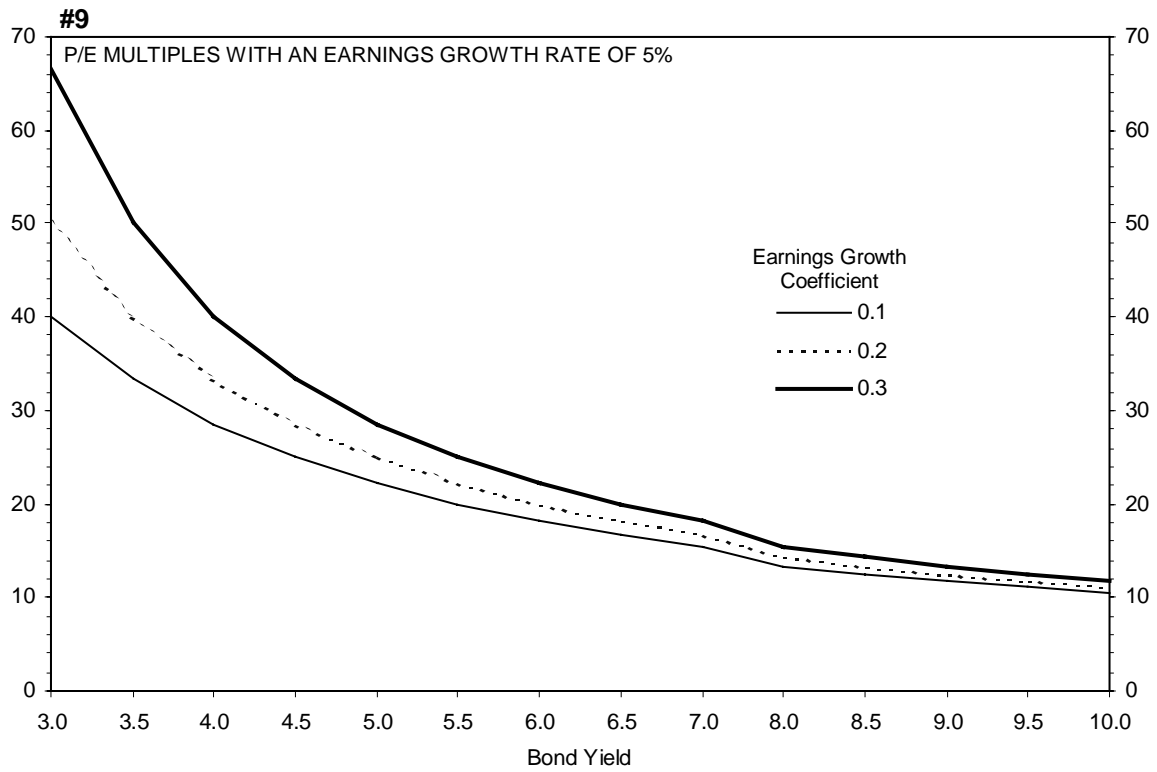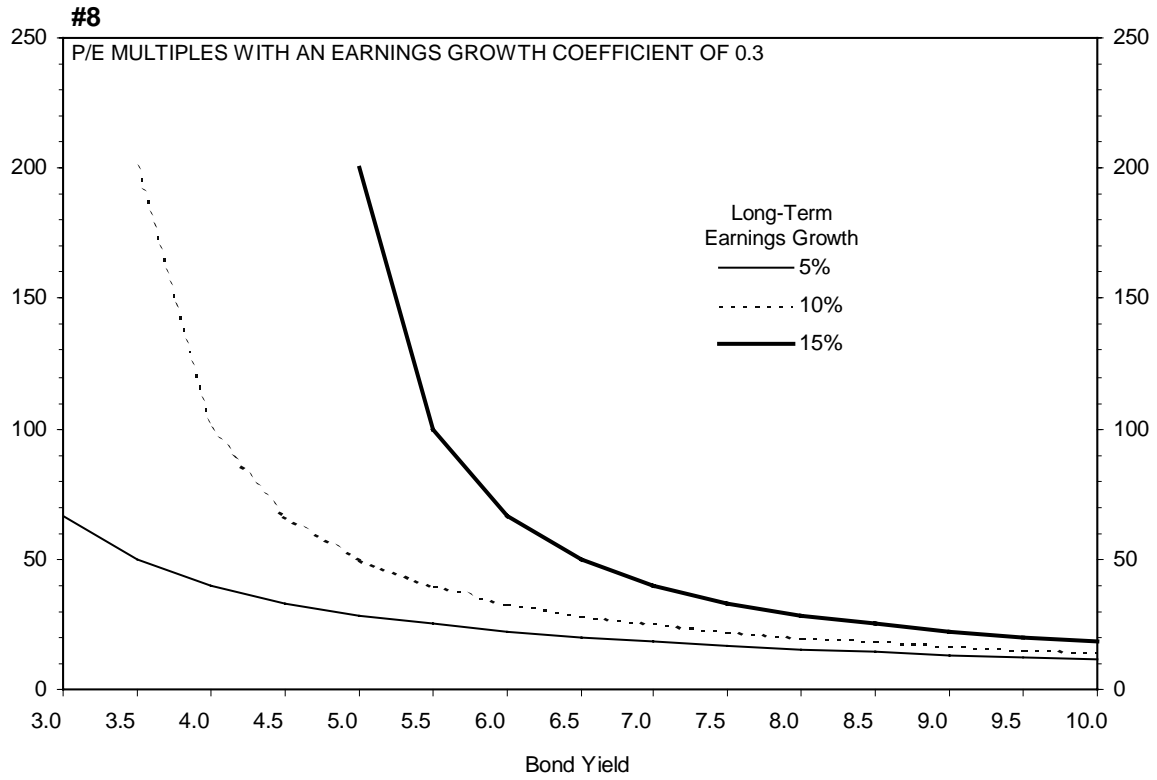
Avg = 10%

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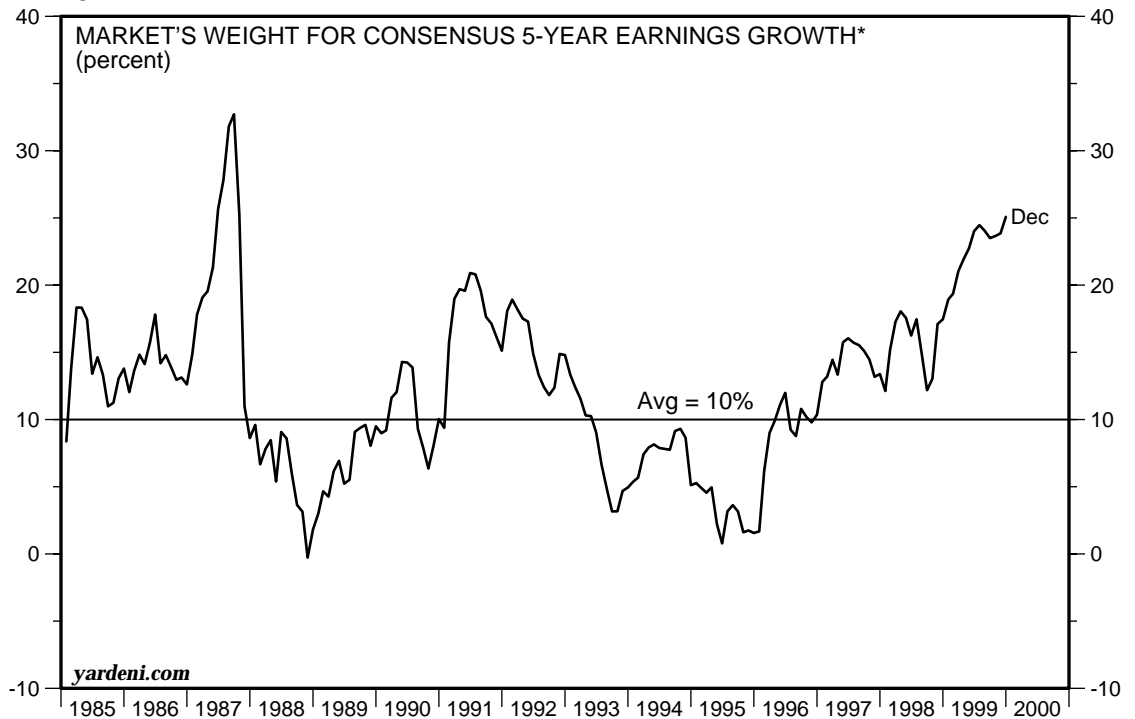
* Moody's A-rated corporate bond yield less current earnings yield divided by consensus
  5-year earnings growth.

- Stock Valuation -

#6

P/E MULTIPLES WITH AN EARNINGS GROWTH COEFFICIENT OF 0.1

Long-Term
Earnings Growth
—— 5%
········ 10%
——— 15%

Bond Yield

#7

P/E MULTIPLES WITH AN EARNINGS GROWTH COEFFICIENT OF 0.2

Long-Term
Earnings Growth
—— 5%
········ 10%
——— 15%

Bond Yield

- Stock Valuation -

#8

P/E MULTIPLES WITH AN EARNINGS GROWTH COEFFICIENT OF 0.3

Long-Term
Earnings Growth
—— 5%
········ 10%
━━ 15%

Bond Yield

#9

P/E MULTIPLES WITH AN EARNINGS GROWTH RATE OF 5%

Earnings Growth
Coefficient
—— 0.1
········ 0.2
━━ 0.3

Bond Yield

- Stock Valuation -

#10

P/E MULTIPLES WITH AN EARNINGS GROWTH RATE OF 10%

Earnings Growth
Coefficient
— 0.1
····· 0.2
— 0.3

Bond Yield

#11

P/E MULTIPLES WITH AN EARNINGS GROWTH RATE OF 15%

Earnings Growth
Coefficient
— 0.1
····· 0.2
— 0.3

Bond Yield

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