#42 The Baby Boom Chart Book 1998

#43 The Economic Consequences Of The Peace: In 1999 & Beyond

#44 New, Improved Stock Valuation Model

#45 Earnings: The Phantom Menace (Episode I)

Topical Study #46

Irrational Exuberance: Earnings Growth & Stock Valuation

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#1 Industry analysts are very exuberant about earnings outlook.

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

I. Greenspan, The Bubble, & Earnings

I believe that the current level of the stock market reflects unrealistically optimistic long-term earnings expectations. In August, the consensus of industry analysts forecast that S&P 500 earnings will grow roughly 15% per year for the next five years (Exhibit 1). This is the highest long-term growth rate forecast recorded since the start of the data, which are compiled monthly by I/B/E/S International. I will show that this projection is probably discounted in stock prices and that stock market investors collectively are giving more weight to this projection than they have on average since 1985, when the data was first collected. Finally, I will demonstrate why 15% per year is unbelievable if nominal GDP continues to grow at less than half this pace, which is believable.

Fed Chairman Alan Greenspan is also concerned about the high expectations for earnings growth. In recent speeches, he has wondered out loud whether the bull market in stocks has driven prices up to levels that are based on overly optimistic assessments of risk and long-term earnings growth. Indeed, he first raised the specter of a speculative bubble in his Congressional testimony on June 17, 1999: "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."[1]

He did it again in his August 27, 1999 speech in Jackson Hole, Wyoming. His theme was the need for economists to build models which better reflect the impact of asset values on the economy. He observed "To anticipate a bubble about to burst requires the forecast of a plunge in the prices of assets previously set by the judgments of millions of investors, many of whom are highly knowledgeable about the prospects for the specific companies that make up our broad stock price indexes."[2]

Of course, it is widely believed that he first expressed his misgivings about the stock market in a speech on December 5, 1996, when the Dow was much lower at 6437. Here is what he actually said:

> Clearly, sustained low inflation implies less uncertainty about the future, and lower risk premiums imply higher prices of stocks and other earning assets. We can see that in the inverse relationship exhibited by price/earnings ratios and the rate of inflation in the past. But how do we know when irrational exuberance has unduly escalated asset values, which then become subject to unexpected and prolonged contractions as they have in Japan over the past decade?[3]

The Fed Chairman didn't say that stock investors were irrationally exuberant back then. He simply wondered out loud if there was some way to make this assessment. He repeated the question in his semiannual Humphrey-Hawkins testimony to Congress on February 26, 1997.[4] He added:

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[1] http://www.bog.frb.fed.us/BOARDDOCS/TESTIMONY/1999/19990617.htm
[2] http://www.bog.frb.fed.us/BOARDDOCS/SPEECHES/1999/19990827.htm
[3] http://www.bog.frb.fed.us/boarddocs/speeches/1996/19961205.htm
[4] http://www.bog.frb.fed.us/BOARDDOCS/hh/1997/february/testimony.htm

> We have not been able, as yet, to provide a satisfying answer to this question, but there are reasons in the current environment to keep this question on the table. Clearly, when people are exposed to long periods of relative economic tranquility, they seem inevitably prone to complacency about the future.

Mr. Greenspan mentioned the bull market in stocks only once in his July 22, 1997 Humphrey-Hawkins testimony: "Soaring prices in the stock market have been fueled by moderate long-term interest rates and expectations of investors that profit margins and earnings growth will hold steady, or even increase further, in a relatively stable, low-inflation environment."[5] But the accompanying "Monetary Policy Report to Congress" had more to say on the subject.[6]

> 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.

Based on this statement, I concluded that Mr. Greenspan and his colleagues were assessing the degree of irrational exuberance in the stock market by tracking a model that I dubbed the "Fed's Stock Valuation Model."[7] The stripped-down version of the FSVM simply compares the S&P 500 index to its fair value, defined as 12-month forward earnings divided by the 10-year bond yield. This is the same as comparing the current earnings yield (forward earnings divided by the S&P 500 index) to the 10-year Treasury bond yield. The market is overpriced when the index exceeds its fair value, or when the current earnings yield falls below the Treasury bond yield.

Subsequently, in my *Topical Study #44*, I improved this simple version of the FSVM by adding a variable for risk (the spread between the A-rated corporate bond yield and the Treasury bond yield) and a proxy for long-term expected earnings growth.[8] I showed that

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[5] http://www.bog.frb.fed.us/boarddocs/hh/1997/july/testimony.htm
[6] http://www.bog.frb.fed.us/boarddocs/hh/1997/july/fullreport.htm
[7] See my *Topical Study #38*, "Fed's Stock Market Model Finds Overvaluation," August 25, 1997. http://www.yardeni.com/topical.html
[8] *Topical Study #44*, "New, Improved Stock Valuation Model," July 26, 1999. http://www.yardeni.com/topical.html

the risk premium has over time offset long-term earnings expectations, which is why the stripped-down FSVM has worked reasonably well.

It hasn't worked very well this year because long-term earnings expectations have significantly exceeded risk assessments. Mr. Greenspan first noted his concerns about overly optimistic long-term earnings projections in his February 1997 testimony:

> Analytically, current stock-price valuations at prevailing long-term interest rates could be justified by very strong earnings growth expectations. In fact, the long-term earnings projections of financial analysts have been marked up noticeably over the last year and seem to imply very high earnings growth and continued rising profit margins, at a time when such margins are already up appreciably from their depressed levels of five years ago.

II. Some Arithmetic

Mr. Greenspan must be tracking the data collected by I/B/E/S International on analysts' consensus expectations for the average annual growth rate of earnings for the S&P 500 companies on an operating basis mentioned above. To see how these expectations are reflected in stock prices, consider the following version of the FSVM:

(1) CEY = a + b [TBY] + c [CBY – TBY] – d [LTEG] + residual

The current earnings yield (CEY) is a linear function of the Treasury bond yield (TBY), the risk spread between Moody's A-rated corporate bond yield (CBY) and the Treasury bond yield, and long-term earnings growth (LTEG). I think it is reasonable to assume that $a = 0$, $b = c = 1$, and $0 < d < 1$. So.

(2) CEY = CBY – d [LTEG] + residual

The current earnings yield is equal to the corporate bond yield less some fraction of long-term earnings growth expectations. The coefficient "d" is simply the fraction of expected long-term earnings growth that the market subtracts from the bond yield to produce the current earnings yield. Exhibit 2 shows the monthly value of "d" since 1985 implied by the above equation. Its average value is .10, which means that, on average, investors have subtracted 10% of their long-term earnings expectations from the corporate bond yield to get a fair value for the current earnings yield. This average value can be plugged into the above equation to derive an estimate of the fair-value of the current earnings yield (Exhibit 3).

III. Exuberance Index

We can rearrange equation (2) to derive a fair-value for the S&P 500 index as I/B/E/S 12-month forward earnings divided by the fair-value of the current earnings yield, i.e., CBY –

0.1 [LTEG]. This series is shown in Exhibit 4. I derive a Stock Market Exuberance Index as the ratio of the S&P 500 index divided by its calculated fair value (Exhibit 5).

According to my analysis, investors are extremely exuberant. In August, the S&P 500 index was 1327, exceeding its 887 fair value by 49.7%. It was down slightly from the record 53.9% reading in July. The previous peak record high was 36.7% during August 1987.

The only way to justify the current level of stock prices is to conclude that investors have raised the weight they assign to long-term earnings growth expectations. The coefficient "d" is now higher than 10%. In August, 1) the current earnings yield was 4.2%; 2) the A-rated corporate bond yield was 7.8%; and, 3) consensus 5-year earnings growth forecasts were 15% per year. To make these numbers all add up using equation (2) requires that d = 24%, or 2 ½ times greater than the historical average. Using this higher value yields an S&P 500 fair value of 1326, the same as the actual value.

IV. Perpetual Prosperity

This new version of the Fed's Stock Valuation Model is designed to gauge the assumptions that are "in the market." My analysis shows that investors currently expect profits to grow at a record pace of 15% per year over the next five years, and they are giving this forecast a much higher weight than on average.

Are these plausible assumptions? I suppose the higher weight for long-term earnings growth can be justified as consistent with the emergence of the so-called New Economy. In the New Economy, strong growth and low inflation can coexist and policy-engineered recessions are less likely.

Totally implausible, in my opinion, is the market's current assumption that profits can grow 15% per year for the next five years. Corporate profits can grow faster than nominal GDP for a while, but not for five years. The average difference between the growth in profits and the growth in nominal GDP of corporate business (which accounts for 62% of GDP currently) has been 1.5 percentage points since 1970 (Exhibits 6 and 7). Nominal GDP is unlikely to grow faster than 6% to 8% annually over the next five years (Exhibits 8 and 9). If a recession occurs during this period—which seems likely—profits growth would turn negative during the downturn.

So what's the bottom line? If we double the weight for expected long-term earnings growth, but cut the market's current expectations for earnings growth in half, the Stock Market Exuberance Index remains where it is today, at a record high and vulnerable to a fall.

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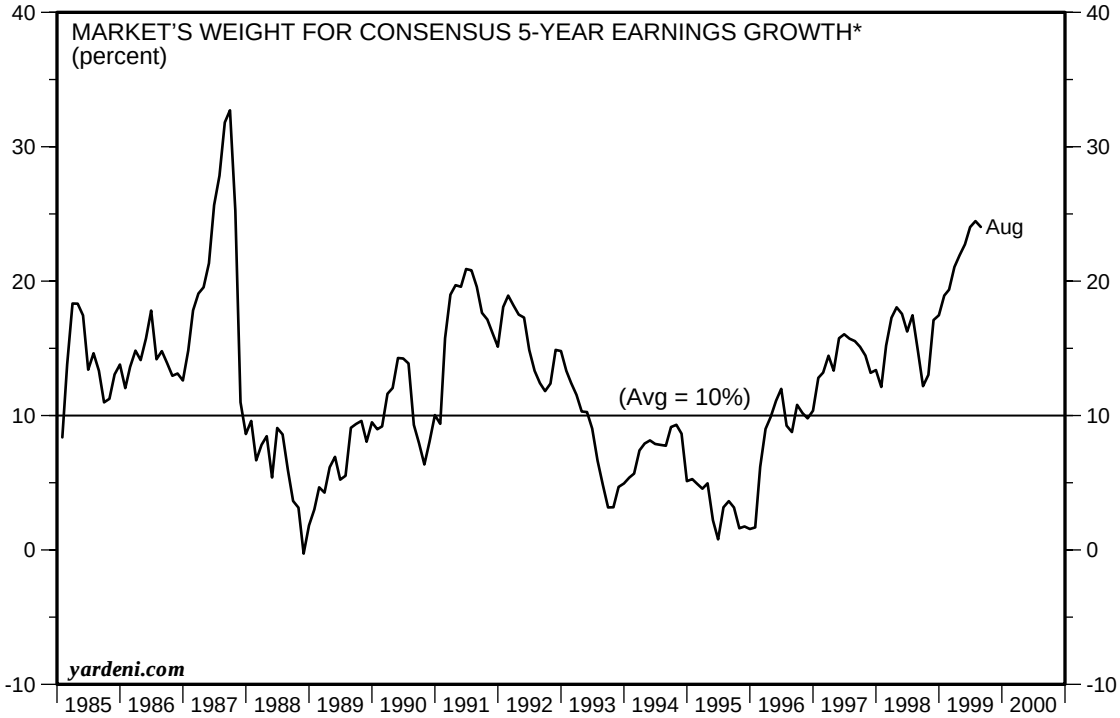
- Earnings Yield -

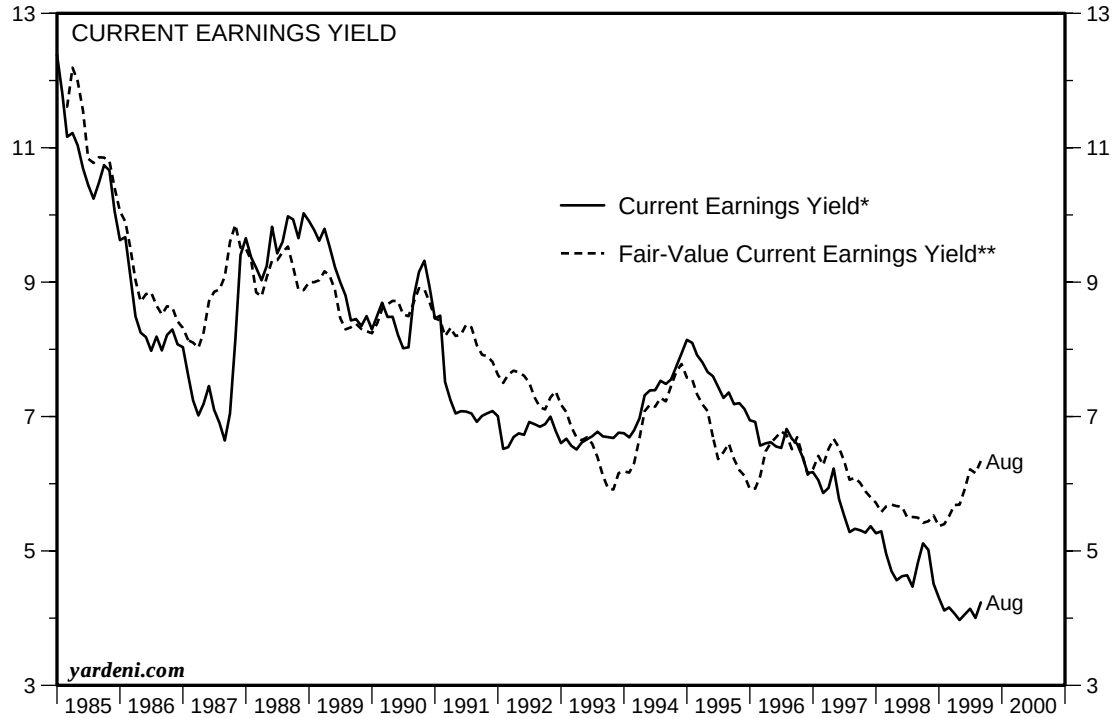
#2



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.

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

#3

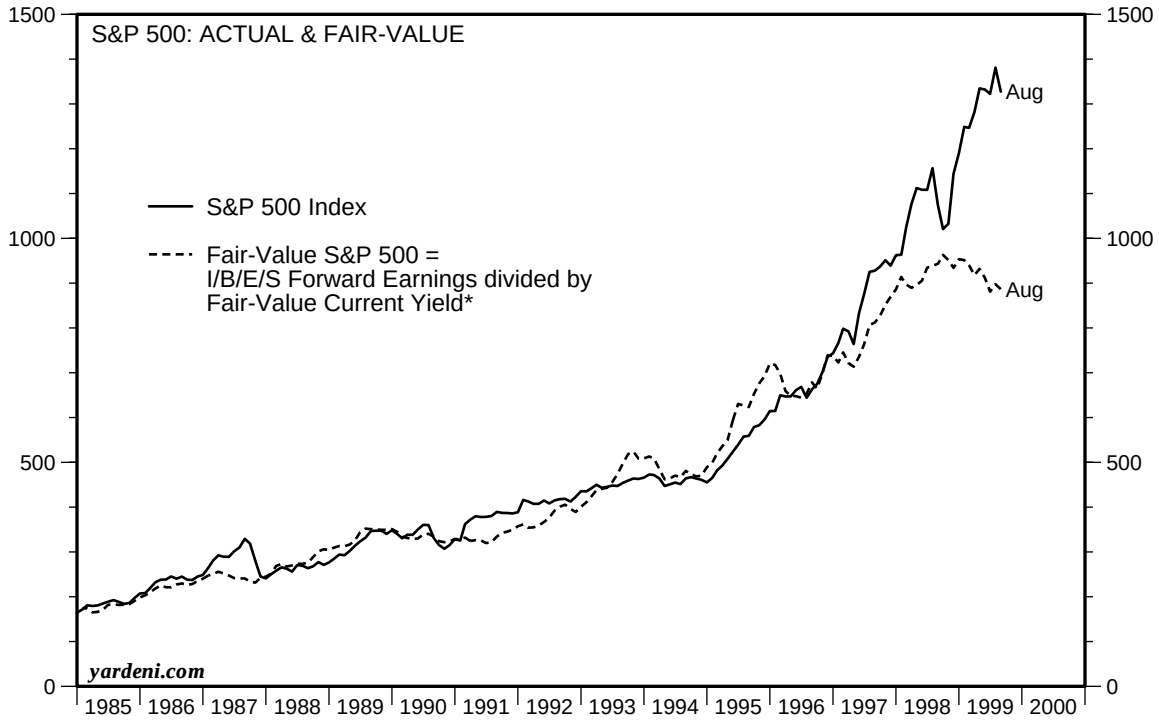


Corporate bond yield and long-term earnings growth suggest current earnings yield should be at 6.3%, well above August's 4.2%.

* I/B/E/S consensus of S&P 500 earnings over the coming 12 months divided by S&P 500 Index.
** Moody's A-rated corporate bond yield minus 10% of I/B/E/S consensus 5-year earnings growth.

- S&P 500 -

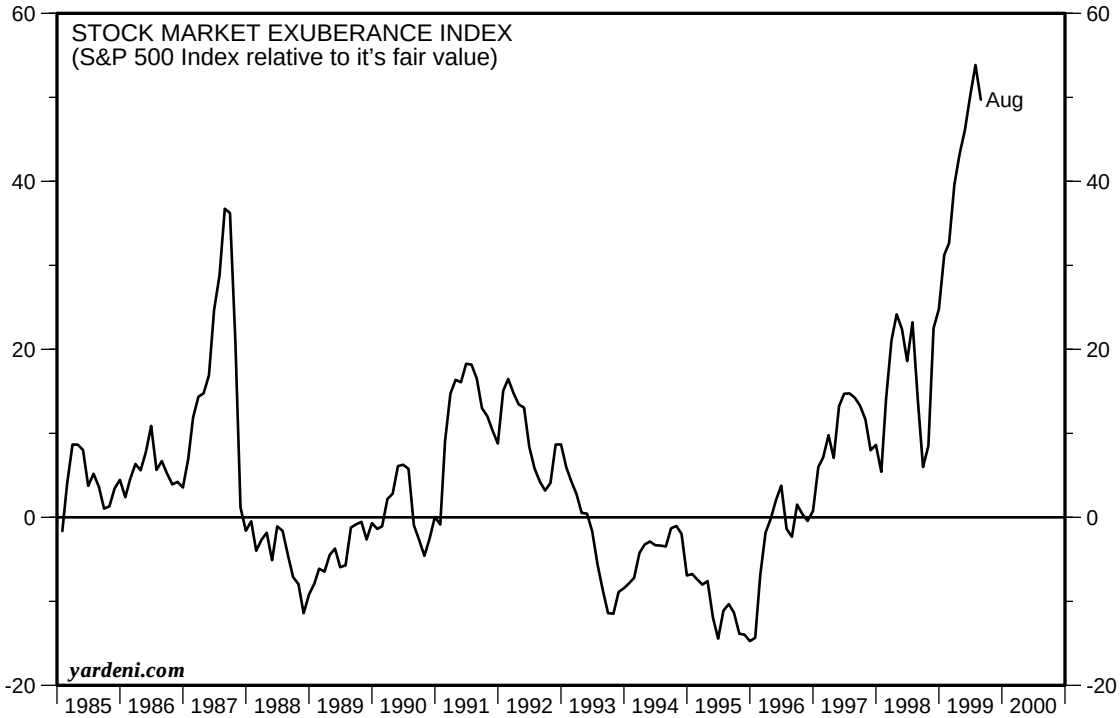
#4



* Fair-Value Current Yield = Moody's A-rated corporate bond yield minus 10% of I/B/E/S consensus 5-year earnings growth.

Corporate bond yield, long-term earnings growth, and 12-month forward earnings suggest S&P 500 should be 887, 49.7% below current level. Stock Market Exuberance Index is at 50, down slightly from the record 53.9% reading in July.

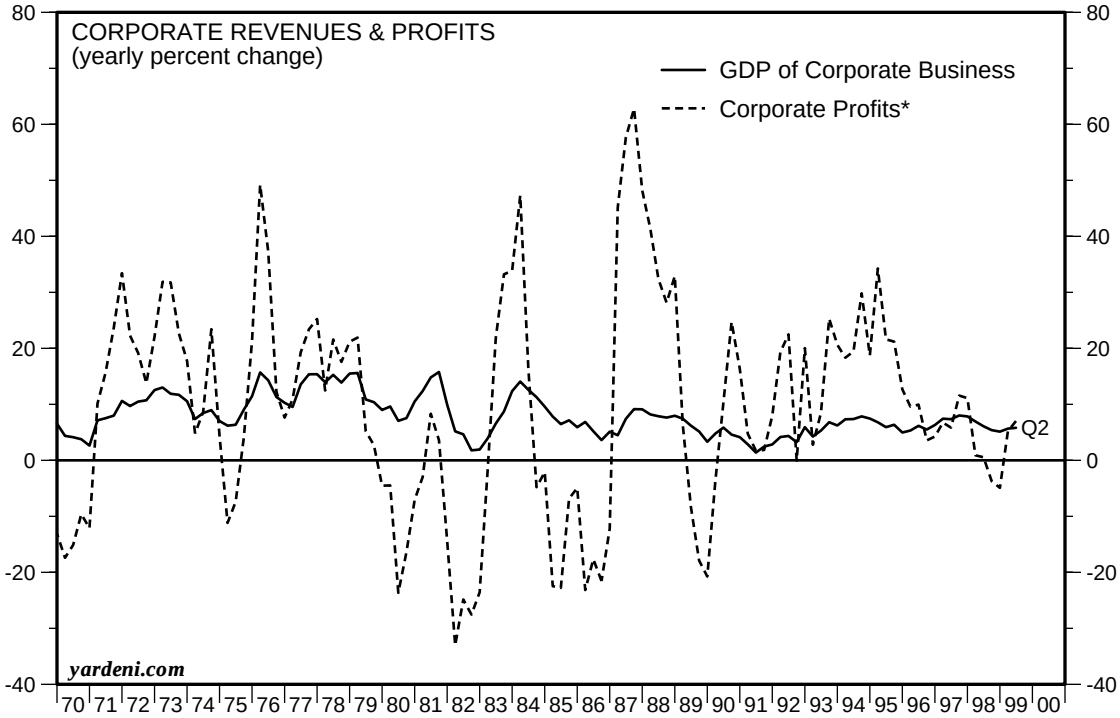
#5



* Fair-Value Current Yield = Moody's A-rated corporate bond yield minus 10% of I/B/E/S consensus 5-year earnings growth.

- Profits -

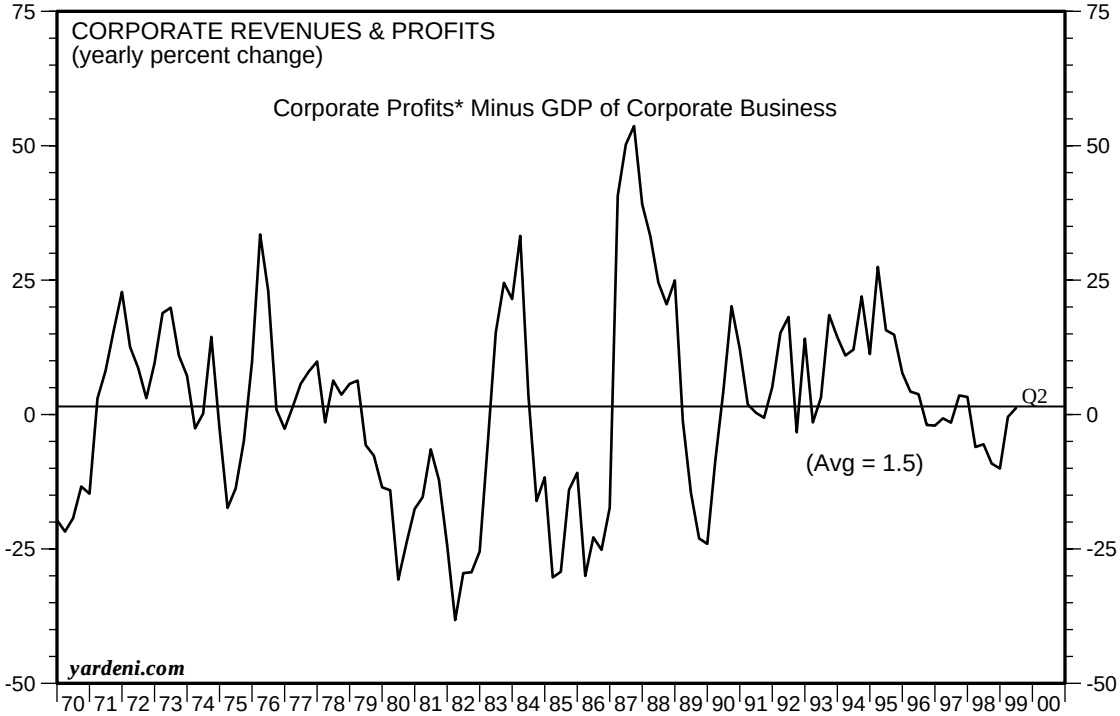
#6



* After taxes and excluding IVA & CCAdj.

Over time, corporate profits can't grow faster than corporate revenues.

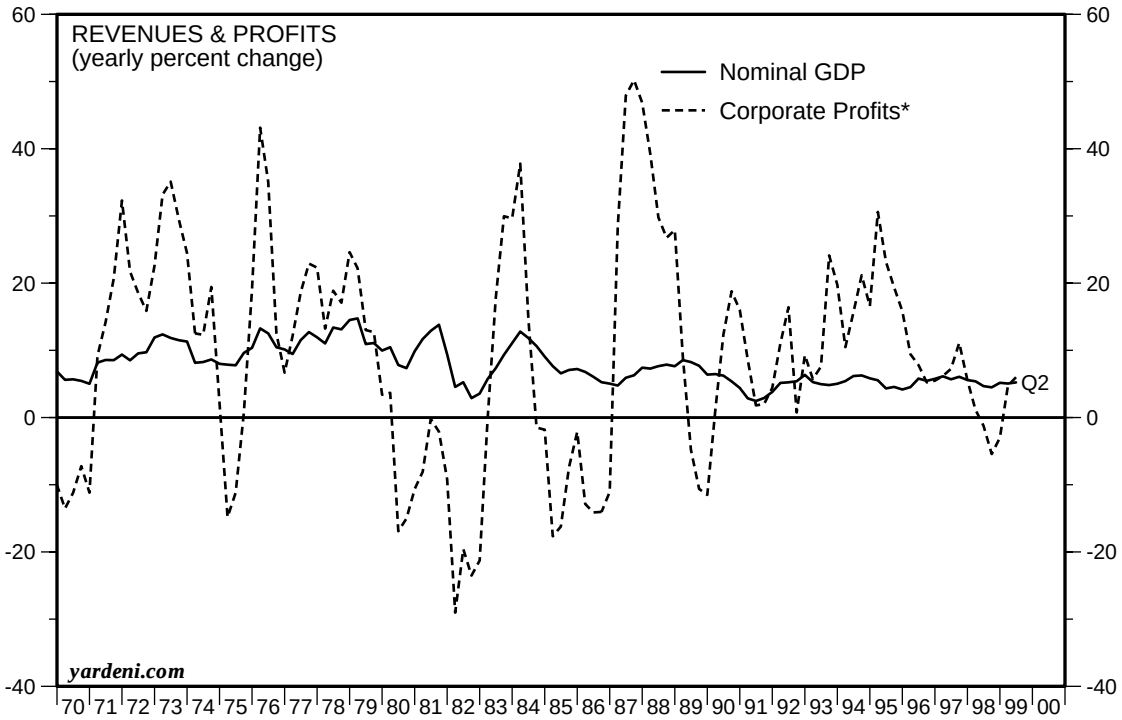
#7



* After taxes and excluding IVA & CCAdj.

- Profits -

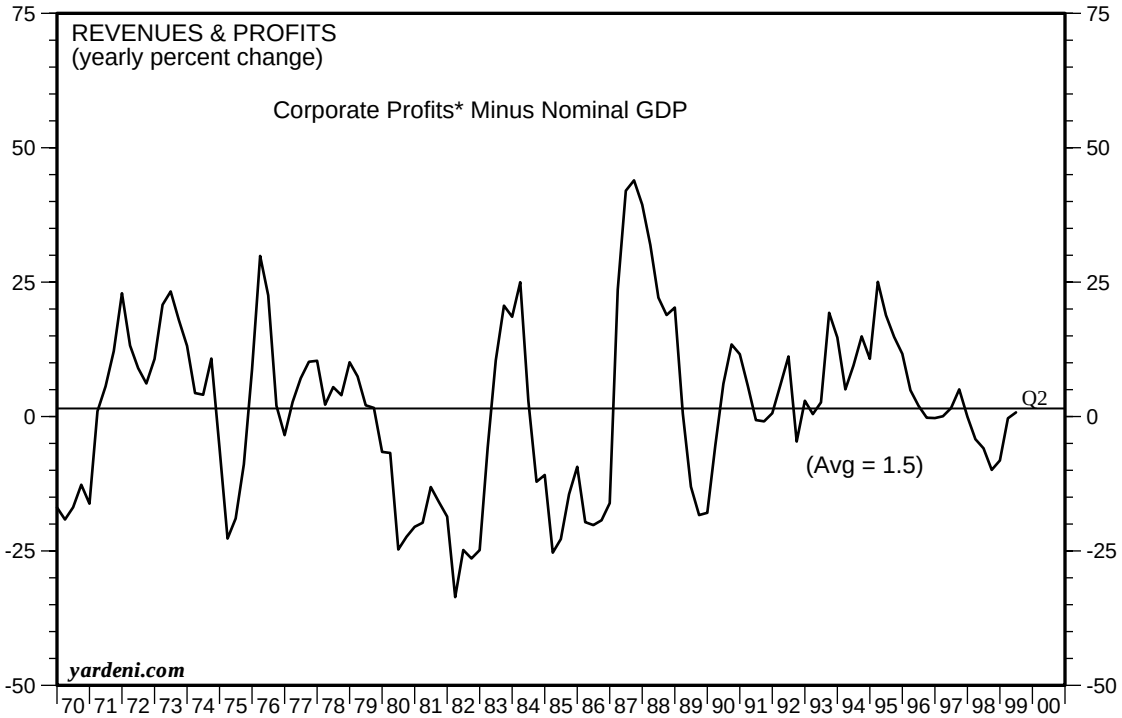
#8



* After taxes and excluding IVA & CCAdj.

Average spread between profits growth and GDP growth is only 1.5 percentage points historically.

#9



* After taxes and excluding IVA & CCAdj.