Expected Stock Returns in Bullish Times

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Abstract
When exuberance rules, investors tend to extrapolate the good times and expect high returns. However, if returns remain high or even increase, the growth of earnings or the expansion in the price-earnings ratio required to sustain high returns become increasingly unlikely. Based on a simple decomposition of stock returns, this article discusses the bullish environment at the end of the 1990s, relates it to the environment in the summer of 2025, and draws some relevant conclusions for expected stock returns.

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1. Introduction

After an extended period of high (low) stock market returns, investors have a tendency to extrapolate the good (bad) times and expect high (low) returns. In fact, this is one of the many manifestations of the well-known recency bias. However, the longer markets move in one direction, the more extreme are, and implausible become, the conditions needed to sustain subsequent moves in the same direction, which sooner or later leads returns to mean revert.

This argument can be best understood, as proposed here, by decomposing returns into three terms, namely, the observed dividend yield, the expected growth of earnings, and the expected change in the price-earnings ratio (P/E); and it can be illustrated, as done here, with evidence from the end of the 1990s, clearly a period of exuberance. Importantly, the analysis may be useful to inform stock market expectations in the summer of 2025, arguably a bullish period.

The evidence discussed here also shows that earnings growth and P/E changes are negatively correlated over ten-year periods, the most typical forecasting period when using valuation-based models. This is relevant because justifying a bullish forecast in times of exuberance may require *both* fast earnings growth and a large expansion of the P/E, but the evidence suggests that if one of them happens, thus pulling expected returns up, the other is likely to move in the opposite direction, thus pulling expected returns down.

The rest of the article is organized as follows. Section 2 presents the formal background, based on a decomposition of stock returns; section 3 discusses the evidence on the relationship between earnings growth and P/E changes, as well as on expected returns around the end of the 1990s and the summer of 2025; and section 4 provides an assessment.

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2. Formal Background

2.1. A Decomposition of Stock Returns

Stock returns can be decomposed in many ways. One such decomposition is between a capital gain/loss and a dividend yield; that is,

$$R_t = \frac{P_t - P_{t-1}}{P_{t-1}} + \frac{D_t}{P_{t-1}} \tag{1}$$

where *R*, *P*, and *D* denote return, price, and dividend, respectively, and the subscript *t* indexes time. Some simple algebra makes it possible to rewrite (1) as

$$R_t = \left(\frac{D_{t-1}}{P_{t-1}}\right) \cdot (1 + g_t^D) + (1 + g_t^E) \cdot \left(1 + g_t^{P/E}\right) - 1 \tag{2}$$

where g^D, g^E, and $g^{P/E}$ denote the growth of dividends, the growth of earnings, and the change in the P/E, respectively; that is,

$$g_t^D = \frac{D_t - D_{t-1}}{D_{t-1}}, \quad g_t^E = \frac{E_t - E_{t-1}}{E_{t-1}}, \quad g_t^{P/E} = \frac{P_t/E_t - P_{t-1}/E_{t-1}}{P_{t-1}/E_{t-1}}$$

Setting (2) one year forward we get

$$R_{t+1} = \left(\frac{D_t}{P_t}\right) \cdot (1 + g_{t+1}^D) + (1 + g_{t+1}^E) \cdot \left(1 + g_{t+1}^{P/E}\right) - 1 \tag{3}$$

which shows that *expected* returns at time *t* are determined by the *current* (hence observed) dividend yield, the *expected* growth of dividends and earnings, and the *expected* change in the P/E. Bogle (1991) suggests that adding up three of the components of (3) results in a simpler expression with very little loss of accuracy. More precisely, he proposes to forecast stock returns using the expression

$$R_{t+1} \approx \left(\frac{D_t}{P_t}\right) + g_{t+1}^E + g_{t+1}^{P/E} \tag{4}$$

Estrada (2007) refers to this expression as the Return Decomposition Model (RDM) and shows empirically, first, that it is a very good approximation of (3); and second, that it provides reasonable forecasts of stock market returns ten years ahead.[1]

2.2. Applications

The decomposition in (4) can be used in at least two ways, namely, to forecast stock returns and to evaluate the plausibility of any given forecast of stock returns. To forecast stock

[1] Bogle and Nolan (2015) also use this decomposition and call it the Bogle Sources of Return Model for Stocks, or BSRM/S for short.

returns at time t (R_{t+1}) an investor takes the current, hence observed, dividend yield (D_t/p_t) as given, and then needs to make a prediction of the growth of earnings (g^E_{t+1}) and the change in the P/E ($g^{P/E}_{t+1}$) over the forecasting period. Adding up those three components yields the expected stock return.

To evaluate any given stock return forecast at time t (R_{t+1}), given a current dividend yield (D_t/p_t), an investor needs to ask how plausible are the conditions (g^E_{t+1} and $g^{P/E}_{t+1}$) needed to sustain that forecast. Note that, as a matter of mathematical necessity, and up to a small approximation, the three terms of the right hand side of (4) *must* add to the left-hand side; hence, if the values of g^E_{t+1} and $g^{P/E}_{t+1}$ needed to equate both sides are implausible (that is, too high or too low), so will be the stock return forecast evaluated.

3. Evidence

3.1. Earnings Growth and P/E Changes

The data consists of prices, earnings, and dividends for the U.S. stock market, downloaded from Robert Shiller's web page.[2] Returns are annual, nominal, and account for capital gains/losses and dividends. The sample period goes from year-end 1871 through year-end 2024. The first step of the analysis consists of calculating the annual growth rate of earnings and P/Es over all possible (overlapping) periods of 1, 3, 5, 7, 10, 12, 15 and 20 years, and then the correlation between these two variables over all those periods. Exhibit 1 shows the relevant results.

Exhibit 1: Correlations

This exhibit shows correlations (Rho) between annualized growth rates of earnings and annualized changes in P/E over periods ranging from one year to 20 years. It also shows the test statistic (TS) for the null hypothesis that the correlation is equal to 0; the critical value at the 5% level of significance is –1.66 in all cases. The sample period is 1872-2024.

Years	1	3	5	7	10	12	15	20
Rho	–0.67	–0.75	–0.66	–0.56	–0.50	–0.45	–0.46	–0.39
TS	–11.17	–13.93	–10.73	–8.15	–6.96	–5.95	–6.09	–4.80

The correlations between earnings growth and changes in P/E are negative and significantly different from 0 in all cases; at the widely-used ten-year forecasting period, the correlation is –0.50. An important implication of these figures is that if a very bullish forecast can be sustained only by a very fast earnings growth *and* a large expansion of the P/E, both are unlikely to happen at the same time.

Note that it could be argued that in a bullish period, with earnings growing at a fast rate, optimistic investors would react by pushing prices at an even faster rate, thus increasing the P/E. More generally, in times when earnings are growing fast, what happens with the P/E can only be

[2] See http://www.econ.yale.edu/~shiller/data.htm; the proxy for the U.S. stock market is the S&P 500.

ascertained empirically; that is, it depends on whether prices increase faster or more slowly than do earnings. Exhibit 1 shows that in times of fast earnings growth, P/Es tend to decrease.

3.2. Expected Returns at the End of the 1990s

Consider the situation at year-end 1999. Over the ten years between 1990 and 1999 the mean annual return of stocks was 17.9%, far higher than the 8.8% mean annual return until 1990.[3] New dot.com companies were being created and going public regularly and the expectation on their performance was sky high. The dividend yield and P/E of the S&P 500 at year-end 1999 were 1.2% and 29.7; considering year-end values, the latter had only been higher at the end of 1998 (31.6). Over the 1872-1999 period, mean annual returns were 9.5%, corporate earnings grew at the annual rate of 3.8%, and the average P/E was 14.3.

Standing at year-end 1999, and based on expression (4), Exhibit 2 shows *expected* annual returns over the 2000-2009 ten-year period, given a current dividend yield of 1.2%, ten scenarios for the expected annual growth of earnings over the 2000-2009 period, and seven scenarios for the P/E expected at the end of 2009. To illustrate, the 3.3% return in the intersection between g^E = 6% and P/E = 20 follows from adding the initial dividend yield (1.2%), the scenario considered for the annual earnings growth (6.0%), and the annual change in the P/E needed to go from 29.7 at the end of 1999 to 20.0 at the end of 2009 (–3.9%); hence 1.2%+6.0%–3.9% = 3.3%.[4]

Exhibit 2: Expected Returns Over the 2000-2009 Period
This exhibit shows expected annual returns over the 2000-2009 period, given a dividend yield of 1.2%, several scenarios for the annual growth of earnings (g^E) over the same period, and several scenarios for the P/E at the end of 2009. Returns and g^E in percent.

↓ g^E	P/E → 5	10	15	20	25	30	35
1	−14.1	−8.1	−4.4	−1.7	0.5	2.3	3.8
2	−13.1	−7.1	−3.4	−0.7	1.5	3.3	4.8
3	−12.1	−6.1	−2.4	0.3	2.5	4.3	5.8
4	−11.1	−5.1	−1.4	1.3	3.5	5.3	6.8
5	−10.1	−4.1	−0.4	2.3	4.5	6.3	7.8
6	−9.1	−3.1	0.6	3.3	5.5	7.3	8.8
7	−8.1	−2.1	1.6	4.3	6.5	8.3	9.8
8	−7.1	−1.1	2.6	5.3	7.5	9.3	10.8
9	−6.1	−0.1	3.6	6.3	8.5	10.3	11.8
10	−5.1	0.9	4.6	7.3	9.5	11.3	12.8

Consider first an investor that at year-end 1999 naively extrapolated the 17.9% annual return over the previous ten years and expected that return over the subsequent ten years. Given that the 17.9% return is not in the exhibit, it follows that it could have only happened with faster

[3] All mean annual returns in this article refer to geometric, compound, or annualized returns. Similarly, all annual growth rates refer to compound or annualized rates.
[4] To be sure, the –3.9% is calculated by taking into account the 29.7 P/E at the end of 1999, the 20.0 P/E expected at the end of 2009, and the ten-year forecasting period; that is, $(20.0/29.7)^{1/10} - 1 = -3.9\%$.

earnings growth or larger changes in the P/E than those considered in the table. For perspective, note that g^E = 10% is more than 2.5 times faster, and P/E = 35 is nearly 2.5 times higher, than the long-term averages through 1999. In other words, the conditions needed to sustain a 17.9% forecast were rather spectacular, thus rendering the forecast extremely unlikely.

What about a more reasonable expectation of, say, 11-13% annual returns? Exhibit 2 shows that such returns could have been obtained if earnings had grown annually at 10% (over twice the average long-term rate) and the terminal P/E had been 30 (over twice the average long-term level); or if earnings had grown annually at 9% and the terminal P/E had been 35; or under more aggressive (hence more unlikely) scenarios. In other words, although 11-13% returns were not impossible, the situation at year-end 1999 made them highly unlikely to occur over the 2000-2009 period. In fact, the figures in the exhibit imply that even expecting annual returns of 9.5% (the historical average through 1999) required conditions rather unlikely to happen.

But is it not possible, an investor may ask, in bullish periods when earnings are growing fast, that P/Es rise fast as well, so that *both* variables, g^E_{t+1} and $g^{P/E}_{t+1}$, pull returns up?[5] Unfortunately, Exhibit 1 highlights that over ten year periods the growth of earnings and the change in P/E are clearly *negatively* correlated, so both are unlikely to pull returns up at the same time. In fact, the negative correlation suggests that if one happens and pulls returns up, the other is likely to pull returns down.

Finally, note that if at year-end 1999 the expectation had been for earnings to grow at their historical annual rate (3.8%) over the 2000-2009 period, and for the P/E to mean revert to its historical average (14.3) by the end of 2009, then the expected annual return would have been –2% (= 1.2%+3.8%–7.0%).[6] In fact, annual returns over the 2000-2009 period were –0.7%; in addition, earnings slowed down significantly, growing at the annual rate of just 0.6%; and the P/E at the end of 2009 was 21.8, nearly 27% lower than it was at the end of 1999.

In short, although the end of the 1990s was a period of extreme bullishness, the conditions (g^E_{t+1} and $g^{P/E}_{t+1}$) that were needed to obtain high returns over the subsequent ten years were very unlikely to happen, and in fact did not happen. How different is that situation from the environment in the summer 2025, and what are the expectations for the subsequent ten years? The next section deals with this question.

3.3. Expected Returns in the Summer of 2025

Consider now the situation in June, 2025. Over the ten years between 2015 and 2024 the mean annual return of stocks was 13.3%, far higher than the 8.9% historical mean return through

[5] Between 1990 and 1999 earnings grew at the annual rate of 7.7%, over twice the rate at which they had been growing until then (3.8%).
[6] For the P/E to go from 29.7 to 14.3 over ten years, it needs to fall at the annual rate of 7.0%.

the end of 2014. Optimism about the Magnificent 7 companies, and the tech sector more generally, dominated the financial headlines. The dividend yield and P/E of the S&P 500 in Jun/2025 were 1.3% and 27.0. Over the 1872-2024 period, mean annual returns were 9.2%, corporate earnings grew at the annual rate of 4.2%, and the average P/E was 16.0.

Standing in Jun/2025, and based on expression (4), Exhibit 2 shows *expected* annual returns over the Jun/2025-Jun/2035 ten-year period, given an observed dividend yield of 1.3%, as well as the scenarios for the annual growth of earnings over the same period, and for the P/E at the end of that period, shown in the table. To be sure, the outlook for the stock market implied by the figures in the exhibit is rather gloomy.

Exhibit 3: Expected Returns Over the Jun/2025-Jun/2035 Period

This exhibit shows expected annual returns over the Jun/2025-Jun/2035 period, given a dividend yield of 1.3%, several scenarios for the annual growth of earnings (g^E) over the same period, and several scenarios for the P/E at the end of Jun/2035. Returns and g^E in percent.

↓ g^E | P/E →	5	10	15	20	25	30	35
1	−13.2	−7.2	−3.4	−0.7	1.5	3.4	4.9
2	−12.2	−6.2	−2.4	0.3	2.5	4.4	5.9
3	−11.2	−5.2	−1.4	1.3	3.5	5.4	6.9
4	−10.2	−4.2	−0.4	2.3	4.5	6.4	7.9
5	−9.2	−3.2	0.6	3.3	5.5	7.4	8.9
6	−8.2	−2.2	1.6	4.3	6.5	8.4	9.9
7	−7.2	−1.2	2.6	5.3	7.5	9.4	10.9
8	−6.2	−0.2	3.6	6.3	8.5	10.4	11.9
9	−5.2	0.8	4.6	7.3	9.5	11.4	12.9
10	−4.2	1.8	5.6	8.3	10.5	12.4	13.9

As before, consider first an investor that naively extrapolates, and therefore expects, the annual return observed over the previous ten years (13.3%). As the exhibit clearly shows, a similar return (12.9% or 13.9%) requires rather spectacular assumptions on the annual growth of earnings (9-10%) and the terminal P/E (35), both far higher than the historical averages. Hence, the very unlikely assumptions that support returns around 13.3% make such forecast very unlikely as well.

What about expected returns around the historical average of 9.2%? This expectation requires less daring assumptions, although it does require that either the growth of earnings or the terminal P/E take on values quite a bit higher than the historical averages. To illustrate, if earnings were to grow annually at 7% (nearly 70% higher than the historical average of 4.2%), then the terminal P/E would have to be 30 (nearly twice the historical average of 16.0) to expect annual returns of 9.4%. Alternatively, if earnings were to grow annually at 9%, then the terminal P/E would have to be 25 to expect annual returns of 9.5%. Therefore, annual returns around the historical average (or higher) seem unlikely over the Jun/2025-Jun/2035 period.

Finally, note that if over the ten years after Jun/2025 earnings were to grow at their historical rate of 4.2%, and the P/E reverted to its historical average of 16.0 by Jun/2035, then the annual return over the Jun/2025-Jun/2035 period would be just 0.4% (= 1.3%+4.2%–5.1%).[7] Of course, a reversion to the historical averages of both g^E and P/E does not have to happen over the next ten years, and yet it may be important to keep in mind that reversion to the mean is one of the most reliable forces in the stock market.[8]

4. Assessment

It is a rather natural tendency for investors to be optimistic in times of exuberance (and pessimistic in times of gloom), to expect the good (and bad) times to continue, and therefore to forecast high (low) returns. However, the continuation of an upward or downward trend requires increasingly implausible assumptions about the growth of earnings or the change in P/E, which sooner or later lead to the well-established mean reversion of stock returns.

This argument is formalized here by using a simple decomposition of stock returns, which is then used to discuss return expectations at the end of the 1990s, clearly a period of exuberance. As the evidence shows, far from suggesting that the good times would continue, it suggested that the conditions required to expect high returns were extremely unlikely to occur, and those leading to expect low returns were far more likely instead.

Similarly, optimism around the Magnificent 7 companies and the tech sector seems to be leading many investors to expect high returns in the several years following the summer of 2025. However, the evidence suggests, again, that the conditions that would sustain high returns are not very likely to happen, and those sustaining relatively poor returns are more likely. Time will tell whether the good times keep rolling or mean reversion will strike, as sooner or later does.

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[7] For the P/E to go from 27.0 to 16.0 over ten years, it needs to fall at the annual rate of 5.1%.

[8] The evidence for mean reversion in stock returns is well established, as illustrated by the early seminal articles by De Bondt and Thaler (1985) and Summers and Poterba (1988).