Investing in the 1990-s: Occam's razor revisited

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Can separating the three major components of stock returns provide a useful forecasting tool?

My article in the Spring 1991 *Journal of Portfolio Management* evaluates the contributions made to the historical ten-year rates of total return achieved by common stocks in terms of three major components: 1) dividend yield at the beginning of each period; 2) earnings growth rate for each period; and 3) impact on return of the change in the price/earnings multiple during each period (**Bogle** [1991]). (The Standard & Poor's 500 Composite Stock Price Index is used as the measurement standard for each.)

Readers have since requested data for moving ten-year periods between 1928 and 1990 rather than the "rounded decades" of the 1930s, 1940s, and so on, that I used for purposes of brevity. Presumably they want to evaluate the data more carefully by using fifty-four "sequential" decades rather than only six "rounded" decades. These additional data are presented in the Table.

The evidence clearly reaffirms, I think, that the combination of initial yield, earnings growth, and change in price/earnings multiple has consistently been a remarkably precise replication of the actual total returns realized by the Index. A total of fifty-three ten-year periods (1981-1990 were added since) were used in my original calculations, and, as I noted, a regression of the actual and the calculated returns yielded an R^2 of +0.952. [1]

[1] I may not have made it clear that this regression was based, not on the results of the six "rounded" decades, but on the fifty-three moving ten-year periods. Also that, strictly speaking, this R^2 translates into a correlation coefficient of +0.976.

As I reconsidered the original article and the data presented in the Table, it occurred to me that my "theory of rational expectations" might actually be useful as a rudimentary forecasting tool. Readers may recall my impassioned argument that, rather than intuitively projecting market returns in the abstract (as in "I expect a 10% return in the 1990s"), it would be more useful to project the components of return (as in "I expect annual earnings growth of 8% and a terminal price/earnings ratio of 14 times. As the current price/earnings ratio is 15.5 times, this reduction will lower the total return by 1%. Therefore, with the entry yield at 3%, this combination should provide a total annual return of 10% for the decade."). In this way, something akin to a shot in the dark becomes the subject of a rational debate.

I then wondered whether it was possible that good market forecasts might be made, not by debating these components of return, but rather by simply regressing to the mean both the earnings growth rate and terminal price/earnings ratio, and adding back the (known) initial dividend yield.

So, we engaged in an exercise:

1. We determined the entry yield for each moving ten-year period.

2. We assumed that the earnings growth rate forecast for each decade would be equal to the long-term historical trend over the preceding three decades.

3. We also assumed that the terminal price/earnings ratio forecast for each decade would be equal to the long-term historical average of the preceding three decades, and then calculated the price impact of any change from the entry price/earnings ratio.

4. Finally, we combined these three figures into a projected total return.

The results, it seems to me, are quite attention-getting. They are graphed from the Table in the Figure for each of the fifty-four decades from 1928-1937 through 1981-1990. The general parallelism between the actual returns of the Standard & Poor's 500 Stock Index and the returns that were forecast by our simple regression to the mean formula is, with some notable exceptions, quite accurate. Statistically speaking, the coefficient of correlation of +0.540 between the projected and the actual results for the full period is impressive -- technically speaking, infinitely better than the 0.000 correlation that would be predicted by mere chance.

It is worth spending a moment on the major exceptions. In the decades that began in 1928 through 1930, actual returns fell well short of the forecast returns, as the forecast model significantly overestimated future earnings growth -- hardly surprising in view of the great depression that lay ahead. Forecast results were again wide of the mark during the periods from 1933-1936, as the model sharply underestimated the strong rebound in earnings. [n2] In the decades that began in 1943 through 1947, the model did not take into account the enormous earnings growth that was to come following the end of World War II, and forecast results lagged the actual returns by significant margins. Then, beginning in 1949, outstanding forecast results were achieved with high consistency, with the correlation rising to a remarkable +0.796 for the thirty-three periods involved.

[n2] It is at least possible that the earnings data (1898-1926) provided by the Cowles Commission are not as statistically rigorous as subsequent data from Standard & Poor's Corporation. If so, this could account for the fact that the preponderance of aberrations between forecast and actual returns took place prior to 1947.

In sum, the model was reasonably accurate in its forecast in forty-one periods, and quite poor in thirteen. This latter figure is a healthy remainder that the equity markets have always exhibited wildly aberrant behavior from time to time. So, it would be unwise to apply this new forecasting tool without considering the possibility that precisely such wild aberrations may lie directly before us. Surely, stranger things have happened!

So, what might the decade of the 1990s have in store for us? Will the solid forecast record for forty-one periods be duplicated? Or will the inability to deal with major aberrations in thirteen periods return to haunt us?

Whatever the case, the forecast model calls for a ten-year rate of total return on equities of +8.7%. This figure includes an entry yield of +3.1%, earnings growth of +6.6%, and a price/earnings multiple impact of -0.9%, as the opening price/earnings ratio of 15.5 times regresses to the (thirty-year) mean of 14.1 times. Its accuracy remains only to be demonstrated, and time will tell.

In any event, I would underscore that while this forecasting technique gave very good results in the past, it was well short of perfect. In addition, of course, there is no certainty that it will work as well in the future. On the other hand, our experience and our common sense tell us that regression to the mean is a distinct characteristic of both earnings growth (limited by the underlying return on equity available in corporate America) and price/earnings multiples (limited by the fact that even the wildest sort of optimism or pessimism -- hope or fear -- can carry only so far). So, Occam's Razor is indeed alive and well. [n3]

[n3] The simpler the explanation to a problem, the more likely it is to be correct.

Note: This table may be divided, and additional information on a particular entry may appear on more than one screen.

TABLE
Long-Term Stock Market Returns

Decade Beginning January 1	Calculated Return%				Forecast Return %		
	Initial Yield	Earnings Growth	P/E Effect	Calculated Return n1	Initial Yield	Average Earnings Growth	Average P/E Effect
1928	4.4	0.2	-5.2	-0.7	4.4	4.8	-2.5
1929	3.5	-7.4	1.6	-2.4	3.5	5.0	-3.4
1930	4.5	-5.7	0.4	-0.7	4.5	4.4	-0.7
1931	6.4	0.8	-4.4	2.7	6.4	2.7	-2.3
1932	10.1	6.6	-5.6	10.8	10.1	0.8	-0.7
1933	7.3	9.6	-5.6	10.8	7.3	-1.3	-2.8
1934	4.4	7.9	-6.0	5.8	4.4	-0.5	-5.6
1935	4.7	6.6	-3.0	8.1	4.7	0.1	-3.9
1936	3.5	2.4	0.2	6.1	3.5	0.5	-2.9
1937	4.2	0.4	-1.5	3.0	4.2	1.0	-2.3
1938	7.6	3.6	0.2	11.4	7.6	1.8	3.5
1939	3.9	13.6	-10.7	5.3	3.9	0.3	-4.2
1940	5.0	9.9	-6.3	7.9	5.0	0.5	-0.3
1941	6.3	10.5	-3.3	13.1	6.3	1.2	2.9
1942	8.2	7.7	2.7	18.8	8.2	2.3	5.8
1943	6.0	8.8	1.6	16.6	6.0	1.3	3.3
1944	5.2	10.3	-2.3	13.1	5.2	1.3	0.5
1945	4.8	11.5	-0.9	15.3	4.8	2.0	-0.9
1946	3.8	14.2	-3.6	13.9	3.8	0.3	-3.0
1947	4.6	12.4	-0.5	16.4	4.6	-1.2	-0.6
1948	5.5	7.7	2.3	15.6	5.5	0.7	3.7
1949	6.1	2.4	11.1	19.9	6.1	2.8	7.5
1950	6.8	3.9	9.4	20.4	6.8	3.1	6.5
1951	7.2	1.4	9.5	18.2	7.2	4.3	6.5
1952	5.9	2.7	8.7	17.6	5.9	7.4	2.9
1953	5.3	4.3	4.5	14.3	5.3	4.2	1.6
1954	5.8	4.8	6.6	17.5	5.8	3.2	2.8
1955	4.3	5.1	3.7	13.2	4.3	3.7	0.1
1956	3.6	3.7	3.6	11.0	3.6	3.6	0.5
1957	3.7	5.0	0.6	9.3	3.7	3.4	-0.3
1958	4.5	4.7	4.3	13.7	4.5	3.8	1.1
1959	3.2	7.1	-0.6	9.7	3.2	2.5	-3.6
1960	3.1	5.5	-1.0	7.4	3.1	2.5	-2.7
1961	3.4	4.6	0.1	8.1	3.4	4.1	-2.7
1962	2.8	6.0	-2.2	6.4	2.8	5.7	-4.8
1963	3.4	5.8	0.7	9.8	3.4	7.6	-2.2
1964	3.0	7.3	-4.4	5.7	3.0	7.7	-3.1
1965	2.9	6.9	-8.4	0.8	2.9	7.7	-3.1
1966	2.9	4.4	-4.4	2.7	2.9	6.6	-2.6
1967	3.6	6.0	-2.8	6.5	3.6	5.8	-0.7
1968	3.0	7.4	-7.1	2.8	3.0	5.3	-2.7
1969	3.0	7.9	-8.0	2.2	3.0	7.6	-2.7
1970	3.4	9.9	-7.6	5.0	3.4	6.4	-1.4
1971	3.4	11.2	-6.5	7.4	3.4	5.4	-2.4
1972	3.0	10.4	-7.6	5.0	3.0	5.5	-2.1
1973	2.7	7.0	-4.9	4.4	2.7	6.3	-2.2
1974	3.5	5.6	-90.2	8.9	3.5	7.5	2.1
1975	5.3	6.5	2.7	14.6	5.3	7.8	6.5
1976	4.1	6.3	2.5	13.0	4.1	7.2	2.3

1977	3.8	3.9	4.4	12.2	3.8	7.7	2.7
1978	4.98	4.9	5.0	15.0	4.9	6.6	5.0
1979	5.3	6.8	4.1	16.5	5.3	5.8	6.2
1980	5.2	4.4	7.8	17.8	5.2	6.4	6.9
1981	4.5	3.7	5.4	13.8	4.5	5.7	4.5

Decade Beginning January 1	Forecast Stock Return n2	Actual Stock Return
1928	6.6	0.1
1929	4.9	-0.8
1930	8.2	0.0
1931	6.7	1.8
1932	10.2	6.4
1933	3.2	9.3
1934	-1.7	7.1
1935	0.9	9.2
1936	1.1	8.4
1937	2.9	4.4
1938	13.0	9.5
1939	0.0	7.2
1940	5.2	9.1
1941	10.5	13.3
1942	16.4	17.1
1943	10.6	16.9
1944	7.0	14.2
1945	5.9	17.0
1946	1.1	16.6
1947	2.8	18.3
1948	9.9	16.3
1949	16.6	19.9
1950	16.6	19.2
1951	18.3	16.1
1952	16.5	16.4
1953	11.2	13.4
1954	11.9	15.9
1955	8.1	12.8
1956	7.8	11.0
1957	6.9	9.2
1958	9.4	12.8
1959	2.0	10.0
1960	2.8	7.8
1961	4.6	98.2
1962	3.5	7.0
1963	8.6	9.9
1964	7.4	6.0
1965	7.3	1.2
1966	6.7	3.3
1967	8.7	6.6
1968	5.5	3.6
1969	7.7	3.2
1970	8.3	5.8
1971	6.3	8.5
1972	6.2	6.5

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1973                     6.6     6.7
1974                    13.2    10.6
1975                    20.1    14.8
1976                    13.8    14.3
1977                    14.4    13.8
1978                    16.8    15.2
1979                    17.6    16.3
1980                    19.0    17.5
1981                    15.0    13.9
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n1 [(1 + Initial Yield) + ([1 + Earnings Growth] X [1 + P/E Effect])] - 1.

n2 Same formula as above except 1) assume that the terminal P/E ratio at the end of each decade is equal to the average P/E ratio for the preceding three decades; and, 2) assume that the earnings growth rate for each decade is equal to the average earnings growth rate for the preceding three decades.
3 Source of data is Standard & Poor's Corporation and the Cowles Commission.REFERENCE
Bogle, John C. "Investing in the 1990s: Remembrance of Things Past and Things Yet to Come." Journal of Portfolio Management, Spring 1991, pp. 5-14.

GRAPHIC: Figure, RETURNS ON COMMON STOCKS S&P 500 INDEX VERSUS FORECAST