

What Do Past Stock Market Returns Tell Us About the Future?

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In the past three years, several academic and professional scholars have concluded that long-run real stock returns will be below historic levels, and the equity risk premium—the additional return on stocks compared with risk-free securities—will be either well below historic levels or negative. One noteworthy aspect of this literature is the list of contributors. It includes academic stalwarts Eugene Fama, Kenneth French, John Campbell and Robert Shiller, and leading professionals such as Robert Arnott, Cliff Asness and Peter Bernstein. This study summarizes and critiques this research, and explains why most scholars believe real stock returns will be below historic levels. It then discusses investment implication of lower real stock returns.

Analysis of Past Returns

Fama and French (2001) is indicative of the

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This study reviews and critiques several recent studies that conclude that long-run real stock returns will be below historic levels, and the equity risk premium will be below historic averages—and perhaps negative. It explains the theory behind the studies' conclusions. This theoretical framework helps when critiquing these studies and when explaining differences in their predictions. Finally, it discusses the investment implications of lower real stock returns.

recent studies. They analyze historical real returns on the S&P 500 index (and its predecessors) from 1950 to 1999. Actual real returns were 10.33 percent, which can be separated into three components as shown in Table 1.

For the 50 years, the actual real return was 10.33 percent. The average real dividend yield was 3.84 percent and the growth in real earnings was 3.04 percent. The additional return—more than three percent a year—was due to the increase in the market's price-earnings ratio.¹ If we assume that the increase in market multiple was unanticipated, the expected real stock return was 6.92 percent, which essentially matches the 7 percent real return Siegel (1998) says U.S. stocks have consistently provided for long horizons since 1802. Also, this indicates that the models' forecasts have not been precise.

Fama, French and most other scholars agree with the following points: (1) market returns in the last half of the 20th century, especially returns in the 1980s and 1990s, were better than expected because market multiples rose unexpectedly; (2) a substantial decrease in the equity risk premium is

largely responsible for the sharp rise in market multiples. As we shall see, a decrease in the equity risk premium has implications for future stock returns.

Two Return-Producing Models

This section presents two models and their related equations that have been used to predict long-run real stock returns. They provide a framework for discussing the articles and comparing predictions. The models predict long-run real stock returns as the sum of dividend yield and growth.

The earnings model is

$$\text{predicted average real return} = (D_1/P) + (\text{growth rate in normal level of real EPS})$$

where D_1 is projected year-ahead dividends, P is today's stock price, and D_1/P is projected year-ahead dividend yield. Real EPS means inflation-adjusted earnings per share. The normal level of real EPS is the level in the absence of cyclical influences.

The corresponding earnings equation is

$$\begin{aligned} \text{actual real return} = \\ (D_1/P) + (\text{growth rate in} \\ \text{normal level of real EPS}) + \\ (\text{percent change in normal P/E}) \end{aligned}$$

where normal P/E is price divided by normal earnings.

The earnings equation is a mathematical identity. It must be true. By definition, average real return is the average dividend yield plus the average real price appreciation. Mathematically, $P = E \times (P/E)$. Therefore, average price appreciation must equal the average growth in normal EPS plus average growth in normal P/E (when expressed in continuously compounded form).

The earnings model does not have the last term mentioned above, the percent change in normal P/E. Therefore, it provides rational stock market forecasts only when this term is zero—that is, when today's normal P/E is a rational forecast of the normal P/E at the end of the forecast horizon. This condition prevails if the market's normal P/E is long-run stable at today's level; when it deviates from today's level, it will tend to revert to this long-run mean.²

The dividends model is:

$$\begin{aligned} \text{predicted average real return} = \\ (D_1/P) + (\text{growth rate in} \\ \text{normal level of real DPS}) \end{aligned}$$

Dividends per share display little cyclical pattern. Therefore, we sometimes drop the "normal" qualifier. The corresponding dividends equation is

$$\begin{aligned} \text{actual return} = (D_1/P) + \\ (\text{growth rate in real DPS}) + \\ (\text{percent change in P/D}) \end{aligned}$$

The dividends equation must be true. By definition, average real return is the average dividend yield plus the average real price appreciation. Mathematically $P = D \times (P/D)$. Therefore, average price appreciation

TABLE 1
Components of Real Returns

			Real Dividend Yield		% Growth Real EPS		% Change P/E Ratio
				+		+	
Actual Real Return	10.33%	=	3.84%	+	3.04%	+	3.41%
Expected Real Return	6.92%	=	3.84%	+	3.04%		

TABLE 2
Implications of Decreases in Dividend Payout Ratio and Equity Risk Premium

Example	Km	= $D_1/P + g$	Payout Ratio	P/E_1	P/D_1
1.	7%	= 7% + 0%	100%	14.3	14.3
2.	7%	= 4.2% + 2.8%	60%	14.3	23.8
3.	7%	= 2.1% + 4.9%	30%	14.3	47.7
4.	4.78%	= 1.44% + 3.34%	30%	20.9	69.7

Km denotes the market's required real rate of return and, in equilibrium, its expected real rate of return. D_1/P denotes the expected year-ahead dividend yield, while g is the expected long-run growth rate in real dividends, earnings, and price. P/E_1 and P/D_1 are the normal levels of forward price-earnings and price-dividends multiples, where forward refers to projected year-ahead earnings and dividends.

This version of the constant-growth dividend discount model predicts real growth in dividends and earnings is the product of $(1 - \text{Payout Ratio})$ and Km. The market's expected real rate of return is the inverse of P/E_1 .

must equal the average growth in dividends per share plus average growth in P/D (when expressed in continuously compounded form). The dividends model provides rational forecasts of stock returns if today's P/D is a rational forecast of the P/D at the end of the forecast horizon—that is, the P/D multiple is long-run stable at today's level.

Obviously, it is important to examine the rationality of the assumptions of a stable normal earnings multiple, P/E, and a stable dividends multiple, P/D. The next section explains why I believe the dividends multiple is unstable.

Effects of Decreases in Dividend Payout Ratio and Equity Risk Premium

Most scholars believe two things have happened since the early 1980s. There has been a decrease in the normal dividend

payout ratio and a decrease in the equity risk premium. This section presents a model that illustrates the effects of each of these factors. In addition, the model helps illustrate differences in studies, and it explains why most scholars believe future real stock returns will be below their historic seven percent average.

Effects of lower dividend payout. Since the early 1980s, there has been a persistent decrease in the stock market's dividend payout ratio (see Bagwell and Shoven 1989, Dunsby 1995, and Fama and French 2000). Everything else the same, a decrease in the normal payout ratio has two effects.³ First, it leads to lower dividend yield and higher future growth rates in dividends and earnings (however, the sum of the two is not affected). Second, it increases the dividends multiple but it does not affect the normal earnings multiple.

Initially assume the zero-growth dividend discount model, where all earnings

are paid as dividends and real growth is zero. Assume the projected level of normal real earnings is \$1 a share for each year in the future ($E_1 = E_2 = E_3 = \$1$). Actual real earnings will vary around \$1 each year, but the level of normal earnings is a constant \$1; the real growth rate is zero. The normal dividend payout ratio, $p = 1.0$, is 100 percent. So projected year-ahead dividends, D_1 , are \$1 a share. The required rate of real return on the stock market, Km , is seven percent, its historic average. According to the dividend discount model,

$$\begin{aligned} P &= (E_1 * p) / (Km - g) = \\ &(\$1) / (0.07 - 0) = \$14.3, \\ D_1/P + g &= 0.07 + 0 = 0.07, \text{ and} \\ P/E_1 &= 14.3 \text{ and } P/D_1 = 14.3 \end{aligned}$$

In this formulation of the dividend discount model, the expected real return is E_1/P , the inverse of the normal P/E_1 ratio. Phillips (1999) developed the model and Siegel (1999), among others, applied it.⁴ Example 1 in Table 2 summarizes this base case. The value of the stock, P , is \$14.3. The sum of dividend yield plus growth is 7 percent. Rational levels of the earnings multiple, P/E_1 , and the dividends multiple, P/D_1 , are 14.3 each.

Now, suppose the normal dividend payout ratio is lowered to 60 percent, $p = 0.6$, which, according to Ibbotson and Chen (2001), is the approximate average level of the actual dividend payout ratio on the S&P 500 (and its predecessors) from 1926 through 1979. The remaining cash is either reinvested at 7 percent, the required rate of return on stocks, or used to repurchase common stock. Example 2 in Table 2 summarizes this case. This decrease in the payout ratio causes the dividend yield to decrease to 4.2 percent and the real growth rate to increase to 2.8 percent $[(1 - 0.60) 7\%]$, but the sum remains 7 percent. If \$0.40 of next year's earnings [40% of E_1] is reinvested at 7 percent, E_2 will be \$0.028 higher than it would be if the \$1 of E_1 is distributed as dividends. Now, E_1 is \$1 and E_2 is \$1.028. If 40

percent of earnings goes to repurchase stock, EPS grows at 2.8 percent. Whether the freed funds are used to finance investments or repurchase shares, normal growth rate in real EPS (and real DPS and real share price) increases to 2.8 percent. The decrease in the payout ratio increases the dividends multiple to 23.8, but the equilibrium stock price and earnings multiple are not affected.

$$\begin{aligned} P &= (E_1 * p) / (Km - g) = \\ &(\$1 * 0.6) / (0.07 - 0.028) = \\ &\$0.60 / 0.042 = \$14.3, \\ D_1/P + g &= 0.042 + \\ &0.028 = 0.07, \text{ and} \\ P/E_1 &= 14.3 \text{ and } P/D_1 = 23.8 \end{aligned}$$

Next, suppose the normal dividend payout ratio is lowered to 30 percent, which is about its current level. Example 3 summarizes this case. The dividend yield is 2.1 percent and the growth rate is 4.9 percent $[(1 - 0.3) 7\%]$, but the sum remains 7 percent. The current stock price and earnings multiple remain at \$14.3 and 14.3, respectively, but the dividends multiple increases to 47.7.

$$\begin{aligned} P &= (E_1 * p) / (Km - g) = \\ &(\$1 * 0.3) / (0.07 - 0.049) = \\ &\$0.30 / 0.021 = \$14.3, \\ D_1/P + g &= 0.021 + \\ &0.049 = 0.07, \text{ and} \\ P/E_1 &= 14.3 \text{ and } P/D_1 = 47.7 \end{aligned}$$

These examples illustrate that a decrease in the (normal) payout ratio has two consequences. First, it lowers the current dividend yield and raises future growth rates in (per share) earnings, dividends and stock price, but it does not affect Km , which is the sum of the two. Second, it increases the dividends multiple but not the normal earnings multiple.

Let us look at the implications of these examples. Fischer Black (1976) reviews dividend policy and concludes that theory provides no help in determining why firms pay dividends or in determining the

market's optimal dividend payout policy. Historically, the market's dividend payout ratio has declined sharply and unexpectedly since the early 1980s. Both theory and history suggest that the market's dividend payout ratio is unstable. An unstable payout ratio implies an unstable dividends multiple, which implies the dividends model is invalid.

What about the earnings model? Although an unstable dividend payout ratio alters the portions of returns in the form of dividend yield and growth in earnings, it should not affect the sum of the two. In addition, an unstable payout ratio does not imply an unstable normal earnings multiple.

Effects of Decrease in Equity Risk Premium

To repeat, most scholars believe that the equity risk premium has decreased. A decrease in the equity risk premium decreases the market's expected rate of return and it raises the market's price-earnings and price-dividends ratios. The market's required rate of real return, Km , consists of a long-term risk-free real rate, R , plus the equity risk premium, ERP . In equation form, $Km = R + ERP$. Thus a decrease in the equity risk premium decreases the market's required rate of real return and, in equilibrium, the market's expected rate of real return. (Later, we discuss the possibility that the market is overvalued.)

To establish the second consequence, return to Table 2. In Example 1, E_1 equals D_1 and the real growth rate, g , is zero. After substituting and rearranging the dividend discount model implies $E_1/P = D_1/P = Km = R + ERP$. This model says, everything else the same, a decrease in the equity risk premium decreases the market's earnings yield, E_1/P , and dividend yield, D_1/P ; that is, it increases price-earnings and price-dividends multiples.

In addition, this model predicts that expected stock market returns vary directly

TABLE 3

Summary of Predictions of Long-Horizon Stock Returns

	Date	Horizon Years	DIV YLD	+ Growth	+ Revaluation	= Stock Returns	Real Stock Returns
Dividends Model							
Jagannathan, et al.	1999	N/S	1.36%	+ 5.19% nom. dividends	+ 0	= 6.55% nom.	4.8% ^b
Fama and French	Dec. 1999	N/S	1.32%	+ 1.61% real dividends	+ 0	= 2.93% real	2.93%
Siegel ^c	Aug. 1999	N/S	1.2%	+ 2.1% real dividends	+ 0	= 3.3% real	3.3%
Arnott and Ryan	Jan. 2000	10–20	1.2%	+ 2% real dividends	+ 0	= 3.2% real	3.2%
Average							3.6%
Earnings Model							
Fama & French	Dec. 1999	N/S	1.32%	+ 3.04% real earnings	+ 0	= 4.36% real	4.36%
Brown	Jan. 2000	20	1.2%	+ 6.5% ^a nom. earnings	+ 0	= 7.7% nom.	5.2%
Average							4.78%
Earnings Equation							
Earnings Model View	Nov. 2001	10	1.44%	+ 3.34% real earnings	+ 0	= 4.78%	4.78%
Middle View	Nov. 2001	10	1.44%	+ 3.34% real earnings	+ -0.95%	= 3.83%	3.83%
Irrational Markets View	Nov. 2001	5	1.44%	+ 3.34% real earnings	+ -7.31%	= -2.53%	-2.53%

a — 6.5% earnings growth = 3% real GDP + 1% stock repurchases + 2.5% inflation

b — For 1999, the yield on 10-year Treasury inflation protection securities averaged about 3.9%. Ten-year nominal Treasuries averaged 5.65%. Expected inflation averaged about 1.75%.

c — Using another model, Siegel projects real stock returns at 3.1% to 3.7%.

N/S denotes "not stated."

with E_t/P and D_t/P (and inversely with price-earnings and price-dividend multiples). Therefore, it should come as no surprise that several studies in the stock-predictability literature conclude that long-run stock market returns can be partially predicted by the market's earnings yield (or its inverse, the price-earnings ratio) or dividend yield. These studies typically use trailing 12-month earnings or trailing dividends instead of projected earnings or projected dividends, because of the absence of long series on projected earnings and projected dividends.⁵

The key points are that a decrease in the equity risk premium first lowers the market's long-run expected return and, second, raises the market's normal price-earnings and price-dividend multiples. Furthermore, because long-horizon stock

returns can be explained partially by earnings yield and dividend yield, the stock-predictability literature suggests that the equity risk premium does indeed vary. Everything else the same, today's low earnings yield and dividend yield (or high market multiples) thus imply low future stock returns.

Example 4 in Table 2 illustrates the consequences of a lower equity risk premium. In this example, K_m , the sum of real risk-free rate of return and equity risk premium, is 4.78 percent. K_m of 4.78 percent corresponds to a normal P/E_t ratio of 20.9 [$1/20.9 = 4.78\%$]. Based on IBES (Institutional Brokers Estimate System) forecasts on November 1, 2001, projected level of S&P 500 earnings over the next 12 months, E_t , is \$50.72. So, P/E_t is 20.9. If normal earnings in the next year are

\$50.72, then today's normal P/E_t is 20.9. If normal earnings exceed \$50.72, due to the recession, then today's normal P/E_t is lower than 20.9. I interpret today's IBES forecast as normal E_t .⁶

The studies reviewed in this paper can be understood by comparing Example 2 and Example 4. Before the early 1980s, the normal payout ratio was 60 percent and the expected real return on the market was about 7 percent. Today, the payout ratio is 30 percent and the expected real return may be 4.78 percent. The decrease in the equity risk premium explains today's high level of normal market multiples. An E_t/P of 4.78 percent and dividend payout of 30 percent implies D_t/P of 1.44 percent and growth of 3.34 percent. These examples prove useful in explaining differences in

studies' predictions of stocks' long-run prospects and in critiquing the studies.

Summary of Studies

Summary of dividend model predictions.

Table 3 summarizes four studies that predict long-run stock returns using the dividend model. To repeat, theory and history suggest that the dividend payout ratio is unstable, in which case the dividends multiple, P/D_t , is unstable and the dividend model is invalid. Jagannathan et al. (2000), Siegel (1999), and Fama and French (2001) predict that the future dividend growth rate will repeat a historic average; they do not project faster growth due to today's low dividend payout ratio. Fama and French question dividend model forecasts—including their own—due to share repurchases and a steady decrease in dividend payout ratios.

Siegel predicts that the future real dividend growth rate will equal its 1946–1998 average of 2.1 percent. He uses the 2.1 percent average instead of a lower average using earlier years' returns “due in part to the higher reinvestment rate” since 1946. He does not increase projected growth due to today's much lower dividend payout despite his assertion that “per share earnings growth has been primarily determined by the reinvestment rate of the firm” (p. 15). Examples 2 through 4 show that today's long-run growth prospects need not be higher than pre-1980 prospects. Examples 2 and 3 show that, holding K_m and the equity risk premium constant, the decrease in the payout ratio increases long-run growth. However, the decrease in K_m has at least a partially offsetting effect on growth; the positive influence on growth of the lower payout ratio is at least partially offset by the lower market return, K_m .

Arnott and Ryan (2001) is the only study to project higher future dividend growth due to the decrease in payout

ratios. Their best estimate projects real dividend growth at two percent, which is one percent above a one percent historic growth rate.

It is important to understand that, due to the decrease in normal payout ratio, historic growth rates in real dividends underestimate future growth prospects. There

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are two separate reasons for this argument. First, the decrease in the payout ratio increases long-run growth. For example, in Examples 2 and 3, the decrease in the payout ratio increases long-run growth from 2.8 percent to 4.9 percent. Second, the decrease in payout ratio causes an initial decrease in actual dividends from \$0.60 to \$0.30. In practice, the stock market's payout ratio slowly decreased over about two decades, so actual dividends typically rose slowly. Nevertheless, actual dividend growth since the early 1980s has been unusually low, and understates future growth prospects. Consequently, it is not surprising that dividends model forecasts, which predict future growth at historic levels, tend to be the most pessimistic.

The good news is the worst forecasts tend to come from the dividends model, a model that has inherent flaws. The bad news is that earnings model forecasts are not much more optimistic and, as we shall see, earnings equation forecasts tend to be less optimistic than earnings model forecasts.

Summary of earnings model predictions. Table 3 summarizes two studies that predict long-run real stock returns using the earnings model. In December 1999, Fama and French predicted real stock returns of 4.36 percent. It is the sum of a 1.32 percent dividend yield and the 1950–1999 average real earnings growth rate of 3.04 percent; they do not project faster earnings growth due to today's low dividend payout. Brown (2000) predicts real stock returns of 5.2 percent, the sum of 1.2 percent dividend yield and 4 percent real earnings growth. The four percent real earnings growth comes from projected three percent real gross domestic product (GDP) growth plus one percent due to share repurchases. Brown's prediction is more optimistic than Fama and French's because he predicts future earnings growth will be one percent faster due to share repurchases.

How good are the earnings model forecasts? They are too optimistic if the price-earnings ratio is likely to fall. Several scholars, including me, believe the normal P/E_t

is likely to fall. The next section discusses this issue.

Does Today's P/E_t Ratio Affect Prediction of Stock Returns?

Recall that, everything else the same, a decrease in the equity risk premium increases market multiples, including the normal P/E_t . Consistent with this theory, several studies conclude that E_t/P and D_t/P are positively related to long-run future returns. This section incorporates this literature into the analysis of the market's long-run prospects. It suggests that future returns are not a random draw from past returns. Rather, future returns tend to be negatively related to the beginning level of market multiples. When market multiples are high, future returns tend to be low, and vice versa. Today, therefore, the last term in the earnings equation is probably negative, in which case earnings model forecasts tend to be too optimistic.

The following dialogue helps explain the three major competing views or scenarios. For this dialogue, return to Table 2 where we assume that long-run real stock returns—the sum of D_t/P and real growth—is the inverse of the normal P/E_t . For example, before the early 1980s the long-run real return was seven percent, which corresponds to a normal P/E_t of 14.3. The bull market ran from 1982 through 1999. Most scholars believe that, during that span, there was a sharp decline in the equity risk premium. In late 1999 and early 2000, the market's P/E_t was in the low thirties, which corresponds to expected real stock returns of about three percent. In late 1999 and early 2000, Siegel (1999) and Arnott and Ryan (2001) predicted a negative equity risk premium—expected stock returns below long-term bond returns. After peaking in March 2000, the stock market fell sharply. As of November 1, 2001, the S&P 500 was at 1060 and the P/E_t was 20.9, which corresponds to real stock returns of 4.78 percent.

What happens from here? The earnings equation forecasts in Table 3 summarize three competing views that differ only in their prediction about the ending normal P/E_t . These views represent three different scenarios for the stock market. According to the earnings model view, the equity risk premium has been permanently lowered such that today's P/E_t of 20.9 is the new long-run normal level. Henceforth, long-run real stock returns will average about 4.78 percent.⁷ In the earnings equation, the last term is zero, meaning the predicted normal P/E_t at the end of the forecast horizon is today's P/E_t .

The middle view says the normal P/E_t will likely fall. In the next ten years, it will likely revert toward, but not all the way to, its "old" normal level of about 14.3. It will settle at a new level of perhaps 19. If normal P/E_t falls from 20.9 to 19 over ten years, the last term in the earnings equation is -0.95 percent per year. Real stock return will be 0.95 percent less than the sum of dividend yield and growth in real EPS. The model's point estimate says real stock returns will be 3.83 percent for the next ten years.

The "irrational markets" view says the stock market is overvalued. The normal P/E_t will revert all the way to 14.3, and the reversion will likely occur within a relatively short period of time, perhaps five years. I believe this reflects the view of Campbell and Shiller (1998) and Shiller (2000) in *Irrational Exuberance*. If normal P/E_t falls from 20.9 to 14.3 in five years, the revaluation term is -7.31 percent, and expected real returns are negative.

What are the merits of each view? We cannot reject the earnings model view. Economists long have been puzzled by the size of the equity risk premium (see Mehra and Prescott 1986, and Kocherlakota 1996). In addition, several developments may have contributed to a real stock return that is permanently lower than 7 percent and thus a normal P/E_t that is permanently higher than 14.3. These include (1) (apparently) better control of the business cycle and (2) lower transaction costs, including

the growth of index funds and electronically traded funds.

Although we cannot reject the earnings model view, the evidence from the market-predictability literature best supports the "middle" view. Contributions to this research include Fama and French (1988, 1989), Campbell and Shiller (1988), Poterba and Summers (1988), McQueen and Thorley (1991), Goetzmann and Jorion (1993), and Barberis (2000) among others. In Reichenstein and Rich (1994), we try to summarize this rigorous research in a user-friendly fashion. This literature suggests that the equity risk premium is slowly mean reverting. The equity risk premium will likely slowly increase. After nearly two decades of superlative returns, in early 2000 investors had underestimated stocks'

risks. Since then, investors' perceptions of stock market risk have increased, risk tolerances have fallen, the equity risk premium has risen, and the normal P/E_t has fallen from the low thirties to 20.9. Furthermore, as the adjustment process continues the normal P/E_t will decline from today's level, but it will not decline to 14.3.

The middle view says the market's normal P/E_t will fall. But how far will it fall and how quickly? Fama and French were smart enough to avoid a point estimate, which they call "a task fraught with measurement error." Arnott and Bernstein (2001) "choose not to go down the slippery slope of valuation." I am not that smart. I venture a guess, in part to provide an idea of what I believe the stock-predictability literature suggests is most likely to happen.

My hunch is the market's P/E_t will fall from its current (November 1, 2001) level of about 20.9 to 19 over the next decade. It will decline by 0.95 percent a year.

The key point is that the earnings model forecasts are too optimistic if the market's P/E_t is likely to fall. The scholars whose works are summarized in Table 3 not only are aware of the possibility of a falling P/E_t , but many also express their concerns. Based on the earnings model, Arnott and Ryan (2001) predict "real returns up to the 3.2 percent range, *assuming that current valuation levels hold*" (p. 63, italics in the original). Arnott and Bernstein (2001) "choose not to go down the slippery slope of valuation, *even though we believe that valuation matters*" (p. 12, italics in original). Their decisions to place the qualifications in italics are clear

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TABLE 4

Impact of Lower Real Returns on Annual Savings Needed for Retirement

Age	Portfolio's Real Return	Annual Savings	Beginning Wealth	Wealth at 65
65	3.5%	NA	\$852,918	\$852,918
65	5.0%	NA	\$739,932	\$739,932
50	3.5%	\$34,319	\$100,000	\$852,918
50	5.0%	\$23,482	\$100,000	\$739,932
50	3.5%	\$25,930	\$200,000	\$852,918
50	5.0%	\$14,306	\$200,000	\$739,932
40	3.5%	\$21,157	\$0	\$852,918
40	5.0%	\$14,765	\$0	\$739,932
40	3.5%	\$15,295	\$100,000	\$852,918
40	5.0%	\$8,008	\$100,000	\$739,932
30	3.5%	\$12,360	\$0	\$852,918
30	5.0%	\$7,802	\$0	\$739,932

For the given real return on portfolio, age, and beginning wealth, this table provides the annual real savings needed in order to withdraw a real income of \$50,000 per year for 25 years beginning at age 65. Wealth at 65 denotes the real wealth needed to meet the target retirement real income of \$50,000 per year for 25 years.

NA denotes "not applicable."

expressions of concern. Fama and French caution readers that their low estimates of real stock returns from the earnings and dividends models "are probably too high....[T]he 1999 expected return estimates are unbiased measures of near-term expectations only if the expected stock return has fallen to a permanently lower level, expected to remain constant for the indefinite future....If the expected stock return is mean reverting,...our low 1999 expected return estimates overstate near-term expected returns" (p. 15).

In a related empirical study, Campbell and Shiller (1998) conclude that stock price growth in the next decade can be partially predicted by a beginning price-earnings ratio. Their P/E ratio is current price divided by ten-year average real earnings, where the ten-year average is an estimate of normal earnings and thus the normal P/E ratio. In short, theory and empirical evidence suggest that future multi-year stock

appreciation is negatively related to the beginning price-earnings ratio. Because today's P/E ratio—whether defined on forward earnings or average actual earnings—is well above its historic average, current stock prospects appear well below average.

For the Record

The predictions from prior studies listed in Table 3 were made before the sharp decrease in the S&P 500 that began in March 2000. Today's normal P/E_t is lower than it was in 1999 and early 2000 when these predictions were made. Because the stock predictability literature implies that the beginning normal P/E_t affects long-run stock prospects, it is important to update old predictions to reflect today's lower multiples. This points out another problem with the earnings model that is not shared by the earnings equation.

Suppose the normal P/E_t is 30 and stock prices crash 50 percent overnight. After the crash, the normal P/E_t is 15. How does the crash affect the projected level of the stock index in, say, ten years? According to the earnings model, the projected level of the stock index ten years hence is 50 percent lower after the crash than before; projected earnings growth remains at the same historic level and the projected P/E_t ratio ten years hence is 15. This is a serious weakness of the earnings model (and the same objection applies to the dividends model).

The stock-predictability literature suggests that the generous stock returns from 1982 through 1999—due in large part to a dramatic rise in P/E_t —will likely be followed by below average returns over the next decade, or longer. Even if the normal P/E_t remains at today's elevated level, expected stock returns are below average. If the normal P/E_t falls, stock prospects are worse. Good times tend to follow bad times, and bad times tend to follow good times. In this case, the good times and bad times are measured in decades.

The predictions in the bottom third of Table 3 are based on a specific version of the dividend discount model. Here, I present more general predictions of ten-year real returns on the S&P 500. The predictions are based on the earnings equation:

$$10\text{-year real stock return} = (D_t/P) + (g \text{ EPS}) + (\text{Percent Change in normal } P/E_t)$$

There is virtually no disagreement about the size of the projected dividend yield over the next year. It is about 1.4 percent.

The estimate of growth in EPS is estimated as the sum of four parts:

$$gGDP + \text{New Age} - \text{Leakage} + \text{Change Payout Ratio}$$

The $gGDP$ denotes growth rate of real GDP. I estimate that the economy will

grow between 2.5 percent and 3.5 percent over the long run. The point estimate is three percent.

"New Age" denotes the additional long-run growth in EPS due to recent technological advances. According to new-age advocates, we are entering a new era of growth that will spur earnings growth, and thus justifies today's high valuations. But Siegel (1999) argues that even if output grows faster, EPS growth will not follow. He says, "Over the long run, the returns to technological progress have gone to workers in the form of higher real wages, while the return per unit of capital has remained essentially unchanged. Real output growth could spur growth in per-share earnings only if it were 'capital enhancing,' in the growth terminology, which is contrary to the labor-augmenting and wage-enhancing technological change that has marked the historical data." I dismiss the new-age argument and estimate this component at zero percent.

Arnott and Bernstein (2001) and Arnott and Ryan (2001) argue that earnings of listed common stocks will grow slower than total business profits. Much of the new growth in a capitalist society comes from non-listed firms. Therefore, on average, earnings of listed stocks will grow slower than the economy. This is the "Leakage" term. Arnott and Ryan (2001) estimate it at one to two percent. Much of future growth will come from firms that currently are not listed on an exchange. However, many venture capital firms fail, so the average return on venture capital is far below the average return on venture capital firms that attain IPO status. Furthermore, most of the increase in wealth from these firms comes after the IPO. Due to the price impact of block trades, institutional investors may not be able to invest in small-cap and micro-cap stocks, so leakage may be substantial for institutions. However, individual investors can invest across firm sizes, so leakage need not be a major concern for individuals. I estimate leakage at zero to one percent for individual investors, with a point estimate of zero.

"Change Payout Ratio" denotes the additional long-run growth today compared with pre-1980 due to today's lower payout ratio. I estimate it at 0.5 percent, the approximate difference between long-run growth in examples 2 and 4 of Table 2. Combining the four components of gEPS produces a range of estimates from three to four percent. The point estimate is 3.5 percent.

The range of estimates for "Percent Change" in normal P/E_t is -3 percent to 0 percent with a point estimate of -1 percent. Assuming today's normal P/E_t is 20.9, this corresponds to ending normal P/E_t ratios of 15.4 to 20.9, with a point estimate of about 19. The point estimate is not in the middle of the range. This implies that, although an ending normal P/E_t of 19 is most likely, the downside risk from today's valuation level is larger than the upside potential.

The range of point estimates for the real return is 1.4 percent to 5.4 percent, with a point estimate of 3.9 percent. Because today's real yield on ten-year Treasury inflation protection securities (TIPS) is about three percent, this implies that the S&P 500 will likely beat bonds by about one percent a year over the next decade.

Investment Implications

This section discusses six investment implications of lower real stock returns. For discussion of additional implications, see Evensky (2001) and Reichenstein (2001).

The first implication is that financial planners should try to change investors' returns expectations. We must adjust to market prospects; market returns do not adjust to our needs.

The second implication is that individuals need to save more to reach their retirement goals. Table 4 illustrates the impact of lower returns on the amount of annual savings required to reach an annual real income goal during retirement. The retirement goal is to be able to withdraw a real income of \$50,000 a year for 25 years

beginning at age 65. Social Security and defined-benefit plans may provide additional income. For each scenario, Table 4 presents the annual savings amounts needed to satisfy the goal when the portfolio's real returns are 3.5 percent and 5 percent, respectively. Assuming a 60 percent stock and 40 percent bond portfolio, this portfolio historically produced an average real return of about 5 percent, while it may produce a 3.5 percent real return looking forward.⁸ All figures are in real dollars.

The first two rows indicate the real wealth needed at age 65 in order to meet the \$50,000 annual withdrawal. Assuming five percent real returns, \$739,932 was needed at age 65 to achieve the annual \$50,000 goal. At 3.5 percent, \$852,918 is needed, or about 15 percent more. For a given retirement nest egg, a retiree can afford a lower standard of living when real rates are 3.5 percent than when they were 5 percent.

The next two rows indicate the annual savings needed by a 50-year-old person who currently has \$100,000 in savings. To satisfy the retirement goal, this individual must save \$34,319 a year when the real return is 3.5 percent, while he or she only needs to save \$23,482 a year when the real rate is 5 percent. Assuming \$200,000 in current savings, the annual savings amounts are \$25,930 at 3.5 percent and \$14,306 at 5 percent.

For someone younger than retirement age, there are two reasons why the required annual savings amount is higher when real returns are 3.5 percent instead of 5 percent. First, due to the lower real rate of return, each dollar of savings is worth less at age 65, and, second, more dollars are needed at age 65. Lower real rates have a double-whammy effect on the amount of annual savings needed to satisfy the retirement goal. For example, someone age 40 (with no beginning wealth) must save 43 percent more each year when the real rate is 3.5 percent instead of 5 percent.

The third investment implication is to minimize investment expenses. Individuals

get to keep after-tax net returns. Although they cannot influence gross returns, they have substantial influence on the investment expenses, which is the difference between gross returns and after-tax net returns. Investment expenses include trading costs when trading individual securities, loads and expense ratios when investing in mutual funds, and taxes. Taxes are often the largest investment expense, yet they may be the most controllable. Before retirement, individuals should maximize savings in tax-favored accounts such as 401(k)s, Keoghs and Roth IRAs. For assets held in taxable accounts, tax efficiency means, when possible, not realizing capital gains and realizing losses.

Fourth, do not try to make up for reduced market rewards by concentrating the portfolio. Do not make large bets on one sector or, worse yet, one stock. The technology crash should have reinforced this timeless lesson for victims and non-victims alike.

Fifth, consider lowering the portfolio's stock weight. Looking forward, real stock returns are below historic averages, while real bond returns are above historic averages. Although the optimal target mix of stocks and bonds depends upon precise estimates of these asset classes' expected returns, standard deviations, and the correlation between their returns, most optimizations would suggest stock allocations that are perhaps 10 percent to 15 percent smaller than usual.

Sixth, consider expanding the asset classes beyond stocks and traditional bonds. Several alternative asset classes are available. Two deserve special merit. The first is inflation-linked bonds. Many scholars consider these bonds to be a separate asset class from the traditional bonds discussed in the prior paragraph. When inflation increases, prices of stocks and traditional bonds usually fall, while inflation-linked bond prices should be unaffected. Consequently, inflation-linked bonds should provide better diversification benefits with stocks than traditional bonds.

The second is equity real estate. Traditionally, returns on real estate have been weakly correlated with returns on stocks and bonds.

Summary and Conclusions

Several noted scholars recently have concluded that long-run real stock returns will likely fall below historic levels. In addition, the equity risk premium is likely to be well below historic levels, possibly negative. These return forecasts come from two models. The good news is that the dividends model, which usually produces the most pessimistic forecasts, is faulty. However, the earnings model also predicts that future returns will be below historic levels. In addition, earnings model forecasts are too optimistic if the market normal P/E_t will fall, which appears likely. The bottom line is that there is theoretical and empirical support for the scholars' consensus view that forward-looking real stock returns (and equity risk premium) will be below historic levels.

More important, this paper provides a framework for predicting future returns. Differences in specific predictions usually can be traced to differences in predictions of specific components of the earnings equation. This framework should prove helpful in reducing the range of forecasts at a given financial planning firm. Moreover, unless financial planners' predictions differ substantially from recent predictions of most scholars, then the planners will have to face the prospects of diminished stock returns.

Finally, this paper discusses the investment implications of lower real stock returns. First, financial planners should try to adjust investors' return expectations. Second, most individuals need to save much more to meet a given retirement lifestyle, and some current retirees must reduce their annual expenditures. Third, individuals should minimize investment expenses. By reducing expenses, including taxes, investors can reap a larger share of the reduced market returns. Fourth, investors should not try to

make up for reduced market rewards by concentrating the portfolio in a few sectors or in a few individual securities. Finally, individuals should consider reducing their stock exposure and expanding their portfolios' assets beyond stocks and traditional bonds, into promising asset classes such as inflation-linked bonds and real estate.



Endnotes

1. Although it is slightly more accurate to use compounding—such as $(1.0384)^{10} = (1.0304)^{10} (1 + \% \text{ change in normal } P/E) = (1.033)^{10}$ —this study uses the simpler arithmetic form (such as $3.84\% + 3.04\% + \% \text{ change in normal } P/E$) to be consistent with most of this research. The 3.41 percent reflects this simplification, but “errors” introduced by this simplification are too small to change the conclusions from the studies.
2. The earnings model view, which is discussed later, may help clarify this paragraph and the statistical term “long-run stable.” The earnings model predicts ten-year real stock returns of 4.78 percent, the sum of D_1/P and growth in real earnings. This is an optimal stock returns prediction only if the best prediction of the normal P/E at the end of the forecast horizon is 20.9, today's normal P/E . A normal P/E that is long-run stable at 20.9 means that, although shocks to the stock market will cause the normal P/E to be temporarily above or below this level, it will tend to revert toward this normal level. Therefore, for long forecast horizons, the best prediction of the ending normal P/E level is today's level. The earnings model predictions are unbiased.
3. The normal dividend payout ratio is dividends divided by normal earnings. When actual earnings are cyclically low, the actual payout ratio exceeds the normal payout ratio.
4. Assuming 100 percent dividend payout

ratio, real earnings growth is zero and nominal growth, G_{nom} , is the expected inflation rate, EI : $G_{nom} = EI$. Nominal risk-free rate, R_{nom} , is the sum of the real risk-free rate, R , and expected inflation—that is, $R_{nom} = R + EI$. The nominal required rate of return on the market, R_m , is R_{nom} plus the equity risk premium, ERP : $R_m = R_{nom} + ERP$. The denominator of the dividend discount model is the spread: $R_m - G_{nom}$.

Because expected inflation is in R_{nom} and G_{nom} , the spread simplifies to $R + ERP$, the expected real return on the market.

5. E/P equals K_m in all examples in Table 2, while D/P does not. Theory suggests that the decrease in the dividend payout ratio altered the historic relationship between D/P and stock returns. This is another factor favoring stock predictions based on the earnings model instead of the dividends model and stock predictions based on E/P (or P/E_t) instead of D/P (or P/D_t).
6. The business cycle has much less influence on forward earnings estimates than on trailing actual earnings. Thus, the forward P/E tends to be a much better estimate of the normal P/E ratio than trailing P/E .
7. I set the earnings model forecast at 4.78 percent or 1/20.9. The 4.73 percent need not be the best forecast of the sum of dividend yield and growth in earnings. The key is that the middle and irrational markets predictions differ in that they project a lower ending normal P/E ratio and thus lower returns.
8. Historically, real returns on stocks and bonds averaged about 7 percent and 2 percent, while current projections are about 3.9 percent and 3 percent, respectively. These correspond to portfolio real returns of 5 percent historically and about 3.5 percent looking forward.

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