



Investment Section
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Future Equity Returns

By Eric Janecek

Assumptions regarding future equity returns are critical for funding pension plans, designing and pricing variable insurance products and associated guarantees, optimizing investment strategies, and personal financial planning. Most of us assume that equities return an average of 8% to 12% per year. Many actuaries and investment professionals use similar expected returns for their long term projections. What is the basis for future equity return assumptions? What are the sources of equity returns? How reasonable is it to use these returns in long term financial projections? This essay explores these questions and reaches some troubling conclusions.

We will focus on expected average returns on Standard & Poor's 500 Index. The concepts and logic can be applied to other equity indices as well. The S&P 500 just happens to have a lot of historical data.

Historical Equity Returns

Returns for historical periods starting between 1871 and 1995 and ending in 2013 generally average between 9% and 12%. Over the entire 142 year period, nominal returns have averaged 9%. Real, or inflation adjusted returns have averaged 6.8%. This seems to justify the average returns typically referenced in the media and used in many financial projections. Historical returns are often used as justification for assuming future returns of the same amount. We will return to the problems associated with this assumption later.

Sources of Historical Returns

Let's consider the sources of historical returns and whether

they are likely to continue in the long term. In doing so, it will be useful to break down equity returns into five components: dividend yield, new shares issued or bought back, changes in the price to earnings ratio (P/E), real earnings growth, and inflation. Share repurchases have roughly equaled new shares issued in recent history and will be ignored as they are unlikely to have a material impact on long term average returns.

Using S&P data from 1871 to 2013, the table below shows the components of the average equity return.

Source	Annual Return Contribution
Dividend Yield	4.4%
Changes in P/E	0.3%
Real Earnings Growth	1.8%
Total Real Return	6.8%
Inflation	2.1%
Total Nominal Return*	9.0%

* Total return is computed by compounding the individual components.

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Can the historical 9% equity returns be sustained into the future? To answer this question, we can get some insight from four different perspectives: *Statistics*, *Contributors to Historical Returns*, *Changes in the Components of Equity Returns*, and finally, a "Reality Check."

A Statistical Perspective: From statistics, we know that when calculating a sample average, we would prefer to have 30 to

¹ To be more precise, in order to have statistical support for setting future returns based on historical data we require:

- ¹ Returns over some set of "time periods" such as years, days, or minutes are independent and identically distributed
- ² The return distribution of potential future returns will be the same as the past
- ³ An adequate number of time periods

Clearly the third requirement could be satisfied by using the 390 1-minute returns from the prior trading day. However, this would not satisfy the first two requirements. Even annual time periods are not independent and identically distributed. Just consider business cycles, the Great Depression, World War II, and the 1990's.

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etc. and somehow converted it all into gold, you still would not have that much wealth. Clearly recent historical returns cannot continue indefinitely.

Future equity returns are important for pension plans, profitability of insurance products, company solvency, asset allocation, and personal financial planning. Now it is certainly possible to have average equity returns of 9%

or more for the next several decades. But I would not bet on it for the reasons discussed above. I would argue that a best estimate long term, real return assumptions is around 4% for equities. A 4% real return and 6% nominal return is materially lower than what many people are using. Let's hope their optimism is well placed. Otherwise, we may be in for some unpleasant surprises down the road.

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