

Is the Stock Market Safer for Long-Term Investors?

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Equities have traditionally been regarded as risky assets. They may be attractive because of their high average returns, but these returns represent compensation for risk; thus equities should be treated with caution by all but the most aggressive investors. In recent years, however, it has become commonplace to argue that equities are actually relatively safe assets for investors who are able to hold for the long term. An extreme version of this revisionist view is promoted by James Glassman and Kevin Hassett in their recent book *Dow 36,000* (Times Books, 1999). Glassman and Hassett argue that stocks are actually just as safe as bonds or Treasury bills, and that as investors come to realize this fact they will bid up stock prices to unprecedented levels.

The revisionist view that stocks are safe assets is not based on any reduction in their short-term volatility. The volatility of market index returns has moved up and down – most recently up, after an unusually quiet period in the mid-1990's – but it shows no downward trend. Rather, the revisionist view is based on evidence that stock returns are less volatile, relative to bond or bill returns, when they are measured over long holding periods.

Evidence of this sort is found in Jeremy Siegel's well-known book *Stocks for the Long Run* (2nd ed., McGraw-Hill, 1998). Using historical US data from a period of almost 200 years (1802-1997), Siegel compares the range of variation of real returns on stocks, long-term bonds, and Treasury bills. In their best single year, stocks delivered a real return of 67%, while in their worst single year they returned -39% for a range of 106% (67%+39%). The one-year range for bonds is far smaller at 57%, and the one-year range for Treasury bills is smaller again at 40%. A similar pattern emerges if one compares standard deviations of annual real returns as measures of risk. In the 1802-1997 data the standard deviation of the annual return is 18% for stocks, 9% for bonds, and 6% for bills. For an investor with a one-year holding period, stocks appear to be considerably riskier than fixed-income investments.

The picture is very different for long holding periods of a decade or more. The average annualized real stock return over the best decade between 1802 and 1997 was 17%, while the average return over the worst decade was -4% for a range of 21%. The decadal ranges for bonds and bills are 18% and 17%, respectively. Over 20-year periods the ranges for all three assets are almost identical at 12%, and over 30-year periods the range is actually smaller for stocks at 8% than it is for bonds and bills at 9%. Standard deviations of real returns follow the same pattern when measured over long holding periods; they are roughly equal over 20-year periods, and lower for stocks than for bonds

or bills over 30-year periods. It would appear that stocks are no riskier than bonds and bills for long-term investors who can hold their positions for at least a decade. Similar patterns are visible in some international markets, although reliable long-term data are harder to come by overseas.¹

These findings create a puzzle. How is it possible that short-term stock market risk largely disappears at long horizons? Where does the risk go? The revisionists devote little attention to this question, but it turns out that the answer is important and it undermines the revisionist case for aggressive investment in equities.

Mathematically, there can only be a difference between the short-term risk and the long-term risk of an asset if its expected return varies over time. With constant expected returns, the annualized standard deviation over a long holding period (say N years) is the standard deviation over one year divided by the square root of N. Thus with constant expected returns, the standard deviations of all assets would shrink with the square root of the horizon, but they would shrink together; we could not see the standard deviation of stock returns shrinking more rapidly than the standard deviations of bond and bill returns. Evidence for reduced relative risk of stocks at long horizons is therefore indirect evidence for predictable variation in stock returns.

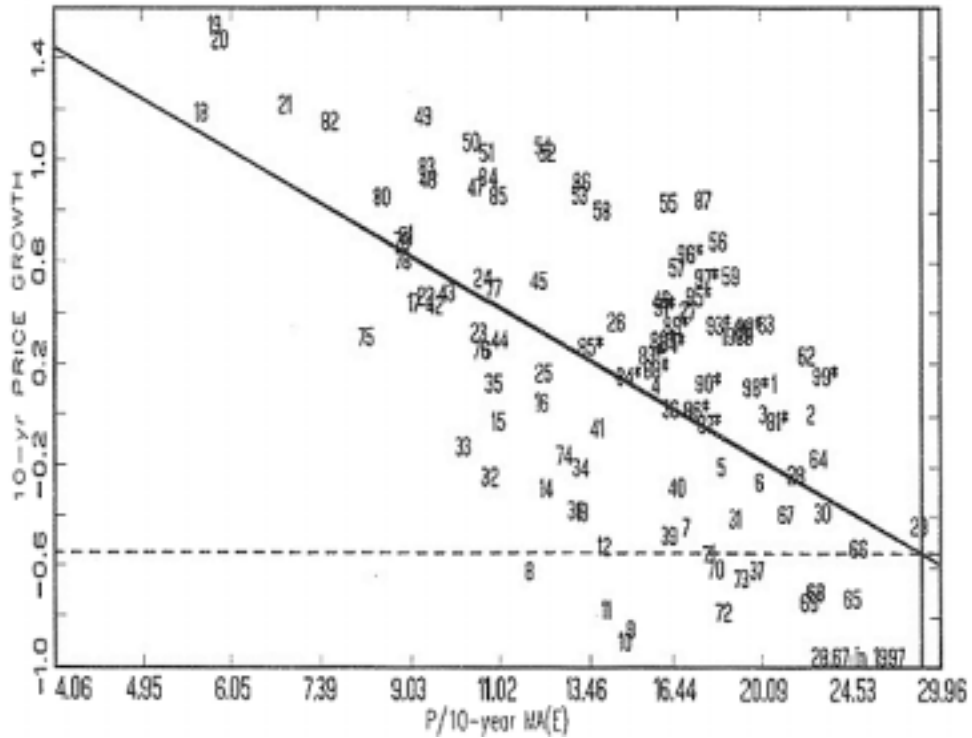
The type of return variation that reduces long-term risk is known as *mean-reversion*. If unusually good stock returns today lower the expectation of returns in the future, then bull markets tend to be followed by corrections and bear markets tend to be followed by recoveries; stock prices revert towards a long-run average or mean, and stocks are said to be mean-reverting. Under these circumstances, stock market risk declines more rapidly with the investment horizon than the square-root rule would imply.

Siegel's risk measurements provide indirect evidence for mean-reversion, but more direct evidence is also available as shown in Figure 1.² The horizontal axis shows a smoothed P/E ratio for the S&P 500 index. The smoothed P/E ratio divides current price by an average of earnings over the past decade, in order to eliminate the effects of temporary earnings declines that occur in recessions. The vertical axis shows the growth of real stock prices over the next decade. Each year from 1871 to 1987 is indicated in the figure using its last two digits (with a star for 19th Century dates). The scatter of points reveals a very strong negative relation between smoothed P/E and subsequent growth in real stock prices; the best fit to the historical data is given by the downward-sloping regression line in the figure. Years with high initial P/E ratios, such as 1929 or 1966, tend to have poor average returns over the next decade, while years with low initial P/E ratios, such as 1918 or 1982, tend to have high average returns over the next decade.

¹ Comparative international evidence on stock and bond market performance is reported in John Y. Campbell, "Asset Prices, Consumption, and the Business Cycle", Chapter 19 in John Taylor and Michael Woodford eds. *Handbook of Macroeconomics* Vol. 1, North-Holland, 1999.

² This figure is reproduced from John Y. Campbell and Robert J. Shiller, "Valuation Ratios and the Long-Run Stock Market Outlook", *Journal of Portfolio Management*, Winter 1998.

Figure 1



Historical US data do not show any evidence for similar mean-reversion in real bond returns. This may be surprising at first; long-term bonds are designed to have a fixed value at maturity, and so one might expect them to mean-revert strongly. The explanation is that historically long-term bonds have made fixed nominal payments, not fixed real payments. Substantial variations in US inflation over the past two centuries have made the fixed nominal payments of long-term bonds highly variable in real terms. In the future investors should expect mean-reversion in bond returns only if inflation is kept under tight control or if inflation-protected bonds (such as the US Treasury's TIPS) are held.

What are the implications of mean-reversion, and the resulting reduced risk of stock returns at long horizons, for the portfolio strategies of long-term investors? Siegel argues that the combination of a high risk premium and low risk should be irresistible for long-term investors; such investors should follow an aggressive buy-and-hold strategy, allocating far more to equities than would be recommended by a short-term mean-variance analysis. Glassman and Hassett go further, arguing that investors are gradually realizing that the historical risk premium on equities is actually too high, given their low

risk for long-term investors; the risk premium is in a transitional period of decline, which is driving market prices up. Once the transition has been accomplished, the equity premium will be in balance with the low long-term risk of stock returns, but in the meantime Glassman and Hassett also recommend an aggressive policy of buying equities.

All these arguments ignore the logical link between reduced long-term risk and mean-reversion. In the presence of mean-reversion, the strategic benchmark allocation to equities should not be fixed, but should adjust gradually to changes in the equity premium. In particular, the equity allocation should be lower at times, such as the present, when the recent performance of stocks has been spectacular.

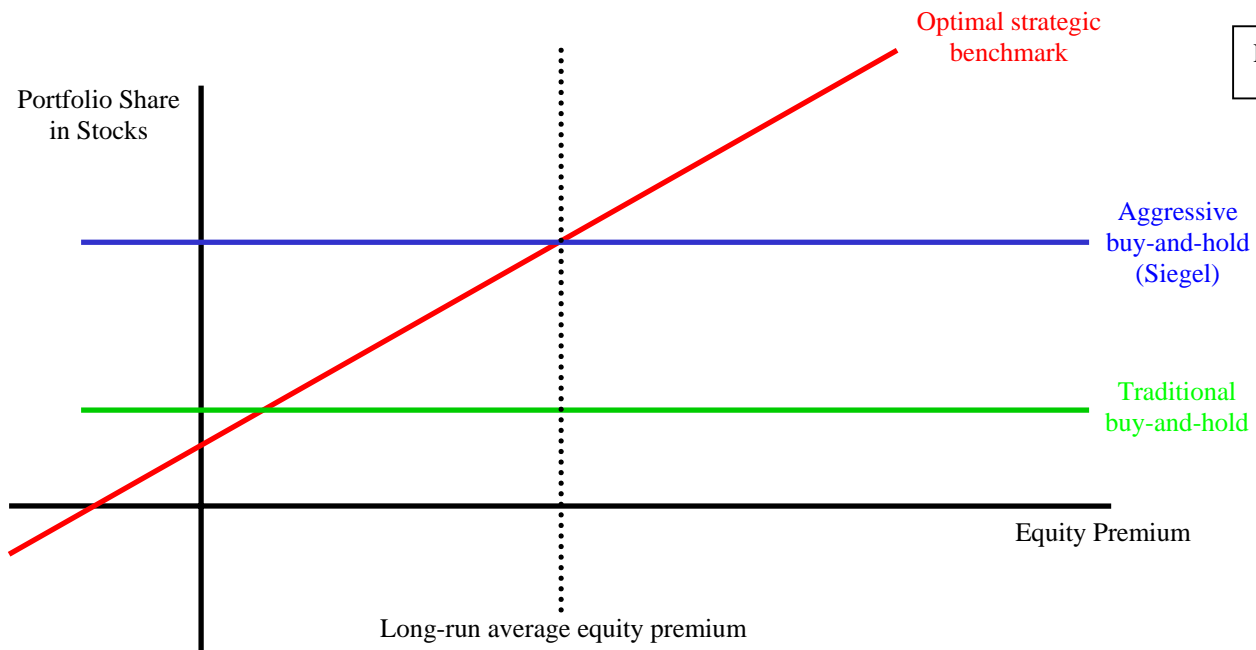


Figure 2 represents alternative benchmark allocations graphically. The horizontal axis shows the equity premium, with its long-run average marked by a vertical dashed line. In the presence of mean-reversion, the equity premium will fall if stock prices have risen (one will move to the left in the diagram) and will rise if stock prices have fallen (one will move to the right). The three colored lines are three alternative rules for setting the strategic benchmark. The green line is the traditional buy-and-hold allocation that would come out of a single-period mean-variance analysis. The blue line is the more aggressive buy-and-hold allocation recommended by Siegel. The red line is the allocation that is optimal for a long-term investor in the presence of mean-reversion. On average, this allocation is as high as Siegel's; but it falls when the equity premium is low. At a time

like the present, the allocation may be no higher—it may even be lower—than would be implied by a traditional short-term analysis assuming a constant equity premium.³

Many investors today are attracted to the stock market by the prospect of high returns combined with low long-term risk. Such investors are trying to have their cake and eat it too. If expected stock returns are constant over time, then one can hope to earn high stock returns in the future similar to the high returns of the past; but in this case stocks are much riskier than bonds in the long term, just as they are in the short term. If instead stocks mean-revert, then they are relatively safe assets for long-term investors; but in this case future returns are likely to be meagre as mean-reversion unwinds the spectacular stock market runup of the past decade.

³ This figure is based on John Y. Campbell and Luis M. Viceira, “Consumption and Portfolio Decisions when Expected Returns are Time Varying”, *Quarterly Journal of Economics* 433-495, May 1999, which calculates the exact position of the red line for investors with different attitudes towards risk.