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Gambler's Fallacy?

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Judged by historical data, the stock market is the growth-optimal investment vehicle among standard types of U.S. securities. The capital of a buy-and-hold portfolio invested in a value-weighted index of large-company U.S. stocks (with capital gains and dividends reinvested) grew at an annualized inflation-adjusted rate of 7.43 percent between the end of 1925 and the end of 2001. By comparison, the corresponding growth rate of a buy-and-hold portfolio of long-term corporate bonds averaged only 2.63 percent. If annual inflation-adjusted rates of growth are independent, random realizations (and thus unpredictable), then an investor who wants to maximize the long-run rate of capital growth should be invested in the stock market at all times.

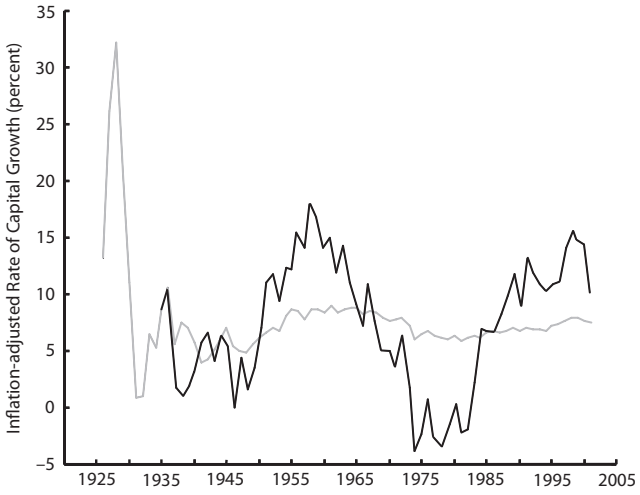
If annual rates of growth of the aforementioned buy-and-hold stock index portfolio are indeed independent, random realizations, then they may be compared to the outcomes of coin flips. The probability of a coin coming up "heads" is independent of the outcomes of past coin flips. A run of several consecutive tails does not change the odds that heads will come up on the next flip. If we keep flipping the coin infinitely, the fraction of heads in the total number of outcomes converges to 50 percent—the long-run average. The convergence to 50 percent happens not because nature corrects deviations from the long-run average; rather, the unfolding random process dilutes deviations from the baseline frequency. To many people, the concept of dilution is not intuitive; they believe that deviations from the long-run average in games of chance will be corrected somehow as the game is played. This correction process is called mean reversion. This erroneous belief in mean reversion when outcomes are in fact independent is known as the gambler's fallacy.

Sometimes it is difficult to determine whether the data-generating processes of an economic variable dilutes or corrects deviations from the long-run average. The stock market is widely believed to follow a random walk, which implies that annual rates of capital growth are independent of past realizations. There are finance scholars, however, who believe that the stock market is mean-reverting. Robert Shiller (1981), for instance, argues that stock market valuation exhibits pronounced swings around its fundamental value.[1] Obviously, if capital growth rates are indeed independent realizations, those who believe in mean reversion in the stock market fall prey to the gambler's fallacy.

The graph below exhibits annualized capital growth rates of the aforementioned buy-and-hold portfolio of large- company stocks. The thin line shows the inflation-adjusted annualized capital growth rate of the portfolio since the end of 1925, while the thick line shows the corresponding growth rate for rolling ten-year periods. The ten-year growth rate swings markedly around the long-run mean rate of growth of 7.43 percent. The stock market outlook depends on whether such swings in shorter-term growth rates reflect mean reversion or whether dilution drives the annual rate of capital growth. ■

[1]Shiller, Robert J. "Do Stock Prices Move Too Much to be Justified by Subsequent Changes in Dividends?" *American Economic Review*, 1981, *71*, pp. 421-36.

Average Rates of Growth ob a Buy-and Hold Portfolio in Large-Company Stocks



NOTE: Annual observations: The first observations are 1926 (average growth rates since year-end 1925; thin line) and 1935 (average growth rate prior 10 years; thick line). The last observation is 2001.
SOURCE: Ibbotson Associates. Stocks, Bonds, Bills, and Inflation. 2002 Yearbook. Chicago: Ibbotson Associates, 2002.