

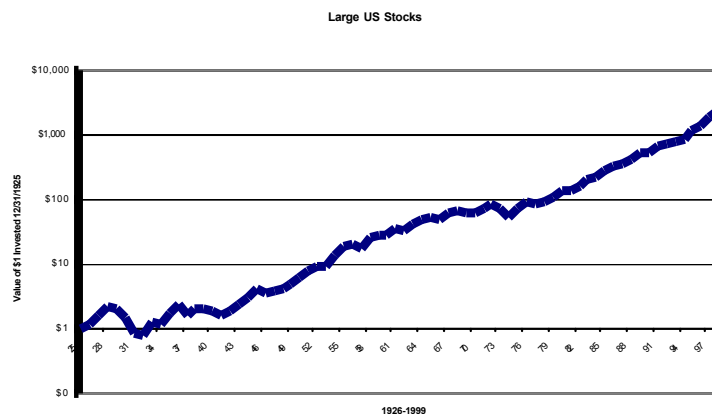
# Does the Stock Market Trend?

## *And Why Do We Care?*

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In the physical world, one of Newton's laws states that objects in motion tend to stay in motion, which is to say they have momentum. This law can be used to predict the position of objects, such as planets. People looking at a chart of stock market history may be tempted to conclude that it trends and that momentum applies to stock prices. If the market moves in trends (if it has momentum), then we can more profitably predict the future direction of the market. Furthermore, understanding the pattern of market movements improves our ability to model future investor wealth. Our Wealth Simulator and AASim products estimate the probability of meeting investment goals by simulating market patterns. The reliability of the results depends upon the realism of the market patterns that they generate.

The market tends to go up more often than it goes down. Based on history, it goes up about 3 out of 4 years. And there are up and down streaks. This supports the idea of a trend. On the other hand, it does not trend in the sense that we can tell whether it is more likely to go up based on what it has done recently. That is, it does not have momentum that allows us to predict the future. The past tells us little about the immediate future.



While this may seem paradoxical, a comparison with the flip of a coin may help.

The random flip of a coin does not “trend.” The previous flip does not affect the next flip. Statisticians call this independence. They also say that there is no serial correlation. Streaks of heads and tails do occur and are the byproduct of the random process. The market behaves something like a coin that lands heads-up about three-fourths of the time. Nothing is known about the next flip of the coin from the previous flip. Likewise the ability to predict the next market return is not improved by knowing previous market returns. The trends in the market are the result of streaks and the tendency for markets to go up.

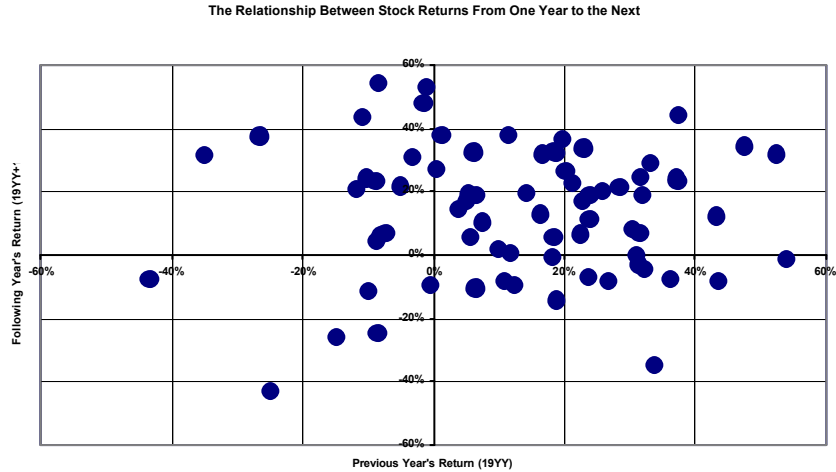
The bottom line is that we can't use past performance to time the markets. However, it makes modelling the market a bit easier. And this facilitates modelling wealth with our Wealth Simulator and AASim products. Both assume that returns in a period are independent of returns in the previous period.

In the case of Wealth Simulator, historical returns are randomly ordered (e.g. 1985, 1943, etc.). AASim randomly generates returns. Each return has no relationship with the previous return. If future market returns are not serially correlated, then these models will produce market-like patterns.

#### *Appendix: Supporting Data and Analysis*

From 1927-1999, fifty-three of the seventy-three years (73%) were positive. Now let's add information about the previous year. If the previous year was negative, the following year was positive in 70% of the cases. If the previous year was positive, the following year was positive in 74% of the cases<sup>1</sup>. Statistically the probability of next year's returns being positive do not depend upon the previous year's returns.

The chart below used data from The chart to the right used data from 1926-1999 to illustrate the weak relationship between the returns in one year (horizontal axis) and the returns in the following year (vertical axis). Knowing the return on the horizontal axis (the previous year's return) does not help you predict the return on the vertical axis (the following year's return). Source of data: Ibbotson Associates.



<sup>1</sup> - Statistically, there is no difference in these percentages. Of the 20 years following negative returns, we would have expected about 14.6 positive returns (73%). We observed 14. Of the 53 years following positive returns, we would have expected 38.5 positive returns and we observed 39.