

Triumph of the Optimists

Elroy Dimson, Ph.D.
Professor, London Business School

October 2003

Triumph of the Optimists

Speaker: Elroy Dimson, Professor of Finance, London Business School

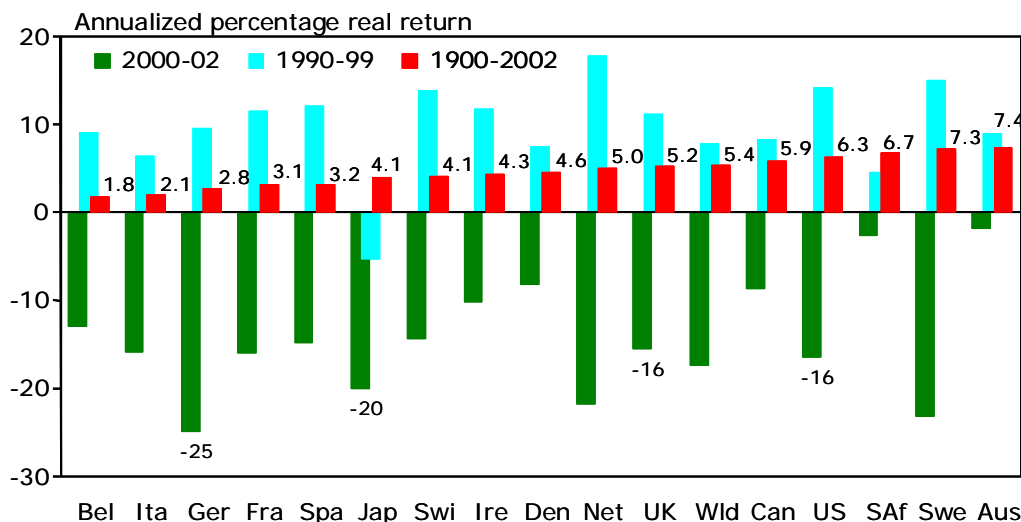
Abstract: *An important question for investors is the expected return and risk from holding equities in preference to lower risk assets. We shed light on this topic by addressing two key questions: What has the real return been on equities historically? And what has the probability been historically of failing to achieve a positive real return? To answer these questions we reviewed evidence for 16 different countries over the 103-year period 1900-2002, drawing on the recent book Triumph of the Optimists by Dimson, Marsh and Staunton. Although equities gave the highest return in every country, they were also risky, and we demonstrate the importance of diversifying globally as well as across asset classes. [▲]*

The long term

To understand the long-term performance of the stock market, one needs to study markets under differing conditions and over long intervals. Our research spans over a century of returns on equities, bonds, bills, inflation, and currencies. It covers two North American markets, the United Kingdom and three other non-Euro markets in Europe, seven markets from what is now the Euro currency area, two Asia-Pacific markets, and one African stock market.

The long-term record for these stock markets is summarized by the bold bars in Figure 1, which show real returns over the 103-year period 1900-2002. Clearly, these long-term returns are much less favorable than the returns during the 1990s, but equally, they contrast sharply with the disappointing returns of 2000-02.

Figure 1: Short- and long-term annualized real equity returns around the world



Note: Markets (from left to right) are Belgium, Italy, Germany, France, Spain, Japan, Switzerland, Ireland, Denmark, Netherlands, United Kingdom, 16-Country World Index, Canada, United States, South Africa, Sweden and Australia.

(c) 2003 Dimson, Marsh, Staunton

[▲] This article builds on *Triumph of the Optimists: 101 Years of Global Investment Returns* (New Jersey: Princeton University Press 2002, ISBN 0-691-09194-3) and on our update entitled *Global Investment Returns Yearbook*, published with support from ABN AMRO. Copyright © 2003 Elroy Dimson, Paul Marsh and Mike Staunton, London Business School.

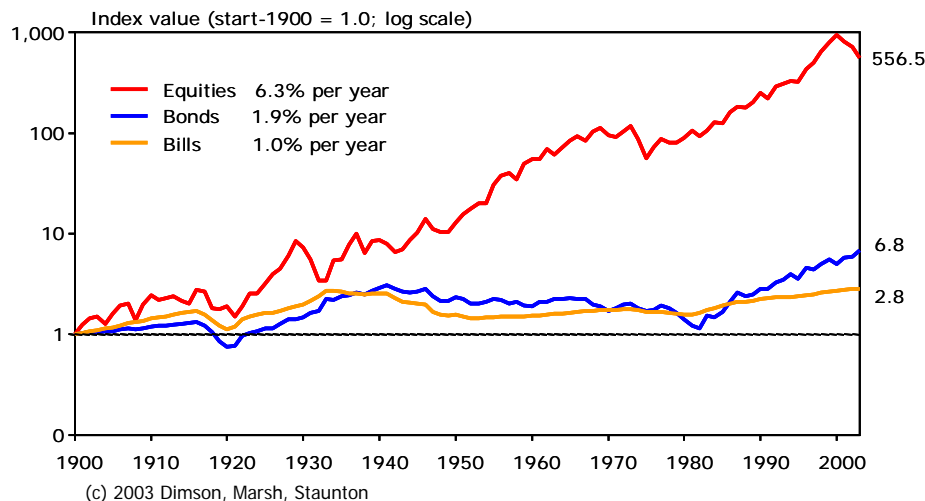
Investors need to examine the full extent of financial market history, and by looking not just at the United States, but at other countries as well. Both practitioners and researchers have grown increasingly uneasy about the large expected returns projected for equities by many investors and pension plans. Our study helps put the long-term experience of American investors in a longer-term context, with comparisons that span sixteen different markets.

The Dimson-Marsh-Staunton database

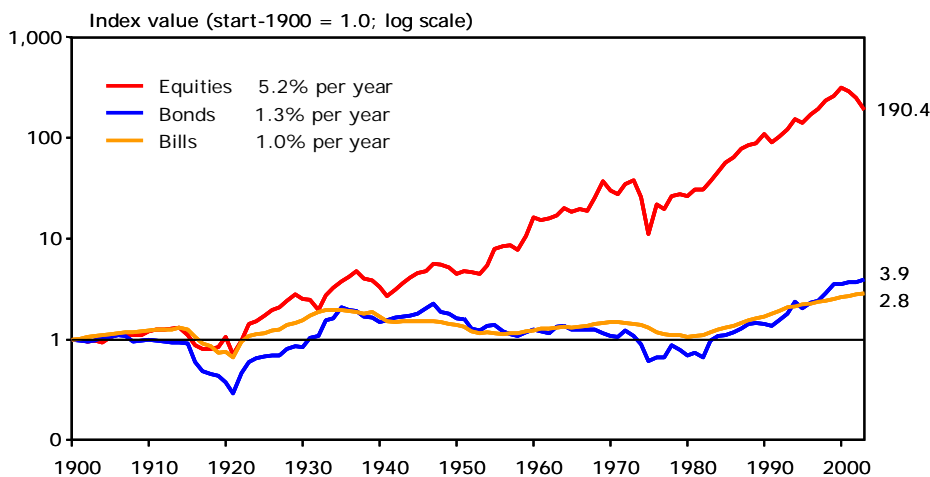
Our evidence on long-run returns is derived from a unique database that today spans some 95% of the free-float market capitalization of all world equities, and which in 1900 comprised around 90% of the world equity market. For each of the sixteen countries, the annual return on each asset category includes estimated income as well as capital appreciation over the period since 1900.

The annual returns are plotted for three representative countries in Figure 2. The line-plots portray each country's real (inflation adjusted) returns on common stocks, long-term government bonds, and Treasury bills (or short-term deposits). In each case, over the course of a century common stocks did better than inflation, better than bonds, and better than bills, though naturally, the scale of outperformance differed across markets.

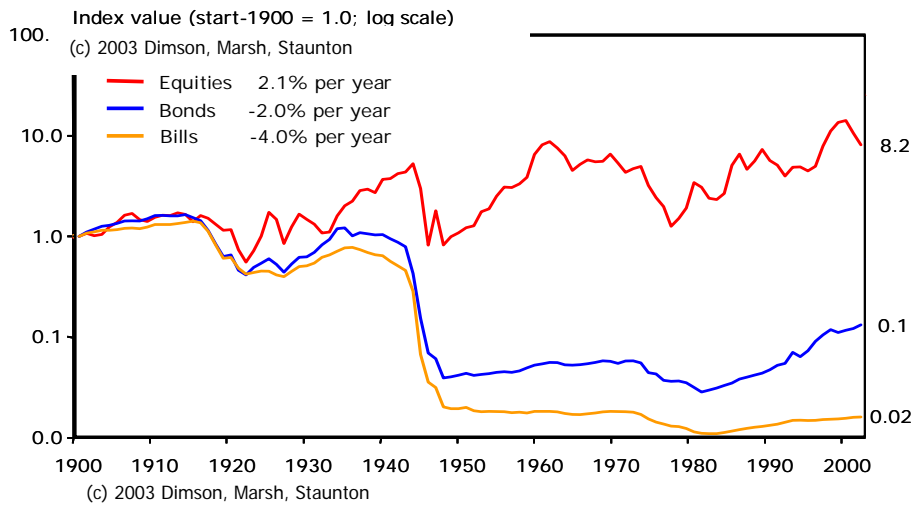
Figure 2: Real Returns in US (top), UK (middle) and Italy (bottom), 1900 – 2002



Our equity return estimates are around 1-2% lower than other major studies of the US and UK. The differences arise from previous biases in UK index construction and, for both countries, our longer timeframe. In previous studies, the research period has typically begun after turmoil (such as war, political unrest, and economic setback) has subsided.



In contrast with this, all our series start at a common date, and do not omit intervals of poor stock market performance. For this reason, our estimates of long-term stock market returns are on average (across all sixteen



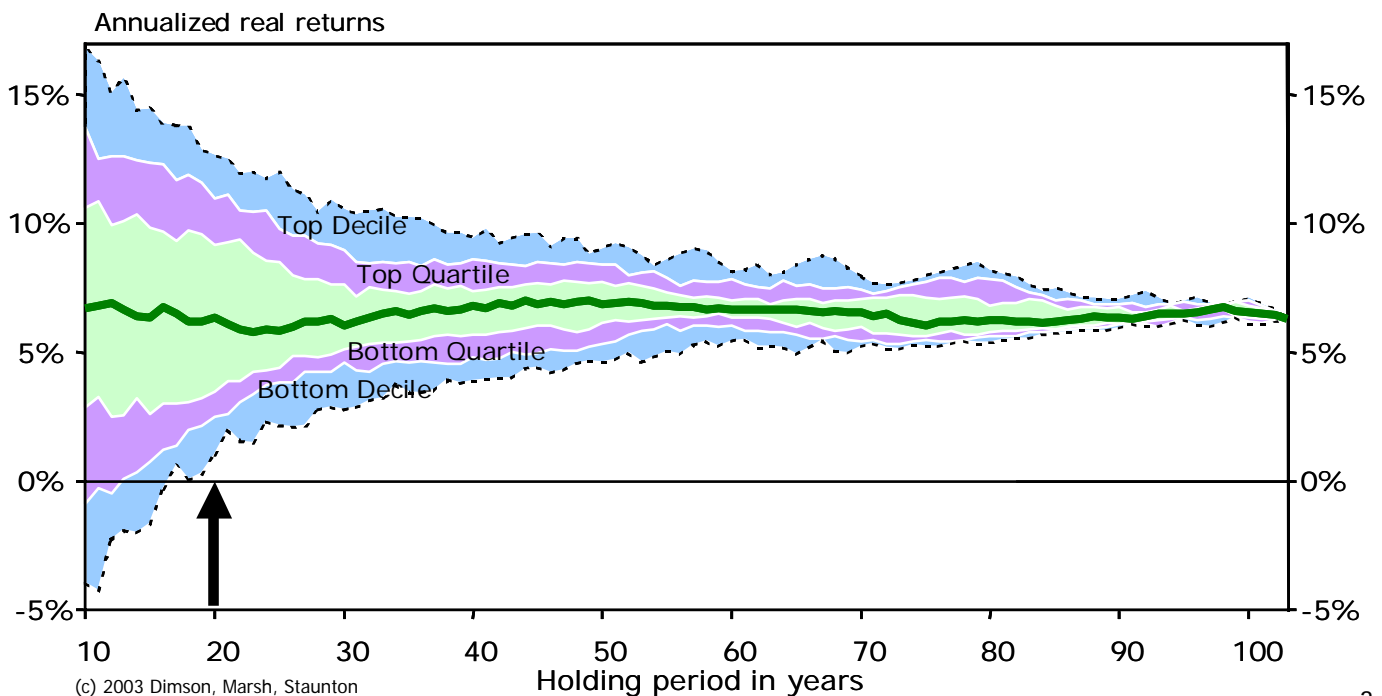
countries) some 3% below previous standard studies, and our 103-year historical estimates of equity market performance are lower than was previously thought and other studies suggest.

Despite the dreadful stock market of 2000-2002, many investors remain optimistic about future performance. There is a pervasive belief that, over the long haul, equities are sure to keep up with inflation. We start by looking at US stock market returns since 1900, and then draw comparison with other countries.

The United States

Figure 3 measures on the vertical axis the annualized real return from US equities. The horizontal axis shows the number of years used to compute the real equity return. The shaded areas run from the maximum (100th percentile) all the way down to the minimum (0th percentile) of the distribution of estimated real returns. The top area represents the top decile of returns; the top two areas are the top quartile; the interquartile range is the area in the middle of the chart; the lower two shaded areas are the bottom quartile; the lowest area is the bottom decile; and the bold line is the median.

Figure 3: Annualized real returns on US equities over periods of 10-103 years



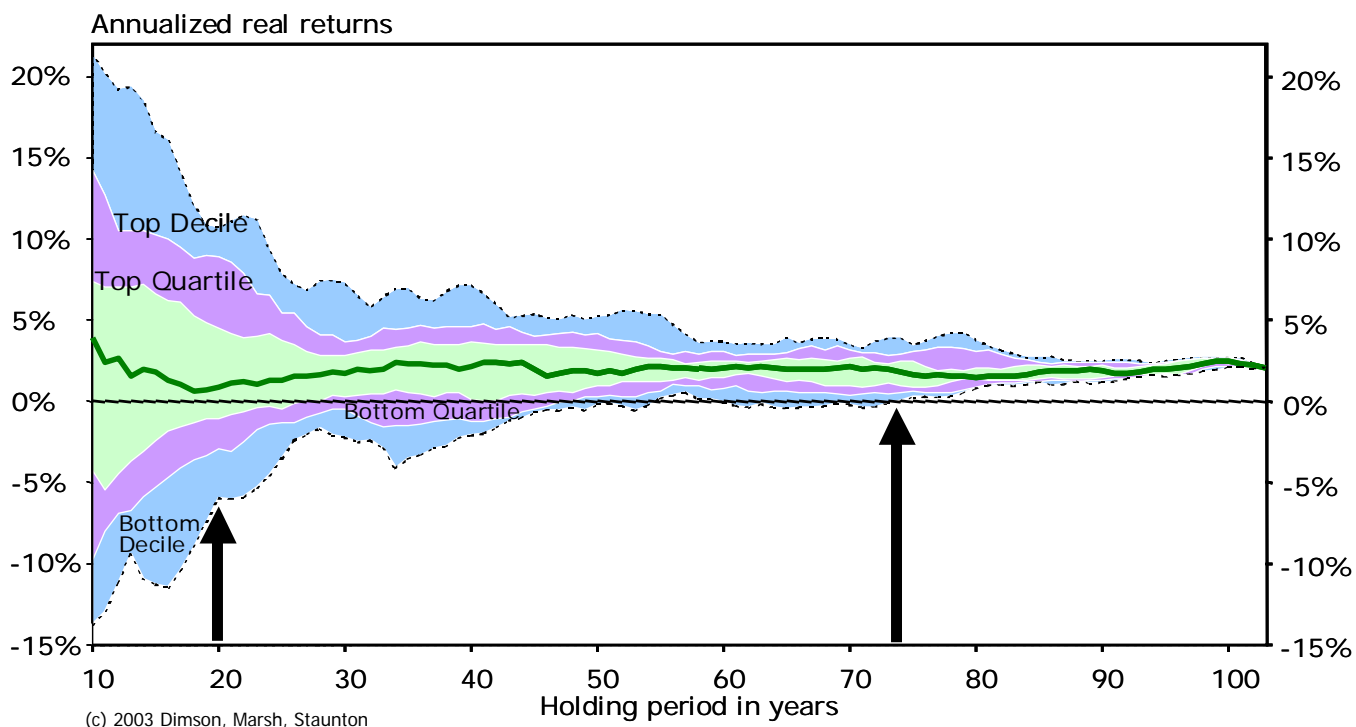
At the left-hand side of the chart, plotted against a holding period of 10 years, is the range of ten-year equity real returns. This part of the chart reflects 94 overlapping estimates of the historical real return over ten-year intervals from 1900–1909 to 1993–2002. The annualized ten-year real equity return was in the range 17% to –4%. The range of estimated real returns narrows over longer holding periods, as successively larger numbers of years are used in the calculations. The range over intervals of twenty years is 1% to 13%. At the right-hand side of the chart annualized real equity returns converge on the long-run geometric mean of 6.3%. The arrowhead in Figure 3 highlights the fact that over all intervals of at least twenty years, real returns on US common stocks have always been positive.

Many pension plans focus on an investment horizon of around twenty years, and Figure 3 summarizes 84 such periods. But of all these twenty-year intervals ending between 1919 and 2002, there are only five independent observations. Our sample is too small to provide statistical precision, and it is sensible to look for confirmation from other markets.

Italy

Figure 4 shows the corresponding analysis for Italy, following the same structure as the previous chart. Reflecting the history depicted in Figure 2, the Italian real return of 4.1% per year is lower than the US. The left-hand arrowhead reveals that, over a twenty-year interval, between one-quarter and one-half of all real returns were below zero. Only when we look back at intervals of at least 75 years, as indicated by the right-hand arrowhead, can we say that the real return on Italian equities has been consistently positive.

Figure 4: Annualized real returns on Italian equities over periods of 10-103 years



Three-quarters of a century is a long investment horizon, but Italy could be an exception. Unfortunately, a majority of countries required an investment horizon of well over twenty years for the historical real equity return to be consistently positive. In many countries, stocks have done well only over the exceptionally long run. Underperformance was often more severe than in the US, and the duration of underperformance sometimes persisted for decades.

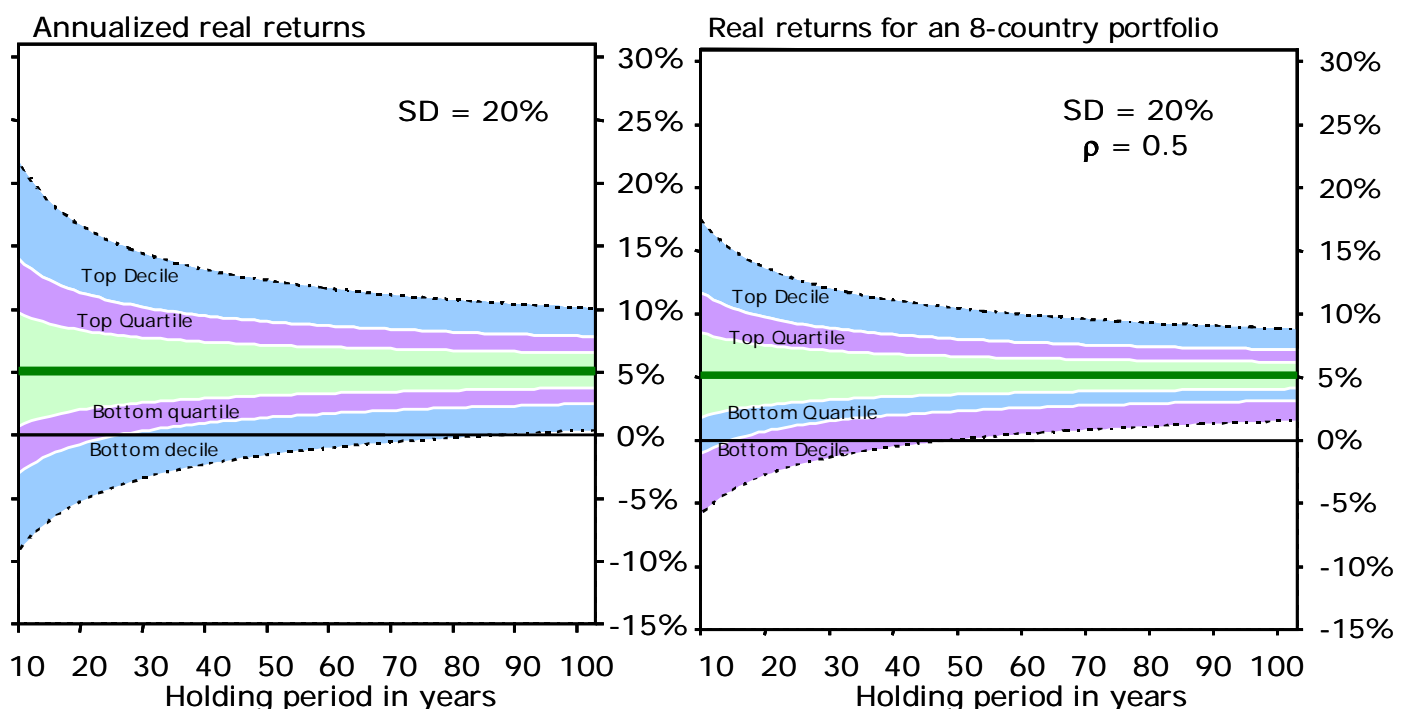
As well as the US, we find that Canada, Australia, and Denmark never experienced a shortfall in real equity returns over an interval of twenty years, and South Africa was on the borderline. However, for the other eleven countries twenty-year real returns were from time to time negative. For four countries there was a greater than one-in-four occurrence of a negative twenty-year real return; and for seven countries there was a greater than one-in-ten occurrence of a negative twenty-year return.

Yet over the twentieth century as a whole, financial markets were kind to investors. In envisioning the future, we should consider not only more modest performance expectations, but also a wide range of possible outcomes.

Looking forward

In looking to the future, the emerging consensus is that future real returns are likely to be lower than the US historical average. In the analysis below we use a projected equity return of 5% per annum in real terms, and assume that the 20% historical standard deviation of the US equity market will persist. To estimate the shortfall risk of an equity portfolio, we now estimate the forward-looking percentiles of the distribution of annualized returns. We plot the 10th, 25th, 50th, 75th, and 90th percentiles of the distribution of annual returns, but (for presentational convenience) we replace the 0th and 100th percentiles by the ½th and 99½th percentiles respectively.

Figure 5: Probability of shortfall with 5% expected real return and 20% volatility



(c) 2003 Dimson, Marsh, Staunton

Figure 5 shows that for an investor holding a diversified equity portfolio, there is a substantial probability of a negative real return, even over a long investment horizon. For example, over a twenty-year horizon, the bottom decile comprises annualized real returns that are all negative; and even over forty years, the probability of a negative real return is 6%.

The projected shortfall risk in the left hand panel of Figure 5 exceeds the historical risk, even for the US (See Figure 3). This is due partly to the lower projected real return of 5%, and partly because, even though we are making no change to volatility from its historical level, we are now focusing on the full range of possible forward-looking returns, rather than on a single historical outcome. By construction, historical returns converged on long-term realized performance, but the forward-looking analysis in Figure 5 reveals that there is always downside risk from investing in volatile securities.

We have so far considered only the case where we invest in the overall US market index, with stock-specific risk eliminated through domestic diversification. Further scope for equity market risk reduction is provided by international diversification. We consider a portfolio spread equally across one-half of our sixteen countries. We assume all eight target markets have the same volatility as the US, and that the pairwise correlations between each market are all 0.5. This has the effect of reducing the overall volatility of the portfolio from the single-country risk level of 20% to 15%. The results, plotted in the right-hand panel of Figure 6, show how international diversification can alleviate, but not eliminate, the downside risk of equity investment.

Conclusion

While a country has only one past, there are many possible futures. The likely rewards from equity investment are worth having over the very long haul. Yet the risk of shortfall is always present, even over lengthy investment horizons. Investors should not assume that favorable equity returns can be guaranteed in the long term; nor should they assume that stocks are safe so long as they are retained for a holding period of at least twenty years.