

# 103 years in the capital markets

August 2003

**The decline in global equity markets since March 2000 is the most severe since the 1930s. Nevertheless, equity investments over long periods, which include these cyclical downturns, have clearly provided higher returns than bond investments and cash. Studies of capital returns in 16 countries for the period 1900 to 2002 show that the average annual gain associated with equity investments has been 4.4 per cent. This article presents a wide range of historical data concerning returns in the world's largest capital markets. Our data and analyses are primarily based on work conducted at the London Business School.**

Previously, historical analyses of returns have been based primarily on data from the US and a few other markets. The conclusion has been that the reward for investing in equities is very high. A relevant objection to the analyses is that the US is only one of many markets – and that the US is not representative for the other markets. Whereas the US has had a very long period without war and destruction, countries in the rest of the world have for shorter or longer periods experienced interruptions in economic activity, reorganisation of companies and obliteration of both equity and bond values.

A similar objection refers to the selection of companies considered. Calculating backwards on the basis of companies that exist today gives a skewed picture, since returns for companies that have gone bankrupt along the way are not included. In order to have real relevance, historical analyses must reflect the investment opportunities which were actually available to investors at any given time.

In financial literature's reservations against the use of historical analyses, such weaknesses have been called "survivor bias". It is also important to include this type of reservation in the continuous evaluations of capital returns. For example, there may be grounds for scepticism about indices that show returns in hedge funds, because the large number of new business start-ups and shut-downs makes it difficult to reflect actual investment opportunities for investors. The indices often overstate the returns because they do not include funds that have been discontinued. Similarly, the risk connected with investing in such a fund is underestimated. Indices for other types of fund products may also be affected by survivor bias.

## Triumph of the optimists

The book *Triumph of the Optimists* shows returns on capital in 16 countries since 1900. The authors, Elroy Dimson, Paul Marsh and Mike Staunton, are all professors of finance at London Business School. For years they have been conducting research connected with the description and explanation of long-term returns in capital markets. The book's title reflects its most important conclusion: over the long-term, equity investors have been well paid for the risk incurred. This article is largely based on data and analyses from this book.

## Equity investments have given higher returns

When analysing returns in capital markets over time, the starting point is often a specific investor who builds up a portfolio of many securities and markets. It is assumed that the investor is not better informed than the average investor and invests his capital in a broad portfolio with many securities. The individual securities and markets are weighted in relation to their value and size.

At the beginning of the twentieth century, an investor could choose among investments in equities, bonds and cash in many countries. If the entire fortune were invested, for example, in Russian equities or Germany government bonds, there would have been little or nothing left after a couple of decades. At the beginning of the century, few investors could foresee the Russian revolution or the hyperinflation in Germany after the First World War. To provide the most realistic picture of the results a normal investor could have achieved, it is natural to assume that the investor does not have this kind of information, but spreads his investments across many securities and countries. Bankruptcies and losses in parts of the portfolio can then be offset by large gains in other parts.

This is also the strategy followed by the Petroleum Fund and most other large international investors. Since adequate information about what will happen far into the future is not available – and it is not possible to foresee short-term movements – the portfolio is spread across many investments in many different markets. According to established financial theory, it is rational for investors to behave in this way. Over time, markets do not pay for taking specific risk in connection with choosing one or a small number of securities, because many market participants can eliminate this type of risk by spreading their portfolios over many securities. On the other hand, it is not possible to diversify away the "systematic risk" connected, for example, with investing broadly in an equity market. Therefore, there is an extra return over time, for taking such risk (a risk premium – see more about this below).

## A choice of markets

In 1900, the European equity markets combined were far larger than the US market. In 2000, the US market accounted for around 46 per cent of the market value of all stock markets in the world. During this hundred-year period, there have been substantial changes in the relative size of the world's equity markets.

At the beginning of the twentieth century, 33 countries had established equity markets and stock exchanges. At that time, Russia was a substantial economy and accounted for roughly 11 per cent of the world's total GDP. However, the Russian

equity market was very small in relation to the size of the economy. Dimson, Marsh and Staunton estimate that the Russian market accounted for only 2 per cent of the global equity market. After the Russian Revolution in 1917, equity values were reduced to nothing. Similarly, India was an important economy in 1900, with a 10 per cent share of the world's GDP. Here as well as in Latin America, the equity market was relatively small.

Dimson, Marsh and Staunton have data on developments in the capital markets for 16 countries from 1900 until the present (see Charts 2 and 3). Countries like Russia, Argentina and Brazil are not included. On the basis of different approaches, however, the authors assume that their selection of countries accounted for at least 90 per cent of the global equity market in 1900.

### More than half of the share values in the railways

In the US, as much as 63 per cent of the limited companies (by market value) consisted of railway companies in 1899. In 2000, the railways' share had fallen to 0.2 per cent. In the UK, 49 per cent of the share values in 1899 were connected with the railways. This share fell to 0.3 per cent in 2000. These figures indicate a low return for an investor who at the beginning of the twentieth century had a strategy of investing solely in railway shares. What about an investor who spread his portfolio over all sectors, and who reinvested the annual dividends in relation to the sectors' and companies' relative market values?

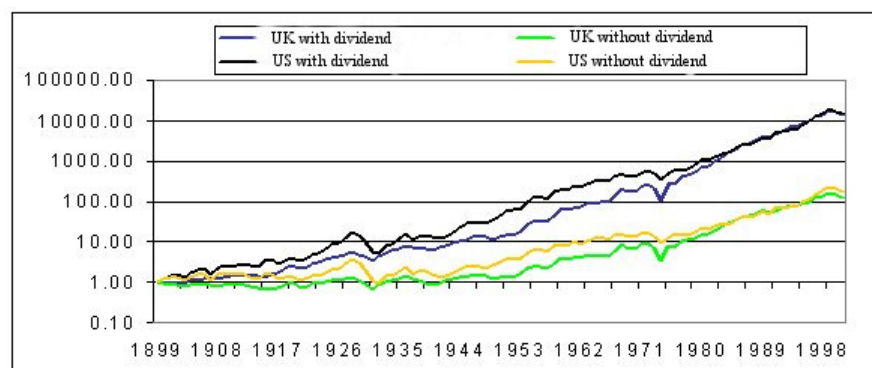
In analyses of long-term returns, it is very important to make assumptions about how the representative investor invests the portfolio's yield and dividends. The analyses made by Dimson, Marsh and Staunton assume that the dividends are reinvested continuously in relation to the size of the companies and markets. This strategy is also followed by and large by the Petroleum Fund and by other similar large investors.

By reinvesting dividends, the portfolio will over time shift from sectors and companies that decline, relatively speaking, to new companies that are established and rise in value. This explains the apparent paradox that a portfolio with a substantial investment in railway shares in 1900 nevertheless achieves a very high long-term return when the dividends are reinvested as described. In the US, the annual (geometric) average excess return for the years 1900 to 2002 was 4.4 per cent for such an investor, compared with one who invested in the short-term money market.

### Share dividends important for long-term return

There are two main types of share indices: those which include dividends (as in the analyses of Dimson, Marsh and Staunton) and those that only show share price developments. When evaluating the capital return over a period of several years, it is very important to include dividends. *Triumph of the Optimists* provides illustrative examples of this. One dollar invested in the US equity market in 1900 would have grown to 198 dollars (nominal) in 2000 simply as a result of a higher price on the shares. If the dividends from the companies were reinvested each year, the investor would have 16,797 dollars (see Chart 1). Whereas the return including the dividend was 10.1 per cent per year, the return excluding the dividend was only 5.4 per cent. Figures for the other markets confirm the same relationship

**Chart 1: Nominal share return in the US and the UK since 1900 – excluding dividends and reinvesting dividends (logarithmic scale)**



The inclusion of dividends becomes more important as the time horizon increases. The value of the portfolio for a long-term equity investor is largely the discounted value of future dividends. The discounted value of any change in share values that is realised in the longer term is generally of little significance.

**Table 1: Distribution of the equity market by sectors in 1899 and 2000, US and UK. Per cent**

	UK		US	
	1899	2000	1899	2000
Railway	49.2	0.3	62.8	0.2
Bank and finance	15.4	16.8	6.7	12.9
Mining	6.7	2	0	0

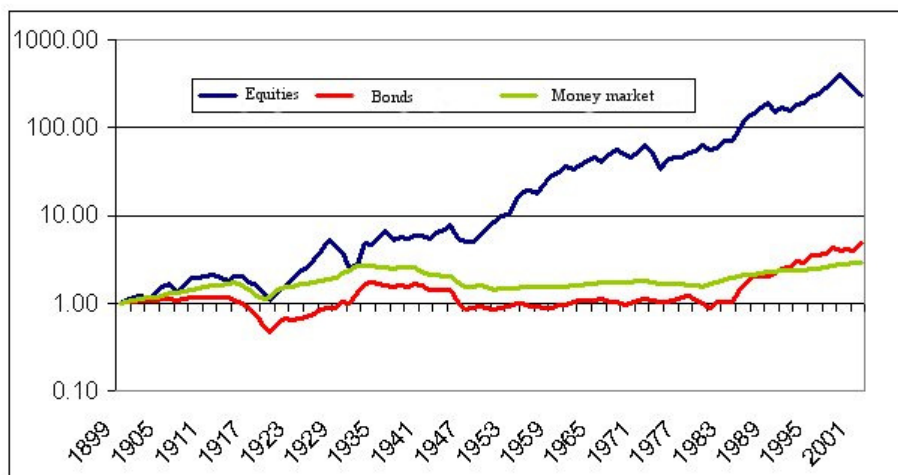
Textiles	5	0	0.7	0.2
Iron, coal, steel	4.5	0.1	5.2	0.3
Breweries and distilleries	3.9	2.1	0.3	0.4
Utilities	3.1	3.6	4.8	3.8
Telegraph and telephone	2.5	14	3.9	5.6
Insurance	1.9	4.4	0	4.9
Other transport	1.4	1.5	3.7	0.5
Chemicals	1.3	0.9	0.5	1.2
Food industry	1	2	2.5	1.2
Retail trade	0.7	4.4	0.1	5.6
Tobacco	0	1	4	0.8
Sectors that were small in 1900	3.4	46.9	4.8	62.4
	100	100	100	100

In recent years, US companies have paid out fewer dividends than earlier. One of the explanations for this is that many companies have paid their shareholders by buying back their own shares. In 1998, more capital was used for buying back shares than for dividends. One of the reasons for the buy-backs is that dividends tax has been higher than capital gains tax.

### Excess return on shares

Chart 2 shows the real return from 1900 for three investors who at the beginning of 1900 invested their capital in shares, bonds or the US money market. The money market investments are in short-term US government paper and may thus be said to be the least risky alternative for an investor in the short-term.

**Chart 2: Cumulative real return on global capital investments from 1900 to 2002 (logarithmic scale)**

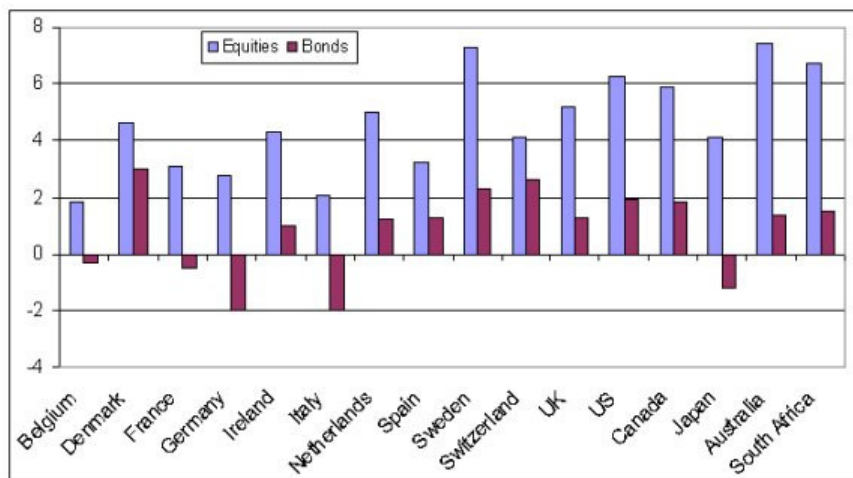


For investments in shares and bonds, it is assumed that the capital is spread in relation to the size of the markets in the 16 countries. Within the individual equity markets, investments are similarly spread in relation to the market value of the individual companies. At the end of each year, the portfolio is rebalanced, which means that the portfolio is adjusted in order to reflect changes in market size and exchange rates. Transaction costs have not been taken into account. All returns have been recalculated to US dollars and deflated by the consumer price index in the US. Therefore, it may be said that the chart shows developments based on a US investor. Dimson, Marsh and Staunton show, however, that the exchange rate and the inflation index used have little effect on the conclusions. (In other words, the theory that exchange rates reflect purchasing power parity proved to be fairly correct during this time frame.)

For the period 1900 through 2002, the geometric average annual real return for an individual who has invested in global equities has been 5.4 per cent (arithmetic average is 6.8 per cent). The annual average return on bond investments was 1.5 per cent, whereas the annual real return on investments in short-term US government paper was 1.0 per cent. The excess return on equity investments as compared with investments in the money market was thus 4.4 per cent. The excess return compared with bond investments was 3.8 per cent (as a geometric average).

Chart 3 shows the average return on shares and bonds in each of the 16 countries. In five of the countries, the return on bond investments has been negative for the period 1900 - 2002 as a whole. These countries are Belgium, France, Germany, Italy and Japan. The return has been "eaten up" by hyperinflation in the years from the First World War until after the Second World War.

**Chart 3: Real return on equities and bonds in 16 countries 1900 - 2002. Per cent per year**

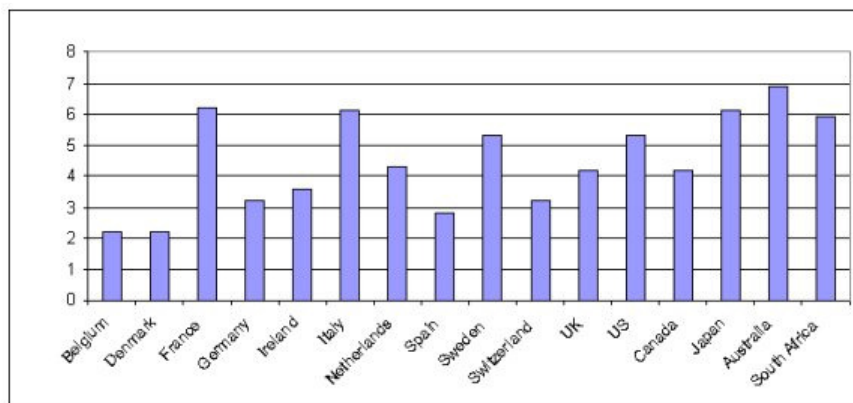


Regardless of which country is considered, the excess return on equity investments as compared with bond investments has been relatively high. The excess return has been lowest in Denmark and Belgium, 2.2 per cent, and highest in Australia, 6.9 per cent higher return than in the money market.

#### Highest risk associated with equity investments

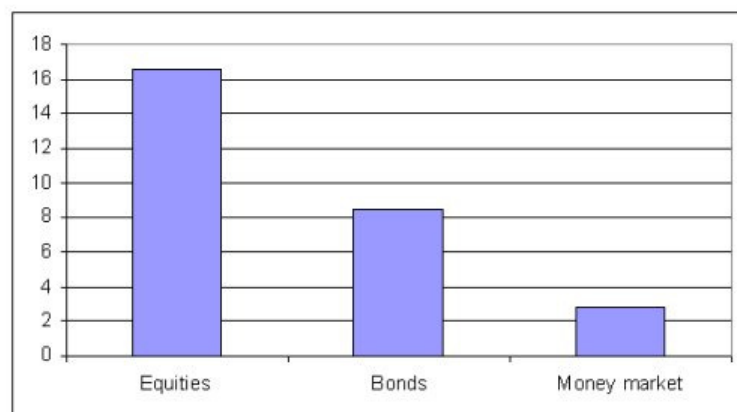
A key issue in connection with any analysis of capital returns is the risk involved in the various choices open to the investors. Financial theory assumes that investors will only take on higher risk if they can expect higher returns. Or said in another way – high returns often reflect high risk.

**Chart 4: Annual excess return from equity investments from 1900 to 2002. Per cent**



The analyses of Dimson, Marsh and Staunton confirm such a relationship between return and risk. The risk associated with equity investments has been twice as high as the risk associated with bond investments – measured as the standard deviation in annual return (see Chart 5). The risk associated with bonds is estimated to be higher than in other studies. It is normal to assume that the risk associated with equity investments is about three times higher than the risk associated with bond investments. The ratios are probably low because Dimson, Marsh and Staunton operate with longer average bond maturities. The term to maturity for bonds in the US and UK is 20 years, whereas in most other countries bonds reach maturity after about 10 years.

**Chart 5: Risk associated with investments in equities, bonds and short-term government paper in the US. Risk is defined as the standard deviation in the annual return. Per cent**



### Properties of a combined portfolio

For a long-term investor like the Petroleum Fund, it is irrelevant to evaluate different investment alternatives individually. In order to achieve the best possible trade-off between expected return and expected risk, it is wise to put together a portfolio that includes different assets with different properties. For example, experience has shown that returns on equities behave differently than returns on bonds in different phases of the economic cycle.

For this reason, the risk associated with a portfolio containing some equity investments may be lower than the risk associated with a portfolio composed solely of bonds.

### Why is there a “premium” for taking equity risk?

Why do equity investments provide a better return over time than investments in bonds and money market instruments? The explanation is related to the fact that investing in stocks involves higher risk than investing in bonds (which is a loan to a company or government). Equity risk is higher than bond risk because bond owners have the first right to profits generated by the company. If things go poorly for the company, the shareholders must bear the heaviest burden – share capital will usually be lost before lenders take a loss on their loans to the company. An economically rational individual will not choose to invest his savings in shares rather than fixed income securities without expecting compensation for the added risk involved. This compensation is called risk premium for shares.

Experience shows that people relate differently to investment risk. Every week, thousands of Norwegians participate in lotteries, bet on football games, etc. People invest in these kinds of lotteries even though the expected return is negative. This is a paradox that the literature has often tried to explain. One reason may be that lotteries require a modest stake (purchase of lottery tickets), whereas the rewards are very high. A virtually undisputed assumption in financial theory is that investors demand to be paid for the risk taken. The apportionment of risk for financial assets is different than for a lottery. The annual return on financial investments is far more symmetrically distributed, while the potential for gains is more limited. Experiments in which participants are confronted with real investments where returns resemble the returns available in the financial market have shown that people are not willing to invest their money without being paid for the risk involved.

When an individual purchases shares, he expects the return to exceed the return on investing the money in the bank or in bonds. Of course, this does not necessarily mean that an excess return is guaranteed in the next five or ten years. Future price trends in the equity market depend on a number of factors which no one has knowledge of in advance. Earnings or profits may be much lower than the investors expect today. The earnings per krone invested may also be priced differently in a few years than is the case today. A few years ago, many people bought shares in technology companies which had virtually no earnings. Actual earnings per krone invested were therefore priced enormously high. This occurred because expectations concerning future earnings were very high. There were almost no limits to the amount of money many technology companies received from willing investors around the world. This capital was used to build up capacity which consumers were not ready to demand. Overcapacity and falling markets led to the collapse of both expectations concerning future earnings and prices on these types of shares.

This example illustrates how financial markets adjust projections for future earnings and share prices over time. In periods when economic developments are positive, investors often require less compensation for investing in shares than in periods when economic conditions are difficult. During upswings, companies have access to adequate equity at the same time that banks are more than willing to extend loans to companies. Companies use the easy access to credit to increase their production capacity. This often leads to overcapacity and squeezed margins. Lower profits result in lower share prices. Banks become more concerned about potential losses and become more restrictive in their lending policies in relation to all customers. Investors often require higher compensation for investing in shares until this process is reversed again.

In a market economy that functions smoothly, credit and equity markets will in this way contribute to market equilibrium where production capacity and demand are in balance. In countries where the credit system functions differently than in a market economy, there is a risk of more permanent imbalances.

### What is a reasonable risk premium in the future?

The historical risk premium in the equity market is usually defined as the annual excess return on shares compared with 10-year bonds or money market instruments. This assumes that all cash paid out from the equity or bond portfolio (dividends

and yield respectively) is reinvested. The calculation of returns over time therefore includes all elements of return and is before tax. Over a long period, dividends or yield during the period will represent the most important element of total returns.

As shown above, the excess return on equity investments has historically been high in most markets. An interesting observation is that most of this excess return has come after the Second World War. The excess return in the first half of the twentieth century was 3 - 4 per cent in the US, compared with 7 - 8 per cent in the second half of the century. Dimson, Marsh and Staunton (2002) and Fama and French (2001) show that a large part of the excess return in the equity market in the last 50 years is a result of the fact that the price which investors are willing to pay per unit of earnings has increased substantially. In other words, the ratio between share price and earnings has increased in this period. (This ratio is often called the P/E ratio.) The authors estimate the excess return without this effect to 3.4 per cent.

A steadily rising P/E, i.e. an increasing appreciation of corporate earnings, is often explained by the fact that investors require less risk premium today when they buy shares than they did 50 years ago. Part of the explanation lies in developments in the global, political-economic situation. There were two World Wars and a deep financial crisis in between in the first half of the last century. There were several brief periods with strong deflation and other periods with high inflation. Since the Second World War, inflation rates have been relatively stable, with the exception of the years before and after the two oil price shocks in the 1970s. With stable inflation rates, future price and wage developments become more certain, leading in turn to more stable inventories, investment and earnings. While cross-country trade has increased, prosperity has increased considerably in the industrialised world. This makes it possible for investors to spread the risk over a number of countries and asset classes, which reduces the risk premium required.

An interesting question is whether the combination of low and stable inflation and the long period of economic growth in the last half of the 1990s pushed the risk premium down too far. Dimson, Marsh and Staunton discuss whether we can expect the same excess return in the future that we have seen in the past. They refer, among others, to a study by Welch in 2000 where 236 US economists were asked what risk premium they expected in the next 30 years, and the average response was 7.1 per cent. The problem is that expectations of such a high risk premium assume that the P/E ratio will continue to rise over the next 30 years, given that profits in this period are not historically high. Therefore, these expectations appear to be unrealistically high even among this group of economists. The reduction in the P/E ratio and the subsequent increase in the risk premium in the last two years indicate a change in investors' perceptions about future returns in the equity market.

The threat of war between the super powers is considerably reduced today compared with several decades ago. Eastern Europe, Russian and China as well as a number of other Asian countries are enjoying strong economic growth and a steadily increasing integration in the world economy. Global inflation is stable and shows no sign of rising. The financial system is more solid and advanced than ever before and trading costs are lower than earlier. A substantial part of the fall in risk premium in the last ten years may be explained by these kinds of economic arguments. Dimson, March and Staunton conclude that the factors that pushed equity markets up over the last decades will not recur and that future risk premiums will be markedly lower than in their historical analysis.

## References:

Dimson, E., P. R. Marsh and M. Staunton, 2002, *Triumph of the Optimists*. Princeton University Press.

Dimson, E., P. R. Marsh and M. Staunton, 2003, *Global Investment Returns Yearbook 2003*. ABN AMRO and London Business School.

Fama, Eugene F, and Kenneth R French, 2000, *The Equity Risk Premium*. Working Paper No. 522, Center for Research in Security Prices.

Welch, Ivo, 2000, Views of Financial Economists on the Equity Premium and on Financial Controversies, *Journal of Business*, vol. 73, no. 4 (October), 501-537.

In a number of submissions to the Ministry of Finance, Norges Bank has provided advice on the management of the Government Petroleum Fund. These submissions are published on the Bank's website ([www.norges-bank.no](http://www.norges-bank.no)). Questions concerning equity investments are discussed in particular in submissions made in [April 1997](#) (PDF document), [August 1997](#) and [March 2001](#). (PDF document)



