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Credit Suisse Global Investment Returns Yearbook 2012

Contents

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To contact the authors or to order printed copies of the Yearbook or of the accompanying Sourcebook, see page 63.

Introduction

The aftermath of the 2008 financial crisis seems to pose unprecedented new dilemmas: how inflationary is quantitative easing, how should investors balance short-term deflationary with potential long-term inflationary risks, how should currency exposure be steered? While current events may appear different from the past, there are nevertheless always lessons to be learned from what went before, especially when we look back across the diverse experience of multiple decades and many countries.

With their analysis of data over 112 years of history and across 19 countries, Elroy Dimson, Paul Marsh and Mike Staunton from the London Business School provide important findings in this year's Credit Suisse Global Investment Returns Yearbook 2012 in respect of the above questions. The Credit Suisse Global Investment Returns Sourcebook 2012 further extends the scale of the analysis with detailed tables, graphs, listings, sources and references for every country.

The first article examines the attributes of stocks, nominal and inflation-linked bonds, gold and real estate returns during the succession of inflationary and disinflationary phases over the past 112 years. Correlations suggest that gold, followed by real estate and to a lesser extent equities, are the better inflation hedges. In terms of generating returns in excess of inflation (inflation-beating properties), equities do well as long as inflation is within a low- to mid-single-digit range. In contrast, bonds generate the greatest returns in deflation times. The authors stress the continuing importance of diversification across assets and markets, and conclude that the case for stocks is that, over the long haul, investors have enjoyed a substantial equity risk premium.

In the second article, the impacts of cross-border investments and associated currency exposure in global portfolios are reviewed. Whereas for equities, investing in a world index rather than just domestically reduces portfolio volatility, cross-border investments in bonds add to portfolio risk, primarily through the currency exposure. Short-term currency hedging is thus found to be particularly meaningful in bond portfolios. In equities, it also contributes to reducing risk, but not as much. However, hedging benefits are found to fall off with longer investment horizons and the observation that equities, in particular, perform best after periods of currency weakness suggests that more unhedged cross-border stock exposure may be desirable at those times.

In the third article, Paul McGinnie and Jonathan Wilmot from Credit Suisse Investment Banking show with more than a decade of history how the contrarian indicator they built – the Credit Suisse Global Risk Appetite Index – helps investors to time risk-on versus risk-off investment strategies.

We are proud to be associated with the work of Elroy Dimson, Paul Marsh, and Mike Staunton, whose book Triumph of the Optimists (Princeton University Press, 2002) has had a major influence on investment analysis. The Yearbook is one of a series of publications from the Credit Suisse Research Institute, which links the internal resources of our extensive research teams with world-class external research.

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PHOTO: ISTOCKPHOTO.COM/PHOTOVIDEOSTOCK

The real value of money

With international efforts to avert recession, fears have grown about the brunt of monetary policy and debt overhang. Sentiment fluctuates between deflationary concerns and inflationary fears, and the demand for safe-haven assets has surged. This article examines the dynamics and impact of inflation, and investigates how equities and bonds have performed under different inflationary conditions. We search for hedges against inflation and deflation, and draw a comparison with other assets that may provide protection against changes in the real value of money.

Elroy Dimson, Paul Marsh and Mike Staunton, London Business School

As 2012 dawned, inflation-linked bonds issued by Britain, the USA, Canada and several other low-risk sovereigns sold at a real yield that was negative or at best less than 1%. Investors had become so keen on safe-haven securities that they had bid low-risk bonds up to a level at which their real return was close to zero.

Inflation and deflation

Inflation refers to a rise in the general price level, so that the real value of money – its purchasing power – falls. In the recent global turmoil, investors have asked whether unconventional monetary policy and attempts at solving the euro crisis might create inflationary pressures. At the same time, there is the worry that some emerging markets will experience overheating, with the accompanying danger of inflation. If inflation is the primary concern, which assets can provide some expectation of a favorable real return, even in inflationary times?

Yet, in an economic environment that may be worse than anything the developed world has seen since the 1930s, investors are also asking whether an extended recession might lead to depression and deflation in major markets. Deflation refers to a fall in the general price level, so that the real value of money rises. For those who are worried about this scenario – perhaps a replay of the Japanese experience over the last two decades – which investments might offer some protection against the turbulence of deflation?

We examine how equities and bonds have performed under different inflation regimes over 112 years and in 19 different countries. We investigate the extent to which excessively low or high rates of inflation are harmful. We ask whether equities should now be regarded as under threat from inflation, or whether they are a hedge against inflation. We compare equities and bonds with gold, property, and housing as potential providers of more stable real returns.

We conclude that while equities may offer limited protection against inflation, they are most influenced by other sources of volatility. Second, bonds have a special role as a hedge against deflation. Third, commercial real estate has been a somewhat disappointing hedge, inferior to domestic housing. Last, we note that inflation-hedging strategies can be unreliable out of sample.

Today and yesterday

Investors care about what the dollars they earn from an investment will buy. Figure 1 gives a decade-by-decade snapshot of US price levels. It shows that a dollar in 1900 had the same purchasing power as USD 26.3 today. The bars portray the corresponding decline in purchasing power: one dollar today represents the same real value as 3.8 cents in 1900.

The chart also shows that there were periods of deflation, with purchasing power rising during the 1920s. By the end of 1920, the price level had risen to 2.64 from its start-1900 level of 1.0. During the subsequent deflation, the price level fell to 1.78 in 1933, a third lower than in 1920, and it then took until 1947 for prices to rise back to their end-1920 level.

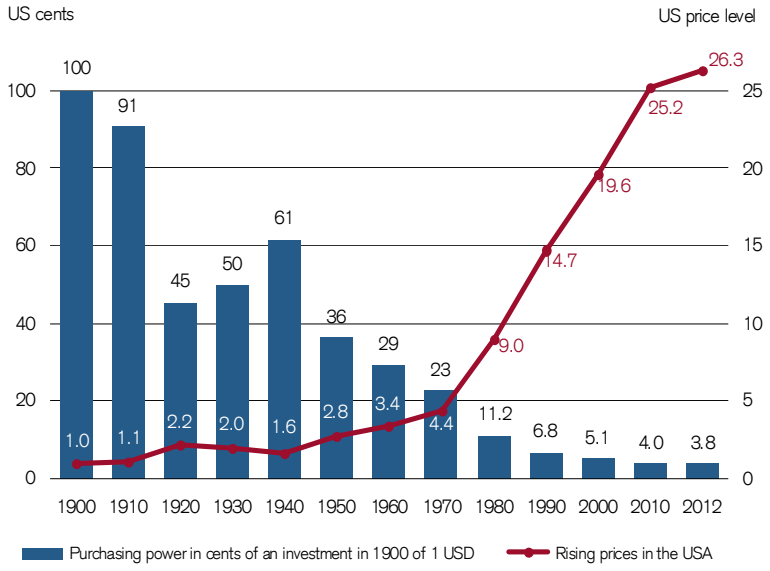
Was the US deflation of the early 20th century an anomaly in economic history? As noted by Reinhart and Rogoff (2011), the long-term historical record, spanning multiple centuries, is in fact one of inflation alternating with deflation, but with no more than a slight inflationary bias until the 20th century.

In Figure 2, we display annual changes in British price levels since 1265. While pre-1900 inflation indexes are admittedly poor in quality and narrow in coverage, Britain's comparatively low long-term rate of inflation, punctuated with deflations, reminds us that sustained high rates of inflation are largely a 20th century phenomenon. Towards the right of the chart, note the frequency of upward (inflationary) and absence of downward (deflationary) observations for the United Kingdom. Sustained price increases were not prevalent until the 1900s.

Figure 1

Consumer price inflation in the United States, 1900–2012

Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Triumph of the Optimists; authors' updates



Around the world

For each of the 19 Yearbook countries, Figure 3 displays annualized inflation rates over 1900–2011. Annual inflation hit a maximum of 361% in Japan (1946), 344% in Italy (1944); 241% in Finland (1918), and 65% in France (1946). For display purposes, the chart omits 1922–23 for Germany, where annual inflation reached 209 billion percent (1923), and where monthly inflation reached 30 thousand percent (October 1923).

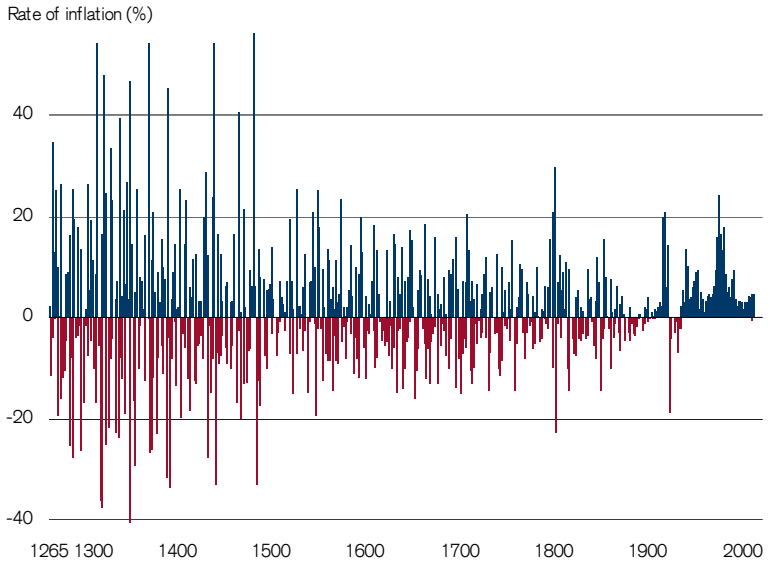
Hyperinflations are often defined as a price-level increase of at least 50% in a month. Mostly, they occurred during the monetary chaos that followed the two world wars and the collapse of communism. Looking beyond the Yearbook countries, Hanke and Kwok (2009) report that monthly inflation peaked in Yugoslavia at 313 million per-cent (January 1994), in Zimbabwe at 80 billion percent (November 2008), and in Hungary at 42 quintillion percent (July 1946). Prior to the 20th century, there was one hyperinflation; during the 20th century there were 28; and in the 21st century, just one (Zimbabwe).

Apart from a few exceptional episodes, inflation rates were not high in the 19 Yearbook countries. The median annual inflation rate across all countries and all years was just 2.8%, and the mean (ex-Germany 1922–23) was 5.3%. Nevertheless, in one quarter of all observations, the inflation rate was at least 6.4%, and during 22 individual years (1915–20, 1940–42, 1951, and 1972–83) a majority of the 19 economies experienced inflation of at least 6.4%. More details on inflation in our 19 nations are included in the 2012 Sourcebook.

Figure 2

Annual inflation rates in the United Kingdom, 1265–2011

Source: Officer and Williamson (2011)



By the last couple of decades, developed economies had largely tamed inflation. In each year since 1992, almost every Yearbook country had inflation below 6%. The exception was South Africa, which in 12 of the last 20 years had inflation of over 6%.

South Africa is in fact one of a number of emerging markets that suffered higher inflation at some point. Figure 4 portrays the range of inflation rates experienced since 1970 by a larger sample of 83 countries. The upper bars (and the left-hand axis) report the highest annual inflation rate for each of the 83 countries, and the down-ward bars (and the right-hand axis) report the most extreme deflation (if there was deflation) in each country.

Over recent decades, extreme moves in price levels have occurred more frequently in emerging markets than in developed markets. Long after inflation was tamed in developed markets, inflation – and to a lesser extent, deflation – persisted in corners of the worldwide economy where there were on average worse institutions and less market discipline.

Deflation and depression

High and accelerating rates of inflation are typically associated with poor conditions in the real economy, and jumps in inflation are likely to have an adverse impact on stock market investments. Disinflation – a slowdown in the inflation rate during which inflation declined to lower levels – has tended to coincide with favorable economic growth. But while disinflation after a previous period of high inflation is a good thing, deflationary conditions – in which the level of consumer prices falls – are associated with recession. During periods of deflation, economies tend to suffer.

While inflation reduces the real value of money over time, deflation can also be harmful. A decline in consumer prices is a danger to an economy because of the prospect of a deflationary spiral, high real interest rates, recession, and depression. Deflation has afflicted many countries at some point, the most cited examples being America's Great Depression of the early 1930s, the Japanese deflation from the early 1990s to the present day, and Hong Kong's post-Asian crisis deflation and slump from late 1997 till late 2004.

Clearly, over the last 112 years, consumer prices did not increase uniformly in the 19 Yearbook countries. In 284 out of the 2,128 country-year observations, consumer prices actually fell. In one quarter of all observations, inflation was less than 1.09% – quite close to deflationary conditions. Indeed, since 1900, every Yearbook country has experienced deflation in at least eight years (New Zealand) and in as many as 25 years (Japan). In 24 individual years (1901–05, 1907–10, 1921–23, 1925–34, 1953, 2009) a majority of Yearbook countries suffered deflation.

Inflation risk

Despite the experience of both inflation and deflation, price fluctuations are a persistent phenomenon. Over the full 112 years, there is a high correlation between each year's inflation rate and the preceding year's rate. Across the 19 Yearbook countries, the serial correlation of annual inflation rates averages 0.56. Following extreme price rises, inflation is also more volatile. This amplifies the desire to hedge against a sharp acceleration in inflation, or against the advent of deflation.

Figure 3

Annual inflation rates in the Yearbook countries, 1900–2011

Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Triumph of the Optimists; authors' updates

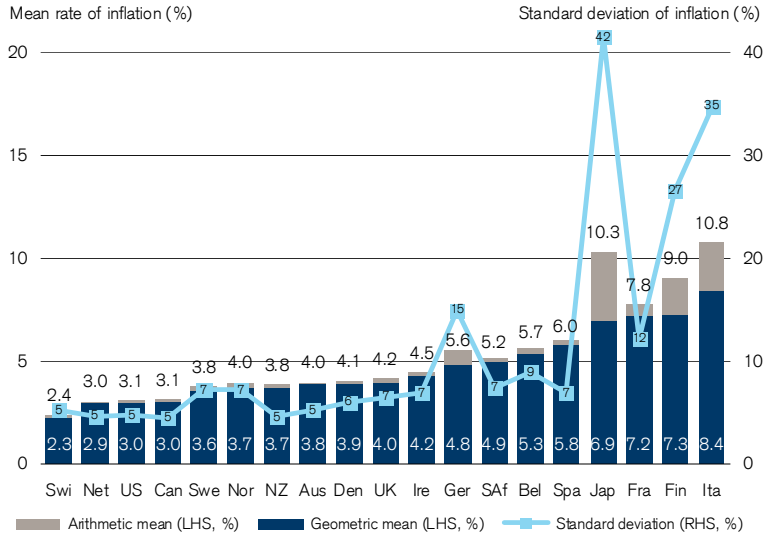
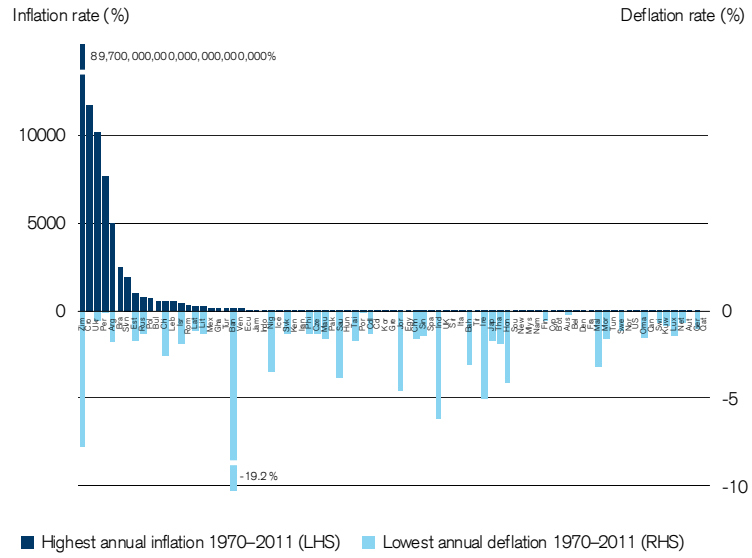


Figure 4

Extremes of inflation and deflation: 83 countries, 1970–2011

Source: Elroy Dimson, Paul Marsh, and Mike Staunton; Hanke and Kwok (2009)



Investors do not like to be exposed to volatility, and the persistence of volatility makes this all the more undesirable. As we show later, they can therefore be expected to pay less for securities at times of high inflation, which should enhance the rewards from investing undertaken at such times.

In the 2011 edition of the Yearbook, we showed that, though risky, buying bonds after years of extreme realized rates of inflation was in fact rewarded by higher long-run real rates of return. Chapter 2 of this year's publication reveals a similar pattern in relation to investing after a period of currency turmoil.

To gain insight into the impact of inflation, in Figure 5 we study the full range of 19 countries for which we have a complete 112-year investment history. We compare investment returns with inflation in the same year.

Out of 2,128 country-year observations, we identify those with the lowest 5% of inflation rates (that is, with very marked deflation), the next lowest 15% (which experienced limited deflation or stable prices), the next 15% (which had inflation of up to 1.9%), and the following 15%; these four groups represent half of our observations, all of which experienced inflation of 2.8% or less.

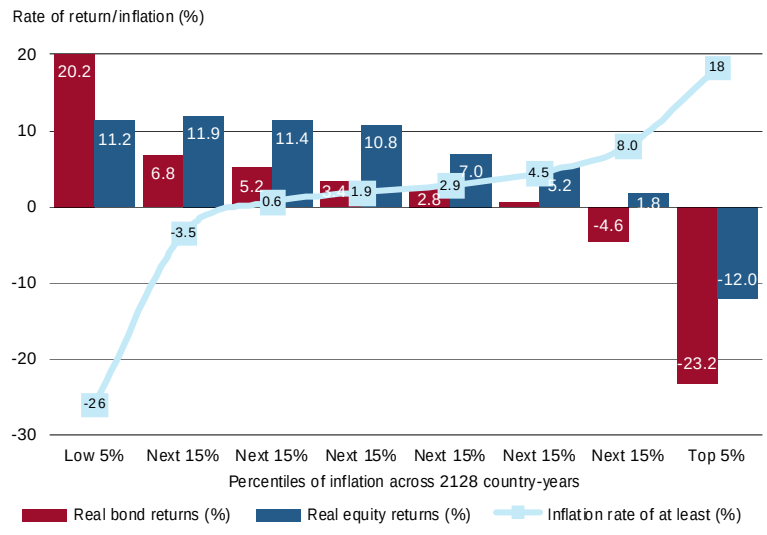
At the other extreme, we identify the country-year observations with the top 5% of inflation rates, the next highest 15% (which still experienced inflation above 8%), the next 15% (which had rates of inflation of 4.5%–8%), and the remaining 15%; these four groups represent the other half of our observations, all of which experienced inflation above 2.8%. In Figure 5, we plot the lowest inflation rate of each group as a light blue square.

Note that in 5% of cases, deflation was more severe than –3.5% and in 5% of cases inflation exceeded +18.3%. Although they represent a tenth of historical outcomes, to most investors such acute scenarios seem exceptionally improbable in the foreseeable future. However, the extremes of history do help us to understand how financial assets have responded to large shifts in the general level of prices.

Figure 5

Real bond and equity returns vs. inflation rates, 1900–2011

Source: Elroy Dimson, Paul Marsh, and Mike Staunton



Returns in differing conditions

The bars in Figure 5 are the average real returns on bonds and on equities in each of these groups. For example, the first bar indicates that, during years in which a country suffered deflation more extreme than –3.5%, the real return on bonds averaged +20.2%. All returns include reinvested income and are adjusted for local inflation.

As one would expect, and as documented in last year's Yearbook, the average real return from bonds varies inversely with contemporaneous inflation. In fact, in the lowest 1% of years in our sample, when deflation was between –26% and –11.8%, bonds provided an average real return of +36% (not shown in the chart). Needless to say, in periods of high inflation, real bond returns were particularly poor. As an asset class, bonds suffer in inflation, but they provide a hedge against deflation.

During marked deflation (in the chart, rates of deflation more extreme than –3.5%), equities gave a real return of 11.2%, dramatically underperforming the real return on bonds of 20.2% (see the left of Figure 5). Over all other intervals portrayed in the chart, equities gave a higher real return than bonds, averaging a premium relative to bonds of more than 5%. During marked inflation, equities gave a real return of –12.0%, dramatically outperforming the bond return of –23.2% (see the right of the chart). Though harmed by inflation, equities were resilient compared to bonds.

Perhaps surprisingly, during severe deflation real equity returns were only a little lower than at times of slight deflation or stable prices. The explanation lies in the clustering of dates in the tails of the distribution of inflation. Of the 1% of years that were the most deflationary, all but three occurred in 1921 or 1922. In those observations, the average equity return was –2% nominal, equating to +19% real. Omitting those ultra-deflationary years from the lowest 5% of observations, the real equity return during serious deflation would have averaged +9%.

Overall, it is clear that equities performed especially well in real terms when inflation ran at a low level. High inflation impaired real equity performance, and deflation was associated with deep disappointment compared to government bonds. Historically, when inflation has been low, the average realized real equity returns have been high, greater than on government bonds, and very similar across the different low inflation groupings shown in Figure 5.

Inflation-beating versus inflation-hedging

We draw a distinction between an inflation-beating strategy and an inflation-hedging strategy. The former is a strategy which achieved (or, depending on the context, is expected to achieve) a return in excess of inflation. This superior performance may be a reward for exposure to risk that has little or nothing to do with inflation.

An inflation-hedging strategy is one that provides higher nominal returns when inflation is high. Conditional on high inflation, the realized nominal returns of an inflation-hedging strategy should be larger than in periods during which inflation runs at a more moderate level. However, the long-run performance of an inflation-hedging strategy may nevertheless be low.

The distinction is between a high ex-post return and a high ex-ante correlation between nominal returns and inflation. This difference is often misunderstood. For example, it is widely believed that common stocks must be a good hedge against inflation to the extent that they have had long-run returns that were ahead of inflation. But their high ex-post return is better explained as a large equity risk premium. The magnitude of the equity risk premium tells us nothing about the correlation between equity returns and inflation.

On the other hand, gold might be proposed as a hedge against inflation, insofar as it is believed to appreciate when inflation is rampant. Yet, as we shall see, gold has given a far lower long-term return than equities, and for that reason it is unlikely that institutions seeking a worthwhile long-term real return will invest heavily in gold.

Inflation hedging

The search for an inflation-hedging investment therefore differs from a search for assets that have realized a return well above inflation. It also differs from a search for a deflation-hedging investment. This is because, if inflation expectations decline (i.e. if disinflation or even deflation lies ahead), inflation-hedging assets are likely to underperform.

There is a price one should expect to pay for "insuring" against inflation. The cost of insuring should be a lower average investment return in deflationary environments and/or in average conditions.

As we have noted, conventional bonds cannot be a hedge against inflation: they provide a hedge against deflation. Equities, however, being a claim on the real economy, could be portrayed as a hedge against inflation. The hope would be that their nominal, or monetary, return would be higher when consumer prices rise. If equities were to provide a complete hedge against inflation, their real, inflation-adjusted, return would be uncorrelated with consumer prices.

However, equities have not behaved like that. When inflation has been moderate and stable, not fluctuating markedly from year to year, equities have performed relatively well. When there has been a leap in inflation equities have performed less well in real terms. These sharp jumps in inflation are dangerous for investors.

To provide a perspective on the negative relation between inflation and stock prices, Figure 6 shows the annual inflation rate for the United States accompanied by the real capital value of the US equity index from 1900 to date. Inflationary conditions were associated with relatively low stock prices during World War I and World War II and their aftermaths, and the 1970s energy crisis. The decline in inflation during the 1990s coincided with a sharp rise in the real equity index. Nevertheless, the correlation between the series is only mildly negative and so this relationship must be interpreted with caution.

Equities and inflation

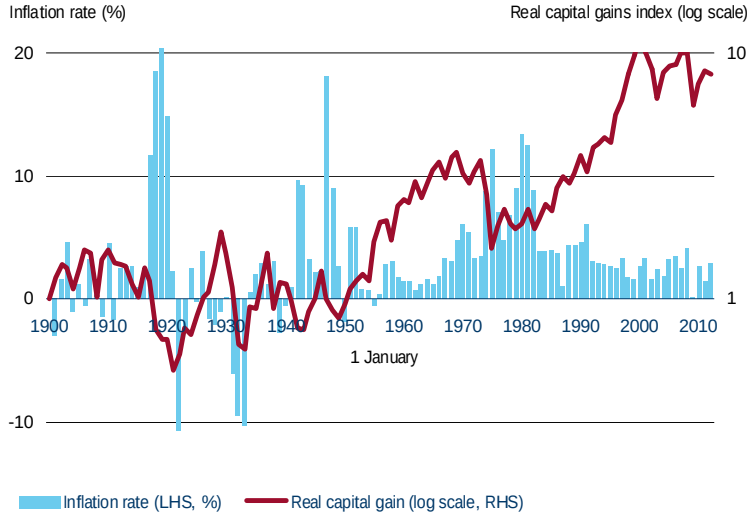
There is in fact an extensive literature which indicates that equities are not particularly good inflation hedges. Fama and Schwert (1977), Fama (1981), and Boudoukh and Richardson (1993) are three classic papers, and Tatom (2011) is a useful review article. The negative correlation between inflation and stock prices is cited by Tatom as one of the most commonly accepted empirical facts in financial and monetary economics.

Figure 7 is an example of the underlying relationship between the equity market and contemporaneous inflation. The chart pools all 19 countries and all 112 years in one scatterplot (omitting from the chart a handful of observations that are too extreme to plot). Charts for bonds and variations based on other investment horizons are omitted to conserve space.

Figure 6

Inflation and the real level of US equities, 1900–2011

Source: Elroy Dimson, Paul Marsh, and Mike Staunton,



This scatterplot has three noteworthy features. First, there is an indication of a slight downward slope, meaning that, across markets and time, higher inflation rates tend to be associated with lower real equity returns. Second, there is a divergence between the average returns achieved over the long run in different markets. Third, there is a tremendous degree of return variation that is unrelated to inflation, reflecting the substantial volatility of equity returns.

To quantify the relationship, we follow Bekaert and Wang (2010) in running regressions of real investment returns on inflation. We use country fixed effects to account for the differing long-term stock market performance of each country. (In our analysis, year fixed effects would be inappropriate because we are interested in how returns respond to year-by-year inflation). Altogether, there are 112 years of data for 19 countries. The base case regressions exclude the five most extreme observations of inflation, which are all in excess of 200% (Germany 1922–23, Finland 1918, Italy 1944, and Japan 1946).

The first row of Table 1 shows the contemporaneous relationship between inflation and real equity returns. When inflation rates are high, real investment returns tend to be lower. A rate of inflation that is 10% higher is associated, other factors held constant, with a real equity return that is lower by 5.2%. So equities are at best a partial hedge against inflation: their nominal returns tend to be higher during inflation, but not by a large enough margin to ensure that real returns completely resist inflation.

Figure 7

One-year real equity return vs. concurrent inflation, 1900–2011

Source: Elroy Dimson, Paul Marsh, and Mike Staunton

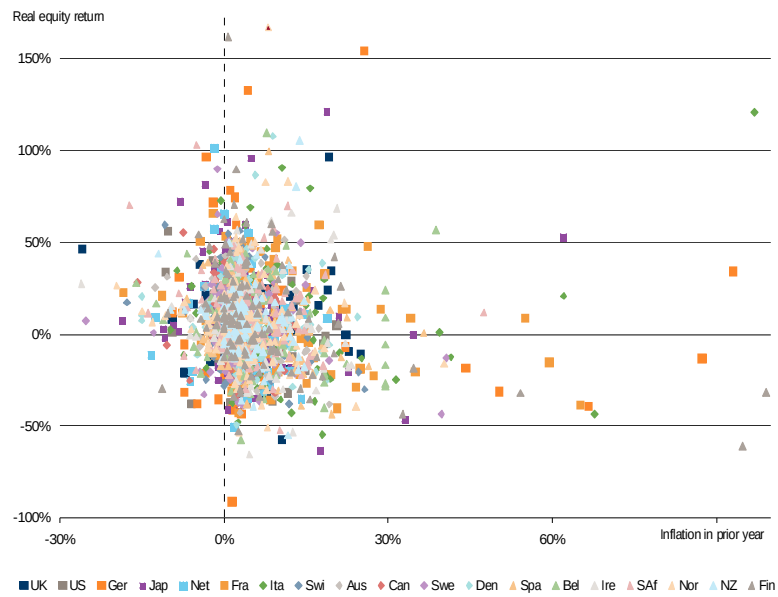


Table 1

Real return vs. inflation, 1900–2011

Regressions of annual real return versus same-year inflation. There is a dummy variable for every country, the intercept is suppressed, and five extreme observations are omitted. Source: Elroy Dimson, Paul Marsh, and Mike Staunton, IPD, WGC, and OECD

Asset	Coefficient	Std Error	t-statistic	No of obs.
Equities	–0.52	0.05	–10.60	2123
Bonds	–0.74	0.02	–35.23	2123
Bills	–0.62	0.01	–70.54	2123
Gold	0.26	0.05	5.00	2123
Real	–0.33	0.20	–1.60	280
Housing	–0.20	0.07	–2.99	719

We are estimating a relationship between real returns and inflation. Inflation therefore appears in the regression both as an independent variable and (indirectly) as a component of the dependant variable. This can reduce the magnitude of the estimated coefficients, so the partial hedge indicated by the first row of Table 1 may understate the hedging ability of the assets in Table 1.

Importantly, the negative relation between inflation and equity returns should not be interpreted as a trading rule. It cannot predict when equities are unattractive. This is because at the start of each year we would need the forthcoming inflation rate to decide whether to sell out of equities. Unless we are blessed with clairvoyance, we cannot derive a prediction from future inflation

Our regressions in Table 1 omit Germany for 1922–23 and three other observations with inflation over 200%. If we reinstate these three countries, the coefficient on equities moves from –0.52 to –0.35. That is, equities appear to have held their real value better when we incorporate these extreme years in our sample. The dilemma for investors is whether we learn more from extreme outliers or whether those are truly unique, non-repeatable episodes. In summary, high inflation reduces equity values.

Bonds and inflation

In the second row of Table 1, we see that a rate of inflation that is 10% higher is associated, at the margin, with a real bond return that is lower by 7.4%. Over and above their smaller average return, the performance of bonds is impaired by inflation more than equities are. There is clearly a tendency for real bond returns to be lower when the investment is held over a high-inflation year. This pattern is also evident when performance is measured over a multi-year horizon (not reported here). As we showed in the 2011 Yearbook, the reduction in bond value also generates higher subsequent returns, on average, for those who invest after a bout of inflation and hold for the long term.

What happens, then, if an investor buys stocks or bonds after a period of inflation? The first two rows of Table 2 provide an answer: the extent to which returns are reduced by prior-year inflation is

Table 2

Real return vs. prior inflation 1900–2011

Regressions of annual real return versus prior-year inflation. There is a dummy variable for every country, the intercept is suppressed, and five extreme observations are omitted. Source: Elroy Dimson, Paul Marsh, and Mike Staunton, IPD, WGC, and OECD

Asset	Coefficient	Std Error	t-statistic	No of obs
Equities	–0.31	0.05	–6.19	2104
Bonds	–0.41	0.03	–15.89	2104
Bills	–0.37	0.01	–24.74	2104
Gold	–0.07	0.05	–1.48	2104
Real estate	–0.54	0.20	–2.72	280
Housing	–0.37	0.07	–5.63	719

almost half of the impact of contemporaneous inflation. A rate of inflation that is 10% higher is associated, other factors held constant, with a real equity return that is lower by 3.1% in the subsequent year, and with a real bond return that is lower by 4.1% in the subsequent year. The continuing negative impact on equity and bond prices reflects the serial correlation of inflation rates.

This is not a market timing tool. High inflation may look like a sell signal, but our model is derived with hindsight and could not be known in advance; there is clustering of observations, so many of the signals may occur at some past date (e.g. the 1920s); and it is not clear where sales proceeds should be parked. In particular, real interest rates tend to be lower in inflationary times, the expected real return on Treasury bills will be smaller after an inflation hit, and other safe-haven assets like inflation-linked bonds are likely to provide a reduced expected return in real terms.

Furthermore, high inflation rates may coincide with greater volatility of real returns. As we showed in the 2011 Yearbook in the context of bond investment, inflation lowers prices to the point that forward-looking returns provide compensation for higher risk exposure. A risk-tolerant investor will see security prices fall when inflation and the risk premium rises, and can then take advantage of higher projected returns.

Deflation is good for bondholders, but the impact on stockholders is less obvious. To illustrate this, we divide our sample into years when there is inflation, and years when price changes are zero or negative – deflationary years. A regression like Table 1, but based solely on data for deflationary years, yields coefficients of –0.07 for equities and –1.88 for bonds. Broadly speaking, the real value of equities is uncorrelated with the magnitude of deflation. Once in a deflationary environment, however, bonds tend to lose 1.88% for every 1% rise in consumer prices. They gain a further 1.88% for every 1% decline in consumer prices.

Bonds come into their own during periods of disinflation and deflation. But they can be dangerous during inflation. If inflation and hence nominal interest rates rise, bond prices must decline. When inflation is rampant, uncertainty about real bond yields may increase. Finally, in a more inflationary environment, credit risk may be heightened, and so spreads for defaultable bonds may widen. There could be three perils for bond investors: nominal interest rates, real interest rate risk, and credit risk.

Compared to bonds, equities are better inflation-hedging assets, though their real returns are still adversely affected by inflation. These properties of equities are most evident during historically extreme episodes. Yet, as Figure 5 highlighted earlier, in conditions of moderate inflation, asset returns are relatively unaffected by the scale of inflation. At the same time, as we saw in Figure 7, national stock markets are buffeted by factors beyond inflation. For that reason, it is wise for investors to look for inflation protection beyond just equities.

Inflation-linked bonds

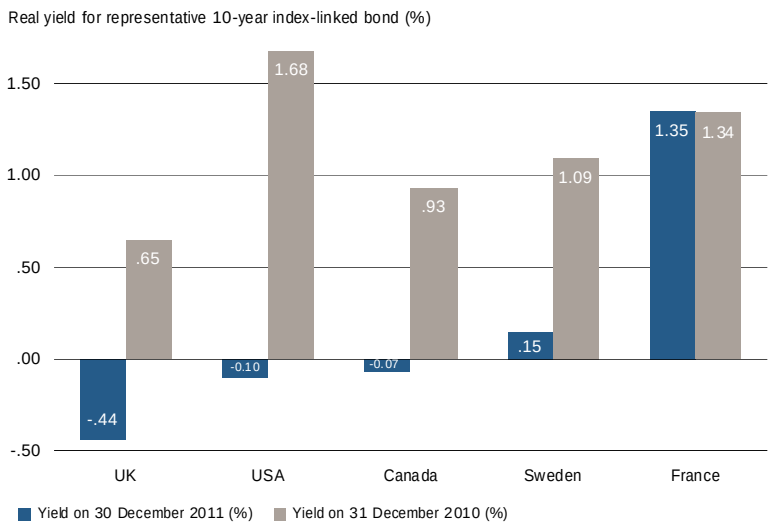
What other assets might provide an effective hedge against inflation? A leading real asset category is inflation-indexed bonds, notably those issued by governments. For indexed bonds that are held to maturity, there is not the same need to interrogate history, since the real yield on these securities provides a forward-looking statement of the inflation-adjusted yield to maturity (of course, over intermediate horizons, when there is real interest rate risk, inflation-linked bonds can also be risky investments).

Figure 8 displays the real yields at which representative inflation-linked bonds with a maturity close to 10 years were trading. We draw comparison between the real yields at the end of 2011 and at the start of 2011 (i.e. the closing yield for 2010). As investors fled to safety during the banking crisis, real yields had already declined prior to 2011, but over that year they fell further. The only countries that have not recently experienced a further tightening of real yields are those where default prob-

Figure 8

Change in inflation-linked government bond yields over 2011

Source: FT table of representative stocks (UK '21, US '28/'31, Canada '21, Sweden '20/'22, France '20).



abilities have increased. An example is France (in Figure 8) or Italy (whose '23 bond at end-2011 offered a real yield of 5.61%).

By historical standards, real yields are today extraordinarily low, being close to or below zero for default-free inflation-linked bonds. As a safe haven for investors concerned with the purchasing power of their portfolio, index-linked bonds offer a highly effective means of reducing real risk. In today's market, however, they can make little contribution to achieving a positive real return over the period from investment to maturity.

Figure 9

Gold prices and inflation in the United Kingdom, 1900–2011

Source: Christophe Spaenjers; Elroy Dimson, Paul Marsh, and Mike Staunton; WGC, EH.net

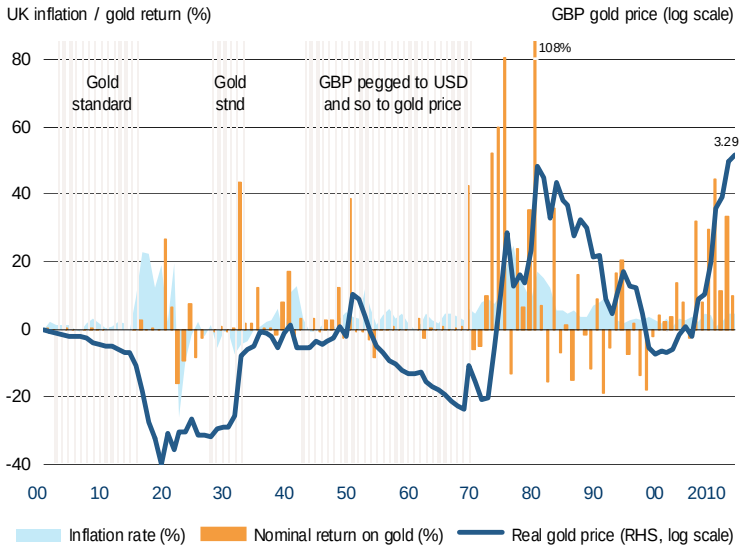
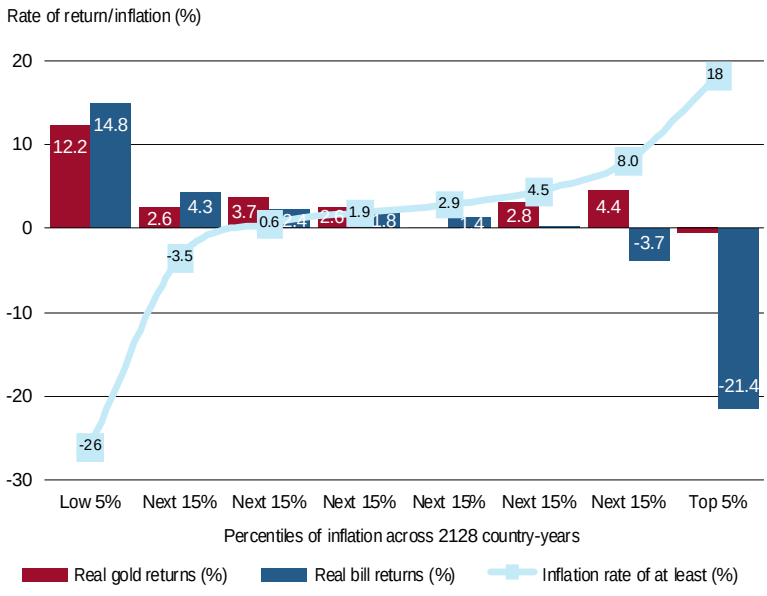


Figure 10

Real gold and cash returns vs. inflation rates, 1900–2011

Source: Elroy Dimson, Paul Marsh, and Mike Staunton; WGC, EH.net.



Gold and cash

Gold is an investment puzzle. At times it has defined the value of major currencies. Yet it is a commodity, offering protection against inflation. Physical gold is a real asset. In dramatic contrast to stocks, bonds, and bills, gold is not a counterparty's liability. At times of uncertainty, investors may turn to gold as a hedge against crises.

But how well does gold provide stability of purchasing power? If it were a reliable hedge against inflation, its real price would be relatively unwavering. Gold's real value is shown in the line, plotted to a logarithmic scale, in Figure 9. Charts such as this can be produced for any currency (the data are freely available on the World Gold Council's website). Here we take a GBP perspective.

The purchasing power of gold has fluctuated over a wide range. The gray shading denotes the era of the gold standard and of the fixed GBP-USD exchange rate while the US dollar was pegged to gold. In that period, the price of gold was fixed in nominal terms, so it failed to serve as an inflation hedge except at rare instances of currency revaluation.

But even during the floating periods, gold was volatile. It lost some three-quarters of its real GBP value (and over four-fifths of its real USD value) between the 1980 peak and 2001. While gold may play a role in a diversified portfolio, it should be seen in part as a commodity, and only in part as an investment that is driven by the desire of investors to protect themselves from financial crises.

In Figure 10, we report the investment performance of gold and cash over the 112-year span covered earlier. As in Figure 5, we analyze 2,128 Treasury bill returns and 2,128 gold returns, where gold is denominated in each country's local currency. Gold returns are of course price returns; returns are adjusted for local inflation. The bars are the average inflation-adjusted returns on gold and on cash (Treasury bills), so, for example, the first bar indicates that during years in which a country suffered deflation worse than –3.5%, the real return on gold averaged +12.2%, while the real return on cash averaged +14.8%.

During marked deflation (rates more extreme than –3.5%) gold gave a real return that was inferior to cash and to bonds (cf. Figure 5). The comparison with cash may be a little unfair. During deflationary episodes, cash generates large real returns because nominal interest rates have usually been non-negative (this contributes to the negative coefficients reported for Treasury bills in Tables 1 and 2).

In contrast, during extreme inflation, gold gave a real return that was close to zero. Its average behavior was quite different over such periods from cash, bonds and bills, even though gold was the only non-income producing asset. Over the

entire 112 years, however, the annualized real return on gold (1.07% from a GBP perspective) was of a similar magnitude to the capital appreciation – excluding dividend income – achieved by equity markets around the world.

Gold is the only asset that does not have its real value reduced by inflation (see Table 1). It has a potential role in the portfolio of a risk-averse investor concerned about inflation. However, this asset does not provide an income flow and has generated low real returns over the long term. Gold can fail to provide a positive real return over extended periods. Holdings in gold should therefore reflect the risk appetite and tastes of the investor. Gold is an individual investor's asset; it sits less easily in institutional portfolios.

Real estate

For investors concerned about the purchasing power of their investments, a natural alternative to publicly traded assets is a direct holding of real estate. Commercial property is a claim on assets that might be expected to rise in monetary value during periods of general inflation. If real estate is an effective hedge against inflation, we would expect the relationship between real returns and inflation to be represented by a flat line. Needless to say, there would still be substantial scatter since, as noted by Case and Wachter (2011), there are many factors beside inflation that influence the performance of a real estate portfolio.

We examine the annual investment performance of commercial real estate using index series from the Investment Property Databank (IPD). Country coverage within IPD is not identical to the Yearbook, so we use all of the IPD index series except Portugal (not one of our 19 countries) and Central Europe (not one of our 3 regions). For each country in IPD's annual dataset, we use unleveraged total returns to directly held standing property investments from one open market valuation to the next. The all-property total return, including income, is converted to real terms using the local inflation index. Countries have between 7 and 41 years of data. Data for the most recent year is based on the IPD monthly property index.

We analyze this dataset by running a regression of inflation-adjusted property returns on inflation, again with country fixed-effects. As reported in Table 1, we find that after controlling for country specific factors, the coefficient of real property returns on inflation is –0.33. Real property returns appear to be hurt less by inflation than stocks, bonds, or bills. However, it is well known that real estate values can lag traded assets, and Table 2 indicates that a rise in consumer prices is associated with a delayed decline in real property values that exceeds other assets. So, on balance, and given its relative illiquidity, commercial real estate has to be considered as a long-term commitment. In contrast to traded assets, it is not an investment that should be initiated because of a new concern about inflation risk.

An appropriate role for commercial property in an institutional portfolio is as a diversifier and source of returns, forming part of the core long-term holdings of the investor. It is not possible for smaller institutions to gain exposure through direct investment to the diversified portfolio represented by a property index. While direct investment in this asset class is impractical for smaller investors, there are opportunities for participating through pooled vehicles.

Housing

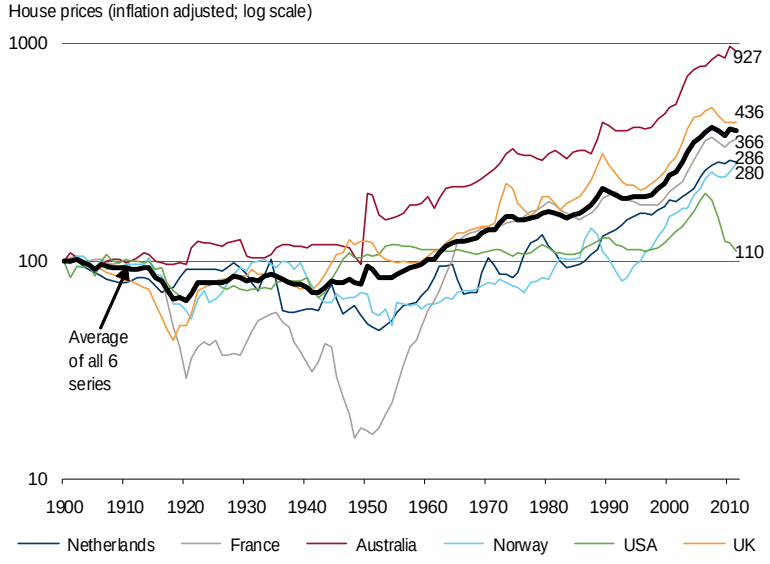
For individual investors, the most prevalent direct holding of real estate is their own home, so we turn now to personal investment in housing. We investigate the behavior of house prices in the Yearbook countries, using an OECD dataset that covers 18 of the 19 Yearbook countries, the exception being South Africa (see Bracke, 2011). The underlying data is quarterly and, for consistency with our other research, we aggregate this to annual observations of capital appreciation or depreciation. The indexes for each country run from 1970 to 2010. Indexes for 2011 have not yet been released.

In contrast to the commercial property studied above, the housing series measure capital values with no adjustment for the rental value that might be imputed to domestic housing. In any given year, only a tiny proportion of the housing stock is transacted, indexes can be unrepresentative, and, as Monnery (2011) explains, there are many other problems with house price indexes. Our pooled regressions relate real house-price movements to local inflation, again using country fixed-effects.

Figure 11

Real price of domestic housing in six countries, 1900–2011

Sources: Eichholtz (1997), Eitrheim & Erlandsen (2004), Friggit (2010), Monnery (2011), Shiller (2011), Stapledon (2011)



We find that, after controlling for country-specific factors, the coefficient of real housing appreciation on inflation is –0.20 with a standard error of 0.07. Real house-price changes therefore seem relatively insensitive to inflation. This may reflect the fact that individual earnings (and hence mortgage capacity) tended to move in line with inflation, causing house prices to co-move with inflation; or it may reflect other attributes of house prices that no longer apply in today's conditions

We conclude with a record of housing prices since 1900 for six countries, drawing on several studies of which Monnery (2011) is the most recent. Housing has provided a long-term capital appreciation that is similar in magnitude to gold. The best-performing house-price indexes are Australia (2.03% per year) and the United Kingdom (1.33%). The United States (0.09%) is the worst. Norway (0.93%), the Netherlands (0.95%), and France (1.18%) fall in the middle.

House price indexes are notoriously difficult to interpret, but they do appear to have kept pace with inflation over the long term. Nevertheless, one must remember that a home is a consumption good, as well as an investment. Investors can never build a properly diversified portfolio of housing. The attributes of a home are a by-product of its intrinsic utility to those who dwell there.

Other assets

Our list of assets is far from exhaustive, and there is a substantial literature that discusses "new real assets." These extend from private equity, through commodity-linked derivatives, energy, and timber, to more recent asset classes such as infrastructure, farmland, and intellectual property. There is a useful discussion in Martin (2010), and Ilmanen (2011) also reviews strategies designed to overcome exposure to inflation.

The dilemma for investors is to identify securities that have a reliable capacity to hedge inflation on an out-of-sample basis. For individual stocks this turns out to be exceptionally challenging. Ang, Brière, and Signori (2011) conclude that "the substantial variation of inflation betas makes it difficult to find stocks that are good ex-ante inflation hedges." Similarly, in a detailed study of listed infrastructure, Roedel and Rothballer (2011) conclude that "infrastructure as an enhanced inflation hedge appears to be rather wishful thinking than empirical fact."

It is tough to find individual equities, or classes of equities, or sectors that are reliable as hedges against inflation, whether the focus is on utilities, infrastructure, REITs, stocks with low inflation betas, or other attributes. Portfolio tilts toward such securities should therefore be made in moderation and with humility, and with effective diversification across assets that are targeted as a hedge against inflation.

Conclusion

Inflation erodes the value of most financial assets. When inflation is high, equities are impacted, though to a lesser extent than bonds or cash. However, equities also offer an expected reward that is larger than fixed income investments.

Table 3 summarizes the long-run performance and inflation sensitivity of those assets for which we have a full 112-year returns history. Since the start of the 21st century, global equities have performed best, with an annualized real return of 5.4%. As our proxy for equities, we have taken the USD-denominated world index, but details for all individual equity markets are in the Country Profiles section of this publication, starting on page 37.

In every country, local equities outperformed local government bonds and Treasury bills. Over the long term, bonds and bills have on average provided investors with low – sometimes negative – real returns. We do not have comparably long-term data on inflation-linked bonds, but it is reasonable to assume that default-free linkers offer a prospective reward that is, if anything, lower than conventional government bonds.

In recent years, gold has appreciated markedly, but over the long term its investment performance has been modest. Whereas the pleasure of owning and storing a gold bar is somewhat limited, housing has appreciated at a similar annualized rate to gold, while home owners receive the benefit of living there.

Table 3 also shows the standard deviation of each asset class. It is worth noting that the housing series are averaged across properties (i.e. measuring the infeasible strategy of highly diversified home ownership) and over time (because individual properties trade infrequently). Consequently, the standard deviation reported in the last row of Table 3 understates the home owner's true financial risk exposure.

Most investors are concerned about the purchasing power of their portfolios, and want some protection against inflation. The final column of Table 3 summarizes the sensitivity of annual real returns to contemporaneous inflation. Equities are hurt in real terms by inflation, but bonds are more exposed to the impact of inflation. The short term

Table 3

Real returns and inflation, 1900–2011

Note: Equity returns are for world index in USD. Bond and bill returns are US. Gold is converted to USD. All returns are adjusted for inflation. Housing excludes income and is an average of local inflation-adjusted indexes.
Source: Elroy Dimson, Paul Marsh, and Mike Staunton, IPD, WGC, and studies cited in text

Asset	Geometric mean	Arithmetic mean	Standard deviation	Sensitivity to inflation
Equities	5.4%	6.9%	17.7%	–0.52
Bonds	1.7%	2.3%	10.4%	–0.74
Bills	0.9%	1.0%	4.7%	–0.62
Gold	1.0%	2.4%	12.4%	0.26
Housing	1.3%	1.5%	8.9%	–0.20

interest rate fluctuates to reflect news about inflation, and so the return on cash (bills) should be, and is, somewhat less sensitive to inflation than longer-term bonds.

Gold has on average been resistant to the impact of inflation. However, investment in gold has generated volatile price fluctuations. There have been long periods when the gold investor was "underwater" in real terms.

Compared to traded financial assets, housing appears to be less sensitive to inflation. Commercial real estate may share these attributes, though the evidence is weaker and we do not have a return history that goes back so far. It is important to note that, because trading in residential and commercial property is intermittent, there may be longer-term responses to inflation that are more severe than our annual analysis suggest (comparison of Tables 1 and 2 supports this view).

Inflation protection has a cost in terms of lower expected returns. While an inflation-protected portfolio may perform better when there is a shock to the general price level, during periods of disinflation or deflation such a portfolio can be expected to underperform.

The assets that will best protect against deflation are quite different from inflation-hedging assets. There are few assets that provide a hedge against deflation, and only bonds can do this reliably. Bond portfolios can be extended from domestic government securities to global fixed income and inflation-linked bonds, while being cognizant of the credit risk that is now associated with sovereign issuers. Similarly, portfolio holdings of cash can be enhanced with shorter-term inflation-linked bond holdings.

Equity portfolios should be diversified across national markets, so that foreign currency exposure can work with foreign equity exposures to provide a hedge against local inflation. Inflation-averse investors should consider extending a traditional stock-bond-cash portfolio to assets that may provide additional inflation protection. However, the literature indicates that this is challenging because sensitivity to inflation changes over time.

The bottom line is that, although equities are thought to provide a hedge against inflation, their capacity to do so is limited. While inflation clearly harms the real value of bonds and cash, equities are not immune. They are at best a partial hedge against inflation and offer limited protection against rising prices. The real case for equities is that, over the long term, stockholders have enjoyed a large equity risk premium.

PHOTO: ISTOCKPHOTO.COM/SKODONNEL

Currency matters

Investing in global equities, rather than just domestically, reduces portfolio volatility. We find that equities in particular perform best after periods of currency weakness, which suggests that more unhedged cross-border stock exposure can be desirable at those times. In contrast to equities, cross-border bond investment can add to portfolio risk primarily through currency exposure. Short-term currency hedging is therefore found to be particularly meaningful in bond portfolios. In equities, it also contributes to risk reduction, but less so. However, hedging benefits are found to fall off with longer investment horizons.

Elroy Dimson, Paul Marsh, and Mike Staunton, London Business School

Currency concerns are center stage today, but currency volatility is not new. We define currency volatility as the cross-sectional variation in exchange rates against the US dollar. Figure 1 plots monthly volatility since 1972, when floating exchange rates largely replaced the old Bretton Woods regime. The light blue area shows volatility of developed-market currencies, and the dark blue line plot shows that of major emerging markets.

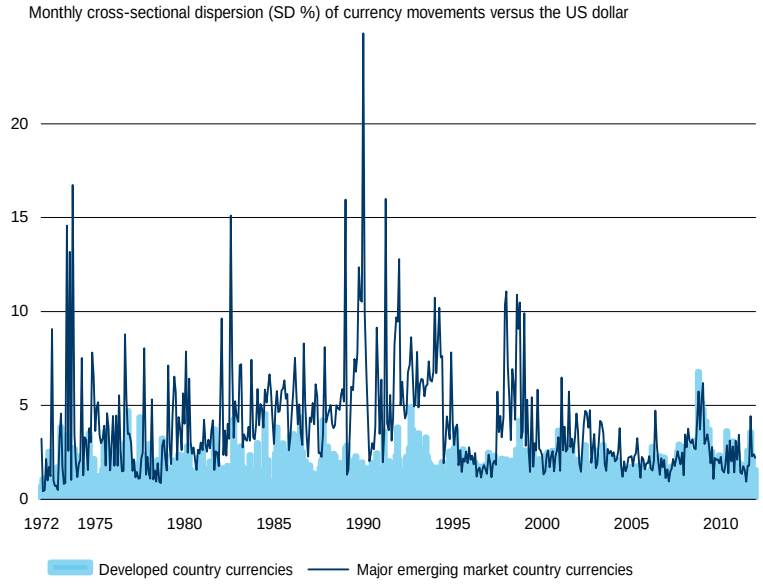
Currency volatility has been the norm, and 2011 was not exceptional. Volatility in developed markets was highest around the Lehman bankruptcy and the 1992 Exchange Rate Mechanism crisis. Emerging market currencies have been more volatile, especially during the 1973 oil crisis, Latin American debt crisis, Asian financial crisis, and Russian default. After 2000, they were more stable and more like developed-market currencies.

Figure 2 shows the US dollar's change in value since 2000 against the world's 20 next most frequently traded currencies. The USD fell against most developed countries and China, and rose against sterling and most emerging markets. The range ran from +248% versus the Turkish lira to −42% versus the Swiss franc. Over this period, Turkish equities gave a lira return of 310%, a USD return of 18%, and a Swiss franc return of −31%.

Figure 1

Currency volatility over time, 1972–2011

Source: Elroy Dimson, Paul Marsh, and Mike Staunton; Global Financial Data



While foreign investment offers diversification and a wider opportunity set, it introduces exchange rate risk. We therefore look at currency risk; ask whether currencies are predictable; and later in this article, examine the benefits from hedging currency exposure.

Figure 2

Changes in value of US dollar (%), 2000–2011

Source: Elroy Dimson, Paul Marsh, and Mike Staunton; DMS dataset and Thomson Datastream

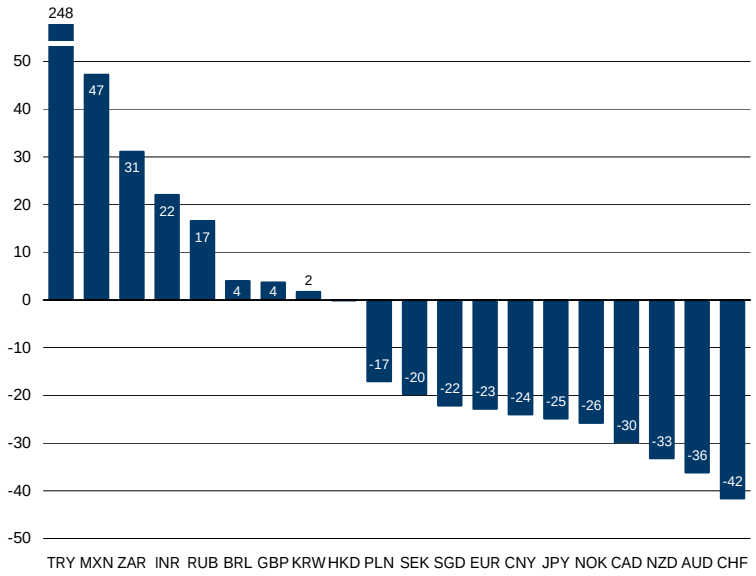
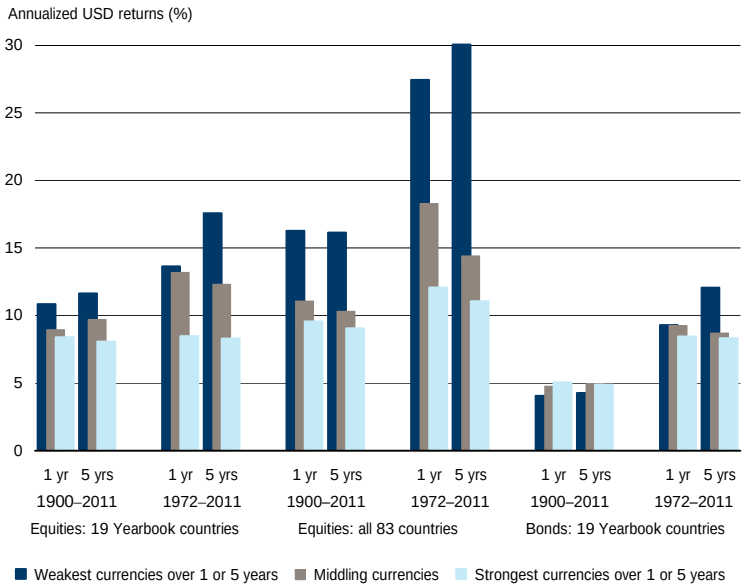


Figure 3

Bond and equity returns and prior exchange-rate changes

Source: Elroy Dimson, Paul Marsh, and Mike Staunton



Invest after currency strength or weakness?

Investors enjoy gains from investments in countries whose currencies appreciate and suffer losses when currencies depreciate, so they often argue that it is better to invest in countries with strong currencies. But this is true only if one can successfully predict which currencies will be strong in the future. All we know for sure is which ones have been strong in the past. So we begin by asking whether past currency movements are related to the future returns on equities and bonds. Put simply, is it better to invest after periods of currency strength or weakness?

We interrogate the Dimson-Marsh-Staunton (DMS) database of 19 countries since 1900. For equities, we add total returns for 64 other countries (mostly emerging markets). So for 43 stock markets we have at least 25 years of data, and for all 83 we have at least 12 years of data.

We follow a global market-rotation strategy. Each New Year, we rank countries by their exchange-rate change over the preceding 1–5 years, and assign them to one of five quintiles from the weakest currency to the strongest. Quintiles 1, 2, 4, and 5 have an equal number of constituents; quintile 3 may have marginally fewer. We invest on an equal-weighted basis in the markets of each quintile, reinvesting all proceeds including income. Countries are re-ranked annually, and the strategy is followed for 112 years. We look separately at equities and bonds; returns are in USD.

Figure 3 summarizes our findings. There are six groups of bars. The two on the left are for equities for the 19 countries; the center two are for equities for all 83 countries; and the two on the right relate to bonds. Within these three pairings, the left-hand group relates to the years 1900–2011, while the right-hand group is the post Bretton Woods period 1972–2011. Within each of the six groupings, there are two trios of bars, representing quintiles based on 1-year and on 5-year exchange-rate changes.

Equities did better after currency weakness

Figure 3 shows that equities performed best after currency weakness, not strength. Outperformance is greater if (a) exchange rate changes are measured over five years, not just one; (b) we focus on the post Bretton Woods period; and (c) we look at all 83 countries. This last observation should be treated with caution as the extra countries are mostly smaller emerging markets with more volatile currencies. It can be hard to trade in them at the best of times, but our rotation strategy may target currencies just when trading is most costly.

For bonds, the picture is less clear. The rightmost grouping of bars shows that over the last 40 years of (mainly) floating exchange rates, bonds, like equities, showed a tendency to perform best after periods of currency weakness, although the

relationship is weaker than for equities, and is not apparent over the full 1900–2011 period.

This is attributable to the world wars and ultra-high inflations of the first half of the 20th century making bond returns very sensitive to outliers. For example, the German bond return of –100% in 1923 wiped a quarter off the four-country portfolio value. Omitting Germany's hyperinflations from Figure 3 would reverse the 1900–2011 ranking.

With the exception of bonds in the first half of the 20th century, both equities and bonds performed best after currency weakness. This might be due to risk, as volatility was appreciably higher for both equities and bonds in the weakest currency quintiles. However, the Sharpe ratios that correspond to the above returns confirm clear outperformance after currency weakness (except, again, for bonds during 1900–49); see Figure 4.

We also computed the betas of the quintile portfolios against the world index. While they are higher for returns after currency weakness rather than strength, they are insufficient to explain away the performance patterns we have documented. The outperformance after currency weakness is robust to standard forms of risk adjustment.

Favoring the weak

It is often said that equity values should fall after currency weakness, as the latter is associated with higher inflation, interest rates, and uncertainty. The counter-argument is that equities can prosper after currency weakness through higher corporate cash flows and earnings, which may be boosted by increased competitiveness and export opportunities. Furthermore, the weakest currencies have often undergone devaluations, after which exchange-rate support mechanisms (like Britain's high interest rates before the ERM crisis) are withdrawn to the advantage of businesses.

To decide which view is supported by evidence, we analyze currency-based investment in event time. The "event" here is the allocation of a country to a currency quintile. There are 19 x 112 = 2,128 events for the Yearbook countries. Of these, 448 involve assignment to the weakest quintile, and 448 to the strongest quintile. These events are deemed to occur at year zero. Our analysis tracks cumulative abnormal returns from 10 years before to 10 years after the event. Abnormal returns are actual returns less the return on an equally-weighted world index. For events in the first and last calendar decades of our period, there are fewer returns due to incomplete data.

The left-hand chart in Figure 5 shows USD denominated event-time returns over 1900–2011. Pre-event, both equities and bonds fell sharply in weak-currency countries and appreciated in strong-currency countries. Since we select quintile entry at the event date based on prior currency performance, this is to be expected. After the event date, equity returns experience a sharp reversal, performing best after currency weakness and worst after strength. For bonds, post-event returns are close to neutral, consistent with our earlier finding that for bonds, the 20th century was a game of two halves.

Figure 4

Sharpe ratios for equity and bond quintiles

Source: Elroy Dimson, Paul Marsh, and Mike Staunton

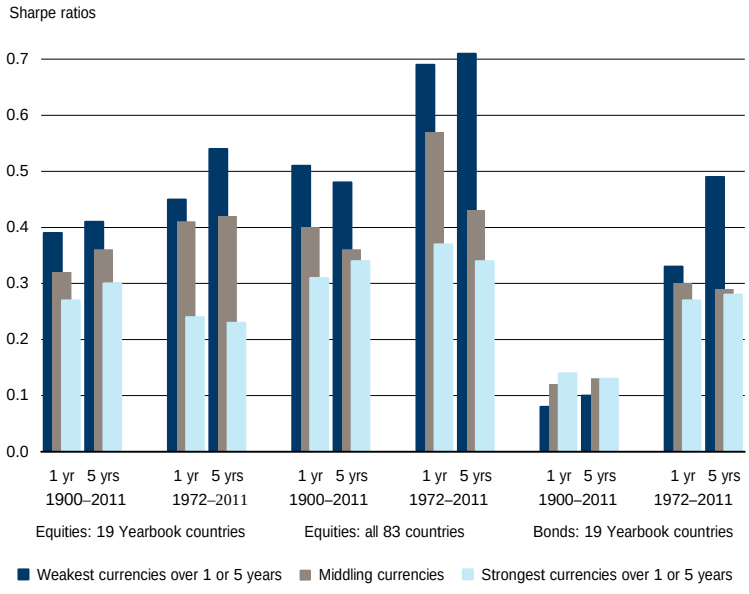
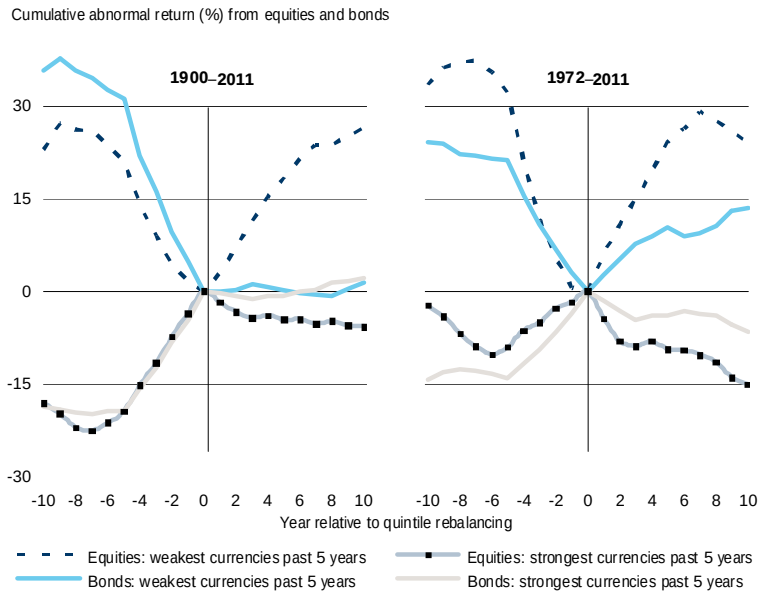


Figure 5

Equity and bond performance pre and post currency changes

Source: Elroy Dimson, Paul Marsh, and Mike Staunton



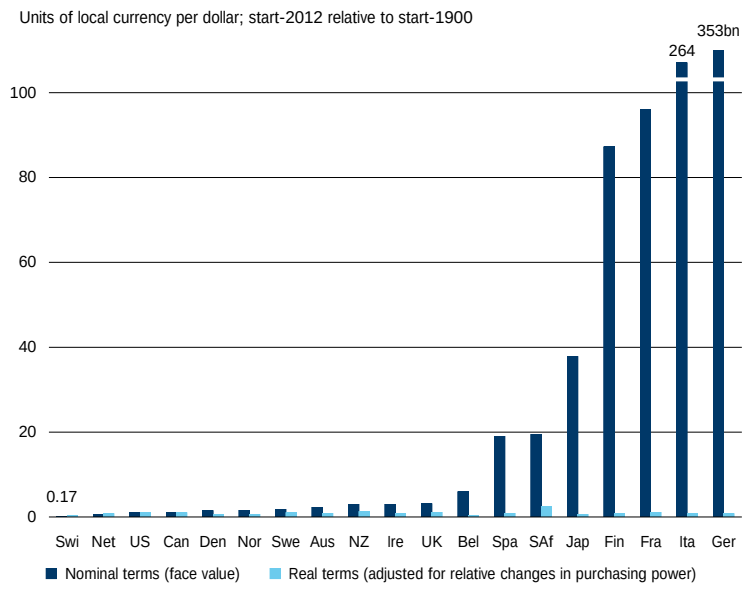
The right hand side of Figure 5 shows the same analysis over the 40-year post Bretton Woods period. Here, bonds show the same post-event pattern as equities, but with less extreme performance. While there are reasons why currency weakness can boost equity values, two puzzles remain. First, the impact of currency weakness should be impounded immediately into equity values. Yet there is a persistent, year-on-year, post-event drift. Second, we find the same pattern for bonds after 1972, yet bond cash flows are fixed in nominal terms and the same arguments do not apply.

It seems more likely that the post-event abnormal returns reflect a risk premium for which we have not adjusted. Weak currency countries are often distressed and higher-risk. So investors demand a higher risk premium and real interest rate, and prices fall accordingly in the pre-event period. The higher returns in the post-event period then reflect the risk premium that was built in at the time of distress. But, as noted above, while there is clear evidence of higher risk from the weakest currency countries, the outperformance persists even after standard risk adjustments.

Figure 6

Nominal and real exchange rates, 1900–2011

Source: Elroy Dimson, Paul Marsh, and Mike Staunton; Triumph of the Optimists; authors' updates



Our event study naturally has some limitations. The quintiles are poorly diversified and outliers can have a distorting impact; the market rotation strategy would sometimes have been infeasible (e.g. in wartime); and we ignore constraints on capital flows, dealing costs, taxes, risk adjustment, illiquidity, and the impact of non-market weights in quintiles and the benchmark. Still, our analysis offers challenges to the "stick-to-strong-currency" school of thought, and provides some support for those who favor "buy-on-weakness" strategies.

Should we hedge exchange rate risk?

Exchange rates are volatile and impactful; so should investors hedge currency risk? To a large extent, this depends on the investor's horizon. We therefore start by analyzing how exchange rates affect long-run returns. In Figure 6, the dark blue bars show exchange rate changes against the US dollar since 1900. Over the long haul, only two currencies were stronger than the US dollar. The barely visible light blue bar for the Swiss franc, the strongest currency, shows that by start-2012, just 0.17 times as many francs were needed to buy one dollar as in 1900. But to buy a dollar today one needs 38 times more Japanese yen, 264 times more Italian currency units (lira, then euro), or many billions more of German currency (marks, then euro), as compared to 1900.

Consider the USD/GBP exchange rate which went from five dollars to the pound in 1900 to 1.55 today, an annualized depreciation of 1.01%. This coincided with, consumer prices rising by 0.96% per year more in the UK than in the USA. Almost all the exchange rate change was attributable to relative inflation. The real (inflation adjusted) fall in the exchange rate was only 0.05%. The light bars in Figure 6 show that, for every one of our 19 countries, the annualized exchange rate change – whether positive or negative – was below 1% when measured in real terms. Given that, in earlier years, inflation indexes were narrow and unrepresentative, it is likely that the true linkage between currencies and inflation is even closer than this.

Figure 7 corroborates this for a large sample of 83 countries from 1970 to 2011. It shows the relationship between nominal exchange rate changes and inflation rates relative to the USA. Nearly all the long-term variation in nominal exchange rates is attributable to relative inflation. This has been confirmed in many studies, Taylor and Taylor (2004) being an example.

Common currency returns

Over most investors' horizons, exchange rate changes can have a big impact. For example, since 2000, Swiss equities have given a nominal return of 5% to local investors, but 80% to unhedged US investors.

In the Country Profiles, we report the real returns to domestic investors. For example, the

annualized real return to an American who held US stocks from 1900 to 2011 was 6.2%, and to a British investor who held UK equities it was 5.12%. If, instead, an American buys UK equities and a British investor buys US stocks, both now have two exposures to foreign equities and foreign currency.

Instead of comparing domestic returns, we can convert to a common reference currency. For example, switching from real local-currency to real USD returns just involves (geometric) addition of the real exchange rate change. Nominal and real exchange rate changes are listed in the Credit Suisse Global Investment Returns Sourcebook for recent and longer term periods.

Sometimes, currency misalignments seem to persist for years. However, with floating exchange rates and liquid forex markets, it is unlikely that currencies can deviate for long from fair value. Other factors are probably at work, such as different weightings in non-traded goods and services (education, healthcare, defense); wealth effects like natural resource discoveries (Norway); improvements in productivity (post-war Japan); and shorter term factors (real interest rates, capital flows). Shorter-term deviations can be large, and currencies volatile. So by how much does currency risk amplify the risks of foreign investment?

Currency hedging for a US based investor

Tables 1 and 2 present an analysis of the impact of hedging for the global stock or bond investor. Each table reports the geometric (annualized) mean, arithmetic mean, and standard deviation of returns. The period is the post Bretton Woods era, 1972–2011, all returns are annual, and they all include reinvested income.

The upper panel of each table presents our results for international equity investment, and the lower panel for investment in government bonds. For each asset, we report statistics for investing in individual countries (an average of the 19 Yearbook markets) and for the weighted world index, which is denominated in the reference currency (US dollars in Table 1). Our analysis presents return and volatility measures for each strategy on an unhedged and on a currency-hedged basis. The latter is a rolling annual hedge of each foreign currency to the reference currency.

Some patterns are common to both tables and all analyses, so we comment on them first. The tables confirm the well known but still powerful risk reduction from international equity investing. That is, the standard deviation of annual returns on the world index is much lower than the average standard deviation of individual markets. The tables also confirm that when the standard deviation is larger, the gap between the arithmetic and geometric mean returns becomes wider. Both of these features will invariably be evident in investment returns series.

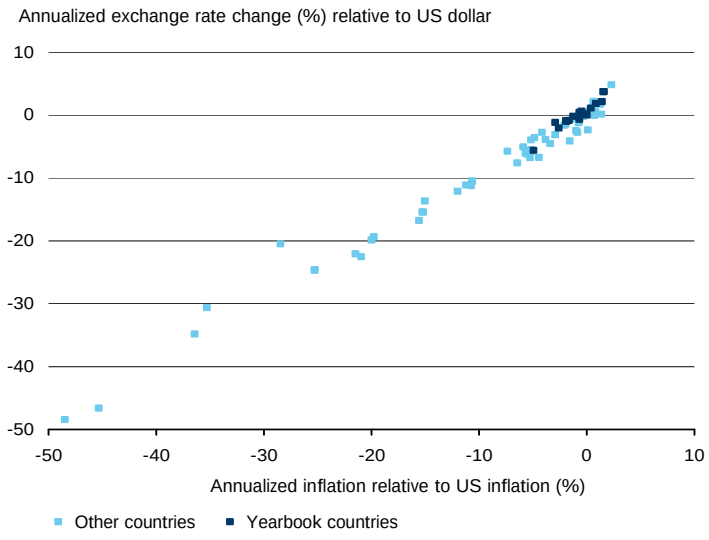
We start in the upper half of Table 1 with an analysis of the impact of hedging on a US based equity investor whose reference currency is the US dollar. We assume she follows one of two strategies. First, she may invest internationally, in which case she divides her assets equally between the 19 markets (of which one is the United States). At the end of each year, we compute the return she has received on her investment in each country, converted to US dollars and adjusted for US inflation. For each of the 19 countries, we therefore have a 40-year history of real, USD returns. We use that to calculate the mean returns and standard deviation for each country.

Averaged across the 19 countries, the 40-year real return is 6.1% unhedged or 4.7% hedged. The hedge reduces volatility by 2.7%, but at the cost of a 1.4% reduction in the annualized real USD return. Why is hedging apparently so costly? The investor reallocated exposure from a basket of currencies back to the dollar, which was weak in real terms, relative to (the equally weighted average of) other markets.

Figure 7

Exchange rates and inflation: 83 countries, 1970–2011

Source: Elroy Dimson, Paul Marsh, and Mike Staunton; Global Financial Data and IMF



The investor's alternative strategy is to invest all her money in the 19-country, weighted world equity index. Her annualized real return is 4.9% unhedged or 4.2% hedged. Historically, around half the value of the world equity index was on average in the US market, and hence the US dollar. Consistent with this, the return reduction from hedging is around half that of the previous example (it is 0.7%). But why does the currency hedge reduce volatility by only 0.7%? This is because much of the world's stock market risk is already diversified away in a global, market value-weighted equity portfolio.

In the lower half of Table 1, we undertake the same analysis of hedging, but now for a US based bond investor whose reference currency is still the US dollar. We assume she also follows one of the two strategies outlined above. Averaged across 19 bonds markets, the annualized real USD return is 4.6% unhedged or 3.1% hedged. However, the hedge reduces volatility by 15.9% to 9.9%. On average, eliminating currency risk has a big impact on volatility as viewed by a US based, dollar denominated bond investor.

Table 1

US based investor, 1972–2011

GM = Geometric mean. AM = Arithmetic mean. SD = Standard deviation. All returns include reinvested income, and are expressed in real USD terms.
Source: Elroy Dimson, Paul Marsh, and Mike Staunton.

Asset	Exposure	GM	AM	SD
Equities		%	%	%
Average of 19 markets	No hedge	6.1	10.1	29.8
	Hedged	4.7	8.1	27.1
World equity index	No hedge	4.9	6.6	18.2
	Hedged	4.2	5.8	17.5
Bonds				
Average of 19 markets	No hedge	4.6	5.8	15.9
	Hedged	3.1	3.6	9.9
World bond index	No hedge	5.0	5.5	10.1
	Hedged	4.3	4.7	8.9

In the final part of Table 1 we examine the GDP weighted world bond index, from a real USD viewpoint. Hedging reduces real return, but the risk reduction for this index is more modest.

Hedging by non-US as well as US investors

The American investor who buys stocks or bonds internationally has counterparts in each of the other 18 countries in our study. We therefore repeat the study described in Table 1 a further 18 times, so that we have the perspective of a British investor concerned about real GBP returns, a Swiss investor concerned about real CHF returns, and so on. As a summary, Table 2 presents the average of all 19 tables.

There are some similarities and some striking differences between the two tables. Look first at the experience of our equity investors in the top panel of Table 2. The average volatility across the 19 markets is very close to that observed previously for the US based investor: standard deviations of 30.0% unhedged and 27.4% hedged. (The volatility of a portfolio invested equally in each of the 19 equity markets would be 22.4% unhedged and 20.4% hedged – a similar level of risk reduction.)

While the volatility story resembles the US based evidence, the returns story presents a contrast. The annualized returns on the unhedged and hedged strategies are virtually identical. In a currency hedge, one party's profit is a counterparty's loss. Consequently, and on average across all parties, hedging makes essentially no difference to investment returns.

Far too many investors form a judgment reflecting just their own country's past experience. They erroneously extrapolate into the future the gains or losses that resulted from hedging back to their home currency. Hedging foreign exchange exposure reduces risk. However, averaged across all parties, it cannot enhance or impair returns for everyone.

When we look in Table 2 at the experience of investors who buy the world equity index, we see now that the unhedged investor has underperformed the hedged strategy by 0.7%. The reduction in return from hedging in Table 1 has become a profit in Table 2. We see in Table 2 that, over the post Bretton Woods period, investors who are concerned with the purchasing power of their investments on average benefitted from avoiding US dollar exposure. But that of course relates to the past; we cannot foretell the dollar's future.

Table 2

Investors around the world, 1972–2011

GM = Geometric mean. AM = Arithmetic mean. SD = Standard deviation. All returns include reinvested income, and are in real terms in the reference currency. This is an average of 19 exhibits like Table 1, each for a different reference currency.
Source: Elroy Dimson, Paul Marsh, and Mike Staunton.

Asset	Exposure	GM	AM	SD
Equities		%	%	%
Average of 19 markets	No hedge	5.5	9.5	30.0
	Hedged	5.5	8.9	27.4
World equity index	No hedge	4.3	6.4	20.6
	Hedged	5.0	6.6	17.8
Bonds				
Average of 19 markets	No hedge	3.9	5.1	15.6
	Hedged	3.9	4.5	10.5
World bond index	No hedge	4.3	5.2	13.5
	Hedged	5.1	5.5	9.3

The equity investor's experience is followed in the lower half of Table 2 by the bond investor's experience. In the bond market, currency hedging reduces volatility dramatically for the average market from 15.6% to 10.5%. (The respective volatilities for a portfolio invested equally in each of the 19 bond markets would be 11.4% and 8.1% respectively.) As noted above, the average

level of annualized returns is unaffected by hedging. It is 3.9% for the average bond market.

Finally, we see that the reduction in geometric mean return for a US investor who hedged currency exposure becomes a gain for non-US investors. Meanwhile, currency hedging reduces risk on average.

Local versus dollar-based investors

Figure 8 extends the record to the full 112-year sample period, and draws comparison with the last 40 years. It takes the perspective of a US citizen investing in the other 18 Yearbook countries. The light blue bars show real exchange rate risk, averaged across countries. The height of the dark blue bars shows the average risk faced by local investors who bought equities (middle bars) or bonds (right-hand bars). The full height of the bars shows the average risk for a US investor buying these same assets. The gray portion of the bars thus shows the average contribution of currency risk to total risk. The left hand bar in each set relates to 1900–2011, and the right hand bar to 1972–2011 (post Bretton Woods).

Over 1900–2011, real exchange rate changes had about the same average volatility (22%) as local currency real equity returns (23%). Yet the gray-shaded areas show that currency risk added only 6% to total risk. Although investors are taking a stake in two assets – a country's equity or bond market and its currency – total risk is less than the sum of the parts, as the returns tend to move independently and, in the long run, to act as a natural built-in hedge. The average correlation between the two during 1900–2011 was –0.09 for equities and –0.12 for bonds, while post Bretton Woods, the figures were –0.07 and –0.09. Thus over the long run, currency risk has added only modestly to the total risk of foreign investment. In the short run, of course, the natural built-in hedge can fail just when you need it most.

Hedging currency exposure

While currency risk is mitigated by its low correlation with real asset returns, it still adds to overall risk, with a higher proportionate increase for bonds than equities. If hedging reduces risk without harming returns, this would be a "free lunch."

Prior research findings on hedging are often period-dependent. To avoid this, we examine the ultra-long, 112-year Yearbook dataset, as well as the 40-year post Bretton Woods period. Investors can hedge by selling futures/forward currency contracts or by borrowing foreign currency to fund the investment. Forward rates did not exist or were unrecorded for much of our sample, so we assume hedging is via back-to-back short-term loans, borrowing in foreign currency and lending in the domestic currency. This is anyway equivalent to a forward contract, since arbitrage opportunities force the difference in interest rates to be equal to the difference between the forward and spot exchange rates.

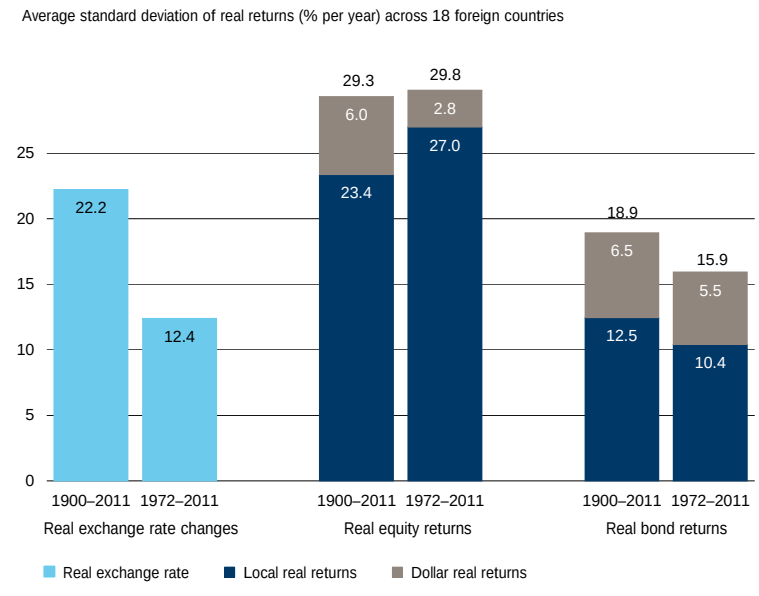
Hedging can reduce, but cannot eliminate, risk because future returns are uncertain and we therefore do not know in advance what quantum to hedge. Most strategies involve hedging the initial capital over the period until the hedge is rebalanced. Our research uses annual data and annual rebalancing. To ensure our findings are independent of the choice of currency, we examine all 19 reference currencies/countries. For each, we look at both a hedged and unhedged investment in the other 18 countries.

As noted above, the impact of hedging on returns (as opposed to risk) is a zero sum game. The profit a German investor makes on Swiss assets if the franc appreciates is offset by the loss the Swiss investor incurs on German assets. Jensen's inequality states that the profit from an appreciating currency always exceeds the loss in a depreciating currency, but in practical terms, this effect is insignificant. Averaged over all reference currencies and countries, the mean return advantage to hedging both equities and bonds was zero, both over 1900–2011 and 1972–2011.

Figure 8

Risks to local versus dollar-based investors

Source: Elroy Dimson, Paul Marsh, and Mike Staunton; Triumph of the Optimists; authors' updates



The benefits of hedging have shrunk

Figure 9 shows the risk reduction from hedging. Volatilities are calculated from continuously compounded returns as we will later be comparing volatilities computed over multiple years. When averaged over all reference currencies and countries, hedging reduced equity volatility (see "Avg" bar) by 15% over 1900–2011, but by only 7% over 1972–2011. For bonds, the figures were 36% and 30%. The benefits of hedging have shrunk, and for equities, the risk reduction of 7% over the last 40 years is less than half that obtainable from international diversification. Investing in the world index, rather than just domestically, would on average have reduced volatility by 20%.

For bonds, the position is different. Over the last 40 years, investors in most of our 19 countries would have increased risk – on average by 35% – by investing in the world bond index rather than their domestic bonds. Cross-border bond investment offers lower diversification benefits than for equities, but adds currency risk. As Figure 8 shows, currency risk is proportionately larger when investing in bonds. And, as Figure 9 shows, short-term hedging is more effective for bonds.

Figure 9 shows the average risk reduction from pairwise investments between countries, but not how investors would have fared had they held a diversified global portfolio. We therefore construct a hedged and unhedged world index for each reference currency, and calculate by how much hedging lowers the risk of investing in the world index, averaging this across reference currencies.

Figure 10 covers 1900–2011 (left-hand side) and 1972–2011 (right-hand). Within each period, we consider equities and bonds, giving four groupings of bars. Within each, there are three clusters labeled C, W, and E. Cluster C corresponds to the "Avg" bars in Figure 9 and shows the risk reduction from hedging averaged across reference currencies and investee countries. Cluster W shows the risk reduction from hedging the world index, averaged across reference currencies. Cluster E is the same as W, but using an equally weighted world index.

The dark blue bars in Figure 10 (one-year horizon, as in Figure 9) show that hedging benefits are lower for the equally weighted world index (E) than the average country (C). The world index is diversified across countries and currencies, so there is less currency risk left to hedge. The equally weighted index also offers lower hedging benefits than our world index, W, because the latter has concentrated weightings that provide less diversification. The US weighting in the world equity index peaked at 73% in 1967, and is still 45% today. In the 1980s, Japan, and hence the yen, also had a heavy weight, peaking at 42% in 1988, when Japan had the world's largest equity market, but this since fallen to just 8% today.

So far, we have looked at hedging over a one-year horizon. But longer-term currency fluctuations are less marked than we might expect due to a tendency to converge towards PPP. Also, hedging involves taking a short position in foreign interest rates and a long position in the investor's domestic interest rate. While helping to hedge short term currency risk, this introduces a new form of risk and source of volatility, namely a bet on real interest rates at home versus abroad; see Smithers and Wright (2011). Hedging thus exposes investors to rapid, unexpected inflation in their home country.

In addition to the one-year horizon (dark blue bars) in Figure 10, we also show the gains from

Figure 9

Risk reduction from hedging: Equities versus bonds

Source: Elroy Dimson, Paul Marsh, and Mike Staunton

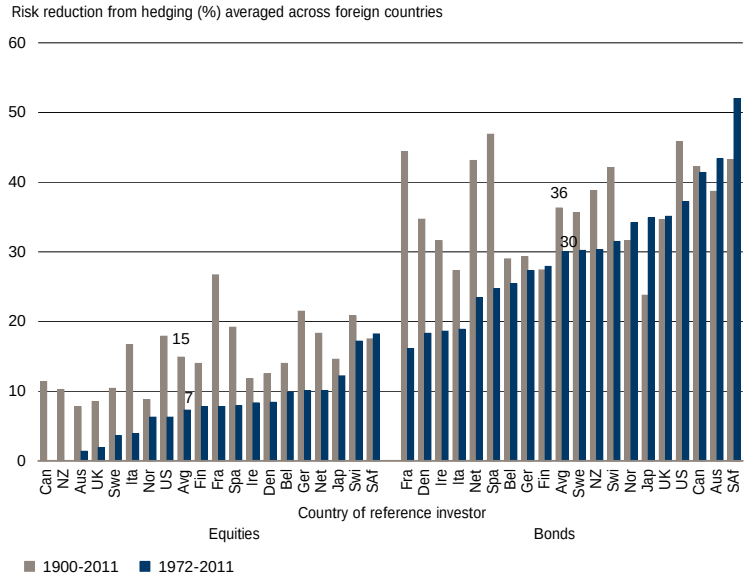
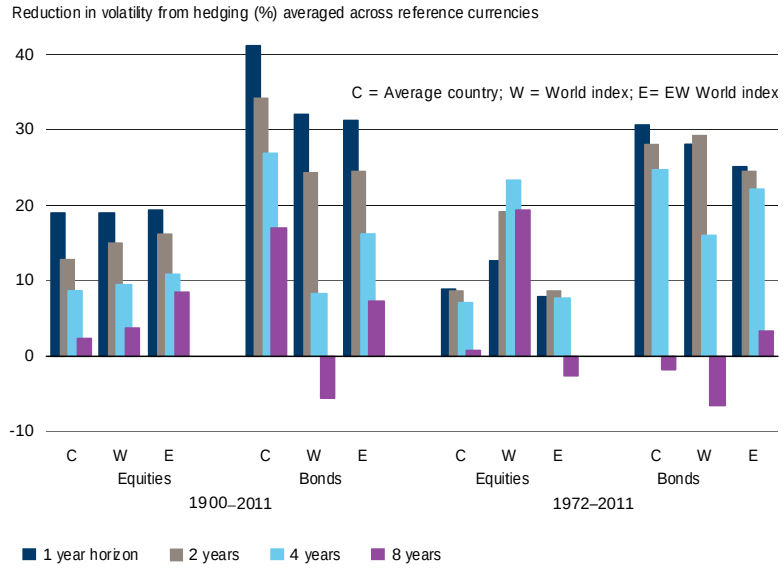


Figure 10

Risk reduction from hedging over different time horizons

C is the risk reduction for the average country; W is the risk reduction for the weighted world index; E is the risk reduction for an equally weighted world index. All estimates are averaged across reference currencies.
Source: Elroy Dimson, Paul Marsh, and Mike Staunton



hedging over two years (gray bars), four years (light blue), and eight years (purple). Typically, the benefits fall the longer the horizon, and rapidly turn negative. Rather than lowering risk, hedging by longer term investors raises risk. The exception is the world equity index in the post Bretton Woods period, where the high US and Japanese weightings had a big influence.

Are currencies predictable?

If currencies are predictable, then targeted exposure, rather than hedging could be appropriate, perhaps via a currency overlay. But predicting currencies is difficult. This is not surprising, given the size and liquidity of the markets and the intense competition between traders. In the 1980s, Kenneth Rogoff showed that economic models of exchange rates fail to predict, or even explain, when used over a period other than the one used to calibrate them. Revisiting his work, Rogoff (2002) concludes, "Explaining the yen, dollar or euro … is still a very difficult task, even ex post."

Richard Levich, a veteran currency researcher, analyzed the Barclays Currency Traders' index and some of its 106 constituent funds. In Pojarliev and Levich (2008), he reports that this index gave an excess return of 0.25% per month over the risk free rate, albeit with much higher volatility. Like other hedge fund indices, it includes only those managers who survived and continued to offer their data, so index performance is almost certainly overstated. Furthermore, after adjusting for style factors, proxied by the returns from well-known and easily implementable trading styles, the alpha (the return from skill) became negative (–0.09% per month) and was not statistically significant. Their findings were not cheering news for currency managers.

The currency style factors are themselves of interest as they imply some level of predictability. The first was a strategy involving long and short positions in currencies that seem cheap or dear relative to their value in terms of Purchasing Power Parity (PPP). This is akin to a value strategy in equity markets, and relies on real exchange rates tending to revert to the mean. The risks are that exchange rates diverge further from PPP, that the PPP exchange rate may have fundamentally changed, or that the adjustment takes place via relative prices, and not the exchange rate. But the greatest problem is that deviations from PPP tend to dissipate slowly, with much noise, and with a half-life generally reckoned to be some three to four years.

The second factor is momentum. There is evidence that momentum generates excess returns in currency markets, for example, White and Okunev (2003). Despite much research into explanations, momentum in currencies remains as big a puzzle as in equities. But, as with equities, the risks are obvious, namely, sudden reversals, false signals, high volatility, and large transactions costs.

The carry trade

The third factor is the carry trade. The carry trade strategy entails buying higher-yielding currencies for their income, while also seeking capital appreciation. Basic economics (the theory that there are no free lunches) tells us that this should not work: we should expect higher-yielding currencies to depreciate against lower yielders, thereby offsetting their initial income advantage.

The success of the popular carry trade strategy, which involves borrowing in low-interest-rate currencies and lending in high, violates economic theory. Like momentum, the carry trade is a puzzle and embarrassment to believers in market rationality. It is so naïve that it should not work. Yet many studies, such as Fama (1984), have found forward rate bias. After initiating the trade, the subsequent depreciation (or even appreciation) fails to offset the interest differential, making the carry trade profitable. Lustig and Verdelhan (2007) look back to 1953 and show that the carry trade worked even in the Bretton Woods era.

Figure 11

Annualized long-short returns from the carry trade

Source: Elroy Dimson, Paul Marsh, and Mike Staunton

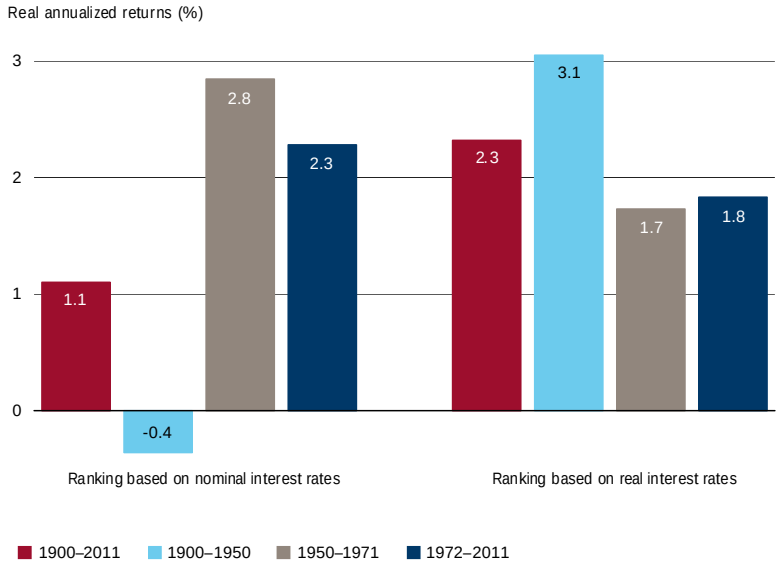


PHOTO: ISTOCKPHOTO.COM/MIKDAM

Our long-run DMS database lets us look back even further. Carry trades are normally short-term strategies, with frequent rebalancing, whereas our database comprises annual data. However, if the strategy works with annual rebalancing, it should work even better with higher frequency data. We simulate the carry trade over four periods: the entire 1900–2011 dataset; the first half of the 20th century, 1900–50; the subsequent period when Bretton Woods was in effect, 1950–71; and the post Bretton Woods period, 1972–2011.

At the start of each year, we rank our 19 countries by the previous year's realized bill return, and select the highest and lowest quintiles (four countries in each). Our perspective is that of a US investor, borrowing in the lowest-interest-rate countries and lending in the highest, holding these long-short positions for a year, then closing them out at the prevailing exchange rates.

The results are shown in the left-hand panel of Figure 11. Over the full period, the carry trade gave a modest annualized return of 1.1%. But over the hitherto unexplored 1900–50 period, the annualized return was –0.3%. From 1950 to 71, a relatively stable period of fixed exchange rates with occasional devaluations, the annualized return was 2.8%, while post Bretton Woods, it fell to 2.3%.

The failure of the carry trade in the first half of the 20th century stems from periods of high and hyperinflation, most of which occurred in the wake of the world wars. At such times, high nominal interest rates may look alluring through the automatic lens of the carry trade, yet prove disastrous.

We repeated the analysis, ranking countries by their realized real, rather than nominal, bill returns. Figure 11 shows that the carry trade now worked in every period, with the first half of the 20th century giving the highest returns. Typically, high inflation countries now showed as having low real interest rates, rather than high nominal interest rates. But note that carry trades could not have been implemented during some of this period, especially during wars. Also note that in the post Bretton Woods period since 1972, the carry trade worked better when based on nominal, rather than real, rates. Other researchers have found the same, serving to deepen the carry trade puzzle.

The carry trade appears more profitable with more frequent rebalancing. Antti Ilmanen (2011) examines weekly rebalancing among the G10 countries from 1983 to 2009. His strategy is to buy the top three interest-rate currencies, funding this by borrowing in the bottom three, using weights of 50%, 30% and 20%. This gives an annual excess return of 6.1%, a volatility of 10.5%, and a Sharpe ratio of 0.61. Returns were spread quite evenly over time with occasional deep drawdowns: –36% in 2008, –28% in 1993, and –26% in 1986.

In trying to explain carry trade profits, risk is the main suspect, but researchers have struggled to explain why it merits a risk premium. A suggestion by Cochrane (1999) seems plausible. He conjec-

tures it may be like catastrophe insurance. Most of the time, carry traders earn a small premium. On rare occasions, they lose a great deal, and they lose it in times of financial catastrophe, just when they can least afford to and when risk premia are highest. The fact that carry-trade drawdowns have been highest during "flights to safety" is consistent with this notion of a catastrophe risk premium.

Conclusions

Currency risk abounds, but history reveals this is the norm. Changes in exchange rates can boost the return from what might otherwise have been a disappointing exposure to foreign assets. But exchange rate movements can also erode or reverse the profits from investing in foreign markets that, in local currency terms, performed well.

We examined whether past currency movements are related to subsequent asset returns and found that equities performed best after currency weakness. The same was true for bonds over the last 40 years. The most likely explanation is that this is a risk premium. But, whatever the reason, our analysis provides some comfort for "buy-on-weakness" investors, and offers no support for "stick-to-strong-currency" strategies.

There is compelling evidence that, over the long haul, currencies reflect relative inflation rates. For long-term investors who are concerned about the purchasing power of their investments, this is motivation enough to regard the currency exposure of foreign equities as a valuable benefit.

It follows that currency risk should not deter investors from diversifying internationally: the benefits outweigh the attendant currency risk. Furthermore, for global equity and bond investors, currency risk has less impact than might be expected. While currencies are volatile when looked at in isolation, currency risk is mitigated by its low, and slightly negative, correlation with asset returns.

So how much currency risk is desirable? Investors who are concerned about short-term volatility may wish to hedge. They may include investors who do not care about real returns, but are concerned largely or wholly about nominal returns. Examples might be insurance companies with monetary liabilities, non-indexed pension providers, or those who are investing to generate a fixed nominal sum at a future date. For such investors, swapping foreign currency exposure for local currency exposure is very attractive. For real-return investors, the decision on hedging is more nuanced.

Hedging can enhance or harm returns, but while it does reduce short-term volatility, its general risk reduction benefits have shrunk in more recent periods. The risk reduction from hedging equities is less that half of that obtainable from global diversification.

For longer-term investors, the risk reduction benefits of hedging rapidly decline. This is because currencies tend to converge towards reflecting relative inflation rates. It is also because hedging introduces a new form of risk, namely, a bet on real interest rates at home versus abroad. Even over relatively brief multi-year horizons, we have seen that hedging on average leads to an increase in the volatility of real returns, and is on average counterproductive.

Finally, we looked at whether currencies are predictable. After adjusting for style factors, there is little evidence that currency managers generate abnormal performance. While, over the long run, currencies do tend to converge to PPP, this is of limited usefulness for short-term predictions. Carry trades, in contrast, have proved profitable, and they may form part of the toolkit for those who undertake dynamic hedging strategies.

Note that, even if investors can forecast currencies, tilting asset allocations towards countries expected to have strong currencies and away from those expected to weaken is not the best way to exploit it. Instead, it is better to trade directly in the currency markets. By using a currency overlay, the desired allocation across assets and countries can be left intact.

PHOTO: FOTOLIA.COM/FROG974

Measuring risk appetite

Investor behavior is a highly social phenomenon, and attitudes towards risk oscillate periodically from over-exuberance to excessive pessimism and back again. In February 1998, Credit Suisse launched the Global Risk Appetite Index (GRAI) to try and objectively measure these collective swings in risk preference. One key feature of the index is that it is usually closely related to shifts in global growth momentum. It can be used in conjunction with other indicators to improve market timing and asset allocation decisions, helping to offset the emotional and social bias common at times of euphoria or panic.

Paul McGinnie and Jonathan Wilmot, Credit Suisse Investment Banking

The Credit Suisse Global Risk Appetite Index ("CS GRAI") was launched in February 1998, partly in response to the Asian Crisis of 1997, with the aim of quantifying a global "sentiment factor," which appeared to have contributed to inter-country contagion. Since then, perhaps the most compelling support for the index comes from its continued relevance over time. As other approaches have broken down under the extreme events of the past few years, the CS GRAI has continued to provide plausible signals relevant to the full range of investors, including central banks and international institutions.

The rationale behind the index is straightforward: investor behavior appears to oscillate from over-exuberance to excessive pessimism and back again, a phenomenon often associated with "overshooting" fundamental or long-term trends. These extremes are strongly correlated across countries and asset classes. One intuitive way to measure these fluctuations in market sentiment is to track the change in the relative performance of safe assets versus more volatile assets, e.g. government bonds and equities. This is the basic methodology behind the CS GRAI. The appendix explains the technical reasons why we chose this approach over the standard alternatives. But first we should ask why this pattern of exuberance and pessimism exists at all, and why we might expect it to persist. And here too the answer is simple: because investors are human.

And it is well known that humans as a species suffer from many perceptual biases, particularly in assessing risk, low probability events and appropriate weighting of recent versus distant experience. Additionally, herd-like behavior and "social contagion" seems to overwhelm cold blooded calculation at times, further increasing the likelihood of what are often called manias and panics.

That in turn gave us two criteria for judging different approaches to measuring risk appetite. First, we hoped to find a statistically robust method that passed the intuition test: were extreme values of the index associated with past shocks and manias?

Less obviously, was the pattern of investor risk appetite closely connected to fundamental drivers such as global growth?

Figure 1

Global risk appetite with notable events marked

Source: Credit Suisse

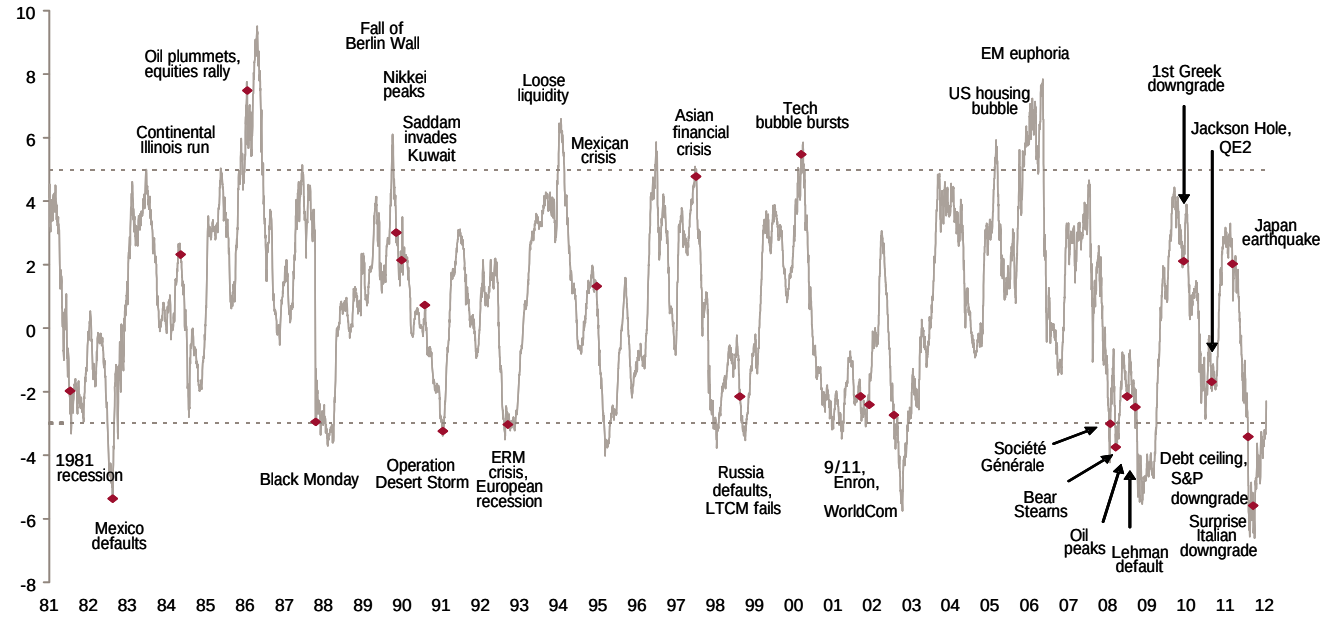


Figure 1 shows the entire available history of CS GRAI, (daily from 1981 where the period up to 1998 was reconstructed post facto), with many of the biggest market events of the last 30 years shown. It is worth pausing to examine the chart in detail, but even a quick glance shows how low values of the CS GRAI have been associated with significant negative shocks and high values with periods of very strong markets.

Overall, "euphorias" seem to be associated with sharp growth recoveries or late-cycle booms and asset bubbles, though occasionally with low growth and super-abundant liquidity. Panic signals appear to be associated with oil shocks, financial crises and cyclical troughs or recessions.

In many ways, the initial and final periods of the chart are the most interesting, since they are particularly rich with shocks and secular policy shifts (though some of the cleanest risk appetite investment signals come in the intervening period).

Our data set begins in the turbulent aftermath of the 1970s oil shocks and stagflation, when Paul Volcker committed the Fed to beating inflation. By 1982, the US (and global) economy were in deep recession and the Latin American debt crisis in full swing. And the CS GRAI was in deep panic. Meanwhile, reflecting a decade or more of economic turbulence, political upheaval and disappointing real returns, equity valuations were very cheap. Rapid monetary easing and the Reagan tax cuts and deregulation agenda promoted a powerful economic upswing in 1983/4, helping to spark off a secular bull market in equities that ran through to the peak of the tech bubble in March 2000, 17½ years later!

The first third of that bull run was especially eventful. The powerful US recovery soon led to an unprecedented combination of tight money and loose fiscal policy, pushing up real bond yields and attracting massive capital inflows – most notably from Japan, where liberalization of capital outflows had just taken place. Both the US dollar and the US trade deficit soared, leading ultimately to rising protectionist sentiment and the Plaza (1985) and Louvre accords (1987).

Yet the early 1980s recovery was also associated with surging supplies of non-OPEC oil output – following the dramatic spike in real oil prices over the previous decade. In late 1985, chronic cheating within OPEC had reduced Saudi Arabia's oil output to four million barrels a day and the Kingdom took drastic action to restore its market share. By early 1986, oil prices had plunged to USD 10 per barrel, a massive tax cut for oil consumers that helped push inflation towards multi-decadal lows and risk appetite to an all time record high.

This favorable income and supply shock saw bond and equity prices surge simultaneously, but the subsequent correction was quite mild and it was not until early 1987 that global growth surged again. At that point, bond yields spiked and equity markets rallied strongly again, pushing valuations versus bonds to highly overvalued territory and risk appetite back into euphoria. Several weeks later, we had the 1987 equity market crash (Black Monday) and a dramatic plunge into risk appetite panic.

So within the space of five years or so, we experienced an extended 3½ year up cycle in risk appetite, with one major dip as global growth slowed and the sixth largest bank in the USA (Continental Illinois) failed, followed by a correction and new euphoria that directly preceded a dramatic crash. This illustrates the interaction between risk appetite and growth (see next section), as well as

the influence of valuation and economic shocks. It also shows how risk appetite signals need to be combined with other levels of analysis for the purposes of investment.

Another extended upcycle in risk appetite began in October 2002 – immediately after the Enron and Worldcom scandals had helped drive risk appetite into deep panic once again, following the tech crash and recession of 2000 to 2001. Here it was the heady cocktail of easy money, a boom in China and the emerging markets, and the US housing bubble that drove the buoyant performance of equity, credit and commodity markets. But it also set up – with a considerable lag – the subsequent period of poor performance and rolling financial and economic shocks.

Indeed, there has been no euphoria signal for several years now, following those in 2005 and 2006. The latter was extended (nearly six months in length) and, with hindsight, foreshadowed the volatile period we are still in today.

2008 was a particularly active year, and while there was no recovery in CS GRAI during the year, there were four separate and timely signals. Panic was indicated in the week before Société Générale announced the liquidation of a rogue trader's portfolio. Again, panic was indicated in the week leading up to the purchase of Bear Stearns by JP Morgan. The third event occurred the day before AIG was supported by the US government. Soon after, for a fourth time, the index tipped into the longest and deepest panic yet recorded, lasting about six months.

At the moment, CS GRAI is in the process of recovering from the second-longest period of panic in the historical record. The index entered "panic" soon after the market fall in August and has only just exited "panic," after reaching the lowest recorded levels of CS GRAI (–6.61) during October at the peak of the Eurozone crisis.

Global growth and risk appetite

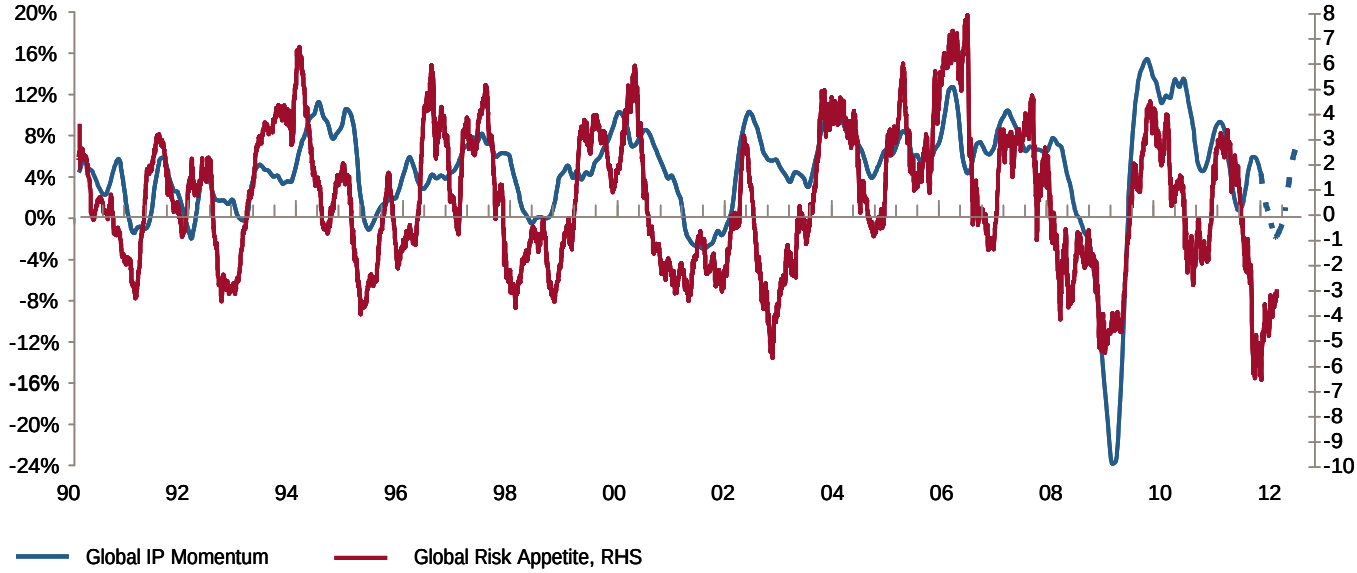
Despite the social and emotional bias common among investors, sentiment and fundamentals are seldom completely disconnected. This is evident from Figure 2, which plots risk appetite against growth momentum, measured using global industrial production. The growth momentum statistic shown is an annualized 3-month on 3-month rate of change. The chart shows how CS GRAI tends to trough slightly ahead or at the same time as global growth momentum. The relationship at peaks in growth momentum is slightly more complex, but similar. Intuitively one should expect equities to outperform bonds during periods when global growth is accelerating, and thus for risk appetite to be rising – and vice versa.

It is also evident that risk appetite more often than not "overshoots" the global growth cycle in both directions: investors tend to overweight more recent experiences and exhibit herd-like behavior. So it turns out that – most of the time – cycles in the CS GRAI are closely related to cycles in global growth momentum, and thus that sentiment is related to fundamentals, but with a tendency to overshoot at peaks and troughs in the cycle. This is a highly desirable characteristic for a measure of risk appetite, and makes it potentially more useful both as a macro-indicator and as an asset allocation tool. Even the occasional episodes of divergence between growth and risk appetite are instructive. The more extreme examples happen in the wake of financial shocks, when risk appetite falls more sharply than growth.

Figure 2

Global risk appetite and global industrial production momentum

Source: Thomson Reuters DataStream, Credit Suisse



Black Monday (1987), the Mexico Crisis (1994), the Asian and Russian crises of 1998, the WorldCom and Enron bankruptcies (2002), the European sovereign debt crises (2010 and 2011) are all examples of this, and are illustrated in Figure 3.

The European Crisis of 2011 is particularly interesting in that it helped to create the deepest panic recorded in the 31 years covered by our data sample, worse even than 2008. The fear of a disorderly and deeply dangerous break-up of the euro led to extreme out performance by the (shrinking) number of "safe" assets in the system, and to a sharp rise in "tail risk" hedging.

This occurred despite the fact that global growth was recovering from the Japanese earthquake shock at the time, and was nowhere near the extreme recession readings of 2008/9. Typically, in the wake of large financial shocks there is an equally – and if needed progressively large – policy response designed to neutralize any danger of systemic breakdown. Since most large shocks have negative short-term effects on growth the typical pattern is that risk appetite and growth re-converge via some combination of slower growth and recovering risk appetite, a pattern that has also been observed since October 2011.

Using CS GRAI as an investment tool: A contrarian indicator

Figure 4 shows a very simple and compelling chart of CS GRAI panics and euphorias marked upon a chart of the ratio of two total return indexes, namely MSCI EM and a US 7–10Y bond index. These assets are chosen to represent the two ends of the spectrum of risk in the assets underlying CS GRAI. This striking chart demonstrates effectively the utility of CS GRAI as a timing indicator of turning points in the relative performance of some equities and bond indexes. To be explicit, periods of euphoria precede the relative underperformance of MSCI EM, while periods of panic precede periods of outperformance.

The signals are neither perfect nor uniform: for example, some signals last several months before the turning point occurs, some merely signal a short-term correction in a larger trend, while others are associated with major turning points. As one might expect, risk appetite extremes cannot be used simplistically to time asset allocation decisions: rather they need to be incorporated into a broader analytical framework and investment system.

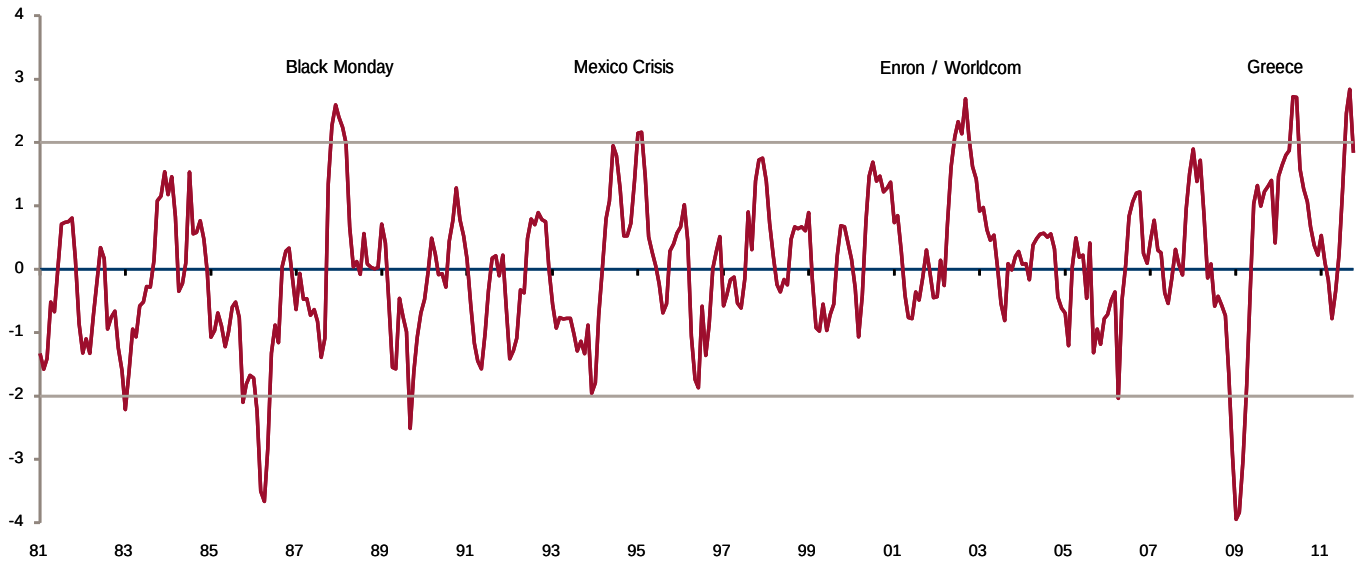
At the highest level, risk appetite signals are potentially most useful when euphoria or panic episodes are combined with (secular) valuation extremes and cyclical turning points in global growth. Notable examples of this are the deep panics of August 1982 and 2008/9, as well as the euphoria that accompanied the peak of the tech bubble in March 2000, when equities were arguably even more overvalued than in 1929 (it is worth noting that real returns for US equities between March 2000 and March 2009 were worse than in any other 9-year period, including the nine years from June 1923 to June 1932).

But experience since the index was first published in 1998 has shown that the CS GRAI and its relationship to the economic cycle is a useful tool for macro-analysis and investment decisions, when used within a disciplined framework.

Figure 3

Global industrial production minus global risk appetite

Source: Thomson Reuters DataStream, Credit Suisse



Conclusion

Risk appetite measures should never be used blindly or in isolation, but the Credit Suisse methodology has proved to be robust, is consistently linked to global growth and widely followed by investors and policymakers. Used appropriately, it can be a valuable resource for identifying potential turning points in financial markets and improving asset allocation decisions.

Note: The Global Strategy team within the CS Investment Bank calculates the CS GRAI on a daily basis, and makes it available to selected clients. Other risk appetite measures using similar methodology are also calculated for global equities, US and European investment grade credit, and for some government bond markets (duration risk appetite).

For more information on the suite of risk appetite indicators and their potential uses for asset allocation please contact Paul McGinnie.

The authors would like to thank Zhoufei Shi and Aimi Plant for their assistance in preparation of this document.

Figure 4

Ratio of MSCI EM to US 7–10Y Index with CS GRAI highlights

Source: Credit Suisse, DataStream: MSEMKF$(MSRI) & AUSGVG4(RI)

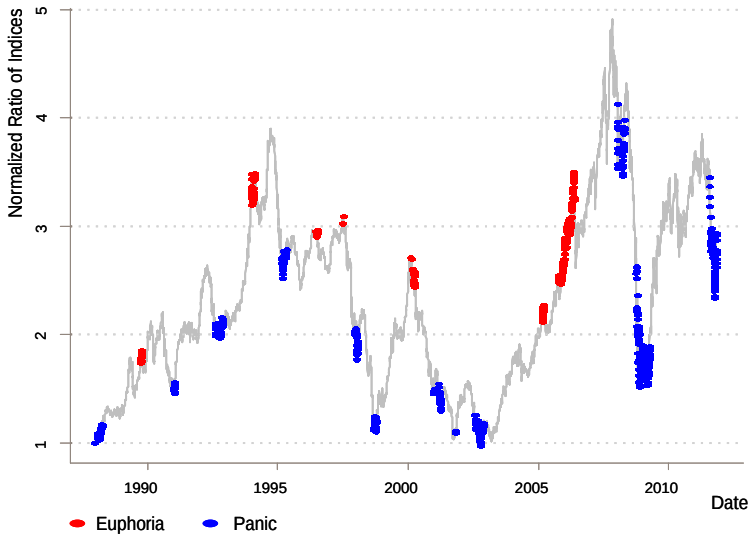
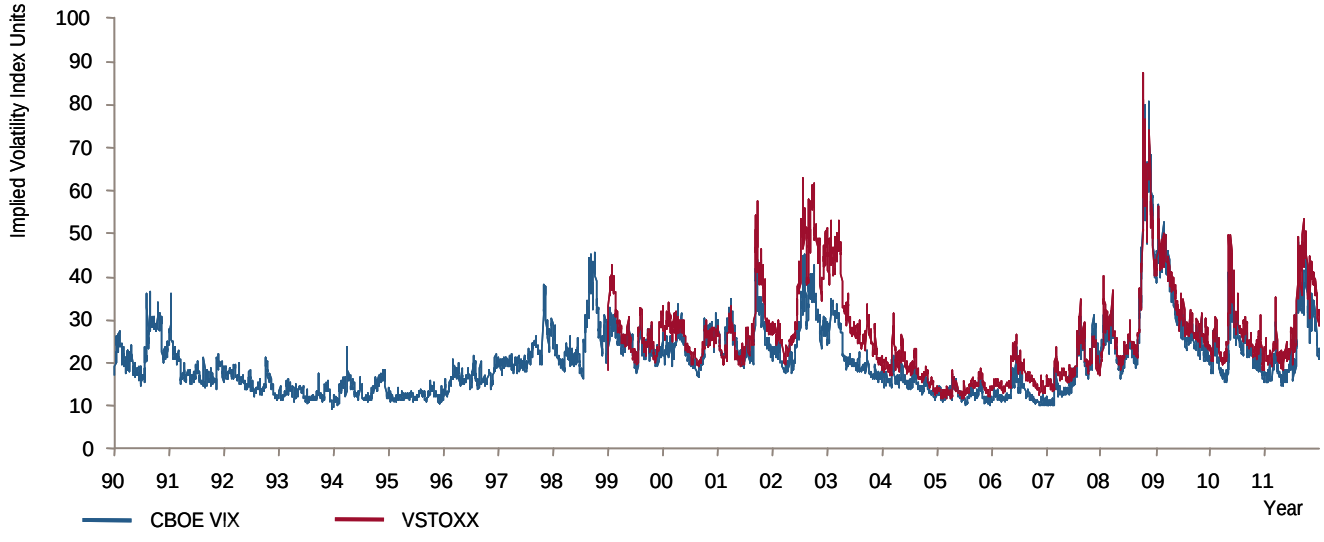


Figure 5

VIX and VSTOXX indexes

Source: the BLOOMBERG PROFESSIONAL™ service



Appendix

One obvious way to assess sentiment is to survey investors. Regular and consistent surveying enables through-time comparison of expectations, upon which investors might base their decisions. Observing these fluctuations can give useful insight into varying investor sentiment. However, such an approach is both expensive and subject to substantial uncertainty about the ongoing pertinence of any given question. Additionally, there are the usual problems with self-reporting of internal states.

Because of these problems, there has been a proliferation of arithmetical and statistical methods to measuring "investor sentiment." These are based upon the idea that the prices of the many available investable assets reveal more about aggregate investor preferences than could any feasible number of surveys. Basically, look at what investors do, not what they say.

While not exhaustive, these statistical methods of estimating "investor sentiment" fall into three general categories: (1) ad-hoc aggregates of relevant prices & price changes; (2) measures of volatility of prices; and (3) measures of orderliness in price co-movements.

The first of these "sentiment estimate" groups is based upon the insight that many risks have associated prices in financial markets, e.g. inflation and TIPS. Statistically combining several such indicators in an aggregate measure may then be useful in identifying extreme episodes, and many provide useful insights into the performance of particular sectors of the economy or certain classes of assets.

However, these aggregates also suffer from the general problem of ongoing relevance. For example FRA/OIS spreads only became commonly used in investor circles well into the 2008 credit crisis. This is merely a manifestation of the problem that the source of the next crisis or bubble period is unknown, probably unknowable.

Volatility

Another common method of assessing "sentiment" is to look at short-term variability, typically price volatility, rather than at price levels or rates of change. The basic insight here is that at times of stress, day-to-day market moves tend to be larger, elevating short-term and forward-looking measures of volatility. Also, since over-optimism is partly the subjective underestimation of objective risk, abnormally low (implied) volatility can be a symptom of complacency. Figure 5 shows the archetypal risk measures of this type – the VIX and VSTOXX indexes, whose family resemblance is quite uncanny, despite the underlying assets existing on different continents.

Figure 5 shows both the strengths and weaknesses of this type of indicator. It is clear that, at a significant number of major events in the past 20 years, there has been a doubling or more of these volatility indexes. However, the lead time of signals is often short, and the signal is sometimes merely contemporaneous with events. The range of the indexes varies widely through time, and so it is difficult to draw conclusions from a particular index level. Additionally, while low volatility may be an indicator of over-optimism, the period around 2000, a time of clear over-optimism, does not seem to demonstrate this. Furthermore, the actual periods of low volatility appear very extended, making precision about timing difficult.

Orderliness

A further indication of extreme market sentiment is found in certain forms of highly orderly market behavior. It is often noted that, at times of major market crises, "correlations tend to one" meaning that the systematic component of asset returns is dominant, and idiosyncratic risks are relatively small.

While the correlation of returns might be high in such circumstances, volatility still remains a distinguishing feature of asset performance. Hence, using simple CAPM-type considerations, returns should be more straightforwardly related to risk than at other times. At times of crisis, high-risk assets would thus have very low returns, and low-risk assets relatively high returns, with the opposite holding at times of over-enthusiasm.

Table 1 shows a simple example of such extreme orderliness. It shows the performance of various segments of the US Treasury yield curve in the last six months of 2011, as assessed by these CS US Government Bond indexes.

The ordering of risk and return is coincident and, moreover, Figure 6 shows that the relationship is almost linear. This suggests that the correlation of the risk and return vectors might act as a measure of orderliness, which appears to be borne out. Alternatively the correlation of the orders (the last two columns of the Table 1), the Spearman rank correlation is sometime utilized in this context. Figure 7 shows a more complex example of such an orderliness measure: the Spearman rank correlation of 6-month measures of risk and return for the CS GRAI assets. From this chart, it is clear that such correlation measures are able to successfully distinguish between periods of over- and under-optimism. Also, because it is bounded between –1 and +1, levels are more easily comparable across time. Unfortunately, the specific location in time of the peak or trough of sentiment is less clear as the measure spends long periods at extreme values, particularly in the period 2003–2007.

Calculating GRAI

CS GRAI is the slope of a cross-sectional, weighted, linear regression of a 6-month excess return measure (y-axis) on 12-month price variability (x-axis). This regression is estimated daily using rolling windows of data.

Currently, the returns of 64 country-based assets are used in the calculation. The constituents are broad equity and government bond indexes from developed countries and many of the more important and accessible emerging markets. These assets form a relatively continuous spectrum of risk from safer G3 bond indexes to riskier EM or peripheral European equity indexes. However, their positions along the risk spectrum do shift over time, but the 12-month calculation period ensures this is more gradual than the changes in return measures.

A weighting scheme is applied in the regression based upon the market capitalization and GDP of the countries of the respective assets. Thus the bond and equity indexes from the USA have a greater impact than those of Belgium.

The average observed value of CS GRAI has been around 1, and 1½ standard deviations is approximately 4. For convenience we call periods when the CS GRAI is abnormally high (above 5) "euphoria" and abnormally low periods (below minus 3) "panic."

The best of both worlds?

A regression coefficient, of which CS GRAI is an example, can be written can be written as

$$r_{x,y} = \mathrm{corr}(\mathrm{x},\mathrm{y})\frac{\sigma_y}{\sigma_x}$$

at least in the in the zero-mean, unweighted case. Here x, the vector of x-co-ordinates, measures risk, and y, the vector of y-co-ordinates, measures return.

σ_x is the standard deviation of elements of x.

Thus the regression coefficient is the product of an orderliness measure (the Kendal correlation of risk and return) and a ratio of dispersions of risk and return. By using slowly moving volatility measures in CS GRAI σ_x is much less variable than σ_y. This results in the regression coefficient being driven by σ_y which is closely related to the volatility measures described above.

This combination of volatility and orderliness helps CS GRAI to combine the advantages of orderliness measures (discrimination of high and low sentiment; through time comparability and a longer lead to signals) with the advantages of volatility measures (precise timing of events and clarity of signal).

Table 1

Risk and return in the US Treasury market

Source: Credit Suisse

	6M vol.	6M ret.	Vol. rank	Ret. Rank
US TBILLS	0.04%	0.04%	1	1
US TSY1-3Y	0.68%	0.74%	2	2
US TSY 3-5Y	2.86%	3.65%	3	3
US TSY 5-7Y	5.37%	7.28%	4	4
US TSY 7-10Y	8.77%	11.79%	5	5
US TSY >10Y	21.32%	27.25%	6	6

Figure 6

Risk and return in the US Treasury market

Source: Credit Suisse

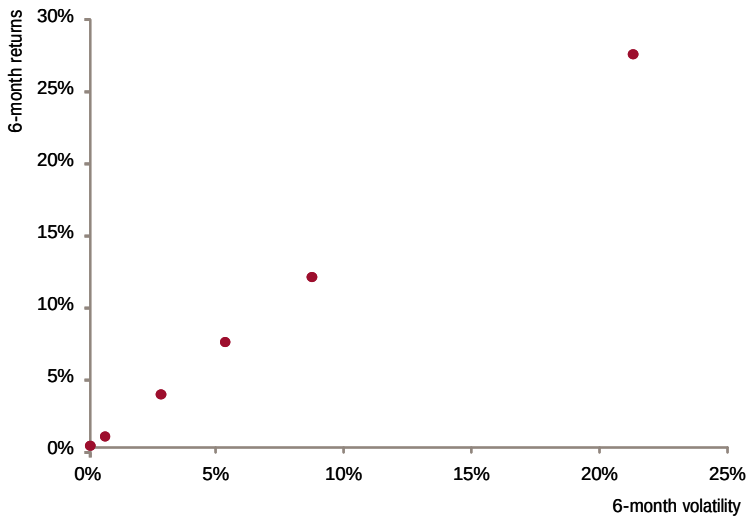


Figure 7

Spearman rank correlation

Source: Credit Suisse

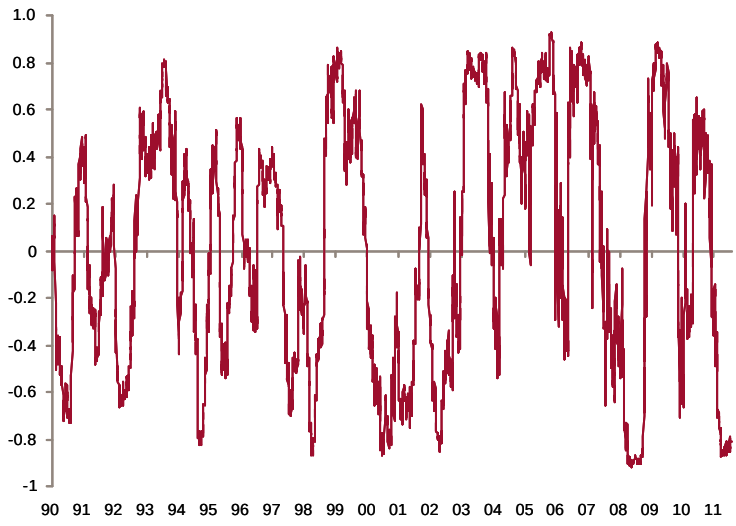


PHOTO: FOTOLIA.COM/TOM

Guide to the country profiles

Individual markets

The Credit Suisse Global Investment Returns Yearbook covers 19 countries and three regions, all with index series that start in 1900. Figure 1 shows the relative sizes of world equity markets at our base date of end-1899. Figure 2 shows how they had changed by end-2011. Markets that are not included in the Yearbook dataset are colored in black. As these pie charts show, the Yearbook covered 89% of the world equity market in 1900 and 85% by end-2011.

In the country pages that follow, there are three charts for each country or region. The upper chart reports, for the last 112 years, the real value of an initial investment in equities, long-term government bonds, and Treasury bills, all with income reinvested. The middle chart reports the annualized premium achieved by equities relative to bonds and to bills, measured over the last decade, quarter-century, half-century, and full 112 years. The bottom chart compares the 112-year annualized real returns, nominal returns, and standard deviation of real returns for equities, bonds, and bills.

The country pages provide data for 19 countries, listed alphabetically starting on the next page, and followed by three broad regional groupings. The latter are a 19-country world equity index denominated in USD, an analogous 18-country world ex-US equity index, and an analogous 13-country European equity index. All equity indexes are weighted by market capitalization (or, in years before capitalizations were available, by GDP). We also compute bond indexes for the world, world ex-US and Europe, with countries weighted by GDP.

Extensive additional information is available in the Credit Suisse Global Investment Returns Sourcebook 2012. This 200-page reference book, which is available through London Business School, also contains bibliographic information on the data sources for each country. The underlying data are available through Morningstar Inc.

The Yearbook's global coverage

The Yearbook contains annual returns on stocks, bonds, bills, inflation, and currencies for 19 countries from 1900 to 2011. The countries comprise two North American nations (Canada and the USA), eight euro-currency area states (Belgium, Finland, France, Germany, Ireland, Italy, the Netherlands, and Spain), five European markets that are outside the euro area (Denmark, Norway, Sweden, Switzerland, and the UK), three Asia-Pacific countries (Australia, Japan, and New Zealand), and one African market (South Africa). These countries covered 89% of the global stock market in 1900, and 85% of its market capitalization by the start of 2012.

Figure 1

Relative sizes of world stock markets, end-1899

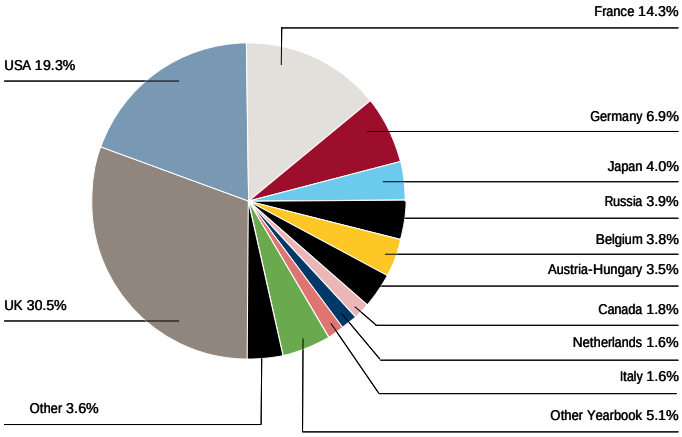
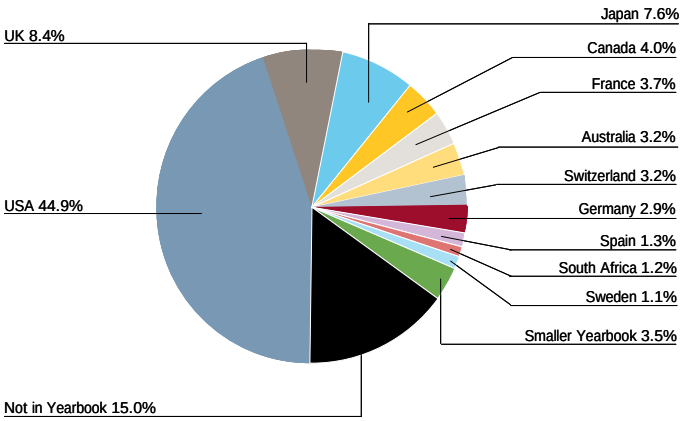


Figure 2

Relative sizes of world stock markets, end-2011



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.

Data sources

1. Dimson, E., P. R. Marsh and M. Staunton, 2002, Triumph of the Optimists, NJ: Princeton University Press
2. Dimson, E., P. R. Marsh and M. Staunton, 2007, The worldwide equity premium: a smaller puzzle, R Mehra (Ed.) The Handbook of the Equity Risk Premium, Amsterdam: Elsevier
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4. Dimson, E., P. R. Marsh and M. Staunton, 2012, The Dimson-Marsh-Staunton Global Investment Returns Database, Morningstar Inc. (the "DMS" data module)

Australia

The lucky country

Australia is often described as “The Lucky Country” with reference to its natural resources, prosperity, weather, and distance from problems elsewhere in the world. But maybe Australians make their own luck: in 2011, The Heritage Foundation ranked Australia as the country with the highest economic freedom in the world, beaten only by a couple of city-states that also score highly. Whether it is down to luck or good economic management, Australia has been the best-performing equity market over the 112 years since 1900, with a real return of 7.2% per year.

The Australian Securities Exchange (ASX) has its origins in six separate exchanges, established as early as 1861 in Melbourne and 1871 in Sydney, well before the federation of the Australian colonies to form the Commonwealth of Australia in 1901. The ASX is now the world’s sixth-largest stock exchange. Half the index is represented by banks (29%) and mining (21%), while the largest stocks at the start of 2012 are BHP Billiton, Commonwealth Bank of Australia, and Westpac.

Australia also has a significant government and corporate bond market, and is home to the largest financial futures and options exchange in the Asia-Pacific region. Sydney is a major global financial center.

Capital market returns for Australia

Figure 1 shows that, over the last 112 years, the real value of equities, with income reinvested, grew by a factor of 2475.2 as compared to 5.8 for bonds and 2.2 for bills. Figure 2 shows that, since 1900, equities beat bonds by 5.6% and bills by 6.5% per year. Figure 3 shows that the long-term real return on Australian equities was an annualized 7.2% as compared to bonds and bills, which gave a real return of 1.6% and 0.7% respectively. For additional explanations of these figures, see page 37.

Figure 1

Annualized performance from 1900 to 2011

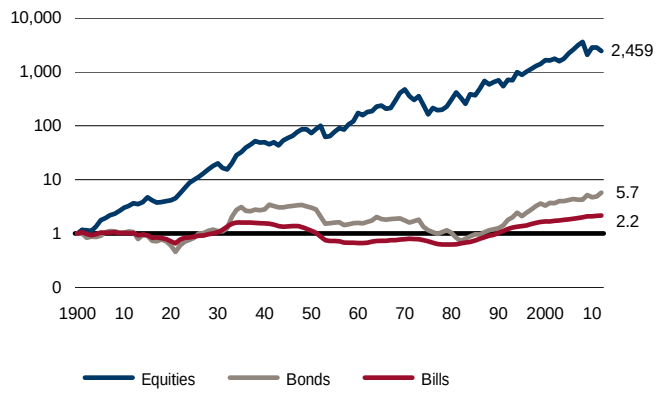


Figure 2

Equity risk premium over 10 to 112 years

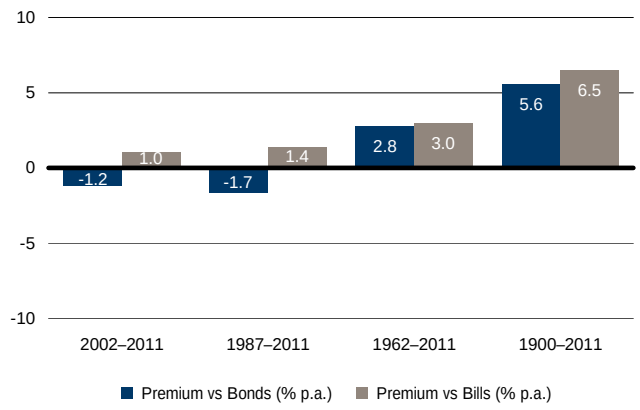
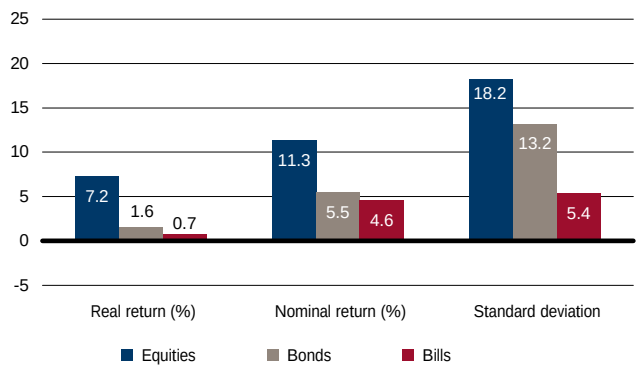


Figure 3

Returns and risk of major asset classes since 1900



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.

Belgium

At the heart of Europe

Belgium lies at the crossroads of Europe's economic backbone and its key transport and trade corridors, and is the headquarters of the European Union. In 2011, Belgium was ranked the most globalized of the 208 countries that are evaluated by the KOF Index of Globalization.

Belgium's strategic location has been a mixed blessing, making it a major battleground in two world wars. The ravages of war and attendant high inflation rates are an important contributory factor to its poor long-run investment returns – Belgium has been one of the two worst-performing equity markets and the sixth worst performing bond market.

The Brussels stock exchange was established in 1801 under French Napoleonic rule. Brussels rapidly grew into a major financial center, specializing during the early 20th century in tramways and urban transport.

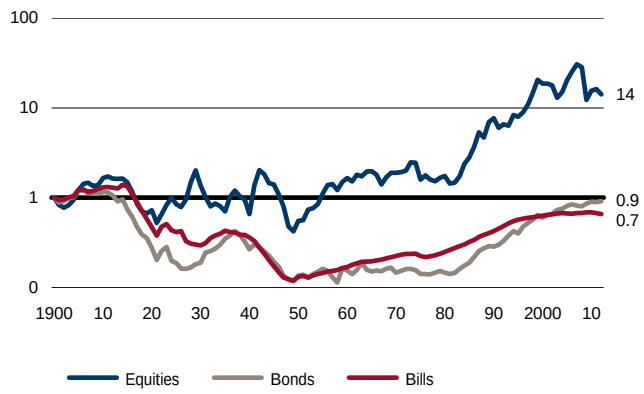
Its importance has gradually declined, and Euronext Brussels suffered badly during the recent banking crisis. Three large banks made up a majority of its market capitalization at start-2008, but the banking sector now represents under 3% of the index. At the start of 2012, more than half of the index was invested in just two companies: Anheuser-Busch (51%) and UCB Cap (6%).

Capital market returns for Belgium

Figure 1 shows that, over the last 112 years, the real value of equities, with income reinvested, grew by a factor of 14.1 as compared to 0.9 for bonds and 0.7 for bills. Figure 2 shows that, since 1900, equities beat bonds by 2.5% and bills by 2.8% per year. Figure 3 shows that the long-term real return on Belgium equities was an annualized 2.4% as compared to bonds and bills, which gave a real return of –0.1% and –0.4% respectively. For additional explanations of these figures, see page 37.

Figure 1

Annualized performance from 1900 to 2011



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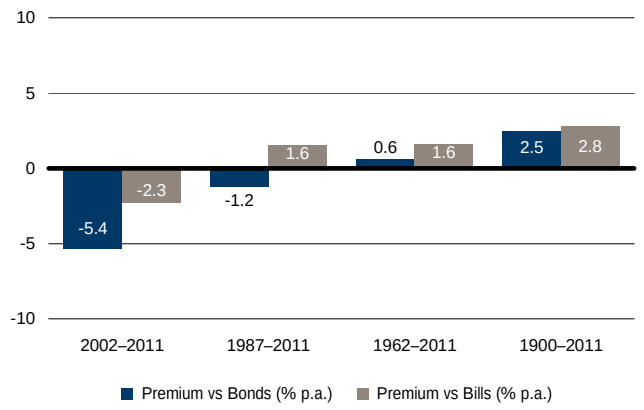
Equity risk premium over 10 to 112 years



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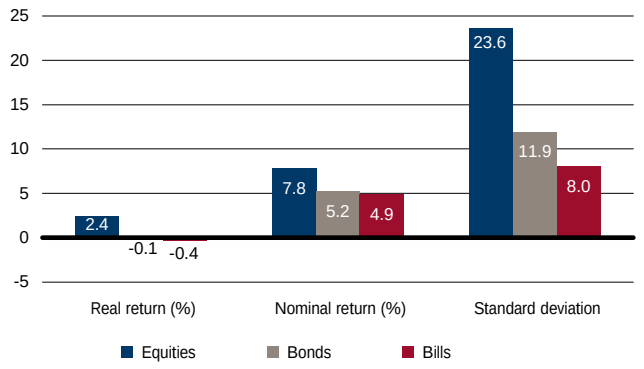


Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.

Canada

Resourceful country

Canada is the world's second-largest country by land mass (after Russia), and its economy is the tenth-largest. As a brand, it is rated number one out of 110 countries monitored in the latest Country Brand Index. It is blessed with natural resources, having the world's second-largest oil reserves, while its mines are leading producers of nickel, gold, diamonds, uranium and lead. It is also a major exporter of soft commodities, especially grains and wheat, as well as lumber, pulp and paper.

The Canadian equity market dates back to the opening of the Toronto Stock Exchange in 1861 and is the world's fourth-largest, accounting for 4.0% of world capitalization. Canada also has the world's eighth-largest bond market.

Given Canada's natural endowment, it is no surprise that oil and gas and mining stocks have a 26% weighting in its equity market, while a further 35% is accounted for by financials. The largest stocks are currently Royal Bank of Canada, Toronto-Dominion Bank and Suncor Energy.

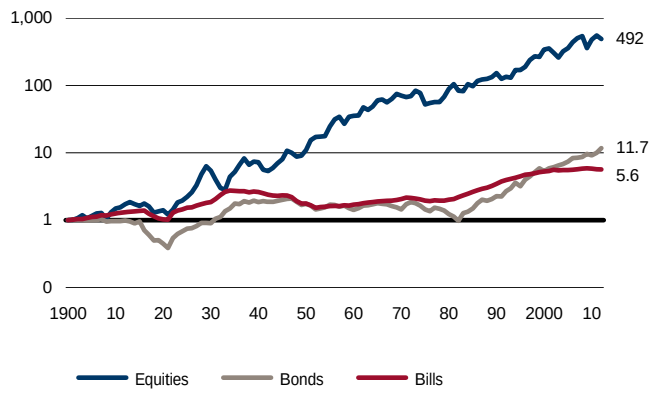
Canadian equities have performed well over the long run, with a real return of 5.7% per year. The real return on bonds has been 2.2% per year. These figures are close to those for the United States.

Capital market returns for Canada

Figure 1 shows that, over the last 112 years, the real value of equities, with income reinvested, grew by a factor of 491.6 as compared to 11.7 for bonds and 5.6 for bills. Figure 2 shows that, since 1900, equities beat bonds by 3.4% and bills by 4.1% per year. Figure 3 shows that the long-term real return on Canadian equities was an annualized 5.7% as compared to bonds and bills, which gave a real return of 2.2% and 1.6% respectively. For additional explanations of these figures, see page 37.

Figure 1

Annualized performance from 1900 to 2011



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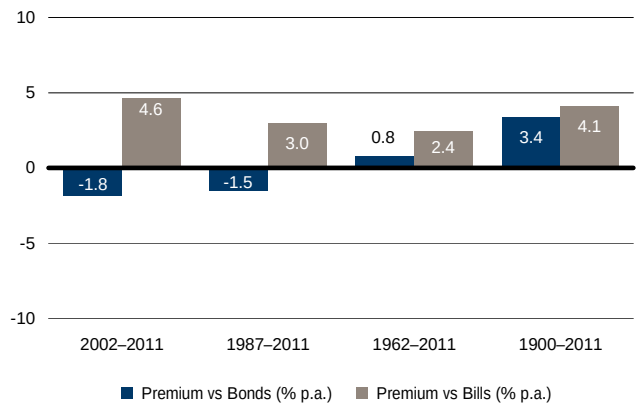

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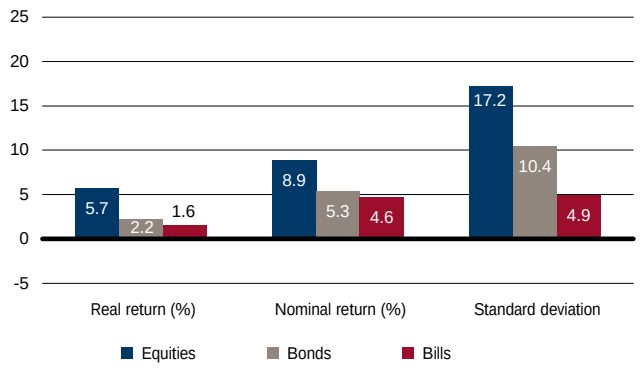


Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.

Denmark

Happiest nation

In a 2011 meta-survey published by the National Bureau of Economic Research, Denmark was ranked the happiest nation on earth, closely followed by Sweden, Switzerland, and Norway.

Whatever the source of Danish happiness, it does not appear to spring from outstanding equity returns. Since 1900, Danish equities have given an annualized real return of 4.9%, which, while respectable, is below the world return of 5.4%.

In contrast, Danish bonds gave an annualized real return of 3.2%, the highest among the Yearbook countries. This is because our Danish bond returns, unlike those for the other 18 countries, include an element of credit risk. The returns are taken from a study by Claus Parum, who felt it was more appropriate to use mortgage bonds, rather than more thinly traded government bonds.

The Copenhagen Stock Exchange was formally established in 1808, but can trace its roots back to the late 17th century. The Danish equity market is relatively small. It has a high weighting in healthcare (61%) and industrials (19%), and the largest stocks listed in Copenhagen are Novo-Nordisk, Danske Bank, and AP Moller-Maersk.

Capital market returns for Denmark

Figure 1 shows that, over the last 112 years, the real value of equities, with income reinvested, grew by a factor of 202.1 as compared to 33.2 for bonds and 11.4 for bills. Figure 2 shows that, since 1900, equities beat bonds by 1.6% and bills by 2.6% per year. Figure 3 shows that the long-term real return on Danish equities was an annualized 4.9% as compared to bonds and bills, which gave a real return of 3.2% and 2.2% respectively. For additional explanations of these figures, see page 37.

Figure 1

Annualized performance from 1900 to 2011

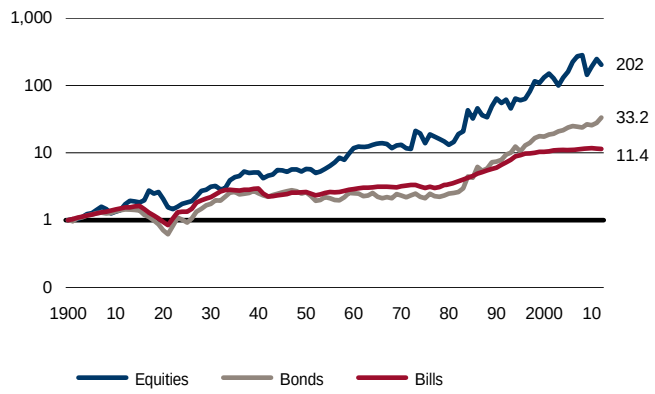


Figure 2

Equity risk premium over 10 to 112 years

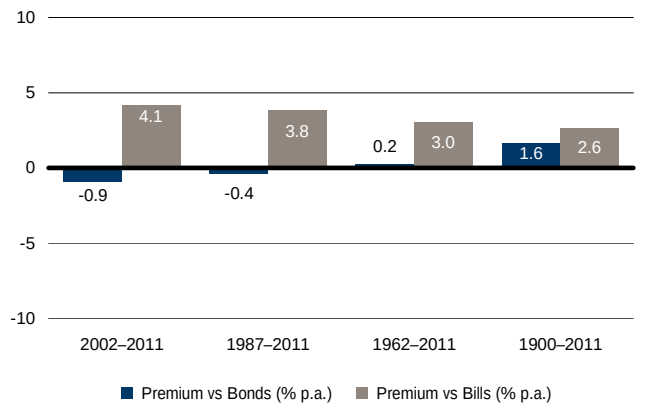
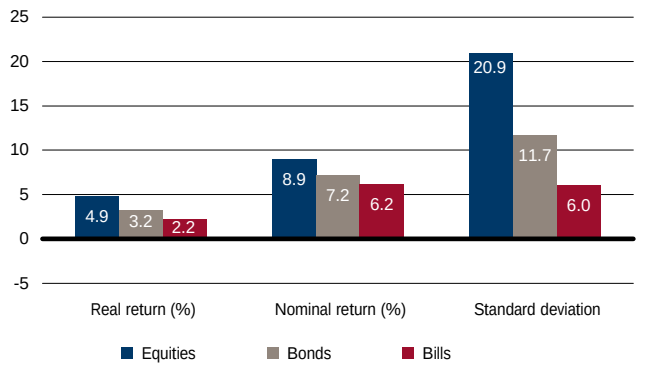


Figure 3

Returns and risk of major asset classes since 1900



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.

Finland

East meets West

With its proximity to the Baltic and Russia, Finland is a meeting place for Eastern and Western European cultures. This country of snow, swamps and forests – one of Europe's most sparsely populated nations – was part of the Kingdom of Sweden until sovereignty transferred in 1809 to the Russian Empire. In 1917, Finland became an independent country.

Newsweek magazine ranks Finland as the best country to live in the whole world in its August 2010 survey of education, health, quality of life, economic competitiveness, and political environment of 100 countries. A member of the European Union since 1995, Finland is the only Nordic state in the euro currency area.

The Finns have transformed their country from a farm and forest-based community to a diversified industrial economy operating on free-market principles. The OECD ranks Finnish schooling as the best in the world. Per capita income is among the highest in Western Europe.

Finland excels in high-tech exports. It is home to Nokia, the world's largest manufacturer of mobile telephones, which has been rated the most valuable global brand outside the USA. Forestry, an important export earner, provides a secondary occupation for the rural population.

Finnish securities were initially traded over-the-counter or overseas, and trading began at the Helsinki Stock Exchange in 1912. Since 2003, the Helsinki exchange has been part of the OMX family of Nordic markets. At its peak, Nokia represented 72% of the value-weighted HEX All Shares Index, and Finland is a highly concentrated stock market. The largest Finnish companies are currently Nokia (23% of the market), Sampo, and Fortum.

Capital market returns for Finland

Figure 1 shows that, over the last 112 years, the real value of equities, with income reinvested, grew by a factor of 237.5 as compared to 0.8 for bonds and 0.6 for bills. Figure 2 shows that, since 1900, equities beat bonds by 5.2% and bills by 5.5% per year. Figure 3 shows that the long-term real return on Finnish equities was an annualized 5.0% as compared to bonds and bills, which gave a real return of –0.2% and –0.5% respectively. For additional explanations of these figures, see page 37.

Figure 1

Annualized performance from 1900 to 2011

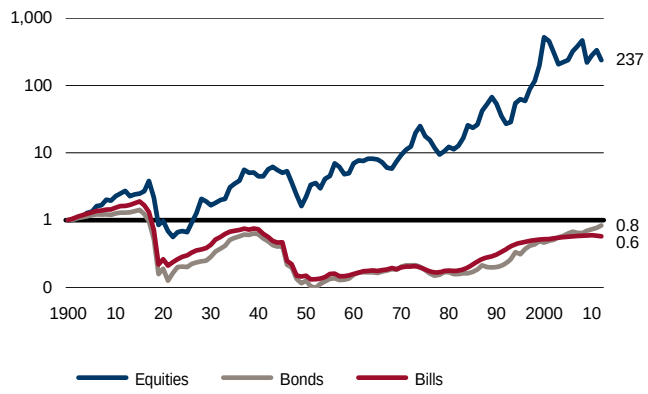


Figure 2

Equity risk premium over 10 to 112 years

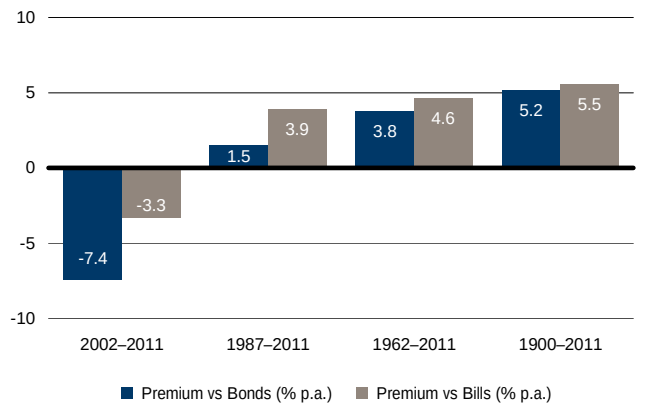
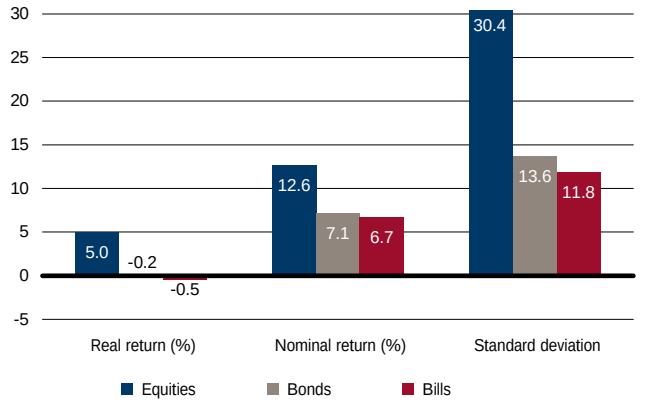


Figure 3

Returns and risk of major asset classes since 1900



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.

France

European center

Paris and London competed vigorously as financial centers in the 19th century. After the Franco-Prussian War in 1870, London achieved domination. But Paris remained important, especially, to its later disadvantage, in loans to Russia and the Mediterranean region, including the Ottoman Empire. As Kindelberger, the economic historian put it, "London was a world financial center; Paris was a European financial center."

Paris has continued to be an important financial center while France has remained at the center of Europe, being a founder member of the European Union and the euro. France is Europe's second-largest economy. It has the largest equity market in Continental Europe, ranked fifth in the world, and the third-largest bond market in the world. At the start of 2012, France's largest listed companies were Total, Sanofi-Aventis, and LVMH.

Long-run French asset returns have been disappointing. France ranks 16th out of the 19 Yearbook countries for equity performance, 15th for bonds and 18th for bills. It has had the third-highest inflation, hence the poor fixed income returns. However, the inflationary episodes and poor performance date back to the first half of the 20th century and are linked to the world wars. Since 1950, French equities have achieved mid-ranking returns.

Capital market returns for France

Figure 1 shows that, over the last 112 years, the real value of equities, with income reinvested, grew by a factor of 23.7 as compared to 0.9 for bonds and 0.04 for bills. Figure 2 shows that, since 1900, equities beat bonds by 3.0% and bills by 5.9% per year. Figure 3 shows that the long-term real return on French equities was an annualized 2.9% as compared to bonds and bills, which gave a real return of –0.1% and –2.8% respectively. For additional explanations of these figures, see page 37.

Figure 1

Annualized performance from 1900 to 2011

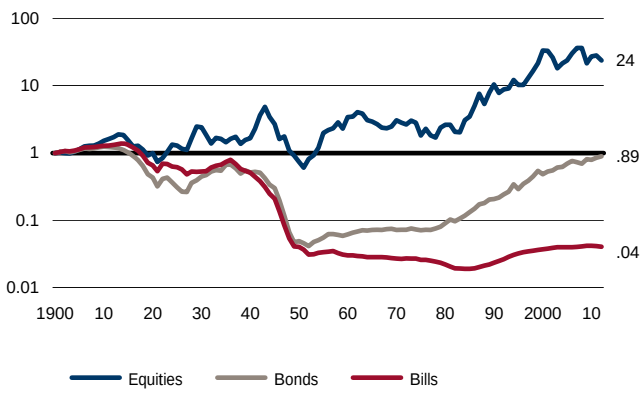


Figure 2

Equity risk premium over 10 to 112 years

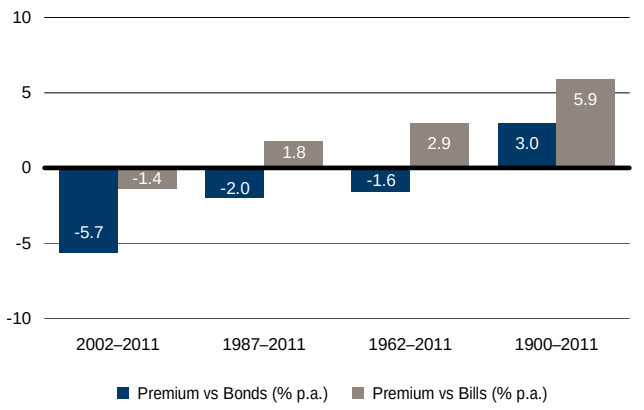
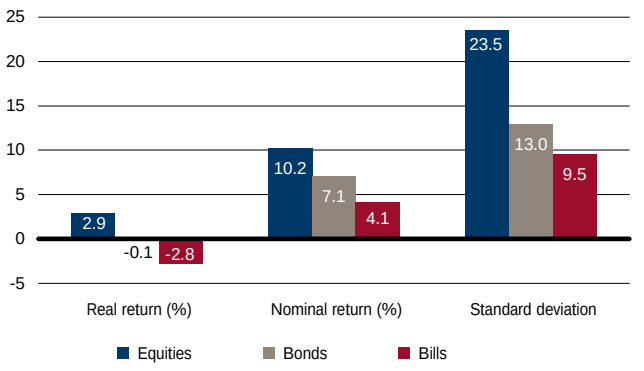


Figure 3

Returns and risk of major asset classes since 1900



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.

Germany

Locomotive of Europe

German capital market history changed radically after World War II. In the first half of the 20th century, German equities lost two-thirds of their value in World War I. In the hyperinflation of 1922–23, inflation hit 209 billion percent, and holders of fixed income securities were wiped out. In World War II and its immediate aftermath, equities fell by 88% in real terms, while bonds fell by 91%.

There was then a remarkable transformation. In the early stages of its "economic miracle," German equities rose by 4,094% in real terms from 1949 to 1959. Germany rapidly became known as the "locomotive of Europe." Meanwhile, it built a reputation for fiscal and monetary prudence. From 1949 to date, it has enjoyed the world's lowest inflation rate, its strongest currency (now the euro), and the second best-performing bond market.

Today, Germany is Europe's largest economy. Formerly the world's top exporter, it has now been overtaken by China. Its stock market, which dates back to 1685, ranks eight in the world by size, while its bond market is the world's sixth-largest.

The German stock market retains its bias towards manufacturing, with weightings of 20% in basic materials, 19% in consumer goods, and 18% in industrials. The largest stocks are Siemens, BASF, Beyer, and SAP.

Capital market returns for Germany

Figure 1 shows that, over the last 112 years, the real value of equities, with income reinvested, grew by a factor of 23.6 as compared to 0.14 for bonds and 0.07 for bills. Figure 2 shows that, since 1900, equities beat bonds by 5.1% and bills by 5.7% per year. Figure 3 shows that the long-term real return on German equities was an annualized 2.9% as compared to bonds and bills, which gave a real return of –1.8% and –2.4% respectively. The bond and bill series are rebased after1923. For additional explanations of these figures, see page 37.

Figure 1

Annualized performance from 1900 to 2011

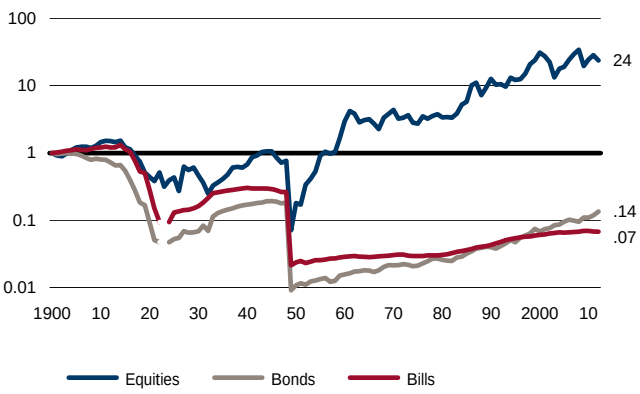


Figure 2

Equity risk premium over 10 to 112 years

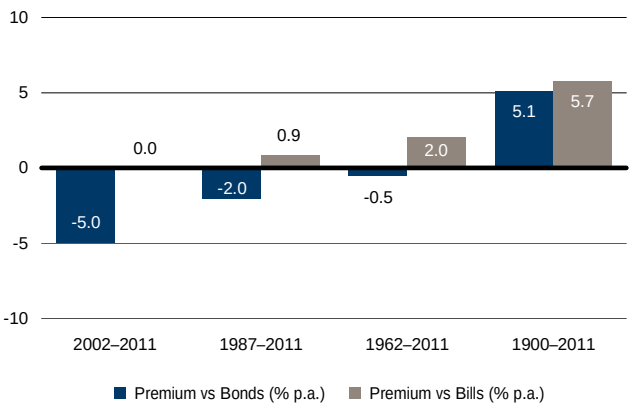
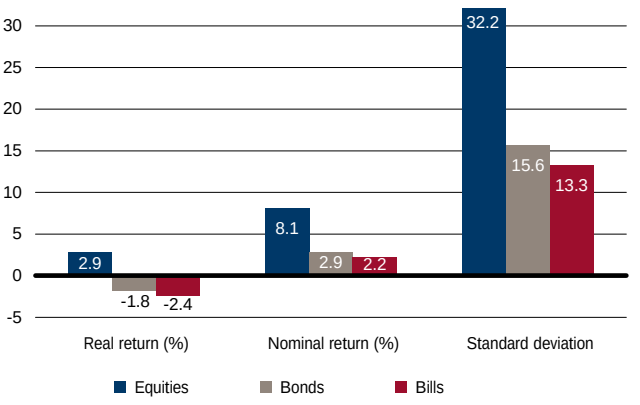


Figure 3

Returns and risk of major asset classes since 1900



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.

Ireland

Born free

Ireland was born as an independent country in 1922 as the Irish Free State, free at last after 700 years of Norman and later British involvement and control. By the 1990s and early 2000s, Ireland experienced great economic success and became known as the Celtic Tiger. The financial crisis changed that, and the country is now facing hardship. Just as the Born Free Foundation aims to free tigers from being held captive in zoos, Ireland now needs to be saved from being a captive of the economic system.

By 2007, Ireland had become the world's fifth-richest country in terms of GDP per capita, the second-richest in the EU, and was experiencing net immigration. Over the period 1987–2006, Ireland had the second-highest real equity return of any Yearbook country. The country is one of the smallest Yearbook markets, and sadly, it has shrunk since 2006. Too much of the market boom was based on real estate, financials and leverage, and Irish stocks are now worth only one-third of their value at the end of 2006. At that date, the Irish market had a 57% weighting in financials, but by the beginning of 2012 they were no longer represented. The captive tiger now has a smaller bite.

Though Ireland gained its independence in 1922, stock exchanges had existed from 1793 in Dublin and Cork. In order to monitor Irish stocks from 1900, we constructed an index for Ireland based on stocks traded on these two exchanges. In the period following independence, economic growth and stock market performance were weak, and during the 1950s the country experienced large-scale emigration. Ireland joined the European Union in 1973, and from 1987 the economy improved. It switched its currency from the punt to the euro in January 2002, and all investment returns reflect the start-2002 currency conversion factor.

Capital market returns for Ireland

Figure 1 shows that, over the last 112 years, the real value of equities, with income reinvested, grew by a factor of 59.9 as compared to 2.8 for bonds and 2.1 for bills. Figure 2 shows that, since 1900, equities beat bonds by 2.8% and bills by 3.0% per year. Figure 3 shows that the long-term real return on Irish equities was an annualized 3.7% as compared to bonds and bills, which gave a real return of 0.9% and 0.7% respectively. For additional explanations of these figures, see page 37.

Figure 1

Annualized performance from 1900 to 2011

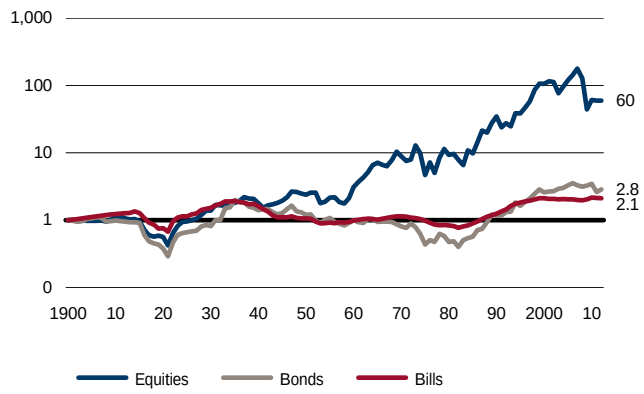


Figure 2

Equity risk premium over 10 to 112 years

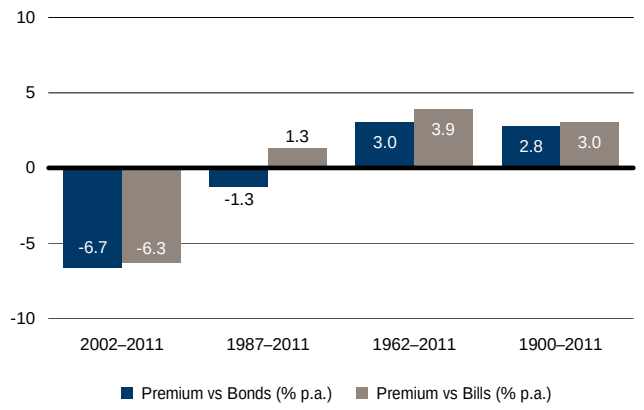
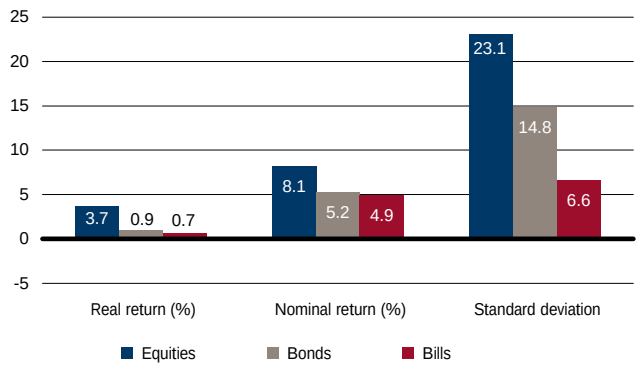


Figure 3

Returns and risk of major asset classes since 1900



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.

Italy

Banking innovators

While banking can trace its roots back to Biblical times, Italy can claim a key role in the early development of modern banking. North Italian bankers, including the Medici, dominated lending and trade financing throughout Europe in the Middle Ages. These bankers were known as Lombards, a name that was then synonymous with Italians. Indeed, banking takes its name from the Italian word “banca," the bench on which the Lombards used to sit to transact their business.

Italy retains a large banking sector to this day, with financials still accounting for 28% of the Italian equity market. Oil and gas accounts for a further 28%, and the largest stocks traded on the Milan Stock Exchange are Eni, Enel, and Generali.

Sadly, Italy has experienced some of the poorest asset returns of any Yearbook country. Since 1900, the annualized real return from equities has been 1.7%, the lowest return out of 19 countries. Apart from Germany, with its post-World War I and post-World War II hyperinflations, Italy has experienced the second-worst real bond and worst bill returns of any Yearbook country, and the highest inflation rate and weakest currency.

Today, Italy’s stock market is the world’s 19th largest, but its highly developed bond market is the world’s fourth-largest. Italians are now focused on the implications of the Eurozone debt crisis.

Capital market returns for Italy

Figure 1 shows that, over the last 112 years, the real value of equities, with income reinvested, grew by a factor of 6.5 as compared to 0.1 for bonds and 0.0 for bills. Figure 2 shows that, since 1900, equities beat bonds by 3.5% and bills by 5.5% per year. Figure 3 shows that the long-term real return on Italian equities was an annualized 1.7% as compared to bonds and bills, which gave a real return of –1.7% and –3.6% respectively. For additional explanations of these figures, see page 37.

Figure 1

Annualized performance from 1900 to 2011

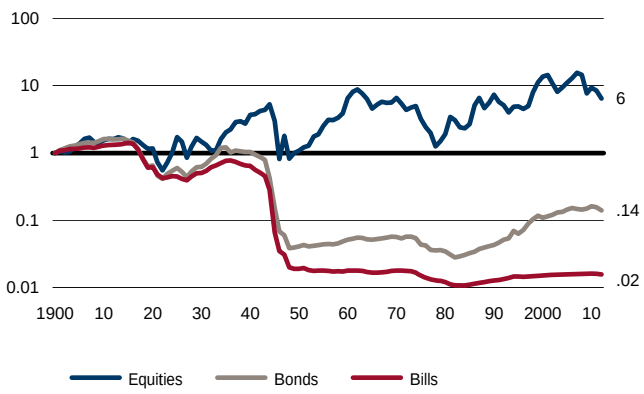


Figure 2

Equity risk premium over 10 to 112 years

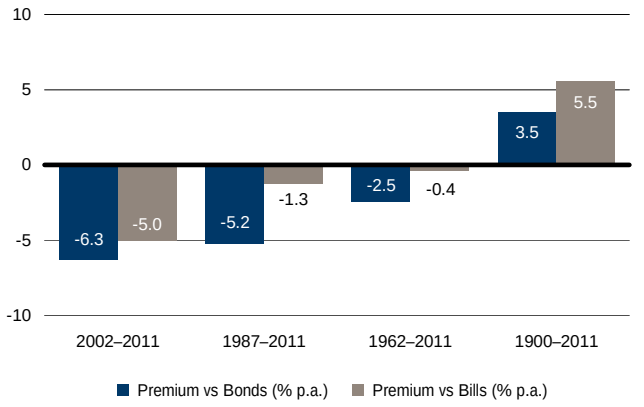
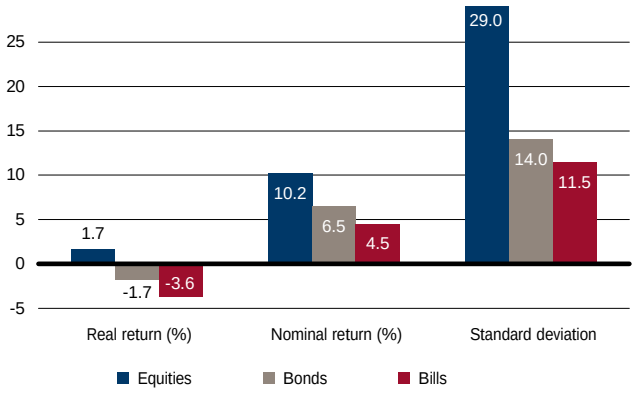


Figure 3

Returns and risk of major asset classes since 1900



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.

Japan

Birthplace of futures

Japan has a long heritage in financial markets. Trading in rice futures had been initiated around 1730 in Osaka, which created its stock exchange in 1878. Osaka was to become the leading derivatives exchange in Japan (and the world's largest futures market in 1990 and 1991) while the Tokyo stock exchange, also founded in 1878, was to become the leading market for spot trading.

From 1900 to 1939, Japan was the world's second-best equity performer. But World War II was disastrous and Japanese stocks lost 96% of their real value. From 1949 to 1959, Japan's "economic miracle" began and equities gave a real return of 1,565%. With one or two setbacks, equities kept rising for another 30 years.

By the start of the 1990s, the Japanese equity market was the largest in the world, with a 40% weighting in the world index versus 32% for the USA. Real estate values were also riding high and it was alleged that the grounds of the Imperial palace in Tokyo were worth more than the entire State of California.

Then the bubble burst. From 1990 to the start of 2009, Japan was the worst-performing stock market. At the start of 2012 its capital value is still only one-third of its value at the beginning of the 1990s. Its weighting in the world index fell from 40% to 8%. Meanwhile, Japan suffered a prolonged period of stagnation, banking crises and deflation. Hopefully, this will not form the blueprint for other countries that are hoping to emerge from their own financial crises.

Despite the fallout from the bursting of the asset bubble, Japan remains a major economic power. It has the world's third-largest equity market as well as its second-biggest bond market. It is a world leader in technology, automobiles, electronics, machinery and robotics, and this is reflected in the composition of its equity market.

Capital market returns for Japan

Figure 1 shows that, over the last 112 years, the real value of equities, with income reinvested, grew by a factor of 53.5 as compared to 0.3 for bonds and 0.1 for bills. Figure 2 shows that, since 1900, equities beat bonds by 4.7% and bills by 5.6% per year. Figure 3 shows that the long-term real return on Japanese equities was an annualized 3.6% as compared to bonds and bills, which gave a real return of –1.1% and –1.9% respectively. For additional explanations of these figures, see page 37.

Figure 1

Annualized performance from 1900 to 2011

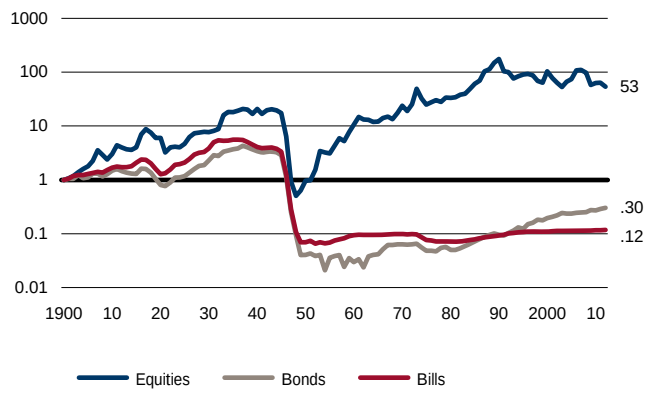


Figure 2

Equity risk premium over 10 to 112 years

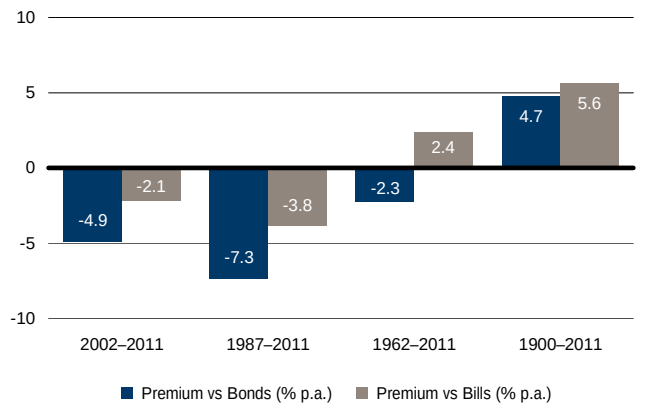
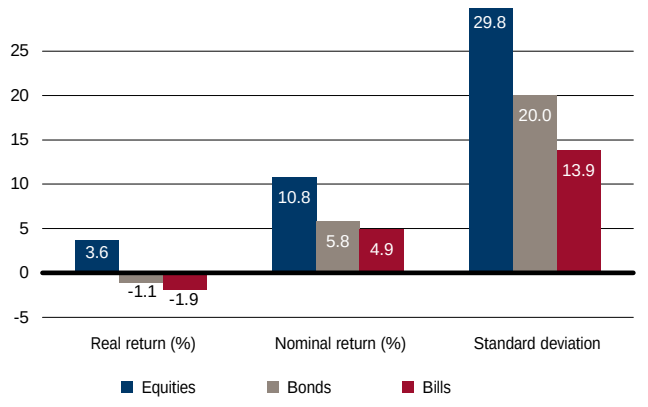
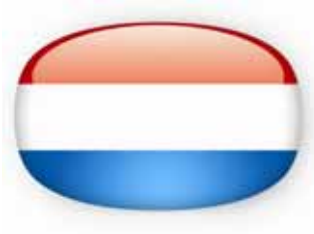


Figure 3

Returns and risk of major asset classes since 1900



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.



Netherlands

Exchange pioneer

Although some forms of stock trading occurred in Roman times, organized trading did not take place until transferable securities appeared in the 17th century. The Amsterdam market, which started in 1611, was the world's main center of stock trading in the 17th and 18th centuries. A book written in 1688 by a Spaniard living in Amsterdam (appropriately entitled Confusion de Confusiones) describes the amazingly diverse tactics used by investors. Even though only one stock was traded – the Dutch East India Company – they had bulls, bears, panics, bubbles and other features of modern exchanges.

The Amsterdam Exchange continues to prosper today as part of Euronext. Over the years, Dutch equities have generated a mid-ranking real return of 4.8% per year. The Netherlands also has a significant bond market, which is the world's 13th-largest. The Netherlands has traditionally been a low inflation country and, since 1900, has enjoyed the second-lowest inflation rate among the Yearbook countries (after Switzerland).

The Netherlands has a prosperous open economy. The largest energy company in the world, Royal Dutch Shell, now has its primary listing in London and a secondary listing in Amsterdam. But the Amsterdam Exchange still hosts more than its share of major multinationals, including Unilever, ArcelorMittal, ING Group, and Phillips.

Capital market returns for the Netherlands

Figure 1 shows that, over the last 112 years, the real value of equities, with income reinvested, grew by a factor of 193.2 as compared to 5.4 for bonds and 2.1 for bills. Figure 2 shows that, since 1900, equities beat bonds by 3.3% and bills by 4.1% per year. Figure 3 shows that the long-term real return on Dutch equities was an annualized 4.8% as compared to bonds and bills, which gave a real return of 1.5% and 0.7% respectively. For additional explanations of these figures, see page 37.

Figure 1

Annualized performance from 1900 to 2011

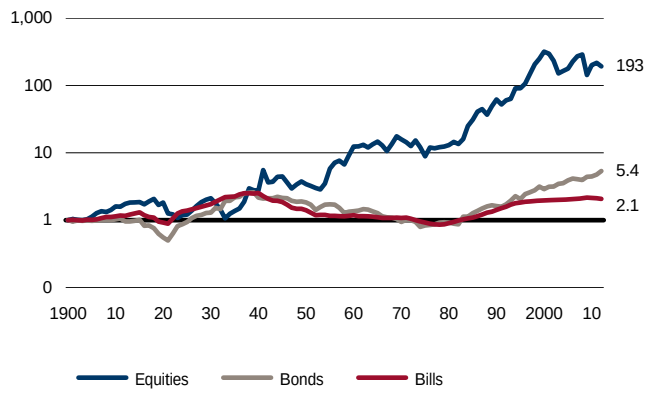


Figure 2

Equity risk premium over 10 to 112 years

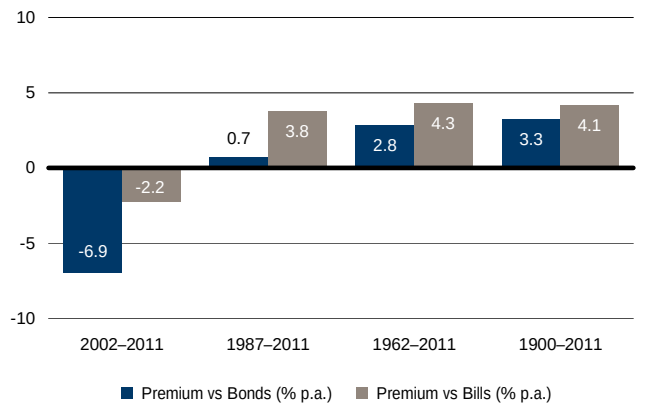
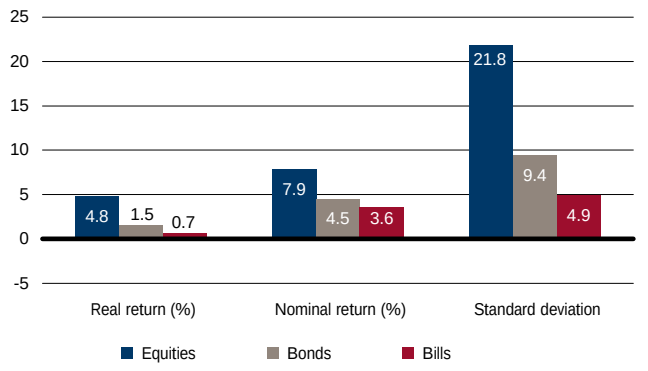


Figure 3

Returns and risk of major asset classes since 1900



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.

New Zealand

Purity and integrity

For a decade, New Zealand has been promoting itself to the world as “100% pure” and Forbes calls this marketing drive one of the world's top ten travel campaigns. But the country also prides itself on honesty, openness, good governance, and freedom to run businesses. According to Transparency International, in 2010 New Zealand was perceived as the least corrupt country in the world. The Wall Street Journal ranks New Zealand as the best in the world for business freedom. The Global Peace Index for 2011 rates the country as the most peaceful in the world.

The British colony of New Zealand became an independent dominion in 1907. Traditionally, New Zealand's economy was built upon on a few primary products, notably wool, meat, and dairy products. It was dependent on concessionary access to British markets until UK accession to the European Union.

Over the last two decades, New Zealand has evolved into a more industrialized, free market economy. It competes globally as an export-led nation through efficient ports, airline services, and submarine fiber-optic communications.

The New Zealand Exchange traces its roots to the Gold Rush of the 1870s. In 1974, the regional stock markets merged to form the New Zealand Stock Exchange. In 2003, the Exchange demutualized, and officially became the New Zealand Exchange Limited. The largest firms traded on the exchange are Fletcher Building and Telecom Corporation of New Zealand.

Capital market returns for New Zealand

Figure 1 shows that, over the last 112 years, the real value of equities, with income reinvested, grew by a factor of 531.2 as compared to 10.5 for bonds and 6.4 for bills. Figure 2 shows that, since 1900, equities beat bonds by 3.6% and bills by 4.0% per year. Figure 3 shows that the long-term real return on New Zealand equities was an annualized 5.8% as compared to bonds and bills, which gave a real return of 2.1% and 1.7% respectively. For additional explanations of these figures, see page 37.

Figure 1

Annualized performance from 1900 to 2011

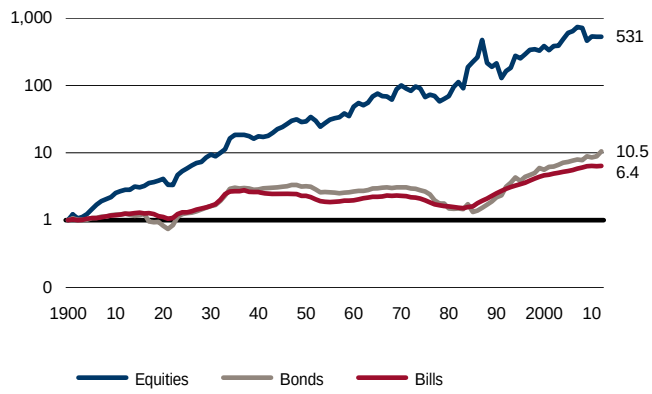


Figure 2

Equity risk premium over 10 to 112 years

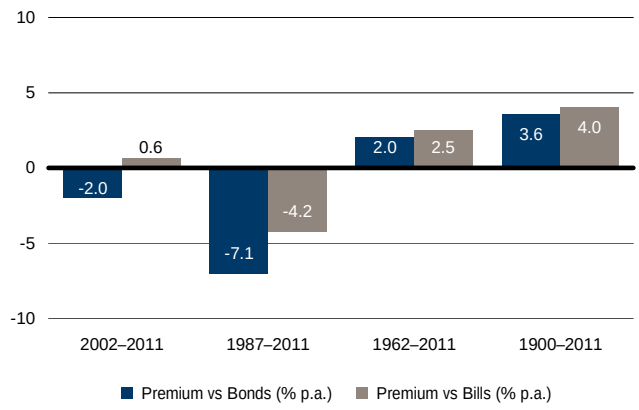
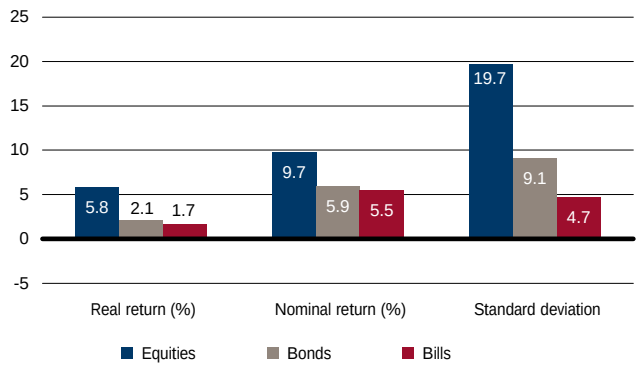


Figure 3

Returns and risk of major asset classes since 1900



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.

Norway

Nordic oil kingdom

Norway is a very small country (ranked 115th by population and 61st by land area) surrounded by large natural resources that make it the world's fourth-largest oil exporter and the second-largest exporter of fish.

The population of 4.8 million enjoys the second-largest GDP per capita in the world and lives under a constitutional monarchy outside the Eurozone (a distinction shared with the UK). The United Nations, through its Human Development Index, ranks Norway the best country in the world for life expectancy, education and standard of living.

The Oslo stock exchange (OSE) was founded as Christiania Bors in 1819 for auctioning ships, commodities and currencies. Later, this extended to trading in stocks and shares. The exchange now forms part of the OMX grouping of Scandinavian exchanges.

In the 1990s, the Government established its petroleum fund to invest the surplus wealth from oil revenues. This has grown to become the largest fund in Europe and the second-largest in the world, with a market value above USD 0.5 trillion. The fund invests predominantly in equities and, on average, it owns more than one percent of every listed company in the world.

The largest OSE stocks are Statoil, Telenor, andDnB NOR.

Capital market returns for Norway

Figure 1 shows that, over the last 112 years, the real value of equities, with income reinvested, grew by a factor of 88.3 as compared to 7.5 for bonds and 3.7 for bills. Figure 2 shows that, since 1900, equities beat bonds by 2.2% and bills by 2.9% per year. Figure 3 shows that the long-term real return on Norwegian equities was an annualized 4.1% as compared to bonds and bills, which gave a real return of 1.8% and 1.2% respectively. For additional explanations of these figures, see page 37.

Figure 1

Annualized performance from 1900 to 2011

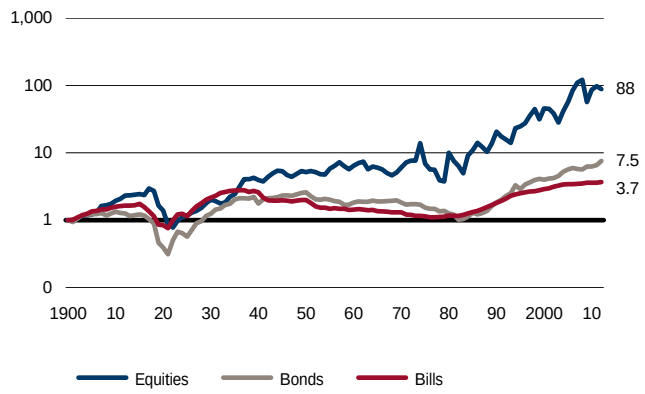


Figure 2

Equity risk premium over 10 to 112 years

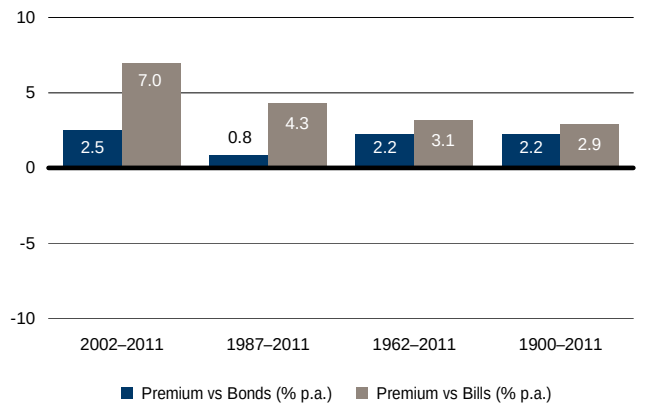
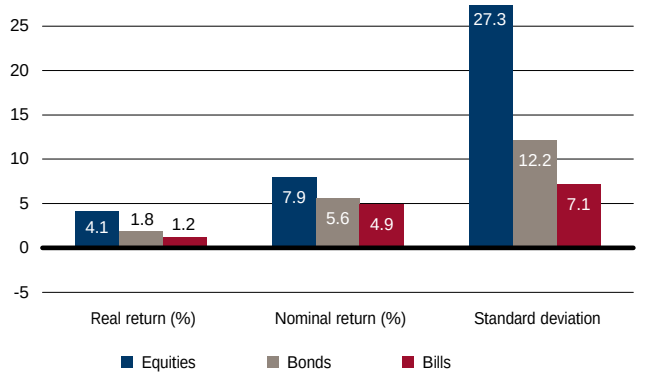


Figure 3

Returns and risk of major asset classes since 1900



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.

South Africa

Golden opportunity

The discovery of diamonds at Kimberley in 1870 and the Witwatersrand gold rush of 1886 had a profound impact on South Africa's subsequent history. Today, South Africa has 90% of the world's platinum, 80% of its manganese, 75% of its chrome and 41% of its gold, as well as vital deposits of diamonds, vanadium and coal.

The 1886 gold rush led to many mining and financing companies opening up, and to cater for their needs, the Johannesburg Stock Exchange (JSE) opened in 1887. Over the years since 1900, the South African equity market has been one of the world's most successful, generating real equity returns of 7.2% per year, the second-highest return among the Yearbook countries.

Today, South Africa is the largest economy in Africa, with a sophisticated financial structure. Back in 1900, South Africa, together with several other Yearbook countries, would have been deemed an emerging market. According to index compilers, it has not yet emerged, and it today ranks as the fifth-largest emerging market.

Gold, once the keystone of South Africa's economy, has declined in importance as the economy has diversified. Financials account for 23% while basic minerals lag behind with 22% of the JSE's market capitalization. The largest JSE stocks are MTN, Sasol, and Standard Bank.

Capital market returns for South Africa

Figure 1 shows that, over the last 112 years, the real value of equities, with income reinvested, grew by a factor of 2440.4 as compared to 7.2 for bonds and 3.0 for bills. Figure 2 shows that, since 1900, equities beat bonds by 5.3% and bills by 6.2% per year. Figure 3 shows that the long-term real return on South African equities was an annualized 7.2% as compared to bonds and bills, which gave a real return of 1.8% and 1.0% respectively. For additional explanations of these figures, see page 37.

Figure 1

Annualized performance from 1900 to 2011

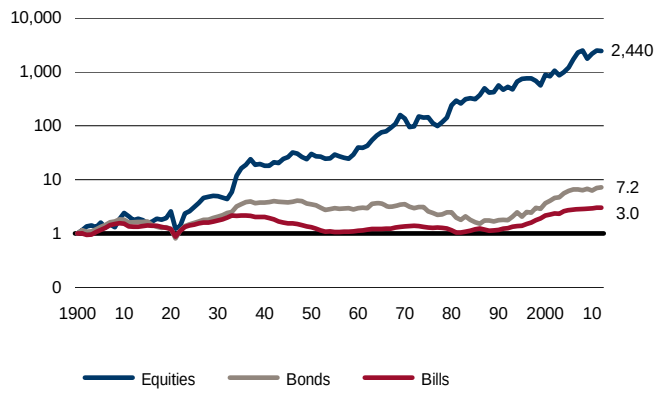


Figure 2

Equity risk premium over 10 to 112 years

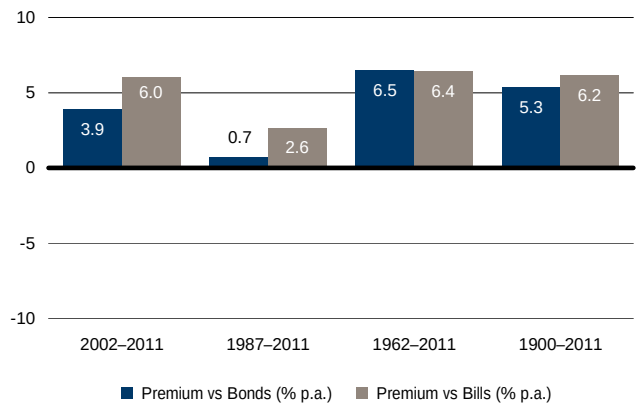
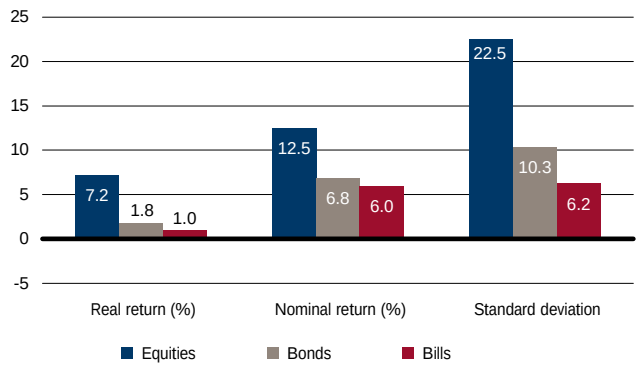


Figure 3

Returns and risk of major asset classes since 1900



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.

Spain

Key to Latin America

Spanish is the most widely spoken international language after English, and has the fourth-largest number of native speakers after Chinese, Hindi and English. Partly for this reason, Spain has a visibility and influence that extends way beyond its Southern European borders, and carries weight throughout Latin America.

While the 1960s and 1980s saw Spanish real equity returns enjoying a bull market and ranked second in the world, the 1930s and 1970s saw the very worst returns among our countries.

Though Spain stayed on the sidelines during the two world wars, Spanish stocks lost much of their real value over the period of the civil war during 1936–39, while the return to democracy in the 1970s coincided with the quadrupling of oil prices, heightened by Spain's dependence on imports for 70% of its energy needs.

The Madrid Stock Exchange was founded in 1831 and it is now the 14th largest in the world, helped by strong economic growth since the 1980s. The major Spanish companies retain strong presences in Latin America combined with increasing strength in banking and infrastructure across Europe. The largest stocks are Telefonica, Banco Santander, and BBVA.

Capital market returns for Spain

Figure 1 shows that, over the last 112 years, the real value of equities, with income reinvested, grew by a factor of 43.4 as compared to 4.3 for bonds and 1.4 for bills. Figure 2 shows that, since 1900, equities beat bonds by 2.1% and bills by 3.1% per year. Figure 3 shows that the long-term real return on Spanish equities was an annualized 3.4% as compared to bonds and bills, which gave a real return of 1.3% and 0.3% respectively. For additional explanations of these figures, see page 37.

Figure 1

Annualized performance from 1900 to 2011

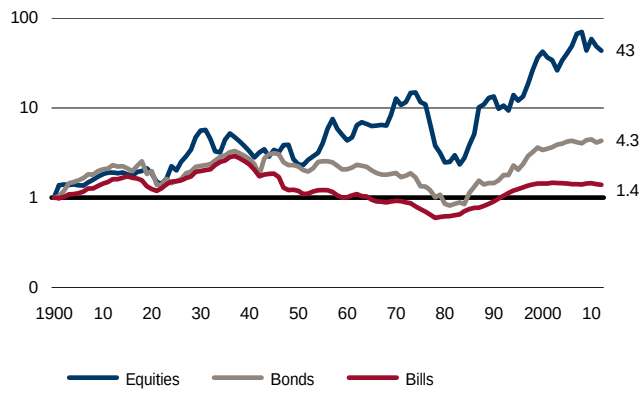


Figure 2

Equity risk premium over 10 to 112 years

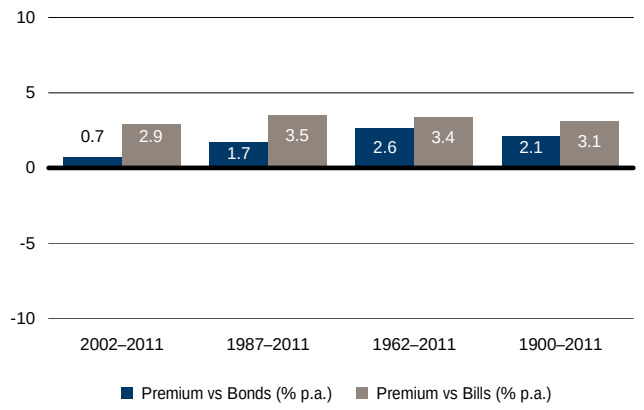
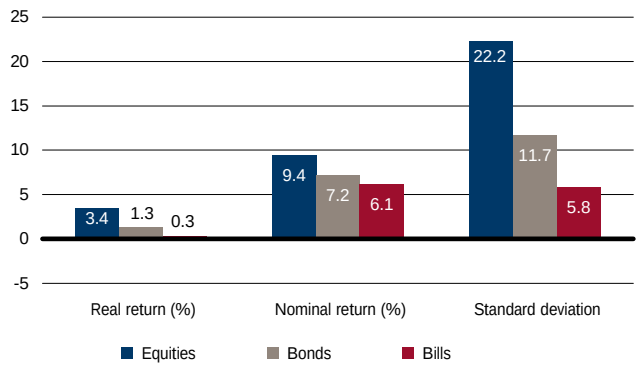


Figure 3

Returns and risk of major asset classes since 1900



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.

Sweden

Nobel prize returns

Alfred Nobel bequeathed 94% of his total assets to establish and endow the five Nobel Prizes (first awarded in 1901), instructing that the capital be invested in safe securities. Were Sweden to win a Nobel prize for its investment returns, it would be for its achievement as the only country to have real returns for equities, bonds and bills all ranked in the top four.

Real Swedish equity returns have been supported by a policy of neutrality through two world wars, and the benefits of resource wealth and the development, in the 1980s, of industrial holding companies. Overall, they have returned 6.1% per year, behind the three highest-ranked countries, Australia, South Africa and the USA.

The Stockholm stock exchange was founded in 1863 and is the primary securities exchange of the Nordic countries. Since 1998, has been part of the OMX grouping. The largest SSE stocks are Nordea Bank, Ericsson, and Svenska Handelsbank.

Despite the high rankings for real bond and bill returns, current Nobel prize winners will rue the instruction to invest in safe securities as the real return on bonds was only 2.6% per year, and that on bills only 1.8% per year. Had the capital been invested in domestic equities, the winners would have enjoyed immense fortune as well as fame.

Capital market returns for Sweden

Figure 1 shows that, over the last 112 years, the real value of equities, with income reinvested, grew by a factor of 764.6 as compared to 17.0 for bonds and 7.8 for bills. Figure 2 shows that, since 1900, equities beat bonds by 3.5% and bills by 4.2% per year. Figure 3 shows that the long-term real return on Swedish equities was an annualized 6.1% as compared to bonds and bills, which gave a real return of 2.6% and 1.8% respectively. For additional explanations of these figures, see page 37.

Figure 1

Annualized performance from 1900 to 2011

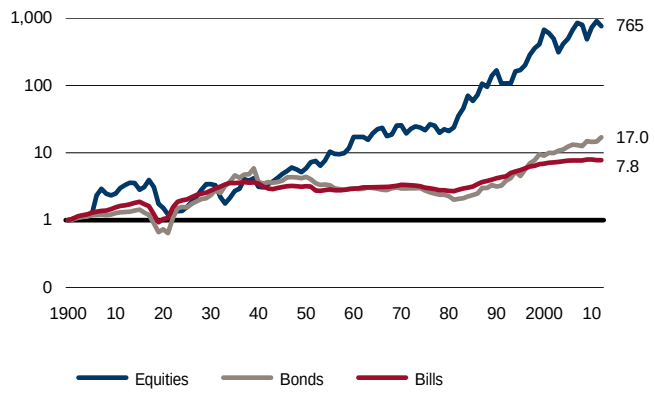


Figure 2

Equity risk premium over 10 to 112 years

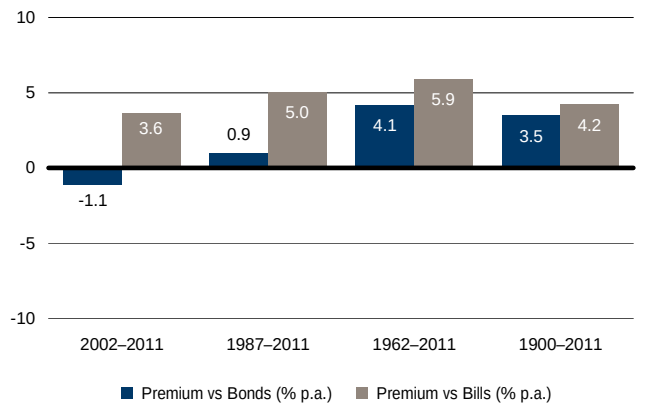
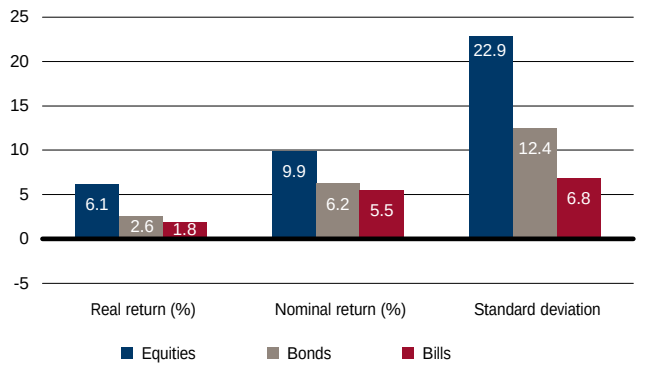


Figure 3

Returns and risk of major asset classes since 1900



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.

Switzerland

Traditional safe haven

For a small country with just 0.1% of the world's population and 0.008% of its land mass, Switzerland punches well above its weight financially and wins several gold medals in the global financial stakes. In the Global Competitiveness Report 2010–2011, Switzerland is top ranked in the world.

The Swiss stock market traces its origins to exchanges in Geneva (1850), Zurich (1873) and Basel (1876). It is now the world's seventh-largest equity market, accounting for 3.2% of total world value.

Since 1900, Swiss equities have achieved a mid-ranking real return of 4.1%, while Switzerland has been one of the world's four best-performing government bond markets, with an annualized real return of 2.2%. Switzerland has also enjoyed the world's lowest inflation rate: just 2.3% per year since 1900. Meanwhile, the Swiss franc has been the world's strongest currency.

Switzerland is, of course, one of the world's most important banking centers, and private banking has been a major Swiss competence for over 300 years. Swiss neutrality, sound economic policy, low inflation and a strong currency have all bolstered the country's reputation as a safe haven. Today, close to 30% of all cross-border private assets invested worldwide are managed in Switzerland.

Switzerland's listed companies include world leaders such as Nestle, Novartis and Roche.

Capital market returns for Switzerland

Figure 1 shows that, over the last 112 years, the real value of equities, with income reinvested, grew by a factor of 93.1 as compared to 11.4 for bonds and 2.5 for bills. Figure 2 shows that, since 1900, equities beat bonds by 1.9% and bills by 3.3% per year. Figure 3 shows that the long-term real return on Swiss equities was an annualized 4.1% as compared to bonds and bills, which gave a real return of 2.2% and 0.8% respectively. For additional explanations of these figures, see page 37.

Figure 1

Annualized performance from 1900 to 2011

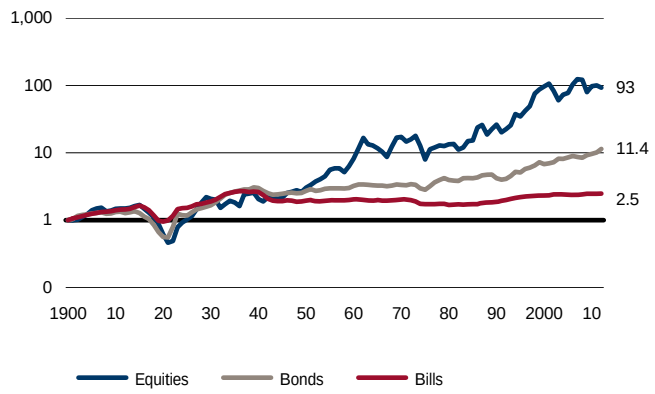


Figure 2

Equity risk premium over 10 to 112 years

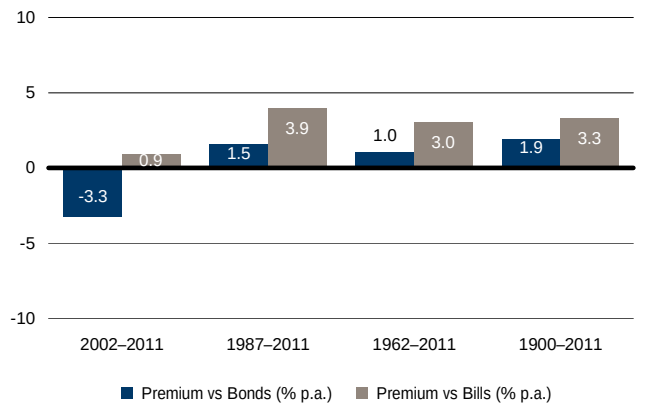
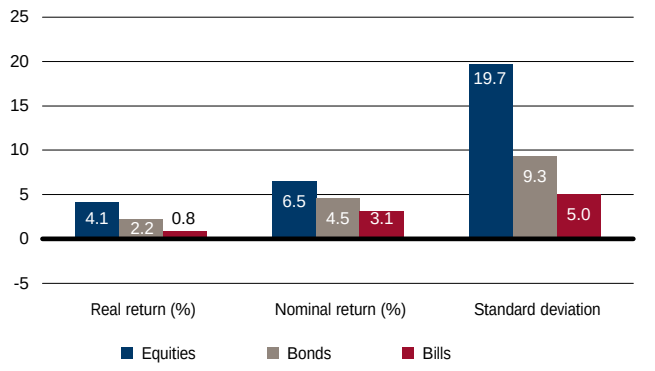


Figure 3

Returns and risk of major asset classes since 1900



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.

United Kingdom

Global center

Organized stock trading in the UK dates from 1698. This mostly took place in City of London coffee houses until the London Stock Exchange was formally established in 1801. By 1900, the UK equity market was the largest in the world, and London was the world's leading financial center, specializing in global and cross-border finance.

Early in the 20th century, the US equity market overtook the UK, and nowadays, both New York and Tokyo are larger than London as financial centers. What continues to set London apart, and justifies its claim to be the world's leading international financial center, is the global, cross-border nature of much of its business.

Today, London is ranked as the top financial centre in the Global Financial Centres Index, Worldwide Centres of Commerce Index, and Forbes' ranking of powerful cities. It is the world's banking center, with 550 international banks and 170 global securities firms having offices in London. The London foreign exchange market is the largest in the world, and London has the world's second-largest stock market, third-largest insurance market, and seventh-largest bond market.

London is the world's largest fund management center, managing almost half of Europe's institutional equity capital, and three-quarters of Europe's hedge fund assets. More than three-quarters of Eurobond deals are originated and executed in London. More than a third of the workld's swap transactions and more than a quarter of global foreign exchange transactions take place in London, which is also a major center for commodities trading, shipping, and many other services.

Capital market returns for the United Kingdom

Figure 1 shows that, over the last 112 years, the real value of equities, with income reinvested, grew by a factor of 291.1 as compared to 5.4 for bonds and 2.9 for bills. Figure 2 shows that, since 1900, equities beat bonds by 3.6% and bills by 4.2% per year. Figure 3 shows that the long-term real return on UK equities was an annualized 5.2% as compared to bonds and bills, which gave a real return of 1.5% and 1.0% respectively. For additional explanations of these figures, see page 37.

Figure 1

Annualized performance from 1900 to 2011

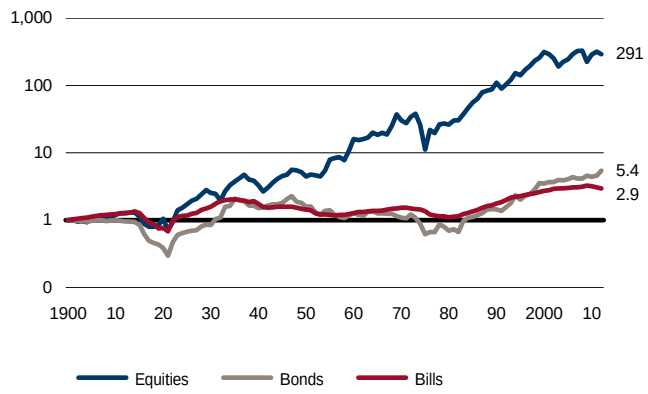


Figure 2

Equity risk premium over 10 to 112 years

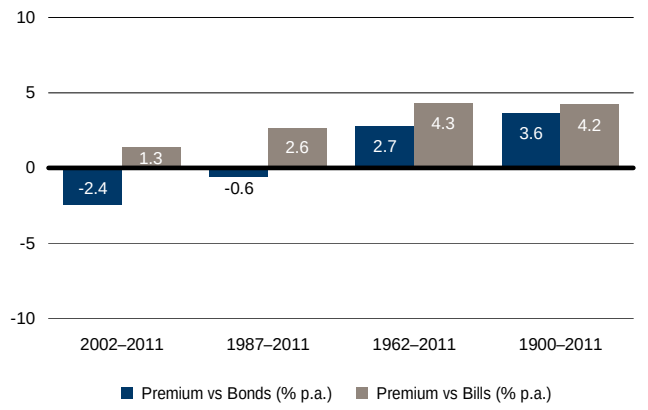
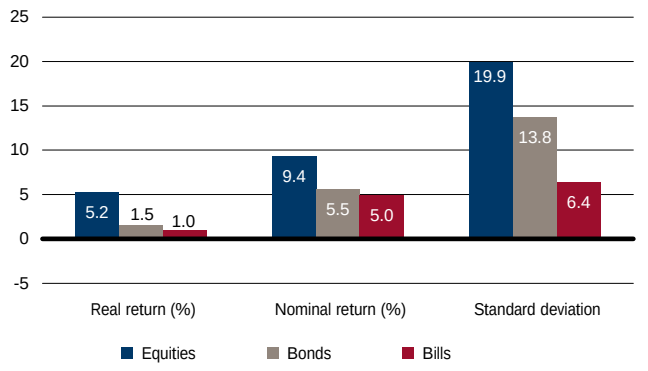


Figure 3

Returns and risk of major asset classes since 1900



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.

United States

Financial superpower

In the 20th century, the United States rapidly became the world's foremost political, military, and economic power. After the fall of communism, it became the world's sole superpower.

The USA is also a financial superpower. It has the world's largest economy, and the dollar is the world's reserve currency. Its stock market accounts for 45% of total world value, which is over five times as large as the UK, its closest rival. The USA also has the world's largest bond market.

US financial markets are also the best documented in the world and, until recently, most of the long-run evidence cited on historical asset returns drew almost exclusively on the US experience. Since 1900, US equities and US bonds have given real returns of 6.2% and 2.0%, respectively.

There is an obvious danger of placing too much reliance on the excellent long run past performance of US stocks. The New York Stock Exchange traces its origins back to 1792. At that time, the Dutch and UK stock markets were already nearly 200 and 100 years old, respectively. Thus, in just a little over 200 years, the USA has gone from zero to a 45% share of the world's equity markets.

Extrapolating from such a successful market can lead to "success" bias. Investors can gain a misleading view of equity returns elsewhere, or of future equity returns for the USA itself. That is why this Yearbook focuses on global returns, rather than just those from the USA.

Capital market returns for the United States

Figure 1 shows that, over the last 112 years, the real value of equities, with income reinvested, grew by a factor of 834.3 as compared to 9.3 for bonds and 2.8 for bills. Figure 2 shows that, since 1900, equities beat bonds by 4.1% and bills by 5.2% per year. Figure 3 shows that the long-term real return on US equities was an annualized 6.2% as compared to bonds and bills, which gave a real return of 2.0% and 0.9% respectively. For additional explanations of these figures, see page 37.

Figure 1

Annualized performance from 1900 to 2011

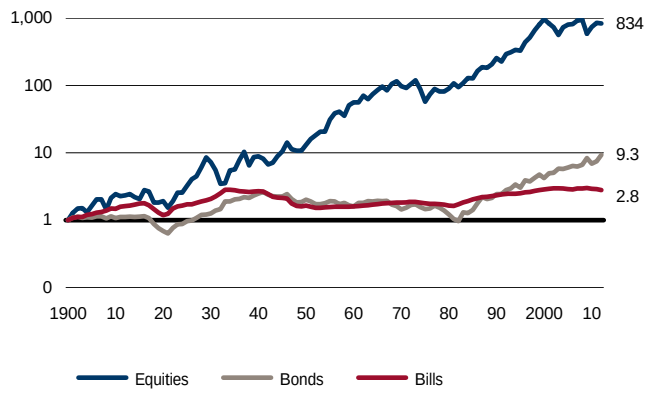


Figure 2

Equity risk premium over 10 to 112 years

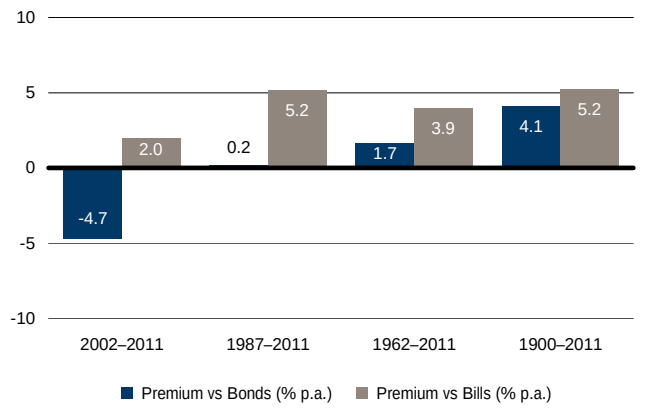
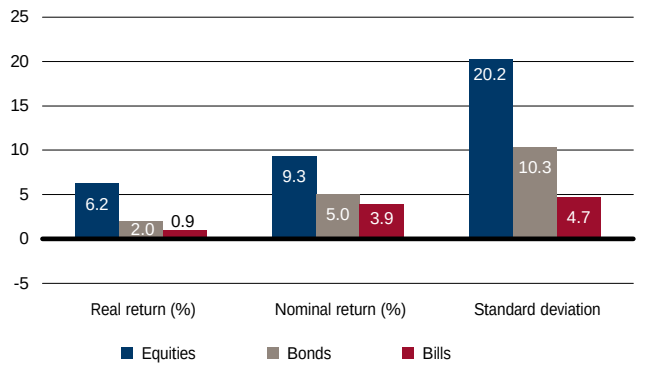


Figure 3

Returns and risk of major asset classes since 1900



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.

World

Globally diversified

It is interesting to see how the 19 Yearbook countries have performed in aggregate over the long run. We have therefore created a 19-country world equity index denominated in a common currency, in which each country is weighted by its starting-year equity market capitalization, or in years before capitalizations were available, by its GDP. We also compute a 19-country world bond index, with each country weighted by GDP.

These indexes represent the long-run returns on a globally diversified portfolio from the perspective of an investor in a given country. The charts opposite show the returns for a US global investor. The world indexes are expressed in US dollars; real returns are measured relative to US inflation; and the equity premium versus bills is measured relative to US treasury bills.

Over the 112 years from 1900 to 2011, Figure 3 shows that the real return on the world index was 5.4% per year for equities, and 1.7% per year for bonds. It also shows that the world equity index had a volatility of 17.7% per year. This compares with 23.4% per year for the average country and 19.9% per year for the USA. The risk reduction achieved through global diversification remains one of the last “free lunches” available to investors.

Capital market returns for World (in USD)

Figure 1 shows that, over the last 112 years, the real value of equities, with income reinvested, grew by a factor of 343.7 as compared to 7.0 for bonds and 2.8 for US bills. Figure 2 shows that, since 1900, equities beat bonds by 3.5% and US bills by 4.4% per year. Figure 3 shows that the long-term real return on World equities was an annualized 5.4% as compared to bonds and US bills, which gave a real return of 1.7% and 0.9% respectively. For additional explanations of these figures, see page 37.

Figure 1

Annualized performance from 1900 to 2011

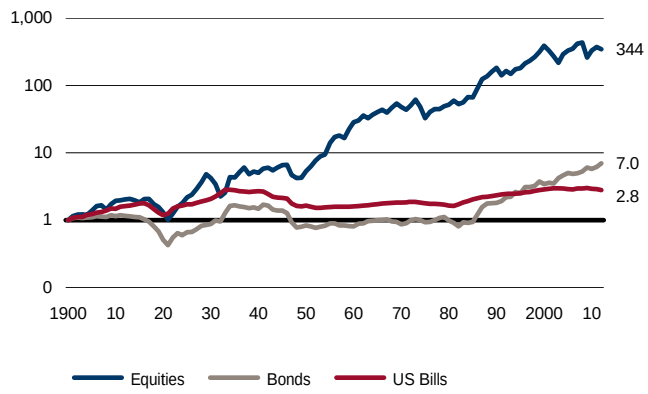


Figure 2

Equity risk premium over 10 to 112 years

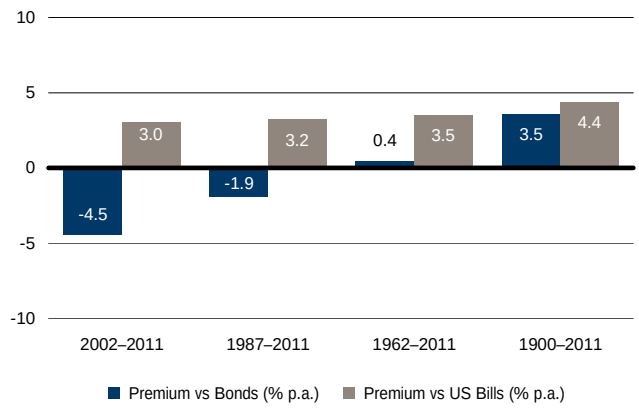
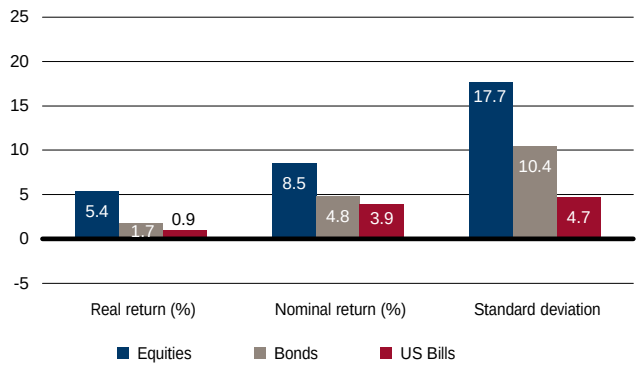


Figure 3

Returns and risk of major asset classes since 1900



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.

World ex-US

Rest of the world

In addition to the two world indexes, we also construct two world indexes that exclude the USA, using exactly the same principles. Although we are excluding just one out of 19 countries, the USA accounts for roughly half the total equity market capitalization of our 19 countries, so the 18-country world ex-US equity index represents approximately half the total value of the world index.

We noted above that, until recently, most of the long-run evidence cited on historical asset returns drew almost exclusively on the US experience. We argued that focusing on such a successful economy can lead to "success" bias. Investors can gain a misleading view of equity returns elsewhere, or of future equity returns for the USA itself.

The charts opposite confirm this concern. They show that, from the perspective of a US-based international investor, the real return on the world ex-US equity index was 4.8% per year, which is 1.4% per year below that for the USA. This suggests that, although the USA has not been a massive outlier, it is nevertheless important to look at global returns, rather than just focusing on the USA.

Capital market returns for World ex-US (in USD)

Figure 1 shows that, over the last 112 years, the real value of equities, with income reinvested, grew by a factor of 200.4 as compared to 4.1 for bonds and 2.8 for US bills. Figure 2 shows that, since 1900, equities beat bonds by 3.5% and US bills by 3.9% per year. Figure 3 shows that the long-term real return on World ex-US equities was an annualized 4.8% as compared to bonds and US bills, which gave a real return of 1.3% and 0.9% respectively. For additional explanations of these figures, see page 37.

Figure 1

Annualized performance from 1900 to 2011

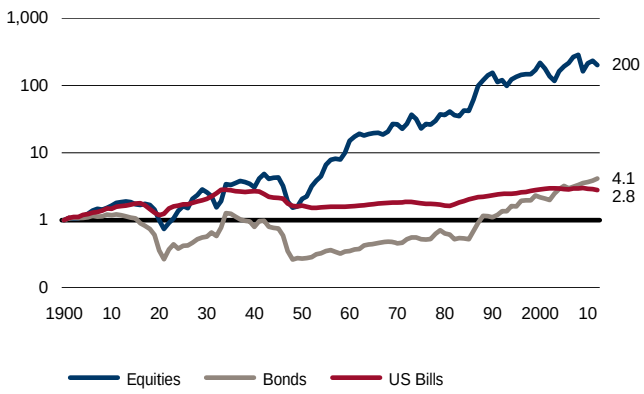
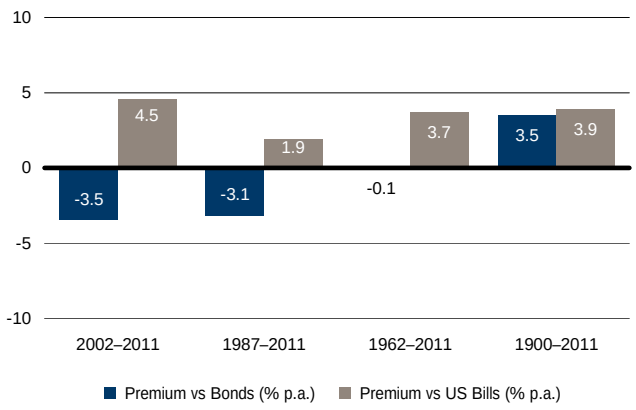


Figure 2

Equity risk premium over 10 to 112 years



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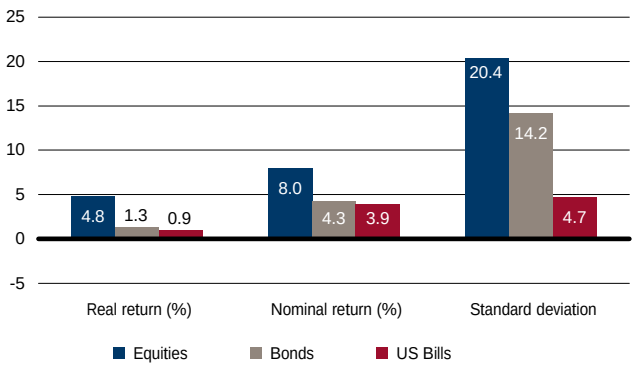
Returns and risk of major asset classes since 1900



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.

Europe

The Old World

The Yearbook documents investment returns for 13 European countries. They comprise eight euro currency area states (Belgium, Finland, France, Germany, Ireland, Italy, the Netherlands and Spain) and five European markets that are outside the euro area (Denmark, Sweden and the UK; and from outside the EU, Norway and Switzerland). Loosely, we might argue that these 13 countries represent the Old World.

It is interesting to assess how well European countries as a group have performed, compared with our world index. We have therefore constructed a 13-country European index using the same methodology as for the world index. As with the world index, this European index can be designated in any desired common currency. For consistency, the figures opposite are in US dollars from the perspective of a US international investor.

Figure 3 opposite shows that the real equity return on European equities was 4.6%. This compares with 5.4% for the world index, indicating that the Old World countries have underperformed. This may relate to the destruction from the two world wars, where Europe was at the epicenter; or to the fact that many of the New World countries were resource-rich; or perhaps to the greater vibrancy of New World economies.

Capital market returns for Europe (in USD)

Figure 1 shows that, over the last 112 years, the real value of equities, with income reinvested, grew by a factor of 149.7 as compared to 2.6 for bonds and 2.8 for US bills. Figure 2 shows that, since 1900, equities beat bonds by 3.7% and US bills by 3.6% per year. Figure 3 shows that the long-term real return on European equities was an annualized 4.6% as compared to bonds and US bills, which gave a real return of 0.9% and 0.9% respectively. For additional explanations of these figures, see page 37.

Figure 1

Annualized performance from 1900 to 2011

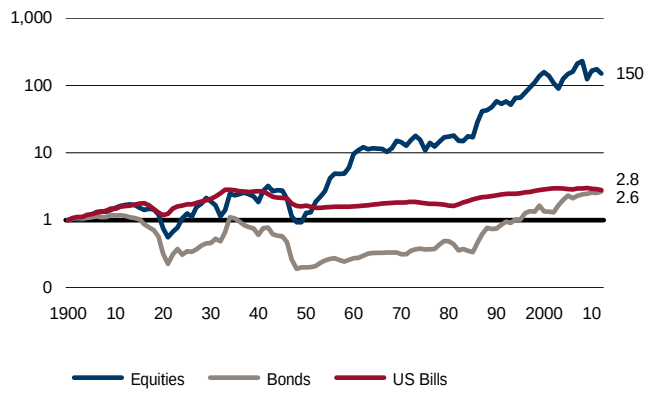


Figure 2

Equity risk premium over 10 to 112 years

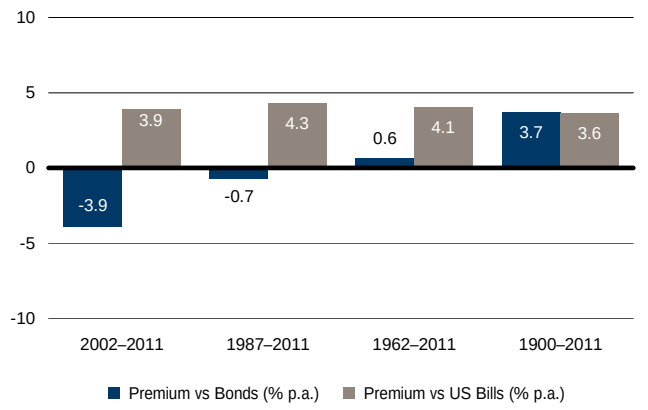
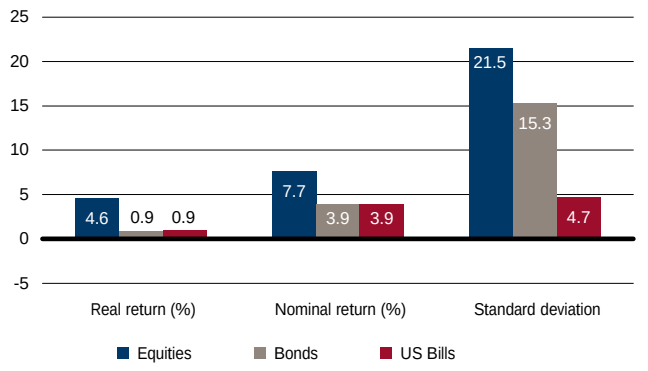


Figure 3

Returns and risk of major asset classes since 1900



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Credit Suisse Global Investment Returns Sourcebook 2012.

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