

GLOBAL EQUITY INVESTING

Risk Contours for Investors

Global Equity Investing: Risk Contours for Investors

Executive summary

Setting the balance between bonds and equities is normally the most important decision when constructing a strategic benchmark. But investors also need to consider the allocation between domestic and international investments.

This paper is about strategic benchmarks and not shorter-term tactical views and it will be of particular relevance where funds are considering changing their strategic allocation to equities.

By using risk contour maps we show the historic effect on different measures of fund risk of having varied the amount invested in foreign equities and, controversially, also the level of currency hedging.

Our analysis shows that:

- ❖ there are risk diversification benefits to be gained by increasing the proportion invested in foreign equities from that held currently by many investors;
- ❖ but as the international proportion increases, currency risk also increases and this has to be addressed;
- ❖ investors who wish to achieve a reduction in their risk position through increasing their foreign exposure need to consider currency management separately from equity management.

Merrill Lynch Investment Managers is not recommending that funds should incur the costs of changing to a new equity benchmark simply because of concerns about the balance between domestic and foreign equities. But the arguments are quite finely balanced and these considerations should be factored into new benchmarking exercises.

Merrill Lynch Investment Managers stands ready to discuss with clients the potential implications of these findings for their investment strategy.

Introduction

There always exists a wide range of broadly appropriate investment strategies.

Investors in all countries have historically favoured domestic securities. In part this reflects current, or past, regulations that limited the exposure to foreign investments; but in part it also reflects the greater costs and lack of familiarity of managing these investments. As investors become more aware of the opportunities in foreign* investments and the cost of making such investments falls, the question that arises is whether the balance between domestic and foreign equities should be revised.

In terms of constructing a benchmark, an investor needs to consider the portfolio that provides the highest level of diversification. Considering the equity portfolio in terms of domestic and foreign components may be a convenient sub-division, but does it have any more validity than any other sub-division? For example, the allocation between large and small companies or between financial and non-financial stocks?

The purpose of this paper is to consider the composition of lower risk equity portfolios and specifically how much they include in foreign listed equities rather than domestic listed equities.

One universal result from all countries is that historically there is always a wide range of strategies that would have produced very similar results in terms of controlling risk, even if there is one strategy that with hindsight was the least risky. There is no known way of selecting the ideal strategy in advance. Therefore, in the charts later in this report we identify the hindsight minimum risk strategy as well as strategies with similar levels of risk.

Here we focus exclusively on risk. We do not consider which strategies have happened to be the most profitable in the past or could be in the future.

A global perspective

In framing a strategy for equity investing, it is better to start with a global than a domestic approach.

In terms of strategic asset allocation the most important decision that investors face is the proportion of the assets that should be invested in different asset classes (equities, bonds or cash). After they have made this decision, the composition of the investments within each of these asset classes should be considered. We show later that a purely domestic approach to equity investing cannot be described as broadly efficient, whereas a global approach, particularly if combined with hedging of currency risk, cannot be criticised as inefficient.

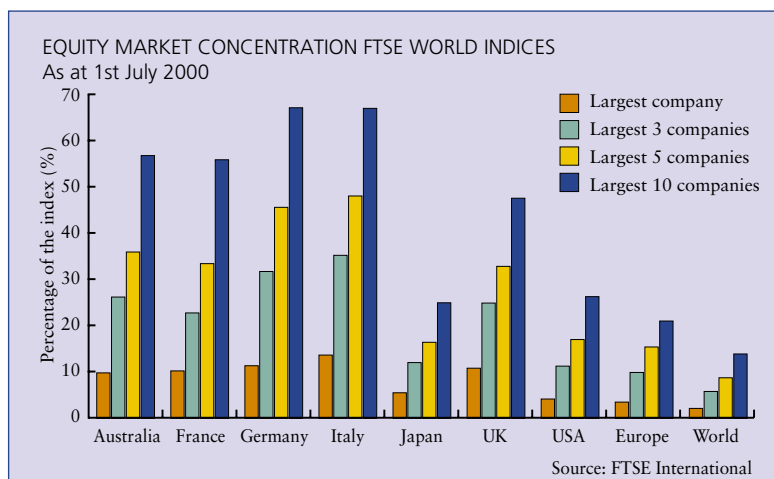
The one exception to this is for US based investors for whom the risk reducing attractions of international investing are less than for other investors. This reflects the relative size of the US in the global market. Notwithstanding the global reach

* We use “foreign” to refer to equities listed in countries other than the domestic market. The word “international” may properly be used to describe many domestically listed equities.

of a large number of companies domiciled elsewhere, other markets – unlike the US market – are not particularly good proxies for the fully diversified global market. Investors should invest in overseas markets. The two key questions are to what extent and what should they do about currency risk?

How well diversified are national markets?

There is a high level of concentration on large stocks in most equity markets.



An issue that faces many investors is the concentration of their domestic equity in a handful of stocks. The chart opposite shows the concentration of various countries, regions and the world index. In the larger markets, such as the World, USA or pan-Europe concentration is not an issue, but in the smaller markets it may be a significant problem.

The key message from this chart is that investors who are concerned about the level of concentration in their national market may address the issue by increasing the proportions invested internationally. For example, at 30 June 1999, DaimlerChrysler represented 11% of the FT/S&P German index. However, it represented less than 1.5% of the European equity market and less than 0.5% of the world equity market.

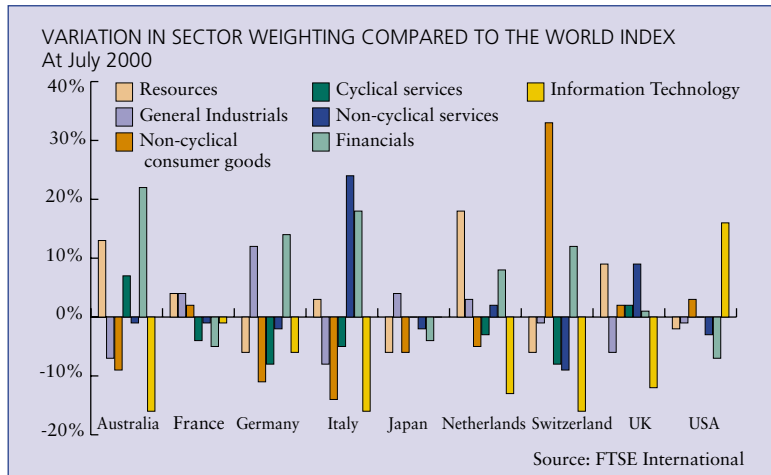
Paradoxically, the behaviour of investors as they diversify into foreign equities may exacerbate the problem of concentration of other investors' domestic markets. When investing in foreign equities, investors have had a tendency to invest in companies with which they are familiar. In addition, since most of these investors are undertaking their investment decisions on a "top-down" basis, they want to be invested in liquid securities. Typically, these are larger companies.

Whilst non-domestic investors are a small proportion of the market, then such behaviour is not material. However, the proportion of various equity markets held by foreign investors appears to be rising. Foreign investors now own 10% of the Japanese equity market compared to 4% ten years ago, and they now hold 12% of the German market and 16% of the UK market (Source SSB).

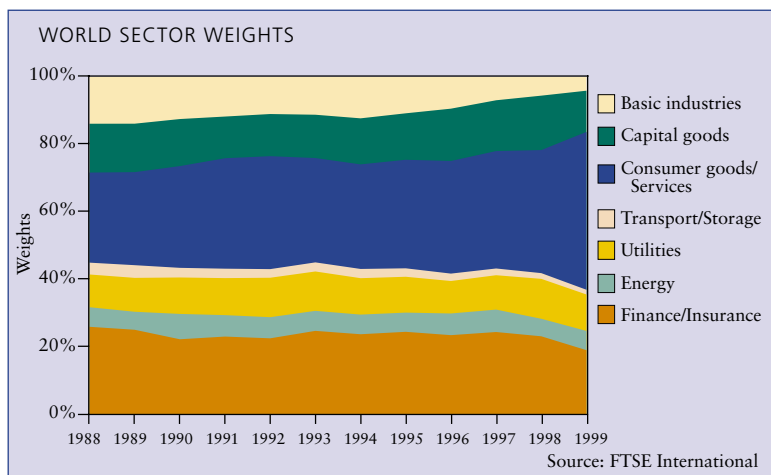
This suggests that if concentration of national indices is a problem, then an effective solution is to alter the weighting between domestic and foreign equities in the strategic benchmark and to invest the foreign equities in a diversified manner.

Economic exposures of national and global indices

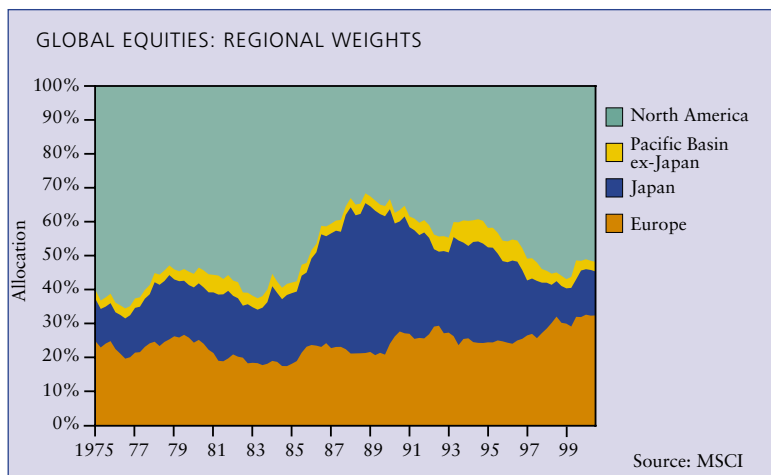
All countries are exposed to certain sectors more heavily than the world index.



The graph opposite shows the difference between the sector weights for different countries relative to the world index. This illustrates that all countries are exposed to certain sectors more heavily than the world index. The extent of these differences varies from the US, where the sector weightings are most similar to the world equity market, to Switzerland, which has the largest variation from the world equity market.



The composition of all indices changes over time. The global equity portfolio and how it has changed geographically and by sector over time is shown opposite. Whilst at present such a portfolio would be rather more than 50% allocated to the US, it remains a diversified mix of different economies and industries.



Managing currency risk

Currency risk must be considered explicitly for bond and equity portfolios.

An important complication of foreign investment is currency risk. Although all investors are exposed to a degree of indirect currency risk in virtually all their equity investments, this exposure is almost always more direct and greater whenever an investment is made in a foreign equity. This is a source of additional risk for which investors should not expect a reward, and so it needs to be managed.

Currency risk may be managed in one of two ways. Firstly, the level of international investments may be restricted. Secondly, explicit foreign exchange exposure may effectively be removed (or “hedged”) by using forward currency contracts. This is equivalent to leaving the assets required to make the investment on deposit in the domestic currency and borrowing abroad to fund the overseas investment. This controls exposure to short-term movements in currencies.

But as a practical matter, many investors will feel more comfortable with maintaining a lower proportion in international equities than a higher proportion overseas together with a long-term commitment to maintaining forward foreign currency contracts. But we do recommend that when funds are considering new benchmarks, investors formally address the issue of managing currency risk.

The theoretical attractions of reducing investment risk through hedging international investments are strongest for bonds, but are still valid for equities.

Hedging Currency Risk

Technically efficient solutions could involve funds in a high degree of “league table risk”.

Normally a reduction in risk goes with a reduction in expected investment return – there are no free lunches in investment. But without currency hedging an investor may be exposed to greater volatility, without benefiting in terms of commensurate higher returns. Currency hedging can be used to manage their exposure. Investors can “swap” their respective foreign currency exposures so that investors end up exposed only to their domestic currency.

However, there are practical and theoretical reasons why a fully hedged strategy may not be advisable.

First, the impact on performance, particularly relative to other funds that choose not to hedge currency exposure, may well be uncomfortably large in terms of opportunity cost and league table ranking. It is almost inevitable that funds would count the profitability or otherwise of adopting the new strategy from year to year. A new strategy might well help to reduce financial volatility, but unless most other funds made a similar change, it would be at the cost of

additional league table volatility – the potential for significant differences in the performance relative to the investors’ peers. Investors need to consider this “risk” at the outset.

For this reason, we recommend that a decision to shift equity investments towards international exposure and any role of hedging these investments should be considered in the context of a wider review of strategy, which would itself presume a willingness to accept additional “league table volatility”.

The other arguments are more conventional, but probably no less important in practice. Hedging is subject to transaction costs, which depend on the liquidity of the two currencies concerned, and the term of the forward currency contracts. For most minor currencies hedging costs are normally prohibitive above a few million dollars.

In order to stay perfectly hedged the fund would have to vary its hedges continuously as market levels changed. Otherwise it would be possible for the fund to become more than 100% hedged, in other words to have a net negative exposure to a foreign currency. Many investors would be uncomfortable with this outcome

If an investor believes in active management, leaving some foreign currency exposure allows some room to add value from active currency management without adopting a net negative exposure to a currency.

The technically most efficient level of hedging depends on a variety of factors. But even if total hedging would result in the lowest volatility portfolios, for the reasons set out above, even an investor who is completely comfortable with the concept may not wish to hedge more than 75% of the foreign equity assets. The impact on risk of varying the proportion of foreign equities that is hedged (the so-called “hedge ratio”) is shown in the accompanying charts.

Examining the second dimension – risk contours

Risk mapping helps investors to explore the wide range of alternative strategies that are available to them.

Many investors hold equities in the expectation that the higher returns that equities have provided historically will continue in the future. It is a simplification, but not unreasonable, to expect similar long run returns (when expressed in a common currency) from different developed equity markets. For this reason, the main advantage of investing in foreign equities, and the focus of this report, is to achieve portfolio diversification.

For most investors “risk” relates to the chances of losing money (or, for a pension fund or insurance company, of failing to meet the liabilities). If two assets have the same expected return (relative to the liabilities), but one has a higher volatility it will also have a higher risk of loss. We therefore focus on the volatility of different strategies.

Investing in overseas equities introduces two types of risk – foreign equity risk and, a second dimension, foreign currency risk. In considering investment strategy both sources of risk should be considered separately, but in conjunction with each other. In our experience, this is almost never done in practice.

To facilitate the discussion we have constructed risk contour maps. The attraction of these is that they demonstrate the extent of alternative strategies that may be considered appropriate. This shows just how wide the scope for consideration of investor comfort is to influence a fund's asset allocation.

How to read the risk contour maps

The volatility of a portfolio invested solely in domestic equities is determined at the lower left-hand corner of the graph (0% in foreign equities and 0% hedged). This shows that over this period the volatility of such a portfolio for a UK investor was between 16.9% and 17.9%. In order to reduce the volatility, or risk, in the portfolio the fund can diversify by increasing the proportion invested in foreign equities. It can also hedge some of the currency exposure.

The benefit of foreign equity diversification without hedging is shown by the change in the volatility on the horizontal or x-axis. As the proportion invested in foreign equities increases the volatility reduces. When the proportion invested in foreign equities is between 22% and 85%, the volatility has been reduced to between 14.9% and 15.9%. Without the benefit of currency hedging, if the proportion invested in foreign equities rises above 85%, the volatility rises above 15.9% again.

Most investors determine their foreign equity exposure without taking account of the impact of currency – the risk contour charts enable an investor to see the effects of the latter. The vertical or y-axis shows the level of currency hedging of the foreign equities. Thus a UK investor who choose to invest 50% of the fund in foreign equities on an unhedged basis would have experienced volatility between 14.9% and 15.9%. If the investor had chosen to hedge over 30% of currency exposure in the foreign equities then this would have fallen to between 13.9% and 14.9%.

The more contours that the investor traverses in moving between two alternative strategies the greater the change in risk – the steeper the “risk gradient”. The direction of the contour shows how investors can most readily reduce the volatility of their portfolios.

For each of the graphs opposite the historic minimum risk portfolio is represented by the black dot. The palest shaded area represents portfolios with volatility within 1% pa of the minimum risk portfolio; as the volatility rises the shading becomes darker. Given that historical experience can never be more than a rough guide to the future, all the points within the palest areas

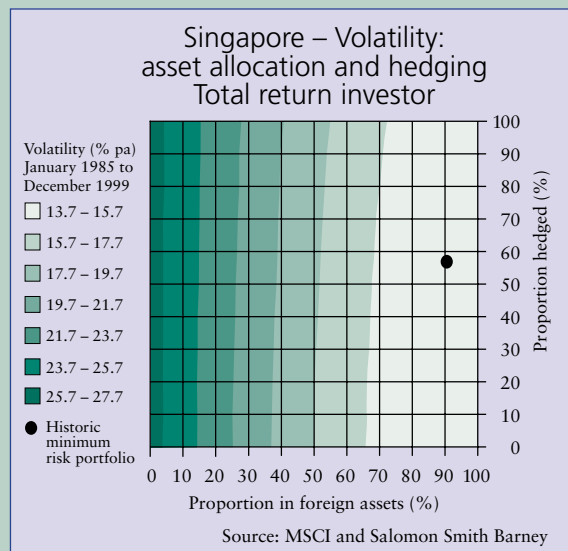
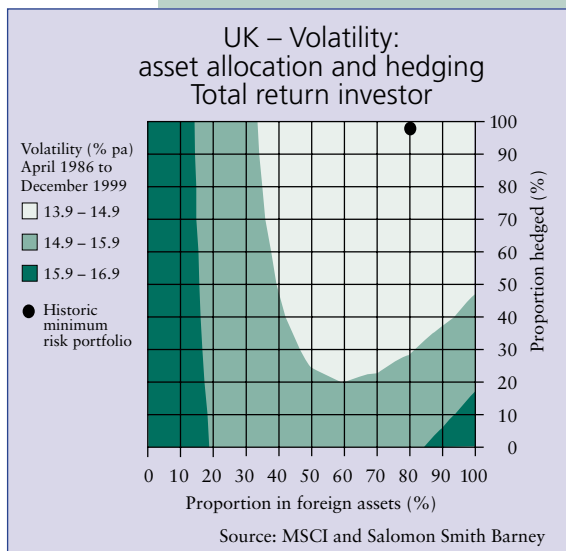
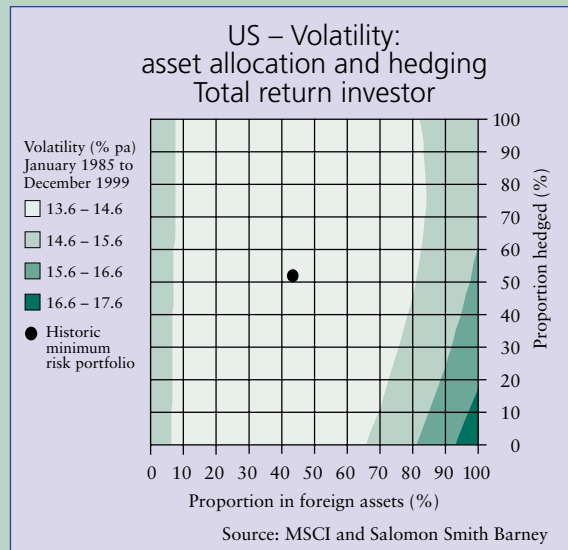
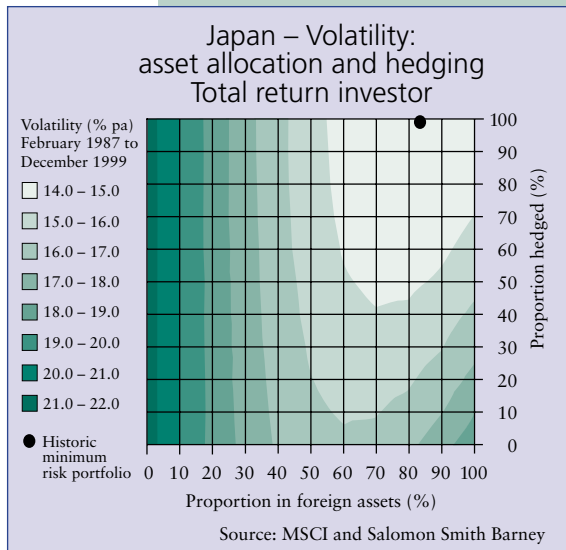
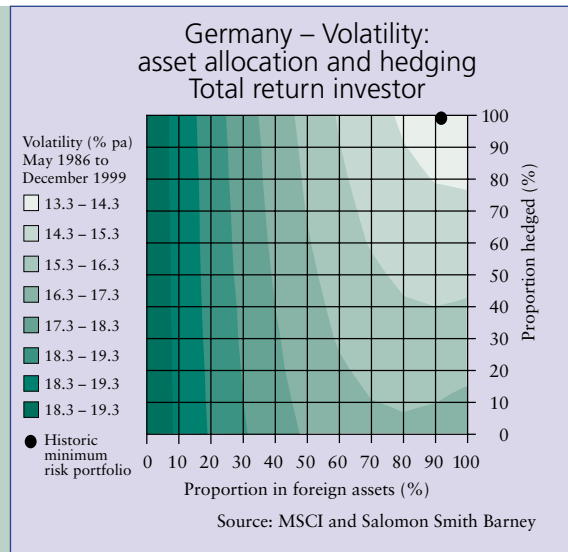
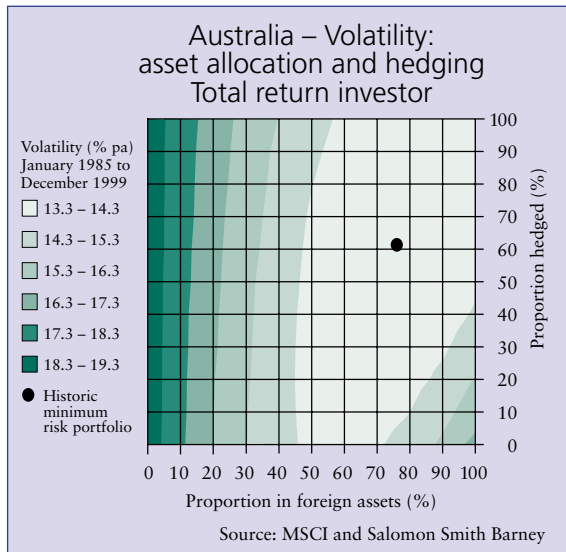
should be considered broadly appropriate in terms of their risk reward trade-off. We repeat, there is no known way of choosing the minimum risk strategy in advance.

All investment structures should be tested over a variety of circumstances and events to ensure that they are robust and practical. We therefore conducted related analyses over various sub-periods. Inevitably the detailed results varied considerably from market to market and period to period, reflecting particularly the impact of October 1987 on earlier periods. Over recent periods the UK has been particularly stable relative to other markets. But overall the results suggested that investors should invest a substantial proportion of their portfolio in global equities and that the bulk of this exposure should be hedged.

For all countries, there would have been a reduction in the volatility of the returns if the investor had diversified his benchmark out of domestic equities, although the benefit of this global diversification is less marked for US investors, which was already the largest market for most of this period. If the currency exposure in foreign equities were hedged then the volatility of the benchmark would have been further reduced.

The position of an investor based in Singapore is different as a result of the Singapore authorities' activities in stabilising the value of their currency. As a result of these successful actions, the volatility of the global equity market measured in Singapore dollars has been lower than for any other currency we have examined, including the US dollar. As a result, the risk reduction benefits of currency hedging have been substantially reduced compared to the position of investors in other countries. The minimum risk portfolio still shows some benefit from hedging, but the difference between the volatility of returns for the minimum risk portfolio and an unhedged fund is slight.

The benefit of hedging increases as the proportion invested in foreign equities increases. For all the countries, the contours for a portfolio with less than 30% invested in foreign equities are parallel to the hedging axis. This means that for funds with this proportion invested in foreign equities, hedging has little impact on the volatility. The precise location of the minimum risk portfolio (in terms of proportion in foreign equities and the proportion hedged) varies over time. Indeed, as a practical strategic benchmark, following the minimum risk portfolio is like chasing the gold at the end of the rainbow, whenever you reach what you thought was the correct position the location has moved. What we have observed is that over different time periods a market capitalization global portfolio using current market weights which is 75% hedged is relatively close to this minimum risk portfolio.



Total return investors and liability-driven investors

Total return investors worry about the absolute volatility of their investments; for liability-driven investors fluctuations relative to bonds and also regulations are more important. The arguments favouring the domestic market are stronger for liability-driven investors than for total return investors.

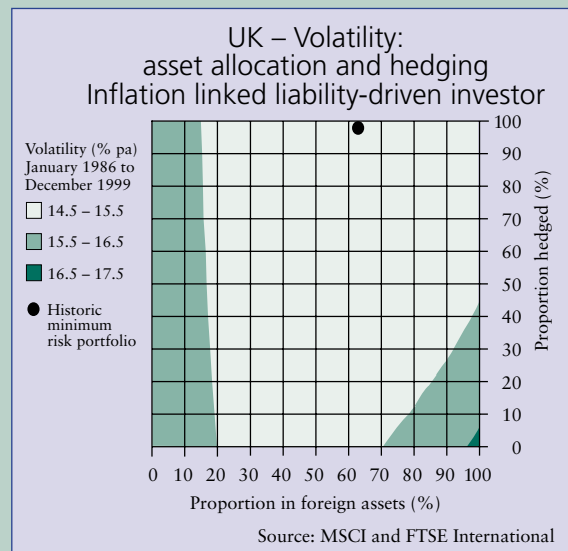
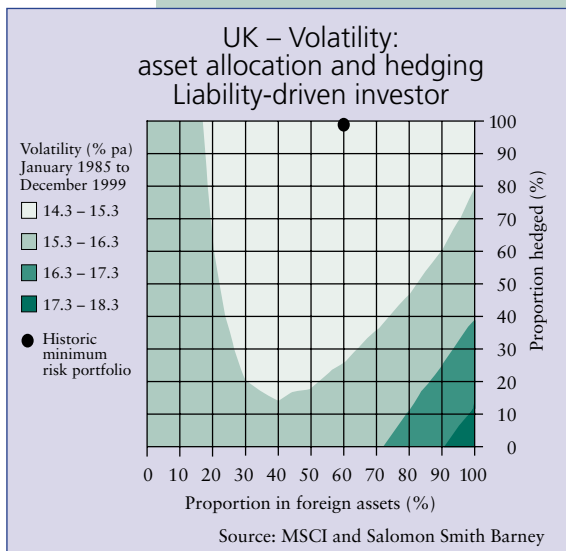
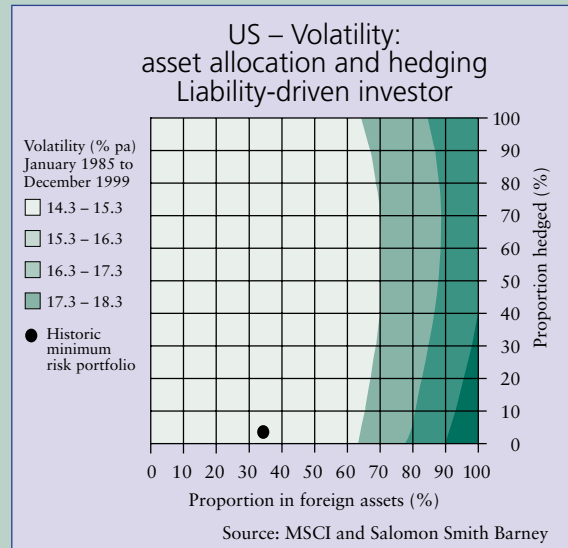
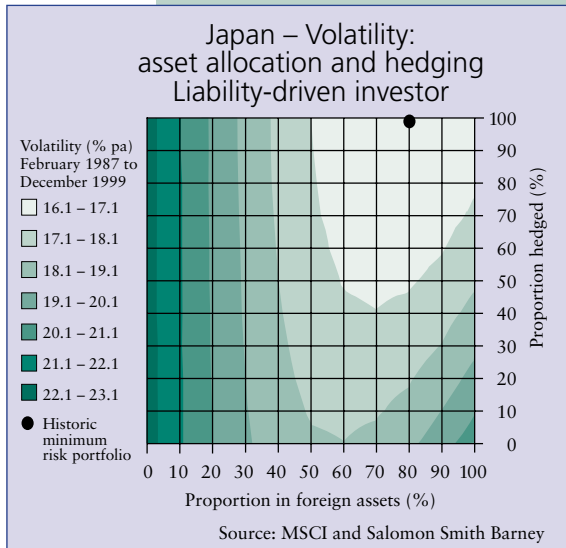
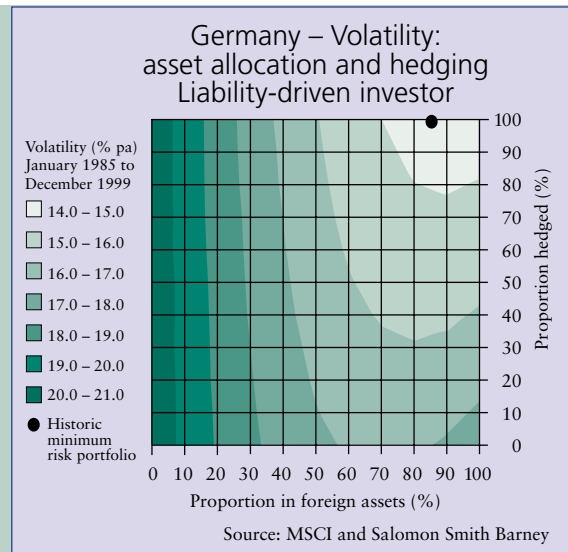
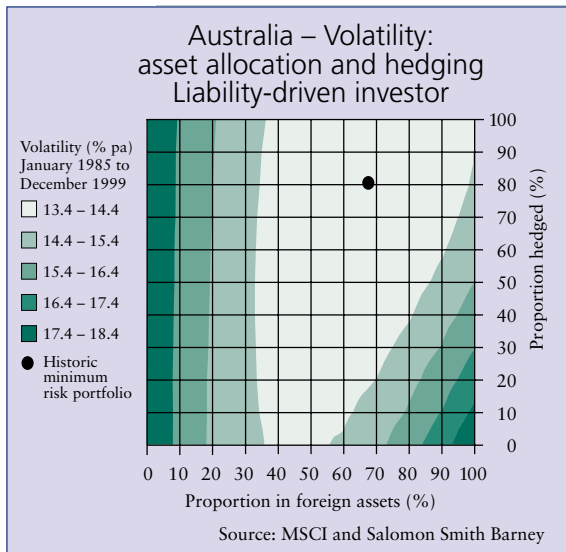
We have so far implicitly assumed that the investor defines risk as the absolute volatility of returns. We describe such investors as total return or short-term investors. Their aversion to capital losses makes a global equity approach most appropriate from a risk control perspective, so long as the investor is prepared to make a large long-term commitment to currency hedging. For liability-driven investors, such as pension funds and insurance companies the perspective is different as they will be concerned to control volatility relative to their liabilities, i.e. relative to conventional or inflation linked bonds.

This different perspective alters the recommended balance between domestic and international equities since domestic bonds are usually more highly correlated with domestic equities than with foreign equities. This reflects the domestic assets' common exposure to domestic conditions, and particularly the impact of changes in real interest rates on the discounted values of bond income and company profits. This relationship favours domestic equities in long-term investors' benchmarks because the risk of domestic equities relative to domestic bonds is reduced.

Accordingly, we repeated the earlier analysis with all returns measured relative to those of domestic long-term conventional government bonds. In all markets the technically efficient allocation towards the home market is higher for liability-driven investors than for total return investors.

Again, we also examined shorter periods. Interestingly, in recent periods a Japanese long-term investor would have invested more overseas than a short-term investor to minimise risk. This is because the positive relationship between domestic equity and bond returns breaks down if an economy is caught in a deflationary recession where falling bond yields (and rising bond prices) coincide with falling equity values, as in Japan.

For many investors the appropriate benchmark is not conventional bonds, but inflation-linked bonds. Whilst there are a number of countries that have inflation linked bonds, most markets are of recent origin and limited liquidity. The largest and oldest market is in the UK. If the analysis is repeated for an investor whose liabilities are inflation-linked then the results are closer to those for the absolute return investor than for the investor with liabilities proxied by conventional bonds. This may reflect the lower volatility of index-linked bonds.



The home market for European investors

The results for a euro-based investor are similar.

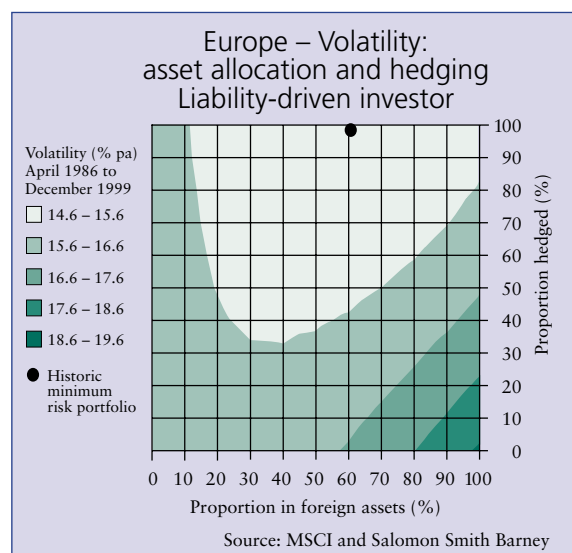
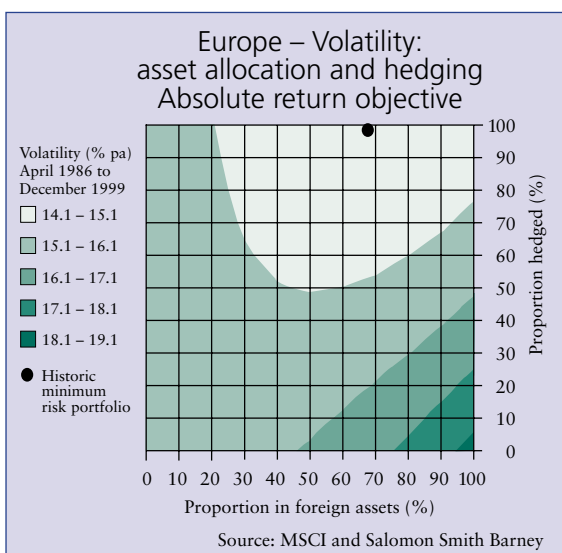
In this paper we have de-emphasised the notion of a “home market”. Nevertheless most investors should still maintain a moderate bias towards domestic equities. In most markets the domestic market is unambiguous, but Europe is an exception. For euro “ins”, in principle, the domestic market becomes the euro-zone, while for euro “outs” – Denmark, Greece, Sweden, and UK – and non-EU European countries it remains the national market.

But given that the euro-zone is likely to expand, many European equity investors will wish to adopt a pan-European domestic benchmark immediately to avoid incurring the transaction costs associated with frequent benchmark revisions reflecting the changing composition of the euro-zone. But for the UK (and non-EU Switzerland) participation in the euro remains an uncertain prospect.

For an investor with a pan-European benchmark the results are again consistent with our recommendations for both short and long term investors. (We assume that euro-zone bonds’ risk characteristics can be proxied by those of DM bonds. The currency exposure of non-EMU European countries is assumed to be nil, reflecting either the use of hedging or future participation in the Euro.)

Implementing currency hedging

Investors need to take account of the nature of currency markets before implementing any strategy.



Investment strategy recommendations need to be both practical and feasible as well as well founded in terms of theoretical analysis. Thus, currency-hedging proposals should be examined in the context of parameters such as liquidity and the structure

of forward foreign currency markets. In textbooks, interest-rate differentials and assumptions about currency movements are assumed to offset each other over time. In reality, the relative monetary policies or yield curves of the two countries whose currencies are involved in the transaction do influence the costs of hedging and decisions about whether to put in place currency hedging strategies. Further issues may include tax, documentation or investment timing implications.

Foreign exchange markets can be divided into three broad groups of varying degrees of currency hedging feasibility. In the first category are the currencies of the traditional developed markets. For these, while hedging costs may vary, normal market conditions mean liquidity is plentiful and there are no exogenous restrictions in the form of tax or investment controls. Thus, virtually any reasonable position can be hedged into or out of one of the other major currencies at almost negligible transaction costs. The second group of countries is represented by countries where liquidity may dry up quickly if the more developed currency markets are moving to less normal conditions and/or by countries whose currency policies may include an exogenous restriction. Consequently, hedges from the major currencies into these domestic currencies can be put on, but the size and duration may be constrained. The third category contains those countries where the feasibility of currency hedging proposals is low due to onerous investment constraints. For these currencies, the feasibility of hedging strategies can also be undermined by the fear, based on experience, of major fluctuations in liquidity in the local foreign exchange market. In practice these issues must be thought through carefully before implementing currency-hedging strategies.

Long run investors over the long run

Purchasing power parity.

The message of the optimisation analyses was reasonably consistent: a mainly hedged strategy is superior to an unhedged strategy. Nevertheless it is possible that over the very long term the relative merits of the two could be reversed for an investor with inflation-linked liabilities.

If purchasing power parity (PPP) holds, currencies will tend back toward their long run PPP level. In other words in the long term the exchange rate will be less volatile than suggested by short-term fluctuations. This suggests that hedging may be less necessary for long-term investors.

PPP is by no means infallible. Taxes and other barriers to trade can cause persistent deviations from PPP. But while PPP is at least a plausible approximation to reality, there is no reason for a period of unexpectedly high relative real interest rates in a market, and therefore of unexpectedly large cumulative returns from currency hedging, to be followed by a compensating period of relatively low real interest rates. In other words there is no “hedged” PPP.

Over the very long term a hedged strategy might then become more risky than an unhedged strategy. This is consistent with the chart below which shows that over the last 20 years relative inflation rates in different markets have been more closely matched by exchange rates movements than average interest rate differentials.

For long term investors there may then be a tension between the short-term monitoring of their long-term liabilities and actually meeting those liabilities in the future. The former focuses on monthly volatility relative to a notional risk free asset, while the latter can take into account qualitative factors such as PPP which are apparently not captured by such an analysis.

Given that investors in practice cannot ignore the short term we suggest that more weight be given to the short term. But some long-term investors might prefer to adopt an unhedged strategy, for example pension funds with a strong solvency position or an endowment fund with long-term objectives, but no formal “liabilities”.

An unhedged strategy might also be appropriate for investors whose future expenditure is also likely to be global, for example a global charity or a wealthy individual moving frequently between different countries for tax or other reasons.

Implementation issues and other considerations

Any change in strategy exposes an investor to “regret risk” of what their return may have been if the change had not been implemented. The timing and direct and indirect costs of implementing change needs consideration. The terms of implementation of a change in policy can be as important as the change itself.

This analysis has assumed that an investor starts with a “blank sheet of paper” and is not subject to any particular constraints. But when establishing their benchmark most investors are not in this fortunate position. The terms of implementation of a change in policy become as important as the change itself.

Investors subject to tax will be influenced by the tax regime as it relates to domestic and foreign investments. Many investors will be unwilling to increase their overseas exposure if this means realising taxable capital gains in their domestic market.

For a large fund heavily committed to less liquid domestic stocks, transaction costs could be significant. While both currency hedging and increasing the overseas exposure will lead to a superior risk reward trade-off, hedging the existing exposure is likely to be less costly to implement initially. It may therefore be the first step that funds should consider.

The costs of changing asset allocation can be mitigated if any alteration coincides with other changes in the fund’s strategy. For example, if the overall proportion invested in equities is to be reduced, this could be achieved through reducing the domestic equity weighting rather than reducing both domestic and foreign equity weightings.

Most institutional investors are reluctant to adopt an asset allocation radically different from their competitors. Even funds with fund specific benchmarks often informally consider the return relative to the peer group. Any move towards a more global approach by a fund exposes it to risk relative to the industry average, unless this itself makes a similar asset allocation shift. Funds substantially increasing their global allocation must be prepared for such league table volatility. This is a form of “regret risk”.

It is prudent to consider current market views when implementing strategic investment changes. This might influence the timing of any major move into foreign equities or currency hedging.

Finally, some investors may believe that they have greater stock-selection skills within their home market. Others may feel they have a social duty to undertake constructive corporate governance for companies in their local market. Both could imply over-weighting the domestic equity market.

“Siegel’s paradox”

One of the attractions of currency hedging is that it is supposedly a “free lunch” in which both sides gain. Investors based in different currencies can “swap” their respective foreign currency exposures, leaving each investor exposed only to his domestic currency. In the absence of market views, there is apparently a reduction in risk without any reduction in expected return.

But hedging may slightly reduce the expected return due to a relation between currency volatility and currency expected returns. By way of illustration consider two currencies which initially have an exchange rate of 1:1. A change in the exchange rate from 1:1 to 2:1 or from 1:1 to 1:2 would lead to a 100% gain by an investor based in one of the currencies but only a 50% loss for an investor based in the other (i.e. $2/1-1=100\%$ but $1/2-1=-50\%$). If the two scenarios are equally likely then investors in both currencies have a positive expected currency return of $(+100\%-50\%)/2=25\%$ from investing in the other. This is known as “Siegel’s paradox”. If it is valid, removing currency risk by hedging could reduce the expected return by about 0.5% pa for a currency with a typical volatility of 10% pa.

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