

Convertibles — The Best of Both Worlds

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Global Pensions Group

The combination of falling equity markets, lower bond yields and a move towards more volatile market-based accounting standards for pensions is leading many plan sponsors to focus on investment strategy in more detail. For many, there is a desire to limit downside risk whilst retaining a considerable part of the upside potential. Intuitively, convertibles seem a good fit.

This analysis looks at convertibles from an ALM perspective. It does so within a corporate finance framework and addresses whether this intuitive conclusion is correct. We find that:

- For underfunded plans, the ALM analysis makes a compelling case for investing in convertibles. For a plan that is substantially overfunded and where the sponsoring company has a relatively weak call on surplus, there is a strong case for locking in that surplus by switching out of equities. However, in this instance convertibles have a more modest advantage over bonds. Whilst the analysis should be carried out on a case by case basis, we believe that, for many funds, there is a good case for allocating 10–20% of total assets to convertibles.
- Any allocation should be implemented globally, on a currency hedged basis. Such an approach is consistent with global trends in equity management, whilst retaining consistency with the approach generally adopted for foreign bonds.
- Managing the portfolio's delta is an important consideration. We suggest that this should be rebalanced in a disciplined manner, subject to the plan's overall risk tolerance and the constraints imposed by the market itself. ■

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Convertibles — The Best of Both Worlds

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The European pensions environment is undergoing many changes. In the UK, there is a clear and accelerating trend from DB to DC and, within the DB sector, a reduction in equity allocations in favour of bonds. At the same time, factors such as FRS 17 (the new accounting standard) have moved pensions up the corporate agenda, causing finance directors and corporate treasurers to focus much more on the true cost of providing these benefits. Much of the same debate is taking place in Continental Europe and this is likely to continue. For example, in the Netherlands, the regulatory regime will move to a fair value basis in 2006. Likewise, from a global accounting perspective, we expect the International Accounting Stan-

the future equity risk premium. If we have now entered a low inflation / low return environment, should our expectations be more in line with Europe's experience of the 1950s and 1960s rather than the strong equity market performance of the 1980s and 1990s? Either way, we are moving to an environment in which pension fund liabilities are valued by reference to long bond yields and, consequently, are volatile themselves. On this basis, recent years have seen the worst of both worlds — falling equity markets depressing asset values with falling bond yields increasing liability valuations.

Is there a way of combining the necessary downside protection (i.e., something linked to bond yields) with the potential to

participate substantially if equity markets perform strongly? In fact there are several possibilities, including a number of derivative-

based strategies. In this piece we will look at an asset class which appears to have been underestimated in this regard — convertibles.

Convertibles have characteristics which, at first sight, seem especially attractive in this environment. Further, they have fundamentally different characteristics from either equity or bonds. Consequently there is a good case for considering them as a separate asset class. The purpose of this analysis is to examine whether the case for convertibles is as strong as it seems. We examine the case from an ALM perspective and consider the practical issues which arise.

Convertibles — What Are They?

A convertible bond is one which can be converted into equity, at the option of investors. The terms on which conversion takes place are specified in advance — for example, a \$1000 bond may be convertible into 20 equity shares at any point within a five-year period. Ultimately, whether or not an investor should convert depends on the price of the equity — the higher the equity price the more likely it is that conversion will occur. Naturally, if the probability of conversion is high, the convertible will behave much like the equity, whilst if the probability of conversion is low, its behaviour will be more bond-like. This leads to convertibles having an interesting return distribution — in rising markets they provide upside participation whilst offering downside protection in weak equity markets. Furthermore, because convertibles behave like bonds (and not cash) when equity markets are weak, this appears to make them a good match for DB liabilities being valued on a market basis.

So what are the risk and return characteristics of convertibles?

Exhibit 1 shows the pay-off diagram. The diagram highlights the asymmetric pay-off. Intuitively, one would expect the downside protection to be attractive to pension funds. In terms of return expectations, it is reasonable to assume that convertibles have an expected return that lies somewhere between that of equities and corporate bonds of similar duration and credit quality. Likewise, the volatility of convertibles should be somewhere between those of the two underlying asset classes, allowing for the asymmetry.

There is a good case for considering convertibles as a separate asset class.

dards Board to move in the same direction as the UK when it reviews IAS 19.

One key issue, which varies by market, is the asymmetries which arise with regard to ownership of surplus — in some cases the sponsoring company is able to use surplus in the pension fund to reduce future contributions; in others the members receive some or all of the surplus in the form of benefit improvements. Conversely, when there is a deficit in the fund, it is usually the company's responsibility to address this.

At the same time, market conditions have created widespread debate on the size of

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Why Don't Pension Funds Invest?

The characteristics described above sound compelling. So why have pension funds traditionally invested so little?

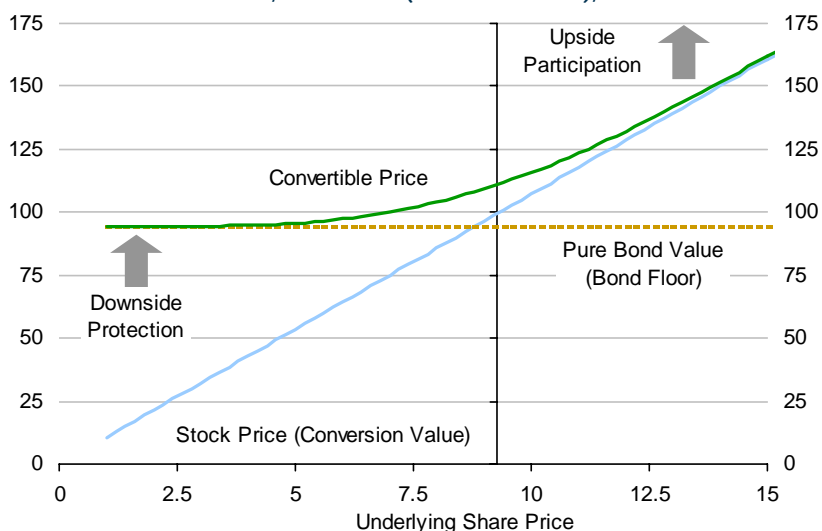
There are several reasons:

- ALM — convertibles don't fit into the traditional ALM framework. In particular, some ALM processes require assets to be normally (or log-normally) distributed. Non-normality can be especially challenging for those models which use optimisation techniques.
- Manager mandates — managers have often been given discretion to invest in convertibles within balanced portfolios and occasionally (on a tactical basis) within specialist equity or bond portfolios. However, relatively few do so. This is partly because convertibles are an asset class which many managers are uncomfortable with. Further, in the strong equity markets of the 1980s and 1990s, managers generally perceived convertibles to be a drag on performance. As specialist management has become more common in recent years, convertibles are less likely to feature within the guidelines. Where they are permitted, managers are well aware of their tracking error against traditional equity (and bond) indices.
- It is commonly believed that the convertibles market is small and relatively illiquid. This, as we will discuss later, is largely unjustified, especially if a global approach is adopted.

It is worth noting that in some countries (Switzerland for example) some pension funds have included convertibles as part of an allocation to "alternative investments;" in

1 Pay-off Diagram for Convertibles

Theoretical Convertible Price, Stock Price (Conversion Value), Pure Bond Value



Source: Morgan Stanley.

these cases the allocations have tended to be fairly small.

The Role of Convertibles in Strategic Asset Allocation

The most striking feature of convertibles is the asymmetric pay-off referred to above. Intuitively, this asymmetry seems to be a good fit for pension fund liabilities, especially when

plus). Controlling this downside risk is therefore important. Downside risk is also important from the members' perspective, but the upside also has considerable value if it can be used to improve their benefits.

Given this background, convertibles would seem to be an ideal asset class, but does ALM support this? In particular, are convertibles attractive in all scenarios or is the allocation sensitive to the plan's funding level, for example? Are they an effective means of lock-

...it is reasonable to assume that convertibles have an expected return that lies somewhere between that of equities and corporate bonds of similar duration and credit quality.

those liabilities are linked to bond yields. From the employer's perspective, the company has to meet the balance of cost if funding level is poor (even though it may not get all — or any — of the benefit if there is a sur-

ing in surplus? Do they reduce accounting risk? Should they be thought of primarily as an alternative to equity or bonds?

We analyse these questions in the following section.

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ALM Analysis

In this section we assess various investment strategies by reference to their impact on the long-term cost of company of providing pensions. This is expressed as the present value of future company contributions, discounted at the corporate cost of capital. Thus, “high return” scenarios are those which generate a low present value of future contributions, whilst “risk” is defined as the present value of future contributions in the worst decile (10%) of outcomes. As a secondary analysis we will also look at risk defined in terms of accounting cost.

Our analysis uses Monte Carlo simulation techniques, based to 20 year projections. Within this projection period we have assumed that the company can fully use any surplus which arises to reduce its contribution rate to zero (but no further — it can’t take money out of the fund) but that the company has no call on any surplus which remains at the end of the 20-year projection period. This is intended as an approximation to the company having a partial claim on surplus both before and after 20 years.

Our key capital market assumptions are summarised in Exhibit 2 and set out in more detail in the appendix.

The liability profile is that of a fairly typical pension plan in the UK or the Netherlands, with 40% of the liabilities relating to active members and 60% to inactives. We have assumed that pensions in payment are fully indexed to inflation. We have analysed three initial funding positions: 80%, 100%, 140%.

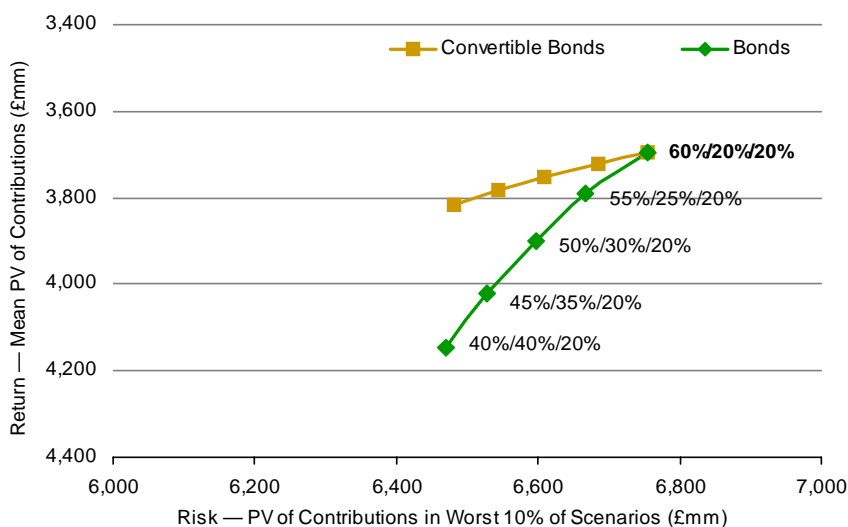
In the following analysis, we start by considering an asset mix of 60% equity, 20% nominal bonds, 20% inflation-linked bonds. We then consider the impact of gradually switching out of equities and into either nominal bonds or convertibles. The allocation to inflation-linked bonds has been held

2 Key Capital Assumptions

	Expected Return (Geometric) %	Standard Deviation %
Equity	8.1	16.0
Nominal bonds (AAA, 10 year duration)	5.2	6.6
Inflation-linked bonds	4.8	7.3
Convertibles	7.6	10.0*

*Calculated ex-post. The return distribution is not drawn from a normal distribution, reflecting the asymmetry of the asset class. Source: Morgan Stanley.

3 Underfunded Plan (80%) Efficient Frontiers



Source: Morgan Stanley.

constant as a reflection of the poor liquidity which is generally associated with this asset class. The results for an underfunded plan are shown in Exhibit 3.

The chart is best read by starting from the point in the top right, which represents 60% equities, 20% conventional bonds, 20% inflation-linked bonds.

The green line shows the impact of switching successive 5% allocations from

equities into conventional bonds. As we would expect, this switch significantly reduces risk, but comes with a lower return. The gold line, representing a switch from equity to convertibles, reduces risk to broadly the same extent as the green line, but without a significant reduction in return. Why is this?

The reason is due to the asymmetric payoff associated with convertibles, which enables investors to control their downside

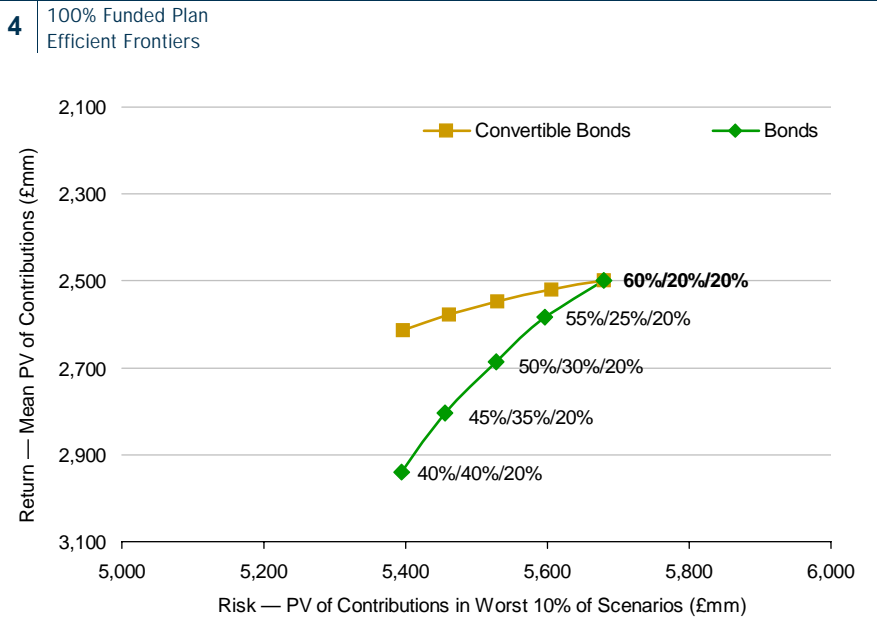
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risk without giving up too much in terms of upside return. A contributing factor is that, during weak equity markets, when convertibles are exhibiting bond-like characteristics, they benefit from a significant yield pick-up compared with government bonds. Of course, there remains the possibility of default on coupon payments (as with any corporate bonds), but there is considerable evidence (for example, see “The Name’s Bond, Corporate Bond,” *Global Equity and Derivative Markets*, July 2002) that investors are well-rewarded for taking credit risk.

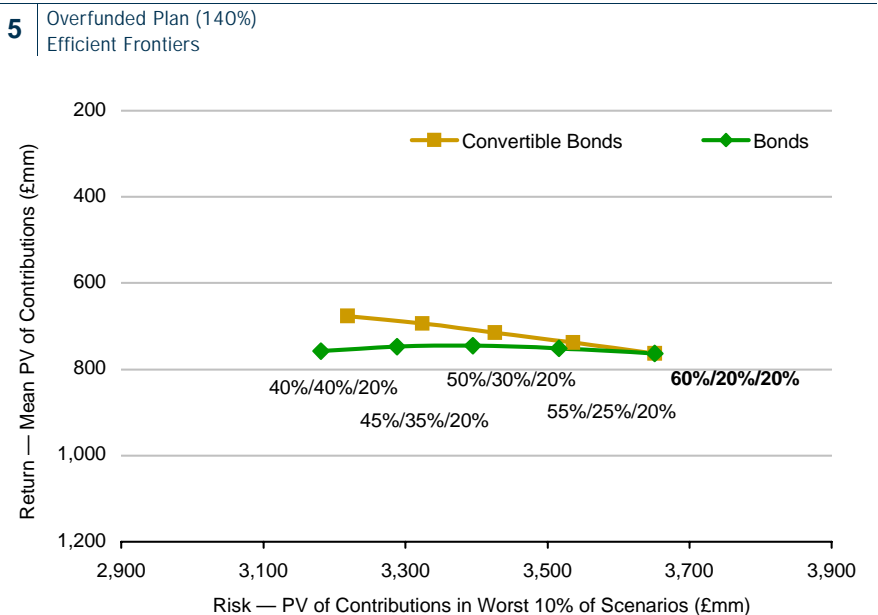
Exhibits 4 and 5 set out comparable analyses for pension funds starting from a 100% and 140% funding position. In both, a good case can be made for convertibles. However, it is clear that the case is weaker in the case of the 140% funding level (the lines are closer together). Why is this?

The answer relates to ownership of surplus. We earlier stated our assumption that the company has, overall, only a partial claim on surplus, since it can reduce contributions within the next 20 years, but cannot take money out of the fund.

In the case of an underfunded plan, the equity upside is useful since it offers the prospect of a return to full funding and a reduction in future contributions. Likewise in a plan currently funded to 100%, equity upside is useful up to a point. However, for a very well funded plan, where the employer has a relatively weak claim on surplus, it has little scope for further upside participation. There is then a strong case for locking in the current surplus. Thus, in Exhibit 5, we see relatively little difference between switching into bonds or convertibles. What is clear is that, in this scenario, switching into either is superior to holding equities; the latter are of little value, since they increase downside risk without the benefit of much upside participation.



Source: Morgan Stanley.



Source: Morgan Stanley.

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An Accounting Perspective

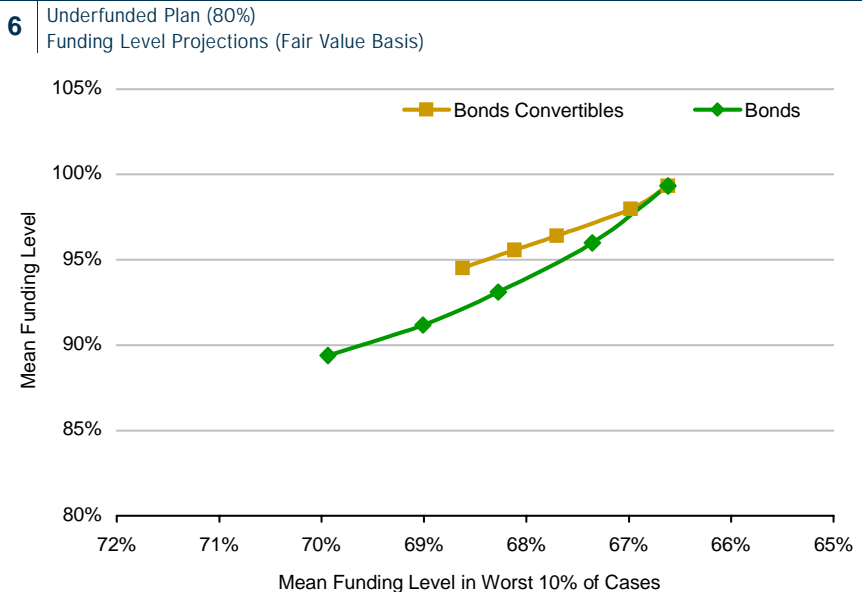
In these charts we have adjusted the measures of risk and return to reflect current thinking in terms of pension fund accounting. For this purpose we have focused on the funded position on a fair value basis, in line with FRS 17 in the UK and the new regulatory basis in the Netherlands.

It has recently been announced that the introduction of FRS 17 will be deferred until 2005 and the changes to the Dutch system will not be introduced until 2006. Nevertheless, we believe that this continues to be a reasonable basis on which to conduct this analysis because:

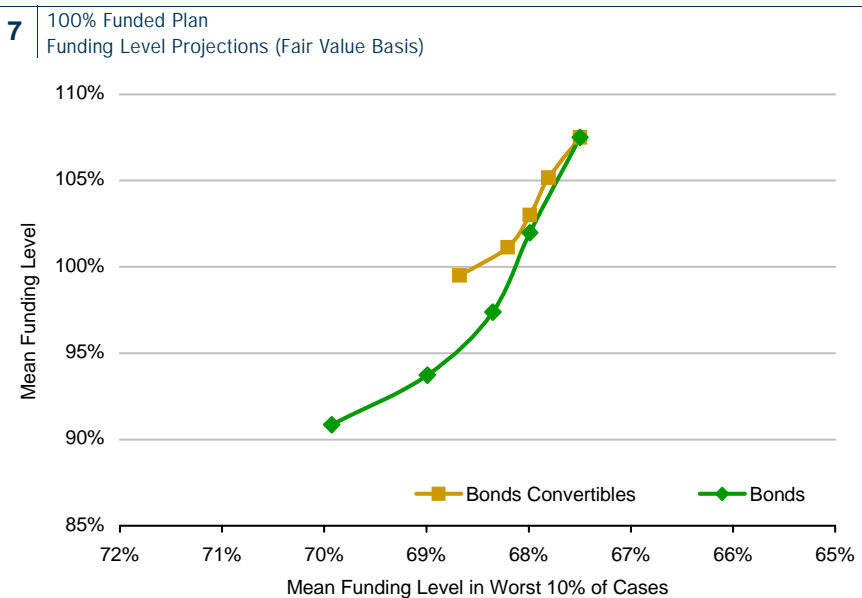
- We expect this to be a blueprint for changes to the international accounting standard (IAS 19) which is under review.
- “Fair value” is the basis that best reflects economic reality.
- Despite the deferment of FRS 17 adoption in the UK, disclosures will continue to be required in the notes to the accounts. We expect analysts to focus on these notes in addition to the figures in the main accounts.

In Exhibits 6, 7 and 8, the vertical and horizontal axes represent the mean funded position projected on a fair value basis and the mean position within the worst 10% of scenarios, respectively.

In each case it is clear that switching out of equities into convertibles is an attractive alternative to traditional bonds. However, close examination shows that the argument is more marginal than the earlier analysis (based on the present value of future company contributions) i.e., the lines are closer together. Furthermore, switching to convertibles fails



Source: Morgan Stanley.



Source: Morgan Stanley.

to reduce risk to the same extent as switching to bonds (the line for bonds extends further to the left).

This reflects the fact that convertibles are an inferior match for liabilities measured

on a fair value basis (as defined by FRS 17, IAS 19 or FAS 87). In particular, whereas the liabilities are driven by the yield on long-duration high quality bonds (typically AA rated), convertibles are of relatively short

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duration and lower credit quality. Thus, there is a limit to how far they can reduce risk when this is defined in terms of accounting cost. For nominal bonds, by contrast, we assumed AAA quality and 10 year duration.

The difference in credit quality is also one reason why, when we focus on the present value of future company contributions, convertibles are so attractive. Considered in the context of bonds, they represent a move down the credit spectrum, for which investors are generally well rewarded.

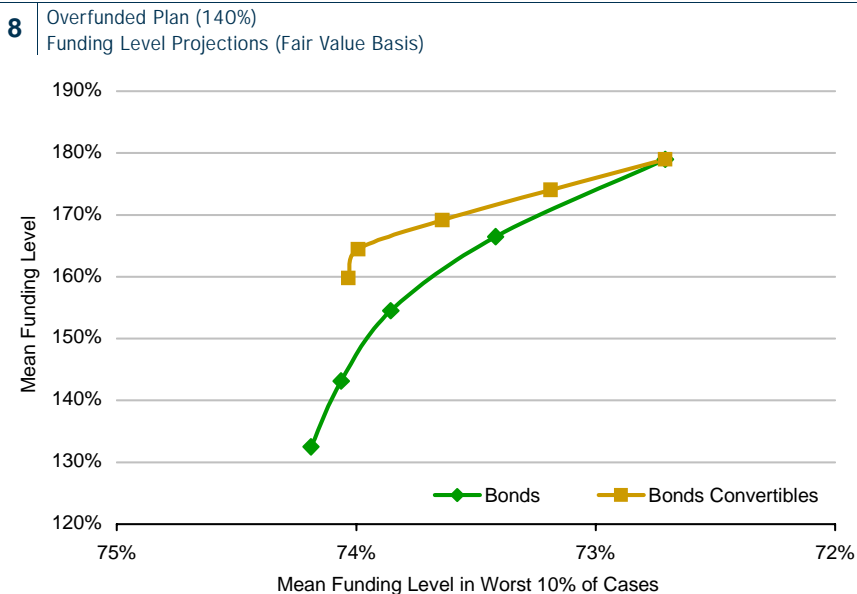
Practical Issues

The analysis above makes a strategic case for convertibles. However, there are several other practical issues which need to be considered, in particular the size and liquidity of the markets, whether to invest globally or regionally, the need to make sure that the portfolio maintains the “right” degree of equity participation and whether to manage the assets actively or passively.

Size of the Market

It is sometimes suggested that the market is not sufficiently large to accommodate convertibles as a strategic asset class. Whilst the size of the market can be a constraint for the very largest funds, we believe the argument is overstated. Exhibit 9 sets out the geographic breakdown of the global convertible markets, together with the split between investment grade and non-investment grade and the delta (degree of equity participation).

At more than \$560bn, the global market is clearly substantial. To put it into context for a UK investor (for example), the UK corporate bond market is modestly over \$300bn and the inflation-linked market approximately \$100bn. Furthermore, the convertibles market is considerably more liquid as a



Source: Morgan Stanley.

consequence of the activities of convertible arbitrage hedge funds. We would argue that the size and liquidity of the global convertible markets is such that it is feasible for even most large funds to make a substantial commitment to convertibles.

Global or Regional?

A global approach can be justified only if it is consistent with the strategic case we have made. Is this the case?

An approach which is global but on a currency hedged basis will be consistent both with the fund's approach to foreign bonds and its thinking with regard to equities.

Our ALM analysis was carried out on the basis that convertibles have some bond and some equity characteristics. In practice, many ALM processes acknowledge a role for foreign bonds, but almost always on a currency hedged basis. Likewise, the same models identify a role for foreign equities, although the question of whether or not to

hedge is generally more difficult to answer and often ambiguous. As a practical measure, many funds choose to partially hedge their foreign equity exposure (one reason is to minimise “regret risk” arising from future currency movements), but from a modelling perspective they might be equally comfortable being fully hedged.

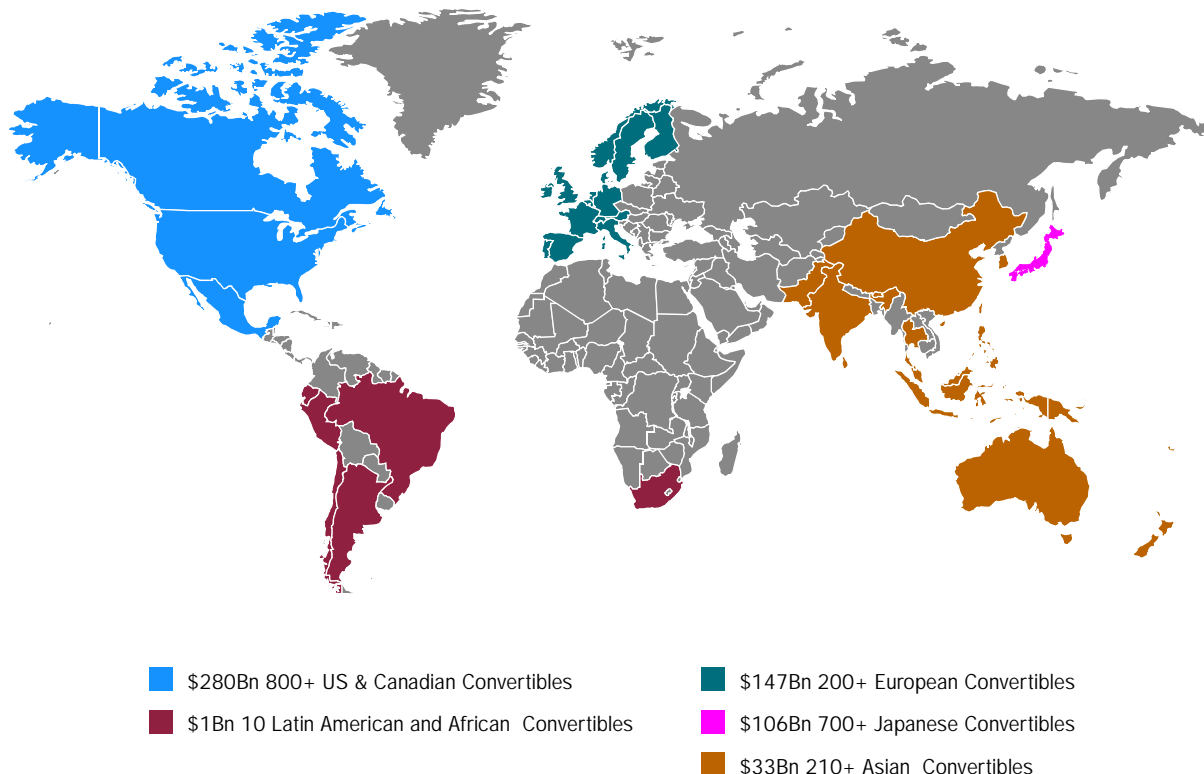
This enables us to define a logical strategy for convertibles. An approach which is global but on a currency-hedged basis will be

consistent both with the fund's approach to foreign bonds and its thinking with regard to equities (even if, in practice, it has chosen to leave part of its equity exposure unhedged). Furthermore, thinking globally broadens the opportunity set, offers better diversification and is entirely consistent with longer-term trends in approaches to equity investment.

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9 | Size of Convertibles Market (Jan. 31, 2002)

Global Market Capitalisation (US\$566Bn)



Source: Morgan Stanley Research Estimates.

Managing Delta

All convertibles are not the same. Some behave much like bonds, others like equity, depending on the likelihood of conversion — the higher the probability of conversion, the more the convertible will be equity-like. The degree of equity participation is called the “delta” of the convertible. This term is taken from derivatives pricing theory and is a number between zero and one, zero indicating that the convertible’s behaviour is entirely bond-like and one that it is entirely equity like.

As equity markets fall, the probability of

conversion falls and the convertible’s delta falls — this is precisely the feature which makes convertibles attractive in the first place. This has the effect of reducing the fund’s overall exposure to equities. We believe a pension fund should implement a rebalancing policy with regard to its delta exposure in much the same way as it would rebalance the underlying equity / bond split. This rebalancing policy should be dynamic (because the optimal level of equity participation varies with funding level) and scheme specific. For example, a pension fund with a high equity allocation is less risk averse than another with

a low equity allocation. It is logical for this to be reflected in the structure of the convertible portfolios, with the former having a higher delta than the latter.

In practice, it is necessary to retain a degree of flexibility when setting the rebalancing policy. Recent market conditions have meant that the deltas of almost all convertibles have fallen sharply — depending on market circumstances at the time it may not be possible to rebalance the delta all the way back to the optimal level, or only to do so by compromising the quality of the underlying portfolio. The delta rebalancing rules need to

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be more flexible, therefore, than those which might be appropriate for the equity/bond split. Nevertheless, having a delta rebalancing process in place is important.

Active versus Passive

Another key decision is whether to invest in convertibles actively or passively. In practice, a passive approach is somewhat less “passive” than is the case with equities — the number of new issues, redemptions, conversions and corporate actions, in conjunction with a delta rebalancing policy, means that the approach might be better described as “semi-passive.” It makes sense to build such a strategy around a fund specific benchmark, defined by reference to the target delta.

Alternatively, of course, it is quite feasible to adopt a more active approach. As with other asset classes, the success of such a strategy will depend on the investor’s ability to manage such a portfolio or, alternatively, to identify external managers who are likely to add value.

Conclusions

The ALM analysis makes a compelling case for investing in convertibles, especially for underfunded plans. Where the plan is substantially overfunded and the sponsoring company has a weak call on surplus, there is a strong case for locking in that surplus by switching out of equities. However, in this instance, convertibles have a more modest relative advantage over bonds. In many cases we believe there is a good case for allocating 10–20% of total assets to convertibles.

For plans where the primary focus is on a corporate accounting perspective, the case for convertibles is weaker (although still quite strong). This reflects the fact that convertibles tend to have duration considerably shorter than, and credit quality inferior to, liabilities defined by reference to AA-rated long bonds.

Any allocation should be implemented globally, on a currency hedged basis. Such an approach is consistent with global trends in

equity markets, whilst retaining consistency with the approach generally applied to foreign bonds.

Managing the portfolio’s delta is an important consideration. We suggest that this should be rebalanced in a disciplined manner, subject to the constraints imposed by the market itself.

As with other asset classes, convertibles can be managed on an active or passive basis. If a “passive” approach is adopted, investors should be aware that there will be a greater degree of activity in the portfolio than for a traditional passive equity portfolio, for example. Indeed, the approach might be better described as “semi-passive.” We believe a good case can be made for building a portfolio around a plan-specific benchmark, based on the fund’s target delta. ■

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APPENDIX — Underlying Assumptions

The ALM analysis is based on the following key assumptions.

10 Capital Markets

	Expected Return (Geometric) %	Expected Return (Arithmetic) %	Standard Deviation %	Correlations:			
				Eq	Bonds	I-L	Convs
Equity	8.1	9.4	16.0	1.00			
Nominal bonds (AAA, 10 year duration)	5.2	5.4	6.6	0.30	1.00		
Inflation-linked bonds (duration 15)	4.8	5.0	7.3	0.05	0.14	1.00	
Convertibles	7.6	8.1	10.0*	0.72	0.24	0.06	1.00

* Calculated ex-post. The return distribution is not drawn from a normal distribution, reflecting the asymmetry of the asset class.
Source: Morgan Stanley.

Benefits

- Typical defined benefit plan, 40% of liabilities are in relation to active members, 60% in relation to inactive.
- Pensions in payment are increased fully in line with price inflation.
- Inflation assumed to be 2.75% (geometric mean) with 2.0% standard deviation; salary increases 4.75% (geometric mean) with 2.0% standard deviation.
- Any surplus arising is used firstly to reduce the company contribution rate as far as zero (i.e., the company cannot take money out of the plan). The company does not have access to surplus arising at the end of the 20-year projection period.

Projections

- Monte Carlo simulations based on 20 year projection period.

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