Reporting derivatives exposure for a pension fund: Gross versus net

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Abstract The simplest and most intuitive way of expressing exposure to derivative instruments in the context of a portfolio is to report gross exposures. However, this is often mistakenly interpreted as some indication of the economic exposure or risk that is assumed as a result of derivatives activity. To address these issues, some measure of the net derivatives position is necessary. The main limitation of net derivatives reporting is that it does not facilitate aggregation above the level of the portfolio. This is an unavoidable consequence of the fact that risk, unlike gross exposures, is not additive.

Keywords: *derivatives; gross; net; delta-weighting; economic exposure; risk*

Introduction

Nearly all pension fund managers need to report the amount of derivatives activity in their investment portfolios, to satisfy regulatory and fiduciary requirements and the requirements of individual investment mandates. For example, many investment mandates limit the use of derivatives to 10 or 15 per cent of the value of the portfolio, so knowing how much is held in derivatives can be vital. Aside from regulatory and contractual obligations, managers usually want to know how important derivatives are to the management of each asset class in the portfolio as well as how the performance of the portfolio may be affected by the use of derivatives. For example, are they adding to or reducing returns? So some consistent approach to reporting of volume and economic exposure is necessary. This also facilitates comparisons between portfolios.

While the exposure of physical assets is generally accepted as equal to their market value, there is no universally-accepted standard for representing derivatives exposure. This is partly because many derivatives positions are effectively short-sales, partly because of the gearing aspects of derivative contracts and partly because any physical asset can have many different derivative contracts associated with it.

This paper considers the most frequent applications of derivatives in investment management and discusses various approaches to representing the volume of derivatives used and their impact on economic exposure. It will show that the rules chosen to represent derivatives exposure in a portfolio will dramatically impact its apparent exposure to derivatives and the financial instruments on which they are based. This has important implications for any conclusions that may be drawn about the

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contribution of derivatives to portfolio performance. It will also show that there is no single 'correct' way of reporting derivative exposure in a portfolio, and that the most appropriate method in each case depends on what information the report is intended to present.

How are derivatives used in portfolio management?

Efficient portfolio management (EPM)

As a complement to conventional portfolios, derivatives are frequently used for liquidity management, asset allocation tactical shifts, return enhancement and for risk management and control. This section describes how each works in practice.

Liquidity management

Simple futures contracts, such as share price index futures and bond futures, can increase the efficiency of investing liquid assets that accumulate in portfolios as a result of dividend and other income flows, and new investment that arrives in small amounts. Rather than leaving these sums uninvested, futures contracts can be bought cheaply as temporary cover. Frictional or transactional liquidity thus forms collateral for bought futures contracts. When market conditions are favourable, or an economic volume of cash is accumulated, the futures can be sold and physical instruments bought in by an exchange-for-physical (EFP) transaction. Having negligible transactions costs, futures avoid the high costs of frequent trading of small volumes of physical instruments or the alternative of remaining underinvested in a rising market, risking underperformance. The use of futures in this way does not affect the risk of the portfolio (except that, by ensuring that the portfolio is fully invested, it lowers risk against the asset

class benchmark). Return can even be enhanced if futures are bought and sold at prices that are advantageous relative to the underlying physical asset. This activity is scalable: the potential benefit of using futures to manage liquidity is virtually limitless due to the high volumes that can be transacted quickly on futures markets.

Tactical asset allocation shifts

As with liquidity management, simple futures contracts can effect short-term asset allocation shifts with negligible transactions costs. Thus a temporary shift from, say equities to bonds, can be achieved by selling share price index futures and buying bond futures. As with the role of derivatives in liquidity management, futures contracts do not alter the risk of the portfolio, but can enhance return if bought below and sold above fair price, and by lowering transactions costs. For longer-term asset allocation shifts, asset swaps can be used in the same way as futures.

Return enhancement

Futures and options can be used to enhance returns to conventional portfolios, both in combination with liquidity management and as return enhancements in their own right.

As mentioned above, futures in lieu of physical can add risk-free return if they are bought at below fair price, or are sold at above fair price. Fair price is easily calculated as a function of the price of the underlying asset, any imminent dividends or coupons, the interest rate and the time to expiry of the futures contract. This return enhancement is frequently achievable in the course of using futures for liquidity management or to effect tactical shifts.

If the investor has some advantage in a particular asset class, such as a favourable tax position or better than average

investment skill, then this can be 'transferred' to other asset classes. To achieve this, physical securities are held in the favoured asset class, while futures are sold in that asset class and bought in another. For example, an investor may have particular skill in selecting European equities, but require some exposure to US stocks where his skill is only average. By combining bought physical European equities, selling futures on European equities and buying futures on US stocks, he can capture his European stock-picking skill while at the same time gaining a broad exposure to US stocks. This type of transaction is sometimes called a synthetic swap. The mechanism is the same as for tactical asset allocation shifts: physical assets are held in the asset class where the manager has greatest advantage. At the same time, futures are used to achieve the desired portfolio asset allocation.

Bought call options can enhance return by:

- providing a cost-efficient substitute for the underlying physical instrument while maintaining exposure to price appreciation; and
- avoiding losses due to falls in the price of the underlying physical instrument.

Bought put options can also enhance return by:

- benefiting from a fall in the price of the underlying asset; and
- avoiding losses due to rises in the price of the underlying physical instrument while benefiting from price deterioration.

Sold options enhance return by attracting option premium, which the option seller retains if the options expire unexercised.

Simultaneous bought and sold options

can provide a cost-efficient substitute for the underlying physical instrument while protecting against unfavourable movements in the price of the underlying physical instrument. For example, a bought call with an exercise price of \$5.00 combined with a sold call with an exercise price of \$10.00 gives exposure to share price movements in between. If the price of the underlying stock is \$5.00 or less at the time the options expire, then the investor loses the net premium paid for the options. If, on the other hand, the share price is \$10.00 or more when the options expire, the investor gains \$5.00 ($\$10.00 - \5.00) less the net premium paid.

Buying and selling options according to their relative value (implied volatility), while ensuring that the overall position is market-neutral by means of delta-hedging (see explanation of delta in the later section titled 'Delta adjustment of options positions') can be an important source of return enhancement that is independent of the return to the underlying physical investment. Thus if the investor believes that an asset is about to become more volatile than it has been in the recent past, but is not sure in which direction the price will move, he or she can buy put options and buy a delta-weighted amount of the underlying asset. If the hoped-for volatility materialises, then his or her portfolio will benefit regardless of whether the price goes up or down. In other words, this source of return is unrelated to the direction of the securities on which the options are based. Because of its diversifying effect it can significantly improve the risk-return balance of the overall portfolio.

Risk management and control

Forwards futures, swaps and options can all contribute to risk management and control of conventional portfolios. The

simplest applications are purchase and sale of foreign exchange forwards to hedge unwanted currency risk or the purchase of share price index or bond futures to manage liquidity, which protects the portfolio against being underinvested in a rising market. More sophisticated risk management is possible by carefully structured swap and option positions, which can allow the investor to target and hedge unwanted risk and retain or increase intended risk. The result is a portfolio that is finely-tuned to its investment objectives and the views of the investment manager.

Investment products based on derivatives strategies

Because they provide efficient means of hedging, targeting and managing risk and managing liquidity, futures, swaps and options can provide the basis for innovative investment products that meet specific risk-return objectives. For example:

- **Smoothed return funds.** Options, in conjunction with predefined decision rules, can help avoid the worst effects of sharp movements in physical asset prices and thus deliver portfolios with much reduced return volatility. Such portfolios can help meet demand for investments that participate in sharemarket appreciation while avoiding the most brutal falls in value. Investors can choose the balance that suits them best between the level of protection against losses and how much they participate in market growth. Moreover, their funds need not rely on a liquid market for the appropriate options: many smoothed-return funds take advantage of the ability to use futures contracts to replicate the behaviour of options.
- **Guaranteed minimum return funds.** Actual options can deliver

investments that will never fall below a specified value within a given timeframe, filling the need for even more risk-averse investments. The main benefit of using options to hedge these portfolios is that it avoids the need for expensive reserve funds. By adjusting the amount of options bought and their effective strike price, investors can choose the balance that suits them best between the level of protection against losses and participation in market growth.

- **Tactical overlay.** These are specialist wholesale investment mandates designed to effect short-term modifications to the composition of an existing balanced portfolio. They work in the same way as tactical asset allocation shifts described above. The overlay and underlying portfolios are often managed by different investment management companies. Futures and forwards are bought and sold to effect asset allocation shifts without transacting physical instruments. The main benefit is to reduce transactions costs, but overlay strategies can also enhance return in the same way that tactical asset allocation shifts do.
- **Protection overlay.** They work in a similar way to tactical overlays in that the mandate is independent of the management of the underlying assets, and is often managed by a separate investment manager. Protection overlays employ the option technology that is used for smoothed return or guaranteed minimum return funds, rather than simple bought and sold futures. The benefit is a cost-efficient and flexible hedge against unwanted volatility or unfavourable market movements without transacting physical instruments.
- **Hedge funds.** Futures, swaps and options are ideal for use in hedge

Table 1: Gross derivatives holdings for three portfolios

Instrument	Portfolio 1 £000	Portfolio 2 £000	Portfolio 3 £000	Total £000
Physical equities	600	450	520	1,570
Share price index futures	150	50	80	280
Call options bought	50	—	20	70
Call options sold	50	—	20	70
Physical bonds	300	200	300	800
Ten-year bond swaption	80	—	50	130
90-day futures bought	50	20	—	70
90-day futures sold	50	20	—	70
Cash	50	20	10	80
Total	1,280	740	980	3,000
Asset class				
Physical equities	600	450	520	1,570
Equity derivatives	250	50	120	420
Physical fixed interest	300	200	300	800
Fixed interest derivatives	180	40	50	270
Cash	50	20	10	80
Total	1,280	740	980	1,720
Instrument type				
Physical	900	650	820	2,370
Exchange-traded derivatives	350	90	120	560
Over-the-counter derivatives	80	—	50	130
Cash	50	20	10	80
Total	1,280	740	980	3,000

funds as they facilitate both gearing and short-selling. This allows the hedge fund to gain effective exposure to risky assets that is many times greater than the capital invested in the fund. They can also sell instruments short in anticipation of buying them back later at a lower price. While one of the obvious benefits of this is that the investor gains simple leverage on the skill of the investment manager, many hedge funds use futures, swaps and options to create offsetting long and short positions. This results in a market-neutral portfolio that derives its return from the relative value of

similar assets rather than the direction of the market itself. Well-managed market-neutral portfolios can combine the high returns from gearing facilitated by derivatives with a risk profile that is considerably more conservative than most long-only portfolios.

Whatever the rationale for using derivatives, some rules need to be established to ensure consistency within and between portfolios on how to report volume of transactions and effective economic exposure. The first question is whether derivatives should be reported as gross or net.

Gross derivatives exposure reports

The simplest way of representing derivatives exposure is to use gross exposures, whereby bought positions appear indistinguishable from sold positions. For example, a bought September FT100 futures contract is given as £41,330 ($£10 \times 4133$). Similarly, a sold contract would show an exposure of £41,330.

Reporting derivatives exposures in this way provides useful information about the volume of transactions and allows this volume to be aggregated to any required level. This means, for example, that an investment manager can easily see how much derivatives activity is being carried out by asset type, by contract type, over-the-counter versus exchange-traded, by client type, by counterparty and at the level of the enterprise itself.

Table 1 illustrates how a gross report might look at the portfolio, asset class and instrument levels. Note that sold derivatives are omitted from the totals.

The limitations of gross derivatives exposure reports

The potential limitation of reporting gross derivatives is that it is sometimes interpreted as an indication of the economic exposure, and by extension investment risk, that is associated with derivatives activity. This is at best misleading, and can give rise to confusion.

The FT100 example above illustrates the point. If the bought position is matched with a sold December FT100 futures contract, which has a face value of, say, £41,460, the total position is reported as £82,790, indicating that the calendar spread gives twice the exposure to UK equities, and is therefore twice as risky as the single bought position. This

is obviously wrong, as the two positions are offsetting, so the exposure of the spread is less than that of either the long or short positions by themselves. The figure of £82,790 indicates the volume of transactions, but the net of -£130 is a better indication of the economic exposure to the UK equities market.

This problem is compounded if the report is compared from one period to the next. For example, if the futures spread is closed out during the period, the month-end report will show a gross exposure of £0, where previously it had been £82,790, suggesting a large reduction in exposure when in fact the reduction is negligible.

Net derivatives exposure reports

Clearly there is a case for reporting net derivatives exposure. The question is: what should and should not be netted? Three possible approaches to netting follow, each with advantages and disadvantages.

- 1 Allow long and short positions in derivatives based on the same underlying asset to offset each other, reporting the net face value. This would eliminate the anomaly illustrated in the FT100 example above, and facilitate aggregating derivatives exposures by instrument type to the level of the portfolio, consistent with reporting of aggregated gross derivatives positions. The disadvantages are:
 - It would not give a helpful report for derivatives in different contracts, for example a futures position may be offset by an economically similar derivative. Consider a bought S&P500 future that is offset by a sold S&P350 future. The two positions are not identical but have obvious similarities and the

- combination has less exposure to the US stock market than either the long or the short by themselves.
- It may introduce other misinformation for example, offsetting otherwise-identical futures for different expiry months ignores the spread risk inherent in the transaction.
 - It would also leave unresolved the anomalies posed when derivatives positions are held in conjunction with physical assets, such as for efficient portfolio management. Derivatives would appear to increase risk when in fact they are reducing it.
- 2 An extension of this is to nominate a maximum tracking error or other risk measure for a pair of instruments or baskets of instruments beyond which derivatives and other assets are deemed to be not offsetting. The maximum tracking error may be set at, say, 10 per cent, so that instrument pairs with a tracking error of 10 per cent or less are deemed to be offsetting, while those with a tracking error above 10 per cent are not. Instrument pairs in this context can be any instruments — derivatives or physical for example, a share price index contract may be netted against a basket of physical shares so long as the tracking error between the two does not exceed 10 per cent. Such ‘congruence checks’ can prove a simple and effective means of determining which derivatives transactions are allowed in the context of efficient portfolio management.. There are several disadvantages:
- It is arbitrary. A relatively small change in market conditions could, from one month-end to the next, shift a tracking error from, say, 9.95 per cent to 10.05 per cent. The result would be that an exposure that was previously reported as zero, because the assets were deemed to be perfectly offsetting, is shown abruptly as equal to the gross exposure because the instruments are now deemed to be unrelated.
 - It is sensitive to both the risk model used and the method used to compute the covariance matrix, which is a major determinant of the tracking error.
 - It does not provide a meaningful indication of economic exposure. Asset pairs with a tracking error of 10 per cent or even 5 per cent do not have equal economic exposures, while assets with a tracking error of, say 15 per cent are not totally unrelated.
 - It can be computationally complex. While suitable for portfolios where there are only a small number of positions used for cash flow management or tactical asset allocation, the procedure becomes more complex when applied to a hedge fund which comprises derivatives positions in complex arrays of positions. The person conducting the congruence check is unlikely to know which instruments should and should not be paired for the purpose of testing for congruence; and risks either testing the wrong pairs, which would give meaningless results, or spending excessive time conducting exhaustive pairs testing.
 - It does not facilitate aggregation to the level of instrument type, asset class, counterparty and portfolio type. Offsetting positions will often span exchange-traded and over-the-counter derivatives and physical assets, as well as swaps, options and futures.
- 3 Net comparative reporting. Use tools

Table 2: Net comparative derivatives exposure report

	NAV	Risk including derivatives %	Risk excluding derivatives %
Portfolio 1	1280	7.50	8.50
Portfolio 2	740	5.00	5.25
Portfolio 3	980	6.15	6.20

already in place, such as tracking error, market beta, DV01 and duration according to the composition of the portfolio, to measure aggregate estimated portfolio risk both including and excluding derivatives. In other words, two risk estimates are produced for each portfolio (see Table 2).

Comparing the risk of the portfolio both with derivatives and without gives a measure of the overall impact of derivatives on portfolio exposure and risk. This has the advantages that it:

- Accommodates offsetting positions;
- Allows for various degrees of differences between derivative contracts and baskets of physical assets.

The result is affected by the period over which covariances are computed, but since both parts of the report are affected in the same way, this effect will be unimportant. The main disadvantage is that it does not accommodate aggregation by asset class and instrument type to the level of portfolio type.

For all three portfolios derivatives are reducing risk, reflecting the fact that positions in share price index futures in each, and ten-year bond swaptions in portfolios 1 and 2 reduce asset allocation risk while options and futures spreads have largely offsetting, and therefore negligible, risk

Being a comparative analysis, the choice of risk measure is not critical as long as it is pertinent to the type of portfolio. For conventional portfolios, the

risk measure could be tracking error or duration versus benchmark. For hedge funds it is more likely to be some kind of value-at-risk (VaR) estimate.

Delta adjustment of options positions

The delta of an option is a number between -1.0 and 1.0 describing the change of the price of an option associated with a change in the price of the underlying asset or contract. For example, an option with a delta of 0.8 will increase or decrease in value by $\$0.80$ for each $\$1.00$ change in the price of the underlying. Delta is a useful way of expressing option positions in terms of their equivalent in the underlying instrument. It is important to note, however, that this comparison is valid only for small changes in price and for short periods of time. The option delta itself changes with the price of the underlying instrument. For example, a deep in-the-money option (for a call this is where the asset price is well above the option exercise price) the delta is close to 1.0 , indicating that the option behaves like the underlying. For a deep out-of-the-money option, the delta is close to zero.

For forwards, futures, contracts for difference and swaps the simple face value of the contract is a good indication of economic exposure to the underlying instrument. For options, the face value needs to be modified by the option delta to more accurately represent economic exposure. This has implications for both

Table 3: Delta-adjusted gross derivatives

Instrument	Delta	Portfolio 1 £000	Portfolio 2 £000	Portfolio 3 £000	Total £000
Physical equities	1.00	600	450	520	1,570
Share price index futures	1.00	150	50	80	280
Call options bought	0.65	33	—	13	46
Call options sold	0.35	18	—	7	25
Physical bonds	1.00	300	200	300	800
Ten-year bond swaption	0.50	40	—	25	65
90-day futures bought	1.00	50	20	—	70
90-day futures sold	1.00	50	20	—	70
Cash		108	20	42	170
Total		1,280	740	980	3,000
Asset class					
Physical equities		600	450	520	1,570
Equity derivatives		200	50	100	350
Physical fixed interest		300	200	300	800
Fixed interest derivatives		140	40	25	205
Cash		108	20	42	170
Total		1,280	740	980	3,000
Instrument type					
Physical		900	650	820	2,370
Exchange-traded derivatives		300	90	100	490
Over-the-counter derivatives		40	—	25	65
Cash		108	20	42	170
Total		1,280	740	980	3,000

gross and net exposure reports. Tables 3 and 4 show how gross and net would be affected by delta adjustment.

Note that the face value of bought and sold options and the ten-year bond swaption have been reduced by the delta. Bought calls are now shown as £33,000 ($£50,000 \times 0.65$). The deltas of 0.65, 0.35 and 0.50 will change over time as well as with changes in the price of the instruments underlying the options and swaption, so it is important to note that this exposure is valid only for the specified point in time.

The most important feature of options is that they have asymmetric return probability distributions, meaning that positive and negative returns are equally likely). That is, they are exposed to

either increases or decreases in price, but not both. The implication of this is that they are unsuitable for inclusion in standard risk measures, such as tracking error, which assumes a normal-like distribution of returns for all the instruments in the portfolio.

There are two main approaches to including options in a portfolio-wide risk measure.

The first is to adjust the option holding by its delta and then treat it as if it were a physical asset. This in effect finds the equivalent exposure in the underlying instrument, which can then be included in the conventional tracking error computation. The benefit of this approach is that it allows a detailed and reasonably accurate estimation of

Table 4: Delta-adjusted net derivatives

	NAV	Risk including derivatives %	Risk excluding derivatives %
Portfolio 1	1280	6.95	8.50
Portfolio 2	740	5.00	5.25
Portfolio 3	980	6.12	6.20

Table 5: Decomposition of comparative risk reports

Delta-adjusted Portfolio 1	NAV %	Risk including derivatives %	Risk excluding derivatives %
Equities	61.13	58.00	55.00
Fixed interest	30.47	35.50	28.00
Cash	8.40	2.00	2.00
Asset allocation		3.00	13.00
Interaction		1.50	2.00
Total	100.00	100.00	100.00

portfolio-wide risk and a robust decomposition of that risk. The limitation is that the option delta applies at only a single price for the underlying instrument and at a particular point in time. Thus the risk measure obtained loses validity with the passage of time and movements in underlying asset prices.

The second approach is to adopt a measure that explicitly accounts for options. One popular such measure is VaR, which is an estimate of the loss associated with a given probability, such as 1 or 5 per cent. It is usually computed using some kind of simulation process based on historical asset returns. It allows the investor to focus only on downside risk, so does not assume any symmetry of return distributions. The limitation of VaR is that most VaR estimates are inherently short-term measures of risk, being designed for overnight risk. For this reason VaR offers only a slight advantage over the delta-weighted risk measure, and for the purpose of investment portfolios is best complemented with some other measure of risk.

Risk decomposition

A potentially powerful extension of net comparative derivatives exposure reporting for derivatives, described earlier, is that a comparative decomposition of risk can show where the risk modification is taking place. Table 5 shows that for Portfolio 1, the share price index futures position and the ten-year bond swaption have reduced asset allocation risk, while the futures and options spreads have increased equity and fixed interest risk slightly.

Other considerations

Gross and net reporting of derivatives exposure, far from being competing approaches, are complementary, furnishing completely different sets of information about the portfolios. Most managers will find they need both, but in deciding which report is suitable, the following considerations may be helpful.

Aggregate exposures

The main limitation of net comparative derivatives exposure reporting is that

aggregation of derivatives exposure is limited to the level of the portfolio. In Tables 1 and 3, gross exposures are shown aggregated by asset class, region and instrument type. They can also be aggregated by counterparty, portfolio type or business unit to give a good indication of the volume of business being transacted in various markets and instrument types. The level of aggregation that is appropriate depends on what information is required, for example the manager of a business unit may be interested to know what volume is transacted on a particular futures exchange.

In contrast, net derivatives reports are only appropriate at the level of the portfolio. The economic exposure implied by derivatives cannot be aggregated across portfolios because risk, and by extension risk comparisons, are not additive. The risk of any portfolio is not equal to the sum of the risks of its components.

Similarly, any net reporting of sub-portfolio derivatives exposures should take into account the interaction effect between asset classes and between asset allocation and asset class composition. For example, reporting futures exposures by asset class may ignore the relationship between futures contracts in different markets. Consider a shift from UK equities to US equities effected by selling FT100 futures and buying S&P500 futures. Netting by asset class will effectively show the two exposures in their gross format, whereas the portfolio-wide net exposure will reflect the fact that, to some extent the positions offset each other. Table 5 illustrates how risk decomposition can be reported for net derivatives.

Avoiding arbitrary cut-offs

When seeking to control risk, many investors and some investment managers are tempted to impose holding or other

constraints and limitations on the portfolio. This approach has undeniable intuitive appeal, but the results can be paradoxical.

The example of the 10 per cent tracking error cut-off for netting illustrated one of the problems posed by limits. If too narrow, they will frequently be hit, with the result that transactions take place merely for the purpose of abiding by the limits, rather than for any economic benefit of the portfolio. This results in a cost to the portfolio with no associated benefit. On the other hand, if limits are set too wide they are meaningless.

Constraints and limitations, are nearly always applied as a proxy for risk control. This being the case, given the existence of widely accepted risk measures, it is surely more appropriate to apply directly the desired risk limits or targets. This has the advantage of avoiding arbitrary cut-off points and the associated costs they can impose, while more effectively targeting the level of risk.

One of the most important advantages of net comparative derivatives exposure reporting is that it avoids the trap inherent in arbitrary definitions and cut-offs.

Ensuring consistency from one period to the next

For most investors, the purpose of the derivatives activity and exposure reports is to gauge the overall level of activity in these markets and some measure of the impact they are having on portfolio performance and risk. They are often also used to compare derivatives activity and exposure between:

- business units;
- asset classes;
- instrument types;

- counterparties;
- portfolio types;
- over time.

While gross reports give useful information about the volume of derivatives transacted, and thereby provide valid comparisons, it is important to avoid their being interpreted as an indication of economic exposure or risk. For this reason, the interests of consistency are well served by providing both gross and net derivatives reports. Net reports are not unduly affected by the large and often arbitrary variations that are the result of offsetting derivatives transactions such as futures and options spreads.

Conclusion

As derivatives are used increasingly to control risk, enhance returns and improve the efficiency of the management of pension portfolios, pension managers are interested in — and are often required to know how much — derivatives activity their funds are engaged in. The simplest and most intuitive way of expressing this is to report gross exposures. But while this is a very good way of indicating the volume of transactions undertaken, it is

often mistakenly interpreted as some indication of the economic exposure or risk that is assumed as a result of derivatives activity. To address the issues of risk and economic exposure, some measure of the net derivatives position is necessary. Of the various ways of expressing net derivatives exposure, net comparative derivatives exposure reporting, showing the aggregate risk at the portfolio level with and without derivatives, is the most elegant and robust, avoiding arbitrary rules and cut-offs that could lead to paradoxical and inaccurate results.

The inclusion of options in a diversified portfolio adds further complication, as most standard risk measures struggle to accommodate these instruments. Portfolios with a relatively small volume of options can include them on a delta-weighted basis in a normal risk estimation. Portfolios that comprise a large proportion of options and option-like instruments benefit from a risk estimation that specifically accommodates the asymmetry of returns, such as VaR.

The main limitation of net derivatives reporting is that it does not facilitate aggregation above the level of the portfolio. This is an unavoidable consequence of the fact that risk, unlike gross exposures is not additive.