



Russell Research

Title: **Dynamic Downside Protection**

Intelligent, efficient and evolving
implementation in action

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Synopsis: The new risk-on risk-off world that we have experienced since the GFC has seen a heightened volatility of volatility. In response, investors are seeking downside protection at a reasonable price. This paper references some commonly available strategies that come at a cost often considered prohibitive. We then highlight the Dynamic Downside Protection Strategy that Russell has been successfully running for the past three years. This strategy provides ongoing risk reduction to clients without the sacrifice to wealth compounding experienced in traditional hedging programs.

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Dynamic Downside Protection

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SECTION I: WHY DOWNSIDE PROTECTION IS SO IMPORTANT

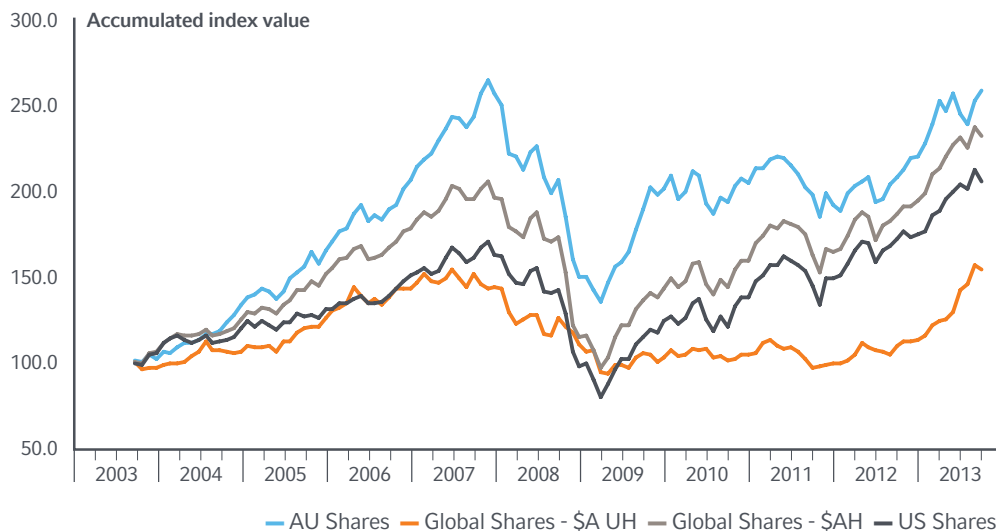
INTRODUCTION

The basic 'math' of negative returns (or compounding) is that you need higher returns in up markets than the returns suffered in down periods to recover the loss suffered. Furthermore, you then need more again on top to provide the positive return investors are seeking for investing in risky assets in the first place. The magnitude of difference increases with severity of movement.

Examples: a 50% fall in one time period requires a 100% rise in the next to get back to a break even position. More realistically, 10% or 20% falls require increases of 11.11% and 25% respectively to restore lost value. Figure 1 illustrates the time required to make back losses incurred during the GFC.

Figure 1: Rise and fall of equities over last 10 years

Rise and Fall of Equity Markets



Source: Russell Investments, for illustrative purposes only

AU Shares – S&P/ASX 300 Index

Global shares \$A UH – MSCI World ex Australia Index

Global shares \$AH – MSCI World ex Australia Index AUD hedged

U.S. shares – S&P 500 Index

Indexes are unmanaged, cannot be invested in directly, and do not take into account any fees and costs associated with an actual investment. Past performance is not a reliable indicator of future performance.

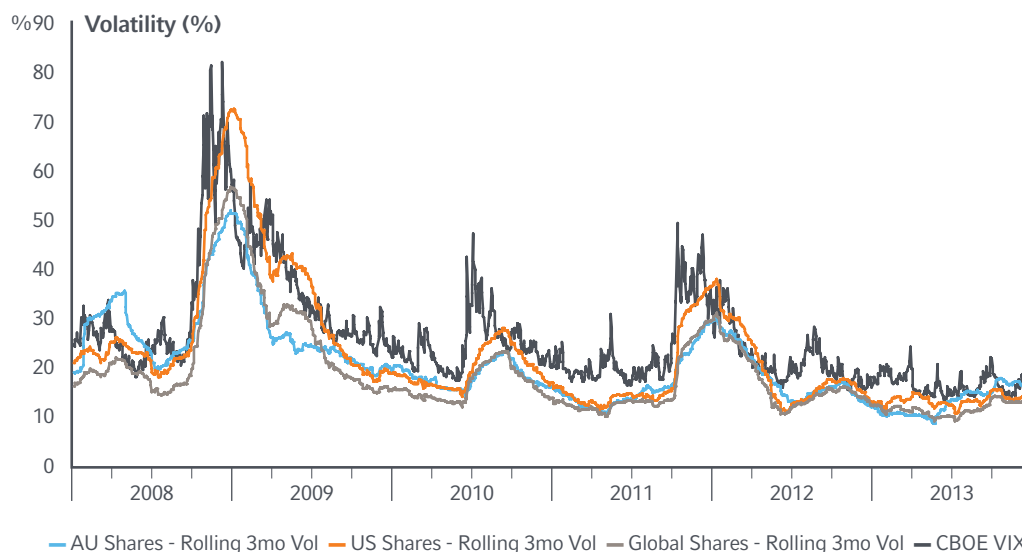
Over the past five years, not only has the volatility¹ of returns increased, but the volatility of volatility² has also increased in markets characterised by 'Risk-On Risk-Off' swings in sentiment. Figure 2 illustrates the changes in volatility and more importantly, the spikes in volatility experienced over the last five years.

¹ Volatility is a measure of the level of fluctuations in both up and down markets.

² The change in market volatility over time.

Figure 2: The volatility of volatility

3-Month Rolling Volatility vs. VIX Index



Source: Russell Investments, for illustrative purposes only.

AU Shares – S&P/ASX 200 Price Index (rolling 3 month volatility)

U.S. shares – S&P 500 Price Index (rolling 3 month volatility)

Global shares – MSCI World ex Australia Price Index (rolling 3 month volatility)

CBOE VIX – Chicago Board of Exchange Volatility Price Index

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Given the heightened volatility of volatility over recent years, investors are looking for solutions. More importantly, they are looking for downside protection, but want to avoid paying an excessive up-front premium or giving away all of their potential upside.

Option-based downside protection is expensive, and increasingly so when you wish you had it most – after volatility has already risen and markets are falling. Furthermore, long option positions have a time-decay³ characteristic that makes holding them on an ongoing basis very expensive. Indeed, there are many long-term investment strategies that take the opposite side of the trade (i.e. provide the protection) to harvest the excess risk premium that the average investor is willing to pay⁴.

In this paper, we outline some potential methods of risk reduction or downside protection: incorporating both physical and synthetic (or derivative based) solutions. Recognising that downside protection is expensive we then illustrate the concept, details and benefits of dynamic option replication strategies using examples of client solutions that we have designed and run for the last three years.

³ Time-decay (also known as theta or time-value decay) is the change (decline) in the price of an option as it nears expiry. This is because the greater the uncertainty about an option's expiry value, the greater the time value. Conversely, the greater the certainty about an option's expiry value, the lower the time value. Therefore, as the time to expiry reduces, the certainty increases and the time value of the option decreases. Consequently, when rolling options (replacing exposure near to or at expiry) to maintain protection, you are selling an instrument with low time value and buying an instrument with high time value. Over time, this erodes value.

⁴ Maidel, S. & Sahlin, K. (2010). "Capturing the volatility premium through call overwriting", by Scott Maidel and Karl Sahlin, Russell Research, December. Bishop, R., Ganti, A., Maidel, S & Pedack, D. (2011). "A framework for considering call overwriting", Russell Strategy Spotlight, July.

SECTION 2: OPTIONS FOR RISK REDUCTION

There are a number of ways in which an investor can protect themselves against volatility or losses beyond their tolerance level. However, almost all of them require some degree of sacrifice in terms of returns, either by reduction in expected upside capture or an explicit cost for protection. Therefore, investors must weigh-up the most efficient trade-off between capital preservation and capital accumulation that meets their particular objectives and risk tolerance.

The desired timeframe for provision of downside protection is of utmost importance in deciding upon the method employed. Physical asset allocation changes can be costly to implement and therefore should not be undertaken unless there is the general desire for longer-term risk reduction. Derivative solutions are far cheaper to implement over shorter timeframes. Either way, recognition of current market views is also important in an attempt to reduce potential regret risk⁵.

Below, we consider various methods for providing downside protection. In part, we would consider the methods described below, involving the physical asset allocation, as a path or rite of passage required prior to implementation of an explicit downside protection strategy. We believe that only after due consideration of these longer-term strategies in building a robust fully diversified portfolio, should you progress to implementation of a specific downside protection strategy.

CHANGING THE PHYSICAL ASSET ALLOCATION

INCREASE DIVERSIFICATION

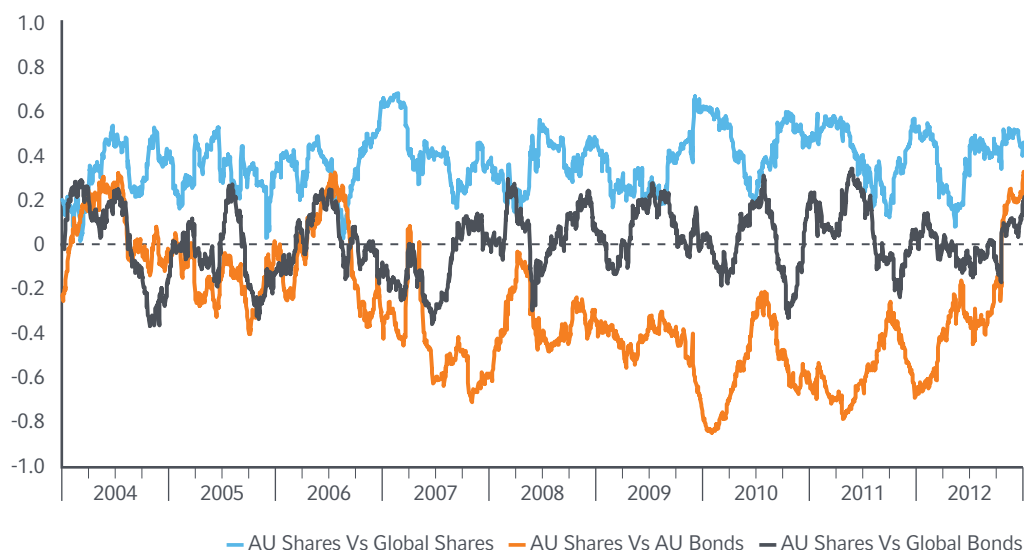
Increasing the diversification of your growth asset exposure is the most cost effective way of reducing downside risk without giving up potential upside. However, whilst the benefits of diversification are well understood, the degree of protection achieved varies under different market conditions and can decline in times of extreme market stress. Figure 3 illustrates the changing correlations between major asset classes over the last 10 years. This demonstrates that correlations are not constant and have moved materially over the last 10 years. Therefore, optimised portfolios and the correlations assumed cannot be relied upon at times of stress when correlations of various risk-seeking assets rise materially. It is for this reason that Russell recommends our clients do not solely rely on optimisers, but rather, consider what if scenario analysis and regularly review their portfolios and strategic allocations given the prevailing market environments.

⁵ Russell's Strategist Outlook & Barometer is produced to assist our clients in making such decisions – see <https://www.russell.com/AU/institutions/our-research/market-commentary/>

Figure 3: Volatility of correlations over time

Rolling 3 month correlations

Correlations



Source: Russell Investments, for illustrative purposes only.

AU Shares – S&P/ASX 200 Price Index

Global Shares – MSCI World ex Australia Price Index (unhedged)

AU Bonds – UBS Australia Composite Bond Index

Global Bonds – Citigroup World Government Bond Index (unhedged)

Indexes are unmanaged, cannot be invested in directly, and do not take into account any fees and costs associated with an actual investment. Past performance is not a reliable indicator of future performance.

EXPLOIT SYSTEMATIC BEHAVIOURAL BIASES THROUGH SMART BETA

Applying tilts to your growth exposure to target lower volatility segments of the market can also reduce risk. Such segments may include simple value or high dividend biases or more multifaceted ‘defensive’⁶ equity allocations. Such targeted exposure to particular sectors, factors or betas within the wider market is commonly referred to as a ‘smart beta’ approach. Targeting betas that have historically exhibited lower absolute volatility can reduce the level of risk within an equity allocation. As with diversification, this strategy provides very cost effective reduction and is something many of our clients and funds have implemented.

REDUCE GROWTH ASSET EXPOSURE

Finally, reducing the exposure of growth assets in favour of defensive assets obviously has the benefit of reducing the degree of portfolio volatility and thus potential downside. The cost is a reduction in expected return, all the more apparent with current bond yield levels being extremely low and the consequent asymmetric risk profile⁷.

⁶ Goodwin, T. (2013). “Russell Defensive & Dynamic Indexes: Better indicators of company risk”, Russell Index Insights, August.

⁷ The asymmetric risk profile refers to the wider range of potential outcomes for higher yields than for lower.

DERIVATIVE BASED EXPOSURE MANAGEMENT

There are vast arrays of strategies that can be employed using derivatives which seek to alter the pay-off profile and reduce the risk of general or specific downside events⁸. It is important to note when assessing any structure whether the protection is 'hard' or 'soft':

- **Hard Protection:** These strategies provide an absolute limit to total loss and would generally involve the purchase of a long put position. The costs of this purchase may be offset by writing other options positions, but the long put provides the hard protection.
- **Soft Protection:** These strategies seek to provide a high probability of maintaining the final value above a floor, but the cost of the protection is reduced by accepting some probability that the full level of protection is not maintained or that the floor is breached⁹.

Some of the most commonly used derivative strategies (Put Options, Put Spreads, Collars and Put Spread Collars) are briefly outlined in the Appendix II¹⁰.

SHORT-TERM TACTICAL TRADING VS. LONG-TERM RISK MANAGEMENT

The use of the options strategies noted above and described in Appendix II often fall into the category of tactical trading, though strategic applications also exist. Each strategy and pay-off profile should be consistent with what an investor believes about the future direction of the market and their specific tolerance for market risks. Without a strong forecast of the near – term market outlook and the specific horizons where option hedging is required, the cost of hedging with options becomes prohibitive.

In contrast, a dynamic option replication strategy provides investors with the ability to harvest greater upside potential whilst still providing an ongoing level of downside protection. Compared to a short-term tactical trading strategy, the dynamic downside protection strategy is an effective longer-term risk management strategy.

⁸ Derivative downside protection solutions are available across multiple asset classes. This paper will focus on equities where the most liquid derivative markets exist. In addition, this is where the majority of investors' risk budgets are spent and therefore where the greatest risk reduction can be achieved.

⁹ Changes to the physical asset allocation can be considered to provide a soft floor if exposure to risky assets remain in the portfolio.

¹⁰ Collie, Bob (2009), "Basic Greeks: Essential knowledge for investors considering options", Russell Research, April. Bishop, R., Ganti, A. & Maidel, S. (2011). "Dynamic Hedging using equity options", Russell Strategy Spotlight, August. Maidel, S. & Sahlin, K. (2010). "Effective implementation of downside protection strategies", Russell Research, May.

SECTION 3: DYNAMIC OPTION REPLICATION

NAMING CONVENTIONS

There are many different names for similar strategies that are all slight derivations of the same desired objective – reduce volatility and provide downside protection. Some refer to types of strategy i.e. Constant Proportion Portfolio Insurance ('CPPI'¹¹) or just Portfolio Insurance¹², along with actual trading strategies such as Safety First or Russell's Downside Protection ('DP') strategy described below, both of which intend to provide dynamic option replication and thus dynamic downside protection.

DESCRIPTION

Option replication strategies represent an example of soft floor protection. Exchange-traded futures¹³ are dynamically traded to replicate the pay-off of a chosen option strategy, such as a put or collar. As noted in Appendix II, Cashless Collar Strategies often require an undesirable trade-off between upside capture and downside protection levels. This is because downside protection is usually more expensive than potential upside participation. However, through a dynamic option replication strategy there is the ability to participate in a much larger part of the potential upside, thus reducing the opportunity cost of implementing a downside protection strategy.

As with all derivative strategies, nothing comes for free. The lower 'cost' on the foregone upside is commensurate with the lack of a hard floor on the downside, and some path dependency (explained below) in returns.

The targeted soft floor and acceptable probability of breaching it are two of the parameters set when tailoring the strategy to a client's objectives¹⁴. Through buying and selling equity exposure when markets rise and fall, the probability of breaking the floor is very low, but it is still a non-zero possibility. The probability of breaking the floor is reduced when markets are falling by selling equity, thus reducing sensitivity to the market. Conversely, a rising market and greater distance from the floor level allows for addition of more equity risk for greater return capture.

¹¹ CPPI is an investment strategy whereby an investor seeks to maintain an exposure to the market's potential upside but also provide a capital guarantee. The investor sets a floor on the dollar value of his or her portfolio, and then structures an asset allocation between risky assets and treasuries or cash, around that decision. The asset allocation is often determined via a simple multiplier factor. The end pay-off profile is similar to that of a put option.

¹² Portfolio Insurance refers to strategies where index futures are short sold to reduce or totally remove market exposure.

¹³ Exchange-traded futures are financial contracts obligating the buyer to purchase an asset (or the seller to sell an asset), such as a financial instrument (i.e. the FTSE100), at a predetermined future date and price. Therefore, purchasing or selling equity futures provides an investor with a positive or negative exposure to market movements.

¹⁴ For example, a 90% floor is targeted with a probability of breach being set at 10%. The lower the floor or greater the probability, then the higher the level of risk that can effectively be taken and the greater the potential upside capture. By comparison, a hard floor strategy that has a 90% floor will have 0% probability of breach but will incur greater costs in terms of forgone upside.

BENEFITS AND POTENTIAL DRAWBACKS

The benefits of a futures-based dynamic option overlay are that it can provide greater potential upside than an equity option strategy. Whilst this is predominantly drawn from the increased potential downside, there are also benefits due to lower costs and added flexibility.

When compared to the use of equity options, option replication:

- **Is more flexible.** It is much easier to revise the option replication strategy as changes only involve rebalancing the holdings in equity futures. This can allow the collar to be 'rolled up' as part of a 'keep what we have' strategy if equity markets deliver good returns in the early part of the term of the collar.
- **Is significantly more cost effective.** Option replication reduces the implicit or explicit costs introduced by:
 - Time decay – option replication reduces the impact of theta (time decay) on rolling option contracts (as noted in Section 1);
 - Skew – down side protection is noticeably more expensive than 'selling upside' within option markets. This 'skew' of pricing is less apparent with exchange traded futures;
 - Trading costs – dealing spreads associated with dealing over the counter ('OTC') options are higher, thus using exchange traded futures reduces the trading costs.
- **Involves less counterparty risk.** Equity futures are exchange traded and thus reduce counterparty risk compared to OTC options.

However, option replication:

- **Involves some degree of gap risk.** The inability to transact continuously means that option replication can lead to a better or worse outcome than a comparable OTC option strategy. E.g. if the market drops suddenly and precipitously (e.g. October 1987 and more recently October 2008), downside protection is not guaranteed.
- **Involves some degree of path dependency.** If the market falls significantly at the beginning of the term of the strategy then (depending on the algorithm or strategy followed) there is potential for equity exposure to be reduced to near zero. So there is no potential to gain exposure to any subsequent market rallies during the term of the strategy (this is referred to as being 'cash-locked').
- **Introduces a degree of opportunity cost¹⁵.** The dynamic trading often involves selling into weakness and buying into rallies. As a result, in choppier, directionless markets, a varied exposure to the market from these strategies can underperform a stable allocation. Conversely a dynamic strategy outperforms static allocations in a market trending period.

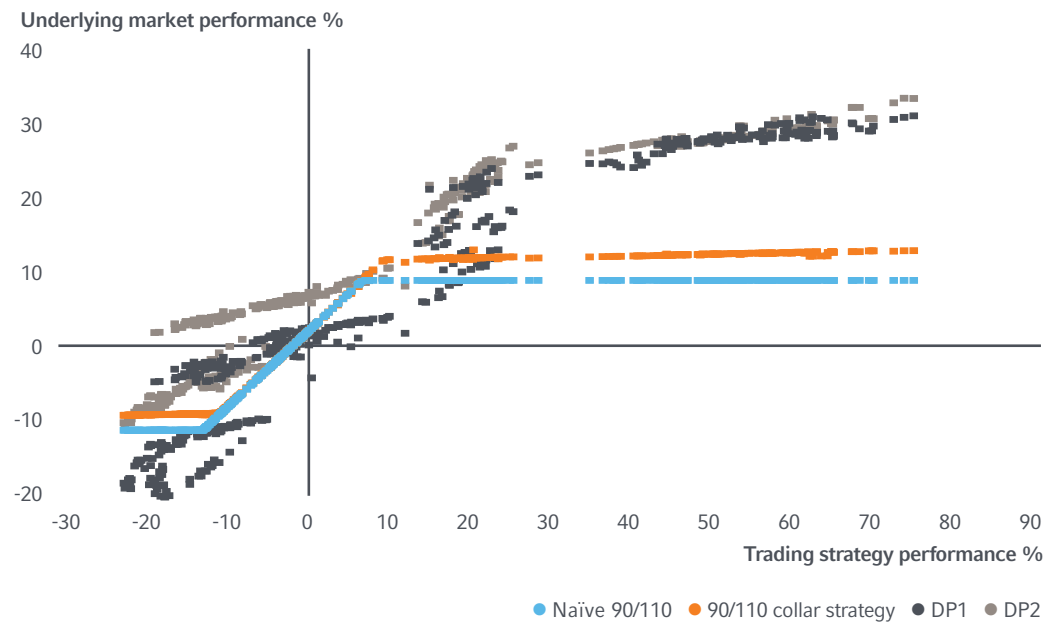
¹⁵ The opportunity cost is linked to path dependency as the 'opportunity' missed out on needs to materialise and therefore depends upon a particular path.

POTENTIAL PAYOFF PROFILE

The graph below illustrates the performance pattern of the downside protection strategy¹⁶ compared to a 90%-110% collar strategy. The downside protection strategy is attempting to provide a 90% floor. As can be seen in Figure 4 the upside is significantly greater than the 90%-110% collar strategy, reaching as high as 135% versus nearer 115%¹⁷. The graph also illustrates that a downside protection strategy doesn't provide a hard floor and under certain scenarios the return can be lower than the targeted 90% floor. This is the 'cost' of maintaining a significant degree of greater upside potential (c20%).

Figure 4: Pay-off profiles – Downside Protection versus 90-110 Collar Strategy

Rolling 1 year performance (Sept 10 – Sept 12)



Source: Russell Investments, for illustrative purposes only

Past performance is not a reliable indicator of future performance.

MIND THE GAP

There are a number of areas that should be appropriately managed in designing an option replication strategy or more precisely the trading algorithm that defines the strategy. It is imperative to address the following questions in designing the strategy.

- 1. How fast-twitch should the exposure management be?** Too much trading means higher transaction fees. Too little trading means higher risk of not meeting your targets due to gap risk. An effective cost-benefit analysis is needed to define trading band widths such as +/-3% or +/-5%.
- 2. How to mitigate intra-day volatility?** Standard strategies rebalance exposures at the end of each day however volatile markets can and have shown the ability to exceed trading band widths within a day. Therefore, a decision needs to be made on how this risk should be managed.

¹⁶ There are two downside protection strategy outcomes illustrated. DP1 represents the initially simplified strategy where as DP2 represents the strategy incorporating floating floors as discussed on page 13.

¹⁷ For reference, a 12 month 90% floor on the TOPIX currently costs close to 4% while a cashless collar strategy with a 90% floor provides a maximum upside of 109% (excluding dividends) Source: Bloomberg 8 November 2013. In reality, the '90%-110% collar strategy' provides returns greater than 110% through the dividends earned over the 12 month period. Dividends also mean that the floor is marginally above 90% as illustrated by the difference between the naïve 90/110 (which just shows a floor of 90% and upside of 110%) and the 90/110 collar strategy.

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3. **How do you mitigate the risk of being 'cash-locked'?** The strategy employed should ensure that should material market falls be encountered early in the life of the strategy, powder is kept dry to participate in potential market corrections.
 4. **How do you manage roll risk?** Trading at expiry can be both expensive and volatile i.e. risky. As such an efficient trading strategy needs to be employed to mitigate these issues.
 5. **How regularly should you reassess your targets?** The market doesn't often finish the year at the same point it started. Therefore, both as a matter of course and particularly following significant market gains, your trading strategy should be reassessed and the floors reset.

Below, we describe Russell's trading strategy that we have developed and implemented for clients over the past 3 years. We then provide actual performance history and analysis to illustrate the benefits of a dynamic option replication program and more specifically, the benefits of the trading algorithm and strategy Russell has developed.

SECTION 4: RUSSELL'S TRADING STRATEGY¹⁸

OVERVIEW

In defining a particular client trading strategy, Russell first discusses desired risk levels with each client. A downside floor is set and a probability of breaking that floor is set in line with the client's risk tolerance. An example would be a floor of 80% for asset value declines and a 5% probability of breaching the floor. As the market moves, the targeted equity exposure (0-100%) moves to hold the probability at the input level¹⁹.

The targeted equity exposure is achieved with a combination of existing physical exposures and futures trading. Russell's Downside Protection ('DP') provides an ongoing overlay strategy that protects a particular floor level in each defined period (typically 12 months). Both the floor and the acceptable probability (client's risk inputs) can be changed over time as the client's needs evolve. By limiting the severity of potential loss in any given period, the strategy behaves as a form of time-based risk budgeting. Having an ongoing futures program also shortens reaction time and allows for protection early in the market correction, rather than reacting in hindsight after the full damage has been done.

In times of extreme volatility, this strategy may even limit the initial equity exposure at the reset of a new protection period if the chosen probability is not attainable with a 100% equity allocation. Conversely, full exposure to the market is expected in a calm market with upward momentum at the point of reset. Thus, Russell's DP overlay matches the level of equity exposure to the investor's loss tolerance – adding equity exposure when market risk is low and reducing equity exposure when market risk is high. Importantly, Russell's approach is a more dynamic one, compared to a typical Constant Proportion Portfolio Insurance (CPPI) strategy, and is more customisable.

The algorithm used as the basis of the strategy is explicitly a function of the:

- remaining time horizon;
- client's risk appetite as determined by the level of floor and the allowable probability of breaching the floor; and
- current market volatility.

The parameters incorporated within the design of the strategy also account for:

- changing market regimes;
- distance from starting position (degree of market movement); and
- potential short and longer-term market corrections.

¹⁸ Russell's proprietary trading strategy/algorithm was originally based around the 'Safety First Portfolio Insurance' strategy developed by Goetzmann & Broadie. We have refined its use to deliver more reliable returns over a finite period – generally a year or quarter – such that protection can be maintained on an ongoing basis.

¹⁹ The targeted equity exposure is calculated by reference to such factors as market volatility, time to expiry and existing level of exposure to best achieve the desired probability levels.

THE DEVIL IS IN THE DETAIL

The outcome of a collar option replication strategy will be sensitive to a number of factors, including:

- actual market volatility and the pattern of actual market returns (path dependency);
- market shocks, particularly close to inception or expiry;
- transaction costs; and
- the effect of the above factors on the frequency of re-balancing.

Below, we highlight some of the research backing the development of the trading strategies that we have implemented for our clients both at outset and through evolution during live implementation. This detail addresses the key questions noted in Section 3.

TRADING BAND WIDTHS

The trading band width is a very important determinant of the efficacy of the trading strategy employed with DP. The wider the band, the higher the potential for losses and breaching the floor as the market falls, or alternatively, the higher the potential for missing out on gains as the market rises if no action is undertaken in either case.

Conversely, there is a cost to trading as trading too often increases costs and consequently erodes value over time. Too narrow a range degrades performance in volatile markets.

Therefore, the width of the trading band needs to be a composite of both the risk tolerance of the investor and a reflection of the current market regime i.e. a risk/reward trade-off is taken.

For example, a client may start with a trading band width of +/-5% in 'normal' market conditions but vary this to +/-3% or +/-10% in particularly benign or volatile markets respectively. Russell's trading strategy evaluates market regimes and adjusts the band widths accordingly.

INTRADAY TRADING (ADDED 'SAFETY')

Just as the size of the trading band can mean that market movements are not accounted for, so too can the potential time between trades. As such, Russell has implemented an intraday trading protocol to prevent floors being breached in the event of abnormally violent global market corrections.

MARKET VOLATILITY OR CORRECTIONS

Equity markets often show periods of inefficiency, rapid rises and then pull backs or crashes and corrections. Put another way, over shorter time periods, and some would argue longer time periods, they exhibit a degree of mean reversion. Given the markets propensity to 'correct' or 'reverse' often aggressively, it is important that the trading strategy recognises this and therefore is not over exposed to bull markets only to be caught by the pull backs. Conversely, the strategy should not be under exposed following a period of market falls to avoid missing the market rally. Russell has built in several adjustments to account for the risk of blindly following a simple dynamic option replication strategy.

FLOATING FLOORS – PROTECTING GAINS

Rapid market corrections following market appreciation can increase the probability of breaching the floor (as exposure to the market is increased on the way up). In a simpler strategy, once the maximum equity weight of 100% is reached, the probability of breaching the floor cannot be maintained - it actually falls (i.e. you are no longer running your targeted level of risk in the portfolio). The problem in that event is that market

declines are needed to raise the probability back to the target level before any selling will occur – an overbought market that eventually corrects becomes problematic because of this extra lag.

Russell's strategy adjusts an 'internal' (higher) floor²⁰ as the market rises to protect a portion of previous gains and allow the probability of hitting this internal floor to remain at target level. An added benefit to the increased responsiveness of our model is that it allows gains to be harvested in a 'sell high' manner – taking gains and providing additional protection from market falls.

EVEN DISTRIBUTION OF RISK SPEND – ENSURING PARTICIPATION IN UP MARKETS

One of the key risks that option replication strategies suffer from is becoming cash-locked²¹ and missing out on market rebounds or rallies. In order to mitigate this risk, Russell's strategy ensures that the entire risk budget is not available at the beginning of the period and thus not entirely consumed during early period market falls.

Russell's model allocates the annual risk budget over the period and consumes it slowly to ensure capture of market upside in the second, third and final quarters of the period remains a possibility. A simple analogy would be to ensure that the buffer or cushion available in excess of the stipulated floor is never 100% exposed i.e. only 50% of it is 'at risk', leaving a further 50% available for later segments of the period.

The key is to find the appropriate balance between ensuring participation in early period returns versus the risk of missing end period rallies.

ROLLING STRATEGY (LIQUIDITY / TIMING)

Russell's strategy and timing for rolling futures is based upon our market experience and the fact that each futures contract has a unique roll cycle that differs across markets. The roll cycle for US futures contracts begins earlier and last longer relative to non-US contracts e.g. 1-2 weeks before expiration versus 2-5 days before expiration in European, Asian, and Australian markets. We monitor volume and open interest carefully to determine which contract is the most efficient to trade. When implementing a trade we also use our broker network to access off-exchange liquidity and mid-market pricing which will reduce the spread cost for clients.

We also use our experience to select the best instrument or basket of instruments with which to mimic the market that the investor is seeking to protect. For a global DP strategy, we use more than 10 futures to mimic the MSCI World Index along with corresponding currency forwards. In some minor countries we may need to use a proxy hedge e.g. New Zealand or Norway with Australian or Swedish futures.

²⁰ The internal floor takes into account both relative current market levels and the implicit level of risk exposure based on the amount of current market exposure.

²¹ Cash-locked refers to the situation whereby the equity exposure is effectively reduced to zero to avoid breaching the floor and then for the remainder of the period, the strategy doesn't participate in any subsequent increases.

SECTION 5: PERFORMANCE

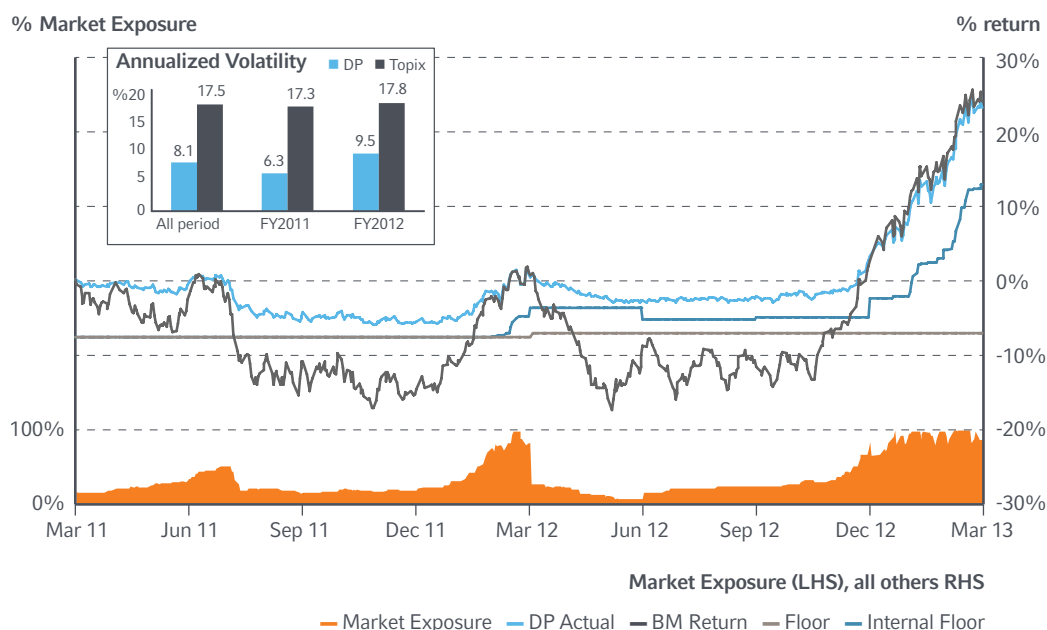
The charts and comments below are based upon the actual experience of strategies that Russell has been running for the last three years. We compare the performance of the implemented DP strategies to:

- 100% exposure to equities; and
- Equivalent Collar strategies.

100% MARKET EXPOSURE TO EQUITIES

Figure 5: Actual client performance compared to underlying market (March 2011 - March 2013)

Actual Client Performance - Japan Downside Protection



Source: Russell Investments, for illustrative purposes only.

Past performance is not a reliable indicator of future performance.

Figure 5 illustrates the potential benefits of a dynamic downside protection strategy. Over the two complete 12 month periods²² of actual client performance illustrated, you can see the markedly lower realised volatility (both from the numbers and the pattern of returns). The benefits of the strategy are clear for the period in question²³:

- Periods of negative returns are far less severe e.g. Q3 2011 and Q2 2012
- Periods of volatile markets are dampened e.g. Q3 2012
- Up markets are still captured e.g. Q1 2013. It can also be seen that this sort of strategy will participate to a lower extent in initial market bounces, especially when the market is below its initial level.

²² In order to present the results of a completed strategy, we have limited the performance to that of the two complete fiscal years that the strategy has covered. Part year performance numbers do not tell the whole story.

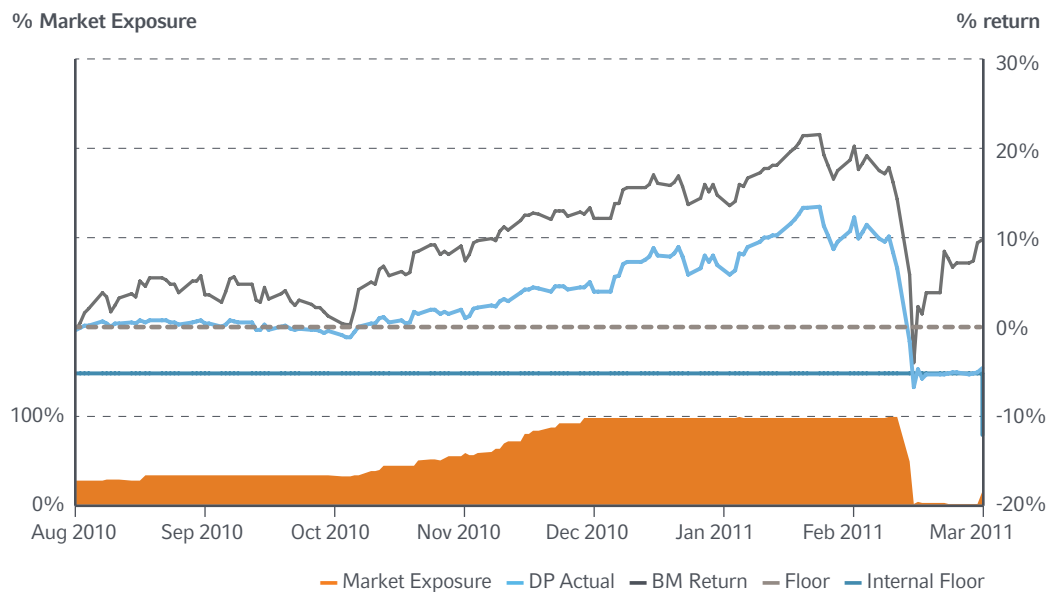
²³ This represents only one of almost infinite potential paths, each one would see a slightly different outcome provided by any form of dynamic downside protection strategy i.e. path dependency.

The two charts below illustrate the two part year periods of implementation either side of the 2 year period illustrated above. Both again illustrate performance patterns that can be expected under particular market scenarios.

The period covered in Figure 6 spans September 2010 to March 2011 when Japan was hit by the Tohoku earthquake and resultant tsunami and nuclear accidents. As such precipitous market falls were experienced. The strategy worked as intended and limited the downside participation during the event thus not breaching the targeted floor. However the resultant de-risking preventing further loss meant that the return received when the market recovered was muted²⁴.

Figure 6: Actual client performance (September 2010 - March 2011)

2010 Part Year Performance - Japan Downside Protection



Source: Russell Investments, for illustrative purposes only

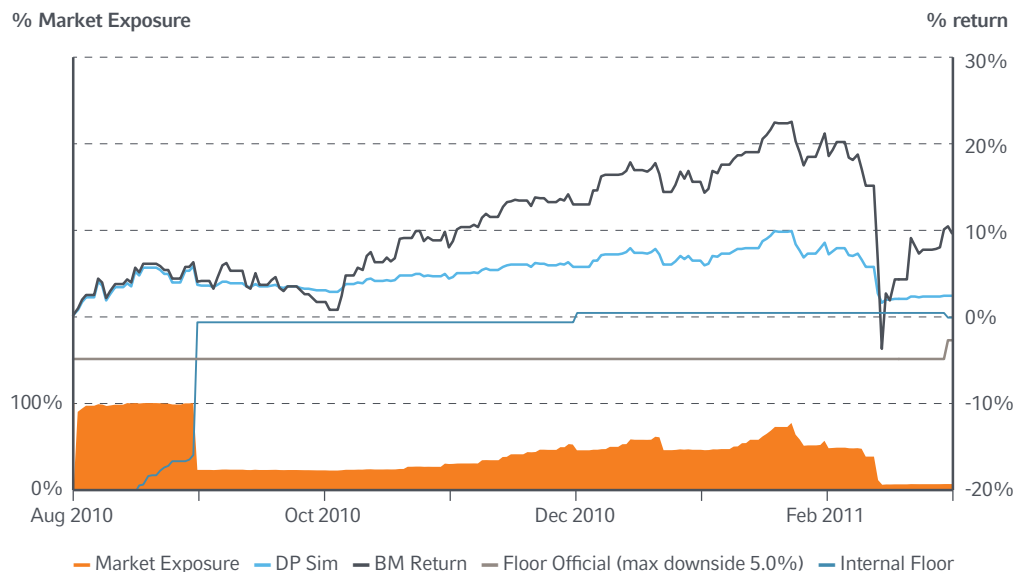
Past performance is not a reliable indicator of future performance.

Following the live experience of the Fukushima event, Russell enhanced our model by adding the floating or ratcheting floors described earlier. Therefore, in future such events the current model with ratcheting floors will provide a greater degree of protection on the downside while also leaving more risk budget to capture any market bounces. Figure 7 illustrates how the enhanced model would have performed during March 2011.

²⁴ This experience led to an evolution of the trading strategy that sought to ensure greater capture of market corrections that follow significant falls.

Figure 7: Simulated performance (September 2010 - March 2011)

2010 Simulated Part Year Performance - Japan Downside Protection

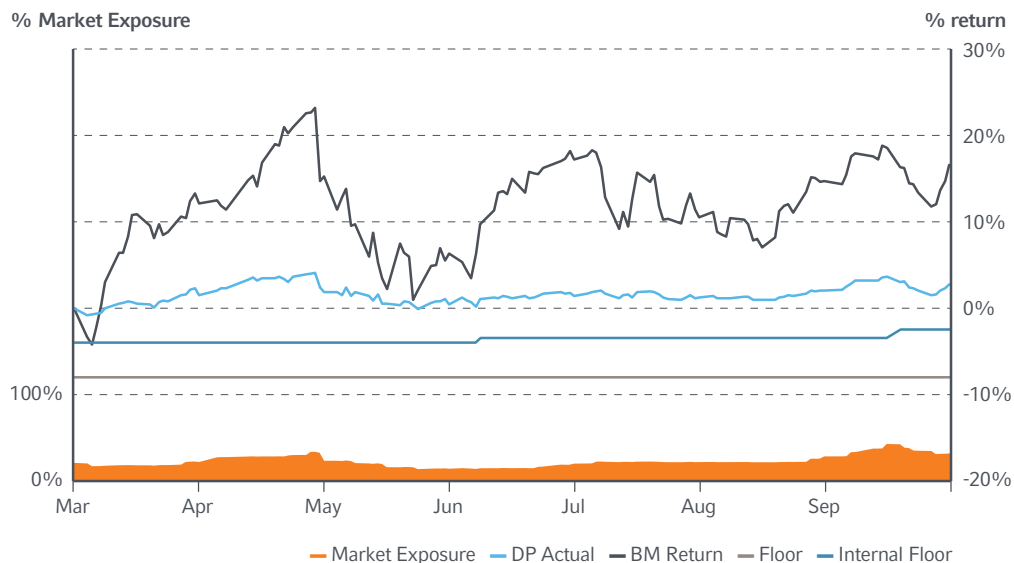


Source: Russell Investments, for illustrative purposes only. Performance is simulated and the expected performance shown is based on hypothetical assumptions and should not be relied upon for the purposes of making an investment decision as projections, whilst based on grounds believed reliable, are not exact forecasts and do not take into account investor specific circumstances.

Figure 8 illustrates the performance of the strategy to October 2013. The strategy is again performing in line with expectations. Given the significant market gains that the Topix has made, the muted market exposure that was being provided has meant the strategy is behind the market by a material degree. However, the strategy is designed for implementation over a full 12 month horizon and therefore does not illustrate the final outcome that will be achieved at the end of March 2014.

Figure 8: Actual client performance (April 2013 - October 2013)

2013 Part Year Performance - Japan Downside Protection



Source: Russell Investments, for illustrative purposes only.

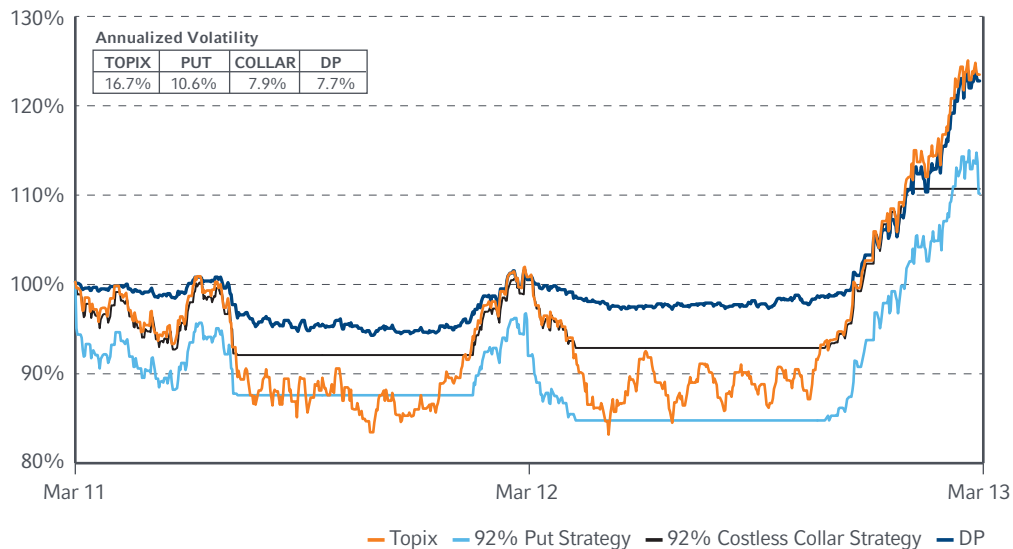
Past performance is not a reliable indicator of future performance.

The graphics above compare the downside protection strategy that has been implemented against a 100% investment in the market. However, greater understanding of the strategy can be achieved through comparisons to similar protection strategies such as the collar.

EQUIVALENT COLLAR STRATEGIES

Figure 9: Actual client performance compared to comparable put and collar strategy

Actual Client Performance – Japan Downside Protection



Source: Russell Investments, for illustrative purposes only.

Past performance is not a reliable indicator of future performance.

The performance patterns illustrated in Figure 9 show that over the two complete 12 month periods the strategy has been running, Russell’s dynamic downside protection strategy has outperformed comparable put and cashless collar strategies. Indeed, it has only marginally underperformed the market, but with a level of realised volatility that is significantly below that of the other investment strategies.

The performance patterns illustrates one of the potential issues with puts and collars; that depending on the sequencing of returns, the floor can continue to fall from the initial intended level as contracts expire and are rolled. It is also instructive to note that the floor for the cashless collar is higher than the plain vanilla put. The difference is the cost. The put’s floor sits below the intended 92% as there is a level of fees paid. The respective loss of upside in the collar can be seen in the second year of returns where the maximum return is reached.

The analysis illustrated in this paper is based upon actual trading strategies run on behalf of Russell’s clients and relates to the TOPIX Index. Appendix III contains simulated returns illustrating how Russell’s DP strategy would have performed in both the Australian and global equity markets.

SECTION 6: CONCLUSION

Many investors are currently searching for efficient and effective downside protection and volatility management strategies. Typical approaches employed include asset diversification, reduced growth allocations and hard floor derivative strategies. However, these can prove either too expensive in terms of lost upside or upfront costs, or do not provide the level of protection desired in extreme market falls. The high cost of the common derivative strategies means that they should be used for shorter-term tactical protection trades rather than as longer-term volatility management strategies²⁵.

Dynamic downside protection or option replication strategies provide access to a pay-off profile that has the potential to provide sufficient downside protection without removing too much upside potential.

Russell has successfully implemented such Downside Protection strategies for a growing number of clients over the past three years. The performance history illustrates the performance pattern you would expect from such strategies, whilst also showing the potential relative attractiveness of the strategies over 100% cash investments, standard derivative protection strategies and alternative trading programs (e.g. CPPI).

Through accepting a defined probability of breaching the desired floor, a simple option replication strategy can provide higher upside participation. Over the last three years, Russell has extended and improved such strategies, by carefully managing the level of risk being undertaken depending on the market environment, as well as improving the trading efficiency. Russell believes these enhancements can provide a much greater degree of confidence in capturing the Holy Grail of what every investor is looking for; downside protection and upside participation.

²⁵ Many investors will still chose to implement such strategies. We strongly recommend that they fully understand the investment decisions that they are taking and ensure that it matches the outcomes that they are looking for. In Appendix I, we include a section titled "Before you pull the trigger" which provides guidance on the thought process that should be followed prior to transacting a derivative downside protection.

APPENDIX I: BEFORE YOU PULL THE TRIGGER

The following comments have been designed to highlight the key factors that should be considered prior to actually implementing a downside protection strategy, whether it has a hard or soft floor.

Preparation: A strategy for dealing with market events needs to be put in place in advance. More often than not, the cost of protection will have moved before investors are able to react.

Budget: A budget needs to be considered in advance to inform the hedging decision. This may be a fixed amount, a portfolio percentage, or some form of risk budget i.e. how much are you willing to spend or how much upside are you willing to forgo to gain the protection?

Market environment: Understanding the volatility environment is a new discipline for many investors who have historically considered only the risk / return dimension. Being nimble to exploit volatility opportunities is crucial. Protection is obviously less expensive when volatility is low. In addition during different market environments volatility will differ across products as supply and demand changes making certain strategies relatively more attractive than others.

Time horizon: This needs to be considered both at the establishment of the strategy as well as when it comes to roll, close or hold positions to expiry. A hedging strategy needs to be dynamic; it is not a single decision at a single point in time.

We believe that only by recognising the above factors and having a clear understanding of your own objectives can an effective hedging strategy be created and then put into action.

QUESTIONS TO ASK

Russell believes that in evaluating providers, or more importantly, the available strategies for the provision of downside protection, an investor should seek to gain a good understanding of the following questions:

- Which equity market index would they propose the option to be derived from and how much coverage does this give to the total portfolio's exposure?
- What are the current and historical indicative pricing for call and put options?
- What level of upside is forsaken for zero cost collars?
- How else can the collar be structured to reduce capping of upside?
- How much are transaction fees and roll costs?
- What timeframe are the strategies to be implemented over? Is liquidity greater at certain tenors?
- How secure are these options against defaults?
- How strong are the selected counterparties and how have they been selected?
- What are the collateral arrangements?
- Can the pay-off profile of the strategies actually be replicated through changes to the underlying physical exposure?

In evaluating any equity derivative strategies, it is important that the Trustee, Board, and/or Investment Committee clearly establish their own objectives before entering into such strategies. For example, is the objective of adopting these strategies to:

- provide downside protection?
- generate additional income through selling unwanted or surplus upside? or
- add value through implementation of market views?

It is also important to understand what the effective underlying equity exposure is that the strategies create or mimic.

APPENDIX II: DOWNSIDE PROTECTION OPTION STRATEGIES

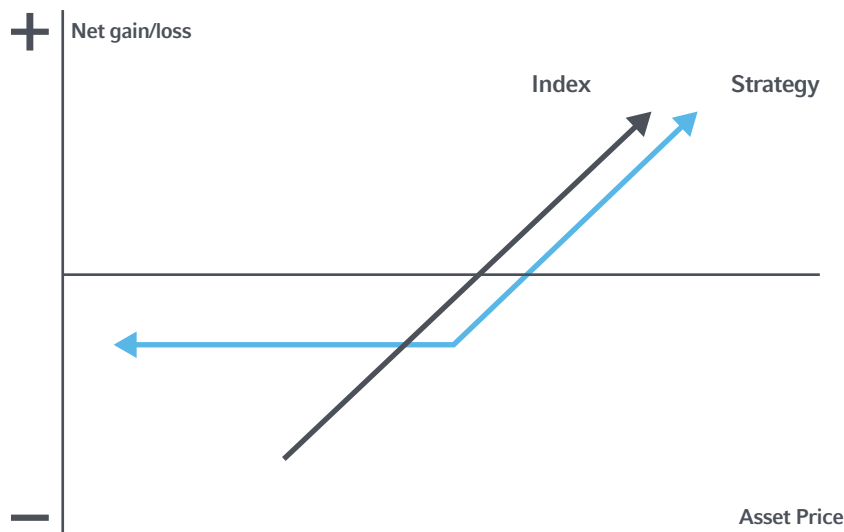
LONG PUT²⁶

The simplest equity hedging strategy is to purchase an ATM ('At The Money') or OTM ('Out of The Money') put option. The strategy reduces risk by limiting losses to the premium paid plus the difference between the spot price (i.e. the level of the market) and put strike (the level defined in the option) at initiation.

Market View: Long puts can make sense in times when tactical, short-term downside protection is desired. Long puts provide true tail risk below the strike level.

Risk: The main drawback to a long put strategy is cost. During market stress, ATM or near the money put options are very expensive due to high implied volatility (i.e. the fact investors want and are willing to pay for the protection). Long put hedges should not be considered strategic hedging solutions. A systematic long put option strategy that perpetually buys protection has a high probability of eroding portfolio value.

Figure 10: Long put



For illustrative purposes only.

PUT SPREAD

A put-spread strategy buys an ATM or OTM put and sells a further OTM put option. Selling the further OTM put generates income and provides the flexibility to reduce upfront net cost or provides a greater level of protection given an equal cost to a long put.

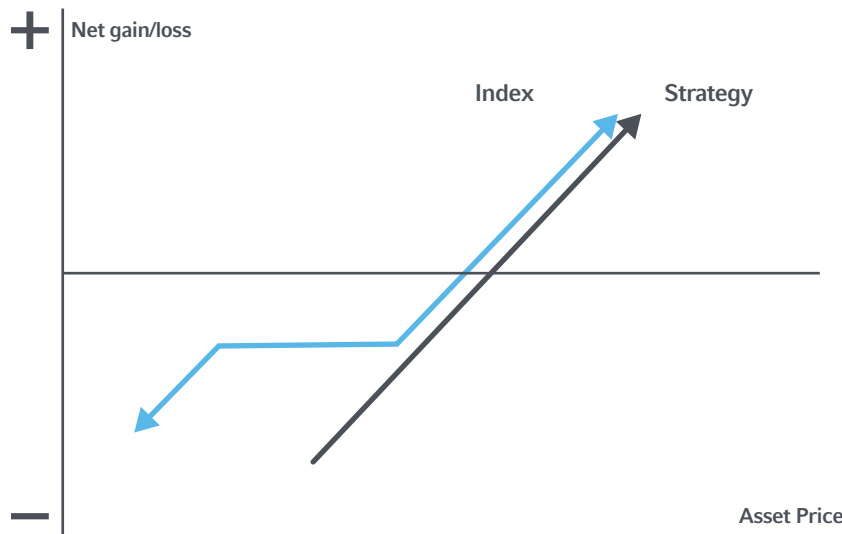
Market View: Long put-spreads can make sense in times when tactical, short term downside protection is desired, especially in environments where there are above average levels of absolute volatility or elevated volatility skew²⁷. Selling the additional OTM option helps monetize this elevated volatility and put skew.

Risk: Put spreads do not provide hard floor downside protection. In exchange for the improved cost characteristics, put spreads reintroduce downside risk below the sold put strike and therefore do not provide true tail risk protection.

²⁶ Put – An option contract giving the owner the right, but not the obligation, to sell a specified amount of an underlying asset at a set price within a specified time. The buyer of a put option estimates that the underlying asset will drop below the exercise price before the expiration date.

²⁷ Collie, B. & Thomas, M. (2010). "The volatility smile and the cost of tail risk protection", Russell Communique, 3rd quarter.

Figure 11: Put spread



For illustrative purposes only.

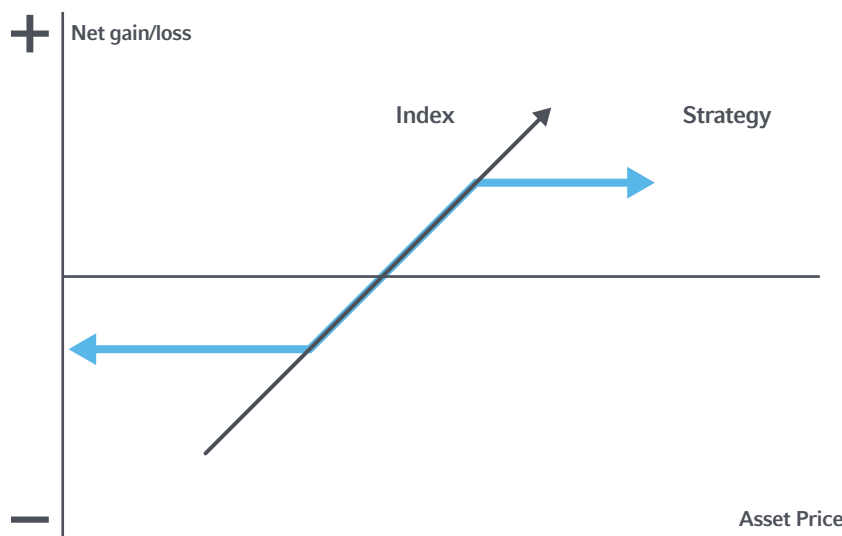
COLLAR

In an equity collar hedge, the underlying asset is overlaid with a long put and short call²⁸. This can be done cashless (no net premium due upfront) or the investor may spend a defined amount of premium for additional upside potential.

Market View: An investor who believes there is limited upside potential in the market would likely choose a collar strategy rather than a put or put spread. In a collar, the put is financed with foregone upside potential rather than a hard premium.

Risk: The primary risk is underperformance in a strong bull market.

Figure 12: Collar



For illustrative purposes only.

²⁸ Call - An agreement that gives an investor the right (but not the obligation) to buy a stock, bond, commodity, or other instrument at a specified price within a specific time period.

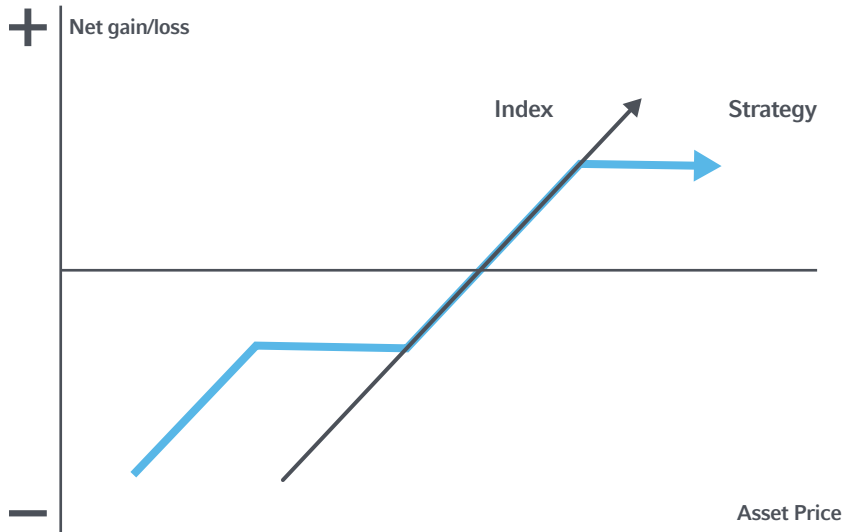
PUT SPREAD COLLAR

An equity put spread collar is a combination of a long put spread and short call.

Market View: An investor who sees moderate upside potential or who expects the market to trade in a range would benefit from this strategy. It offers ranged downside protection defined by the width of the put spread. The put spread collar allows for additional upside potential relative to a similarly priced collar.

Risk: The primary risk is underperformance in a strong bull market, as well as limited protection in sharp declines.

Figure 13: Put spread collar



For illustrative purposes only.

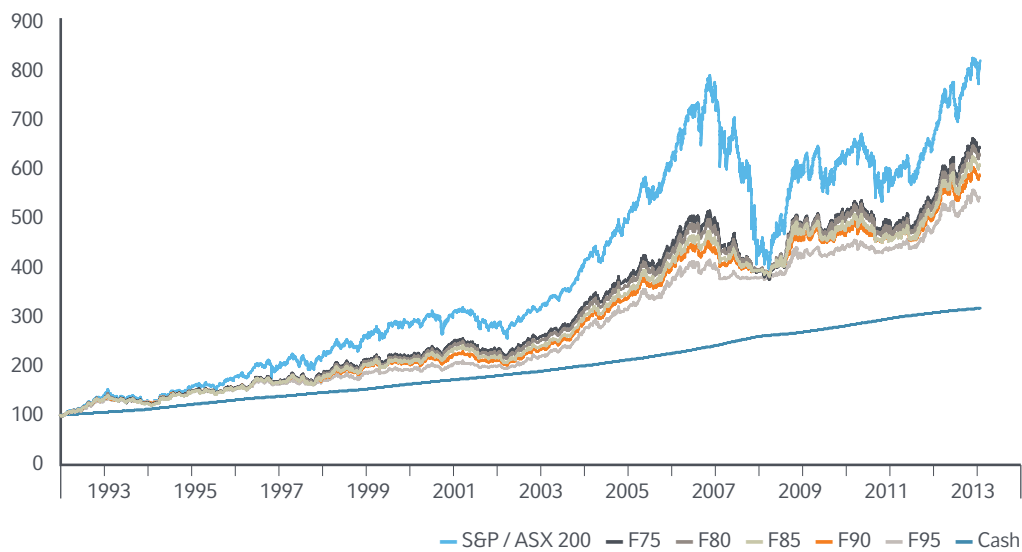
APPENDIX III: AUSTRALIAN AND GLOBAL EQUITY SIMULATIONS

AUSTRALIAN EQUITIES – S&P/ASX 200 INDEX

The charts below illustrate the simulate performance patterns of a number of DP strategies with varying floors (75-95%). Over a period in which the Australian market has increased dramatically the strategies with a lower floor and therefore greater risk tolerance have outperformed those with a higher floor or lower risk tolerance. The return patterns in Figure 14 show that while the strategies were significantly behind the market coming into the GFC they provided a significant degree of protection during the crisis. Therefore, the strategies provide a similar level of return but with far lower volatility.

Figure 14: Simulated performance - Australian equities

S&P / ASX 200 Downside Protection



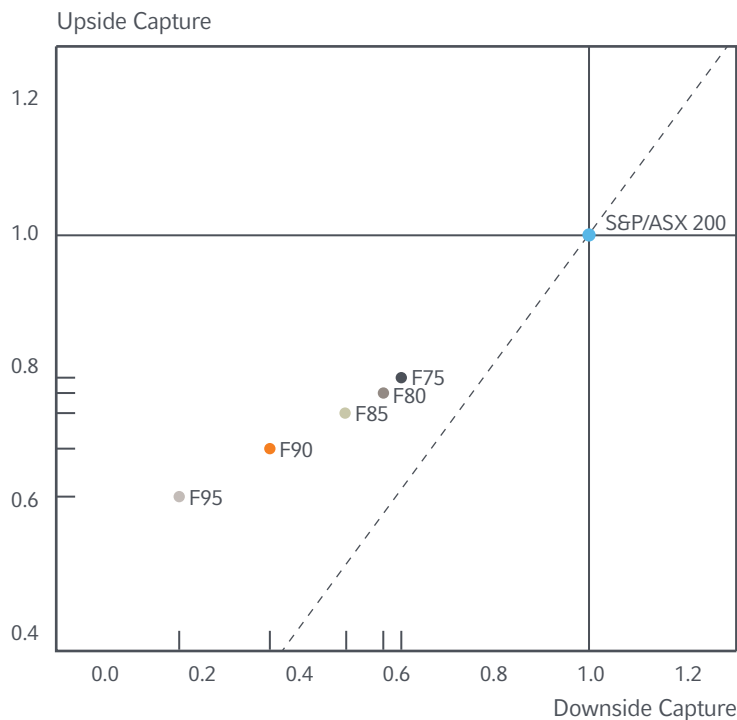
Source: Russell Investments, for illustrative purposes only.

Performance is simulated and the expected performance shown is based on hypothetical assumptions and should not be relied upon for the purposes of making an investment decision as projections, whilst based on grounds believed reliable, are not exact forecasts and do not take into account investor specific circumstances.

Figure 15 illustrates the capture ratios for the various strategies tested. As can be seen, the simulated DP strategies all achieve a greater risk return trade off than the market, i.e. achieve proportionately more exposure to upside gains than downside losses. For example, a floor of 80% provides downside capture of 50% but upside capture of 75%, compared to the market that provides, by definition, a 50/50 capture ratio.

Figure 15: Simulated capture ratios - Australian equities

Capture Ratio (annual time periods)



Source: Russell Investments, for illustrative purposes only.

Performance is simulated and the expected performance shown is based on hypothetical assumptions and should not be relied upon for the purposes of making an investment decision as projections, whilst based on grounds believed reliable, are not exact forecasts and do not take into account investor specific circumstances.

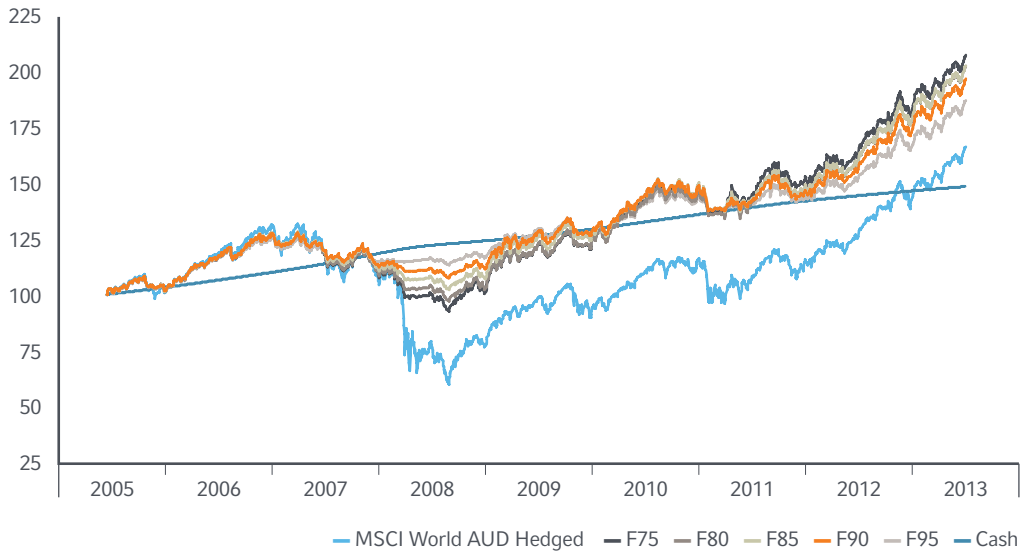
GLOBAL EQUITIES – MSCI WORLD INDEX (AUD HEDGED)

The charts below illustrate the results from a similar analysis on the MSCI World (AUD hedged). The returns history is shorter but illustrates the return pattern you could expect from such a strategy where there is a significant fall early in the period. Given the downside strategies protect on the downside, the strategies all outperform the market regardless of the level of the floor.

Immediately after the GFC, the highest floor (F95) provides the best performance. As the market then recovered, the strategies under which more risk is tolerated (lowest floors) participate in more of the upside. However, these more risky strategies fell more during the GFC. Thus, the choice of floor level comes down to your particular circumstances, investment strategy and risk tolerance. The range of performance and capture ratios demonstrated in Figure 16 and Figure 17 are similar to the Australian equity simulation.

Figure 16: Simulated performance - global equities

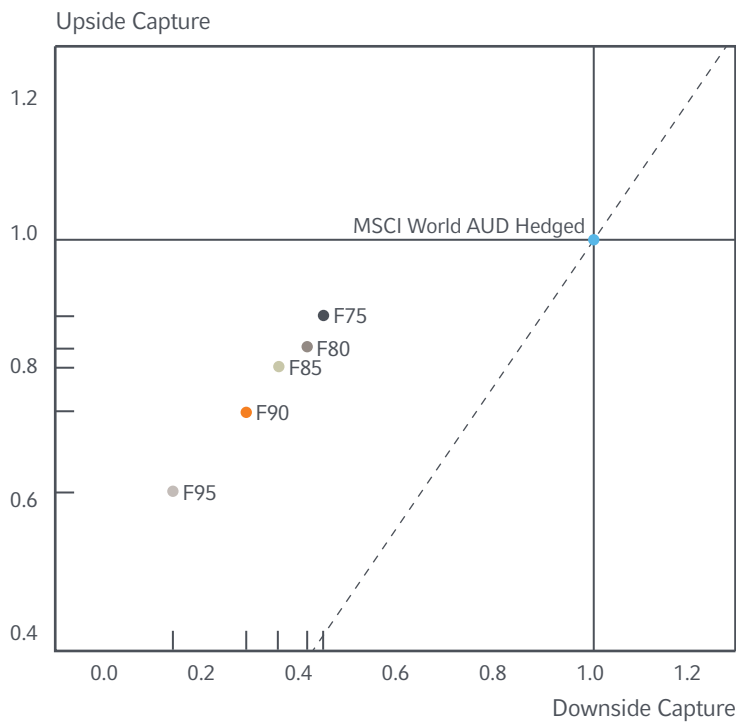
MSCI World AUD Hedged Downside Protection



Source: Russell Investments, for illustrative purposes only. Performance is simulated and the expected performance shown is based on hypothetical assumptions and should not be relied upon for the purposes of making an investment decision as projections, whilst based on grounds believed reliable, are not exact forecasts and do not take into account investor specific circumstances.

Figure 17: Simulated capture ratios - global equities

Capture Ratio (annual time periods)



Source: Russell Investments, for illustrative purposes only. Performance is simulated and the expected performance shown is based on hypothetical assumptions and should not be relied upon for the purposes of making an investment decision as projections, whilst based on grounds believed reliable, are not exact forecasts and do not take into account investor specific circumstances.

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