portfolio construction forum

How much risk do equities contribute to diversified strategies?

Michael Furey | Delta Research & Advisory | 02 June 2016

Many experts have spoken over the years of the significant risks super funds carry with respect to Australian equities exposures. Most notable were comments a few years ago from David Murray, former Chairman of the Future Fund, and Ken Henry, former Federal Treasurer, who both said they had concerns that Australian superannuation funds were overweight Australian equities. The comment I probably heard most, coming from many investment professionals, was along the lines of "balanced funds have around 60% to 70% in equities but this accounts for more than 90% of the portfolio risk". So, I thought I'd finally get around to checking out how true this statement is and whether the industry as a whole has changed much over the last few years with respect to the influence of equities on multi-asset portfolios.

METHODOLOGY

If you trust my analysis and you're not deeply familiar or interested in quantitative methods, then save yourself some sleepy time and skip on to the Results. Otherwise...

Two primary analyses are undertaken, both involving regression analysis. Instead of analysing individual diversified strategies, I chose the following peer group indices as they capture most of the market, as best as I can determine:

- Morningstar Australia OE Multisector **Conservative** (0-20% Growth Assets)
- Morningstar Australia OE Multisector **Moderate** (20%-40% Growth Assets)
- Morningstar Australia OE Multisector **Balanced** (40%-60% Growth Assets)
- Morningstar Australia OE Multisector **Growth** (60%-80% Growth Assets)
- Morningstar Australia OE Multisector **High Growth** (80%-100% Growth Assets)

These indices are also chosen as they pre-tax, thereby enabling an apples for apples comparison with benchmarks which are also pre-tax.

The following benchmarks were used to represent Australian equities, global equities, and the risk-free rate:

- MSCI Australia GR AUD
- MSCI World GR AUD
- Bloomberg AusBond Bank 0+Y TR AUD

The following models are used to assess contribution to portfolio risk. Model 1 is used to calculate exposure and contribution to total portfolio risk of Australian equities and Model 2 is used to calculate the exposure and total contribution to risk by both Australian equities and global equities. These regression models are applied to monthly returns between 31 December 1993 and 30 April 2016... a long time!

- $R_p - R_f = \alpha + \beta_1(R_a - R_f) + \epsilon$
- $R_p - R_f = \alpha + \beta_1(R_a - R_f) + \beta_2(R_w - R_a) + \epsilon$

where:

- R_p is the monthly return of peer group index
- R_f is the Risk-free rate
- α is the Alpha of the model (or beta-adjusted excess return)
- β_1 is the calculated exposure to Australian equities
- R_a is the monthly return of Australian equities
- β_2 is the calculated exposure to the excess return of Global equities minus Australian equities
- R_w is the monthly return of Global equities
- ϵ is the residual error of the model

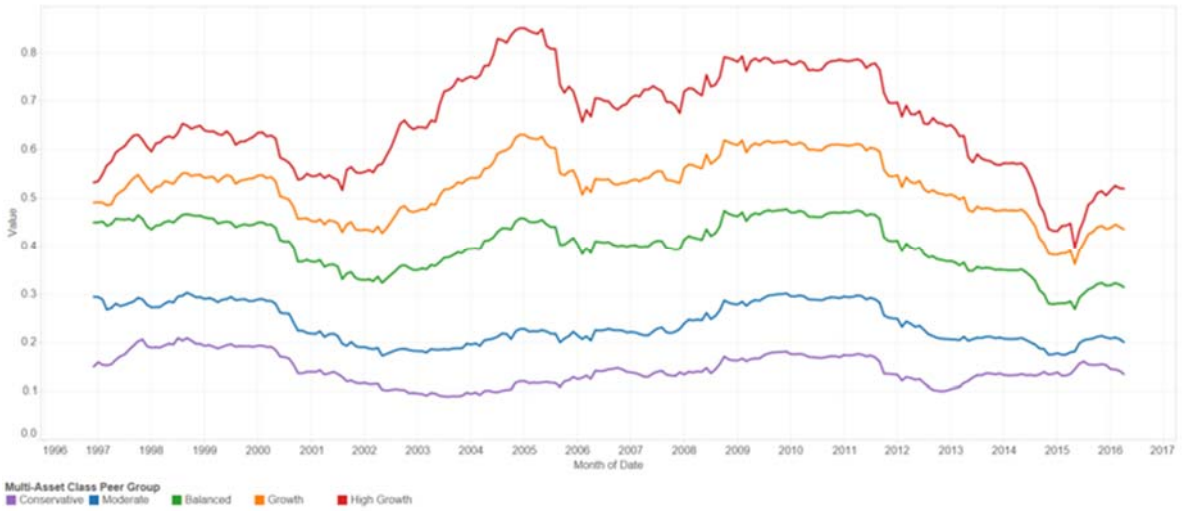
The R-squared value of each regression equation is calculated to determine the portfolio risk that can be explained by each model and is therefore used as a proxy for "risk contribution". The R-squared of a regression model is also known as the "goodness of fit" and its calculation (without going into too much detail) is = Explained Variation/Total Variation.

RESULTS

Figure 1 shows the Beta, or exposure, of Australian equities to each of the peer group indices. As expected, the higher the allocation to growth assets, the higher the exposure to Australian equities market. Interestingly, since late 2011 it appears the Australian equities beta has declined, suggesting a lower exposure. Given the maximum growth assets for each peer groups isn't much higher than the Australian equities beta for each peer group, you could interpret that Australian equities is the dominant asset class, and maybe it is. But, it

may also suggest evidence of a relatively high correlation between Australian equities and other growth asset classes.

Figure 1: Australian equity beta
Effective exposure to Australian Equities

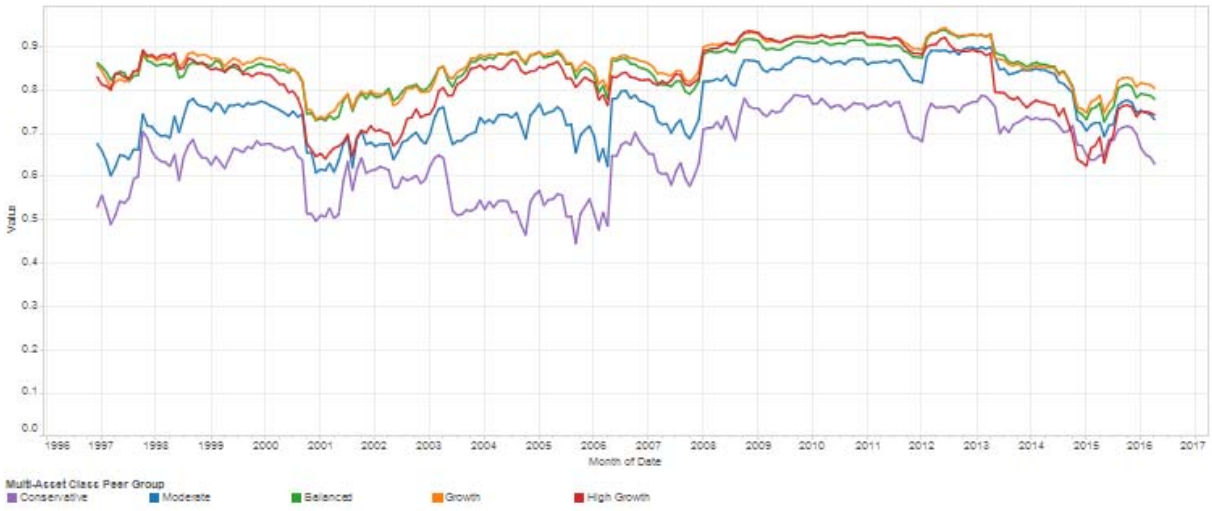


Source: Delta Research & Advisory.
Benchmark: MSCI Australia GR AUD, Rolling 3 years.

Either way, these results are consistent with expectations and may somewhat support concerns around higher Australian equities allocations given their exposures or sensitivity appears to be a high proportion of the portfolio. But it also proof that this sensitivity to Australian equities has been in decline over the last few years or so.

While the exposure to Australian equities appears fairly consistent with expectations, its total contribution to portfolio risk is a different story (Figure 2). In essence, for the most part over the last 23 years (this figure starts at the end of 1996 and shows rolling 3-years so the data really starts in 1993), the Australian sharemarket contributed to a majority of risk across all multi-asset class peer groups - and is therefore a very, very important part of the portfolio.

Figure 2: Australian equity contribution to portfolio risk

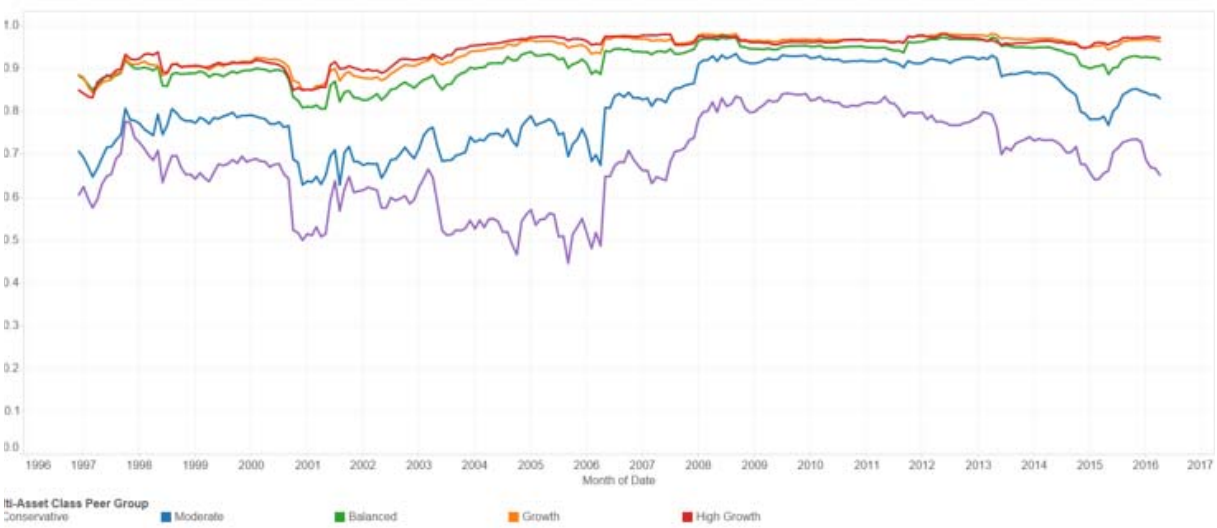


Source: Delta Research & Advisory.
Benchmark: MSCI Australia GR AUD, Rolling 3 years.

Over the last few years, which is the very last point on the far right of Figure 2, this percentage has been in the vicinity of 63% to 83% across each peer group. This is somewhat consistent with the concerns spoken of balanced funds by various experts (being that Australian equities is 60% of the allocation to growth assets but responsible for 90% of the risk"). However, even for conservative strategies where the allocation to growth assets is less than 20%, Australian equities contributed at least two-thirds of the total portfolio risk over the last 10 years.

Figure 3 shows the same risk contribution statistic as Figure 2, but this time it is for Model 2 which adds the global equity market. The increase in risk contribution from both equity markets is only marginal because we are adding only the excess return of global equities over Australian equities and the two markets are fairly positively correlated so the impact of the additional asset class is small.

Figure 3: Australian and global equity contribution to portfolio risk
Total Equity Risk Contribution



Source: Delta Research & Advisory.
Benchmark: MSCI Australia GR AUD and MSCI World GR AUD, Rolling 3 years.

The more interesting results from Figure 3 include that, over the last 10 to 15 years, Australian equities and global equities have accounted for:

- More than 90% of total portfolio risk across Balanced, Growth, and High Growth multi-asset class strategies.
- More than 80% of the total portfolio risk for Moderate multi-asset class strategies
- Between 60% and 80% of total portfolio risk for Conservative multi-asset class strategies, despite having no more than 20% allocated to growth asset classes!

So, irrespective of the allocation to equities or the equity market beta, across all risk profiles, equities are clearly the dominant asset class in terms of contribution to total portfolio risk.

SO WHAT?

When "experts" say that "equities account for 90% of the total portfolio risk of a balanced fund" – implying there is too much exposure – it is not necessarily about too much exposure, just the importance of equities. So what should investors do to reduce this reliance on equities? As we see above, holding only 20% growth assets as the conservative peer group does, still produces a very high proportion of portfolio risk due to equities.

The answer is to include non-correlated assets - or, in English, add assets to the investment portfolio that behave differently from equities and go up when equities go down. This is Markowitz 101 and the continued search for the holy grail of investing - finding non-correlated assets to add to portfolios that reduce the risk without reducing the return expectation or increase the return without increasing the risk.

The obvious non-correlated asset over many years has been conservative highly rated bonds... which I believe was Ken Henry's suggestion when looking to reduce the reliance on equities. Adding conservative bonds to a portfolio did reduce the contribution to risk from equities (see Figures 2 and 3 above) but, as we know, adding conservative bonds is unlikely to improve portfolio return expectations and, by our industry's definition, obviously changes the risk profile.

Lifecycle funds are a good example of reducing equity risk. These have a moving risk profile (i.e. decreasing through time) and they gradually increase a fund's exposure to bonds throughout time. The effect of this is to reduce portfolio volatility to combat sequencing risk leading into and through retirement. But portfolio volatility will still be most dependent on equities.

Other potential lowly correlated considerations are alternative assets, such as property, private equity, infrastructure or, perhaps, hedge fund strategies. There is much debate about the value of some alternatives (asset consultants and fund managers who were in favour of alternatives and some big institutions are throwing in the towel e.g. CALPERS). And, if you do believe alternatives are the diversification solution, significant care must be taken to truly understand what is driving the underlying risk of these strategies - particularly because equity markets may still be a very influential driving factor!

Either way, if alternatives do reduce the reliance on equities in portfolio risk equation, they do so by introducing other risks which is not necessarily a bad thing - but may be. So the challenge then becomes about assessing whether those risks are adequately compensated.

FINAL THOUGHTS

Investor face very challenging times. Interest rates both in Australia and around the world are so low. Even retired millionaires are at significant risk of running out of money. To produce higher returns still requires the acceptance of higher risk, but escaping equity market risk is not at all easily achieved without significant sacrifices in costs, liquidity, or chancing the unknown. So no matter what the investor's investment strategy or risk profile, equities will most likely have a strong influence on success.

The communication of this bigger picture concept will always be more important than the marginal advantages gained or lost from manager selection, dynamic asset allocation, security selection or whatever the latest trend is.

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