Talking Point
Anchoring strategic asset allocation to valuation rather than to averages
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Background and purpose
The key difference between objective based multi-asset investing and traditional multi-asset investing is that the objective based portfolio is not anchored to a single strategic asset allocation (SAA) based on long run assumptions. The application of a long run SAA portfolio is convenient since it provides a basis for anchoring the investment strategy and therefore also provides a performance benchmark. However, we have long argued that despite its conveniences, a long run SAA framework leads to inefficient outcomes when compared to achieving an objective of real returns.

Why? The key reason is the SAA framework fails to discount all available information. Instead of structuring a portfolio to take account of current market conditions, the SAA framework only incorporates information based on very long run averages. This is why many institutional portfolio changes are minimal even in the face of quite dramatic changes in valuation conditions impacting markets. This also explains why many institutional investors entered the GFC carrying very high exposures to equity markets.

Up until now, we have been aware that while many investors have recognised the shortcomings of maintaining an SAA framework, there has been a lack of any systematic framework to stand in its place to alleviate key shortcomings.

Many investors have instead moved to apply enhancement concepts such as “Dynamic Asset Allocation” (DAA), a process in which medium term asset allocation tilts are applied to portfolios thereby moving them away from the long run SAA portfolio when valuation (or other factors) moves to extremes relative to the long term average.

While some applications of DAA practices will no doubt prove more successful compared to adopting a passive SAA portfolio, others may not. Whatever the case, the one central issue that cannot be resolved by adopting such an approach is the central anchoring bias to the long run average portfolio.

It is for this reason that we prefer to address the central problem of anchoring bias to an SAA at its root cause. That is, to recognise that over medium term periods, market returns are conditional on fundamental factors which evolve. A key question is whether such fundamental factors are structurally identifiable. If they are, then they can be incorporated into a long term asset allocation framework and remove the bias to a single SAA portfolio.

In this paper¹, we test for the reliability of valuation as an indicator of future market returns over a long range of data and find strong favourable evidence. We also test explicit rules for structuring valuation factors that can guide a change in strategic asset allocation when market conditions dictate. We argue that because conditional rules can be identified and incorporated explicitly into a multi-asset framework, then such analysis can be used to augment single portfolio SAA frameworks and break down the bias towards one long term portfolio, without having to rely on the opacity and subjectivity of any single manager’s approach.

¹ In conducting this research, Schroders contracted independent actuarial firm Rice Warner, to provide modelling input on both an historical and prospective basis. We are grateful for their contribution to this work.
We first test for the effectiveness of valuation as a signal on major equity and fixed income markets. That is, we examined a priori valuation indicators and their correlation with subsequent real realised returns within major asset classes. This approach allowed us to initially look at individual asset classes but more importantly to then form a basis for assessing their effect on overall multi-asset portfolio outcomes.

The key valuation indicators we focussed on were the Shiller PE ratio for Australian and overseas equities, and two potential indicators in the case of fixed income markets: the term spread and nominal 10 year bond yields. At the multi-asset class level we selected the term spread for reasons discussed further below. Appendix A shows the valuation indicator for each asset class relative to subsequent rolling three year real return outcomes.

We then constructed the following rules to design a valuation state contingent strategic asset allocation model:

- We apply three valuation states: cheap, normal and expensive. In addition, we have three “optimal” strategic portfolios designed to apply for each state.
- In a total portfolio context (multi-asset context), valuation is a joint concept. This is why we define the three states by realised returns and then try and choose signals to identify these states.
- Due to the potential conflict in valuation signals for bond and equity markets, we use the term spread (measured as the difference in yields on 10 year government bonds and 3 month bills), in place of yields for the Australian and US bond markets. The term spread is primarily chosen as an indicator for potential periods of economic recession, that is, when term spreads are low or negative and for periods of recovery, that is, when term spreads are high. This is used in conjunction with the Shiller PE to determine the overall valuation state of markets.

Importantly, we allow the portfolio to invest a proportion of its assets in each state according to how probable that state is of occurring according to the valuation signals. For example, the valuation signals may indicate a 90% probability of investing in a cheap state and 10% of investing in a normal state. The overall portfolio would therefore represent a blended allocation of a 90% allocation to the cheap state portfolio and a 10% allocation to the normal state portfolio.

The effectiveness of this approach can be measured by reference to its outperformance relative to a traditional SAA approach in terms of its overall risk adjusted returns, drawdown experience and long term performance. We demonstrate in this paper the performance of a state-contingent SAA approach versus a long run approach where the average asset allocation over time is similar. We are then able to examine overall returns, risk adjusted returns and downside risk characteristics for each approach.

Key findings and observations

1. We find that long run valuation metrics can reliably indicate valuation states for major individual asset classes.
2. Additionally, combining predictive valuation metrics can be used in a multi-asset framework to identify valuation states.
3. Specifically, the Shiller PE ratio performs well as a medium term valuation indicator for equity markets. While bond yields are a reasonable indicator of value for bond markets, the term spread works more effectively in combination with the Shiller PE ratio in a multi-asset context. The key reason is that the term spread is a superior indicator of severe downside risk.
4. Long term strategic portfolios can be optimised in each valuation state (conditional portfolios). We find that the cheap and expensive conditional portfolios are significantly different in composition compared with a traditional SAA portfolio (unconditional portfolio).

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2 The Shiller PE used to value overseas equities contains adjustments made to earnings to ensure a more consistent treatment of goodwill writedowns throughout history.
3 We use the valuation signals to collectively indicate which state markets are in. We then calculate the 12 month trailing average of the valuation state to determine the final state that’s used for asset allocation. This is because valuation measures in general, as well as the ones we have used (Shiller PE and term spread) tend to lead the market. Additionally, this helps to smooth out noise and prevents rapid changes to the portfolio’s asset allocation.
5. The conditional SAA framework outlined in this paper significantly outperforms the unconditional portfolios in terms of overall cumulative performance, drawdown experience and efficient use of risk (as measured by the Sharpe ratio).

6. The sole driver of difference between the conditional and unconditional portfolio is valuation\(^4\) and this gives rise to important investment insights in terms of generating superior risk adjusted returns. Relative to the standard 70/30 unconditional SAA portfolio we make the following observations:

- **’stay significantly uninvested during expensive market states’**: the majority of additional value is generated by maintaining large cash positions when valuations are expensive.

- **’less diversification is rewarded during cheap market valuation conditions’**: investors are rewarded for holding a more concentrated portfolio of growth assets under a cheap valuation state as their probability of loss is low and expected returns are high (refer to Charts 1 and 2 in Appendix A).

- **’A traditional SAA portfolio offers adequate performance subject to neutral market valuations states’**: a relatively diversified portfolio such as a standard traditional SAA portfolio can offer adequate risk adjusted performance subject to neutral valuations.

An overall conclusion from the analysis is that the lack of incorporation of valuation information in unconditional SAA portfolios leads to inefficient diversification. Using the average (unconditional) experience of capital markets, also leads to the use of average correlations which our analysis suggests become much less effective in extreme over- and undervalued states. Less diversification is rewarded in cheap and expensive states while diversification is rewarded under a normal market state.

1. We find as a corollary that the unconditional SAA portfolio is necessarily inefficient.

2. As applications of this research, we make two major observations:
   - A conditional SAA framework could be used as a potential market linked (investable) benchmark to assess objective based managers who may use more sophisticated valuation driven strategies to achieve a specific investment objective.
   - Funds and their consultants may find a conditional SAA framework outcompetes current scenario analysis frameworks used to “stress test” SAA portfolios. The primary benefit is the conditional SAA framework embeds the probabilities of being in a particular state and the valuation signals used to predict them.

In the remainder of this paper we provide our analysis in support of the major findings outlined above.

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\(^4\) In this context we define valuation to mean ‘states’ of high, normal, and low three year returns and the use of valuation indicators to predict these states.
Part 1: Indicators of valuation states for major individual asset classes

Equity markets

We examined two equity markets for the purpose of this paper: Australian and International equities (hedged). In each case, as we have done in previous work, we put forward a priori the Shiller PE ratio as an effective valuation measure. For each observation of the Shiller PE ratio, we considered the relationship between the market state (as determined by each three year return) and the Shiller PE that immediately preceded this state.

Fixed Income markets

In the case of fixed income markets, again we examined two major markets commonly used by Australian investors: Australian fixed interest and International fixed interest (hedged). With these markets the a priori valuation signals identified were the term spread and nominal yield on 10 year treasury bonds. The effectiveness of the nominal yield as a valuation measure was noticeable at an individual asset class level, however in the context of an overall portfolio, the effectiveness is diluted as equities are the dominant driver of portfolio volatility and return for a growth-orientated portfolio. In a multi-asset portfolio context, we prefer the term spread, given it tends to more reliably indicate the risk of recession and therefore asset class risk beyond fixed interest.

The results for each asset class are shown in the tables below. The cheap and expensive cut-offs are based on 0.8 standard deviations from the average valuation measure. For example, the average bond yield for Australia is approximately 6.5%, while the standard deviation of the yield is approximately 3.3%. Adding 0.8 standard deviations (approximately 2.6%) to the average yield provides the cheap cut-off for Australian bonds, while subtracting 0.8 standard deviations provides the expensive cut-off.

In addition, plot charts for each data point used in the analysis are shown segregated into respective valuation states in Appendix A.

Table 1: Australian Equities: Relationship between Shiller PE ratio and three year return state

<table>
<thead>
<tr>
<th>3Y Real Return</th>
<th>Unconstrained</th>
<th>Cheap AU Shiller PE &lt; 13.5</th>
<th>Neutral 13.5 &lt; AU Shiller PE &lt; 20.8</th>
<th>Expensive AU Shiller PE &gt; 20.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>7.5%</td>
<td>16.5%</td>
<td>7.7%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Std Dev</td>
<td>9.4%</td>
<td>10.3%</td>
<td>6.8%</td>
<td>8.0%</td>
</tr>
<tr>
<td>Max</td>
<td>38.9%</td>
<td>38.9%</td>
<td>24.0%</td>
<td>22.8%</td>
</tr>
<tr>
<td>Min</td>
<td>-16.3%</td>
<td>-6.2%</td>
<td>-11.1%</td>
<td>-16.3%</td>
</tr>
<tr>
<td>Observations</td>
<td>381</td>
<td>68</td>
<td>222</td>
<td>91</td>
</tr>
</tbody>
</table>

Source: Global Financial Data, Schroders

Table 2: International Equities (Hedged): Relationship between Shiller PE ratio and three year return state

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>5.6%</td>
<td>10.6%</td>
<td>4.9%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Std Dev</td>
<td>10.8%</td>
<td>12.2%</td>
<td>8.8%</td>
<td>12.1%</td>
</tr>
<tr>
<td>Max</td>
<td>41.0%</td>
<td>41.0%</td>
<td>24.3%</td>
<td>21.0%</td>
</tr>
<tr>
<td>Min</td>
<td>-25.0%</td>
<td>-7.9%</td>
<td>-17.2%</td>
<td>-25.0%</td>
</tr>
<tr>
<td>Observations</td>
<td>994</td>
<td>243</td>
<td>580</td>
<td>171</td>
</tr>
</tbody>
</table>

Source: Global Financial Data, Ricer Warner, Schroders
Part 2: Applying valuation indicators in a multi-asset context

While it is a necessary condition to demonstrate that valuation states can be forecast with reasonable reliability and that once indicated, each state is strongly correlated with a return outcome (eg. cheap valuation states correlate with high returns), these are not sufficient conditions in a multi-asset context.

In the context of constructing multi-asset portfolios we need to deal with the challenge that not all markets are in the same valuation state at the same time. We overcome this problem by adopting the following steps:

- Optimise a (conditional) portfolio for each valuation state;
- Optimise the combination of weights for valuation signals that best predict a valuation state\(^5\);
- Allow for the valuation signals to be imperfect by probability weighting the likelihood of being in a state (as opposed to always being 100% within a state).

For a given portfolio state, the optimal strategic portfolio allocations implied are presented in the following table. For reference these are shown relative to a more traditional 70/30 (unconditional SAA portfolio).

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\(^5\) We apply a 12 month trailing average calculation to the valuation state to determine the final state that is used for asset allocation. This is because the valuation signals used tend to lead the actual market. This also helps to reduce noise generated by the valuation signals that would lead to constant and rapid changes in asset allocation.
Table 5: Conditional portfolio allocations versus Unconditional portfolio allocations

<table>
<thead>
<tr>
<th></th>
<th>Australian shares</th>
<th>International shares</th>
<th>Australian fixed interest</th>
<th>International fixed interest</th>
<th>Cash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cheap</td>
<td>65%</td>
<td>25%</td>
<td>7%</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td>Normal</td>
<td>20%</td>
<td>50%</td>
<td>17%</td>
<td>10%</td>
<td>3%</td>
</tr>
<tr>
<td>Expensive</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>5%</td>
<td>95%</td>
</tr>
<tr>
<td>Fixed SAA</td>
<td>40%</td>
<td>30%</td>
<td>15%</td>
<td>10%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Source: Schroders

We examine the optimal combination of the valuation signals that most likely indicate an overall cheap, normal, or expensive portfolio state. The following table provides a summary of the resulting weighting scheme derived to indicate overall capital market conditions.

Table 6: Chosen Indicators and Weights to indicate overall portfolio valuation conditions

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Weight&lt;sup&gt;6&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cheap</td>
</tr>
<tr>
<td>Aust Shiller PE &lt; 10.0</td>
<td></td>
</tr>
<tr>
<td>US Shiller PE &lt; 15.0</td>
<td></td>
</tr>
<tr>
<td>Aust term spread &lt; 1.8</td>
<td>&lt; 1.8</td>
</tr>
<tr>
<td>US term spread &lt; 2.3</td>
<td>&lt; 2.3</td>
</tr>
</tbody>
</table>

Source: Global Financial Data, Rice Warner, Schroders

The weighting scheme suggests an overall probability of being in a particular state. Depending on the value of each individual valuation metric the combination could indicate that the probability of being in a particular state is 100%, or it could indicate a range of probabilities of being in a number of states (each of course summing to 100%).

To illustrate the application of this, if for example the weights indicated that the probability of being in the cheap state was 50% and the normal state was 50%, then the resulting portfolio adopted would be a blend of the two conditional SAA portfolios. The following table shows the actual implied probabilities (based on a trailing a 12 month average) of being in each valuation state over the period from 1929 to 2014.

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<sup>6</sup> The weighting schemes for the Cheap and Expensive states are based upon a Rice Warner model. The application of the weights is non-linear to the extent that valuation levels beyond the cheap/expensive cut-off are allocated greater weighting.
**Part 3: Performance and asset allocation outcomes**

Overall based on data from 1929 to 2014, the conditional SAA model outperformed the traditional SAA model by an average of 1.5% p.a. (which relative to the total average return of the 70/30 SAA portfolio is an improvement of 29.7%). In addition, the performance was generated more efficiently in risk adjusted terms with a Sharpe ratio of 0.83 versus 0.47. The following chart shows the relative performance of the conditional SAA model versus the traditional unconditional SAA model on a cumulative basis.

**Chart 2: Cumulative portfolio performance**

Source: Schroders
Additionally, we analysed performance outcomes for the conditional SAA and traditional SAA models over a shorter timeframe – rolling 3 year periods. The charts below show the rolling 3 year maximum drawdowns, volatility and Sharpe ratio for the 2 models. The results demonstrate that the conditional AA model consistently outperforms the traditional SAA model – having on average lower maximum drawdown levels and lower levels of volatility (Charts 3 and 4 respectively), particularly during the oil crisis in the 1970s and more recently through the GFC. This is also reflected in the higher Sharpe Ratio (Chart 5) – which demonstrates a more efficient use of risk.

**Chart 3: Rolling 3 year maximum real drawdown**

Source: Schroders

**Chart 4: Rolling 3 year portfolio volatility**

Source: Schroders
Over the entire period, the average asset allocation of the conditional approach compared to the 70/30 portfolio is shown in the table below.

<table>
<thead>
<tr>
<th></th>
<th>Conditional Asset Allocation Average (%)</th>
<th>Traditional 70/30 Asset Allocation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australian Shares</td>
<td>29.2</td>
<td>40</td>
</tr>
<tr>
<td>Overseas Shares</td>
<td>28.1</td>
<td>30</td>
</tr>
<tr>
<td>Total Growth assets</td>
<td>57.3</td>
<td>70</td>
</tr>
<tr>
<td>Australian fixed interest</td>
<td>9.1</td>
<td>15</td>
</tr>
<tr>
<td>Overseas fixed interest</td>
<td>5.4</td>
<td>10</td>
</tr>
<tr>
<td>Cash</td>
<td>28.2</td>
<td>5</td>
</tr>
<tr>
<td>Total Defensive assets</td>
<td>42.7</td>
<td>30</td>
</tr>
</tbody>
</table>

Source: Schroders

On average, the conditional approach shows that the average exposure to growth assets was considerably lower over the entire period analysed. The key asset class responsible for this lower average was the much higher exposure to cash which was the optimal portfolio allocation when markets are in an expensive state.

It should also be noted that while the asset allocation for both the cheap and expensive states differ very significantly relative to the traditional 70/30 model, this is moderated by the approach to probability weight each state. Effectively this means that if based on the weighting scheme outlined earlier, the indicators suggest a 50% probability of being in an expensive valuation state and 50% normal valuation state, then the modelled portfolio would be a combination of the respective asset allocations for those states. The following charts show the modelled asset allocations for the conditional approach over time and relative to the 70/30 traditional SAA portfolio.
The variation in asset allocation between the conditional and unconditional SAA portfolios was pronounced in episodes, most noticeably when markets are considered expensive, and is shown in Chart 7 (using the traditional 70/30 portfolio as the baseline).
Part 4: Applications

The analysis in this paper is not designed to substitute for more sophisticated investment processes that are used to manage objective based portfolios. Instead, the analysis was at each stage transparently designed to illustrate the flaws in anchoring to an SAA portfolio built around average return and correlation assumptions. These averages structurally ignore valuation regimes which themselves can be transparently predicted using established evidence-based indicators of valuation.

Notwithstanding that valuation is broadly recognised as a cornerstone in many institutional clients’ investment philosophy and beliefs, we argue that a key reason that prevents clients and advisors moving away from a fixed strategic asset allocation is the lack of a fully articulated substitute framework.

With this in mind, we commissioned Rice Warner, a firm of independent actuaries to verify and extend the historical analysis to demonstrate how the framework developed in this paper could be extended into the familiar prospective analysis used by many clients and advisors to frame their SAA benchmark portfolios. We found that by applying the conditional valuation principles in a stochastic framework yielded similar results with conditional portfolios outperforming unconditional counterparts. Moreover, this analysis was robust in the face of various objectives including:

- Choosing a real return objective and minimising the risk around this; and
- Maximising a real return subject to acceptable volatility levels.

The key points we take away from this analysis are that for investors and their advisers:

- anchoring to an unconditional SAA framework leads to inefficient portfolio outcomes; and
- from a governance and implementation perspective, there are practical alternative approaches.
Appendix A

Chart 1: Australian Equities: Relationship between Shiller PE ratio and three year returns

Source: Schroders

Chart 2: International Equities (Hedged): Relationship between Shiller PE ratio and three year returns

Source: Schroders
Chart 3: Australian Fixed Interest: Relationship between nominal bond yields and subsequent three year returns

Source: Schroders

Chart 4: International Fixed Interest (Hedged): Relationship between nominal bond yields and subsequent three year returns

Source: Schroders
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