Portfolio construction methodologies: looking beyond the good, the bad and the ugly

Key points

Most of the debate about portfolio construction methodologies revolves around the proposal or defence of a specific methodology over others.

Our view is that no methodology – risk parity, fixed weight or momentum – is wholly superior across market scenarios.

As it is very much the case for any asset, the performance of different asset bundling methodologies depends on one or a few factors and is therefore subject to biases and cyclicality.

We see significant value in diversifying risk across different portfolio construction methodologies.
The most recent synchronised fall of bonds and equities has reignited the debate regarding the strengths and weaknesses of risk parity portfolios.

On the one hand, supporters of risk parity can point to the fact that the drawdown experienced this time around has been much lower than what was experienced in the second quarter of 2013, when the US Federal Reserve signalled a change in its monetary policy. On the other hand, investors who dislike risk parity can use this drawdown as yet another harbinger of the imminent failure of the approach.

Although we do not employ risk parity in our multi asset strategy, we believe it is a well-founded approach to portfolio construction. Still, it is only one of several well-founded approaches, alongside fixed weights and mean-variance optimisation. Our view is that none of these methodologies is wholly superior across market scenarios. Rather, the stronger a methodology is in a specific market scenario, the higher the likelihood that it will underperform in others. Indeed, as it is very much the case for any asset, the performance of different asset bundling methodologies is heavily reliant on one or few factors and is therefore subject to biases and cyclical.

Conceptually, any investment process can be explained by the interaction of its two main component parts: asset selection and asset bundling. It is striking that while most investors recognise the need for and benefits of asset diversification, fewer attribute equal merit to diversifying bundling methodologies. This is perhaps attributable to the natural human bias of seeking the ‘holy grail’ solution rather than embracing a more gradual and articulate one.

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In this paper, we will briefly review the basic characteristics of the most common portfolio construction methodologies and expose their intrinsic biases. In doing so, we will highlight the main risk of relying on one single methodology and provide practical suggestions to combine them. Finally, we will briefly discuss risk management and asset selection.

1. Asset bundling methodologies: an overview

The essential objective of any asset bundling approach is to achieve a degree of diversification in terms of both risks and returns.

One of the core tenets of our investment philosophy is that in the long run, markets are efficient in rewarding risk.1 However, reaping such a reward presumes that an investor is continuously engaged with the market, which, at times, may prove to be difficult. Furthermore, the long-term impact of stepping out of the market as a natural reaction to a turbulent period can be quite detrimental on wealth creation. Equally, switching asset bundling methodologies as a result of poor short-term results can also cause investors to ultimately leave a lot of money on the table.

Through an actively managed and diversified portfolio it is possible to maintain a fairly consistent risk level throughout market cycles.2 In the context of a truly long-term investment approach, we do not believe that asset bundling diversification comes as a free lunch in that what one gains in consistency one loses in the ability to shine in any specific market scenario. For most investors, however, the consistency that ensues from diversification will dramatically increase their ability to stay the course, thereby fully capitalising on market returns.

Given the ample analysis by academics and practitioners on the topic of portfolio construction methodologies, rather than conduct another review of the options available to investors, we will focus on the major ones with the objective of highlighting the key characteristics.3

We bucket various methodologies into three categories: fixed weight, risk-driven and return-driven. In practice, rather than combining these methodologies, investors typically adopt one and often attempt to enhance it, usually leading to complications.

Fixed weight: This is the most basic asset bundling methodology, wherein different assets are assigned a specific weight. The portfolio is then rebalanced to those weightings on a periodic basis. These weightings can be equal or based on a specific strategic asset allocation that reflects the investor’s risk appetite. This latter approach inspired the 60-40 model portfolio that was traditionally used by pension funds before the financial crisis. The 60-40 split, initially between bonds and equities, was simply an estimation of the market portfolio in the context of the Capital Asset Pricing Model (CAPM) theoretical framework. Since then it has been widely criticised and in many cases abandoned. As we will discuss later, while we believe that these criticisms are well deserved with regards to the starting point (i.e. the weights derived from the market portfolio), they are largely unfair with regards to the asset bundling methodology.

Risk-driven: This asset bundling methodology is based on risk expectations and can be split into two categories: risk-outcome oriented and risk-allocation oriented. In the first category, the portfolio is the result of an optimisation with the objective of either minimising risk or maximising diversification. In the second category, risk is allocated based on one or more measures of risk, such as volatility or drawdown, with or without the inclusion of correlations. The allocation can then follow an equal weighting logic (i.e. risk parity) or one based on risk budgeting. Risk-driven methodologies would typically require more frequent portfolio rebalancing than those managed to fixed weights. In general, this type of approach has attracted an increasing amount of interest following the financial crisis. As we will discuss later, we believe that such interest is mostly well founded, though the enthusiasm is perhaps excessive and a direct result of the financial crisis and the quantitative easing programmes undertaken by major central banks around the world, which have helped establish an extremely favourable market scenario for this methodology.

Return-driven: This asset bundling methodology is based on return expectations. Among several variations, the most common approach is to combine risk and return expectations into a mean-variance optimisation (MVO). The frequency of rebalancing varies greatly among different sub-approaches, though it would typically be more frequent than fixed weight.

1 This concept is generally backed by empirical evidence across asset classes, though it can be challenged on an intra-asset class level
2 For example, using volatility targeting or hedging strategies. See Market risk insights, by the Hermes Investment Office
3 For an extensive review of the different approaches and their characteristics, we would point to the JP Morgan research piece written by Marko Kolanovic and Zhen Whei in 2013 (see end notes)
While a classic MVO has several well-known limitations in practical use (such as weight instability and the assumption of a normal distribution), its strength resides in its simplicity. Subsequent approaches such as the Black-Litterman model offer scope for a more realistic implementation. At the far end of the spectrum, traditional medium-term trend following strategies represent a special group of return-driven methodologies wherein the portfolio is often the result of pure return-driven signals with little attention to diversification.

**Figure 1. Summary of asset bundling methodologies**

<table>
<thead>
<tr>
<th>Fixed weighting</th>
<th>Risk-driven</th>
<th>Return-driven</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition</td>
<td>Risk-based weights based on outcome (optimisation) or risk budgeting</td>
<td>Return-based weights</td>
</tr>
<tr>
<td>Examples</td>
<td>Minimum variance*</td>
<td>Mean variance*</td>
</tr>
<tr>
<td>Intrinsic biases</td>
<td>Low volatile assets</td>
<td>Black-Litterman</td>
</tr>
<tr>
<td>Key factors</td>
<td>Risk estimates</td>
<td>Return estimates</td>
</tr>
<tr>
<td>Key risk</td>
<td>Estimation error</td>
<td>Estimation error</td>
</tr>
<tr>
<td>Complexity</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Expected turnover</td>
<td>Low</td>
<td>Medium/High</td>
</tr>
<tr>
<td>* Requires optimisation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Hermes as at July 2015

It would be incorrect to presume that risk-aware, or more sophisticated investors, should opt for a risk-driven methodology while fixed-weight methodologies are for risk-unaware, or less sophisticated, investors. As we will see later on, once the starting allocation is made “risk-aware”, the difference between fixed-weight and risk driven methodologies is largely due to style biases, with fixed-weight methodologies being value-driven and risk-driven methodologies being momentum driven. In the context of return-driven methodologies, these investment biases can either be mitigated or exacerbated depending on the logic with which return expectations are derived (i.e. value or momentum).

These intrinsic biases are subject to cyclicality, which over time causes the out- or underperformance of some methodologies against others. While the cyclicality of asset bundling methodologies can be more extended than the one of assets, timing asset bundling approaches remains as difficult as timing asset purchases. Moreover, given that an investment process tends to be altered far less frequently than the asset allocation, the consequences of bad timing are likely to be even greater.

We believe that investors’ natural reaction to poor results, which often sees one portfolio construction method being swapped for another, is the main risk underpinning the use of a single portfolio construction methodology.

For the most part, financial markets have been driven by the interaction of political, economic and behavioral factors and we do not expect this to change. So unlike other service sectors, such as healthcare or media, where knowledge breakthroughs tend to be relatively frequent and often require a radical shift from old to new practices, in the context of asset management important changes are far less frequent, thereby resulting in a more gradual evolution of practice. As Peter Bernstein suggests in his highly insightful journey on the role of risk in our society, all of the tools we use today in risk management and decision making stem from developments that took place between 1654 and 1760 with only two exceptions: the concept of regression to the mean, revealed by Francis Galton in 1875, and the mathematical proof of the benefits of diversification, proposed by Harry Markowitz in 1952. In fact, we have gone so far down the Modern Portfolio Theory track, that switching to a new paradigm may prove to be difficult.

We believe that investors’ natural reaction to poor results, which often sees one portfolio construction method being swapped for another, is the main risk underpinning the use of a single portfolio construction methodology.

Our experience and observations tell us that portfolio construction methodologies generally go into or out of fashion because of three reasons:

1. Negative surprise: an in-vogue methodology is affected by an uncomfortable level of poor performance
2. Herd mentality: consensus among the investor community that the current methodology is broken and that there is a clear alternative
3. Empirical evidence: new knowledge, typically limited to the last 10-20 years, supports the case for switching approaches.

At the cost of stating the obvious, the methodologies that are going out of fashion today were in fashion when they were adopted. At the time, they were adopted because they made sense rationally and, more importantly, empirically. This led most institutional investors to first adopt and then (often) reject the 60:40 model or the David Swenson-led Yale model, and is directing many investors to adopt the risk parity approach, sometimes referred to as the “Bridgewater model”, today.

We generally reject the notion that investors in the past were less thoughtful or less rational than today’s investors. The main difference between now and the past is a continuously larger historical data set and ever greater computational power. Despite all of this, there is little evidence that investors are becoming more accurate at forecasting economic indicators, asset returns, or anticipating turbulent markets and crisis points (the financial crisis being a recent reminder of that). In fact, it is possibly the case that the ever greater computational power may

generate a false sense of security and incentivise the need to adopt the newest asset bundling methodology. In other words, the most recent “long-term” empirical evidence may add decisive momentum to investors’ enthusiasm towards a specific asset bundling methodology.\(^5\) We also are not immune to the natural bias of relying excessively on the data set at hand, whereas secular-type cyclicity is much harder to incorporate in our day to day decision making process.\(^6\)

As Peter Bernstein wrote:

*The essence of risk management lies in maximizing the areas where we have some control over the outcome while minimizing the areas where we have absolutely no control over the outcome and the linkage between effect and cause is hidden from us*

Fortunately, the concentration risk associated with any portfolio construction methodology can easily be diversified by combining different methodologies. To illustrate this concept we will discuss three widely different methodologies: risk parity, fixed weights and trend-following.

### Risk parity, or “the good”

The financial crisis has substantially raised investors’ interest in risk-driven methodologies, with risk parity seemingly the most popular among them. The main argument for adopting a risk-driven methodology is the fact that fixed-weight methodologies may suffer from excessive concentrations of risk. During the financial crisis, it became clear that a 60:40 equity-bond split in notional terms translates into something closer to a 90-10% split in risk terms.

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Moreover, the loose monetary policies implemented by central banks since the crisis have inflated asset prices across the markets. In such a scenario, the best asset bundling methodology is the one that offers the broadest and most efficient exposure to risk factors. Risk parity provides just that.

Given the enthusiasm for risk-parity investing, let us focus on some of the risks, and three scenarios in particular which would cause risk-parity portfolios to spring negative surprises.

1. **Correlation breakdown among assets**: As we think about the next phase of the market cycle, one conceivable scenario is a synchronised fall in prices across assets, perhaps triggered by a surprise rise in inflation or simply the withdrawal of the monetary policies that have caused the run up in valuations in the first place. It is useful to remind ourselves that although the correlation between bonds and equities has been negative for most of the last 20 years, it had been significantly positive in the 20 years prior. The correlation between bonds and equities is driven by different factors, including inflation and growth, some of which can be more important than others in different economic environments.\(^7\) Such a setting would cripple the ability of risk-parity portfolios to deliver attractive risk-adjusted returns and would, in the process, surprise some investors.

**Figure 2. UK bond and equity correlations (36-month rolling v FTSE 100 Index)**

<table>
<thead>
<tr>
<th>Year</th>
<th>US 7-10yr nominal bonds</th>
<th>US 7-10yr inflation-linked bonds</th>
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<tbody>
<tr>
<td>1989</td>
<td>0.0</td>
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<td>2013</td>
<td>0.0</td>
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<tr>
<td>2014</td>
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2. **Correlation breakdown between volatility and returns**: Like all other risk-driven asset bundling methodologies, risk parity benefits from a negative correlation between assets’ volatility and short-term returns. Empirical evidence shows that increased levels of volatility have had a tendency to be concurrent with, and a leading indicator for, negative returns. Moreover, within asset classes, securities exhibiting low volatility tend to outperform more volatile ones.\(^8\) This phenomenon has puzzled academics and practitioners for a long time as it contradicts the rational assumption that higher risk needs to be compensated through higher returns. This perceived low-volatility premium is being used in smart beta strategies. While such a phenomenon can certainly persist, like any other empirical relationship, it can break down for significant periods of time or even disappear. These breakdowns would impact risk-driven methodologies more than any other.

3. **Potential reduction in the significance of traditional risk measures in the context of factor-based investing**: Our hesitance to rely decidedly on cross-asset correlations to construct a portfolio extends beyond the relationship between bonds and equities. It is one thing to have a fundamental understanding of the level of the correlation between traditional assets, but having a similar level of confidence when dealing with traditional and alternative risk factors requires a much greater leap of faith. While we are strongly in favor of using the widest range of (economically sound) risk factors, we would suggest not relying excessively on statistical relationships that can hardly be explained from a fundamental point of view. Furthermore, as more investors are employing factor-based investing, the correlation metric between traditional and alternative risk factors is bound to evolve (and probably for the worse).

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\(^1\)To put the last 20 years of data into a longer perspective, we suggest reading “Triumph of the Optimists: 101 Years of Global Investment Returns” by Elroy Dimson, Paul Marsh and Mike Staunton, published in 2009

\(^2\)Daniel Kahneman and Amos Tversky have written extensively on the subject of behavioural biases

\(^3\)Binky Chadha at Deutsche Bank wrote an interesting piece on the subject in 2014

\(^4\)“Expected Returns” by Antti Ilmanen, provides one of the most comprehensive reviews on the subject of the sources of returns across traditional and alternative risk factors
For all of these reasons, among risk-driven strategies we prefer those that are mostly focused on the concept of volatility rather than those which put an emphasis on correlation. If correlation metrics are to be used, we would suggest using long-term or even static ones. This belief becomes even firmer in the context of a leveraged portfolio.

**Fixed weights, or “the bad”**

For the most part, the increased interest in risk-driven methodologies has come at the expense of a fixed-weight approach.

During the financial crisis, the 60:40 model performed poorly. Echoing the widespread disappointment, in 2011 Arjan B. Berkelaar at KAUST stated that the traditional approach to asset allocation and risk management was “dead”. Several institutional investors have abandoned the prevalent fixed weight approach, often in favour of risk-driven approaches. Among others, the CERN pension fund wrote an insightful paper on this transition, though Bob Maynard at Idaho PERS is equally eloquent in its defence.

While a periodic reassessment of a portfolio and risk management methodology is best practice, we wonder if the drawdown suffered in 2008 has not excessively influenced both the choice of the type of new methodology (i.e. often towards minimum risk) and in the decision to abandon the fixed-weight methodology altogether, as opposed to seeking greater diversification through a gradual approach.

In fact, although risk-driven approaches have achieved good risk-adjusted results after 2008, it is generally the case that a fixed-weight approach would have generated stronger absolute returns. In the current market context, risk premia are compressed across assets and looking forward to the next five-to-ten years, the excess return—which was forgone by switching from one methodology to another—may prove to be significant.

Given the lack of enthusiasm for fixed-weight methodologies, we will focus on the positive characteristics that we think are being overlooked.

1. **Contrarian:** Among all of its limitations, a fixed-weight approach presents a unique advantage. It is the only approach that offers an unwavering value bias in that the rebalancing activity is always going to be contrarian with respect to the market moves that have occurred between one rebalancing date and the next. This effect is particularly evident in the context of infrequent rebalancing activity, i.e. at annual intervals or longer. As James Montier of GMO wrote: Being a contrarian involves three separate elements: 1) having the courage to stand against the dominant view, 2) being an independent thinker, and 3) having the firmness of character to stick to your guns. All three of these traits are unnatural of human beings!

2. **Flexible:** Another unique advantage that a fixed-weight methodology has over the others is that it lends itself to the inclusion of illiquid assets. Risk and return-driven methodologies do not, because they find it hard to reconcile evaluations of risk between assets which trade and those that do not, and although assumptions can be made to incorporate real assets into a Value at Risk-like framework, they tend to underestimate the risk of illiquid assets. Furthermore, both methodologies tend to require more frequent rebalancing activity, which requires an exception to be made for illiquid assets.

The simplicity and flexibility associated with a fixed-weight methodology, combined with its value bias, are strengths that in our view would be imprudent for a long-term investor to completely forgo.

If the main issue with fixed-weight methodologies is that they lead to a portfolio that is grossly unbalanced in terms of risk, an obvious solution would be for the initial portfolio to take account of long-term risk (alongside long-term return). Later on we will show that even just adjusting an initial portfolio once every 10 years can dramatically reduce the gap with a risk-driven methodology in terms of volatility and drawdown risk. We suggest for risk expectations to be set using long-term volatility (inclusive of higher moments) and drawdown measurements. Return expectations should be set using a combination of long-term historical evidence and valuation-based forward-looking expectations. These assumptions should be re-assessed over a long-term cycle of three years or longer.

The simplicity and flexibility associated with a fixed-weight methodology, combined with its value bias, are strengths that in our view would be imprudent for a long-term investor to completely forgo.

**Momentum, or “the ugly”**

Momentum as an asset bundling methodology is mostly used in the context of trend-following strategies. In its purest form, it leads to a collection of long/short trades across a universe of assets based on a trend signal. The portfolio is then purely based on a return-driven philosophy, often with little consideration for diversification and correlation other than sizing positions based on risk budgeting.

Trend-following portfolios are generally model driven. The discipline of a systematic approach is required given that the hit ratio and pay-off profile goes against the natural biases of most investors. A typical CTA hedge fund would have a hit ratio of 30-40% (i.e. only three or four out of 10 trades are profitable with six or seven losing money). Such an appalling hit ratio is the consequence of a disciplined risk framework that cuts losing positions very quickly while letting the winning positions run. This type of strategy would generally exhibit an average profit and loss ratio of 3:1 or better.

Because of this approach, the return profile of a pure trend-following portfolio is often unattractive as a standalone strategy when compared to other growth-oriented ones: long periods of meagre returns are interrupted by short periods of explosive returns. Crucially, however, the strong returns tend to correspond with periods of poor performance for other methodologies. For the 30 years to 2014, the median excess annual return of the MSCI World Index over the Barclays CTA Index has been 4.5%. Moreover, the MSCI World Index has outperformed the CTA Index nearly two-thirds of the time.”
The scatter plot chart below shows the monthly returns for both indices. This profile is often referred to as the “CTA smile” and is a rare and highly attractive profile to have in the context of overall portfolio construction.

Figure 3. Winners are grinners: the CTA smile

This scatter plot of monthly returns for the MSCI World Index v the Barclay CTA Index illustrates the convexity profile of a long/short momentum strategy. It also shows the significant difference in skew. The equity index has a negative skew while the CTA index exhibits positive skew relative to a normal distribution (i.e. it’s relatively higher frequency of small losses is compensated by fewer outsized gains). Data sourced from 360 observations between January 1985 to May 2015.

As a result of the systematic approach and the rather unique return profile, investors tend to either embrace or reject a long/short momentum strategy. Additionally, even among those investors who embrace them, many would find it difficult to size it appropriately in the context of their overall portfolio.

Long/short momentum strategies are somewhere in the middle between an absolute return strategy and a tail-risk hedging strategy. Their reactivity to a sudden risk-off event is significantly less reliable than that of conventional hedging strategies, such as those based on options. In fact, a common misconception about long/short momentum strategies is that they are long volatility when in fact they are simply long gamma, meaning that they become more exposed to a trend the more pronounced it becomes, thereby benefiting from a major risk-off period. But for long-term investors, we believe that they provide a more appealing trade-off in terms of costs and rewards. Figure 4 illustrates how complementary a typical long/short momentum methodology can be to an actively risk-managed multi-asset growth portfolio (typically managed with a risk or return-driven methodology). Last but not least, in the current environment, long/short momentum is one of the few asset bundling approaches that we expect to perform strongly in the context of a medium-term shift in the market, regardless of its impact on volatility and cross-asset correlations.

2. Empirical evidence

To illustrate these concepts, we simulated the three different methodologies: risk parity, or equal risk contribution (ERC), fixed weights (FW) and trend-following, or momentum (Mom). We compared them to the 60:40 model (60/40). To avoid any historical bias, we split the data into six periods of 10 years each with a five-year overlap. To compare the different methodologies on a level playing field, for the FW approach we are setting the initial portfolio using a risk-parity methodology focused on volatility. Once the initial portfolio is set, it remains so for the following 10 years. Only in this way can we truly compare a FW rebalancing methodology with a risk-driven rebalancing methodology. Please refer to the appendix for a detailed explanation of the data and methodologies used.

The next table summarises the findings of our simulation showing some performance, risk and efficiency metrics for the four different methodologies over the six periods analysed, as well as an average of the FW, ERC and Mom methodologies (Combo).

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12“We suggest reading Hermes’ research piece “CTAs: Shedding the light on the black box” for an extensive review of the properties of medium-term trend-following strategies in 2012.
Figure 5. A comparison of asset bundling methodologies across various time periods

<table>
<thead>
<tr>
<th></th>
<th>60/40</th>
<th>FW</th>
<th>ERC</th>
<th>Mom</th>
<th>Combo</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1980-1989</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annualised return</td>
<td>17.8%</td>
<td>12.6%</td>
<td>11.3%</td>
<td>9.3%</td>
<td>11.1%</td>
</tr>
<tr>
<td>Annualised volatility</td>
<td>11.4%</td>
<td>6.5%</td>
<td>6.6%</td>
<td>5.6%</td>
<td>5.5%</td>
</tr>
<tr>
<td>Maximum drawdown</td>
<td>-18.0%</td>
<td>-7.2%</td>
<td>-7.4%</td>
<td>-10.8%</td>
<td>-4.8%</td>
</tr>
<tr>
<td>Total return</td>
<td>417%</td>
<td>228%</td>
<td>192%</td>
<td>143%</td>
<td>187%</td>
</tr>
<tr>
<td>Sharpe Ratio (0%)</td>
<td>1.56</td>
<td>1.93</td>
<td>1.72</td>
<td>1.65</td>
<td>2.03</td>
</tr>
<tr>
<td>Calmar Ratio</td>
<td>0.99</td>
<td>1.75</td>
<td>1.53</td>
<td>0.86</td>
<td>2.31</td>
</tr>
<tr>
<td>Correlation to equity</td>
<td>0.97</td>
<td>0.58</td>
<td>0.58</td>
<td>0.43</td>
<td>0.62</td>
</tr>
<tr>
<td>Annualised return</td>
<td>12.4%</td>
<td>12.8%</td>
<td>12.3%</td>
<td>9.9%</td>
<td>11.7%</td>
</tr>
<tr>
<td>Annualised volatility</td>
<td>10.7%</td>
<td>5.3%</td>
<td>4.5%</td>
<td>4.7%</td>
<td>4.5%</td>
</tr>
<tr>
<td>Maximum drawdown</td>
<td>-18.0%</td>
<td>-6.6%</td>
<td>-4.4%</td>
<td>-4.6%</td>
<td>-4.2%</td>
</tr>
<tr>
<td>Total return</td>
<td>221%</td>
<td>235%</td>
<td>220%</td>
<td>158%</td>
<td>203%</td>
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<tr>
<td>Sharpe Ratio (0%)</td>
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<td>2.44</td>
<td>2.72</td>
<td>2.13</td>
<td>2.60</td>
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<td>Calmar Ratio</td>
<td>0.68</td>
<td>1.95</td>
<td>2.81</td>
<td>2.16</td>
<td>2.78</td>
</tr>
<tr>
<td>Correlation to equity</td>
<td>0.98</td>
<td>0.79</td>
<td>0.57</td>
<td>0.60</td>
<td>0.71</td>
</tr>
<tr>
<td><strong>1985-1994</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annualised return</td>
<td>13.2%</td>
<td>11.2%</td>
<td>10.7%</td>
<td>10.3%</td>
<td>10.8%</td>
</tr>
<tr>
<td>Annualised volatility</td>
<td>8.6%</td>
<td>3.9%</td>
<td>4.1%</td>
<td>3.9%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Maximum drawdown</td>
<td>-12.5%</td>
<td>-3.9%</td>
<td>-3.4%</td>
<td>-6.2%</td>
<td>-3.9%</td>
</tr>
<tr>
<td>Total return</td>
<td>244%</td>
<td>189%</td>
<td>178%</td>
<td>166%</td>
<td>178%</td>
</tr>
<tr>
<td>Sharpe Ratio (0%)</td>
<td>1.54</td>
<td>2.84</td>
<td>2.63</td>
<td>2.64</td>
<td>2.89</td>
</tr>
<tr>
<td>Calmar Ratio</td>
<td>1.05</td>
<td>2.86</td>
<td>3.20</td>
<td>1.66</td>
<td>2.77</td>
</tr>
<tr>
<td>Correlation to equity</td>
<td>0.98</td>
<td>0.61</td>
<td>0.61</td>
<td>0.48</td>
<td>0.61</td>
</tr>
<tr>
<td><strong>1990-1999</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annualised return</td>
<td>10.0%</td>
<td>9.4%</td>
<td>9.5%</td>
<td>9.4%</td>
<td>9.5%</td>
</tr>
<tr>
<td>Annualised volatility</td>
<td>8.2%</td>
<td>4.6%</td>
<td>4.0%</td>
<td>4.5%</td>
<td>3.8%</td>
</tr>
<tr>
<td>Maximum drawdown</td>
<td>-20.6%</td>
<td>-5.3%</td>
<td>-5.5%</td>
<td>-4.4%</td>
<td>-2.4%</td>
</tr>
<tr>
<td>Total return</td>
<td>160%</td>
<td>146%</td>
<td>147%</td>
<td>145%</td>
<td>147%</td>
</tr>
<tr>
<td>Sharpe Ratio (0%)</td>
<td>1.22</td>
<td>2.03</td>
<td>2.35</td>
<td>2.07</td>
<td>2.50</td>
</tr>
<tr>
<td>Calmar Ratio</td>
<td>0.48</td>
<td>1.79</td>
<td>1.71</td>
<td>2.14</td>
<td>3.91</td>
</tr>
<tr>
<td>Correlation to equity</td>
<td>0.98</td>
<td>0.63</td>
<td>0.54</td>
<td>0.14</td>
<td>0.50</td>
</tr>
<tr>
<td><strong>1995-2004</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annualised return</td>
<td>3.3%</td>
<td>7.2%</td>
<td>5.5%</td>
<td>5.9%</td>
<td>6.3%</td>
</tr>
<tr>
<td>Annualised volatility</td>
<td>8.7%</td>
<td>4.7%</td>
<td>6.0%</td>
<td>4.6%</td>
<td>4.0%</td>
</tr>
<tr>
<td>Maximum drawdown</td>
<td>-27.5%</td>
<td>-11.9%</td>
<td>-17.0%</td>
<td>-11.5%</td>
<td>-8.7%</td>
</tr>
<tr>
<td>Total return</td>
<td>38%</td>
<td>101%</td>
<td>71%</td>
<td>77%</td>
<td>83%</td>
</tr>
<tr>
<td>Sharpe Ratio (0%)</td>
<td>0.38</td>
<td>1.54</td>
<td>0.92</td>
<td>1.27</td>
<td>1.56</td>
</tr>
<tr>
<td>Calmar Ratio</td>
<td>0.12</td>
<td>0.61</td>
<td>0.32</td>
<td>0.51</td>
<td>0.72</td>
</tr>
<tr>
<td>Correlation to equity</td>
<td>0.98</td>
<td>0.71</td>
<td>0.62</td>
<td>-0.25</td>
<td>0.49</td>
</tr>
<tr>
<td><strong>2000-2009</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annualised return</td>
<td>6.8%</td>
<td>6.5%</td>
<td>7.5%</td>
<td>4.2%</td>
<td>6.2%</td>
</tr>
<tr>
<td>Annualised volatility</td>
<td>8.1%</td>
<td>5.5%</td>
<td>7.0%</td>
<td>5.3%</td>
<td>4.6%</td>
</tr>
<tr>
<td>Maximum drawdown</td>
<td>-27.5%</td>
<td>-13.2%</td>
<td>-9.9%</td>
<td>-11.6%</td>
<td>-6.7%</td>
</tr>
<tr>
<td>Total return</td>
<td>92%</td>
<td>89%</td>
<td>107%</td>
<td>51%</td>
<td>82%</td>
</tr>
<tr>
<td>Sharpe Ratio (0%)</td>
<td>0.83</td>
<td>1.19</td>
<td>1.08</td>
<td>0.79</td>
<td>1.34</td>
</tr>
<tr>
<td>Calmar Ratio</td>
<td>0.25</td>
<td>0.50</td>
<td>0.76</td>
<td>0.36</td>
<td>0.93</td>
</tr>
<tr>
<td>Correlation to equity</td>
<td>0.98</td>
<td>0.79</td>
<td>0.72</td>
<td>-0.02</td>
<td>0.67</td>
</tr>
</tbody>
</table>

Source: Hermes computation using Bloomberg data
Figures 6-8 show the historical monthly allocations for the three simulated methodologies.

**Figure 6. Risk-parity methodology: historical monthly allocations**

From this analysis we can draw the following observations:

— There is not a clear winning methodology

— Risk parity methodology performs strongly in most periods – especially in the most recent one. It tends to exhibit higher turnover than the other methodologies (the results are not inclusive of trading costs)

— When removed from the 60:40 framework, the fixed weight methodology performs strongly across most periods and does so with much less turnover than the risk-driven methodology

— The performance of trend-following strategies is less attractive in absolute terms. However, it displays the lowest correlation to equities

— A simple average between the three different approaches provides the most consistent results

These results are specific to the data sample and asset mix we have selected. We are therefore wary of suggesting any definitive solutions based on them. While we are reluctant to draw definitive conclusions based on a few decades of empirical evidence, we still think that the numbers can help illustrate our point in that it illustrates how resilient a combination of methodologies can be.

Separately, and in an attempt to remove ourselves from any historical bias, we have also tested different methodologies and their combinations using a randomly generated series. These series have been generated by employing different types of distributions to emulate the assets real characteristics. The results remain consistent: diversification of asset bundling works in delivering more consistent results.

**Volatility as a measure of risk**

Volatility is by no means an exhaustive reflection of risk, but in the context of an investor with an undefined or variable investment horizon, we believe that it is a good proxy for risk. First, it is relatively straightforward to make economic sense of volatility in terms of both historical shifts and cross-sectional differentials across assets (or factors). Second, while volatility as measured by standard deviation has limitations, it is relatively easy to enhance. For example, this can be achieved by incorporating higher moments of the distribution, such as skew and kurtosis. There are also other measures for volatility, like conditional volatility, true range, and so on.

Conversely, over the medium term, volatility has historically shown strong clustering and mean-reverting properties, which explains why value investors would typically see higher volatility as an environment rich with opportunities rather than plagued with risk. Though we agree with this notion in theory, and especially in the context of locked-up capital, we believe that the behavioural bias risk associated with higher levels of volatility justifies the use of volatility as the most relevant proxy for risk for most investors.
3. Practical suggestions for combining different asset bundling methodologies

Before we suggest any combination of portfolio construction methodologies, it is important to highlight the one key attribute that we believe all asset bundling methodologies should share: simplicity.

First, simple approaches tend to be more robust over time while complex and optimised processes usually inexorably fade away. Second, and perhaps more importantly, it is far easier to stick with a simple process during those turbulent times that any asset bundling methodology will inevitably go through. The stronger the understanding of the economic rationale behind a methodology, the easier it is to formulate expectations as to what constitutes a positive or negative market environment. This insight reduces the scope for surprises. As we discussed, being able to hold onto an investment methodology throughout the cycle dramatically increases the likelihood of reaping the rewards it is designed to deliver.

The first step to selecting an asset-bundling methodology is to establish the key objectives for a mandate. In most cases, this is comprised of return and risk objectives, but for some investors it can be much more elaborate and include other objectives, such as income requirements, drawdown limits, and environmental, social and governance considerations. Whenever there is more than one objective, we believe it is important to articulate, define and then prioritise them in the form of a priority list. This approach will highlight complementarities or conflicts – or both – that are inherent in the list itself. In the current environment, assets across the spectrum of choice are priced at fair to rich valuation levels. Generating returns similar to those achieved in more benign times may require tolerating higher than normal levels of drawdown and volatility risk, or accepting that the return target will have to become a second priority after minimising downside risk. To help manage these conflicts effectively, it is important to establish a hierarchy among the priorities. This will help when making choices where there is a trade-off between different priorities.

The second step is to establish the scope of portfolio construction methodology. Such scope should be set based on the level of confidence in estimating or forecasting risk and returns. Figure 9 identifies what asset bundling methodology best matches those confidence levels.

But the reality is not as clear. First, there can be different degrees of confidence across those axes, which may render strategy bucketing difficult. Second, such levels of confidence can vary over time. The ability of investors to estimate risks or forecast returns can vary depending on the economic cycle and secular trends. So forcing a mandate into one box rather than embracing a diversity of approaches can prove to be suboptimal in the long-run.

Other factors, such as liquidity requirements, size of the mandate (capacity), the scope for flexibility and governance, will help determine the most appropriate set of methodologies among fixed-weight, risk-driven and return-driven techniques.

Rather than attempting to solve the problem through a defined process, which will invariably oversimplify the issue, a mandate can be managed to a combination of methodologies.

Figure 10. Combining asset bundling methodologies

<table>
<thead>
<tr>
<th>Example</th>
<th>Pension fund</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristics</td>
<td>Long-term investor requiring steady income</td>
</tr>
<tr>
<td></td>
<td>Adverse to large drawdowns but relatively insensitive to moderate levels of volatility</td>
</tr>
<tr>
<td></td>
<td>Comfortable exploiting mean-reversion</td>
</tr>
<tr>
<td></td>
<td>Comfortable with allocation to illiquid assets</td>
</tr>
<tr>
<td>Investment philosophy</td>
<td>Value bias</td>
</tr>
<tr>
<td>Ability to assess and manage risk</td>
<td>High</td>
</tr>
<tr>
<td>Ability to implement market views</td>
<td>Low</td>
</tr>
<tr>
<td>Our suggestion</td>
<td>Combine a risk and return conscious fixed-weight methodology (about 70%-80%) with systematic long/short momentum and discretionary thematic overlays (about 20%-30%)</td>
</tr>
</tbody>
</table>

Source: Hermes as at July 2015

How to combine the asset bundling methodologies?

While we see significant value in combining 2-3 methodologies, the marginal benefits of diversifying beyond that point gets eroded very quickly by the additional complexity.

Some investors may prefer to identify one methodology as core and one or more others as non-core. This would make sense in the context of investors that have a clearly defined investment culture, such as value-driven, risk-driven, or return-driven. Other investors may opt for an equal weighting approach across methodologies. This is especially appealing for those investors who are mostly focused on asset selection.

There are various ways in which investors can combine the different methodologies in one portfolio. For the most part, they can be classified as either a top down approach or a parallel approach. Taking a top down approach, the investor can choose to let one methodology drive the broad asset allocation and another to determine the allocation across sub-sectors. For example, the split between equities, rates, commodities and alternatives can be set using a fixed-weight approach (similar to the Yale model), while the sub-sector allocation can be more dynamic and based on a risk or return-driven approach. In the parallel approach, the different methodologies are applied at the same level and the final portfolio is simply the weighted average across all methodologies. This is our preferred option as it is more flexible over time.
While we see significant value in combining 2-3 methodologies, the marginal benefits of diversifying beyond that point gets eroded very quickly by the additional complexity.

In the context of a wide-reaching and complex asset selection, such as one investing in traditional and alternative approaches, different portfolio methodologies can be applied to different asset sub-sets, which can partially overlap. For example, in our real return strategy, we have two portfolio methodologies that are applied to two mostly different sets of assets, defined as matching and enhancing assets. The former consists of assets with strong linkages to inflation and the latter consists of assets which have a proven ability to outperform inflation over a full business cycle.

With respect to the portfolio construction itself, we believe that asset bundling should be largely systematic with a discretionary overlay. Asset bundling is about risk allocation and we use a systematic approach because it avoids behavioural biases. We use a discretionary overlay primarily as a risk management tool but also to express thematic views or simply to take advantage of short-term opportunities.

Risk management: bringing everything under one roof

We firmly believe that when it comes to risk management there is no standardised approach: risk should instead be measured and managed in the context of its multiple dimensions. Also, while risk is complex, managing it should not be an over-complicated process.

Risk management should be embedded in all aspects of the investment process, from asset selection to portfolio construction. That said, even when using multiple asset bundling approaches, a single risk management process should be applied to the end portfolio.

From an asset selection perspective, we suggest subjecting each asset (and asset type) to a risk cap. This should be a function of volatility (inclusive of higher-order moments).

From a portfolio construction perspective, we suggest adopting a risk targeting rather than risk minimising approach. First, in the context of long-term return targets, we believe that having too little risk can be as detrimental as having too much risk. Second, any approach based on minimisation or maximisation implies an optimisation which can only amplify the risk of surprises when the environment shifts. Third, when risk is measured through the lenses of volatility and correlation metrics, or both, minimum-risk approaches, such as conditional value-at-risk, tend to carry a positive bias towards illiquid assets.

We generally reject traditional asset bucketing and prefer to group assets ourselves based either on their expected risk characteristics or their specific usage. In terms of risk, we like to categorise assets in the following way: pro-cyclical, such as equity and credit; counter-cyclical, such as bonds; and idiosyncratic, which demonstrate specific factors. We use empirical analysis, statistical tools and judgment to assist us in this segmentation and consistently review these decisions.

Risk allocation should be reflective of the core/non-core or equal allocation philosophy. In the context of a core approach, the core methodology should have priority in terms of the risk budget. For example, in the case of our real return strategy, the matching portfolio has priority over the enhancing portfolio with regards to risk usage.

Finally, it is important to be mindful of the potential biases of the asset selected versus the biases of asset bundling methodologies. For example, market-capitalisation weighted indices have a momentum bias while equal-weight indices have a value bias. Overlaps are not necessarily to be avoided as it is often the case that the timeframes of such biases are different. It is more important to be aware of them so that in the context of asset selection one can focus more on particular types of assets instead of others.

Asset selection: the key driver

In the context of a multi-asset portfolio, the top-down asset allocation is likely to be the main driver of returns. However, the differences in returns when comparing portfolio construction methodologies are likely to be smaller than those when comparing the same portfolio methodology applied to a different asset mix.

In fact, the large majority of the returns comes from the assets themselves. In other words, being exposed to the right mix of assets remains the major factor determining success. The chosen portfolio construction methodology should smooth the journey. Diversifying the portfolio construction methodologies helps ensure that the value generated by the asset selection does not get eroded by an out-of-sync bundling methodology.

As a result, we believe that asset selection should be largely discretionary and free from any preconceived asset class bucketing. We employ a factor-based investing approach applied to alternative and traditional factors so long as they are subject to the specific criteria (see figure 11).

Figure 11. Our asset-selection criteria

<table>
<thead>
<tr>
<th>Example</th>
<th>Pension fund</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic rationale</td>
<td>Strong theoretical basis supported by academic or practitioner research. The rationale can be rooted in either investors’ biases or structural imbalances. In all cases, the risk premium must represent a compensation for the transfer of risk.</td>
</tr>
<tr>
<td>Robustness</td>
<td>Supported by sufficient empirical evidence (tested in different scenarios). Each risk premium needs to show attractive but cyclical risk returns characteristics over time.</td>
</tr>
<tr>
<td>Clear drivers of return</td>
<td>For each risk premium, we need to be able to identify one (or a few) key valuation metrics to assess its attractiveness.</td>
</tr>
<tr>
<td>Accessibility</td>
<td>The extraction of factors needs to be simple and replicable through transparent instruments. Risk premia need to offer ample capacity and liquidity.</td>
</tr>
</tbody>
</table>

Source: Hermes as at July 2015
Being exposed to the right mix of assets remains the major factor determining success. The chosen portfolio construction methodology should smooth the journey.

Conclusions
As we have seen, given the current biases of investors, there are seemingly good, bad and ugly methods of constructing portfolios none of which are ultimately superior throughout all market scenarios. We believe that the main risk associated with selecting one single approach is behavioural bias: this increases the likelihood that a chosen approach will be abandoned or tweaked at the wrong time.

The determination of the most appropriate asset bundling mix should start from a clear articulation of the mandate in the form of a priority list. From that point, the most appropriate solution is highly dependent on the specific and often unique set of characteristics resulting from the interaction of mandate requirements, organisational set up and investment culture of the managing team.

While maintaining a discretionary overlay, we suggest adopting the discipline of a systematic approach to portfolio construction to limit the impact of behavioural biases.

Regardless of the choice of asset-bundling methodology, being exposed to the right mix of assets remains the key factor for success. In this, we suggest casting the widest net by investing across alternative and traditional factors. We also suggest adopting a discretionary approach to asset selection.

Importantly, our overarching suggestion is to keep it simple and to adopt a gradual approach to making changes.

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Appendix
To perform the simulation we used four broad asset classes: equity, rates, commodities and credit. Data are from Feb 1975 to June 2015. Each asset class return is the result of the average cross asset monthly return for every relevant underlying asset class.

The commodities asset class is composed of agriculture, industrial metals, precious metals and energies indices.

Equities and rates comprise the equity and bond indices of the US, Europe, UK and Japan.

And credit is made up of the US high yield and EU crossover markets.

To avoid any historical bias we divided the data into six sub-periods of 10 years each with a five-year overlap: from January 1980 to December 1989, from January 1985 to December 1994, from January 1990 to December 1999, from January 1995 to December 2004, from January 2000 to December 2009 and from January 2005 to December 2014.

We then simulated 4 different portfolio methodologies: 60/40 equity bond split (60/40), fixed weight (FW), equal risk contribution (ERC) and trend-following (Mom).

60/40 allocates 60% of the portfolio to the equity asset class and the remaining 40% to rates at the beginning of each sub-period. The weights are rebalanced quarterly, and we make sure that the portfolio is constantly 100% allocated (no leverage or under allocation).

FW is similar to 60/40 in terms of the rebalancing frequency and constant 100% allocation. The initial weights are calculated over the inverse of the monthly volatility of each asset class over the previous three years prior to the first allocation and kept fixed for the whole simulated period.

Equal Risk Contribution (ERC) methodology generates monthly allocation weightings through an optimisation process in order to have a portfolio with equal total risk contribution from each asset. The risk inputs are calculated over a 12-month rolling window.

Momentum methodology (Mom) generates a monthly buy signal every times the current monthly price for a specific asset class is greater than its price 12 months before; if the price is smaller, the model generates a sell signal. All of the signals are then weighted according to the inverse of the monthly volatility of each asset class over the previous three years prior to the first allocation and then kept fixed for the simulated period. In contrast to the other methodologies, Mom could be under allocated ranging potentially from -100% to 100%.
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A focus on greater predictability of outcomes.

Risk control
Factor-based analyses improves diversification and reduces tracking error.

Risk premia expertise
Early adopter within alternative multi asset portfolios

Asset selection expertise
Systematic approach with pragmatic discretionary overlay.

Leveraging off Hermes’ asset-specific expertise
Combining the inflation expertise of our Inflation-Linked, Credit, Real Estate and Infrastructure teams.

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