

## Multi-Asset Grows Up

Peter Simmons, CEO

Multi-asset attribution now incorporates most of the complexity of fixed income. We review some of the solutions that we have used to handle the large number of securities involved, to identify and attribute the underlying currency exposures and the process required to successfully tag strategy portfolios. Finally, we show how a straightforward extension to the Brinson model can incorporate fixed income allocation.

### A short history of multi-asset

Not long ago, multi-asset attribution was straightforward, most UK portfolios were managed against a peer group, and, although there was always uncertainty in the peer group weights, the sectors were well defined and fund management companies were set up along similar lines. That began to change as trustees focussed more on the liabilities of their pension plans and a best-of-breed approach to asset management became more popular. The changes have unleashed a wave of innovation, multi-asset attribution has had to change to keep up and can no longer be described as straightforward.

We founded CloudAttribution to create a new fixed income attribution system, but one of the first questions we were asked was whether we could handle multi-asset attribution? Managing multi-asset portfolios usually involves an interesting mix of equity and fixed income techniques and is largely driven by the nature of modern portfolio management: derivatives are common, often in overlays; currency is generally managed separately; and ETFs provide a whole new set of instruments that can be used to gain exposures. Since then, we have worked with several multi-asset teams and this paper describes a few of the problems that we have encountered and the solutions that we have used. Specifically, how to reduce the number of securities needed in the attribution, how to capture and attribute currency exposures, the role that strategy tagging can play, and how to incorporate fixed income.

### All of the assets

Multi-asset attribution has changed from the top-down attribution of 10 sectors to a full security-level attribution; portfolio and benchmark combined can be 16,000 to 20,000 securities. A full security-level analysis is madness surely? Well... yes and no. Those 10 sectors hid a lot of exposures that are now managed separately. The security level approach aims to surface the exposures being managed. It can be taken a step further: a held fund's underlying assets can also be included; ETFs can be represented by their benchmark securities. The number of securities in the analysis quickly mounts up.

We have found that focusing on the factors being managed can shrink the universe. Multi-asset PMs are not managing individual securities against an equity or fixed income benchmark, although they may buy one or two individual names. It is usually the sectors, countries and currencies that are the focus. The full security-level data is being classified to these factors for a top down analysis.

A security-level approach gets the user to the right place, but is unnecessarily complex. It is helpful to keep the portfolio at security level to calculate the performance, but for the benchmark it is much better to pre-calculate aggregates, based on the factors used to manage the portfolio. The number of assets reduces markedly without any loss of detail in the attribution. For composite benchmarks, not all components may need detail: for example, US equities might be used as a single NAV return, global

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equities might require more detail. The key is to understand what is being managed.

### Currency's a problem

We find that the most important “hidden” factor is the currency exposure. In a multi-asset portfolio this can be hidden in many ways: the benchmark may contain a global index so a single return number would miss the detail, the portfolio may hold a mutual fund or an ETF. Individual securities may include ADRs and GDRs and derivatives too may be on an index or security in a different currency.

When breaking out the currency within components, as with sectors or countries, it is important first to ask who is managing that exposure. Is this being managed by the underlying equity or fixed income manager, usually the case for a country or sector, or is this being managed by the multi-asset or currency teams? Although benchmark aggregates can show exposures, they only address the benchmark side. A slightly different approach is needed on the portfolio side to provide insight on the currency exposures hidden within the securities held: currency baskets.

Currency baskets are created for every security with an exposure different from its traded currency. This can be 100% exposure to INR for a US traded ADR on an Indian company. But can extend to ETFs: these can be modelled by reference to the currency exposure of their benchmark. Now instead of needing thousands of assets we have 20-30 new assets that can represent all of the underlying currency exposures in portfolio.

By way of example, if we imagine that our portfolio holds a USD-denominated mutual fund that invests in JPY, EUR, GBP and USD assets and that the investor has a USD base currency, then we can see that a naïve analysis would suggest no currency exposure. However, changes in the price of the fund will clearly include a currency element. The currency basket approach posits that we can add these exposures explicitly. We add four new assets: three currency exposure assets to represent the underlying overseas currency exposures in the fund and an offsetting USD exposure to make the portfolio weights balance.

Their returns give us the currency contributions. As the table shows, there is one more step: we can work out how much of the original fund return was contributed by the underlying currency exposures. This is subtracted from the local return to leave performance unchanged overall but with a more representative split between local and fx returns.

#### *Performance contributions using a currency basket*

Description	Weight	Local Return	FX Return	Total Contribution
Fund before	100%	1.43%	0%	1.43%
Fund after	100%	0.97%	0%	0.97%
JPY	10%	0%	0.73%	0.07%
EUR	30%	0%	1.10%	0.33%
GBP	20%	0%	0.30%	0.06%
USD	-60%	0%	0%	0%

It's a simple idea and relatively straightforward to implement. This approach allows an overlay manager to see the results of their decisions without a huge security level overhead. Currency exposures can be broken out whenever they are being managed by the multi-asset and currency teams.

### Strategy tagging

Separately-managed currency is only one aspect of the changing construction process. Increasingly, multi-asset is taking on the clothes of the hedge fund world, particularly in the absolute return space. In doing so, the whole portfolio construction process is being disaggregated: portfolio managers talk more about strategies currently implemented, and less about a fixed classification structures.

At its most extreme, a portfolio may contain more than 50 strategies, although a more normal number is 5 to 10. Strategies stretch the attribution process because they often overlap. Implemented using a combination of futures, ETFs and swaps, one security may exist in four or five different strategies at the same time, as we show in the screenshot. Clearly, a static classification structure is no longer enough.

We tag transactions and think that this is essential for accuracy because the system needs to be able to

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### Securities may be tagged to multiple strategies

Trans. Date	Settle. Date	Cusip	Instrument Description
08-Aug-2013	08-Aug-2013	TYU3	US 10 YEAR FUTURE SEP 13
16-Aug-2013	16-Aug-2013	TYU3	US 10 YEAR FUTURE SEP 13

Strategy Tag	Shares	Cum. Shares	Market Value
Absolute Strategies_Short Global Duration	1	-37	125,234.38
FI Relative Value_Long Diversifiers vs. Short IG	1	15	125,234.38
FI Relative Value_Long Australian 10Y vs. US 10Y	-4	-47	-500,937.5
FI Relative Value_UST 5Yr vs. 10Yr Flatteners	9	9	1,127,109.38
Residual:	0		

Trans. Date	Settle. Date	Cusip	Instrument Description
27-Sep-2013	27-Sep-2013	TYZ3	US 10 YEAR FUTURE DEC 13

capture changes in the classifications day-to-day and potentially within the day. But in fact, strategy tagging is much more about the operational side than the calculations.

The key is to ensure that clear allocation information is maintained at least as often as trades are undertaken in the portfolio; in particular, the numbers of contracts or the weights of the associated securities. It can also be helpful to separately maintain the composition of baskets used if, for example, a long ex US Equity - short US equity strategy is to be implemented through a range of equity futures.

Simple tagging strategies can be automated, for example, when the ratio between securities is fixed through time. But where manual intervention is needed then we rely on giving the user as much useful information as possible: what trades took place on a particular day, what were the weights and contracts, what are existing weights / contracts in a strategy and after a strategy is implemented or changed.

Finally, extensive reporting of a tagged portfolio is important. By providing detailed output at the strategy level then portfolio managers can better understand their portfolios. An overview report also needs to show how the strategies are made up: weights and performance contributions from the individual elements of the strategy. We have found that this can be best done by producing a single page overview of each strategy, giving the component contributions, trade and level tracker and a graphical representation of the contributions and weights. This allows the portfolio manager to focus, but also provides “tear sheets” that can be taken to meetings

to discuss specific aspects of a strategy. Ultimately these are often the most complex portfolios. Reporting provides an important window into what is happening.

### Incorporating fixed income

Disaggregation of the portfolio decision-making and the increasing use of derivatives means that a greater variety of decisions are being taken within the multi-asset team that might previously have been the preserve of the equity or fixed income teams. Equities don't present a big problem, Brinson et al were after all asset allocators whose model has been co-opted to equities. But the fixed income team will typically use a different model, and rarely something standard.

We have written a previous white paper containing suggestions for implementing fixed income attribution; when first incorporating it for multi-asset, small steps are appropriate since it can get very complex. We suggest an approach for duration views:

#### Market duration

If the manager has decided that a particular fixed income market is cheap or expensive, then the easiest way to express a view is to buy or sell futures. This can be imperfect: although many markets have futures of different maturities, the manager may choose to use only one or two to implement their view. In small markets the duration of the future and of the market overall may be different. The standard Brinson-Fachler approach would be to use weights as the measure of exposure such that:

$$\text{Allocation} = W_F \times (R_M - R_B) \text{ and}$$

$$\text{Selection} = W_F \times (R_F - R_M)$$

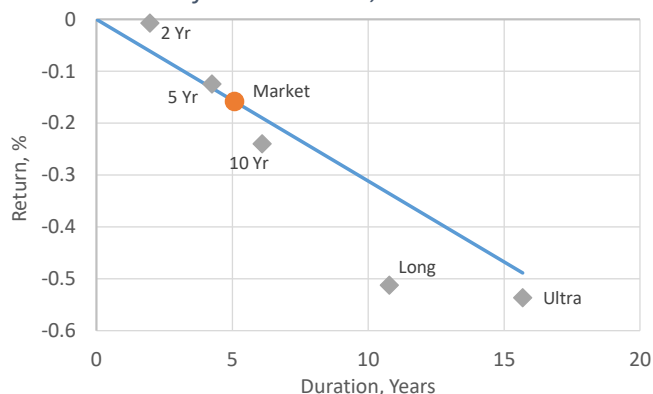
where we have assumed for simplicity that the exposure is off-benchmark using a future with weight  $W_F$  and return  $R_F$  when the benchmark return is  $R_B$  and the return of a government index for the market is  $R_M$ .

This will work, but doesn't give the right insight. For fixed income the questions should be different: did I

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US market and futures returns, 31 March 14



get the market decision right and did I use the right part of the curve to express that view? The answers to those questions require a slight rewrite and some easy to obtain fixed income analytic data. Now:

$$\text{Allocation} = W_F \times \left( D_F \times R_M / D_M - R_B \right) \text{ and}$$

$$\text{Curve} = W_F \times \left( R_F - D_F \times R_M / D_M \right).$$

The first term is broadly the same as for Brinson but scales the market return by the duration of the future used. The correction for the duration difference is essentially a risk correction. With Brinson, when the market and the future have very different durations then there would be a large offsetting term between allocation and stock selection without this correction. Looking graphically, using USD data from 31<sup>st</sup> March 2014, we can see that the returns of the different futures are broadly linked to their duration. Instead of just increasing the weight to increase the bond market exposure, the PM can also lengthen duration. To a first order this will increase the exposure but

brings a second order curve effect since the different returns are not exactly on the market line.

A comparison between Brinson and this fixed income suggestion, taking the market duration and return as 5.09 years and -0.16% respectively, shows that the correction for the duration of the future used makes a big difference and gives more context to the choice that was made of how the market was accessed.

### Capturing the duration leverage effect

Future	Duration, Yrs	Brinson model		Fixed income alternative	
		Allocation	Selection	Allocation	Curve
<b>2Y</b>	1.96	-0.16	0.15	-0.06	0.05
<b>5Y</b>	4.25	-0.16	0.03	-0.13	0.01
<b>10Y</b>	6.09	-0.16	-0.08	-0.19	-0.05
<b>Long</b>	10.77	-0.16	-0.35	-0.34	-0.18
<b>Ultra</b>	15.68	-0.16	-0.38	-0.49	-0.05

### Summary

Multi-asset portfolio managers have been big beneficiaries from the increasing prevalence and use of derivatives in portfolios. This has meant that what used to be a fairly straightforward attribution process has become significantly harder. We have described four changes that can help to improve the process and increase the usefulness of the final results. We have successfully implemented these for clients to help them to get the most out of their attribution. We expect that complexity will continue to grow in portfolios and that multi-asset and fixed income will be the areas where most effort is expended by performance teams in the short and medium term. More solutions like these will be needed.

**Peter Simmons** is the CEO and co-founder of CloudAttribution, which since 2012 has provided its web-based performance and attribution system to institutional fund managers in Europe and North America. They specialise in the complexities of fixed income and multi-asset portfolios, providing an interactive way for PMs and the client team to quickly understand how portfolios are positioned and what the outcome has been.

Peter has 15 years of asset management experience in various quantitative roles, 12 of them at UBS Global AM. He headed up the quantitative support area in fixed income, UBS Global AM for five years and was responsible for leading the team that built fixed income's performance attribution tool. Previously he was head of risk management, and a quantitative analyst for Global Equities.

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