Macro Strategy Attribution

Peter Simmons | CEO

CloudAttribution

Extending the Standard Brinson-Fachler Model to Use a Strategic Benchmarking Approach to Attribution

The standard Brinson models are well known. They seek to explain performance differences between a portfolio and its benchmark. They are extensively used in equity and multi-asset attribution because they are easy to implement and easy to interpret.

They are also relatively easy to extend to apply to more complicated problems, with a straightforward extension of the framework. Here, we explore how to use them when multiple levels of benchmark exist; for example, when a portfolio manager applies a strategic and / or a tactical benchmark to a portfolio. In this whitepaper, we show how to extend the model and how to think about the results.

What is the Standard Brinson-Fachler Model

The standard Brinson-Fachler model (also known as the Brinson model) attributes performance on a relative basis, splits the results into two elements: allocation and a selection term, we use it here without the interaction term. By way of a recap, we review those terms below:

Allocation

Comes from being under or overweight the asset classes (or sectors, countries, etc.) defined in the benchmark.

Looking at the equation for allocation:

$$Allocation = (w_p^{ac\,i} - w_b^{ac\,i}) \times (r_p^{ac\,i} - r_b^{total})$$

The left-hand term is the difference between portfolio and benchmark weight of the asset class. The right-hand term is the excess return of the asset class over the total benchmark return. Therefore, by how much has the asset class out or underperformed the total benchmark. Overweighting an asset class that has outperformed the overall benchmark leads to a positive allocation, as does underweighting an asset class that underperformed the benchmark. And vice versa.

Selection

Looking at selection, it is similarly easy to calculate and interpret:

$$Selection = w_p^{ac} \times (r_p^{ac\,i} - r_b^{ac\,i})$$

The left-hand term is now just the portfolio weight because this return difference acts across the whole asset class in the portfolio. The right-hand term is the difference between the return of the asset class in the portfolio and in the benchmark. If a manager chooses securities within the asset class that outperform, then this leads to a positive performance contribution. Conversely, underperformance in the assets held will lead to a negative contribution and negative selection.

Multi-Level, Multi-Asset

As we move from a single benchmark approach, it's helpful to understand why additional levels of benchmark may need to be defined. Not all portfolios will have all of these, and some may have more, but these are the levels that we refer to in the attribution process. Although we only define allocation and selection, in practise currency changes are often involved. This would be a further extension that should not be forgotten.

Allocation Decisions

Plan Allocation: Set by the pension trustees, this is the allocation that is given to the portfolio manager and is the ultimate benchmark to which we aim to attribute.

Strategic Allocation: The manager may vary this allocation, particularly by adding additional asset classes. This would be the long-term benchmark that the manager will manage against.

Manager Allocation: In seeking to add value, the manager will create models to value individual asset classes. They may then vary the weights of these according to their view of relative value.

Tactical Allocation: Finally, short term valuation opportunities may be accessed through a tactical overlay, often implemented with futures, swaps, forwards or other derivatives.

For each of these levels, we assume that the composition of the asset class remains the same where the asset class exists in both allocation levels. Where new asset classes are added, for example, adding a high yield allocation within fixed income, this is a new allocation that is not benchmarked against anything in the prior level. These levels are not exhaustive but serve as examples to be clear how the process can work from an attribution point of view.

Selection Decisions

The requirement to keep the asset classes unchanged across the strategy levels will often hold, but not always. In choosing a strategic allocation, the manager may have a different preference for benchmark providers to the client. Or, when choosing a fund to invest in within the manager allocation, a fund with that benchmark is not available or not preferred.

We define two additional terms here although, again, this is not exhaustive. Every level could have a different composition as well as allocation. But, in just creating two here, we aim to show how the process works.

Client Benchmark: Each asset class is designated a benchmark which is used to define it and measure the performance against. The lowest level benchmarks are set by the client and, like the Plan Allocation, form the basis against which the client will measure performance.

Although not strictly part of the client benchmark, we would also include in this category the benchmarks used for new asset classes added, such as high yield in the example above.

Manager Benchmark: The benchmark suggested by the client is not always the best one for the portfolio manager. The funds available for investment by the client may already use different benchmarks, or the portfolio managers might have a particular benchmark preference. Whatever the reason, this is essentially a change in the asset class composition. As such, it needs to be attributed separately from the allocation

Extending Brinson to Handle Multiple-Level Strategies

So far, we have defined a set of allocations and a set of asset class compositions. We've also outlined the model Brinson and Fachler devised to attribute changes in portfolio against benchmark. Although it looks complex, it's relatively straight forward from here to extend the framework.

Changing Allocation

We start by looking at the move from one Allocation Strategy to the next, assuming that the composition remains unchanged. We use ***c*** to denote the client benchmark, ***s*** for the strategic benchmark and ***m*** for the manager allocation; we have abbreviated asset class to ***ac***. Then:

$$Strategic\ Allocation = (w_s^{ac} - w_c^{ac}) \times (r_c^{ac\,i} - r_c^{total})$$

$$Manager\ Allocation = (w_m^{ac} - w_s^{ac}) \times (r_s^{ac\,i} - r_s^{total})$$

It is simply a daisy chain through the benchmark level structure using the weight difference and the returns from the previous level. For each term, we continue to include the benchmark total because this then provides a relative attribution rather than an absolute one. This process makes more sense in a benchmark relative attribution even when attributing the different levels of allocation decisions.

Changing the Benchmark Within Asset Class

So far, we have assumed that the asset class compositions remain unchanged; that the benchmarks constituents are fixed. However, using the second part of the Brinson model changes to the asset class benchmarks can also be easily handled. These changes are a little bit harder to conceptualise, so we provide an example. We think about a move from the strategic allocation to the manager allocation, where US equities are benchmarked against the Russell 3000 strategically, but the manager's benchmark is the S&P 500. We need to capture:

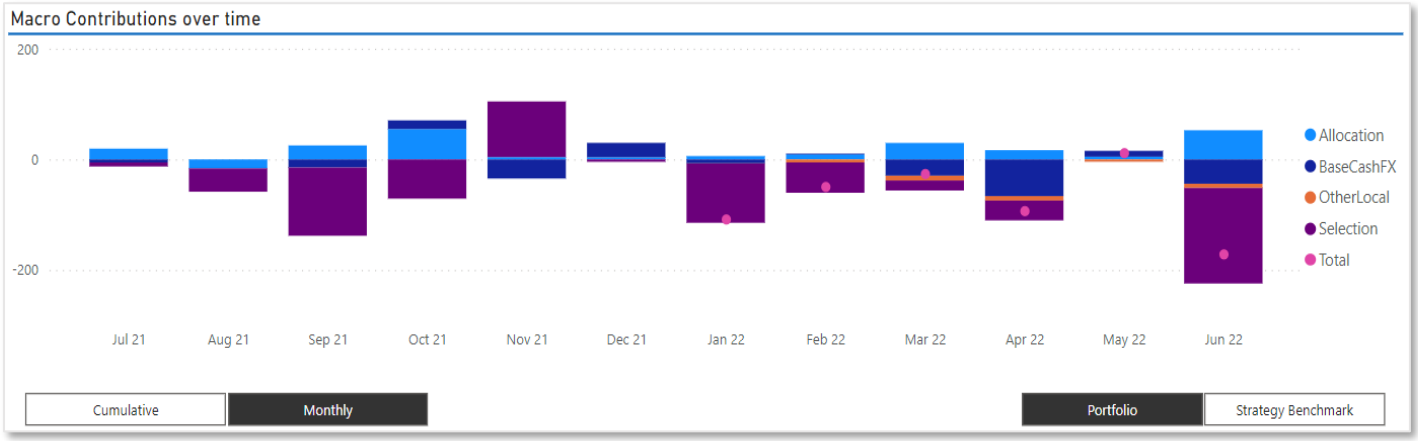
- The change from Russell 3000 to the S&P500
- The equity manager's performance against that benchmark.

We use ***s*** and ***m*** to denote strategy and manager benchmarks; and ***p*** to denote the portfolio. We have again abbreviated asset class to ***ac***. Then:

$$Manager\ Selection = w_m^{ac} \times (r_m^{ac\,i} - r_s^{ac\,i})$$

$$Portfolio\ Selection = w_p^{ac} \times (r_p^{ac\,i} - r_m^{ac\,i})$$

Once again, the daisy chain process moves us through the allocation levels capturing any changes in the asset class composition. In the example, the change from Russell to S&P is captured through Manager Selection. The final portfolio selection term then attributes the performance of the underlying security level fund manager against their S&P benchmark.



A Detailed and Insightful Analysis

Using the framework in this way allows us to think separately, at each level, about what is changing and therefore what we want to capture in the attribution.

For many decision levels, there will just be an allocation term. However, if needed we can also bring in selection to capture changes in benchmark that denote an asset class compositional change as well.

The original Brinson model envisaged a single pair of allocation and selection terms. Now, moving to a full strategic attribution of the portfolio, it is possible to envisage multiple allocation and selection terms to capture each set of decisions as they are made.

Implemented in this way, it is easy to extend the attribution to as many levels as needed.

About CloudAttribution

CloudAttribution is a disruptive new software solution for investment performance reporting. Designed by portfolio managers, for portfolio managers, our innovative software will revolutionise the way you calculate and report on investment performance attribution. CloudAttribution also provide a consultancy service for our software users, acting as an extended team to provide support whenever you need it.

www.cloudattribution.com

London
+44 2086 388 210
Thornton House,
Thornton Road,
Wimbledon,
London
SW19 4NG

Chicago
+1 312 235 2828
One Lincoln Centre,
18W140 Butterfield Road
Oakbrook Terrace, Suite
1500
Oak Brook, Illinois, 60181
USA

info@cloudattribution.com

About The Author

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 at 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.