

Rethinking Fixed Income Attribution

Peter Simmons, CEO

There is unlikely to ever be one standard model for fixed income attribution, the security types are too diverse and the level of detail required by end users is too disparate. But can we redesign the process to make fixed income attribution faster to implement, easier to calculate and more intuitive to understand? We think so!

Fixed income attribution doesn't have to be difficult. We showed in a previous white paper¹ that the fundamental drivers of performance are quite straightforward. In this paper we look at some of the operational issues. It is written slightly differently; we compare the standard approach with the approach that we have taken for each issue. We have found that a few quite small changes in the operating model can significantly shorten the implementation time, increase the quality of the results, reduce and simplify the data requirement and provide a better service to users... big statements of intent! We'll focus on three areas in particular:

1. Our attribution calculations sit directly on top of the performance. That means that data errors are easier to find and the implementation time is reduced.
2. Sourcing analytics is usually a nightmare: most models require price-aligned data. The performance-based approach significantly reduces this data requirement.
3. Being cloud based enables a partnership between you and us. Implementation becomes more flexible, ongoing support becomes possible and the web based nature of the system means that it can sit on every user's desktop, providing a better way to work with the results.

The normal approach to attribution

Most attribution systems provide analytics or recalculate analytics based on provided prices; they attribute using changes in yield for each security. When provided by the external system, analytics includes prices, yields and durations. It assumes that there is only one price - true in equities but rarely true for fixed income because securities are not traded on exchange and pricing providers have slightly different methodologies. Not surprisingly, the final result often has a big difference to the official return.

A second approach requires prices to be loaded too, and aims to create price aligned yields and durations. Unfortunately, this requires terms and conditions for every security (although those may be in the system itself). It is a lot of work and provides a lot of opportunities for error.

Neither of these approaches handles derivatives well. Very often these need to be separately modeled, something that requires a full set of terms and conditions. A buy and hold method is also often used, something we have more to say about below.

Returns based attribution

An alternative approach, the one that we use, is fast gaining popularity because it requires significantly less data. We observe that most accounting systems already break down each holding into a clean price

¹ A quick fixed income primer, CloudAttribution White Paper Number 1

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element and accrued interest (coupon). Our attribution model can use this breakdown directly, there is no requirement for additional terms and conditions, and derivatives are handled naturally because they have already been priced within the accounting system. Best of all, since it is based on the performance then there is no residual, the results should exactly match the official return.

There is also no longer the same emphasis on all of the analytics being aligned. The model doesn't use yields at all and is not particularly sensitive to the security's duration. Instead, we aim to source durations from the front office where possible. The results are then consistent with PM's expectations; the performance team doesn't need to recalculate analytics; it is a significant time and complexity saving.

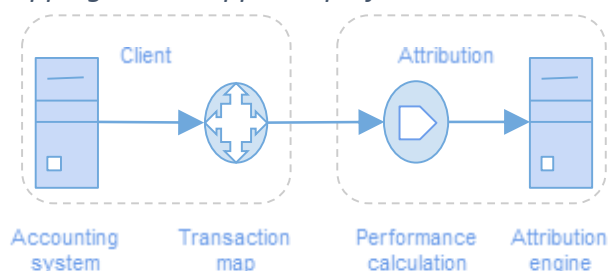
Although this type of model is much simpler to set up, we have found that it can give as much insight as a yield based model. Complexity can then be layered on top for more difficult-to-handle securities as needed.

The performance calculation

Now that we have shown that the performance calculation is the key simplifying the attribution calculation, then the onus is on us to show that the performance calculation can be accurate. As you might expect we take a non-standard approach here too.

Most attribution systems that use a holdings based approach will fail in the accuracy stakes. We think that transactions are also necessary as we detail below. However, this usually means that the user needs to map transactions to a simplified form to fit the

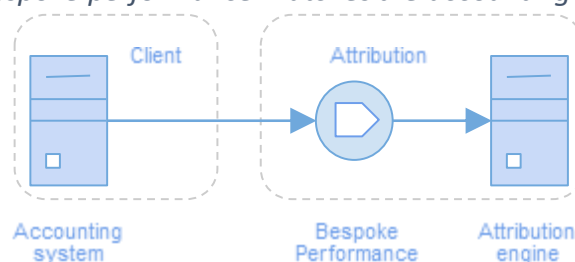
Mapping to the supplier's performance model



system's performance model. This often does not handle the nuances between accounting systems. It also puts the effort on to the client to get that mapping right. It's another possible source of errors.

We take the transaction data as-is, and build a bespoke performance calculation to match the accounting data. We've done this quite a few times so are quite good at it. It is a lot faster than asking you to handle the mapping and it's more flexible going forwards when there is a new transaction type. It's also easier to track errors. Now there are only two possible sources of errors: the performance calculation or booking errors.

Bespoke performance matches the accounting



Do I need transactions?

In equities, a buy and hold approach is often enough. In fixed income, we think that transactions are a definite requirement as well.

Accuracy: We are frequently trying to attribute less than 10 bps of active performance. Given that a typical model might have 20+ buckets to attribute to and there are often hundreds of securities in a portfolio, then errors tend to be very visible; transactions reduce the "noise".

Corporate actions: With so many securities in a portfolio, there are inevitably a great number of corporate actions. Simpler events such as name changes and tendered events abound; these would be difficult to handle in great numbers without transactions. But it is the credit events and pay downs that really require transactions; they can have a very large effect on performance. Including transactions in the calculations allows us to include these effects much more easily.

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Trade costs: Fixed income securities are much more illiquid than equities. Trading, particularly in corporate and high yield bonds, can form a substantial part of the attribution. Capturing that requires transactions.

In summary, transactions are much more important in the fixed income performance calculation. The accounting system and custodians have this data; it makes sense to use it.

Reporting

Reporting is a large and largely separate subject; however, in certain aspects we believe that it is also the key to making performance and attribution effective. Performance and attribution both produce mountains of data, particularly for fixed income. How that data is combined and presented is one of the most important and neglected aspects of fixed income attribution.

What do we want to achieve?

We produce attribution with the aim of helping to tell the story of the portfolio. What happened, when and why? And to make the story clear and quick to read. This can then be used to understand the way the portfolio has been positioned and how that has affected performance.

Different user groups require different information from the system. Some will need more data, some less, most will be interested in the last month and quarter, many will also want to be able to compare that with a longer history. It's also often useful to be able to compare the results with those for other funds over different time periods.

Finally, it won't always be possible to create the required reports in the system. Flexible ways are needed to extract the data and create the ability to join it with data from other systems and to create client reports.

Who's interested?

We see four core internal groups of users for any attribution system:

Performance team: Clearly, the first job of reporting is to help the performance team to understand what has happened in the overnight batch. This should indicate what has been processed and highlight where problems have occurred, suggesting remediation steps where possible.

Once the data has been released then having detailed results available to users, ideally through an interactive report, means that there are more eyes on the data. Performance analysts can sit down with users to discuss the results and explain what they see. It is a good way to build rapport and trust between the teams.

Portfolio managers: Quick and detailed feedback on portfolio performance provides feedback on positioning and position scaling both of exposures and of hedges. For PMs we find that detailed single period overviews, starting by presenting top down data and then allowing them to dig into particular areas of interest, potentially all the way down to security level gives maximum utility. However, this is rarely enough.

Portfolio managers think about their portfolio in many different ways: potentially duration across the curve and between markets, credit between sectors, and by currency. Being able to switch quickly between these views allows the PM to explore different aspects of their portfolio's construction.

Client team: Here, an ability to quickly get up to speed on what has happened in the portfolio - what the positions have been over the last three months and what has been the consequent outcome - are a good first step. Then, the client team user needs to be able to create a fairly high level overview of a longer time period that can be discussed with the client.

An historical view is often forgotten

Description	Jun-11	May-11	Apr-11	Mar-11	Feb-11	Jan-11
Portfolio	8	39	29	-6	-4	-30
Benchmark	7	134	-119	-67	-42	-81
Active	1	-95	148	61	38	50
Duration Management	3	0	-11	-4	3	-31
Active Duration	0	-1	0	0	3	0
Market Allocation	4	3	-9	-9	-4	-33
Duration Curve	-1	-2	-1	5	5	1

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Management: Control, consistency and comparability necessitate the ability to see many portfolios, across managers, teams and regions, and ideally all using the same classification structure, together on one page. This can lead to discussions requiring detail in specific areas, again very often across many portfolios.

Inevitably each of these user group descriptions is somewhat clichéd, all members of the team at times find different types of view useful. The key is to be able to access them quickly and to be able to manipulate them to review aspects of the portfolio construction process for one or more portfolios and for one or several time periods.

Using interactive reports

We find that pdf and Excel reports work well to take to meetings but often don't have the flexibility to provide all of the information and detail that different users of the system need. Excel pivot tables provide one route to analysis but they are somewhat slow and clumsy. A better way is through the web to each user's desktop. Web based reporting offers a way for the user to explore the results top down, digging into the numbers and expanding to areas of interest.

Our web based system provides a wide range of functionality and, using the latest technologies, can scale to handle many concurrent users. Web based reports also have the added advantage that they are quick to change in response to user feedback.

Our application programming interface (API), an interface between the system and Excel and other

A single period interactive report

Portfolio Total Return (Model)

Model Strategy SecType

1 May 2012 - 31 May 2012

Column View (Client) - Local

Category	Weight	Exposure Weight	Begin Total Market Value (client)	End Total Market Value (client)	Base Market Value (client)	Total P&L (client)	Total Return (local) %	Total Return (no %)	Total Return (no %)	Total Return (no %)	Total Return (no %)
Total Attribution	100.00	100.00	274,739,171	261,424,509	271,406,344	-5,207,793	-2.51	0.60	-1.93	-2.53	0.60
US Treasury	2.22	2.22	5,894,035	5,897,381	5,894,035	1,346	0.02	0.00	0.02	0.00	0.00
Government Bond	0.27	0.27	2,735,107	0	2,735,107	-20,495	-1.14	-5.91	-2.77	0.01	-0.02
>FRANCE (GOVT OF) 3.00000	0.27	0.27	2,735,107	0	2,735,107	-20,495	0.95	-1.83	-0.88	0.01	-0.02
Agency	0.69	0.69	1,818,951	1,867,931	1,818,951	48,980	0.83	1.82	2.65	0.01	0.01
Corporate Bond	66.73	66.73	221,705,801	167,871,579	222,287,043	-2,143,330	0.64	-1.84	-1.20	0.43	-1.23
Credit Default Swap	-0.47	-0.47	557,063	-540,310	557,063	-2,510,177	191.67	7.48	199.33	-0.89	-0.04
CHARGE DISCOUNT 20000	-0.03	-0.03	283,500	283,500	283,500	2,510,177	88.13	3.09	188.78	0.01	0.01
	89.23	89.23	221,522,281	167,871,579	222,287,043	-2,143,330	0.94	-1.99	-1.05	0.43	-1.01

external data consuming systems also provides the user with a lot of control over the data, to quickly build reports and extend the reporting framework.

Summary

We have described a different way of implementing fixed income attribution. It focuses on the performance calculation, getting this right eliminates the residual and gets us halfway towards the attribution model which is then built on top. This approach is a lot faster to implement and there is a lot less to go wrong. Data requirements in particular are significantly simplified, reducing another bottleneck to implementation and to subsequent operations. Our cloud based system brings a partnership approach and also allows for interactive web reporting; this broadens out the user base of the system and changes the way that users receive and work with the attribution results. The feedback from our clients is that they think that it is a better way to work.

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.

CloudAttribution has offices in London and Chicago. Please contact us via email at info@cloudattribution.com or see www.cloudattribution.com

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