

# Factor investing

*Fixed income factors*



*Anthony Charlwood | Kate Hollis | Olivier Laplénie  
Andrew Peach | Graham Wardle*

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## Factor investing in fixed income

Fixed income is the new frontier for factor investing. Pursuing value, momentum, quality or low volatility strategies in bond and credit markets is yet to reach the levels of popularity enjoyed on the equity side of portfolios.

This could be about to change. Pension scheme trustees are a cautious bunch and so many could already be looking to lock in the gains recorded in equities last year.

Indeed, the combined pre-tax profit of the FTSE 350 reached a record £153.8bn in 2017. Growth continued into the first three months of 2018 with dividends up 7.6% year-on-year to £16.7bn.

Bonds are the default market for those with a low tolerance for risk, but with yields on UK government debt at a 1.53%, some may be lured slightly higher along the fixed income risk spectrum.

This is where consultants need to explain the virtues of using factors in fixed income. The sales pitch is usually along the lines of: “You could beat the benchmark and pay lower fees than you would for an active manager.”

This sounds attractive, but this is a young market and youth has its teething problems.

Factor investing is based on economic and corporate fundamentals, but some investors point to a lack of data in this market, especially at the issuer level.

There is clearly some way to go before the level of academic and broker research on factors in the debt and credit markets reach parity with the equity markets.

The investors and consultants we brought together to discuss this topic also pointed to problems finding the right people to design factor strategies. It appears that you cannot simply replicate in fixed income what works in equities.

This is a market that has to be approached in a new way and it will take time to boost its popularity. Fixed income is the next challenge for the factor investing industry.

Mark Dunne

Editor, *portfolio institutional*

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***Anthony Charlwood***  
Investment manager  
TPT Retirement Solutions

Chair:  
***Mark Dunne***  
*portfolio institutional*

***Andrew Peach***  
Senior consultant  
Aon



**Graham Wardle**

Trustee executive  
BESTrustees

**Kate Hollis**

Senior investment consultant  
Willis Towers Watson

**Olivier Lapl nie**

Head of quantitative fixed income management  
BNP Paribas Asset Management



Andrew Peach

*“More schemes are now considering end-game portfolios and may well be coming back to unleveraged fixed income investments with a focus on buy-and-maintain credit. Factor-based investing may well have a large role to play there.”*

*Andrew Peach, Aon*

**PI: Why are more and more investors using factor-based strategies?**

**Olivier Laplénie:** We tend to see three categories of investors potentially using factor-based strategies. The first are the investors who are unsatisfied with the performance of their active managers. We have met quite a few of these. The new factor-based strategies seem interesting to them and, generally speaking, they are more cost efficient than their active manager. Typically, in terms of pricing, factor-based strategies sit in the middle between pure passive management, like index replication, and traditional active management. So an investor’s thinking is: “If I’m able to get a bit better performance than the benchmark but with a lower cost, why not try these strategies?”

Secondly, we are seeing investors coming from pure passive index-based strategies who are looking to enhance their return. Since they were comfortable with systematic passive strategies, systematic factor-based strategies are a natural evolution of their investment process.

Finally, the third type of investor are those who have a growing awareness of factor investing. These investors are starting to analyse the global factor exposure of their portfolio. They may have discovered, for instance, that they have a value bias with their active managers and are therefore interested in custom multi-factor strategies. This means the weight of the factors can be tilted towards the exposures that they do not have in their portfolio, such as momentum.

What is interesting is that this is a move from an asset-based allocation framework to a more factor-based allocation framework. We are still at the beginning, but it's a start.

**PI: So you expect to see a shift in this direction going forward?**

**Laplénie:** Yes, but it will definitely take some time. We are still in the early stages here in Europe.

**PI: How are trustees using factor investing?**

**Tony Charlwood:** For defined contribution (DC) funds, which approach about £1bn now, we use target date funds. In the growth phase they are predominantly invested in equities, mainly through index-tracking funds. Charges are competitively set in the DC world so using index-tracking funds helps with the issue of fees.

About a year or so ago, our investment manager suggested we move some of that pure index tracking exposure into global factor funds. We see the move slightly away from pure index-tracking funds to factor funds as a way of harvesting some additional alpha. At the same time, although factor fund fees are higher they are clearly lower than those for pure active managers. So by having a mixture of index-tracking funds and factor funds, we can still offer a competitive charge to employers and members.

**PI: Where does this sit in the active/passive debate?**

**Charlwood:** It is a question of definition. Given the complications of the charge cap, we wouldn't have pure active equity managers. So we see it as a halfway house. The factor funds we are using are global multi-factor funds where the mix of factors is managed dynamically by the manager, so that's clearly an active element.

**Kate Hollis:** Like anything else in investment, it's a spectrum. Drawing hard dividing lines is difficult. So when we started looking at fixed income smart beta we started at the passive end and designed better benchmarks. If you are designing better benchmarks you can incorporate tilts into your benchmarks. Now, whether you call that passive or whether you call it factors is a matter for discussion. As you move further away from passive and more towards the active end, the factor exposures are more explicitly used for adding excess return and then you move into full active.

From time-to-time, we have animated debates about which side of the line this or that particular strategy should fall in and it doesn't worry us if clients want to classify it differently or use it for different things. It's all about providing solutions that work for the clients' portfolios in the context of the portfolio as a whole.

**Andrew Peach:** It doesn't neatly fit into either bucket for me. Coming from the client's perspective, what matters is the reference point. That reference point for a lot of clients is the market benchmark, be that equities or bonds. So if something is designed in a different way, that's going to introduce tracking error relative to where that client is coming from. That, in itself, is an active decision. Investors, therefore, need to have patience that this will work over the long term. However, the construction can be considered passive, and that's where the cost benefit comes in.

**Graham Wardle:** In the fixed income space it seems that investors have always been on the active side. There is very little passive investment there so this is a way of reducing the cost of investing in fixed income.

**Hollis:** There are some asset classes in fixed income, like government bonds, where it's not worth investing actively. Lots of our clients have passive gilts as part of their liability driven investing portfolio, but that's rather different.

DC clients that have a limited fee budget might get a better bang for their buck in equities or in another asset class, in which case it might make sense to do fixed income passively.

**Wardle:** In the defined benefit space schemes are moving towards de-risking and moving out of equities. This is why factor investing in the fixed income space is quite interesting.

**PI: The cost benefits sound appealing, but how are these strategies performing?**

**Wardle:** In the fixed income active space there have been recent moves into a lot more emerging market debt, private debt, all of that sort of thing, which is undoubtedly active and quite expensive. It has

produced some fairly good returns, but if you can do it in a more efficient way via factor investing then, yes, that will work.

**Hollis:** There are some things that active fixed income managers do consistently and systematically which can be replicated and they call it 'alpha'. It might generate excess return, but if it can be replicated systematically it's quite difficult, in my mind, to call it 'alpha'. If you can do the same thing systematically at a much lower cost then that's obviously for the benefit of the investors.

**Charwood:** If you analyse a portfolio's most active fixed income managers, they always have a bit of extra yield there as an under-pinner and that can easily be replicated.

**PI: When you get beyond value, low volatility and momentum, how are the more niche factors performing?**

**Hollis:** A good strategy which is well constructed should perform. A bad strategy probably won't and so it's not enough just to say: "I got factor exposures." You have to be constructing your factors in the right way, you have to be combining them in the right way and implementing them in the right way. Momentum, for example, can be a high turnover factor, but in fixed income you can bleed away all the excess return because you've turned over your portfolio very quickly. That's one of the important things about factor investing in fixed income as opposed to factor investing in equities.

**Peach:** The construction is as important as the factor.

**Charwood:** If you look at the factor funds that we are using, the emphasis is on persistent factors that over a reasonably long time period will be expected to outperform. There might be certain market conditions where certain factors won't, but again, it emulates back to this question of turnover. You can't keep churning the portfolio or all the benefits are absorbed in transaction costs.

**PI: Quant-based models have been used in fix income for some time and now we have factor investing. What is different this time?**

**Peach:** If it's active management and it's 'alpha' that's being sought, then the quant model is the intellectual property of the manager and it's fiercely guarded. If it's a 'factor', it's a market exposure and it needs to be understood and, therefore, it needs to be more transparent. From a client's perspective, that's the key difference.

**Laplénie:** Transparency is one of the differentiators between factor investing and the older quant models. Another fundamental differentiator is that factors are based on a strong economic or financial rationale, not just statistical findings. If you think about the quality factor in the credit space, for instance, leverage, it is something that has been used for decades by managers. It is something which is widely understood, which you can replicate yourself. That's very different from old quant models, which were mostly doing statistical arbitrage. They were running sophisticated and complicated regressions on huge universes, and finding relationships that no one understood. They ran that and expected it to work, and often it didn't, except for some of the largest hedge funds. So this idea of using factors with an economic and financial rationale, and not only a statistical finding, is one of the key differences.

Factor-based strategies have a much lower turnover than older quantitative models because they tend to use low frequency indicators. We were talking about the leverage of a company. It changes, at best, on a quarterly basis and so it generates lower transaction costs. The other big benefit of having factors which have a low turnover is around the capacity of the strategy. An old statistical arbitrage strategy generally had a low capacity because if you put too much money into the strategy, the arbitrage disappears. If you put money into a quality factor it won't affect the market. People have been doing it for decades and it has not disappeared, so we feel much more comfortable running these strategies with billions of assets than statistical arbitrage strategies.

What is different is that we are benefiting from decades of experience in quantitative portfolio management and this experience has been integrated into the construction of factor-based strategies, particularly on the risk management side. A good factor-based strategy pays close attention to its absolute risk, but also its risk compared to the benchmark.

By using these decades of experience in equities and other asset classes we have been able to build



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more robust models. In a way we have learned from past mistakes, which is critical in the investment process.

**PI: Does this mean investors are switching out of fundamental analysis?**

**Hollis:** They're doing it in a different way. Factors in many cases are based on fundamental criteria, but you are just looking at them or finding them and expressing them differently. To put it another way, people have used quant screens in fixed income for ages as an easy way to identify bonds that might be cheap. They then did fundamental analysis to find out if they were really cheap or not.

Factor-based strategies will take a quantitative screen and also other indicators and using just that we'll try and find a bond that's cheap. So I don't think it's different. It's complimentary, but there are things like the low risk factor which you wouldn't find explicitly in fundamental analysis at all. People tend to buy lower quality longer duration bonds, whereas low risk factors intuitively are about better quality shorter-duration bonds.

That's one of the things about factor investing. It can diversify the excess returns you get from fundamental managers because it has factors in it, perhaps, that you don't get through a common-or-garden active manager.

**Charwood:** There has to be a fundamental justification for honing in on certain factors. There's always a danger that data mining is used to produce a range of factors, but for us we would like to see a rationale underpinning the use of these factors as well as a vigorous analysis, even if it's only using back-tested data about how they will actually perform.

**PI: Liquidity is one of the differences between factor investing in fixed income and equity, but how else do they differ?**

**Laplénie:** There are obviously some similarities in the styles or, let's say, in the factor families that are used. Typically, we have quality, value, momentum and low risk. At BNP Paribas Asset Management we do not consider size a factor unlike others.

**Wardle:** In the fixed income space presumably by value you mean real yield?

**Laplénie:** It depends. We split fixed income into three segments: government bonds, credit and FX. We use different indicators to assess the constituents of each universe. So for credit the indicators are comparable to equities, but for FX what is a quality indicator for a currency? Also for government bonds, what is quality?

For government bonds we use macro-based factors linked to the performance of the economy of a given country and factors based on the evolution of prices and credit in the economy.

What is most striking within credit is if you compare the book value of a company to the price of its equity. You would typically buy equities with a low price-to-book ratio, but if you do that in the investment grade credit space you would lose a tonne of money. So in the fixed income world you want to take this factor in reverse by avoiding companies with a low price-to-book ratio. This example demonstrates that when designing good factor-based strategies you need people who have fixed income experience, not just those coming from the equity space saying: "Okay, it worked for equities so let's apply it to fixed income."

**Hollis:** The other difference is that equities are perpetual and they are at the bottom of the capital structure. In fixed income neither of those are likely to be true and fixed income can be anywhere in the capital structure. So when you're looking at value you can't just look at the issuer level, you have to look at the bond level. When you are looking at a 30-year bond you can't just run its track record for 30 years because it starts as a 30-year bond and ends as a six-month bond. So you have to be able to take all of these things out at each security as you analyse it and as you run your back tests, but this is difficult. Also getting that data is difficult and expensive which means unlike equities there are fewer houses doing factor research at the stock level in fixed income. There are plenty of people doing it on futures and swaps on derivatives, but at the individual security level it's much more difficult to do.

**Charwood:** That also means, of course, there is probably, in theory, more opportunities. The breadth of Barclay's global indices is enormous.

**Laplénie:** That's between 15,000 and 20,000 bonds. So yes, more opportunities, but it is of course



Graham Wardle

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*Graham Wardle, BESTrustees*

more difficult to analyse bonds. We launched our credit strategies later than our rates and FX strategies, because we spent a great deal of time developing our customised database that maps bonds to equities. For the equity of the issuer there has been no public database giving an accurate mapping over the last 20 years. This information is key, as bonds are located on a different part of the capital structure. We employed a two-stage process to achieve the mapping. First, we used an algorithm, however this proved to be unsatisfactory. I then set my credit specialist portfolio manager an objective to review the mapping by hand. It was an enormous task, with a total of about 20,000 bonds. We needed to take into account all corporate actions over the past 20 years and check explicit and implicit guarantees, for which we are looking directly into the prospectuses of the issuers. It took 18 months and that's why there are less managers today providing credit strategies than in the equity space, because you need to put in the upfront effort to build this up. This is proper mapping.

**Peach:** The data problems inherent within fixed income markets mean that it is more complicated to do the analysis and to design and construct an index, so there are clear transparency challenges. Within equities, if you talk to a client about the ‘value’ factor and you define it as price-to-book; that makes intuitive sense to a lot of people – it is buying stocks cheaper than the book value of the company suggest that it ought to be. That comparison is harder in bonds because of the data difficulties; you can compare them to the spread of other similar bonds or to the equity volatility of the company. Given these complexities, at the end of all this, you need to make sure that there isn't a wonderful product that is every bit as expensive as a traditional active product would have been.



Anthony Charwood

*“There’s been a trend towards total return investing in bonds and, again, coming up with a factor product, which is almost as expensive, is a bit of a hard sell.”*

*Anthony Charwood, TPT Retirement Solutions*

**Charwood:** In practice most institutional investors, certainly in corporate bond portfolios, are managed actively now. There’s been a trend towards total return investing in bonds and, again, coming up with a factor product, which is almost as expensive, is a bit of a hard sell.

**Laplénie:** We know that if we want to be able to sell the strategy it needs to be cheaper.

**Wardle:** How much research are the investment consultants doing into this?

**Hollis:** We’ve been doing credit smart beta for 10 years. We only started looking at factor-based credit at the security level about four years ago, because it was only around that time that there were products coming out. At the passive end of the strategy we’ve been doing it for 10 years. At the active end of the strategy we’ve only been doing it for about the last four.

**Charwood:** Another differentiating factor is there’s now a whole body of academic research on equity-factor investing, but it’s still quite light on fixed income investing.

**Hollis:** If you’re going to be doing the academic research you have to be able to test it, which means you need the clean scrubbed data to test it with.

**Wardle:** I’m not seeing much evidence yet of investment consultants putting it forward to pensions schemes.

**Peach:** I would concur from our experience. I don’t think that the challenge here is anything to do with factors necessarily. It’s to do with your traditional credit benchmark, which has been cannibalised to a degree by the extent of a pension scheme’s leveraged liability management processes.

It’s not that there isn’t an interest in factor-based investing; it is that all of a sudden the floodgates have opened to different opportunities for earning a premium above government bonds. That may well

change. Asset performance over the last five years has been better than expected, not least in the equity markets. Pension schemes are generally better funded than they were five years ago. More schemes are now considering end-game portfolios and may well be coming back to unleveraged fixed income investments with a focus on buy-and-maintain credit. Factor-based investing may well have a large role to play there.

**Wardle:** Yes, that makes sense certainly and without doubt the better funded defined benefit schemes are moving away from equities and more into fixed income of some sort.

**PI: How do you see the quality of the advice being given?**

**Wardle:** There are some very good investment consultants out there. Certainly all of the major firms would be included in that. It was just that I, personally, have not seen much in the fixed income space yet where factor investing is being promoted by the consultants. I'm sure it will come because it certainly happened in the equity space. I've been mainly talking about defined benefit, but in defined contribution in the growth phase it's pretty much entirely equity-type factors being promoted.

**PI: So factor investing is not as prevalent as it is in the equity space. Do you see that changing?**

**Hollis:** There's a long and dishonourable history in the financial markets of people taking a good idea and sticking it as a label on all sorts of things that it isn't. I'm starting to see that in fixed income, I don't know whether any of you are, but, as we just discussed, it's difficult to do it well and there are only a few houses capable of doing it well, but there are a lot of people starting to promote factors in fixed income.

**Peach:** The amount of white papers that I've seen on fixed income has increased. It took some time for that to get going in equities. First there was academic research, then the more commercial research followed and when it turned into something investable clients became interested. We're not quite there yet on the journey with fixed income, but I've certainly seen more white papers.

**Charlwood:** One thing I will be asking consultants or managers on factor investing in fixed income is, is there a liquidity issue amongst those 20,000 fixed income bonds? What's the ability to trade here?

**Laplénie:** A huge part of our work as quantitative portfolio managers is to make sure that these strategies make investable portfolios. In the credit space we spent quite a bit of time working on our liquidity filters and robust portfolio construction to make sure that the alpha would not be eaten by the transaction costs. To do that we integrated turnover and transaction costs at the heart of the portfolio construction process.

BNP Paribas Asset Management has been trading credit for many years and we have a huge database of trades on all kinds of forms. So we took this database and used it to build a model to estimate the total transaction cost incurred when trading a credit bond. This transaction costs model was then integrated into the optimiser used to construct the portfolio. When the optimiser switches a bond in the portfolio it will make sure that the expected alpha that you will get from switching the bond is significantly higher than the transaction cost you will incur. This transaction cost model was built a few years ago when we started with our low risk mono-factor strategy.

We now have a four-year track record for this transaction cost model. We recently did an analysis of the performance of the model and it turned out that we were in line with real-life transaction costs. We were actually lower for European credit and that's why we feel comfortable trading credit bonds.

Regarding liquidity for US denominated bonds we have TRACE (Trade Reporting and Compliance Engine) data, which is a system into which every bank and broker has to submit its transactions. Liquidity can thus be evaluated reliably at the bond level. For a euro-denominated bond, it's a bit more complicated because we have no such systems and here we rely on the size and age of the issue. We also rely on our specialised portfolio manager who before trading, checks if it is liquid. If it's illiquid it's flagged as such and removed from the portfolio and the model is re-run. So there are ways to deal with these higher transaction costs which are to take them into account and design models with a lower tolerance for turnover.

**Charlwood:** That's quite encouraging because if you read research then you often get a little note in the small print at the end that this doesn't take into account transactions costs.



**Laplénie:** All our models take into account transaction costs because I know a lot of factors which can perform without transaction costs. Factors which perform after transaction costs are much, much rarer.

**Peach:** You take either your regional or your global bond factors and then you say you control that for liquidity. Have you got a feel for how much of the sweetie shop is left by the time you've done that?

**Laplénie:** What I can tell you is after all the filters we apply, including the mapping, we are left with approximately 70% to 80% of bonds in the corporate investment-grade space. It's more around 50% for high yield bonds, but that's still a significant amount because there are thousands of issues.

**Hollis:** Even active managers in some of the high-yield space, where bonds trade once every three months if you're lucky, won't touch them or they will buy them and never sell them.

**PI: Are investors playing a role in developing new factors?**

**Laplénie:** Not so much new factors because it's quite hard to find new factors. Investors are becoming aware of their implicit factor exposure. It is well known in the equity world, but in the fixed income world investors are starting to become aware. They are starting to run analysis on their global portfolio, including all their active managers.

We can help these investors with this analysis if they wish to, but most investors do not like to share their data with us. Generally what we will give them is a detailed breakdown of the performance of our strategies and a detailed factor attribution, so that they can use this data to analyse the factorial exposures of their portfolios themselves.

**Hollis:** When you start screening portfolios you need to be a little bit thoughtful about how you are doing it and if you want to tilt your portfolio one way it may implicitly mean that you are tilting it a different way for different sets of factors or a different universe of factors.

**Laplénie:** Factor-based performance attribution is a huge quant topic. That's probably the most sophis-



ticated part of the investment process. You really need advanced statistical techniques. We have PhDs working on that.

**Charlwood:** One issue that's developed in factor investing in equities is the concept of crowding. Too many investors are trying to get into the same factors at the same time and it's arbitrated away. I suppose if you're a bit early into the game of factor investing in fixed income crowding might be less of an issue.

**Laplénie:** Today it is not an issue because it's really early. We've seen some investors actually switch in Asia and in Europe, but it's limited. There is a large capacity for this strategy because not everyone agrees on how to construct factors. Different managers have different factor portfolios so they are not buying the same bonds. Also, the factors we are talking about – quality, low risk, momentum and things like that – have been used implicitly by active managers for decades without causing excessive market disruption. Crowding risk might be higher in some less liquid areas, like high yield, but it's quite limited for now.

**Charlwood:** How do you deal with things like excessive sector biases when screening for factors?

**Laplénie:** We pay close attention to building what we call pure factors. The factors should have no beta bias or sector bias against the benchmark. All our indicators are computed at the sector level and so we aim to have only low sector divergent from the benchmark.

**Hollis:** But you can control things in the same way as you would in anything else. A couple of years ago when energy was really cheap there were caps on sector exposures and so you would have been maybe max weight in energy but not 100% of the portfolio.

**PI:** If you look at the surveys, reports and press releases in my inbox you would think that the world was only interested in ESG. Is ESG playing a larger role in factor investing?



Olivier Laplénie

*“Factors which perform after transaction costs are much, much rarer.”*

*Olivier Laplénie, BNP Paribas Asset Management*

**Hollis:** I’ve seen emerging real market debt products screened for ESG and using it as a quality factor. Not so much in credit though. They’re not quite the same thing.

Again, it’s another of the differences of fixed income and equities that ESG in credit needs to be expressed differently than the way it is expressed in equities.

**Laplénie:** For us ESG is a big topic. BNP Paribas Asset Management has invested a lot in building our internal ESG team, which gives us scores at the issuer level. The way we use the ESG score is not as an alpha factor. We use it as a constraint on the portfolio construction side, meaning we have scored all our bonds and we are ready to select investable portfolios. It is at this step that we include the ESG aspect. The way we do this is a mix between excluding the worst-rated issuers and selecting more better-rated issuers, which improves the global average ESG score of the portfolio.

Also something to note is that we use a best in-class approach in the way we score issuers. They are scored at the sector level in order to minimise the sectorial biases which could easily arise within ESG.

**Charlwood:** We’ve been looking at it for equity investing. There are two ways of doing it. Narrow the universe down, for example, using the MSCI World Socially Responsible Investing index. Then you are automatically screening out the worst and having a bias in favour of the better companies.

The other thing is to apply a tilt. There is always a question there of whether you exclude carbon companies totally or just tilt away from certain ones in favour of others. There are funds that have been developed, such as LGIM’s Future World Fund, which is used by HSBC’s pension scheme, which is a multi-factor fund with a carbon tilt on top.



**Hollis:** But again, you need to be thoughtful about it because in the credit universe there are issuers who are not companies. So, for example, you can look at EDF. It is the largest nuclear operator in Europe and also has lots of wind farms, so where do you put that on your climate change spectrum?

All sorts of government-guaranteed issuers would not have a climate bias at all, like German sovereign-owned agency KfW. Again, you need to be a bit more thoughtful in credit.

**Charlwood:** You can screen them out entirely, it will probably be significantly underweight the oil and gas sector or you can apply it as a tilt. Underweight say BP and Shell but then overweight clean energy companies.

**Hollis:** Or you can apply a different tilt and overweight the most improving companies.

**PI: Will awareness of factors in fixed income improve when the data improves?**

**Wardle:** Olivier, I was interested to hear what you had to say about the effort you've put into the data side.

**Laplénie:** There is no public database available, but at some point there will be one. No public database means there are more opportunities. If you have the technology you can grab these opportunities, if you don't have it then too bad. As an investor you might benefit from this situation.

**Wardle:** That's true, but there's an element there of someone who comes to you and it's a "trust me" situation, whereas in equities there's more research and more funds with a track record.

*"You have to be constructing your factors in the right way, you have to be combining them in the right way and implementing them in the right way."*

*Kate Hollis, Willis Towers Watson*



Kate Hollis

## Are fixed income factors up to the challenge?

*Andrew Peach, Senior Consultant, Aon*



Factor investing in equities has been a rapidly expanding segment of the investment universe and we expect this momentum to carry on as implementation methods and research evolve.

This is an area to which Aon has dedicated significant research and we have witnessed significant growth in investor awareness, demand and breadth of investable options.

One of the reasons it has grown in popularity is that it enables investors to target active-like returns at passive-like fees – an outcome which is clearly very appealing. The added benefit of its transparency has seen the trend accelerate.

The growth in interest has led to the obvious question being asked: can the same methods be employed within fixed income markets?

The application is still in its relative infancy within bond markets and, while there is encouraging evidence that it can add value, it is clear that such an approach faces challenges when compared to equities.

In the case of equities, there is a wealth of available information on companies and historic stock price movements which can be used to determine common attributes and create rules for investing in a systematic, transparent and low cost way.

Bonds, by their nature, are not so clear cut. A company may issue several bonds with different maturities, different covenants and potentially different currencies. Add to the mix that they mature, further limiting the availability of back history, and it becomes clear that there are significant challenges in terms of availability of appropriate data.

Bonds are also traded in a different way, not on exchanges but over-the-counter which means there is reduced transparency on availability and price (albeit this has improved in recent times).

This reduced visibility means that liquidity and transaction costs will likely need to be carefully controlled within index construction.

### **What about investor motives?**

At a high level, the 'market' risks taken by investors are duration and default risk. Investors expect a higher return for accepting the greater price variability of longer-dated bonds (duration risk). Similarly, investors expect a higher return for accepting a higher risk of a given entity defaulting on their commitments (default risk).



In the UK, from an institutional investor perspective, more and more pension schemes are accessing duration through leveraged liability management strategies aimed predominately at risk reduction rather than adding value. To an extent, this trend has also cannibalised interest in traditional credit indices given that risk premia no longer need to come with duration attached.

However, factors do not need to be tied to a specific benchmark and there have been strides within the fixed income market to apply similar factors to those employed in equity markets (value, low risk, quality and size) to add value in a wide range of market conditions. We believe this will be of genuine interest to investors.

The challenge, given the inherent data and market difficulties, will be ensuring that these products maintain the key benefits that have seen factor investing in equities become so popular – namely transparency and cost efficiency.



## Factor-based investing in fixed income: going beyond duration, currency and credit risk

*Olivier Laplénie, head of quantitative fixed income management, BNP Paribas Asset Management*

*Charles Cresteil, quantitative investment specialist, BNP Paribas Asset Management*



Following the spectacular development of factor investing in equity markets, fixed income investors are increasingly turning to factor-based strategies too, and there are good reasons to think that factor-based investments should be an integral part of their strategic allocation.

While the traditional approach to bond investing essentially focuses on actively managing duration, credit risk and/or currency exposure – three parameters that can be characterised as directional risks or ‘beta’ - factor investing, on the other hand, aims to delve into all the other sources of risk – and returns – most likely to drive markets. The objective of factor-based strategies is thus to improve risk-adjusted returns by actively targeting these non-directional sources of performance, also called factor premiums. In other words, factor-based strategies are designed to generate pure alpha, i.e. returns that are not linked to any active view on the direction of interest rates or credit markets.

### **The factors that drive bond markets**

The four following groups of factors are considered critical drivers of performance in fixed-income markets:

- Value/carry factors: focused on price-related data, mostly with a value for money – or carry for risk – approach
- Fundamental quality factors: focused on non-price-related data, such as company-specific data for corporate bonds and country-specific data for government bonds (macroeconomic data, for example)
- Momentum-type factors: based on market dynamics and sentiment, they are a way to capture market moves that may not be fully reflected by fundamentals
- Low-risk factors: built on the empirical observation that the bonds with the lowest risk tend to offer higher risk-adjusted returns over the long term.

These factors have been documented in academic research for their capacity to explain long-term returns, and have been the subject of extensive historical testing. They are based on relatively simple concepts which have been used by active portfolio managers for decades – only in a less formalised and disciplined way.

### **Building a systematic exposure to factors**

While the concepts that underpin factors are straightforward and well-recognised, building an efficient factor exposure requires an elaborate investment process. Indeed, selecting factors is only half of the story, as methodological choices made to implement factor strategies are equally important, if not more, to ensure a factor-based strategy can achieve long-term outperformance. In particular, one area which requires sophistication is the removal of potential directional biases in a factor portfolio. For instance, consider a naïve carry/value factor, which would overweight bonds with high carry and underweight those with low carry. If this factor is not adjusted for beta, it will be biased toward high-beta bonds/countries/sectors, and much of the final performance of the factor will be the result of this beta bias.

### **Combining factors**

Another key methodological choice is how factors should be combined in portfolios. Factors have been shown to outperform over the long-term, however extended periods of underperformance for a given factor are not uncommon. This is why, multi-factor strategies are generally preferred by investors, as diversifying across multiple factors not only improves total risk-adjusted returns, it also results in shorter drawdown periods.

For this to be true however, the underlying correlations between factors need to be low, not only on average, but also on tail events – i.e. during drawdown periods. Using factors from different investment styles is a first step in that direction – for example value and quality styles tend to be complementary as the former essentially focuses on finding good yield, while the latter favours companies with the most robust business model. However, the construction methodology used to implement factors is also crucial in that respect, because if the factors do not properly account for potential biases, they risk ending up being highly correlated during some periods.

### **Static or dynamic allocation: we favour a balanced approach**

In view of the differences in the short-term performances of factors, some investors might be tempted to deviate from a balanced factor allocation to introduce a ‘timing’ mechanism. The aim would be to anticipate which factor should outperform based on its recent performance or on where we stand in the economic cycle. One such strategy can be to look at the valuations of factors with a mean-reverting approach, i.e. underweighting factors that have outperformed compared to their long-term rhythm and overweighting factors that have been out of success recently. However, the analyses of our Quant Research Group at BNP Paribas Asset Management suggests that the added value of such strategies tends to be quite low historically, and is often negative when turnover-related costs are factored in. Another option can be to look at the sensitivities of each factor to the economic cycle, but our research shows that the correlations between factor returns and the cycle are usually the result of directional biases in the factor construction. Hence, such correlations are much less apparent when ‘purified factors’ are used. As a result, maintaining a balanced allocation to the different factors seems to be the most efficient and straightforward approach for most long-term investors.

### **Using factors: a tailored approach for institutional investors**

Factor investing can be of interest to different institutional investors for different reasons. For pension funds it can be valuable to analyse the factor exposure of their existing portfolio. For example, they may find out that they have a significant allocation to value-style factors from their active managers. In that case, it would make sense for them to consider a tailored factor solution, in order to balance the factor exposure for their overall portfolio, by favouring the factors that are under-represented in their portfolio. Insurers have been under pressure in recent years as they try to preserve their investment returns while controlling risk. With limits to how much they can invest into risky assets, it is particularly important for insurers to extract greater return from less risky portfolios of assets. Factor-based products can serve as powerful tools to capture uncorrelated return opportunities and improve portfolio diversification.

### **Conclusion**

With the development of factor investing, a new breed of strategies has emerged with the objective of improving risk-adjusted returns by focusing on the underlying drivers of fixed-income markets, such as carry, fundamentals, risk and momentum. By building purified factors and combining them efficiently, it is possible to build investment solutions that can help address many core needs of institutional investors, enhancing long term risk-adjusted returns and improving portfolio diversification.



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## Strength in numbers

Multi-factor funds prove that being popular is not easy. *Lynn Strongin Dodds* looks at how to navigate the complex world of next generation smart beta products.



Smart beta may account for a sliver of total passive assets under management but it is one of the hottest topics in investment circles. It is, therefore, only natural that multi-factor funds are the next stage of the asset class' evolution.

As with any diversification strategy, they aim to ease the investment journey, although combining factors is a more complicated task. Careful attention also needs to be paid to construction and methodology.

Demand for multi-factor funds has been strong in the equity exchange-traded product (ETP) space. Figures from Blackrock show that multi-factor investing has grown from a paltry \$3.8bn (£2.7bn) in assets under management at the end of 2009 to almost \$80bn earlier this year with a broad range of products offered by around 25 fund providers. While this is a sizeable sub-sector of the overall \$437bn (£317.4bn) smart beta pie, it is still a small slice of the

\$3.9trn (£2.8trn) equity ETP industry.

There are several drivers behind the trend, and disappointment with some of the individual factors is, most notably, near the top of the list.

Value has had a protracted period of poor returns culminating in Goldman Sachs almost sounding the death knell last year. It estimated that the Fama-French model of buying low-priced stocks generated a cumulative loss of 15% in the past decade

compared to the S&P 500, which rose by two-thirds during the same period.

The rout started after the financial crisis and has consistently worsened as tech companies have soared.

Last year, for example, they comprised 38.7% of the Russell 1000 Growth Index's market value, but only accounted for 8.6% of the Russell 1000 Value Index.

"What we have seen is that the large technology companies, the so-called FAANGs (Facebook, Apple, Amazon, Netflix and Google), have dominated the US stock market in the last few years and that has had a significant impact on investment strategies, including single factors," says Dimitris Melas, MSCI managing director and global head of core equity research.

"These risks can be mitigated by diversifying portfolios across several factors which is why we are seeing greater interest in multi-factor funds," he adds.

#### VALUE, VOLATILITY AND PATIENCE

Morningstar's director of passive fund research in Europe, Hortense Bioy, believes that multi-factor strategies are becoming popular because they try to address the shortcomings and cyclical nature of the single factor experience.

"Single factors such as value, minimum volatility or quality are cyclical and will go through periods of underperformance, although over the long term they should deliver superior risk-adjusted returns," she says. "This requires patience, which many investors do not always have. So investing in multi-factor products will not only help smooth the cyclical nature but also better manage behaviour risk."

A study conducted by S&P Dow Jones Indices showed that value as well as momentum, low volatility and quality based on the S&P 500 often missed the mark of the underlying index over most time horizons during 1995 and 2017.

The frequency of risk-adjusted outperformance though was notably lower for shorter holding periods.

By contrast, an equally-weighted portfolio of factors performed as well or better than the best performing single factors over all

time horizons. Diversification contributed to an outperformance of the portfolio 80% of the time compared to the S&P 500 over one-year and 97% of the time over three years.

Another significant benefit are lower transaction costs, believes Vitali Kalesnik, head

"These factors can be captured systematically, at relatively low costs and have been proven to offer benefits in terms of diversification and attractive returns," he says.

"The awareness is also a result of increased transparency which enables clients to have better insights into what they are holding

## “ A diversified multi-factor strategy can substantially reduce transaction costs compared to single-factor strategies. ”

Vitali Kalesnik, Research Affiliates

of equity research at Research Affiliates. "They are typically not top of the list for an investor but they should be.

"A diversified multi-factor strategy can substantially reduce transaction costs compared to single-factor strategies," he adds. "Based on our estimates, the costs associated with constructing a multi-factor portfolio is in the order of 15bps to 30bps on an annual basis, while it can run as high as 150bps to 200bps for a single strategy."

More generally, multi-factor investing is part of the overall migration towards passive from active investing.

Figures from Morningstar show that slightly more than a third of all assets in the US are in passive funds, up from about a fifth a decade ago. The share of passive assets has doubled in Europe over the same time horizon, albeit the figure is only at 15%. This is expected to change as the Financial Conduct Authority and MiFID II tighten the screws on fund management fees.

#### UP OR DOWN?

As Stan Verhoeven, NN Investment Partners' portfolio manager factor investing & solutions, puts it: there is recognition that many things previously labelled 'alpha', which came with a higher price tag, are actually factors which have a long history in academics and in practice.

in their portfolios and as a result create better portfolios themselves."

The challenge is, of course, finding the right mix of factors. "Multi-factor investing makes sense but the devil is always in the detail," says Vincent Denoiseux, head of quantitative strategy at Deutsche Asset Management.

"They are more complex products and there is no one right way to build a product. It is important though that it delivers performance, investors understand the methodology and that the process is transparent."

In essence, there are two schools of thought on how best to build such a product. The first being a top-down approach, which combines distinct sleeves for each factor often in an equally weighted manner.

It draws on the differentiated sources of return in a relatively simple and transparent way and but can also lead to a dilution of portfolio-level factor exposures. The second option, a bottom-up approach, involves an integrated structure where individual factors are combined and each stock rated to create a multi-factor score.

This is then used to select a more concentrated portfolio of so called "all-rounders" that are characterised by exposures which are fairly evenly distributed across all the desired return drivers. While there are debates as to which one is better, the bot-



tom-up contingency is gaining traction. “A top-down approach is not a good way of capturing the factor exposures,” says Chris Mellor, a product specialist at Invesco PowerShares.

“A bottom-up approach provides minimum exposure to unrewarded sectors and countries and maximum exposure to long-term factors that drive outperformance. You do not get any clashes or offsets.”

Take value and momentum, which typically have negative correlations. “The momentum strategy might be buying stock X while the value strategy is selling stock X, or at least implicitly in a long only context,” Verhoeven says.

“This is just a simple example but clearly shows that while diversification offers huge benefits to investors one has to be smart about implementation. It also demonstrates how returns can be eaten up by turnover providing a clear cut case of the importance of implementation and a good infrastructure to support it.”

There is also a growing body of research supporting the bottom up and integrated path approach.

The most recent is the 2016 paper: *Can the Whole be More Than the Sum of the Parts? Bottom-Up versus Top-Down Multifactor*

published by AQR Capital Management, found that an integrated approach not only adds about 1% per annum of excess returns versus the cap-weighted benchmark but also increases the level of the information ratios by about 40% relative to the portfolio mix. Trading efficiency is also enhanced, while turnover is reduced by netting trades that would have been executed in separately managed single-style portfolios.

Moreover, back tests of the S&P Quality, Value & Momentum Multi-Factor Index showed that a bottom-up approach outperformed a top-down fund of funds as well as each of the individual factors between 1995 and 2017.

The index also has the highest average return during each five and 10-year period in the sample horizon, outstripping the top-down approach by an average of 1.6% and 2.4% per annum over each five and 10-year period, respectively.

#### PRIME CHOICE

The other hot topic for discussion is the type of factors that should be slotted into these funds. Unsurprisingly, there are different variations on the multi-factor theme, but, as Verhoeven points out, it is important to note that not every factor is a factor.

sources of return and, have long-term academic research and economic intuition to support them.

“We have, for example, left size out because we do not believe that there is enough empirical evidence and economic intuition to support it as a factor in the way it is traditionally defined and implemented,” he adds.

Other key attributes, according to Kalesnik, include robustness across definitions, meaning that small changes in the measurement of a factor should not destroy its demonstrated performance.

The same characteristics should be present across geographies to show out-of-sample performance, and finally they should be implementable without incurring large trading costs that erode the factor’s return premium. Looking ahead, more producers are expected to jump on the bandwagon and multi-factor strategies will only become more sophisticated.

The recent debut of Amundi’s dynamic multi-factor euro, Europe and global equity range is a case in point.

They differ from many in that they place risk management at the heart of the portfolio construction.

According to Amundi’s head of ETF product specialists, Nicolas Fragneau, equity-factor investing relies on a long-standing research framework which dates back 60 years.

In addition to the passive solutions relying on index providers and research from ERI Scientific Beta, Stoxx and MSCI, Amundi Active Multi Factor portfolios are built through the group’s proprietary research. Factors are then combined using a strategic allocation methodology and each factor is equally weighted to the portfolio risk profile.

The team also re-adjusts tactically among factors to avoid bias and to tackle valuation risks plus portfolio guidelines are applied to avoid concentration and limit execution costs.

The move to a multi-factor approach is understandable, but it does not eradicate risk. So tread carefully when picking your team of factors.

“A top-down approach is not a good way of capturing the factor exposures.”

Chris Mellor, Invesco PowerShares

*Portfolio Construction.* This analysed the equity factors of value, size, quality, low volatility and momentum to build global portfolios from developed markets.

They concur that a bottom-up construction yields superior risk-adjusted returns because the portfolio weight of each security will depend on how well it ranks on multiple factors simultaneously.

By contrast, stock-specific risk tends to be more pronounced in the sleeve approach. A separate paper comparing the two, pub-

“A lot of data mining is happening with people trying to come up with a new holy grail or something novel,” he adds. “In this case it is better to be safe than sorry. The ‘standard’ factors have an extensive history in academics and in practice.”

AQR Capital Management principal Ronen Israel adds: “You may hear people say that there are hundreds of factors in the market, but, in our opinion, there are in fact only a small number – value, momentum, quality or defensive – that can provide persistent

**Editor:** Mark Dunne

**Contact:**

John Waterson

Phone: +44 (0)20 7822 8522

j.waterson@portfolio-institutional.co.uk

Clarissa Huber

Phone: +44 (0)20 7822 8522

c.huber@portfolio-verlag.com

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Phone: +44 (0) 20 7822 8522

[j.waterson@portfolio-institutional.co.uk](mailto:j.waterson@portfolio-institutional.co.uk)

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