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Smart beta and factor investing

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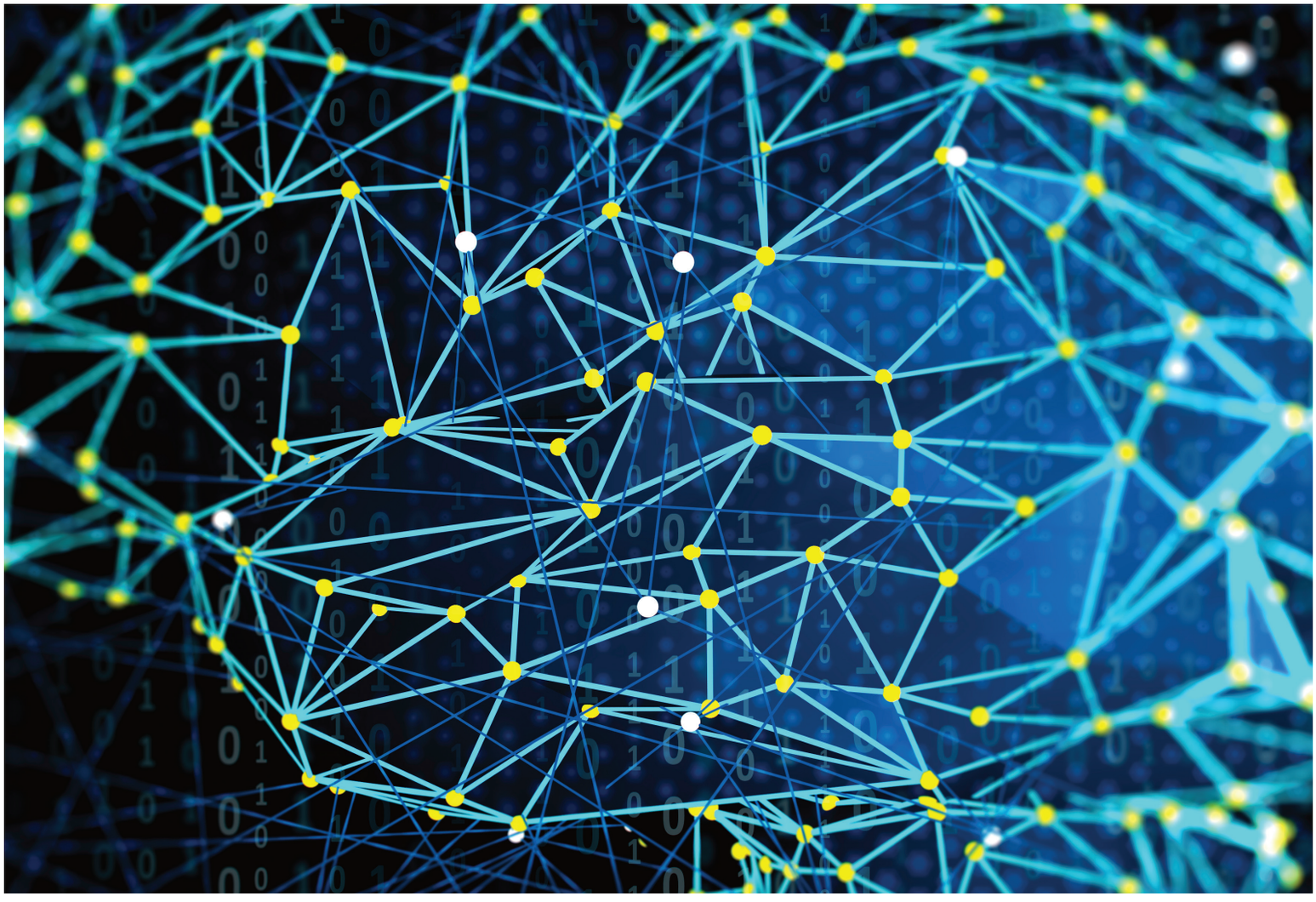

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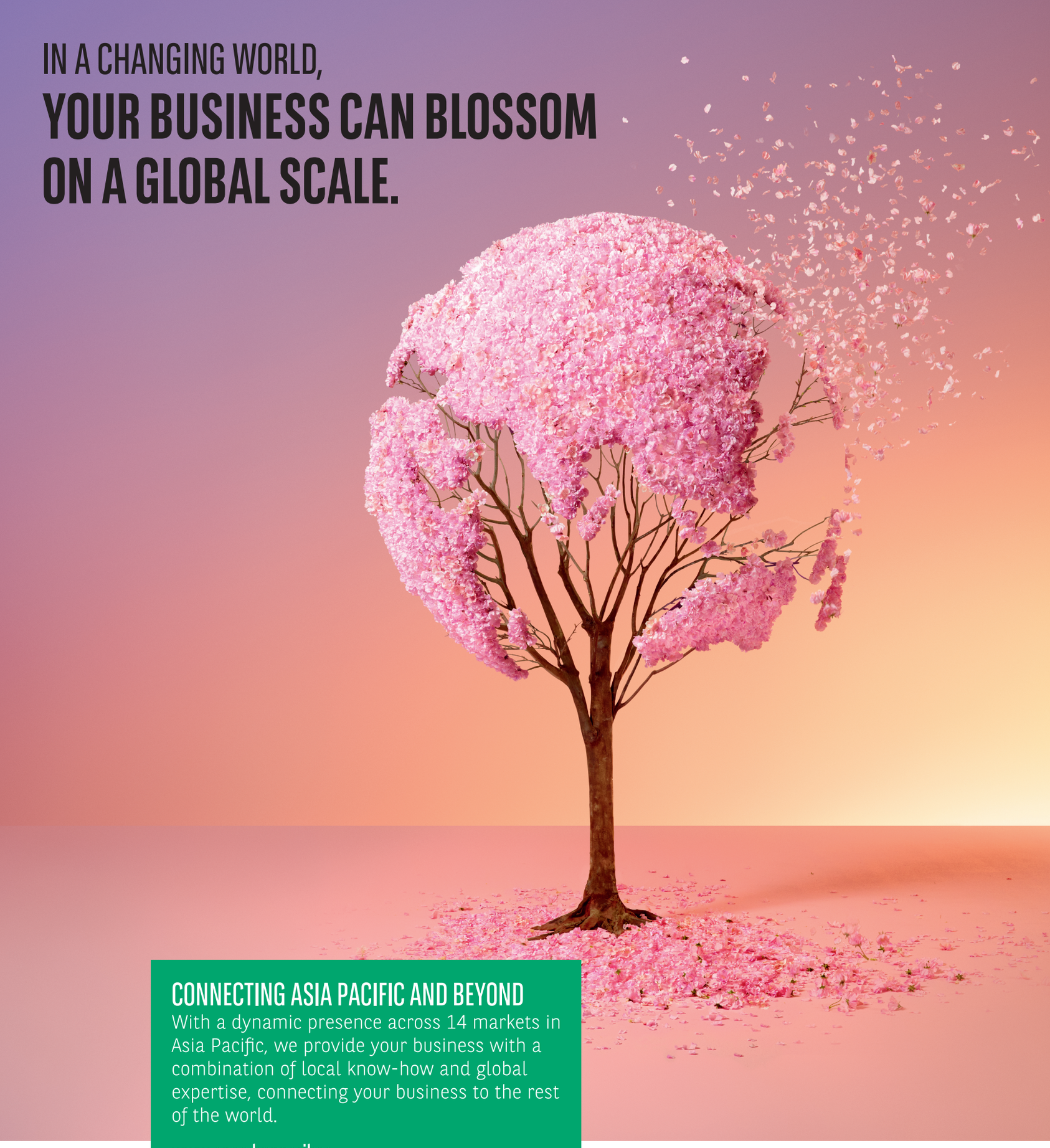

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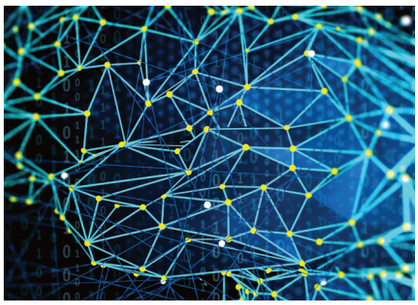

Jumping on the smart beta bandwagon

Asia has been slow to embrace smart beta investment strategies, but this is beginning to change with an increase in sustainable investing and institutional investors in the region – such as insurers and pensions managers – looking to protect portfolios amid a strong run in equity markets.

The adoption of smart beta in Asia had lagged because of limited investment in building smart beta exchange-traded products, misaligned incentives or higher remuneration for brokers to promote other products and, until recently, a lack of investor knowledge. Most of these issues have now been addressed.

So far, the majority of smart beta exchange-traded fund (ETF) investors in Asia have been Japan- or Australia-based. Japan accounted for the largest share of assets under management (AUM) in smart beta ETFs, with $7.3 billion invested. Initiatives from Japan's Government Pension Investment Fund (GPIF) and the Bank of Japan to encourage investors to increase their exposure to ETFs have contributed to these inflows. While smart beta ETF assets in Asia-Pacific including Japan grew by 57% in the year to June 2017, the asset class in the region represents only 4.3% of total ETF assets, which now stand at $390 billion, according to Morningstar.

The first smart beta index in China – the China Securities Index Company's Research Affiliates Fundamental Index – was only launched in 2009. The first ETF based on it was released a year later – almost seven years after the first smart beta fund was launched in the US.

Interest is picking up, however – especially in China, where insurers are keen to jump on the bandwagon. This increasing interest in smart beta in Asia coincides with intensified demand for sustainable investing.

China is currently responsible for 30% of total global investment in renewable energy and 27% of investment in energy efficiency, according to the International Energy Agency. Furthermore, the GPIF is promoting engagement strategies to encourage shareholders to push companies towards more sustainable practices.

Investors are looking for index products with green exposures and ways to incorporate sustainability metrics alongside traditional financial ones.

One way smart beta has been used to incorporate environmental, social and governance (ESG) investing is through an ESG filter, overlaid onto a fund that assesses a number of factors. Although this reduces the investment universe, risk-monitoring tools can be used to ensure the performance of the fund.

However, those looking into smart beta and ESG in Asia must be conscious of not trying to replicate successful strategies elsewhere without accounting for regional differences. For example, ESG issues such as air pollution may be a more important consideration in Asia than in other regions.

Equally, features of less-developed markets – such as the large number of state-owned enterprises in China – must be considered when putting together an effective smart beta strategy there.

Another factor generating demand is that smart beta decisions are essentially driven by data and enhanced with technology. As the two enablers advance, the execution of smart beta strategies becomes increasingly consistent and inexpensive from a fund management perspective. For fee-conscious Asian investors struggling with global falling returns, this provides an opportunity – rising interest in Asia coincides with a global surge. Smart beta ETFs accounted for about $430 billion, with new inflows of more than $45 billion recorded in 2016, according to Morningstar. Fund manager BlackRock predicts that total AUM in smart beta ETFs will grow to $1 trillion by 2020, and to $2.4 trillion by 2025.

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Premia Partners

Integrating smart beta into a developing Chinese market

Jason Hsu, adviser to Premia Partners – also founder, chairman and chief investment officer of Rayliant Global Advisors, and co-founder and vice chairman of Research Affiliates – and Aleksey Mironenko, partner and chief distribution officer, discuss how Premia Partners and Rayliant Global Advisors are positioned to address product gaps and devise solutions for deploying smart beta strategies into the Asian – and particularly Chinese – market, and how investors can seek ways to improve their exposures

When was smart beta first deployed in China?

Jason Hsu: The first smart beta index in China was the China Securities Index Company's Research Affiliates Fundamental Index (CSI RAFI), which launched in 2009 – a collaboration between the CSI and Rayliant Global Advisors (formerly Research Affiliates Asia). The first exchange-traded fund (ETF) product based on CSI RAFI was launched by Harvest Funds in China in 2010.

What are the differences between applying smart beta to a developed market and applying it to a developing market?

Jason Hsu: Generally speaking, smart beta strategies work better in less efficient markets, thus we expect stronger outperformance from smart betas designed for developing markets. There are definite reasons to adopt different smart beta constructions for developing markets – for example, many are dominated by state-owned enterprises (SOEs). You need to take that into consideration, otherwise your value smart beta will be dominated by SOEs, which tend to trade at low price/earnings and price/book ratios, but do not necessarily generate a value premium.

Do the factors used in the US and Europe work in China?

Aleksey Mironenko: Yes and no. Many of the well-studied factors in developed markets perform well in China – value, low volatility and size all show excess return. That said, simple replication of US signals leaves a lot of excess return on the table as there are nuances specific to China that can improve the outcome. Dividends are a great example – normally a reliable indicator of value, the signal simply does not work in China because of local regulations. This is why we are working with Rayliant on our China smart beta products – its research ensures the strategies are fit for purpose, and not just copy-and-pasted from the US.

Jason Hsu

Aleksey Mironenko

How much interest has there been in smart beta strategies in China?

Jason Hsu: China is a 'fast follower' when it comes to smart beta. The global success of smart beta products has generated a buzz and a demand for products. However, for smart beta to really gather assets under management – and to make a meaningful difference to Chinese (retail) investors – the products may be better incorporated into fund-of-funds or multi-strategy products for diversification, or in ETF form for flexibility compared with outright long-only mutual funds.

Aleksey Mironenko: For global investors, the current approach is to use either a traditional beta ETF or an active fund. The popular ETF benchmarks (FTSE A50 and CSI 300) leave a lot to be desired – the top 50 or 300 stocks by market cap result in large financial or SOE weights without other considerations and are not representative of China's economy. With MSCI inclusion and more channels opening up, investors are realising that the expedient approach is not always the right one, which is where smart beta comes in.

What should investors consider when looking at smart beta?

Jason Hsu: Investors should understand that smart beta products are tools rather than solutions. They will need to buy a diversified portfolio of equity smart betas as well as non-equity strategies to construct the right solutions. For Chinese investors, the desired solution is often absolute return or downside risk-controlled by nature. No single smart beta product could deliver on that outcome and, in such circumstances, a multi-factor fundamental approach would be more appropriate than taking a concentrated bet on any single factor that may fall out of fashion or become too expensive because of crowding.

Aleksey Mironenko: What works for one investor in smart beta may not work for another. China is a two-speed economy – some investors prefer new economy tilts, others prefer the mainstream companies, while many actively allocate between the two. While smart beta is a key consideration, it's also important to ensure asset allocation fit. For example, if an investor is unhappy with the FTSE A50 financials allocation, a smart beta tilt of the same universe will not resolve the real issue.

How should an investor distinguish among smart beta strategies?

Jason Hsu: There are two major categories of smart beta: single-factor and multi-factor – and this is not specific to China. The popular single-factor smart betas are value, low volatility, small cap, quality and momentum. Generally, for investors looking to dynamically allocate to different exposures, the single-factor smart beta is the appropriate tool. In the multi-factor space, there is an abundance of varieties, among the most popular of which are

theme-based multi-factor smart betas, such as the recently launched CSI Caixin Bedrock Economy Index and the CSI Caixin New Economic Engine Index. These indexes select stocks based on a particular investment theme, then weight them by their respective factor scores to generate excess returns.

Tell us more about theme-based multi-factor strategies.

Aleksey Mironenko: The two strategies look to solve the two-speed economy dilemma investors face in China. The Bedrock strategy is a core economy approach – it targets the largest stocks and contributors to GDP today. The New Economy strategy utilises the Mastercard Caixin BBD China New Economy Index to define sector exposure. While the Bedrock approach leans heavily on financials, industrials, real estate, and so on, the New Economy approach targets consumer discretionary, technology and healthcare – financials are close to zero. These two options allow investors to express a view on different portions of the economy. Once the universe is decided, the benchmarks amplify those factor exposures that generate excess returns in China. For Bedrock, that's value, quality, low volatility and size, adjusted for China where needed. For New Economy, the focus is instead on low fixed assets, quality, productive growth and liquidity. The goal is to capture the excess return available in their respective universes. The results speak for themselves, with Bedrock generating ~8% excess return annualised versus CSI 300 since 2005.

Is there any evidence of smart beta's success for China beyond these new strategies?

Jason Hsu: The nine CSI RAFI indexes launched since 2009 have averaged 3–5% outperformance versus their respective cap-weighted indexes. This is probably the best real-world data supporting the efficacy of smart beta's application to Chinese stocks.

Many investors believe that active is the only way to access inefficient markets such as China. How do you know this approach will work?

Aleksey Mironenko: Inefficient markets create alpha opportunities, which can be captured by smart beta strategies as well as active managers. Fundamental bottom-up research originated in the US, yet we all accept that it works in emerging markets when adjusted correctly, given the inefficiencies involved. The same is true for smart beta: inefficient markets amplify signal strength. This is why RAFI in China averages 3–5% outperformance, while in the US the same approach only yields 1–2%. Similarly, multi-factor strategies in the US typically deliver low single-digit excess returns, whereas we see high single digits with Bedrock. The key is not to replicate blindly, but to adjust for specific markets and ensure the smart beta is fit for purpose.

1. Bedrock economy – outperformance versus popular benchmarks

Cumulative performance of CX Bedrock[1] versus existing China indexes
July 1, 2005–31 May, 2017, indexed July 1, 2005 value to 100

[1] Monthly total return from July 2005–June 2017, using total return indexes

Why are there fewer smart beta funds available to invest in developing markets?

Jason Hsu: Developing markets tend to be followers when it comes to financial product adoption. Smart beta has only recently become a widely adopted investment strategy in the developed world and it is in the early stages of the adoption cycle for developing markets. On the supply side, shorter histories, data cleanliness and a lack of commercial product availability are areas to improve on before widespread adoption in developing markets. Rayliant is working on the first two parts and collaborating with Premia Partners to bring products to the market.

Where do smart beta strategies fit into an asset allocation portfolio strategy?

Jason Hsu: Smart beta strategies are often used to replace underperforming active managers or passive cap-weighted index products. It is important to realise that smart betas are not new asset classes, but ways to create excess return relative to the standard cap-weighted indexes.

How can investors effectively manage risk when deploying a smart beta strategy?

Jason Hsu: Generally, smart beta products are long-only – this is especially true in China because of to the no-shorting constraint. Thus, Chinese A-share smart betas will have volatility similar to the major market indexes, such as CSI 300, which has historically averaged around 33% per annum. This means there is substantial risk of large negative returns. To manage this downside risk, investors should combine their smart beta investments with other non-equity asset classes to diversify away some equity risk. Alternatively, accessing smart beta strategies through more liquid tools such as ETFs provides an added degree of flexibility and tactical adjustment.

Which factors are best in deploying a smart beta strategy for China?

Jason Hsu: I would certainly advise against investing in only one factor exposure – there is no evidence that one equity factor dominates other factors. The standard factors have all been vetted by academic researchers, and deliver outperformance at different points in time. Thus, the right approach is to diversify across the different standard factors.

How do you see the smart beta market in Asia evolving over the next two to three years?

Jason Hsu: Smart beta adoption will increase in Asia over time – similar to developed markets – as providers increase educational efforts. Institutional investors, financial technology and fund of funds will likely be the early drivers of flow into smart beta, as allocators tend to be more sophisticated in their investment knowledge. Ultimately, the success of smart beta products depends on the creation of cost-effective products and strategies that deliver on outperformance. On that front, the relatively larger expected excess return for smart beta strategies in developing markets bodes well for strong adoption.

Aleksey Mironenko: With the inclusion of China into global benchmarks, it's only a matter of time before investors start looking for ways to improve their exposures. The same is true for Asia more broadly. Already clients are questioning the high fees in Asian active management and the lack of product granularity and variety in Asian betas. Addressing the product gaps in Asia is the primary reason we started Premia Partners. Investors will demand better solutions to Asian exposures quicker than most will expect, and our goal is to be there for them and to help fill those product gaps. ■

Seeds of destruction?

Rapid growth has fuelled anxiety over the passive sector's vulnerability to frontrunning. By Paul Amery

The rise of passive, index-replicating investment funds and mandates seems unstoppable. Worldwide assets in exchange-traded funds (ETFs), most of which track indexes, hit $4 trillion in May 2017, having topped the $3 trillion mark only a year earlier.

Passive funds' share of the money managed in US equities is now around 40%, more than double the level of a decade earlier (see figure 1).

Such inexorable growth, though, brings questions about indexing's inherent vulnerabilities. The volumes of money following every nuance in the benchmark rules of index firms such as MSCI, FTSE Russell and S&P Dow Jones, have long created opportunities for hedge funds seeking to trade ahead of those moves, potentially at the expense of other investors.

This is well known. Sebastien Lieblich, head of index management at MSCI, describes the trading surrounding index changes – and index firms' efforts to frustrate it – as a "cat-and-mouse game". But as the sector grows, there are increasing fears that the mouse might be getting easier to catch.

Need to know

- The rapid growth of passive investing has rekindled fears about index-based strategies being vulnerable to frontrunning by active managers.
- MSCI's head of index management describes a "cat-and-mouse" game in which index firms try to deter opportunistic trading around index changes.
- The so-called index effect could cost an investor tracking the S&P 500 between 21 and 28 basis points a year, according to one academic.
- There is strong evidence of the frontrunning of factor index additions and deletions, says Robeco's head of factor research.
- Others, though, say index-rebalancing events have become harder to exploit and index-based funds are getting better at timing their trades.
- Index firms, too, are making it harder to arbitrage the changes they make.

Rebalancing costs

Key here is that passive investing is – unavoidably – less passive than its name suggests.

In *Sharpening the arithmetic of active management*, a paper published earlier this year, AQR's Lasse Pedersen points out that anyone starting out with an investment in the market portfolio has to keep up with changes to its composition. This means participating in initial public offerings and other equity offerings, and reinvesting the proceeds of mergers, takeovers, share repurchases and dividends.

Without such activity, an equity investor would end up owning only about 60–80% of the market after 10 years, Pedersen notes.

In fixed income, the effects of index reconstitution are even larger: an investor in an index-tracking bond fund typically has to trade 20% of the portfolio each year to keep up with index changes, including corporate actions, the reinvestment of interest payments and the proceeds of maturing issues.

This leads to the so-called index effect – the inflation of prices for stocks entering an index as active investors anticipate changes in its composition and buy ahead of passive funds, and the deflation of prices as stocks exit.

Antti Petajisto, a portfolio manager at multi-strategy hedge fund LMR Partners and previously a financial academic, has attempted to quantify the index effect for investors in tracker funds and ETFs.

In *Inefficiencies in the pricing of exchange-traded funds*, Petajisto calculates that between 1990 and 2005 the average price impact on stocks entering the Standard & Poor's (S&P) 500 index was an increase of 8.8% between the announcement date of index inclusion and the close of trading on the day when index inclusion was made effective. For stocks exiting the index, the price fall between announcement date and effective date averaged 15.1%.

These price effects lead to a hidden cost borne by index-tracking funds, Petajisto argues, in the form of a premium that gets "baked into" the index level. For the S&P 500 index, Petajisto estimates the index premium as a minimum of 21–28 basis points per year, while for the Russell 2000 index of small-cap stocks the premium is a higher 38–77 basis points annually.

"The massive flow of funds into index-tracking funds, mandates and ETFs can only increase the price premium on stocks that results from index membership," says Petajisto.

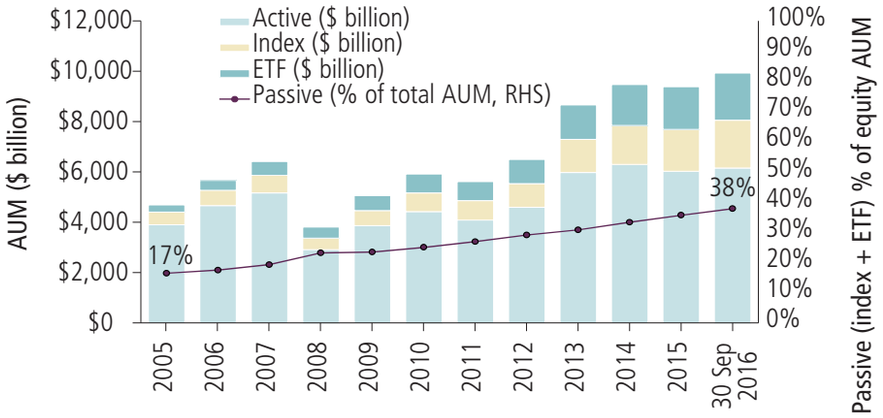
Active asset managers are keen to emphasise the potential inefficiencies relating to index-driven flows, particularly in non-standard smart beta and factor indexes.

"The fact that rebalancing trades are announced in advance is equivalent to the release of price-sensitive information," says Joop Huij, head of factor investing research at asset manager Robeco and associate professor at Rotterdam School of Management.

"There's strong evidence of the frontrunning of factor index additions and deletions. And prices don't return to equilibrium after index additions – they stay systematically too high. This suggests there's an overcrowding effect."

In a recent paper co-authored with Georgi Kyosev, Huij estimates the price impact from announcement to effective day on the MSCI minimum volatility indexes as 1.07% for index additions and –0.91% for index deletions. Around two-thirds of this effect remained in force several weeks after the index change.

1 The rise of passive funds' market share in US equities



Source: Strategic Insight, Goldman Sachs

Vitali Kalesnik, director of equity research at Research Affiliates, an index provider focusing on smart beta strategies, argues rebalancing-related costs are particularly important in smart beta.

"The trading costs for factor index strategies can be very high and can effectively remove the factor premium the index strategy is expected to generate," says Kalesnik. "We've studied the past performance of US mutual funds and concluded that, even for relatively low-turnover factor strategies like value, trading costs remove around half the theoretical value premium. For higher-turnover strategies, like momentum, all the premium disappears."

Better execution

But the managers of index-tracking funds stress they are aware of the potential for frontrunning by hedge funds and other arbitrageurs.

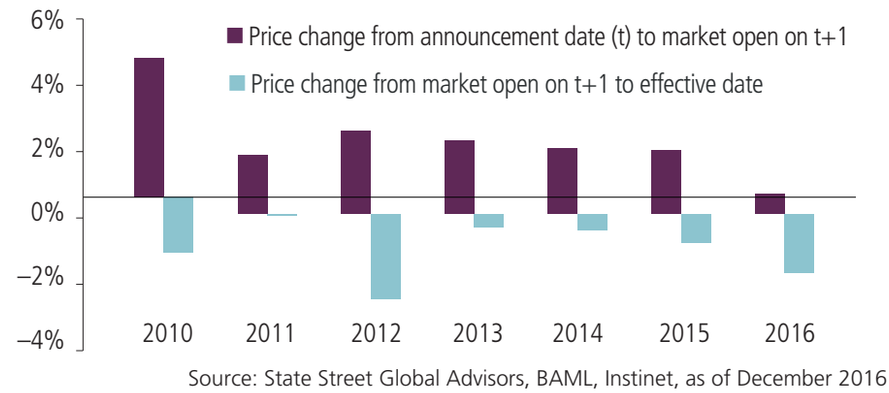
"As the volume of assets in index-tracking funds has grown, so has the number of people looking at potential arbitrage activities," says Arnaud Llinas, head of Lyxor ETFs and indexing. "But index fund managers can add real value by timing their index-related trades and smoothing the execution."

Karl Schneider, deputy head of Americas at State Street Global Advisors' global equity beta solutions unit, suggests index-rebalancing events have become more difficult to exploit as more people have focused on them.

"As interest in index inclusions grew over the years, hedge funds began frontrunning the index change effect and essentially arbitraged it away," Schneider writes in a recent research note.

"Over the last seven years, stock prices for companies added to the S&P 500 index have actually fallen from the morning after the announcement to the effective date of the index change," he notes (see figure 2).

2 Price performance for names added to the S&P 500 index



Source: State Street Global Advisors, BAML, Instinet, as of December 2016

John Carson, member of the index watch team at Societe Generale Corporate & Investment Banking (SG CIB), points out that previously stable price effects around global equity index-rebalancing events have also weakened.

"During the past few years, the performance of a strategy involving early purchases of the stocks entering the MSCI indexes and early sales of those exiting has become much more volatile," Carson says.

"The premiums seen on or just before the effective date for stocks entering the indexes have been lower than before. Up to three or four years ago, the average price spread for stocks entering or leaving developed market indexes could be around 12% over six weeks, but more recently it's been closer to single figures," says Carson.

"We've learned to time our trades around index changes to when it makes the most sense for the stock in question. Sometimes that means buying the stock soon after the announcement, sometimes that means buying it on the effective date and sometimes that means trading it afterwards," says State Street's Schneider.

As index fund managers make their rebalancing-related trades less predictable, so hedge funds and arbitrage traders have been forced to alter their strategies.

"Those seeking to arbitrage index changes appear to be making their trades earlier, in some cases several months pre-announcement. Undoubtedly, arbitrageurs are also increasingly looking at non-standard benchmarks," says SG CIB's Carson.

Meanwhile, the historical practice by investment banks of offering index fund and ETF managers financial instruments that guarantee outperformance of an index over rebalancing periods has also become less prevalent. This outperformance came at the expense of passive managers following a naive rebalancing strategy of placing all trades at the market close on the effective date of the index change, when the index effect is typically strongest.

"There appear to be fewer such credits offered to passive fund managers," says Carson.

For their part, index firms stress that while they are unlikely to make their benchmarks less transparent, they can tweak index rules to make frontrunning riskier or less lucrative.

For its Investable Market Index series, which undergoes a biannual rebalancing in May and November, MSCI randomly chooses a closing price from any day within a two-week window to calculate which stocks qualify for index inclusion or exclusion, muddying the water for those aiming to anticipate index-related trading flows.

The Center for Research in Security Prices (CRSP),

which calculates benchmarks for several large Vanguard index funds, including the $561 billion Total Stock Market fund, announced that from September 2017 it will spread its quarterly index rebalancings over five days rather than performing all index changes on one day.

"Market impact transaction costs could potentially be reduced through a more gradual reconstitution process," Vanguard says in a statement accompanying the announcement of the change by CRSP.

"There's no evidence that active players, quants or broker-dealers are systematically managing to outplay the index," MSCI's Lieblich says.

The acid test of performance

Ultimately, allegations of inefficiencies created by the increasing volumes of index-linked assets are only likely to carry weight if backed up by performance statistics. Here, so far, it appears active asset managers have a weak case.

"If active managers were going to become successful at arbitraging passive fund flows, you'd surely see this first in large-cap US equity indexes, where passive has such a major presence," says Jo McCaffrey, head of international product at State Street.

"But the performance statistics, such as S&P's Spiva study, show no evidence that they are managing to do this. Over three years, 93% of active managers have underperformed the index in large-cap US equities."

Even when passive funds' fees are taken into account, the picture is hardly brighter for active firms. Ben Johnson, director of global ETF research at Morningstar, which publishes an annual study comparing the post-fee returns of cohorts of actively managed US mutual funds and their passive peers, stresses the importance of keeping costs low.

"Active asset managers are handicapped by their fees. They're in a 100-metre dash and the passive funds are starting at the 90-metre mark," says Johnson.

Over the 10 years to 2016, Morningstar calculated that only 14% of actively managed funds investing in US large-cap stocks did better than their passive counterparts, though active funds' success rate was modestly higher in small-cap stocks (29%), foreign equities (32%) and intermediate-term bonds (44%).

It may be in the fixed-income and credit markets that active asset managers have the best chance of demonstrating an edge over indexing. Philippe Lespinard, co-head of fixed income at Schroders, suggests this may involve the avoidance of index-related inefficiencies.

"In the US corporate bond market, index eligibility often means everyone is bidding for the same securities. If an issue isn't index-eligible because it's small or has some non-standard features, it often offers more value," says Lespinard.

"Month-end trades relating to the extension of indexes' duration are a major feature of the government bond markets. If you ignore them you run the risk of getting run over," he points out.

Though he admits it's difficult to prove that index flows are helping generate active performance, Lespinard suggests there's a link.

"The alpha content of our actively managed credit strategies has been going up over the past five years, even as assets have been growing. If there were a finite amount of alpha available across the market, you'd expect it to be falling," he says.

There's a lot of rhetoric about the possible distortions to markets caused by indexed investment. But so far, index-related pricing inefficiencies seem not to be helping active managers outperform. Nevertheless, as assets in index funds and ETFs grow inexorably, it seems all investors will be grappling more closely with the index effect. ■

Previously published on Risk.net

BUBBLE MACHINE?

As the march of index trackers continues, defenders of active asset management are fighting an increasingly vocal rearguard action. Critics of indexing allege that passive stock selection provides inadequate corporate governance, fails to allocate capital efficiently and acts as a 'free rider' on the backs of active managers.

Another long-standing criticism is that exchange-traded funds (ETFs) and index funds drive up correlations among stocks and bonds in the same index, reducing the opportunities for the investing public to spread risk through security selection.

Recent evidence of sharply falling pairwise correlations among stocks in the widely followed S&P 500 index – even as flows into tracker funds reach historical highs – appears to belie this claim.

Although there has been a rapid rise of interest in so-called smart beta index funds and ETFs – trackers of indexes embedding a particular investment or risk control strategy – the vast majority of indexed assets remain in standard, capitalisation-weighted indexes such as the MSCI World, S&P 500, Russell 1000 or FTSE All-Share.

This in itself presents a potential problem, according to Timothy O'Neill, global co-head of Goldman Sachs Asset Management. O'Neill recently called market cap-based indexing "a potential bubble machine".

He contends that market-cap-based indexes ensure new investment goes to the same stocks already attracting passive money.

Victor Haghani, chief executive of asset manager Elm Partners, which invests globally for clients using ETFs, takes issue with O'Neill's assertion.

"A lot of active managers are putting arguments out that are not very coherent: for example, that indexing is causing the market to go up," says Haghani. "But if I take my money out of an active fund and put it into an index fund, how have I changed anything?"

The assertion that the trend towards indexing is causing a bubble doesn't hold, argues Haghani, "unless you assume that the active managers being replaced are those owning the cheap stocks".

"In other words, you're assuming that those switching to passive are getting rid of all the smart active managers and keeping the not-very-smart ones. It's a pretty convoluted argument that doesn't make a lot of sense to me."

Lasse Pedersen, a principal at AQR Capital Management and a finance professor at Copenhagen Business School and New York University, defends active management in a recent paper, *Sharpening the arithmetic of active management*.

"The most obvious reason 'informed active managers' can outperform in aggregate is that they trade against 'non-informational investors' who are motivated by liquidity needs, institutional constraints, hedging or are influenced by behavioural biases," Pedersen writes.

Meanwhile, Paul Woolley, founder and senior fellow of the London School of Economics' Centre for the Study of Capital Market Dysfunctionality, associates the overuse of benchmarks with market instability.

"There are only two strategies in investing," Woolley says. "One is to buy on the basis of expected future cashflows, the other is momentum – trying to exploit fund flows and ignoring cashflows."

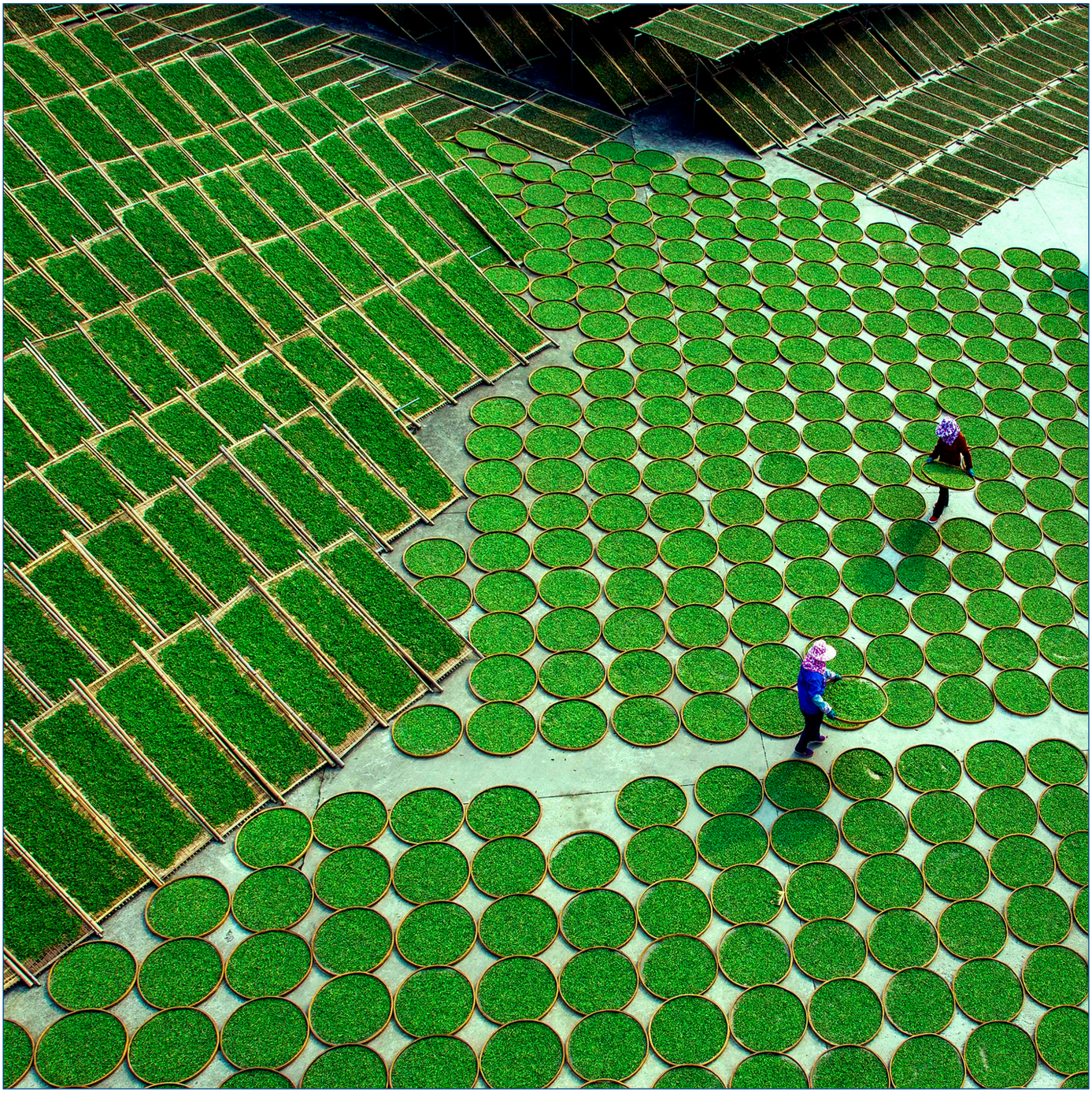
"The overuse of benchmarks inverts the relationship between risk and return. The fact that investors chase what their neighbours are doing is formalised in the delegation process. Instinctively, people know that benchmarking creates potential problems. It gets gamed and markets become upside down and prone to bubbles."

Woolley argues that asset owners should take responsibility for counteracting these trends.

"Asset owners' contracts should specify that they buy things that have gone down, not those that have gone up," he says.

BNP PARIBAS

‘Green’ China leads the global drive for a sustainable economy



China is making wholesale changes to promote a more sustainable future. BNP Paribas examines China's drive for sustainability, and how investors can make the most of participating in its ongoing green revolution

For institutional investors, accredited investors and expert investors only. This content represents sales and trading market commentary only and is not intended as research.

China's tremendous economic achievements over the past four decades have come at a severe environmental cost. Since 2007, the country has been the world's largest producer of CO_2 emissions, while smoggy skies and contaminated water have led to large-scale health problems, often resulting in premature death.

This problem is so severe that the World Bank estimates air and water pollution could cost China around 10% of its GDP.[1] It is therefore no wonder that investors are concerned the country's energy-intensive growth model could be doing more harm than good.

Investors are right to worry about the prospects of companies in polluting sectors associated with the traditional growth model – steel manufacturers and coal miners, for example. But investors should also be aware of the abundant opportunities in China's new economy, especially for companies that stand to benefit from the government's comprehensive measures aimed at tackling the threat of climate change.

Stricter regulations, massive investment in cleantech infrastructure and commitment to green finance are all on the national government's agenda. Beijing is backing these plans with spending pledges on a truly unprecedented scale.

China is forecast to invest a total of $2.2 trillion across six sustainability-focused sectors by 2020, according to consultancy ENEA.[2] That number is greater than the 2016 GDP of India – the seventh largest economy in the world.[3]

Renewable power, waste and water management, and measures to reduce air pollution will all receive sizeable investment. The huge amount of capital going into clean energy assets makes China the world leader in the space, accounting for 30% of global investment in renewable energy and 27% in energy efficiency.[4]

Beyond spending, China is introducing a range of measures to incentivise the corporate sector to conduct business in a more sustainable way, with tough penalties to ensure companies take environmental regulation seriously. This takes its most sophisticated form in an upcoming carbon-trading market, which will penalise heavy polluters while rewarding the most sustainable peers.

The financial services industry will also play an important role in helping China meets its sustainable goals, as banks and investors will channel more and more capital into sustainable projects. Green finance is a way of thinking about investment that considers social and environmental metrics alongside traditional financial metrics. It is already a developed area of finance in Europe and the US, and a growing number of investors in Asia are incorporating sustainability metrics into their portfolios.

Investors looking to participate in China's drive towards a sustainable economy can take advantage of a growing range of index products that grants exposure to the green theme. The S&P New China Sectors Index, for example, removes old economy companies, leaving a selection of Chinese companies in new sectors – such as technology, consumer and healthcare. In effect, this acknowledges the fact that China is very different to a decade ago, and stands in sharp contrast to the most widely followed Chinese benchmarks – such as the Hang Seng China Enterprises Index (HSCEI), which is still focused on industrial companies and state-owned banks. Although new, the S&P New China Sectors Index has already provided impressive performance, gaining, for example, 48.09% since the beginning of this year, outperforming the HSCEI by 22.2% over the same period.[5]

"Here lies one of the strengths of the S&P New China Sectors Index. Not only does it add environmental, social and governance considerations into stock selection," says Yoram Layani, managing director and head of institutional sales, Asia ex-Japan, at BNP Paribas, "but by focusing on new economy companies it also addresses the problem with popular China benchmarks, which focus too much on older industrial companies that have not been attractive for some time."

The FTSE China A50 Divest Invest Index uses more sophisticated screening techniques to increase exposure to green companies, which will create important differentiation between polluters and sustainability-focused companies ahead of the introduction of the carbon market later this year.

Similarly, the China Green Basket – a selection of 26 stocks that includes both A shares and Hong Kong-listed companies – offers diversified exposure to companies that focus on environmental protection and clean energy production. It can be invested as a single underlying instrument via a delta one product.

By approaching the sustainability theme from different angles, forward-thinking investors can take advantage of BNP Paribas' strengths in this area to participate in China's green revolution. ■

[1] *World Bank 2013,* The cost of pollution.
[2] *ENEA,* Seizing China's cleantech opportunity.
[3] *According to World Bank data.*
[4] *International Energy Agency,* World Energy Investment 2017.
[5] *Bloomberg, BNP Paribas – data correct as at October 9, 2017.*

For more information

Please visit *cib.bnpparibas.com* using the search term "green China"

Too smart for their own good?
Industry divided over smart beta capacity

Smart beta index compiler Research Affiliates believes trading costs will wipe out any returns related to these products, but critics say its assumptions are overblown. By Luke Smolinski

Invest in smaller or cheaper stocks, and you can outperform the market average. The theory is at least 35 years old and has spawned a $500 billion industry in smart beta investment products, aiming to profit from this and similar anomalies in the market. But worries are growing that smart beta products may be suffering from their own success.

Research Affiliates (Rafi), itself a smart beta index compiler, has suggested the popularity of well-known smart beta indexes – including its own – will reduce and in some cases wipe out their expected excess returns over their benchmarks.

Its chairman, Rob Arnott, is well known for warning that many of smart beta's returns come from short-term flows into the sector. But the firm is now warning of longer-term problems facing the industry.

Smart beta vendors and constructors, including BlackRock and MSCI, say the capacity of the strategy is "enormous", as smart beta still makes up such a small portion of the equity market.

The dispute is over how much capacity smart beta factors have – that is, at what level of assets under management (AUM) transaction costs exceed the premia that smart beta products are thought to generate above equity benchmarks.

For $10 billion allocated to each strategy, Research Affiliates estimates MSCI's US Momentum index has annual trading costs of 2%, which would wipe out its backtested excess returns of 1.85%, going back to 1968, for example.

Smart beta providers have hit back, criticising Rafi's figures for their trading cost assumptions, calling them an order of magnitude too high and pointing to evidence that capacity is "frankly enormous". BlackRock says its algorithms slash trading costs to much lower levels.

But Rafi cites academic papers that produce similar estimates to its own. What works on paper in backtests may not be able to be implemented with billions of dollars, it says. Not only are greater flows into smart beta pumping up prices in the short term, but excess returns expected in theory may vanish over the long term, the argument runs.

Rafi thinks size, and high-dividend and quality indexes have much lower estimated trading costs of around 0.5% with $10 billion in assets, but in some cases that may still be enough to wipe out future outperformance. The Standard & Poor's (S&P) quality index has historical excess returns of 0.8% and Russell 2000 small-cap stocks historical has excess returns of 0.4% since 1968 in backtests.

Meanwhile, value, multi-factor and some other volatility indexes have estimated trading costs near zero, Rafi says.

The numbers are based on the firm's calculations that every 10% of average daily volume of trading yields a 0.3% transaction cost, in the form of tracking error and implicit rebalancing costs while funds crowd into trades. These effects occur as annual, quarterly or monthly rebalancing causes stock pricing to move up or down temporarily.

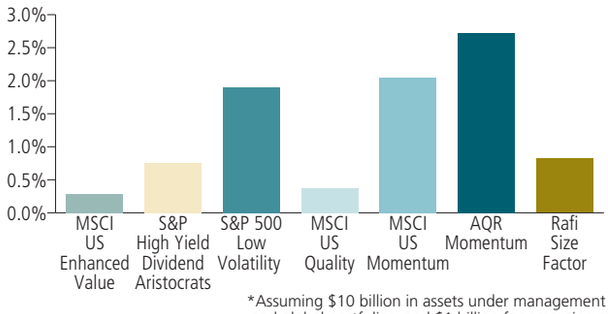
Smart beta providers say they do not recognise the scale of these figures, adding that the total US equity market dwarfs the amount invested in smart beta.

"If you take the S&P 500, around $20 trillion in market cap, and look at the different clienteles trading that, approximately 15% is US active mutual funds, exchange-traded funds (ETFs) is 6%, smart beta is well below 1% and some which have been popular recently like minimum volatility strategies are less than 0.2%," says Andrew Ang, New York-based head of factor investing strategies at BlackRock.

Ben Seager-Scott, London-based director of investment research at Tilney, a personal investment adviser, says, "To suggest this relatively small amount of money is causing market distortions – I don't think we're anywhere near that at the moment. I don't think volumes are anywhere near high enough to have a meaningful impact on markets."

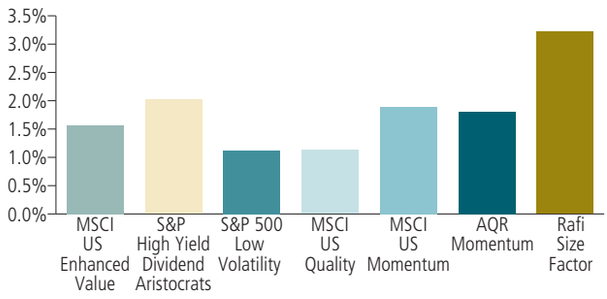
BlackRock has much higher estimates for smart beta capacities, suggesting that, with a one-day trading horizon, momentum has a $65 billion capacity, not $10 billion. This is based on BlackRock's own trading model, which allows it to reduce trading costs and frictions with larger orders. Over a five-day horizon, with all rebalancing conducted over that period, the capacity is more than $320 billion, the firm says.

1 Rafi's estimated trading costs for selected indexes*



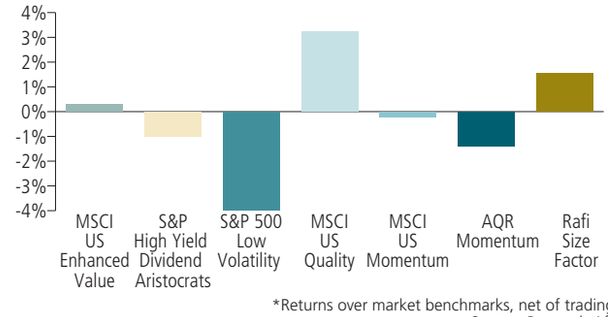
*Assuming $10 billion in assets under management for US and global portfolios, and $1 billion for emerging markets
Source: Research Affiliates

2 Historical excess returns of selected indexes*



*Annualised returns over market benchmarks since 1968
Source: Research Affiliates

3 Rafi's expected net excess returns of selected indexes*



*Returns over market benchmarks, net of trading costs
Source: Research Affiliates

"The bottom line is that capacity is enormous. Short term, smart beta will always be cyclical – some more than others – but anomalies being eroded away is unrealistic," says Ang.

Low volatility and size have much higher one-day trading capacities at $1.4 trillion and $5 trillion, BlackRock calculates. One reason is high demand on the other side of the trade. "As a group, active mutual funds tend to be long volatility. The explanation behind that is they need to beat benchmarks – and the way to do that is to take on greater market exposure or greater risk than the benchmark, so in both cases they need to go long volatility," says Ang.

Stuart Doole, managing director for research at MSCI in London, says Rafi has made overblown assumptions. "Those transaction costs seem to me extremely high. They are an order of magnitude out. Look at the ETFs that run on these smart beta strategies: they seem to be able to capture these smart beta factors very effectively," he says.

Dimitris Melas, MSCI's global head of equity research, also in London, says: "Smart beta strategies ultimately have limited capacity, unlike market cap-weighted strategies, but we are still at the early stages of adoption of these strategies.

"There are better people that have experience in implementing large-scale portfolios, trading books, and I would argue Rafi is perhaps not the best or most experienced institution in this. There are broker-dealers and large passive managers who can provide more realistic estimates of trading costs."

Invesco PowerShares, AQR and S&P Dow Jones Indices declined to comment for this article – though Rafi has identified their flagship indexes as likely also to underperform equities.

Rafi says its capacity estimates are based on a model produced by Michael Aked and Max Moroz, both firm employees, in *The market impact of passive trading* (2015). Vitali Kalesnik, California-based head of equity research for Rafi, says: "Usually the trading cost estimates provided by any single implementer are relative to an index. What these estimates usually miss is the absolute joint impact of multiple implementer trading on the index itself; this is what the Aked and Moroz model is estimating."

"If you are an investor, there is very little consolation if your implementer has no slippage relative to an index if the index level itself reflects a huge price impact of multiple implementers fighting for the liquidity," he adds.

Noah Beck, senior researcher at Rafi, says: "Our trading cost estimates aim to adjust our backtested returns for the trading costs they likely would have incurred," adding that its capacity estimates are in line with the academic literature. Rafi also points to a 2015 paper from Robert Novy-Marx and Mihail Velikov, *A taxonomy of anomalies and their trading costs*, as an example, which found passive momentum's profitability disappears when $5 billion of new capital on the long and short sides pursues the strategy. Earlier research from Robert Korajczyk and Ronnie Sadka in *Are momentum profits robust to trading costs?* in 2002 reached a similar conclusion.

Nevertheless, the firm believes active momentum strategies have a much higher capacity. "Active implementation of a momentum strategy has a significant advantage over passive implementation, because you don't have to disclose your trade, and your trades are not mechanistic. You can choose what to trade, what not to trade and when to trade it. In this way you can reduce trading costs significantly," says Kalesnik.

MSCI's Melas thinks Rafi's model is too simplistic, saying many factors change smart beta's capacity. "It depends on how rapidly you want to trade, how big the underlying portfolio is, whether you're targeting US equities, international equities, big cap or small cap. There are a lot of parameters here to specify and define before you can start to talk about capacity. It is therefore very difficult to give an absolute number," he says.

The academic literature provides support for this view. Marco Vangelisti in *The capacity of an equity strategy*, a 2006 paper, finds that using a single number – AUM – to predict performance depends on a series of other variables and assumptions, and advises the use of a range of numbers to define capacity instead.

In *The surprisingly small effect of asset growth on expected alpha*, a 2005 paper, Ronald Kahn and J Scott Shaffer find a number of ways to mitigate capacity effects by managing turnover in a sophisticated way.

Rafi does not account for the size of the market taking the opposite side of the trade, the flexibility or skill of the trader, Melas argues. Smart beta firms are aware of capacity, seek to diversify their portfolios and trade less frequently

than monthly to retain profitability of the chosen premia. Nevertheless, Tilney's Seager-Scott sees the theoretical basis for the idea that some market anomalies may be arbitraged away if they get more popular. "I distinguish between a genuine risk premium where you take a higher risk and get a potentially higher reward, and something that is psychological, an anomaly that could be arbitraged away," he says.

"This is a fairly live debate, and no-one has categorically said these are risk premia and these are anomalies. That said, value and size are risk premia, the academic literature suggests: you're taking more risk if they're small companies or it is cyclical risk. Value has been shown to outperform a market cap index, but it comes with higher volatility," he adds.

Momentum and low volatility are more likely anomalies, based on human behaviour, he thinks. "What causes momentum? One argument is herd mentality. Investors see an asset has done relatively well recently and so pile on. Similarly with low beta, it's difficult to build an economic rationale for a risk premium. Either it's a preference for less risky stocks or the more volatile stocks have a less attractive risk-return payoff because more investors take punts on riskier stocks."

"As more money follows smart beta, if it is an anomaly being exploited then returns will reduce," he says.

Meanwhile, Rafi makes a second contention: that over the short term, flows and performance chasing drive smart beta returns – such that investors may be in for a more volatile ride than backtests suggest.

Smart beta investors have started to compare factors and invest in those with the highest returns, Kalesnik believes. "At the start of last year, these would have been funds like low volatility, quality and momentum-related funds, and these have been attracting assets," he says. These were also the funds to suffer a downturn in 2016.

Rafi finds a strong correlation for each factor between the price tag and poor subsequent performance. Overvalued factors are likelier to perform less well.

"If the momentum strategy becomes overcrowded, then its profitability should decline. Whether it is today or not – we don't have very quantitative measures to answer that question," says Kalesnik.

The firm's data suggests five low-volatility indexes have very high price/book ratios compared with the strategy's past valuations over nearly 50 years. Multi-factor indexes are also historically overpriced on similar metrics.

"My concerns are around minimum volatility and momentum, just because some people don't fully understand some of the ramifications. Momentum investors just look at the long-term excess return and don't appreciate how scary these things can be if markets undulate," says Seager-Scott. He thinks a lot of investors are piling into low-volatility indexes. "Low volatility is not guaranteeing low volatility in the future. What you are reliant on is the mathematics: the covariance matrices and the relationships between those stocks, and markets do change. If covariance breaks down, you may not get the ride you expect – and those are the more complex areas as well," he says.

But Eric Shirbini, London-based product specialist at ERI Scientific Beta, a smart beta provider, cautions against using historical valuations to predict when a price correction will occur. "There is no academic evidence to suggest price/earnings can be used to identify cheap asset groups," he says.

"I don't believe the correction will happen because these things are expensive. I think they will experience correction when the risk to these factors materialises. If we have an economic slowdown, I expect the value factor to do poorly. When interest rates rise, the volatility factor will do poorly. I find it hard to believe the market is so inefficient that low volatility will go down simply because there are too many investors in volatility," he adds.

"It is really difficult to forecast the stock market or to time when the equity risk premium dispenses itself. So what makes us think we can time factors, to say when these risk factors are too expensive or not?" Shirbini concludes. ■

Previously published on Risk.net

MIXED RETURNS

A look at 29 popular smart beta indexes compiled by Research Affiliates suggests 20 indexes generate annualised returns of 0% to 2% above the market benchmark since 1968, net of trading costs, with four indexes underperforming and five with more than 2% outperformance.

Such variable returns have produced two groups of critics: those who think smart beta is the latest investment fad, such that many premia are in the middle of a bubble, and those who think predicted premia have been exaggerated over the long term. There is $500 billion in exchange-traded funds (ETFs) known as smart beta, Bloomberg estimates. Defenders say assets under management are just a drop in the ocean, compared with more than $27 trillion (traded) in the US stock market.

By way of comparison, US internet stocks in 2000 exceeded $3 trillion in market capitalisation, compared with $15 trillion in US equity markets. The multiplicity of factors, some of which counterbalance others – as momentum funds typically push up pricing of stocks that value funds are not invested in – may guard against anything like a tech bubble appearing.

BlackRock forecasts smart beta ETFs to grow to $1 trillion by 2020 and $2.4 trillion by 2025. This figure does not include the many mutual funds and pension funds that track smart beta benchmarks, or active and quantitative fund managers that use such rules of thumb to generate returns.

"For low volatility, a lot of these valuations have stretched. But if you had to say smart beta is a bubble, that would be an exaggeration because there are so many factors and so many ways of accessing those factors. Maybe pockets of certain stocks have been pushed due to ETFs that were relatively simple in their implementation," says Julien Barral, senior associate at bfinance, an investment adviser.

Critics in the second camp think the evidence presented to smart beta investors is skewed towards outperformance. In 1977, when value investing was first identified in the academic literature, value stocks were priced higher relative to growth stocks than they have ever been since. When the size effect was first published in 1981, small stocks were three years away from a drastic 15 years of underperformance relative to larger stocks.

This may be enough to confirm for some that smart beta flows chiefly propel their returns. Michael Edesess, Hong Kong-based research associate at Edhec-Risk Institute, thinks smart beta providers "don't have enough statistical evidence to prove something works over the long term, like a 30-year period, because the history consists of only three overlapping 30-year periods".

Improving sustainability in Asian investments

Firms increasingly concerned about the social impact of their investments are taking environmental, social and governance (ESG) factors into consideration. In a forum sponsored by Premia Partners and Societe Generale, market practitioners examine the key topics, including whether this increasing consideration of ESG factors suggests the industry had previously been operating in an unsustainable way and what investors should consider in their approach to ESG investing in Asian markets

David Lai
Partner and Co-CIO, Premia Partners
www.premia-partners.com

What are responsible investments, and how has demand for them changed in recent years?

David Lai, Premia Partners: Traditional responsible investments represented an investment style that used positive and negative screens to adjust a portfolio based on social, moral, ethical and religious criteria, and it could exclude companies deriving a certain percentage of their revenue from areas such as gambling, weaponry, alcohol and tobacco. As the concept of responsible investments evolves, it is incorporating environmental, social and governance (ESG) factors into investment decisions. It involves a proactive and comprehensive review of a company to provide a more robust image of its operations and social – as well as economic – impact. Investors basically want to look at both social and financial returns on investments. Interestingly, a study conducted by Nielsen shows that millennials and baby boomers are willing to pay extra for sustainable offerings, and indicates a growing global and cross-generational interest in companies that promote sustainability.[1]

Isabelle Millat, Societe Generale: Responsible investments are those that incorporate ESG criteria in the selection process.

There are many ways to use ESG criteria in investment decision-making. Responsible investment is a term that usually refers to investment portfolios that take into account at least one 'E', 'S' or 'G' angle or exclude certain activities viewed by some investors as unethical – such as weapons, tobacco or alcohol. At Societe Generale, we prefer the term 'sustainable investment' to encompass all approaches to ESG, including the positive selection of ESG themes.

Global demand has increased sharply, growing from $18 billion of assets under management (AUM) in 2014 to $23 billion in 2016, according to the Global Sustainable Investment Alliance's *Global sustainable investment review 2016*. A key driver for this growth is that research papers and empirical evidence have demonstrated that ESG criteria are material to financial performance – so that responsible investors can do both good and well.

Between 2014 and 2016, the retail versus institutional market share doubled from 13% to 26%, according to the *Global sustainable investment review 2016*. This has been made possible by the development of exchange-traded funds (ETFs) and structured products that combine an ESG theme with the financial characteristics that retail investors look for – capital protection, in particular. Societe Generale has worked with its asset management subsidiary, Lyxor, to launch ETFs such as the World Water Fund, and has distributed the Finvex ESG indexes since 2013, notably in capital-protected notes sold to institutional clients and distribution networks.

What are the key ESG factors investors should be looking at in Asia?

David Lai: In principle, ESG factors should not be significantly different in Asia than in the rest of the world – environmental factors are climate change, greenhouse gas emissions, resource depletion, waste pollution and deforestation. Having said that, some ESG issues may carry more short-term weight to reflect variations across jurisdictions, cultures and developmental stages. The most prominent environmental concern is the deterioration of air quality in certain capitals – such as Beijing and New Delhi – and the resulting macro-government policy impact on equity markets. It would not be unreasonable to monitor and overweight companies' contribution to global warming in Asia ESG screening.

Isabelle Millat: As with other areas, the materiality of environmental and social indicators for financial performance varies depending on the industry, while material corporate governance indicators are more common across industries. Investors should also look at ESG factors that match the environmental or social impacts they want to achieve.

Does this focus on sustainable investment mean the industry had previously been operating in an unsustainable way?

Isabelle Millat: It means investors are now increasingly considering sustainability in their investment decisions. This is driven by proof of the financial materiality of ESG criteria, and is made possible by increased reporting from issuers – providing robust and reliable data, which is essential to the sustainable investment selection process.

David Lai: It would be more appropriate to say that awareness of sustainable investment is increasing. Even in the eighteenth century,

[1] *The Nielsen Company 2015,* The sustainability imperative, *http://bit.ly/2y15Kir*

The use of money, a sermon by John Wesley, one of the founders of Methodism, outlined the basic principle of social investing – not harming your neighbour through your business practices and avoiding industries such as tanning and chemical production, which can harm the health of workers. In the late 1970s, activism increasingly focused on nuclear power and automobile emissions control. The industry is adjusting gradually and turning sustainable investment into a structured and systematic approach that investors can follow more easily.

A survey by Longitude Research and State Street Global Advisors reveals that Asia-Pacific investors are ahead of their global peers incorporating active ownership as part of a comprehensive ESG strategy. Around 80% of respondents from the region have some level of ESG engagement with the companies in which they invest, compared with 70% in the US and 58% in Europe. Despite increased adoption of ESG strategies by Asia-Pacific institutional investors, the findings show that the share of their portfolios with ESG exposure remains low. Only 15% of respondents in Asia-Pacific have more than half of their assets exposed to ESG factors, compared with 27% in the US and 17% in Europe. Going forward, we expect awareness and exposure to ESG factors to rise in Asia-Pacific. ESG exposure can transform investors' long-term financial results, risk mitigation and exposure to volatility.

SOCIETE GENERALE

Isabelle Millat, Head of Sustainable Investment Solutions for Global Markets Activities, Societe Generale Corporate & Investment Banking
www.sgcib.com

What questions should investors ask about their approach to ESG investing in Asia?

Isabelle Millat: They should first determine what their priorities are – which tracking error they are willing to accept to improve the ESG risk profile of their portfolios or whether they have a strong value-based or ethical driver to adopt sustainable investment, for example. This will help them choose between diversified best-in-class strategies, where they maintain sector diversification and favour the best ESG issuers in each industry, or exclusion approaches where they disinvest in companies that they – or their end-users – consider controversial.

Do we currently have the data we need to properly incorporate ESG factors into the investing process in Asia?

Isabelle Millat: There has been significant improvement in recent years but, as elsewhere in the world, it's always a work in progress. Global initiatives aiming to broaden and harmonise reporting among issuers will strongly support future improvements.

David Lai: Challenges inhibiting greater ESG adoption in Asia-Pacific include cost, limited demand from stakeholders, and lack of internal knowledge and capability. Certainly, data availability is a major obstacle in implementing an ESG strategy in Asia. Data in the public domain is usually insufficient, and data based on self-reporting or questionnaires may be inaccurate or incomplete. Regulators and industry consultants are encouraging companies to increase ESG disclosures. For example, the Taiwan Stock Exchange mandated sustainability reports for large companies and certain sectors with the goal of expanding to around 90% of members by market cap before the end of 2017. The Hong Kong Stock Exchange strengthened its standard ESG guidelines in 2016.

What future ESG trends should investors be thinking about?

Isabelle Millat: They should watch for new trends that are going to reshape the market, and how issuers and investors communicate on impact. In that sense, the UN's 17 sustainable development goals are becoming common vocabulary in the sustainable investment space. Societe Generale has created a range of positive impact finance notes, whereby the bank commits to holding an amount in positive impact finance assets equivalent to the nominal amount of the notes. Positive impact finance aims to deliver a positive contribution to one or more of the three pillars of sustainable development – economic, environmental and social – once any potential negative impacts have been identified and mitigated. The UN's sustainable development goals are in line with the three pillars of sustainable development; thus positive impact finance is a way of supporting these goals. The positive impact finance notes have been sold to retail and private wealth networks, as well as to institutional clients in Europe.

Investors should also think about asset class diversification and the growth of ESG in the fixed-income space.

In approaching sustainable investment, investors in Asia should pay particular attention to the trend set by Japan's Government Pension Investment Fund, which places a strong focus on engagement initiatives in which investors use their shareholder power to push companies towards the best ESG practices.

David Lai: An interesting trend is ESG development in the ETF space. Currently there are around 50 ETFs incorporating ESG factors globally with AUM of $4.5 billion, which is about 0.1% of the entire ETF market. Taking the largest (AUM of more than $500 million) as examples, they performed mostly in line with the market.

ETFs, given their listed status, tradability and transparency, could help spread the ESG concept beyond institutional investors to the general public. For example, CalSTRS, the second-largest pension fund in the US, is looking to invest in companies that promote gender diversity, as research shows that those with at least three female board members outperformed others in overall return on equity by more than 36%. Despite these findings, US women account for an average of just 16% of executive teams. Instead of implementing this particular strategy through a segregated account, CalSTRS provided the seed capital and packaged it into an ETF to attract more investors to engage with ESG issues.

In Asia, the strongest private sector advocates for ESG are often family offices with long-term focus and impact-investing interests. They are often early advocates and, instead of purely implementing for their own investment mandates, many take an interest in initiatives that raise public awareness with the objective of socialising and popularising ESG development. ETFs are a perfect public tool for such investors, but are limited in scope within Asian markets. To address this, both the demand and supply sides of the ETF industry must move in tandem to fast track the process. Sales leaders and product strategists with strong technical backgrounds will have to work together to build this space in the coming years. ■

The fixed-income paradox

The extension of smart beta ideas to fixed income is posing questions about how well risk factors are really understood. By Faye Kilburn

Need to know

- Asset managers have sought to apply factor-based strategies to fixed income in recent years after the success of smart beta in equities.
- Though premia seen as accompanying certain factors in stocks – such as price momentum, for example – appear to exist also in fixed income, academics have struggled to explain why.
- In the absence of any consensus theory, asset managers have taken *ad hoc* approaches to developing products.
- Key challenges are managing the additional risks in fixed-income portfolios such as duration, and identifying suitable ways to identify securities with exposure to a given factor.
- "It is good news and bad news," says one finance professor. "The same factors work. But it proves we don't really understand the factors at all."

Encouraged by the popularity of smart beta investing in equities – and struggling with low bond yields – fund managers have started asking how they can extend smart beta ideas to fixed income.

It has been slow going, so far; not least because the search for answers has raised new questions, including about the theoretical ground on which factor-based investing stands.

Strategies that return a premium in equities, such as buying stocks with positive price momentum or low price-to-book ratios, seem to work in fixed income too. But fund managers are finding the explanations given for their success in stocks fail to make sense for bonds.

"It is good news and bad news," says Riccardo Rebonato, professor of finance at Edhec Business School and a member of the Edhec-Risk Institute in London. "The same factors work. But it proves we don't really understand the factors at all."

In response, academics have shifted their focus from analysing factors in specific asset classes towards seeking a unified theory that applies across all of them. That has left fund managers – in the absence of a consensus of theory – having to experiment with *ad hoc* approaches of their own.

Smart beta strategies seek to benefit from the relative outperformance of stocks with specific characteristics, as observed in academic studies going back 30 years. For example, value strategies capture the excess return over time to stocks that have low prices relative to book value.

A typical factor-based strategy in equities will overweight the stocks that best represent the factor in question and underweight the least representative. In bonds, though, it is not so easy.

At the time of writing, fewer than 30 of the more than 800 smart beta exchange-traded funds listed on ETF.com's industry database cover fixed income. Just a handful have launched each year since 2007.

There are clear ways to differentiate fixed-income securities, such as maturity dates and volatility. But most fund managers looking at the application of smart beta to fixed income concede it is harder to slice portfolios of bonds compared with stocks because a single issuer might issue multiple bonds.

"If you're trying to run security-level analysis on fixed-income portfolios over time, even looking at just small sections of the universe, the composition of the portfolio changes by borrower, by maturity – and you have to control for all that. The upshot is there aren't very many people who have the modelling ability and knowledge to do all this effectively," says Kate Hollis, who leads the smart beta credit team at Willis Towers Watson in London, a global advisory and broking firm.

At the same time, factor-based differences in performance are less pronounced in bonds compared with equities, particularly at investment-grade level.

In theory, there could be more opportunities to harvest smart beta down the quality ladder towards sub-investment grade and high yield because correlations are lower, Hollis says. But then it becomes harder to source good-quality, constituent-level data on fixed-income indexes.

The real challenge facing asset managers, though, is how best to measure a bond's exposure to the factor in question.

Equity smart beta funds use broadly recognised proxies to do this. For value, for instance, the typical proxy in equities is the ratio of price-to-book value. That makes intuitive sense for stocks. But when you move to fixed income, there is no equivalent.

At present, there are as many approaches to solving such problems as firms coming up with them. Asset manager Russell Investments, for example, uses spread value as a proxy to root out the cheapest bonds, looking at option-adjusted spreads relative to a bond's rating category.

"We think that will outperform the whole benchmark over time. We won't necessarily be buying down in credit. We think we're buying mispriced bonds," says Kelly Mainelli, director of fixed-income investments at Russell Investments in Seattle.

The firm rebalances any mismatch to the benchmark in the portfolio's other exposures using derivatives.

"Let's say we're yielding more than the benchmark with credit bonds we bought that are cheaply valued, but we're short or long duration, so now we're off the benchmark in other factors: we use either futures or credit default swaps, depending where we're short, to 'true' that smart beta back to how the benchmark is," Mainelli says.

State Street Global Advisors (SSGA), which has close to $3.8 billion of assets under management in smart beta fixed-income strategies, has come up with its own proxy for momentum after finding the relative returns approach often used in equities did not work for bonds.

"A lot of bonds that appear to have price momentum often are not very liquid and are not trading much. When they do trade, it leads to apparent momentum," says Riti Samanta, global head of systematic fixed income and senior portfolio manager, in fixed income, cash and currency at SSGA.

To get around this, the firm has incorporated proxies for liquidity such as trading frequency and trading volumes into its smart beta calculations.

Liquid alternative ETF provider IndexIQ has also found evidence of the momentum factor in fixed income, but Sal Bruno, chief investment officer, says the firm was unable to research the factor properly because of the discontinuity of pricing on individual bonds.

At the same time, liquidity in individual bonds would be too low to support the necessary turnover in any strategy, he believes: "It's not just an academic exercise; you actually have to harvest the benefits of momentum investing."

IndexIQ dropped its research in single bonds last year and turned to bond ETFs, where there is far greater secondary market liquidity. The fund has since launched two fixed-income momentum ETFs with almost $300 million invested to date.

"The target excess total return over the aggregate bond universe is 75–100 basis points, which isn't a huge amount in equities," Bruno says. "But in the fixed-income world, if you can do that with lower tracking error and similar volatility to the broad aggregate universe, it could be very interesting."

These three examples illustrate just some of the hoops asset managers are being forced to jump through as they extend smart beta to the realm of fixed income.

But, while asset managers seek ways to translate what works for stocks to bonds, academics are retracing their steps and looking for a single theory to make sense of observations across asset classes.

Broadly, two explanations are given to explain premia associated with specific equity factors: either investors are being compensated for extra risk – low-value stocks will sell off more sharply in a crisis, say – or markets are irrationally underpricing stocks with certain factor exposures in some way.

The problem is, when the same factors are observed in other asset classes, these explanations are not transferable.

Ill-equipped theories

In a 2013 paper, *Value and momentum everywhere*, AQR founder Cliff Asness and others sought to extend the theory of value and momentum to other asset classes. They found value and momentum returned a premium across eight markets and asset classes. But the paper concluded this was difficult to explain using existing theories that relied on fundamental indicators such as company investment risk or company growth potential to explain the value and momentum premia. "These theories seem ill equipped to explain the same and correlated effects we find in currencies, government bonds and commodities," the paper states.

Edhec's Rebonato says: "The equity explanations that were [put forward] in the early studies of non-capital asset pricing model factors become unconvincing when applied to completely different asset classes for which the same factors have been found to work."

"It's not just an academic exercise; you actually have to harvest the benefits of momentum investing"

Sal Bruno, IndexIQ

Purists argue that without a sound academic grounding and a principled approach to factor definition there is a danger the extension of smart beta to fixed income descends into a fishing expedition for factors, with firms chasing the latest fad rather than building a robust understanding of how factors behave.

Since the publication of Asness's paper, there have been further papers looking at factors in fixed income and other asset classes, but they have been written by practitioners, and tended to focus on certain bond types and factors rather than seek an overarching theory of factors.

As a result, there has been no convincing academic breakthrough.

The reason, according to Rebonato, is that academics lack access to the costly fixed-income market data they need, while banks and asset managers that have the information lack the inclination or time to carry out such research.

To remedy this, academics, banks and asset managers should work together to carry out a "dispassionate analysis of what's behind the data", he says.

Until then, applying risk premia investing in fixed income seems likely to remain a fragmented exercise. ■

Previously published on Risk.net

BNP PARIBAS

Making the most of risk premia strategies

With risk premia opening up potential for a multitude of complex cross-asset investment strategies, they have become an area of interest in the investment world. However, questions remain about how to get the best out of risk premia. Yoram Layani, managing director and head of institutional sales, Asia ex-Japan, at BNP Paribas discusses the most effective ways investors can use specific risk premia strategies

For institutional, expert and accredited investors only.

Why does risk premia investing remain such a hot topic?

Yoram Layani: The combination of prolonged underperformance and hefty fee structures of hedge funds – 1/10 or 2/20, depending on the manager – has been the driving force behind the growth in risk premia, which emulate hedge fund-style returns, while gaining exposure to the same underlying risk factors.

Risk premia are to hedge funds and alternatives what exchange-traded funds have been to index funds, or what smart beta has been to traditional stock-picking mutual funds.

Yoram Layani

Financial innovation and technological improvements have made it possible for global investors to gain exposure to these systematic risks in a more transparent, liquid and cost-effective manner. There is a growing realisation among institutional and professional investors that a large part of the long-term return provided by hedge funds comes from taking exposure to certain systematic risks – such as equity momentum and foreign-exchange carry. In contrast, risk premia use rules-based investment strategies, designed to isolate exposure to specific systematic risks. As investors know the exact rules behind the strategy, they can make more informed decisions or question unreasonable fees.

Risk premia started as a handful of simple stock-selection strategies, and a decade later offer thousands of diverse and increasingly sophisticated cross-asset investment strategies, which can be accessed through a variety of products. As research and live track records have accumulated, investor interest worldwide has increased.

Is it possible to develop rules-based risk premia funds?

Yoram Layani: The asset management industry is certainly trying. We have seen a lot of activity, with certain institutions hiring entire teams to develop and run their own internal models, and others buying existing specialist quant boutiques. Over the past 18 months, quant funds have emerged as the winners in terms of fund inflows versus other managers.

BNP Paribas Asset Management has also rolled out its highest conviction strategies in a fund format – which is compliant with the Ucits directive – under the THEAM Quant umbrella. An example of this is BNP Paribas' award-winning THEAM Quant multi-asset diversified fund, a cross-asset momentum strategy with almost $5 billion in assets under management, which recently won best performing fund in the quant macro category over a two-, three- and five-year period in *The Hedge Fund Journal*'s Ucits Hedge Awards for 2017.

Success in the risk premia business requires cutting-edge quantitative capabilities and extensive investment in infrastructure and technology. With global execution capabilities, and a liquidity provider running a global derivatives book, BNP Paribas can efficiently price and trade these strategies in a transparent and liquid format. The breadth of our capabilities enables us to service fund managers in this space by handling the execution strategies that run their internal risk premia models, or providing off-the-shelf and customised strategies to managers with limited resources.

Where do risk premia strategies fit into a portfolio asset allocation, and how do you allocate between strategies?

Yoram Layani: Certain investors have simply been replacing some of their alternative or hedge fund allocation, while others required our help to build a portfolio of single strategies that fit predefined constraint versus their broader portfolio. For instance, we have seen investors who are keen to achieve an absolute return portfolio with close to zero correlation to main market drivers, while others specifically aim for a negative correlation with equity or credit markets to complement the rest of their traditional allocation. Ultimately, risk premia exposure serves as a powerful diversifier that sits between market beta and pure discretionary alpha, which cannot otherwise be captured by systematic trading strategies.

Allocating between risk premia strategies is a challenge and unfortunately no solution has so far prevailed. The most common approach is to diversify

across risk premia and asset classes. The difficulty lies in risk premia exhibiting low correlations with traditional asset classes as well as between themselves. These correlations are unstable over time and are hard to estimate. Consequently we find that a number of classic models – mean variance, equal risk contribution, efficient frontier, and so on – that require correlation as an input would not be optimal.

These strategies commonly show low volatilities, but are also susceptible to large drawdowns. Any good risk premia portfolio allocation needs to factor in this fat-tail distribution, as well as standard risk metrics such as volatility. We have developed maximum drawdown-driven solutions that address this characteristic. Asset managers operating in this space add value through their discretionary element in due diligence, analysis of strategies and dynamic allocation of premia. The jury is still out, however, on whether this discretionary involvement adds any significant value to performance compared to purely systematic approaches.

Is risk premia implementation in fixed income the next phase?

Yoram Layani: Risk premia are very much a fixed-income topic, and have been since the outset. Once a risk factor has been identified for inclusion in a portfolio, asset classes are almost irrelevant. For instance, harvesting carry can be done in equities through dividends, in commodities through the futures carry premia, in rates through the interest rates curve premium, in forex though forward rates, and so on. Carry across currencies is possibly one of the oldest and most widely traded premia.

Risk premia are definitely a cross-asset topic, and exposure to each factor should be diversified across various sources.

From inception, risk premia have been widely acknowledged across asset classes, but the development of well-designed implementations has been relatively slow for fixed income. However, this has changed over the past few years, as increasingly sophisticated strategies have provided access to a wide range of premia observed in fixed-income assets. This has been – and remains – a major focus for BNP Paribas.

How can investors determine the risk premia strategy that best meets their objectives?

Yoram Layani: Risk premia indexes are built based on well-known strategies and persistent sources of return – typically, they are not temporary arbitrages. They reward investors for taking risks that are systematically accessible, beta-neutral and persistent. It is important that investors realise this and avoid frequent activation/deactivation. It is expected that market signals are built into the investment models.

Investors should understand that these strategies are designed to generate returns from exposure to specific systematic risks over the long term. The returns from individual strategies generally vary over time. Instead of trying to time the returns, investors should maintain a stable exposure to a well-diversified portfolio of risk premia strategies. When selecting strategies, investors should consider multiple factors – including simplicity, transparency, basis in research and academia, live track record, explicit and implicit costs, correlations with other strategies in their portfolio and independence of the calculation agent.

Do transaction costs have meaningful implications for strategy design and implementation?

Yoram Layani: Absolutely. The primary objective of risk premia investing is to offer a cost-efficient, transparent and liquid alternative to hedge funds. A premium may seem attractive in theory but if the cost of accessing it is too high, then it may not be worth pursuing. BNP Paribas focuses on premia that offer significant long-term returns, after factoring in the costs associated with accessing them. It is therefore vital that all costs are explicit, justified and transparent.

The portfolio construction process is important to the return generation of any given strategy. With any investment model, going from theory to practice comes with some performance slippage. To minimise this, investors should look for a robust implementation – timing risk, public and auditable pricing references, and execution commitments, for example. They should be aware of overfitting or backtest optimisation by stress-testing parameters and assumptions, in particular transaction costs.

Recognising the importance of providing such guarantees to investors, BNP Paribas undertook an extensive independent audit exercise that earned it a service organisation controls 1 (SOC 1) certification – an international standard certification that testifies to the robustness and quality of the full value chain behind our quantitative investment strategy platform – the validation process, stress testing, Chinese walls, infrastructure quality and the independence of publication, trading and research functions. This is all as important as the investment research itself. ■

Why investors need multiple betas

Segmented upside and downside betas can be used for better risk management, writes Damian Handzy, global head of risk at StatPro – a London-based cloud provider of performance and risk analytics for the investment management industry

Beta analysis has become a staple of the investment industry because it provides a simple way of encapsulating expectations about both relative return and relative risk.

But virtually all measures of beta assume that the fund and its benchmark have the same relationship when making money as when losing money. Possibly even more egregious is the built-in assumption that the relationship is linear across all returns.

Betas should be measured for different zones of returns to capture differences not only in up markets and down markets but also in extreme markets.

Measuring upside/downside statistics is well established in financial services: downside volatility has been a standard measure for decades, and some firms extend the idea to upside and downside correlation.

But few firms consider upside/downside beta, perhaps because they limit themselves to a fundamental factor framework in which market side plays no role. However, in a statistical or regression approach, computing such betas is rather straightforward, especially when dealing with single factor regressions.

In the case of only one index or benchmark, we could divide the dataset in two parts: one subset covering only those days on which the index suffered a loss for which we compute β-, and another subset covering only those days on which the index returned a gain, for which we might compute β+. This would allow for a comparison of how differently, if at all, the fund is sensitive to the index in up markets and in down markets.

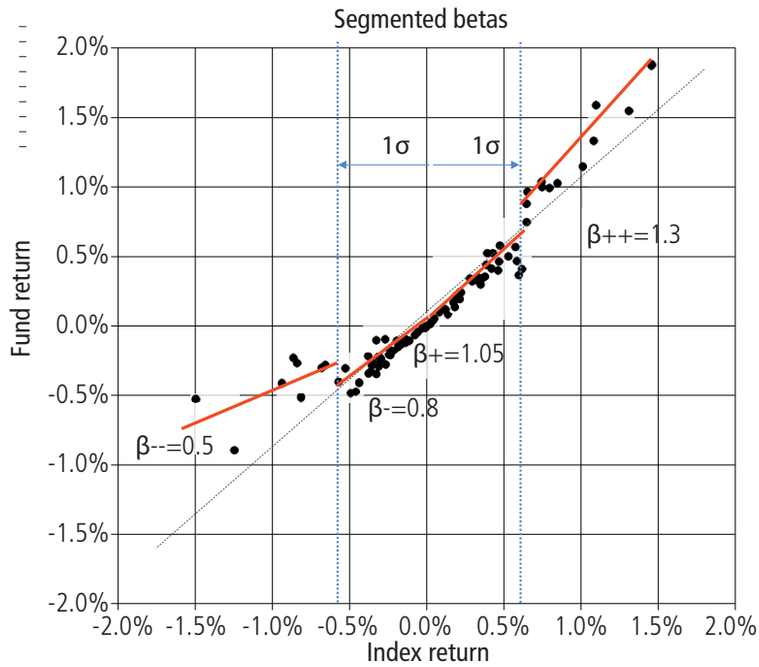
Just as it is desirable to have a relatively large beta to upward markets, it's also desirable to have a small beta to downward markets. Funds that show larger values of β- than β+, on the other hand, would lose more in downward markets than they make in upward markets.

Taking this concept one step further, we propose computing not two betas but four: β--, β-, β+ and β++, each of which covers a specific zone of index return.

For normal markets, defined as those within one standard deviation of the index's average return, we calculate β-, and β+ as described above. But we further segment the index's returns into extreme markets – those outside the one standard deviation band. For days when the index is up more than one standard deviation, we compute β++ and for those days when the index suffers a loss greater than one standard deviation, we compute β--.

Figure 1 shows an example using recent returns of the Standard & Poor's (S&P) 500 with returns of a hypothetical fund, demonstrating the zones and values of the four betas. For comparison with our technique, we show the all-inclusive beta of 0.89 in the light grey line going through all the data. Using our segmented beta approach, the 'normal betas' have values β- = 0.8 and β+ = 1.05, showing

1 Example of four betas for different zones of the benchmark's returns



The grey line shows the beta if only one regression were performed on the entire data set, with a value of 0.89. The red lines show the regressions for the four betas described in the text. For simplicity, this example was constructed so that all data sub-sets have offsets (alpha) of zero

2. Stress-test accuracy improvement when using multiple betas

Shift in S&P 500	Fund shift (1 beta)	Fund shift (2 betas)	Fund shift (4 betas)
-2%	-1.78	-1.6	-1.0
-0.5%	-0.45	-0.4	-0.4
+0.5%	+0.45	+0.53	+0.53
+2%	+1.8	+2.1	+2.6

that the fund is slightly less sensitive to benchmark movements on the downside than on the upside. To compute those values, we considered only the days on which the fund was up/down and having returns within one standard deviation.

We further divided the data into extreme zones, defined as returns larger than one standard deviation beyond the mean. While each of those zones has only 11 data points, they visibly demonstrate a different relationship with the fund than the data within the one standard deviation zones. The positive extreme beta, β++, has a value of 1.3 while the negative extreme beta, β--, has a value of only 0.5. As shown through multiple beta analysis, this hypothetical fund is more sensitive to index/benchmark movements on the upside than the downside and exhibits non-linear behaviour.

While segmenting the data set by standard deviation naturally limits the number of data points in the extreme subsets to only 11% of the total, we believe it is superior to using other methods, for example an equal segmentation of data (for example, 25% for each zone), because of the canonical nature of standard deviation. Rather than using only 100 days' history as we did in this example, we suggest using 200 days' history in practice, giving 22 data points each for the computation of β-- and β++.

Beta analysis is often used in simulating market stresses since, for a given shift in the index's value, beta can be used to estimate the fund's likely response. For the previous example, as shown in figure 1, had only one beta been computed, the estimated result for any shift in the S&P 500 would be 0.89 times the S&P move. For example, for a 1% move up in the S&P, we would estimate a 0.89% rise in the fund. For a -1% move in the S&P, we would estimate a -0.89% move in the fund. Instead if we had used β+ and β-, we would arrive at slightly different answers: -0.8 for the downside and +1.05 for the upside. Similarly, using the four betas would result in still further differences. Table 2 summarises the results of using just one beta, two betas and four betas for both small and large movements in the index.

Certain investment vehicles, such as hedge funds, are supposed to provide non-linear returns that might be picked up by such a multi-beta analysis. Measuring funds' responses to the markets with multiple betas has the potential to add a layer of useful analysis both for return generation and risk management. ■

Previously published on Risk.net

Amundi ASSET MANAGEMENT Smart Beta

Practical applications of smart beta

A smart beta solution can represent a key tool for investors seeking to monitor risk and optimise their performance. Bruno Taillardat, global head of smart beta and factor investing at Amundi, discusses how investors can get the best from this investment strategy

Over the past few years, institutional investors have been getting to grips with the concept of smart beta. And, while some have allocated funds to one or more of these strategies, many remain unaware of its potential.

Smart beta products can offer solutions to specific issues, and investors may be surprised to find these strategies can be used in a range of scenarios to monitor risk and improve potential performance while keeping a lid on costs.

In this article, Amundi shares four examples of how smart beta can be used. It should be noted, however, that every client is different, and a well-resourced asset manager would be able to propose a solution according to their clients' specific requirements.

Bruno Taillardat, global head of smart beta and factor investing, Amundi

Case 1 – Improving portfolio returns while monitoring risk

Today's peculiar market conditions pose a dilemma for institutional investors. Nowadays, yields on fixed income securities – whose profile is often less risky than equities – are very low, and while equity securities could potentially provide attractive returns, they are riskier because of higher volatility.

In this context, because of low expected returns and increasing asymmetrical risk in bond markets, a balanced investor may want to reallocate from fixed-income to equities while avoiding an increase in overall risk.

Certain smart beta strategies can allow investors to switch a bigger portion of their portfolio to equities while keeping a lid on risk. Switching from a market cap-weighted index to a low-volatility smart beta product allows investors to improve the return profile of their portfolios, at the same time limiting the impact of portfolio volatility.

The Amundi Conservative Equities range, for example, aims to offer exposure to equity markets with a lower volatility while maintaining the same expected potential returns. Investors can thus increase their allocation to equity without changing their overall risk. The investment process is based on a robust portfolio construction, ensuring a good level of diversification, thereby providing lower risk and more resilience compared with the benchmark.

The management team implements a process based on a systematic multi-criteria analysis to select quality stocks by taking care of liquidity. A quantitative optimisation process is then applied, aiming to build a portfolio with low volatility by ensuring it is not strongly exposed to risk factors with highly asymmetrical behaviour – so avoiding 'crowded trades' and exposure to downside traction.

Our solution – when exposed to European equities, for example – has a proven track record of performance enhancement over the past seven years, outperforming its benchmark (the MSCI Europe index) in five out of seven observed years, with reduced maximum drawdowns versus benchmark drawdowns.[1]

Case 2 – Integrating environmental, social and governance (ESG) factors into a smart beta portfolio

A leading Dutch charitable foundation wanted to restructure its entire equity portfolio to reflect its cultural ethos of social responsibility and good governance, as well as to access the superior returns of smart beta strategies.

However, the foundation's board was concerned that too great a focus on ESG factors would push the performance too far from its internal reference benchmark.

The investor was also concerned that including an ESG filter might narrow the investment universe too greatly, diluting the fund's 'smart' characteristics and reducing portfolio performance.

In the past, Amundi has achieved these different investment goals by employing a number of asset managers, each with specific mandates – some focused on ESG targets with others providing a smart beta approach.

This is not necessary, however – all these investment aims can be applied to the whole equity portfolio. Firstly, Amundi created a fund that accessed a number of different investment factors, then applied an ESG filter.

This filter reduced the investment universe by 40%. However, using risk-monitoring techniques such as minimising volatility and reducing correlation preserved the potential performance of this fund. This was a suitable outcome for the foundation, as all the funds could be consolidated with a single manager who could apply a smart beta strategy and an ESG filter to the entire equity portfolio. This resulted in lower fees, though performance did not deviate too far from the reference benchmark.

Case 3 – Using smart beta to maintain potential capital preservation

European insurance companies increasingly use strategies known as constant proportion portfolio insurance (CPPI) products. These products have a dynamic mix of cash and equities, ensuring the invested capital does not fall below a certain value.

An average product has a maturity of five years, which would provide up to 80% capital preservation. These products are popular with insurance companies because they have a lower capital cost than other forms of investment, enabling the firm to comply more easily with Solvency II regulation. The potential capital preservation makes them popular retail products.

When the value of the portfolio falls to a level close to the amount preserved in the product, equities must be sold to ensure the promise can be met. Once the threshold level is reached, however, the entire portfolio must be invested in low-risk or cash funds, as any additional equity holding would undermine the capital guarantee. Once the portfolio is entirely invested in cash or low-risk funds, it cannot be re-invested in equities.

While this policy of selling equities would ensure the capital guarantee is met, the ultra-low-yield environment makes it hard to produce any returns from a portfolio invested entirely in cash, as yields are currently negative. In addition, the fund is a forced equity seller when values are falling, which could reduce returns further. These two characteristics result in a cash lock-in, which is a negative event.

However, if the fund were to use a low-volatility equity strategy, rather than a standard market-cap index, the possibility of reaching this threshold is less likely – thus reducing the chances of a cash lock-in.

CPPI products constructed using low-volatility equity strategies are much less likely to trigger this equity fire sale. Between the end of 2008 and January 2016, a CPPI product using the Amundi Europe conservative strategy, rather than MSCI Europe stocks,[2] maintained a much higher allocation to equities.

The fund constructed with Amundi's low-volatility fund has a minimum equity exposure of 15% and a maximum of 81%, while one constructed using MSCI Europe has a minimum of 4% and a maximum of 75%.[3]

Case 4 – Smart beta instead of traditional active managers

A Canadian client with a global equity portfolio was interested in using an active strategy, rather than a standard market cap-weighted index, to give the portfolio exposure to stocks with a high dividend yield, but wanted these shares to be chosen using fundamental analysis, rather than a straightforward systematic approach.

It is now possible to build a smart beta portfolio with an emphasis on high dividend stocks using qualitative factors, as well as quantitative ones. This can be achieved by using a sophisticated filter that screens for more fundamental metrics – such as cashflow generation, low debt levels and profitability – which can allow dividend payments to remain sustainable over the medium term.

Applying a fundamental analysis by using a high-quality filter reduces the universe of 1,600 investable stocks to 650. This universe is then filtered for high dividend stocks, while ensuring the portfolio has optimum diversification by picking stocks with minimal reciprocal correlation. Thus, despite it being invested in only 100 stocks, the final portfolio meets all of the client's requirements.

Conclusion

The increase in demand from investors and offers from asset managers around smart beta solutions is now particularly significant. These examples of smart beta's practical applications prove that it can be used for a variety of purposes, with the objective of maintaining potential performance, enhancing diversification and monitoring risks.

Today, investors could benefit from a large offering of smart beta strategy implementation – be it active management, exchange-traded funds (ETFs) or index funds – and could go one step further by applying a tailor-made smart beta approach to an existing portfolio to keep initial constraints. As Europe's largest asset manager,[4] Amundi is fully committed to accompanying investors taking up smart beta in their asset allocation and building the appropriate solutions for their specific needs. ■

Contact

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[1] *Amundi, as of December 31, 2016.*

[2] *The funds are not sponsored, endorsed, sold or promoted by MSCI, any of its affiliates, any of its information providers or any other third party involved in or related to compiling, computing or creating any MSCI index (collectively, the 'MSCI parties'). The MSCI indexes are the exclusive property of MSCI. MSCI and the MSCI index names are service mark(s) of MSCI or its affiliates and have been licensed for use for certain purposes by Amundi Asset Management. None of the MSCI parties make any representation or warranty, express or implied, to the issuer or owners of this fund or any other person or entity regarding the advisability of investing in funds generally, or in this fund particularly, or the ability of any MSCI index to track corresponding stock market performance. A complete description of the MSCI indexes is available on request from MSCI. MSCI indexes are registered trademarks of MSCI, which are used to identify indexes it calculates and publishes. MSCI guarantees neither the value of the index at any given time nor the results or performance of products indexed against this index.*

[3] *Simulation on pure algorithmic CPPI management realised by Amundi, based on annualised performances between December 31, 2007 and January 29, 2016.*

[4] *Investment & Pensions Europe,* Top 400 asset managers, *published in June 2017 and based on AUM as of end December 2016.*

Mind the gap

'Great rotation' highlights a clash over unseen risks in factor investing, as gaps in the performance of apparently similar products rekindle the debate on index construction. By Rob Mannix

Need to know

- Gaps in the performance of products that aim to capture the same factor exposures have rekindled debate about unseen risks in the strategies and indexes on which they are based.
- Industry participants attribute disparities to the mechanics of how indexes are constructed: from the factor definitions used, to weighting schemes and rebalancing practices.
- Some argue the differences in risk profile and performance justify enhancements to definitions and weightings in pursuit of purer factor exposure.
- Others say the opposite – that factor investing has drifted too far from its academic foundations meaning newer strategies have not faced enough scrutiny.
- "If we don't do a good job [of implementing factor-based investing] this whole thing will go by the wayside," one asset manager says. "Right now I'm not so sure we're doing the best job in the world."

From the US election to mid-January a 126-basis point gap opened up in the returns of two popular iShares exchange-traded funds (ETFs), even though both aim to capture a premium from the same value factor (see table 1).

Similar disparities have appeared elsewhere across the factor investing space.

Numbers collated by Morningstar for *Risk.net* show the gap between the best and worst of the main quality-factor ETFs, for example, was 136bp over the same period (see table 2).

The gaps have been exposed as investors started to bet on growth and inflation in the second half of last year. But quant managers and indexing firms cannot agree on what they mean, or how to respond.

For some in the industry, gaps simply are not a problem. For others they underline differences in how factor-based products behave that investors little understand.

While one side of the industry argues for greater refinement of products, the other is calling for the exact opposite – more standardisation.

Small differences, big differences

There has been talk across the industry for a while that investors might be overlooking small differences in index mechanics that make big differences to performance and risk.

An Axioma study last year stripped down four high dividend yield ETFs with together more than $35 billion in assets under management (AUM) to illustrate what is happening.

"One would think US large-cap high yield is US large-cap high yield," says Melissa Brown, the firm's New York-based senior director of applied research. "In fact, the biggest names in each ETF are different."

The ETFs Axioma looked at buy stocks that pay above-average dividends, aiming to benefit from a statistical tendency of such stocks to outperform the market over the long term.

It is one of several anomalies identified through academic research going back to the work of Eugene Fama and Kenneth French in the 1990s that gave rise to factor investing.

On the face of it you might expect these smart beta products tilted at a single factor to look and behave alike.

But Axioma found stark differences in holdings, risk exposure and performance attribution.

At the end of October 2016, for example, shares in oil and gas company ExxonMobil made up more than 8% of holdings of one product, but 4% of a second and less than 1.5% of the others.

Financials accounted for 24% of sector exposures in one, but only 1% in another. And

while one ETF contained 76 names, with the top five making a third of its weight, another contained more than 400 names with the top five making up about a fifth.

When Axioma looked at the active risk in each product – its risk over and above the market benchmark – it found negative exposure to market sensitivity was a bigger contributor than the dividend yield factor the ETFs were supposed to capture.

In fact, the researchers concluded dividend yield was a negative contributor to the active return of all four products. Returns for those that outperformed the market came largely from their low-beta and small-cap profile along with some of their industry bets.

"Is smart beta smart?" Axioma asks in a presentation the firm has been giving to asset managers, owners and academics since last summer. "Is it beta?"

Small wonder asset owners considering investments in such products might be confused.

Flows into factor index-based strategies have increased sharply in recent years with more than $50 billion invested in factor ETFs in the eight months to September 2016 alone, according to data collected by MSCI.

Yet a 2016 survey by Edhec-Risk Institute found asset owners saying the information they most require is some of the hardest to get hold of.

A portfolio manager at a Nordic pension fund echoes those findings. "When I've looked at some ETFs to try to benchmark what we're doing, I've found some of them are not at all doing what they are supposed to," she says.

"What is the true benchmark for these factors? You can define them a hundred different ways. Why would yours be the right one? Some people forget that, and go out and buy a product, then think 'what is this?' afterwards."

The lack of clarity also creates a headache when combining factors in multi-factor portfolios, an approach increasingly popular with institutional investors.

"If you can't see and understand the risks, how are you going to diversify them away?" asks Andrew Lapthorne, head of quantitative equity research at Societe Generale in London.

Michael Hunstad, director of quantitative research at Northern Trust Asset Management in Chicago, calls it a "truth in advertising" issue.

"Few asset owners have the tools to do the necessary decomposition or analysis of indexes and strategies. The consultants don't have the tools, or don't do this kind of analysis. There are a lot of strategies that have a tremendous amount of extraneous risk in them. Unfortunately they are the ones a lot of investors are gravitating towards."

1. US value ETFs post-election

Name	Return (day to day) Nov 8, 2016 to Jan 16, 2017	Total return YTD (daily) USD	Total return 1 yr (daily) USD	Total return annualised 2 yr (daily) USD	Total return annualised 3 yr (daily) USD	Total return annualised 5 yr (daily) USD	Annual report net expense ratio
iShares Edge MSCI USA Value Factor	10.11	1.24	28.06	7.58	8.80	–	0.15
PowerShares Dynamic Large Cap Value	9.71	1.13	28.31	7.70	9.01	14.23	0.57
iShares Core Russell US Value	9.54	0.79	29.24	7.98	9.20	14.16	0.08
iShares S&P 500 Value	9.22	0.88	27.67	8.31	9.18	13.87	0.18
Vanguard Value	8.95	0.72	26.92	8.95	10.15	14.52	0.08
Vanguard Mega Cap Value	8.88	0.61	26.16	9.13	10.26	14.36	0.07
Vanguard Russell 1000 Value	8.87	0.85	27.62	7.51	9.13	14.15	0.12
iShares Russell 1000 Value	8.85	0.85	27.69	7.52	9.10	14.09	0.20
Schwab US Large Cap Value	7.95	0.58	25.66	8.52	9.27	13.68	0.07

Source: Morningstar

2. US quality ETFs post-election

Name	Return (day to day) Nov 8, 2016 to Jan 16, 2017	Total return YTD (daily) USD	Total return 1 yr (daily) USD	Total return annualised 2yr (daily) USD	Total return annualised 3yr (daily) USD	Total return annualised 5yr (daily) USD	Annual report net expense ratio
Fidelity Quality Factor	6.80	1.69	–	–	–	–	–
PowerShares S&P 500 Quality	6.53	1.16	22.6	9.09	11.48	15.08	0.29
iShares Edge MSCI USA Quality Factor	5.44	0.88	18.22	8.47	9.73	–	0.15

Source: Morningstar

Index mechanics

Industry specialists attribute the differences broadly to three things: the nuances of factor definitions used by indexing firms, the mechanics of stock-weighting schemes, and the practicalities of portfolio turnover and trading costs.

Thus, while investors only recognise six or so factors as robust – value, quality, size, momentum, low volatility and high dividend yield – there are multiple souped-up approaches to picking the stocks to best capture them.

Even for the longest-established factor – value – definitions stretch from the 'classic' academic approach of comparing stock price with book value, to comparisons with cashflows or sales, or with projected earnings over multiple years.

Different flavours of definition can and do have different relationships with risk, says David Purdy, a portfolio manager at Acadian Asset Management in Boston. Price-to-book tends to be a riskier type of value definition than price-to-cash earnings.

"There are segments such as energy where book prices are justifiably impacted by stranded assets, things like oil reserves that are unlikely to be extracted, representing a real risk as opposed to a mispriced opportunity."

For the quality factor, which Vitali Kalesnik, head of equity research at Research Affiliates (Rafi), calls the "worst offender", definitions used by six of the main index providers are matched only in using profitability in their assessments of stocks. "The other measures they use are all different," says Kalesnik. "And often they use things such as leverage for which there is little evidence they matter in the long run."

Weighting schemes are equally varied. Some indexes select the stocks most exposed to a given factor from the whole universe of stocks, others select sector-by-sector or country-by-country. Some approaches overweight more exposed stocks. Others underweight stocks with less exposure.

The effects can be dramatic. From June to November 2016, when the rotation from low-volatility stocks was gaining pace, a fully sector-neutral strategy would beat an MSCI minimum volatility index by more than 6% in cumulative return, according to Etienne Vincent, head of global quantitative management at Theam, part of BNP Paribas Investment Partners. MSCI's approach optimises to reduce volatility with fewer constraints on sector exposures.

Failure to account for turnover and trading costs, meanwhile, can wipe out the gains of an index altogether. In a study published in September 2016, Rafi found the – sometimes hidden – transaction costs of rebalancing a momentum index with $10 billion in AUM led to a loss of -3.8% relative to the market.

"Index replicators have little control over what and when to trade," the paper states. That creates opportunities for frontrunners to capture a portion of the premium at the expense of index investors.

"The momentum factor works," Kalesnik says. "But indexes are not the way to trade it."

There are other reasons, too, why products can differ more than expected, including the universe of stocks they start with, how they narrow that universe down, how often they rebalance and what fees they charge.

Split response

But if industry players are agreed on why products behave differently, they are wholly split on how to respond.

To many, recent experience vindicates the same tweaks and enhancements to factor definitions and weighting approaches that can contribute to disparate performance and risk. For this group, performance gaps might be seen as a sign of progress.

"These markets are illustrating the importance of both proprietary factor definitions and sophisticated weighting schemes," says Purdy at Acadian.

Among them, Northern Trust has led work on heightening factor efficiency, an idea presented by Hunstad and colleague Jordan Dekhayser in a 2014 paper.

Take Fama and French's value factor, for example. Simply picking stocks with low price-to-book ratios returns a premium in only about four of the Global Industry Classification Standard sectors and performs badly in the other seven. "It's effective overall from a statistical perspective, but not on a sector level, and with good reason," says Hunstad.

"The concept of book value is different across sectors. It's different across geographies."

Factor definitions can be improved, he argues.

Northern Trust tracks ratios of factor efficiency where the numerator is exposure to an intended factor – the source of return – and the denominator any extraneous risk.

"We have found a strong link between the purity of a factor product and its risk-adjusted return," Hunstad says.

Others take a similar approach. HSBC Global Asset Management uses a linear optimiser to select stocks for its long-only portfolios based both on exposure to a given factor and on

DIGGING IN THE WRONG PLACES

To sceptics, much of the work in tweaking factor definitions or coming up with new ones can be characterised as so-called data mining – churning through enough data to throw up random patterns and wrongly ascribing meaning to them.

The process of backtesting strategies should be treated with caution, they warn.

"Just introducing survivorship bias into a backtest, in other words using today's constituents instead of the historically correct constituents, can give you 5–10% per annum outperformance," says Andrew Lapthorne at Societe Generale.

Recent academic work has cast doubt even on some of the research widely accepted in the factor-investing world, suggesting academics might have been guilty of data mining too.

In a 2015 paper, academics Campbell Harvey, Yan Liu and Heqing Zhu write: "In medical research, the recognition of the multiple testing problem has led to the disturbing conclusion that most claimed research findings are false. Our analysis of factor discoveries leads to the same conclusion. Many of the factors discovered in the field of finance are likely false discoveries."

The paper finds more than half of nearly 300 factors might be considered false, depending on the statistical approach you use to evaluate them.

Unlike for active managers, backtests are widely published and used by investors to inform decision-making about passive products, points out Felix Goltz at Edhec-Risk Institute.

Goltz calls for providers to document how they ensure backtesting is reliable. "They should explain how factor definitions came about," he says. "Did they pick 50 versions and take the one that looked best? Even large institutional investors don't have the resources to redesign these indexes from scratch and check what the sensitivity is of performance to specific choices."

Hortense Bioy at Morningstar says views on what constitutes a reasonable backtest vary across the industry, with backtests for some products going back as little as five years.

To avoid the pitfalls of backtesting, indexing firms assert they construct a thesis for factor definitions before checking the numbers, not the other way around, and often seek evidence from beyond the passive space that a given strategy has worked.

FTSE Russell's senior director of research Tom Goodwin says the firm requires multiple academic studies to support a factor's existence, a sound behavioural or structural explanation, and a proven track record of generating returns for active investors. "The resulting factor index is often not the best performing in a backtest, but it does meet our criteria," he says.

At Northern Trust, Michael Hunstad says: "The Harvey-Liu-Zhu research is a headline grabber and clients have asked questions about their papers."

But that approach is purely to say from a statistical perspective that if you double the amount of data available the propensity to data mine will be higher, he argues. "No-one disagrees with that. The challenge is to be more diligent in coming up with your economic behavioural explanation."

minimising exposure to extraneous factors.

"Can we achieve perfect factor efficiency? No," explains Vis Nayar, deputy chief investment officer for equities. "But we've looked at some popular indexes and found that if you get a 1% tracking error you are getting 20bp of whatever you're looking for and 80bp from unintended risks."

To others, such a view is anathema. "What index providers are offering billed as factor investing based on academic consensus is no such thing," says Felix Goltz, head of applied research at Edhec-Risk Institute in Nice.

"The academic consensus exists around half a dozen factors, providing a sort of open-source due diligence for investors," he says. "But index providers have tweaked their definitions of factors to try to make them 'better'. The problem is, these 'better' examples haven't faced the same levels of scrutiny." (See box: *Digging in the wrong places*.)

To this school of thought, firms are trying to differentiate themselves from competitors – an approach they hope will resonate with asset owners used to hunting out the best stock-pickers.

But doing so, critics argue, gives up the benefit of decades of peer testing, surrenders the advantages of diversification, and ignores doubts over linking returns to factors at stock level.

"There is no deterministic link between factors and returns," Goltz says. "It is a weak link. At the stock level it is very noisy. It is hard to distinguish between two stocks. If we want to be reliable we have to be modest."

Edhec also rejects the idea that risk-adjusted returns are improved by purity, citing its own 2016 paper *Diversified or concentrated factor tilts?*, published in the *Journal of Portfolio Management*. Edhec tested six factors, with different versions of tilted portfolios for each – capturing the top 50% of most exposed stocks and the top 20%.

"When you narrow down the index and select fewer and fewer stocks, the returns increase but you get more volatility in tracking error. If you are interested in risk-adjusted returns, nothing interesting happens until you get to a very narrow index where risk starts increasing exponentially and you start reducing risk-adjusted performance," says Goltz, who was one of the paper's authors.

Crudely put, being highly concentrated in champion stocks of a given factor exposes you to stock-level risk such as bad management decisions, product failures and so on.

A third group sits somewhere between these two, viewing divergence between indexes and products as the by-product of a healthy market.

"Small differences between different indexes capturing the factor should iron out over time," says John Belgrove, head of investment at Aon Hewitt in London.

Competition between providers ensures they stick to supplying what investors require, he argues.

"The indexes that asset managers choose are important. Some are quite straightforward, some less so. But managers need to be confident they are tracking a comprehensive, well-managed investible index based on good data. Indexes that fail to meet those criteria don't get followed or supported."

Investors have sound reasons for wanting indexes that behave differently one from another, argues this group, and diversification is beneficial for markets as a whole.

"It would not necessarily be good if everyone agreed on definitions," says Hortense Bioy, director of passive funds research at Morningstar in London. "That could lead to crowding."

> "The momentum factor works. But indexes are not the way to trade it"
>
> Vitali Kalesnik, Research Affiliates

Dimitris Melas, global head of equity research at MSCI in London, sees his firm as constructing indexes to meet demand in a field where no single approach is absolutely right or wrong.

"There is a continuum here," he says. "At one end you have simple and transparent methodologies. But simplicity and transparency are two of the key reasons many investors like indexation.

"At the other, you use more sophisticated tools to construct an index. But that's also fine because you gain efficiency and get more control of other characteristics; you could argue you gain more purity."

Thus, MSCI offers both a value-weighted index and an enhanced-value index. The first reweights all the stocks from its parent index on the basis of valuations. The second selects a subset of stocks and then reweights them, using valuations in both steps.

"Value weighting is the high-capacity approach," Melas says. "It's the equivalent of a low-tracking error product. Enhanced value is for investors who want more bang for their buck." As a result, investors should expect enhanced value to outperform value weighting when value does well, and underperform when it does badly, he explains.

Melas draws an analogy with the concentration of nutrients in different foods. The factor is like protein, he says, but its concentration varies depending on what you eat.

"As long as investors understand why these methods are used and what they are trying to achieve, it is fine," he says.

Educating beta

There, perhaps, is the rub. Few in the industry seem confident such understanding is yet widespread.

"Smart beta portfolios can be created in almost infinite ways. Smart beta requires ingredients labels so investors know what they are getting before they buy and what they got afterwards," Axioma's Brown says.

One suggestion is for an industry benchmark that would help asset owners cross-check their investments against wider performance – perhaps an aggregated index representing the performance of leading indexes for a single factor.

But it's unclear how such an idea would be implemented in practice. "A benchmark of the benchmarks, a sort of comparetheindex.com. It is an interesting idea but who would collate it?" says Aon Hewitt's Belgrove.

However, broad agreement exists on the need for investors to be aware of discrepancies between products and indexes, and their causes.

As Melas puts it, factor-based strategies are passive in one sense: they are systematic in their implementation, making for lower transaction costs and greater transparency. But they are active in some ways too. Each individual index is taking implicit bets depending on its construction.

In facing these questions, the stakes for the industry are high. Right now, factor-based investing is growing rapidly. But one asset manager concludes the trend will live or die by its implementation.

"If we don't do a good job this whole thing will go by the wayside," he says. "Right now I'm not so sure we're doing the best job in the world." ■

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Ten commandments for alternative premia investing

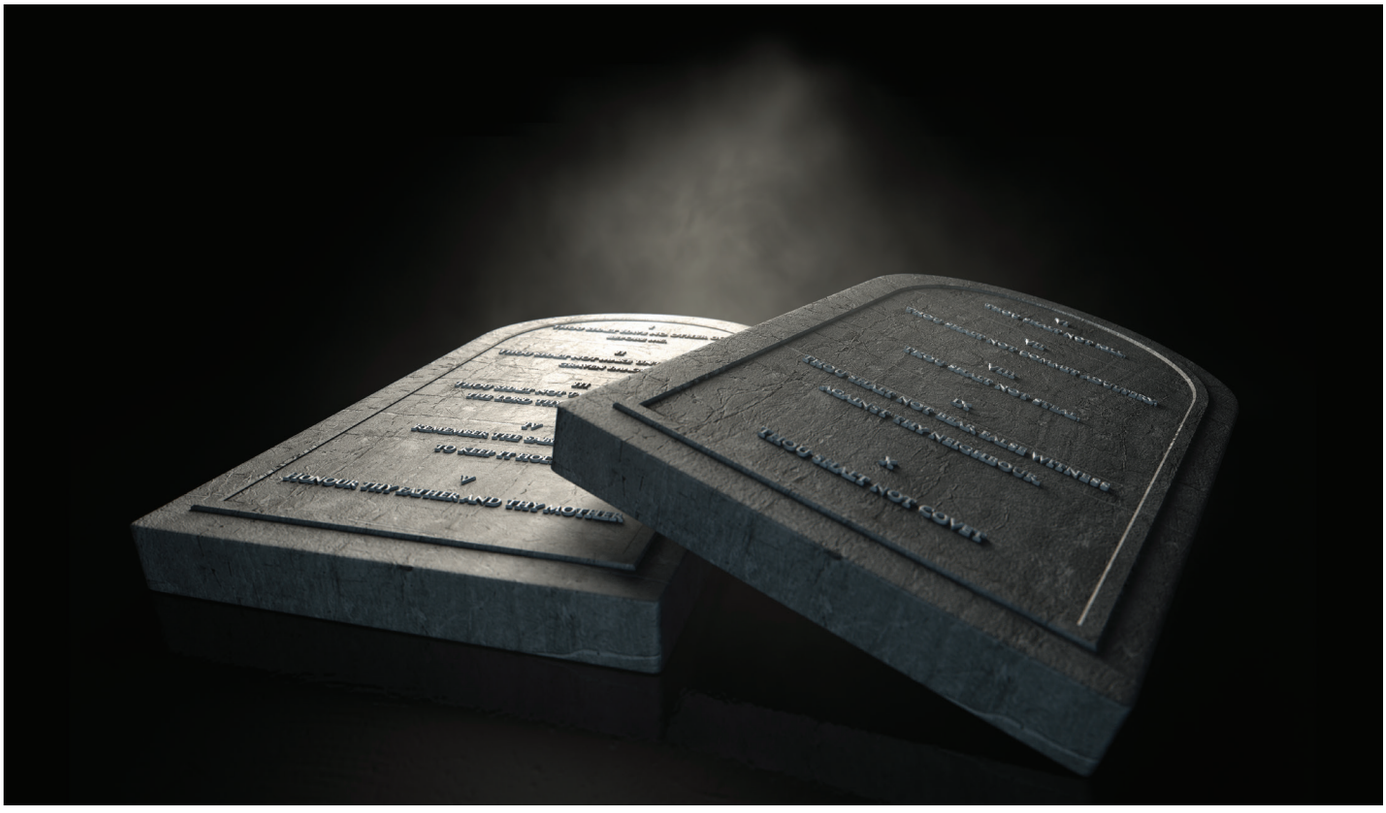


Image: Shutterstock

Luc Dumontier, head of factor investing and senior portfolio manager at La Française Investment Solutions, sets out 10 commandments for investors looking to construct a robust premia portfolio with stable performance

1 Go beyond the academic

Most factor-investing strategies – whether long-only (smart beta) or long/short (alternative premia[1]) – are based on academic factors and seek to capture standard investment styles, including value, carry, momentum, low risk, and so on, within traditional asset classes. The rush into factor-investing strategies raises legitimate concerns that these common premia may become overvalued, and thereby structurally compressed and overcrowded, magnifying dislocation episodes such as 2007's quant crisis.[2]

The best way to mitigate this risk is to broaden the scope of alternative premia.

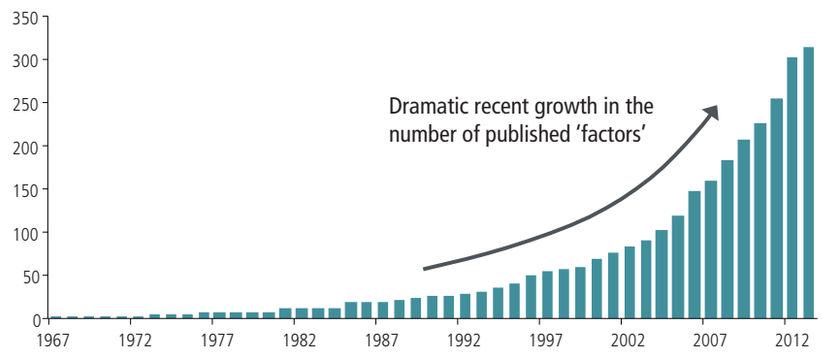
The academic approach can be extended to other asset classes such as commodities (Dumontier and Garchery, 2015), corporate bonds (Houweling and van Zundert, 2014) and implied assets. The best-known example of the latter is the 'volatility premium', which seeks to monetise the spread between implied and realised volatility of a given asset. Strategies with different investment horizons to those of 'low-frequency' academic premia bring further diversification: for example, a 'pair trading' bet on the convergence between two historically correlated securities, typically over a period not exceeding a week.

Insurance-linked securities also offer interesting potential for alternative premia strategies. Indeed, insurance and reinsurance companies take on the role of the policyholder by assigning (life and non-life) risks to investors and paying them premiums. Finally, certain arbitrage strategies exploit pricing inefficiencies in the cash (or spot) and futures markets for the same asset, often due to the inability of market participants to hold the underlying asset.

2 Do not invent factors

The factor-investing buzz has spurred a hunt for new strategies in a quest for diversification. Seek and you shall find. Harvey, Liu and Zhu (2015) observed a strong increase in factor 'discoveries'

1 The factor zoo



Source: Harvey, Liu and Zhu

since the seminal work of Sharpe on market beta in the 1960s (see figure 1). While the rate of factor discoveries was one per year on average in the 1980s, it increased to five in the 1990s and to almost 20 in the 2000s. To use the expression coined by Cochrane, the "factor zoo" now has several hundred factors.

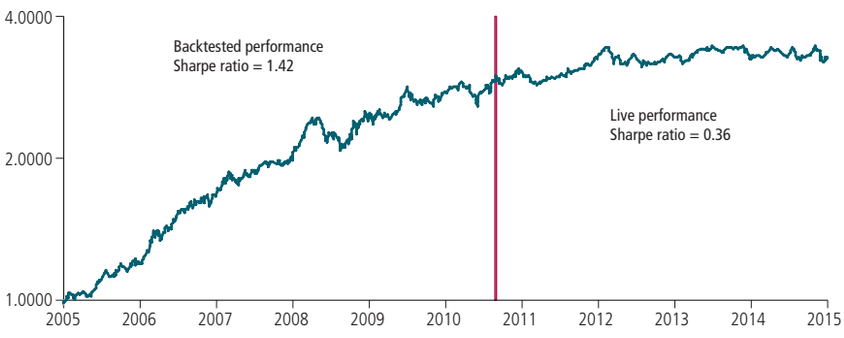
Expertise in economics and/or statistics is not required to infer that most of these factors represent, at best, another expression of an existing factor (and are therefore likely to deliver correlated returns). At worst, they are unintelligible and probably unrepeatable: that is, unlikely to deliver returns over time. The onward rush of 'discoveries' is especially dangerous as the calibration error of a portfolio's volatility increases with the number of factors it includes, and soars if these factors – which are expected to be uncorrelated – re-correlate strongly.[3] To avoid inventing factors, each must fulfil the strict qualification criteria below.

3 Understand the underlying rationale

As Warren Buffet said, we should only invest in what we understand. What is true for stocks is even more so for alternative premia. Understanding the rationale underpinning each factor helps to ensure that: (i) they will persist so that each factor will continue to pay a premium, and (ii) they are different from one another so that factors will deliver uncorrelated premia. Alternative premia should only be retained if they either remunerate exposure to an additional risk factor that cannot be diversified away (risk premia) or stem from biases linked to market participants' behaviour, investment constraints and structural flows (style premia).

Thus selected, premia strategies are likely to persist. Rational investors will always require a return to take on additional risk. In the equity value strategy, for example, investors hold stocks with attractive valuations but which are, correspondingly, vulnerable to the 'value trap' phenomenon. Investors are paid a premium to assume this risk that could materialise if reasons for these low-valuation multiples intensify. Similarly, behavioural biases are so strongly ingrained that it will always prove difficult for rational investors to arbitrage them completely. For example, investors tend to overreact in the short term to new information (eg, earnings publication). Mean-reverting strategies capitalise on this by buying past losers and selling past winners (using a lookback period of few days) to bet on the convergence in their short-term returns. Finally, regulation such as the Basel Accord for banks and Solvency Directives for insurance companies should generate more opportunities for non-constrained investors – for example, cash-and-carry arbitrage strategies.

2 Illustration of strategy performance
Backtest versus live sample (log scale)



Source: Suhonen, Lennkh and Perez

4 Avoid data mining or over-fitting

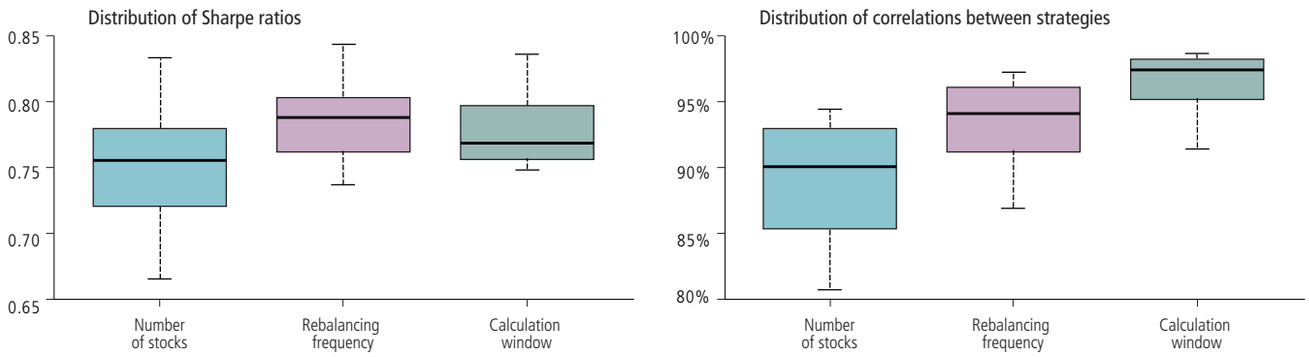
While it is said that 'promises only bind those who believe in them', investors are often willing to trust simulations of factor-based strategies, assuming they are built using simple criteria supported by academic research. Nevertheless, Suhonen, Lennkh and Perez (2016) show alternative beta strategies are far from immune to simulation biases. This comprehensive study analysed a wide range of rules-based strategies offered by investment banks, and found a median 73% deterioration in Sharpe ratios between backtested and live performance periods (see figure 2). Interestingly, the fall-off in risk-adjusted performance was even greater for complex strategies with numerous rules and filters.

Recent research papers identify other common biases and help to separate the robust factors from the lucky factors. Harvey and Liu (2014) propose methods to account for multiple testing. Bailey and de Prado (2012) define the minimum track record needed for statistical significance. Amenc et al (2015) discuss the relative robustness or ability of a strategy to offer similar performance in similar market conditions. Investors should stick to strategies that resist parameter changes well, including the number of assets selected or the frequency of rebalancing (see figure 3).

5 Control exposure to underlying asset classes

It seems universally acknowledged that long/short portfolios that capture standard equity premia must be market (beta) neutral to preserve their diversification power, but little emphasis is placed on the importance of market neutrality for other asset classes.

3 Ensuring the robustness of the equity low risk premia strategy



Source: La Française Investment Solutions

For example, a carry premia strategy on foreign exchange is often implemented through a portfolio that is long the three highest-yielding currencies and short the three lowest-yielding. The result is returns that are highly correlated with risky assets. Similarly, a government bond portfolio that is long US and short Japanese bonds with the same duration displays positive overall market exposure, as US beta is far higher than that of Japan. Finally, a gold versus oil position is probably not 'commodity neutral'.

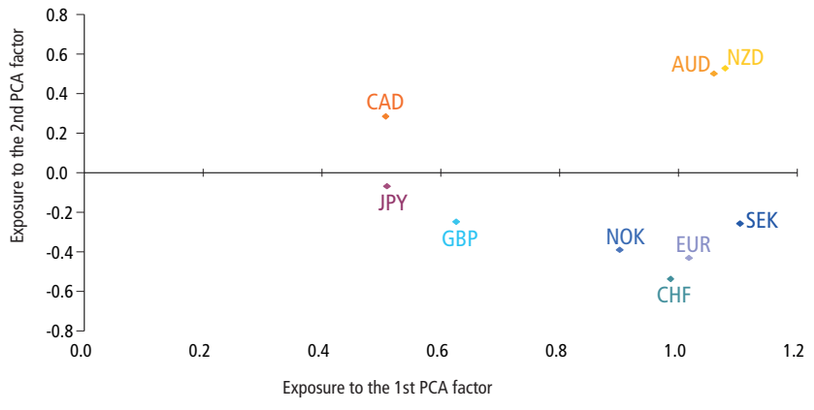
Investors should use principal component analysis to control the biases to the underlying asset classes. For example, developed market currencies (versus the US dollar) have common exposure to two factors that are robust over time (see figure 4). The 'US dollar factor' (*x*-axis) represents the co-movement of all currencies versus the US dollar. The 'bloc factor' (*y*-axis) represents the fact that dollar bloc commodity currencies on one hand and European currencies on the other tend to display even stronger co-movements. According to this analysis, alternative premia should comprise positions such as 'AUD vs NZD' or 'SEK vs NOK' to be 'market neutral'. While the expected Sharpe ratios of these pairs are lower than the traditional forex '3 versus 3' carry trade, this is compensated for by low and stable correlation.

6 Control exposure to other alternative premia in the portfolio

Even if biases versus main asset classes are controlled upstream (fifth commandment), premia may still be correlated – positively or negatively, structurally or cyclically. One topical bias is how expensive the low-risk equity premium is now, in terms of valuation multiples (for example, price earnings and price-to-book ratios). This is often attributed to the popularity of this strategy and translates into cyclical negative exposure to the 'value versus growth' premium. The low-risk premium is also structurally negatively correlated to the 'small minus big' premium. Specifically, stocks of big companies – on average well diversified, both geographically and in terms of business mix – tend to be less volatile than the stocks of small companies.

The allocation process between premia (ninth commandment) can address this re-correlation risk. However, for the sake of parsimony and readability, we encourage a 'double-sorting' approach to build the purest possible premia strategy. As an illustration (see figure 5), the main biases of the low-risk premium can be minimised by: (i) removing from the investment universe the most expensive and the cheapest stocks, and (ii) building several low-risk portfolios within each of the major capitalisation tranches (for example, big, medium and small).

4 Principal component analysis among G10 currencies

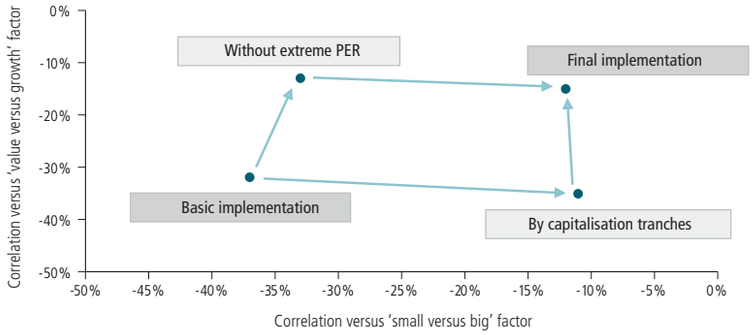


Source: La Française Investment Solutions

7 Minimise idiosyncratic risks

A major event in premia investing was the strong appreciation of the Swiss franc after the Swiss National Bank's decision to de-peg it from the euro in early 2015, and the subsequent simultaneous plunge of common forex academic premia. Few realise that events of this magnitude occur on a daily basis in equity markets – for example, following the news of a takeover bid or a profit warning. The equity universe being much larger than that of factors, equity portfolios are usually well diversified and less sensitive to strong idiosyncratic movements. The Swiss franc serves as a useful reminder that a portfolio of alternative premia is, above all, a collection of individual

5 Orthogonalisation of the equity low risk premia strategy



Source: La Française Investment Solutions

positions and must be managed accordingly.

One approach is to underweight alternative premia based on asset classes where the investment universe is smaller. A better option would be to set *ad hoc* constraints in nominal terms to force the containment of idiosyncratic risks and expand the investment universe to the highest possible number of assets. As an example, many investment solutions implement premia in the government bonds space using only the four or five liquid 10-year futures. By using swaps, it is possible to more than double the number of underlying countries to which the strategy has exposure.

8 Monitor correlations in specific situations

Controlling historical correlation between premia (fifth and sixth commandments) and aggregate exposure to single assets (seventh commandment) does not mitigate concentration risk in full. For example, a portfolio with juxtaposed standard academic premia would have progressively carried significant 'commodity risk' in 2015: short commodity-related stocks (low-risk and momentum premia), short high-yielding commodity currencies (momentum premium) and short energy commodities (carry and momentum premia). If this risk is not addressed, the performance of the overall portfolio depends only on developments around this specific thematic – a significant departure from the diversification promised by 'factor investing'.

To gauge instantaneous correlation between premia, we suggest retropolating returns with current positions – that is, without any historical rebalancing. Simultaneous movements of these series, as well as the performance of the overall portfolio, particularly in response to: (i) periods of financial crisis (eg, Lehman bankruptcy), (ii) specific macroeconomic developments, (iii) strong movements in asset classes, and even (iv) customised scenarios are very useful for assessing concentration risk. The final step is to implement stop-loss policies. For example, if the current portfolio were likely to lose more than 5% in any considered scenario, a portion of the actual positions could be cut.

9 Beware of the temptation to time factors

According to Rob Arnott, founder and chairman of Research Affiliates, a Pimco subadvisor, many versions of smart beta equity products (eg, low volatility) became victims of their own popularity and grew increasingly expensive in terms of valuation multiples. This raised the question of whether factor timing can add value. In the other camp, Cliff Asness, co-founder of AQR Capital Management, found that timing strategies using the simple 'value' of the factors themselves did not deliver convincing results. The author's research supports the AQR view. This is unsurprising if we take a step back. If it is complicated to predict how equity markets will evolve, why should it be easier for alternative factors?

Furthermore, it is important to keep in mind that if a specific factor is excluded while maintaining the same target return for the portfolio, the remaining factors have to deliver individually higher Sharpe ratios to compensate for the resulting diversification shortfall. Removing one factor from an equally risk-weighted portfolio of five independent factors[3] would require the four remaining factors to each deliver a 20% higher Sharpe ratio to generate the same overall return – that seems unlikely. A more credible way of enhancing returns is to add new factors (first commandment), provided they comply with the selection criteria outlined above.

10 Invest in people and infrastructure

Compliance with the first nine commandments requires an investment team able to deploy experience and techniques from across the finance industry, including quantitative asset management and investment banking. A robust investment infrastructure is also necessary.

The investment team must be capable of identifying opportunities, as well as designing, implementing and managing a wide range of alternative premia, from academic to investment-banking strategies (first commandment). While different in nature, each strategy must respect the same set of selection criteria (second, third and fourth commandments) to maintain the coherence of the whole. They must also be built and combined to maximise diversification (fifth and sixth commandments), whatever the market context (eight commandment), while minimising specific risks (seventh commandment).

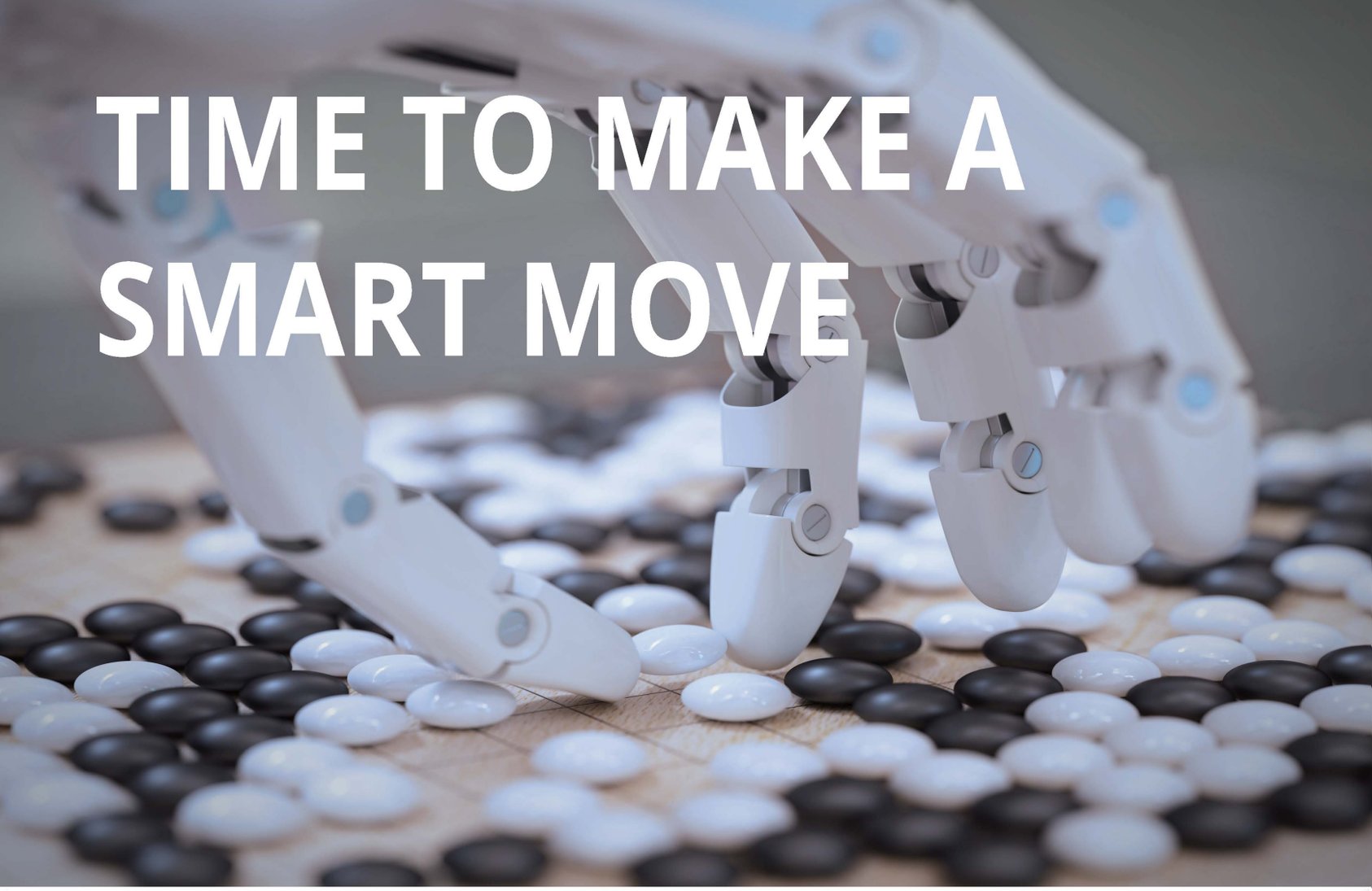
Efficient implementation is also important. Academic premia are mostly implemented using plain vanilla instruments. Here, every basis point counts and the ability to pre-negotiate the lowest possible transaction costs can have a significant impact. For premia implemented using derivatives instruments, dealing arrangements with the maximum number of counterparties is a determinant of success. Indeed, most of these investment strategies are only visible to investors whose scope of counterparty relationships allows them to see opportunities, such as a bank needing to recycle a given risk.

When solicited on the subject of smart beta and, by extension, alternative premia strategies, Markowitz is said to have compared this investment framework to so-called all-natural food at a grocery store. Many products may bear the 'smart beta' label; however, not all are necessarily all natural or even good for you. Each alternative premia strategy must be evaluated individually on its merits. ■

Previously published on Risk.net

For a fully referenced version of this article, visit *www.risk.net/2478128*

1. Alternatively, 'risk premia', 'style premia', 'style factors', 'risk factors', 'factor premiums', etc.
2. See 'Why re-correlation matters in alternative premia investing' by Dumontier, published on Risk.net, October 2016 www.risk.net/2473808.
3. About the number of independent factors that can be captured from the set of traditional academic premia.



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