

Exploring the world of factors

NINE ACADEMICS ON SMART BETA AND FACTOR INVESTING

For professional investors only

ROBECO
The Investment Engineers

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FOREWORD

An invitation to 'explore' factor investing



Robeco has long been a pioneer in researching and exploiting factor premiums, working closely with leading universities in the fields of finance and econometrics. Factor investing fits naturally into our cautious, scientific and disciplined approach to investing, dating back to our foundation in 1929. When quantitative selection techniques became available, we were one of the first asset managers to apply them to global equity and bond markets.

Our researchers and portfolio managers maintain strong ties with the world of academia, with several appearing as guest lecturers at leading universities and taking part in long-running quantitative investing research and academic programs. They have made a number of contributions to quantitative investment theory and regularly publish articles in top academic journals on topics such as factor investing, the low volatility anomaly and how to minimize transaction costs in quant investment processes.

This booklet gathers interviews with seven high-profile external researchers in the academic field of finance, who delivered the keynote speeches at our Robeco Explore series of conferences on factor investing, across Europe and Asia, throughout 2017. It also features interviews with two of our most respected experts on factor investing, as well as a brief introduction to Robeco's factor-based strategies, in particular Enhanced Index Equities. This document presents to the reader different views on what factor investing really means for investors, as well as a comprehensive overview of the current status of empirical research in this area.

Our interviewees do not always have definitive answers to our questions, nor do they always fully agree with each other. Depending on their personal background and their own research inclinations, they all bring an original contribution to the discussion. For our part, we do not intend to impose a specific point of view. Actually, the opinions expressed in this document may not necessarily be the same as those of Robeco in certain respects. Our goal with this publication is to provide valuable insights on the current debates in this fascinating area of finance, and to foster curiosity. In short, we see this booklet as an invitation to 'explore' factor investing further.

Gilbert Van Hassel
CEO Robeco

INTRODUCTION

Turning academic concepts into investment strategies

The concept of factor investing dates back to the 1970s, but it has only been gaining traction over the past few years. Factor-based allocation has its roots in the vast amount of empirical findings, accumulated over many decades, that document the existence of various factor premiums in financial markets. These premiums can be systematically harvested in order to achieve higher risk-adjusted returns and better diversification than with traditional market capitalization-weighted indices. Factors represent different characteristics or attributes of a financial security – such as the size of its market capitalization, its valuation, or its price momentum and volatility – that are important determinants of its risk and return in the long run.

Prominent institutional investors have publicly embraced more systematic approaches to portfolio allocation and securities selection, based on these insights, and the idea of factor investing has been rapidly gaining popularity among professional investors around the world. Meanwhile, asset managers and market index providers have also dived in and increased the breadth of their offering in this field dramatically.

A recent survey of international investors by Invesco illustrated the rise of factor investing worldwide. It reported a broad-based increase in allocations to factor-related products, with overall factor allocations increasing, from 12% of assets under management in 2016, to 14% in 2017. All key institutional and retail segments and geographies experienced an increase. For investors, the obvious starting point is to make sure they understand the theory behind factor investing. It is important to comprehend the major empirical findings on which it is based, before forming investment beliefs and goals. In the process, clients should explicitly state the kinds of risks they are comfortable with. They should also make clear the role factor investing should play in achieving their objectives, in accordance with their own investment policy.

Enhancing returns, reducing risk

The factor investing label encompasses a wide variety of investment products that can be put to work in many different ways. The range of possible solutions goes from generic single-factor smart beta ETFs to more sophisticated offerings based on bespoke factor indices and actively managed multi-factor and multi-asset funds. This is important as the needs and priorities related to factor exposures or flexibility with regard to a reference index can differ greatly from one investor to another.

For example, while some asset owners may be willing to fully embrace factor investing, others may only be looking to reduce downside risk in their overall equity portfolio. And while some clients may already be considering risk from an absolute perspective, others may not be ready to abandon their benchmarked investment approach. Broadly speaking, products can be classified into two major categories: those designed to generate enhanced returns through explicit exposure to well-rewarded factor premiums, and those with a clear focus on risk reduction.

Within the enhanced returns category, investors will typically find diversified multi-factor solutions. These strategies are designed to build portfolios that generate higher long-term returns through a balanced exposure to several premiums. There are also single-factor strategies that focus on value or momentum premiums, for example. These offer clients greater leeway to manage individual factor exposures in their portfolios, frequently at a lower cost. Meanwhile, risk-oriented products aim to achieve higher risk-adjusted returns, most of the time through volatility or drawdown risk reduction.

Evidence-based investment philosophy

Robeco has been ahead of the pack in quantitative investment approaches from the very beginning, in particular factor investing. For more than two decades now, we have developed solutions that successfully exploit market inefficiencies in both equity and fixed income markets. Our quantitative research department was formally established in the late 1980s and the first stock selection models were developed in the early 1990s. In 1994, these first models were introduced in the investment process of some of our equity strategies. Building on the success of these models in practice, in 2002 Robeco launched a fully quantitative equity product line. Robeco currently employs one of the largest teams in Europe dedicated to quantitative investment, consisting of almost 40 researchers and portfolio managers. As of end of 2017 we manage EUR 52.9 billion in quantitative strategies in equities, fixed income and multi assets for a wide range of clients worldwide.

We believe in an evidence-based investment approach, in order to identify the factors that are rewarded with superior risk-adjusted performance. This includes extensive empirical testing and falsification over long periods of time and in different markets. We also look beyond mere statistical patterns and aim to understand the economic drivers behind factor premiums. Risks that are not adequately rewarded with higher returns should be avoided.

We also believe in a prudent investment approach, where the resulting portfolios should be transparent and easily explainable. Our proprietary portfolio construction algorithm enables us to understand the logic supporting each position and each transaction. We also strive to avoid unnecessary trading costs, resulting in low turnover and better after-cost returns in the long run.

In accordance with this investment philosophy, we believe investors should be selective and focus on a small number of well-established factors. To qualify as relevant, a factor should (1) show a strong premium over long periods of time and across different markets and asset classes. And (2) it should have survived rigorous falsification attempts, both in academia and in-house.

There should also (3) be an economic rationale with strong academic underpinnings for each factor. Finally, a relevant factor should be (4) implementable in practice, that is generate superior risk-adjusted returns in real life conditions, that is after trading costs and taking into account practical implementation constraints.

Four key factors for equities

In recent years, the combination of cheap computing power and greater market data availability for researchers in quantitative finance has led to a dramatic rise in the number of market anomalies reported in academic the literature. Purported factors have become so numerous that a growing number of experts have started warning about a so-called “zoo” of new factors. This term was coined by John Cochrane, of the University of Chicago, in his presidential address to the American Finance Association, back in 2011.¹

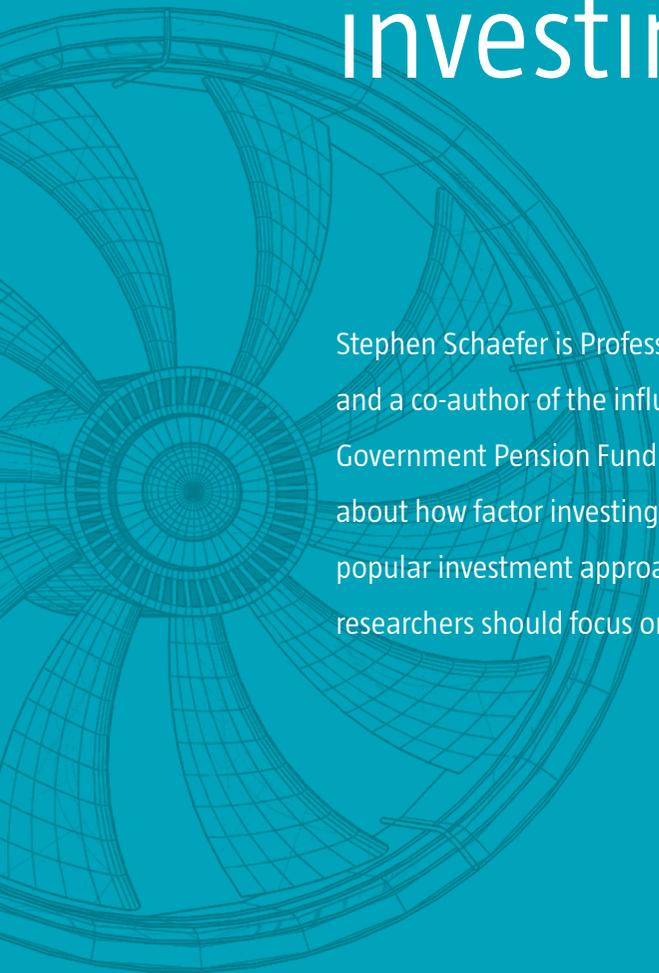
However, most of these factors tend to be related to one another. They frequently turn out to be simply different, maybe more exotic, ways to measure the same phenomenon. In fact, our research shows that it is possible to bring the number of anomalies included in the zoo down to a handful of relevant factors. For equities, for example, we consider only four major factors meet the required criteria: value, momentum, low-volatility and quality. These are well-rewarded factors, persistent over time, that have been documented in many different markets and across multiple asset classes. ■

1. J. Cochrane, „Presidential Address: Discount Rates”, 2011



STEPHEN SCHAEFER

On the origins of factor investing



Stephen Schaefer is Professor of Finance at the London Business School and a co-author of the influential 2009 report on the Norwegian Government Pension Fund and factor investing. We spoke with him about how factor investing came about and went on to become a popular investment approach. We also talked about the major issues researchers should focus on going forward.

Stephen Schaefer is a Professor of Finance at the London Business School and the author, together with Andrew Ang and William Goetzmann, of the 2009 report, 'Evaluation of Active Management of the Norwegian Government Pension Fund – Global' (the 'Norwegian Oil Fund'), which represented a major breakthrough for factor investing. Throughout his career, he has published extensively on a variety of topics such as fixed income markets, risk management, credit risk and financial regulation. In particular, Stephen Schaefer's academic work includes a study on corporate debt default in the US over the past 150 years, which was awarded first prize in the 2011 Fama/DFA Award for the Best Paper Published in the Journal of Financial Economics in the areas of capital markets and asset pricing. He was formerly a faculty member at the Graduate School of Business at Stanford University. He has also been a visiting professor at the Universities of British Columbia, California (Berkeley), Cape Town, Chicago and Venice, where he was recently awarded an Honorary Fellowship. Today, he is the lead Academic Director for the AQR Asset Management Institute at LBS. Outside academia, Stephen Schaefer has consulted for a variety of financial institutions. He has also been an independent board member of the Securities and Futures Authority; a senior research advisor to Moody's KMV; a trustee-director of Smith Breeden Mutual Funds and a member of Moody's Academic Research and Advisory Committee.

You have worked with some of the most prominent academics in the field of finance of the past few decades. Through your work for the Norwegian Oil Fund you have a significant impact on the adoption of the concept of factor investing. How did this concept emerge? What exactly were academics looking for at the time?

"The term factor investing may be relatively new, but the ideas that underpin it have been around in different forms for quite a while now. Firms such as Dimension Fund Advisors (DFA) have been making use of concepts such as the premium on small firms for several decades. Taken individually, this and other findings such as the value premium were initially seen as small steps in the academic field of finance, and we certainly did not imagine they would become so influential on investment practice. Actually, it is only over the last ten years or so, that these concepts have caught on in a substantial way."

"Let me tell you an anecdote that will illustrate what the situation was like 30 or 40 years ago. One of the very first anomalies to emerge in the literature was the small-firm effect, which was first discovered by Rolf Banz back in the late 1970s. I happened to be visiting the University of Chicago at the time and attended the seminar where Rolf first presented his results."

"There are two striking things in this story. The first is that, initially, Rolf was not looking for a potential small-size effect in returns at all. He was trying to do something quite different and happened to rank firms in a way that nobody had done before: by market capitalization. This is how he discovered the extraordinary fact that the returns of small-capitalization stocks in his data were on average much higher than those on large-capitalization stocks and by an amount that was easily as large as the equity market premium."

"The second remarkable thing, which at the time seemed totally reasonable, was the reaction of the audience. It was a very distinguished group, but their initial response was that Rolf had made a programming error, that he should go away and correct this technical mistake. Of course, there was no error and people finally took his conclusions on board."

What have been the major changes in the way factor investing is perceived over the past few years?

"What has changed over the past decade is that individual factors are now increasingly considered as part of a broader family. Instead of being

enthusiastic about, say, investing in small firms, or investing in value stocks, investors are getting used to the idea of somehow exploiting these investment strategies as a family and looking at the interaction between them. This is actually quite an important element and this is what is actually new.”

“In the early days it was natural to think about anomalies in the context of the Capital Asset Pricing Model (CAPM), in which many people at that time still had a lot of faith. Then, in an important paper, future Nobel prize winner Eugene Fama and co-author Ken French made things much clearer by showing that average returns on a stock were strongly related to its size (market capitalization) and its book-to-market ratio, in other words to its characteristics, and not just to beta.”

“Then, in a slightly later paper, they showed that average stock returns were also related to their sensitivity to portfolios constructed on the basis of size and book-to-market. This was a decisive step from the perspective of asset pricing theory and gave a much richer description of the pattern of return premia across stocks. And this second step was also extremely useful from an investment point of view.”

You mean, before it eventually turned into a popular investment approach, all the theory around factors had more to do with uncovering which elements affected expected returns, right?

“Correct. The initial objective was to say something about the CAPM and expected returns. And these findings were extremely important because they showed that the CAPM failed quite badly. It turned out that the value minus growth portfolio generates a big positive premium. So, value stocks achieve better returns than growth stocks but, at the same time, have a lower beta. This is a robust finding and goes against the most important prediction of the CAPM which is that expected returns are positively related to beta.”

“From then on, and for a variety of (often practical) reasons, academics started to acknowledge the need to adjust the expected returns they were measuring for their exposure to factors such as size, book-to-market and, more recently, momentum. Otherwise, standard statistical methods in finance such as event studies, simply didn’t give the right answer. However, even if this adjustment in expected returns is correct, it doesn’t have direct investment implications.”

“Take, for example, the 3-factor model which was introduced by Eugene Fama and Kenneth French, back in the early 1990s. As I’ve mentioned, this model shows that expected returns do not simply depend on the sensitivity to market moves (beta), but also their sensitivity to portfolios chosen on the basis of size and book to market. However, as a pricing model this has no more direct implications for investment than the CAPM does. The CAPM just predicts that the higher the beta, the higher the expected return. The portfolio you choose to hold then boils down to how much beta risk you wish to take. And, as a pricing model, the implications of the three-factor model are essentially the same.”

“To me, the fork in the road occurred when some people started to regard factor returns as anomalies – inefficiencies that you might want to exploit – while others just saw them as part of a broader asset pricing model. The former is consistent with the way that most investors see factor investing: regarding the factors as potential sources of return that, in principle, everybody should exploit.”

“Alternatively, factor premiums could be market compensation for types of risk that the CAPM does not address. That is both perfectly logical and theoretically plausible. A number of alternative models that try to capture some of these additional risks have been proposed. Up to now, however, nobody has been able to translate the factors that have emerged from research on anomalies into the kind of risks that, for example, Robert Merton was talking about when he introduced an extension of the CAPM that gave rise to multiple factors. In his framework some investors, depending on their own preferences, would be willing to bear these factor risks and others would wish to take the other side of the trade in order to hedge.”

How do you see the success of factor investing after your report on the Norwegian pension fund was published in 2009? How has this report changed the way people perceive investment, in your view?

“Well, I am not sure you want to put this in the interview, but let me tell you another anecdote. Approximately five years after the publication of our report on the Norwegian pension fund, a major US investment bank invited me to talk about factor investing at one of their events. I thought: ‘Sure!’ And then they showed me some kind of booklet they had been using to pitch factor investing to potential clients. Well, on page two of

this document was an extensive summary of our work on the Norwegian Oil Fund. So it does appear that, somehow, our work has been genuinely influential, although I did not know exactly to what extent for several years.”

“One crucial conclusion we came to was that a significant fraction of the Oil Fund’s outperformance, most of it really, was simply due to exposure to the very standard factors we have been talking about. But since these exposures were not built into the benchmark that the fund was using, it was viewed as ‘outperformance’. Divergence in factor exposure between the portfolio and the benchmark has important consequences for the way investors should view the performance of their asset managers nowadays.”

“Before the crisis and before the large negative returns relative to their benchmark in 2008, I think people viewed the Oil fund as an actively managed fund that was producing small excess returns relative to the benchmark with relatively low risk. Indeed, I think that’s the impression you get from reading the Fund’s own reports prior to the global financial crisis. The recommendation in our report – which they did not actually follow at the time – was: ‘if you want exposure to a given factor, that’s something you should decide: it should be in the benchmark.’ In other words, these exposures should not happen by accident, they should be the result of explicit decision by the fund sponsor.”

“There are two reasons for this. The first is that different factor exposures are accompanied by different types of risk, and the fund sponsor should decide whether or not these risks are acceptable. The second reason is that, if the fund decides to take on such risks, nowadays there are relatively cheap ways to get different types of factor exposure. Therefore, a fund should only pay an active management fee to someone who can actually outperform a benchmark that actually takes into account exposure to these factors.”

“This is crucial because we now know that portfolios with different characteristics – for example a portfolio of value stocks versus growth stocks, or a portfolio of large-capitalization stocks versus small-capitalization stocks – will often have quite different factor exposures and will, therefore, often behave quite differently over time. Since we can measure these sensitivities fairly accurately it would be a mistake to use benchmarks that do not reflect these differences.”

More specifically, what is your view on the current frenzy of research around factors and smart beta product launches?

“Well, there is obviously a danger about it. We all work on the same data, and the time period we look at increases very slowly, so it is difficult to get new data very quickly. There is a paper¹ you may be familiar with, written by Campbell Harvey, Yan Liu and Heqing Zhu, in which they count the number of factors that academics have identified; there are about 300 of them. They also point out that, because results are typically both identified as



‘interesting’ and published on the basis of statistical significance, at least some of these results – perhaps many – are likely to be ‘false positives.’”

“This ‘p-hacking’ risk is a widespread problem in many areas of scientific research; it is not restricted to finance. Here is an illustration. Let’s imagine two completely independent series of returns data, i.e., with a true correlation of zero. If we generate 500 such pairs of data then, even though the true correlation is zero in each case, we would expect to find that, on average, 25 of them (5%) will appear to be significant at a confidence level of 5%. And if, from that finding, I deduce that I have found an interesting and meaningful pattern in 5% of the data, I am making an obvious mistake. In this case the mistake is obvious because I can see the 95% of the data that produces no significant correlation alongside the 5% that appears to be significant.”

“So, in this case, I can easily see that it’s just luck. But now imagine that 500 different researchers do exactly the same thing with each researcher analyzing just one pair of series. The (on average) 5% of researchers who find a result that is significant at the 5% level are likely to be convinced they’re on to something! And, because they appear to have found something, these are the results that are more likely to get published. We’ll never see the 95% of analyses that resulted in nothing at all because analyses that find nothing don’t get published. This is simplified version of the point being made by Campbell Harvey and his co-authors.”



“You may remember this famous phrase by the 20th century physicist, Sir Arthur Eddington, who is famous for carrying out observations of a solar eclipse in 1919 that confirmed Albert Einstein’s predictions about the effect of gravitation on light. He once said: ‘it is a good rule not to put overmuch confidence in a theory until it has been confirmed by observation.’ But then he went on: ‘it is also a good rule not to put overmuch confidence in the observational results that are put forward until they are confirmed by theory.’ In other words: if all you have got are some observations and you lack the theoretical framework to understand them, you really need to be cautious.”

“But let me make another comment on the current explosion in research and product launches. I think that one of the reasons behind it is linked to some kind of widespread sentiment that future returns may be lower than they have been in the past. And added to this is the fact that you need a huge amount of evidence to be lucky enough to identify an active manager that will outperform in the future and not charge you a fee that will basically wipe out all that outperformance. You’ll be fortunate if you find a manager like that.”

“There is a growing skepticism among some asset owners, correctly so in my view, about the benefits of active management and about the fees that usually go with it. In a way, factor investing falls somewhere in between conventional active and purely passive management. It differs from

‘If all you have are some observations and you lack a theoretical framework, you really need to be cautious’

passive investing in the sense that it is not purely holding the market. But, at the same time, it is not classic active management, in the sense that the strategies are quite transparent.”

“So, for investors who are tempted to give up active management and go for purely passive strategies, factor investing is a very natural thing to look at, because it features many of the elements that can be found in active management.”

Are there any other kind of warnings or recommendations you could give to researchers and investors?

“Yes. As I already mentioned, I think we all need to realize that while it is true there is a lot of evidence on the widespread nature of factors, and the historical premiums attached to them, there is not, so far, any fully convincing explanation of why this is the case. That is not to say that these premiums don’t really exist, or that a good explanation isn’t possible. It’s just that, so far, we haven’t got it. In any case, as researchers we should definitely keep looking for an answer to this question. And, as investors, we should always keep in mind the fact that, to this point, we don’t have a clear answer to the question.”

“In the case of market risk premium it’s not at all difficult to explain why there should be a premium on equities as a whole relative to government bonds. Equities bear much of the business risk in the economy and if

we could be confident that government bonds would achieve average returns similar those of the equity market we would all hold government bonds. So, the logic for a market risk premium in equities is quite clear. Determining the size of the premium is another issue, but the reason it exists is clear.”

“But when it comes to focusing on a specific premium that reflects just one aspect of the equity market, say the premium on value stocks over growth stocks, things become much less obvious. It is not that we can’t think of possible reasons for this kind of premium, but there is currently no consensus on what those reasons actually are. And I think investors should definitely be aware of that.”

What are the most important aspects or questions academics should focus their research on?

“Let me point out two important areas where I think further research is much needed. As we have already discussed, there is now a very long list of factors in the academic literature; a sort of ‘zoo’ with a lot of different species in it. I suspect that many these species are related in some way, and if we were able to get a better grasp on the relationship between them, that would help quite a lot.”

“For example, momentum and value are generally negatively correlated, and this is in itself very surprising, because both factors apparently have

‘Until we find a satisfactory explanation, there will always be a concern that factors may not be permanent’



a positive risk premium. Finding an uncontroversial explanation for this phenomenon would be very useful in helping to understand the interrelationships between the different factors.”

“The second area of research I would mention is the quest for a genuinely convincing theory of why these factor premiums exist. Until we find some satisfactory explanation for what is going on, I think there will always be a concern that factors may not be permanent and could, therefore, disappear at some point.”

This is a possible scenario if everybody were to suddenly start investing using factors, right?

“Yes, definitely. There are already concerns about the amount of money that is currently being invested in strategies of this kind, and the consequences this may have on expected returns. And some of these strategies are very puzzling. Think, for example, about momentum. This factor is among the most perplexing, because it leads to an investment strategy that your five-year old nephew might come up with. Why on earth should we invest in things that have gone up and sell things that have come down? I mean, it sounds so naïve...”

“So, in this case, it is quite difficult to come up with a rational risk-related explanation. Why has the momentum effect not just disappeared? People have had long enough to arbitrage it away. As a consequence, we cannot simply rule out a risk-related explanation. If a factor is related to fundamental risk, it may well never disappear. And this is why, from my perspective, it is so important to get a better theoretical grasp on what these factors exactly are. And that should be a concern not just for academics but also for practitioners.”

Where do you see factor investing going forward? Do you foresee a similar success to that of passive strategies? What would limit the development of factor investing?

“Up to a point, because collectively we do hold the sum of whatever is out there in terms of assets – let’s call it the market. So factor investing is about people deviating from this average position and we can’t all deviate from the average position in the same direction. But I do think factor investing will remain successful and will very likely grow. This framework has been around for over 30 years now and it is a fact that the risk

characteristics of different categories of stocks are predictably different. So I think that as investors become increasingly conscious of the fact that there are different risk-return characteristics within the overall market, they will take these into account and then make well-informed choices.”

“Some investors may consciously decide not to explicitly target any factor premium and simply go for conventional indexation. But other asset owners, who previously allowed their active managers to determine the portfolio’s factor exposures, will increasingly make these choices themselves. Some will do so based on their own risk preferences, some will target the premiums attached to the different factors and others will pay attention to both the risk characteristics and the premiums.”

“So even though there is still an ongoing debate on the actual size of the different premiums, I think factor-based approaches are likely to become an increasingly important part of the investment landscape going forward, just because they enable investors to make more deliberate choices about the kind of risks that they are prepared to take. As we understand more about these risks it will make it easier for asset owners to decide whether they are prepared to be exposed to certain risks and the level of exposure they feel to be acceptable.”

“As for the potential limits to the development of factor investing, well, as I have mentioned, most of these strategies imply long-short positions and not all investors can implement the same long-short position. This could limit the expansion of factor investing unless there are enough investors happy to take the other side of these bets. But for now, at least, I think we are still quite a long way from this limit.” ■

1. C. Harvey, Y. Liu and H. Zhu, ‘...and the Cross-Section of Expected Returns’



MATHIJS VAN DIJK

From market inefficiencies to factor investing

Mathijs van Dijk is Professor of Financial Markets at the Rotterdam School of Management, Erasmus University. We spoke with him about market efficiency and some of the most clear-cut anomalies that have been reported in the academic literature. In particular, we discussed the size effect and the numerous questions that have arisen around this specific anomaly in recent decades.

Mathijs van Dijk is Professor of Financial Markets at the Rotterdam School of Management, Erasmus University. His research focuses on the functioning of stock markets around the world. He has published in leading academic journals such as the *Journal of Financial Economics*, the *Review of Financial Studies*, the *Journal of Accounting and Economics*, and the *Review of Finance* on topics such as market efficiency, market liquidity, the cost of capital stock market anomalies, and dual-listed companies. Mathijs has presented his work extensively at international conferences and seminars at academic institutions including, among others, Boston College, Dartmouth, Duke, Harvard, HEC Paris, INSEAD, and UCLA. He is a frequent speaker at industry events and has written for practitioner-oriented journals such as the *Financial Analysts Journal*. His teaching includes topics such as corporate finance, asset pricing and international financial management. Mathijs has been a visiting graduate student at Warwick Business School and Princeton University and a visiting research scholar at the Ohio State University, Duke University, and UCLA. He obtained his MSc in Econometrics (cum laude) from Erasmus University and his PhD in Finance from Maastricht University.

Your research has been closely related to asset pricing theories, cost of capital and market efficiency. One of the most important innovations of the 20th century in that field has been the Capital Asset Pricing Model (CAPM). This model was formalized in the 1960s but it has also been heavily criticized since. What is your view concerning the CAPM?

“The CAPM has been instrumental in the emergence of the academic field of finance. In a way, it represents one of the first attempts to really quantify what determines the price of financial assets, such as stocks for example, and to make very specific predictions. This has had a huge impact on the field of academic finance, and, as such, on the financial industry practice.”

“The model makes explicit the notion that there is a relation between risk and expected returns. The key prediction is that the returns that you can expect from investing in a given type of asset is a function of how risky those assets are. This may sound a bit elementary nowadays, but when it was developed, having captured this concept in such an elegant model was quite revolutionary. This is why the CAPM remains a very important tool and why we continue to teach it.”

“However, it is also true that the empirical evidence confirming the particular prediction proposed by the CAPM remains very weak. In short, there is little support for the notion that the key risk measure in the CAPM, a stock’s degree of market risk as captured by beta, explains stock returns in real life. This greatly limits the practical applicability of the model, because it does not seem to accurately reflect the reality. So, we are faced with a kind of dilemma. We keep teaching the CAPM because it helps students understand the logic of risk and return. But, at the same time, applying the model in practice does not seem to be very useful. And we know we should be extremely careful.”

What conclusions can be drawn from this concerning the efficiency of financial markets?

“The fact that the CAPM does not work, does not necessarily mean markets are inefficient. Yes, the model is based on the notion that markets are efficient and that participants are rational, while we know that quite a few of these agents are not rational. They make mistakes, they are overly optimistic or pessimistic, etc. However, the model could still work if there were enough rational people to correct for that irrational behavior. Also, the

CAPM is just one kind of model. Maybe we don't understand very well what types of risk investors care about. Maybe we should not only take market risk into account, for example. A variety of alternative models have been proposed that could, in principle, still be consistent with market efficiency."

"Having said that, I personally think market efficiency is a nice idea in theory, and is also very valuable, but there are definitely a lot of inefficiencies. Asset prices frequently deviate from what they ought to be, sometimes quite drastically. Some of my early academic work looking at stocks that are dual-listed focused on very clear examples of such inefficiencies. And some of my more recent research has shown that the degree of market efficiency is actually dynamic. Sometimes markets are pretty efficient and sometimes they are not so efficient."

How would you explain the fact that market efficiency varies over time?

"Let's start by saying that a lot of investors are active in financial markets. Together, these investors determine market prices and there is a lot of evidence that many of them are not particularly rational. As I already mentioned, they make mistakes, they don't pay enough attention, they have all kinds of psychological biases, they ignore information, and so on and so forth. All this potentially makes prices deviate from what they ought to be."

"At the same time, there is also a contingent of investors who actually try to exploit this less than rational behavior. These investors are frequently referred to as 'arbitrageurs'. People often think about hedge funds run by very smart people who try to exploit inefficiencies and thereby make the market more efficient, because they drive prices back to where they ought to be. But it could also be done by mutual funds or simply smart individual investors. Really, it could be anybody who is paying attention and has good tools."

"Then, the logical question is: how difficult it is to do that? And the answer is that it may not always be that easy. My own older research¹ focused on Unilever, a company that is listed in both Amsterdam and London. I showed that for this particular firm, the stock price in one of these markets can sometimes deviate by 10% or 20% from the price in the other market, of what is essentially the very same stock. That leaves enough room for arbitrageurs to actually profit from this anomaly. But this a very specific

example, because – in contrast to a cross-listed company or ADR – in a dual-listed company, the stocks traded in Amsterdam and London are actually not the same stocks, although they represent claims on the same underlying value. That means that you cannot just buy cheap on one side of the Channel and sell expensive on the other side."

"If the stock is cheaper in Amsterdam, what you can do is buy it there, and short the other stock in London and then wait until the prices have converged again, which they generally do. However, it could end up being a very risky strategy, because it can take months, sometimes even years, before this occurs. In the meantime, all kinds of things can happen. In particular, prices might deviate even further due to local market sentiment, for example. In that case, you might suffer losses, at least on paper, but paper losses can be very painful, if for no other reason than because you might get a margin call or your investors withdraw their money."

"What I want to illustrate here is that, even though the market might be inefficient and there may be arbitrageurs out there who notice the efficiencies and want to profit from them, it might be tough to actually do that in practice. The conditions that determine how easy it is to profit from inefficiencies vary over time, they probably also vary across securities and countries."

"In more recent paper², I looked at the amount of money that is actually available for arbitrage, focusing on how much is held in hedge fund portfolios. This amount tends to vary quite a lot over time, depending – among other things – on hedge funds' past performance. During the financial crisis of 2008-2009, for example, many investors withdrew their money from professional asset managers, and there was less money flowing towards the arbitrage sector. As a result, arbitrageurs were less successful at correcting any mispricing and the market was overall less efficient."

Which market inefficiencies are the most important, in your view?

"I think some of the most clear-cut pricing anomalies are the ones related to dual-listed companies, such as Unilever. Because in those cases, there is a clear benchmark: there is an equivalent security trading in a different market that should have the same price. There are also a few other cases of very obvious inefficiencies, that academics have looked into.

For example, in a paper published in 2002, 2017 Nobel-prize laureate Richard Thaler, and fellow researcher, Owen Lamont, analyzed a number of technology stock carve-outs that took place between 1998 and 2000. They found cases where part of a company was split and listed separately and that company was worth more than the original one. This also seems very hard to reconcile with the market efficiency hypothesis.”

“However, obvious examples like these are relatively rare, and most market anomalies that have been observed in a broader set of stocks (such as the size and value anomalies) are less clear-cut, exactly because there is no benchmark security. My sense is that there is probably a mispricing element to many of these anomalies too, but the debate as to whether there could be a rational explanation is still ongoing. A good example is the value anomaly, the fact that stocks that have relatively low market values relative to their book values tend to perform well going forward. This finding seems to suggest that these stocks may be undervalued, but some theories have been proposed that actually suggest it might be rational pricing.”

“So, we have a few clear-cut cases and large number of market patterns that have been documented, which I think cannot fully be explained by rational or risk-related explanations. It is a lot harder to be definitive about them. That makes their analysis very challenging but also very interesting, at least from an academic point of view. And from an investor’s point

of view, it is also interesting to see what you can do about them. This does not mean there is a recipe for making a lot of money, and I am not saying prices don’t make any sense at all. But I am very sympathetic to the possibility that mispricing or irrational behavior plays a substantial role in financial markets.”

So what is your view on factor investing?

“Let me just start by clarifying one point. When looking at the academic literature on market efficiency, I would mention two main areas of research. The first one has to do with the search for patterns in asset prices and returns that seem odd, that seem hard to square with the market efficiency theory. This area can be thought of as looking for direct evidence on market inefficiency.”

“The second area of research has to do with the performance of professional investors. If markets are really that inefficient, those who invest for a living, who have been trained for this and who follow the market professionally, should be able to exploit these inefficiencies. And, according to the evidence, even though the vast majority of professional investors tend to fail to beat the market some of them seem to do a little better than the market. This, in a sense, is indirect evidence of market inefficiency.”



‘My sense is that there is probably a mispricing element to many of these anomalies’

“Now, back to your question. Over the past ten years, financial markets have experienced a huge shift towards passive investing. And my interpretation is that this is, at least in part, because a lot of people have realized that active investing is very tough. It is very difficult to perform and it is also quite costly, because you do a lot more trading and need to pay more attention. In addition, most mutual funds don’t beat the market.”

“More recently, say over the last five years, people have been thinking whether it is possible to do passive investing in different ways. For example, you can just track some general market index, like the S&P 500 or Russell 2000. But perhaps you can do a bit more than that. And I think that’s where factor investing might come in.”

“The concept is not as new as it may seem. The idea of factors that are associated with premiums in stock returns has been with us for several decades, but factor investing was really put on the map by the study on the Norwegian Government Pension fund, by Andrew Ang, William Goetzmann and Stephen Schaeffer, back in 2009. This article essentially coined the term ‘factor investing’ and got people interested.”

“The idea is that we have accumulated a vast amount of academic research that suggests there are at least patterns in stock returns that could provide an indication of what types of stocks have higher expected returns than others. And, looking at past data in multiple markets, some

of these market anomalies – such as the size effect, the value effect, the momentum effect or the liquidity effect – seem to be quite pervasive.”

“So, holding a passive portfolio based on a broad market index might not be optimal, because you might be able to get higher returns by focusing on these types of stocks. And I think that logic is quite powerful. In that sense, I think factor investing is a very interesting development, that I would take very seriously as an institutional investor.”

Yes. But you still sound a bit cautious here...

“That’s right. Because, obviously, there are no easy wins. There are a number of issues investors really need to look at before engaging in factor investing. The most important caveat is that all of these patterns in asset returns have been identified based on past data. We can’t be sure they will show up in the data in the future as well. Of course, once you see more data, you get a little bit more confident, but there is really no guarantee.”

“Being confident about those patterns also requires understanding why they are there. For example, if you can show one of them is due to a certain type of investor behavior, it might give you more confidence to say it will not go away, or at least that we will more likely than not see that pattern going forward. For most of these anomalies, however, our understanding of the underlying causes remains pretty shaky so far.”



“The second issue I would mention is that investors should really care about whether the underlying explanation for a given anomaly relates to additional risk or chronic mispricing. If it is risk, then you obviously need to carefully consider whether you, as an investor, are comfortable taking that type of risk. Maybe you are, and in that case you will earn reasonable and fair compensation. If not, you might want to stay away.”

“If the reason is mispricing, that makes the anomaly a lot more interesting. It suggests that you can earn an additional return that does not compensate for risk, by investing in some specific assets. And in a sense that’s the holy grail of asset management, although the reasons behind anomalies are often a mix of both risk and mispricing.”

“A third aspect investors need to take into account is that even if these anomalies might not be viewed as a compensation for risk, that does not mean that investing in them is not risky. For example, even Nobel prize-winner Eugene Fama has admitted that the momentum effect is a challenge to market efficiency. However, we know that, although the momentum effect has been quite consistent over time, during the financial crisis, in the US, momentum investors lost a lot of money. So even if it is mispricing it is not risk-free.”

“And then the final question investors need to look at is whether they can really implement their strategy in practice. The evidence supporting it might look nice on paper, but academic research has a strong tendency to ignore all kinds of issues that investors face on a daily basis, such as trading costs, short-selling constraints or margin calls.”

“All these issues are very important ones, and investors need to find compelling answers to these questions before they should eventually engage in factor investing. I don’t have an answer to all these questions, but I think they are really worth exploring.”

You have studied³ the size effect extensively. Could you explain your views on this specific market anomaly?

“The size anomaly is a fascinating one. On the one hand, it is pretty prominent and has been documented in many different stock markets around the world. On the other hand, especially in the US, it seems it has been a lot weaker in the 1980s and 1990s. That observation raises a lot

interesting questions such as why was the anomaly there in the first place? Or why it is still there in other markets? The answers to these questions are not straightforward. There is still quite a lot of debate about them.”

“Small firms are often considered riskier than bigger ones. So, one could think of risk as a possible explanation for this phenomenon, but not necessarily the kind of market risk that the CAPM takes into account, because maybe we are not measuring the right type of risk. Lower liquidity and higher trading costs could also be an alternative explanation. Based on the research, we know that stocks that are more expensive to trade and that are less liquid also tend to have higher returns, most likely as compensation for the trading costs. And stocks of small companies are usually less liquid.”

“At the same time, one big puzzle is that to a large degree, especially in the US, the size effect, stems from performance in the month of January. In other words, small-capitalization stocks tend to outperform bigger-capitalization stocks, particularly in January, which seems hard to square with any kind of risk-related, rational explanation. Why would small firms be riskier in January? Or why would transaction costs be much higher during that month? As a matter of fact, when you look at transaction costs, there is not a very strong seasonal pattern at all.”

“Other possible explanations for the size premium include more behavioral causes. There could be some kind of neglect effect, related to the fact that these small-capitalization stocks are really not on the radar of many investors. When you talk to institutional investors, you find that a lot of them focus on the bigger-capitalization stocks and that many do not consider investing in small-cap firms. As a result, these stocks tend to have lower valuations, which in turn might lead to higher average returns going forward.”

“All these are potential reasons for the size effect. We don’t really know, but they seem plausible. Now, turning to the question of whether size effect actually disappeared in the 1980s and 1990s. In my view, it may have been lower during those two decades, but it clearly recovered after 2000. For the past 15 to 20 years, the anomaly has actually been pretty strong again. And one explanation for this temporary lull could be a profitability shock.”

“Let me try to explain that. A lot of research has been and is currently being carried out, in academia and in the financial industry, to establish which variables determine expected returns. The reason is simple: if we know that, we will know what returns to expect on stocks. And if we have some kind of idea as to whether that is due to risk or mispricing, it can tell us a lot about potentially attractive investment opportunities.”

“The problem is, we can’t really measure expected returns. All we can see is realized returns. So while the size effect is supposed to say something about expected returns – on small stocks you can actually expect a higher return – this has been documented mostly based on realized returns. The apparent lull in the size effect in the 1980s and 1990s could therefore be simply have been due to unexpected returns.”

“In a recent study, we actually found some evidence of that. We found that the profitability of small-capitalization companies had been worse than expected during those years. As a result, unexpected returns were very low, because those smaller firms did worse than the market anticipated in terms of profitability. Therefore, if you look at the realized returns – that basically include expected returns and unexpected returns – you are kind of underestimating the size effect of the 1980s and 1990s compared to if you were only looking at expected returns.”

“So, given that many regions across the world have provided evidence for the size effect and that it has again proven pretty strong over the past 20 years, the overall evidence of a size effect seems pretty strong. Of course, there is no guarantee that it will continue to do so in the future, because we can only study past data. But it seems to be pretty persistent and worth investigating further. In particular, I think the risk and liquidity-related explanations that have been put forward do not suffice. There seems to be room for some kind of inefficiency-type of argument.”

Your research has also focused on liquidity in financial markets. How should investors proceed with liquidity issues?

“That is a tough question. First of all, I think it is important to distinguish liquidity from liquidity risk. There are two potential reasons for an investor to care about liquidity. The first one is quite simple and quite straightforward: a relatively illiquid stock is costlier to trade. Therefore, illiquid stocks are less attractive for investors. They tend to have slightly

lower valuations and achieve higher returns, providing compensation for the cost of trade.”

“For investors, the way they should deal with this liquidity issue depends on their investment horizon. If they are very short-term investors, and want to benefit from short-term movements, then of course transaction costs are very important. They will probably want to stay away from the illiquid stocks, even though they have high returns, because the higher return is going to be completely eaten up by the trading costs. For a more long-term investor, it might be worthwhile: they would get a premium, or at least it seems that they might get one, and that premium may not completely cancelled out by transaction costs.” ■

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ELROY DIMSON

Looking at the long-term evidence for factors



Elroy Dimson chairs the Newton Centre for Endowment Asset Management at Cambridge Judge Business School, and is Emeritus Professor of Finance at London Business School. We spoke with him about the long-term evidence for factor premiums, as well as the current state of academic research in that field and the appetite for factor-based and smart beta investment strategies.

Elroy Dimson chairs the Newton Centre for Endowment Asset Management at Cambridge Judge Business School, and is Emeritus Professor of Finance at London Business School. He also chairs the Advisory and Policy Boards of FTSE Russell, and serves on the Advisory Council of Financial Analysts Journal and the Steering Committee of the Financial Economists' Roundtable. Until 2016 he chaired the Strategy Council of the Norwegian Government Pension Fund Global, and before going to Cambridge was a Governor and Professor at London Business School. A significant part of his academic research – together with fellow researchers Paul Marsh and Mike Staunton – has centered around measuring very long-term investment returns for different asset classes across numerous countries and regions. The three academics also focused their work on the long-term evidence concerning factor premiums.

Your work provides compelling evidence for the existence of an equity risk premium. Do you think the evidence for factor premiums is just as convincing?

"I think there is a difference. My work, together with Paul Marsh and Mike Staunton, shows it is difficult to measure precisely the equity risk premium. And, from that point of view, factor premiums are almost certainly estimated with greater error. I do not favor seeking exposure to a large number of factors. One should be considering premiums that are well supported by academic evidence across multiple markets and over multiple research periods."

Factor investing has become increasingly popular among investors. Do you think we have enough hindsight from an academic research point of view?

"There is considerable scope for investigations in this field. Research shows that factor premiums tend to be smaller 'out-of-sample'. That is, premiums tend to be smaller when the data analyzed is not the same as that which initially revealed the factor. Several papers have been published over the past couple of years highlighting the disappointing performance of many factor strategies after the research findings have been published. Professor Campbell Harvey, confirmed in his 2017 presidential address to the American Finance Association 'that many of the research results being published will fail to hold up in the future.'"¹

"Statisticians refer to the risk of misjudging a certain pattern and wrongly identifying a factor as 'p-hacking' or 'data mining'. The 'p' value refers to the probability that a researcher detected a phenomenon that is really robust and significant. And 'p-hacking' is the term used for trying many different forms of analysis until you appear to have found something which looks like a premium. This concept is commonly used in medical sciences, where pharmaceutical companies are often accused of putting forward, among a large number of existing studies, only those that show the most favorable results. This is also a very serious issue for investors. In a way, if they still made those old telephone books, it would be like searching through one of these books and trying to find some kind of pattern in the phone numbers that would suggest the existence of a factor premium. But finding a pattern in one book would not necessarily mean that it could be found in another phonebook, in particular for another country."

Which factor premiums do you think are strongest, and which do you think are more questionable?

“If you would ask randomly any two experts to name five factors that they consider the most relevant or interesting ones, they would probably come up with different answers. Having said that, a few factors would likely be common to both lists. In a recent article² I and my co-authors focused our analysis on the following factors: size, value, income or yield, volatility and momentum. Why these? Well, we always look at data globally and over long periods of time, which is a distinctive feature of how we like to work. This obviously has an influence on the kind of data we choose to look at. For example, it is very difficult to analyze the low volatility effect across a large number of countries for a very long period of time. This is an important aspect, because the research that underpins some of the factor premiums that have become popular among investors often relies heavily on US stock market data. These studies may show very compelling results, but we don’t really like the idea of basing investment strategies solely on US evidence. Ultimately, the resulting investment strategies could prove very profitable in one particular country, and yet fail in other countries.”

“This is a dilemma for academics as well as for investors and asset managers because there are only two to three decades of market data available internationally. Take the quality factor, for example. It has drawn a lot of attention from academics and investors in recent years. But quality remains a relatively new and more subjective concept than value or low volatility, for example. To assess the quality factor rigorously, researchers should analyze data globally over numerous decades. In my view, looking only at a quarter of a century is not enough. Things could go well or turn bad simply due to chance. This is why investors and asset managers need to remain cautious when analyzing and exploiting market data. They should not rush towards one single factor that they find attractive. In addition, while empirical evidence is important, it is also key to gather some theory behind it. If you cannot find economic reasons to explain the existence of a factor premium, then I think it is more questionable whether it will persist.”

In particular, what is your view concerning the Size factor?

“Evidence for a size premium was first published in the very early 1980s for US stocks, but it has since been found across many different equity markets. Taking the result from various research studies and updating them using available small and large-cap indices, Paul Marsh, Mike

Staunton and I showed that small caps have achieved a long-term premium of 0.32 percent per month, on average, relative to large caps. This study was based on data from 23 countries with an average history of 43 years. The length of the research period for individual markets ranges from 16 years for countries such as Austria, Norway or Portugal to 91 years for the US.”

“Still, the relative long-term outperformance of small-capitalization stocks has not been consistent and steady over time. There were some periods of relatively disappointing performance, in particular from the mid-1980s to the mid-1990s. The small cap effect seems to have somewhat faded in recent decades. Small caps continue to perform differently from large caps, but not to the extent suggested by the first studies that reported the existence of a very pronounced size premium. If researchers were to investigate this factor for the first time nowadays, they would probably only find a modest small-cap premium and would most likely not deem it a major anomaly. In terms of performance, investors with a long-term horizon should expect a ‘normal’ reward for the illiquidity risk and the higher management costs associated with running a small cap fund. Buying such stocks often implies a more sophisticated investment process than with large caps and requires greater patience when building a position.”

What about the Income factor?

“This is actually a very long-established factor. I think it is reasonable to assume that, if you go back long before any modern financial theory, investors already looked at income or yield. So this is probably one of the best substantiated approaches to investing. Moreover, it seems to have paid off. A number of studies published over the past decades have shown a significant premium for higher-yielding US stocks, based on data going back as far as 1927. In the UK, my research together with Paul Marsh and Michael Staunton has also evidenced a similar pattern since the beginning of the 20th century. Meanwhile, outside the US and the UK, our analysis also showed a clear income effect in almost 20 countries over the 1975-2016 period.”

“Some people may say that income has paid off because there is a reward for taking certain sorts of risks. For example, one risk that you take with a high yield strategy is buying a stock whose price declined for legitimate

reasons. As such, they may become more volatile or they may be more prone to collapse, for example. However, our analysis shows that, on all the measures we can come up with, those risks are not very large. In other words, the Sharpe ratios are much higher for high yield than for low yield securities. Not only is the return higher, but the ratio of reward to risk is also larger for high yield stocks.”

What is your view on the economic explanations that are often brought forward to justify the existence of factor premiums?

“I think there is still a lot of research to be done in this area too. Let me take the very popular momentum and low volatility factors, for example. Momentum strategies are nothing new. They used to be called ‘relative strength’ and they were a standard investment approach half a century ago. In practice, you would buy stocks that are moving up and you would avoid stocks that are moving down. Back in the 1960s, there were already a number academic papers that demonstrated that this approach had worked. One of these studies was even published in the *Journal of Finance*, one of the most prestigious academic publications. At some point, however, these articles were ridiculed because the reasons mentioned to explain this phenomenon were considered unconvincing and the empirical research lacked rigor. People felt uncomfortable about that.”

“The main explanation that was brought forward in the 1960s for the ‘relative strength’ effect was that investors only adjust gradually to

information. First, some particularly smart investors would spot good or bad news concerning a specific company and they would buy the stock. The next day, less smart investors would buy the newspapers and they would buy the stock as well. A week or two later, other investors would see prices going up and only then they would also buy the stock, and so on. But it is also not very difficult to imagine that those smart investors, who bought the stocks in the first place, could have foreseen the coming adjustment and could have taken action. Doing so, they would arbitrage away this price anomaly. After a while, these strategies would just self-destruct. Moreover, in today’s world, you don’t have to wait for tomorrow’s paper to appreciate what’s happening. News cannot take days and weeks to permeate through the market, so the momentum anomaly is really puzzling.”

“Now, let’s turn to the low volatility factor. I have a deep desire to discover long-term evidence concerning low volatility stocks around the world. It’s an intriguing anomaly because one of the explanations most frequently mentioned is the asset management industry’s focus on performance relative to benchmarks. But many decades ago, people were not engaging in benchmark driven investing. In the UK, the FTSE All-share Index was launched only in 1962 and the total return version of this index did not appear until 1993. Before that, you just had capital gains indices and an average income to work with. As a result, if you go back to the 1970s for most countries, and to the 1960s for almost every country, people had little reason to be interested in relative to benchmark investing.”



“If this explanation is correct and benchmarked management is the main driver of the low volatility effect, we should not be able to find any convincing evidence of this phenomenon in prior decades. Well, I have no data to support this and I just don’t know what the answer is. But I suspect the anomaly was already there. To be sure, other factors such as size or value were about as prominent many decades ago as they have been in more recent years. This is why the search for long-term evidence is so crucial. I think we, academics, should join forces with asset managers to carry out this kind of research. Putting together very long series of market data is arduous and tends to be done only on a single country basis. Using lengthy single-country datasets we can test models out of sample. We can see what happens using data going back to long ago. Otherwise, looking forward, we’ll need to wait for an unacceptably long time to get sufficient new data.”

Would you recommend institutional investors to allocate strategically not just to traditional asset classes, but also to factor premiums? To what extent? Monitoring factor exposure or actively seeking to capture premiums?

“It does depend on their time horizon and the costs they face, but I think investors should at least monitor factor exposures. Let me give you a concrete example of this. I was once a member of the investment committee of a charity which was hungry for income. It was made clear to the manager that the charity wanted more income because it could

not spend out its capital. As a result, all other things equal, the manager tried to buy high yielding securities. And when high yield stocks did well, this fund did very well. When high yield stocks did not do so well, the fund would lag. This illustrates the fact that simply having a view about sustainable levels of spending can drive asset managers into unplanned factor exposures. I believe factor tilts are important and that both asset managers and their clients need to be aware of their existence. Even conventional investors, not just the very sophisticated, quant-oriented ones, need to assess and to take into account their exposure to different sources of risk.”

What is your view on the current smart beta frenzy and the numerous product launches?

“Factor investing was highlighted in a December 2009 report, ‘Evaluation of Active Management of the Norwegian Government Pension Fund – Global’, prepared at the request of the Norwegian Ministry of Finance. The authors were three finance professors, Andrew Ang, then at Columbia Business School; William Goetzmann, Yale School of Management; and Stephen Schaefer, London Business School. Sometimes referred to as ‘AGS’, they revealed the substantial impact of factor exposure on the investment performance of Norway’s sovereign wealth fund. As I document in work with two co-authors³, Norway has been a model for other asset owners, and the AGS analysis had a far-reaching impact on asset owners, investment managers and index compilers.”

‘I think factor tilts are important and both asset managers and their clients need to be aware of their existence’



“Often marketed as smart beta, factor investing has taken the investment community by storm. You can see its impact in the successive editions of the annual smart beta survey published by FTSE Russell. By 2017, nearly three-quarters of survey respondents had either implemented, or were evaluating or planning to evaluate, smart beta index products.”

“Is the increasing enthusiasm for smart beta a passing fad – or, in your words, a frenzy? In the FTSE Russell survey, the primary objectives of institutional adopters have been return enhancement and risk reduction. Another important factor that asset owners cite is cost savings, which suggests that smart beta is increasingly perceived as an alternative to active strategies. Retail investors, such as buyers of ETFs, may well be pursuing the latest fashion, and smart beta is certainly in vogue among individual investors as well as institutions. But I don’t think it is a full blown frenzy – at least, not yet. There is still upside for promoters, suppliers and consumers of factor-driven products to increase the penetration of factor strategies in the investment marketplace.”

What is your view on overcrowding risk for certain factor-based strategies?

“A typical example of the concern about possible overcrowding relates to the income factor. All managers, not just quantitative managers, are worried about the possibility that they could be overpaying for income stocks or bonds. In the current low-yield environment, investors are chasing

all sorts of sources of income, sometimes with the mistaken conviction that higher income will not be associated with lower capital appreciation. Asset owners want exposure to this factor, so of course there is a risk of overcrowding. Thoughtful investment professionals now voice the fear that high yielding securities may have been pushed to unsustainable valuation levels, in multiple countries and for many asset classes.”

“However, other investors may consider that the need for income is still there. As a result, there may still be upward momentum for high yield assets. Many managers are certainly wondering whether they are overpaying for income right now. But they also probably fail to see an obvious alternative for meeting their clients’ performance targets. I think that, for an academic, it is too close to call. Certain segments of the market may turn out to be overvalued, but we don’t know which segments or when the top will have been reached. But I would also say that overcrowding is an important issue and something investors should clearly be paying attention to.”

Could you tell us a bit more about the Norway model and its approach to factor investing? What lessons for other investors?

“The Norwegian Government Pension Fund-Global (GPF) was formally established in 1990 to channel and manage the country’s oil revenues in a long-term and sustainable way. Several key characteristics set its model apart. I would highlight its large size, its long-term horizon and

‘In my view, looking only at a quarter of a century of data is not enough. Things could go well or turn bad simply due to chance’



its public ownership. Moreover, its investment strategy builds extensively on modern financial theory, as well as robust empirical evidence. As such, it takes advice from leading consultants and prominent academics across the globe. This is important if one is to understand the fund's approach to factor investing, because many of these external advisors have recommended that the GPFG should consider it."

"After the AGS report at the turn of the century, the fund started to make small allocations to style tilts, such as value or momentum. These tilts only contribute to a small portion of GPFG's active risk, mostly because of the fund's considerable size. But the impact of the AGS recommendations on the asset management industry worldwide has been profound. The Norway model is increasingly seen by other investors and investment managers, as an approach that can and should be emulated. We've already discussed the growing number of factor-based investment solutions available in the market. Low cost products, exchange traded funds and factor strategies make it easier for smaller asset owners to mimic Norway in running an inexpensive, diversified global portfolio with moderate factor tilts that meet the needs of investors." ■

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THORSTEN HENS

Factor investing from a behavioral perspective

Thorsten Hens is Professor of Financial Economics at the Department of Banking and Finance of the University of Zurich, in Switzerland.

We spoke with him about the behavioral aspects of factor investing, as well as concepts such as evolutionary economics and evolutionary portfolio theory. We talked about the impact of cultural differences on the way investors behave.

Thorsten Hens is Professor of Financial Economics at the Department of Banking and Finance of the University of Zurich, in Switzerland. He is also a CFA International Scientific Advisory Board member and a fellow of the Swiss Finance Institute. He studied at the University of Bonn, and previously held professorships at Stanford University and at the University of Bielefeld. Thorsten Hens is most well-known for introducing and pioneering the field of evolutionary finance, and for conducting the first large-scale international test on risk and time attitudes (INTRA). He lectures on various subjects, including behavioral finance, evolutionary finance and advanced portfolio theory. He also carries out consulting work for several Swiss pensions funds, such as the Pension Fund of the City of Zurich and the Vita Pension Fund.

A significant part of your academic work has been dedicated to exploring the behavior of investors. How does behavioral finance relate to factor investing?

“According to the efficient market hypothesis, factor investing should not work because there is only one factor, which is the market. But the vast amount of empirical research related to factor investing that has been accumulated over the years, shows that there are other factors, like value, quality or momentum. And, in my view, these factors can be explained by certain biases in investor behavior.”

Yes, but there is still a debate in academic circles. Some experts argue that factor premiums only represent a compensation for taking on more risk, while others think they are simply a case of mispricing due to behavioral causes. What is your point of view?

“I think there is some confusion in the industry. People like to interpret factors as ‘risk premiums’. And because they use this term, they think it means the explanation for these premiums is rational. But if you look a little deeper, these risk premiums are actually a bit like an insurance premium.”

“Let’s say, for example, that an insurer is paid a premium for insuring you against a potential hazard, and if this hazard happens, you receive some payment. Well, even though this may all seem very rational, it does not mean that the premium itself is rational. There are times when people are willing to pay a lot for insurance against some kind of hazard. While at other, perhaps quieter, times, people are not prepared to pay so much for the same type of insurance.”

“Regarding factor premiums as risk premiums does not make them rational. Look at the size effect in equity markets, for example, the finding that small-capitalization stocks tend to achieve higher returns than large-capitalization stocks in the long run. Well, the premium here is not constant over time, it fluctuates. Sometimes it can become really very attractive. And, in my view, these are times when the market is not being rational, because you get an excessively high compensation for the degree of risk you are taking.”

“Similarly, there are periods, particularly after a market crash, when the value factor offers a very high premium. And at other times, the

momentum factor offers a high premium. Whenever any of these premiums becomes extreme, that's when I would say investors are becoming irrational. If the premium remains moderate, 1% or 2% on top of the market return, it means we are in a more rational scenario."

"So, I think the confusion in the industry comes from the fact that some people use the term 'risk premium' so they can claim it is a rational phenomenon. But premiums can fluctuate, just as asset prices do. They can be quite rational, but are also sometimes completely irrational."

Is this true only for stock markets or do you see similar patterns in other asset classes?

"Oh, yes. These patterns exist in most asset classes. Take the value and momentum factors, for example. They can be found in all asset classes – currencies, fixed income, commodities, etc. And the reason is quite actually simple."

"Markets are affected by the many different views of those involved. These can basically be divided into two main groups: those who always focus on fundamentals and those who are trend-followers, like the chartists, for example. And it is the interaction of these two forces that creates volatility in the market.

"These two types of behavior can be found in all markets. Let me give an example. Originally, the concept of value investing was theorized by professors Benjamin Graham and David Dodd of Columbia Business School, in the 1930s. Their research focused on equity markets, where they looked at measures of value, such as book-to-market. But you can carry out a similar analysis in currency markets, looking at real effective exchange rates, for example. The same is true for price momentum: this phenomenon can be documented across many different financial markets."

So the value and momentum anomalies are linked to the behavior of investors?

"Clearly. These anomalies are linked to the interaction of the two opposing forces I just mentioned. Because these two groups of participants interact with each other, we have dynamics in financial markets. If all investors focused solely on fundamentals, markets would be much more efficient.

There would only be small fluctuations and you would not be able to earn very high factor premiums."

"But because there are also trend-followers, momentum investors, chartists, noise traders, and so on, there is much more action in the market. This happens in all kinds of asset classes: the real estate market, the currency market, the equity market, etc. Wherever you look, you always see these two opposing camps – one that focuses on fundamentals and another made up of trend-followers – trading with each other."

What about the factors included in the five-factor model of Nobel-prize winner, Eugene Fama, and his fellow researcher, Kenneth French?

"If you take into account the different factors that make up the five-factor model, I think you can probably define all five of them as combining rational and behavioral attributes, because they don't include momentum which is purely behavioral. In neither the original three-factor model, or the more recent and extended five-factor model, do Fama and French consider momentum as a factor."

"And I think the reason is that the concept of a momentum factor is very hard to reconcile with the concept of the risk premium equilibrium you would expect from parties agreeing on a price. As I already said, momentum happens because investors are trend-chasers, while economic models are usually based on the concept of equilibrium. So, it is difficult to incorporate a variable such as momentum."

"Another interesting factor included in the five-factor model is quality. In the past, it used to be called profitability. Now, I think most people call it quality. This seems to be a very rational risk-related factor. But the funny thing is that the logic is reversed. If you consider this as a risk factor you should be compensated for holding risk; the lower the quality the higher the return. While in fact exactly the opposite is the case: the higher the quality, the higher the return."

"I think there is something mysterious here. Moreover, when you look at the literature, things can vary considerably depending on the way quality is defined, on the kind of accounting measures that are used. So, the theory around quality is still rather fragile, in my view."

Some people actually argue that quality is not a real factor, it's a combination of different factors and has more to do with financial marketing than anything else. What is your take on this?

"Quality is not yet very well understood. If you look at the work of Fama and French, it even drives out book-to-market factor. When you carry out regressions with the quality factor, the book-to-market is no longer significant. And then the significance of the quality factor, depends on which accounting data you take and what you define as quality. So, I think there is more work to be done in this area."

What about what some people call the low-risk factor or the low volatility factor? There seems to be another paradox here too, right?

"To me, the low volatility factor is only partly a paradox. What the low volatility effect says is that, when you hold low volatility stocks or bonds, you get higher returns than you should expect according to the Capital Asset Pricing Model (CAPM). But it is still true that higher volatility is generally rewarded with higher returns than lower volatility is. Maybe the additional return is not as high as the CAPM predicts, but it is still higher."

"Many explanations have been proposed for this anomaly, like short-selling constraints or the fact that institutional investors tend to focus too much on large-capitalization stock and neglect smaller-capitalization, more volatile stocks, which weighs on valuations. I think it is more a matter

of institutional constraints than behavioral biases. So, to me, low volatility is not a big puzzle. Quality, on the contrary, is."

Why is it so important to determine how much of a given anomaly is due to rational risk assessment and how much is down to behavioral causes?

"My warning signal would be the following: if the returns you can get from a given factor are higher than 1% or 2% in excess of the market return, then it probably means investors are being irrational and you should start to worry. An interesting related question is whether you can time the periods during which you can earn a higher premium for the value or momentum factors, for example. Academics and practitioners are divided on this issue."

"Some say there is no way you can time factors efficiently and the best way is to diversify. They say: build a portfolio across asset classes with the three dominant factors, with the market, with value, with momentum, but don't try to time them. Meanwhile, other experts argue that some indicators can be used to time factors. For the value factor in equity markets, you can look at things like the business cycle, for example."



And where do you stand in this factor-timing debate? Should investors try to systematically time factors? Or is it more complicated than that?

“At the end of the day, our goal is to find a way to time the factors, of course. And I think you can use a number of indicators, such as changes in monetary policy or in the business cycle, to time the value and momentum factors in equity and bond markets. However, I am not sure this could also be applied to other asset classes.”

“If you look at commodity markets, or real estate, not much research has been carried out, so far. Further in-depth analysis needs to be done. So, we don’t really know yet, and this is why it is such a hotly debated topic at the moment. Should we time or combine?”

What about traditional asset allocation? Can investors simply scrap their old diversification framework?

“Yes. Before factor investing, people carried out classic asset allocation. They just allocated portfolios strategically into equities, bonds and alternative investments, like commodities or real estate. But the academic research accumulated over the past 10 to 20 years shows that you can build better portfolios if you allocate to factors rather than to asset classes.”

“As we already discussed, the markets for all asset classes are affected by the many different views of investors – those who focus on fundamentals

and those who are trend-followers. But if you look at the market from a factor perspective, you are better able to grasp these differences and take advantage of them. So, factor investing can be considered as a revolution for the financial industry.”

“Both institutional investors, such as pension funds for example, and private investors, are slowly shifting from asset allocation to factor allocation. And to me, this is a huge step forward. Of course, it also means that new, more sophisticated investment techniques are required. Many factor strategies need to be long-short, so it can be quite complicated to design and implement them. Individual investors or standard buy-and-hold investors often lack the capacity to construct such long-short portfolios.”

But then, what happens to diversification?

“You can diversify across factors too, so you no longer need to diversify across asset classes. True, the financial industry is not yet structured according to factors. Asset managers are usually structured according to asset classes. For example, you can find a manager for a US equity portfolio, an equity portfolio in another region, a bond portfolio, a commodity portfolio, and so on and so forth. This is how the fund industry is structured.”

“But from the perspective of a pension fund, for example, it would be great to find good cross-asset value managers or cross-asset momentum

‘Many factor strategies need to be long-short, so it can be quite complicated to design and implement them’



managers. Currently, only very few providers offer this. Most asset managers offer solutions that focus on a certain asset class, a certain region etc. But they don't have any cross-asset offering in the factor domain."

OK, but different factor premiums can sometimes clash with each other and this is why you should always take several factors into account. If you look at factors individually, how do you deal with these factor clashes?

"I understand your concern. But the real question is: who should determine the factor mix? Should asset owners determine this themselves? Or should they delegate it to their asset managers? If we look at the way traditional asset allocation is currently performed by pension funds, we see that asset owners generally determine the combination – often called strategic asset allocation – themselves. Then, they award mandates to the selected asset managers for the different asset classes."

"Meanwhile, when it comes to factors, most asset managers only offer bundled multi-factor solutions. Take it, or leave it. I think it would be better for pension funds if they carried out their strategic allocation in-house, but made a strategic allocation to factors. Then, they could look for the best managers for each one of the factors they are interested in. Of course, I also understand that from an asset manager's perspective, it is easier to do the combining themselves and offer asset owners diversified solutions. This means that if one the factor does poorly in the short run, they won't be blamed too much."

Also, as you mentioned, many pension funds don't have the structure, right?

"Well it's a bit like the chicken and the egg problem. The clients don't establish the structure because they can't find the providers. And the providers can't offer the product because the clients don't have the structure. But I am optimistic. I think things will slowly head in that direction: pension funds will start structuring according to factors, and some asset managers will specialize their product range accordingly."

In recent years, your research has also focused on evolutionary economics, and more specifically on the evolutionary portfolio theory. Could you explain this concept?

"This evolutionary model was introduced in a paper I wrote together with Igor Evstigneev and Klaus Reiner Schenk-Hoppé back in the early 2000s¹. The idea behind it is to look at the interactions between the different investment strategies that are being implemented in the market. For example, value strategies, momentum strategies, carry strategies and so on. And when you understand the different interactions between these strategies; you understand when is a better time for value, when is a better time for momentum."

"This model is very useful when backtesting a given strategy you plan to implement, for example. Standard backtests assume that you implement your strategy, but not how the rest of market reacts to what you do. That's because they usually rely solely on past return data, which is obviously quite naïve, particularly in these times when everybody is looking at factor investing. It is important to realize that we are now just part of a crowd of asset managers focusing on factor investing. To address this issue, the evolutionary model offers new types of tests: the so-called impact and reflexivity tests."

"Here is an analogy that will illustrate my point. This summer, I was driving my car through Germany and suddenly my navigation system said: 'ten kilometers ahead, there is a traffic jam, you'd better get out of here'. So I did, but so did everybody else. And so we all got stuck in the same little village shortly afterwards. That's exactly what standard backtesting leads to: it means you don't take the reaction of other market participants into account. Of course, the second time my navigation system said the same thing, I stayed on the highway. And it was the right decision because all the others drivers left. So, when you test a strategy, you really need to think twice."

So, if factor investing becomes too popular, some of the well-established premiums could eventually fade or even disappear, right?

"Not necessarily. Because there are different types of anomalies and different types of strategies. Take mean-reversion strategies, for example. If more and more investors implement this kind of strategy, the related premium will tend to decrease, because prices will be driven back to where

they should be according to fundamentals. And when the price is where the fundamentals say it should be, this kind of strategy becomes pointless. But then there are also what I would call explosive strategies, like momentum strategies. In this case, the more people who jump on board, the higher the return.”

“The evolutionary model can help determine which category the strategy you are considering falls into. In some cases, like value or momentum, the answer is quite obvious. But when you look at other kinds of strategies, such as carry strategies for example, you need to look a little more closely at the equations. It takes some computational work with logarithmic returns to work this out, but it is possible.”

“More generally, I would prefer it if the financial industry was not so influenced by trends. I know, it’s classic herd behavior, but from the perspective of a long-term investor, such as pension fund, it’s a real pity. Before the current factor investing trend, we had the asset allocation hype, when asset managers were all trying to persuade investors to get into commodities, interest rates swaps, and all kinds of asset classes.”

“Nowadays, everyone is talking about factors. It’s amazing how coordinated the industry seems to be. If you look at the conferences that are being organized, it is all the same: factor investing everywhere. I don’t think it’s a good idea because, when something becomes a fashion, people tend to become irrational about it.”

Your work has documented a number of country-specific cultural differences, that have an impact on the way investors behave locally. In particular, you document differences in terms of investment horizon and loss aversion. What are, in your view, the consequences for the major anomalies that we have been talking about so far?

“Well, I have looked more specifically at the value factor in equities and found interesting differences. In some countries, for example, the value factor only generates a low premium. These are countries where investors tend to be experienced and quite loss-tolerant. While, in other countries, you can get a higher return from the value factor, but these are generally younger markets where investors tend to be much less experienced, such as emerging markets for example².”

“I guess similar studies could be carried out on other factors. In a paper³ published some years ago, Andy Chui, Sheridan Titman and John Wei, analyzed the return of momentum strategies across several countries. They found important gaps which, according to them, could be explained by cultural differences, in particular the degree of individualism.”

Does that mean investors willing to implement a momentum strategy should focus on those countries where the momentum effect is the strongest?

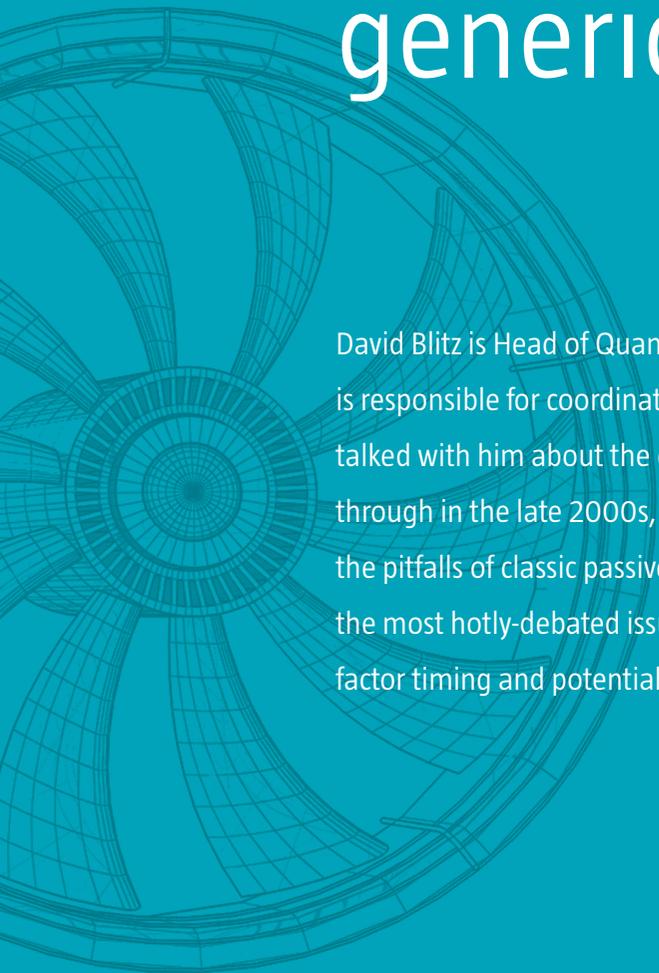
“I think investors should be aware of the differences between countries, if they want to pursue factor investing. They need to be careful where they do what. For example, it might be interesting to target the value factor in one region of the world, and the momentum factor in another.” ■

1. A non-technical survey is given in Evstigneev, I., T. Hens and K.R. Schenk-Hoppè (2016): “Evolutionary Behavioural Finance”, in: *The Handbook of Post Crisis Financial Modelling* (Haven, E., Molyneux, P., Wilson, J.O.S., Fedotov, S., Duygun, M., eds.), Palgrave MacMillan, pp. 214-234
2. N. Caliskan and T. Hens (2013): “Value around the World”, working paper No #848 NCCR FINRISK, 2013
3. A. Chui, S. Titman and J. Wei (2010): ‘Individualism and Momentum Around the World’, *Journal of Finance*, 2010, vol. 65, issue 1, 361-392



DAVID BLITZ

Pointing out the pitfalls of generic factor investing



David Blitz is Head of Quantitative Equity Research at Robeco and is responsible for coordinating all quantitative equity research. We talked with him about the difficult times quantitative investing went through in the late 2000s, Fama-French's multi-factor models and the pitfalls of classic passive strategies. We also discussed some of the most hotly-debated issues among factor investing practitioners: factor timing and potential overcrowding of factor strategies.

David Blitz is Head of Quantitative Equity Research at Robeco and is responsible for coordinating all quantitative equity research. Key tools which have been developed in this area are proprietary stock selection models and portfolio-optimization algorithms. He has published papers in peer-reviewed academic journals such as the *Journal of Portfolio Management*, *Journal of Empirical Finance* and *Emerging Markets Review*. In addition, he is a lecturer at VU University Amsterdam for the postgraduate Investment Management program and a regular speaker at international conferences. David Blitz started his career in the investment industry at Robeco in 1995. He holds a PhD in Finance and a Master's degree in Econometrics (cum laude) from Erasmus University Rotterdam.

You have been active in the field of finance for several decades now. In what way has the perception of quantitative investing, in particular factor investing, changed among academics and practitioners? What have been the most important milestones?

"When I started my career in the investment industry, people were still very much focused on fundamental investment strategies. Quantitative investing was definitely not mainstream. Over the years, however, it gradually became more accepted, and people opened up to it. Then, in the summer of 2007, there was this 'quant crisis', that made a lot of people become very negative again about quant investing. So, for a couple of years, quant really had a bad reputation."

"At the time, this so-called 'quant' umbrella encompassed many different aspects of investing. I remember, for example, this book titled *The Quants: How a New Breed of Math Whizzes Conquered Wall Street and Nearly Destroyed It*,¹ where things as different as credit default swaps, securitization, high frequency trading, factor investing, financial leverage and poker tournaments were all placed in the same category. At around the same time, so-called '130-30' strategies were hyped a lot. These strategies take short positions on poorly performing stocks up to 30% of a portfolio's value and use the proceeds to take a long position on the stocks expected to outperform the market. Many of these strategies, however, failed to live up to expectations."

"All this made the atmosphere around quantitative investing very negative, and it then went through a down period. Quantitative, factor-based strategies were able to silence the critics by delivering solid results, and as a consequence they were soon back in vogue. For the concept of factor investing, the real breakthrough came when well-known academics started to recommend that investors take these quantitative factors into account in their strategic allocation, as an indispensable part of their portfolio. As a result, factor exposure went from being an alpha decision to becoming a beta decision: building blocks of a portfolio investors should not ignore anymore."

Some consider Nobel prize winner, Eugene Fama, and fellow researcher, Kenneth French, with their three-factor model, to be the founding fathers of factor investing. What's your view?

"Absolutely. Eugene Fama and Kenneth French indeed laid the foundations of factor investing with their three-factor model, back in the early 1990s. They were the first to make a strong case for the existence of a size and a value factor, in addition to the market premium. Also around that time, some investment firms such as Dimensional Fund Advisors, whose approach is based on the research of Fama and French, and Vanguard, started to introduce small capitalization and value funds. This basically enabled investors to capture these value and size premiums."

"However, genuine factor investing did not take off for a long time. What I mean to say, is that the work of Fama and French initially caught the attention of the financial industry in a very puzzling way. Investment research firm Morningstar created a style matrix with 'small, mid and large' and 'value, growth and blend' dimensions. And what people did with that style matrix – and this has been predominant in the US for decades – was to basically pick a fund in every category."

"So, yes, investors were buying a small capitalization value fund. But they were also buying a large capitalization growth fund. However, the main take-away of the work of Fama and French is that you should have just one element of that matrix. You should have 'small capitalization value stocks', which is the sweet spot, and you should definitely not have the 'expensive large capitalization' stocks."

"Meanwhile, asset managers did not just offer small capitalization and value funds, they also offered growth funds and large capitalization funds. Index provider S&P Dow Jones, for example, not only offers value indices but also growth indices. And investors thought they should diversify across these styles, so they ended up being exposed to the market as a whole."

"Clearly, Fama and French's basic idea remained widely misunderstood for quite a long time, except by some very specific asset managers such as the ones I mentioned before. Actually, even now, one still wonders if investors really understand what factors are all about. Because, if you look at the huge number of products available, some are based on sound academic ideas, but many others do not seem to be based on solid evidence."

In your own research, you have focused on the low volatility and momentum anomalies which are not part of the group of factors included in Fama and French's models. How do you explain that?

"In my opinion, Fama and French brought order to the chaos with their three-factor model. At the time, there were already scores of empirical studies documenting all kinds of market anomalies that could not be explained by the capital asset pricing model (CAPM). The three-factor model showed that, if you use size and value, then you can actually explain most of the information provided by other anomalies."

"That was true back then. But in the 20 years that followed, everyone tried to come up with better tools, that would beat the three-factor model. I personally think that momentum and low volatility, together with quality, are the biggest challenges for that model. It took Fama and French quite some time to do something with all these new insights. Only in 2015, did they publish a paper in which they expanded their original model and turned it into a five-factor model, by actually introducing two quality-related factors."

"Regarding momentum, they have always acknowledged a momentum effect, but this concept does not align with their theory. So they mention it on their website, but they still refuse to include it in the model. In a way, that's a bit strange, since well before 2015, many academic studies were already adding momentum to the original three-factor model, turning it into a four-factor model. Therefore, I expect that, in the future, most studies based on the five-factor model will also add momentum, turning it into a six-factor model."

"As for the low beta and low volatility effects, these phenomena are so fundamentally contradictory with their whole 'Chicago School-efficient markets'-thinking that the two academics are very reluctant to do anything with them. All in all, I would say that the Fama-French five-factor model is a step forward, but also a missed opportunity."

You seem to focus your analysis on a very limited number of factors. But what about the hundreds of factors reported in the academic literature?

"You are right. Over the years, hundreds of factors have been empirically documented. I think this is obviously a bit exaggerated. For instance, you can take price-to-book, price-to-earnings, price-to-cash flow, price-to-sales, enterprise value-to-EBITDA: it is all value. These measures may not be

exactly the same, but they are obviously related. They are simply different ways to measure the same thing. And if one of these factors works, it is not so surprising to find out that others work as well.”

“So if you take these hundreds of reported factors and apply the same reasoning, you can certainly bring that number way down. More generally, I think you probably need multiple variables to measure the one premium you are really after. All these variables probably will have incremental value compared to each other. So, I would definitely not say there are 200 different anomalies. I think if you take the four factors we consider really relevant at Robeco – value, momentum, low volatility and quality – they are able to capture most of the information that these hundreds of factors claim to provide.”

Some critics of factor investing have warned about possible overcrowding issues, in particular given the current frenzy surrounding some very popular smart beta ETFs. Do you think overcrowding really poses a serious threat to factor premiums?

“I think these concerns are exaggerated, at least for now. Allocation to factors and factor based strategies has been around for decades, but the premiums provided by these factors have not disappeared. Moreover, if there is a rational behavioral explanation for eligible factors, as I think there is, there is no reason to believe such premiums will disappear even if many investors are aware of their existence.”

“The arguments that are used to justify overcrowding concerns are typically not evidence-based, but tend to be anecdotal. For instance, the rising valuation of low volatility stocks is cited as evidence that too much money has been poured into these strategies, while a long-term historical perspective shows that current valuations are not unusual at all. For instance, low volatility stocks were also more expensive than the market in the 1940s and 50s, when low volatility investing was still a completely unknown concept.”

Could the rapid expansion of smart beta ETFs change that?

“In theory it could. But let’s take a look at the evidence. In a recent paper,² I analyzed factor exposures of a broad sample of US equity ETFs, by regressing their returns on the returns of various well-known factors, based on data recorded in late 2015. I found that many funds indeed offer a large positive exposure to factors, such as size, value, momentum and low volatility. As such, they can be considered suitable instruments for investors seeking to systematically harvest these premiums, except perhaps for the momentum premium.”

“At the same time, however, I also found that many other US equity ETFs had a similarly large degree of negative exposure to the very same factors. On balance, the exposures to the size, value, momentum and low volatility factors turned out to be very close to zero. These findings clearly go against the idea that factor premiums are rapidly being arbitrated away by ETF

‘The arguments that are used to justify overcrowding concerns are typically not evidence-based’



investors. They also contradict the related concern that factor strategies could be leading to overcrowded trades.”

Still, impressive growth in assets under management targeting specific factors looks like a warning sign...

“Yes... and no. The increased popularity of low volatility strategies is a good illustration of this. Low volatility was one of the first market anomalies to be identified. At first glance, investors looking only at the billions of dollars invested in ETFs who are specifically targeting this anomaly may rightfully be concerned about possible overcrowding. However, upon closer examination, the funds in question are found to represent only a small fraction of the total ETF market.”

“Moreover, at the other end of the spectrum, you find a similar number of ETFs which provide exactly the opposite factor exposure, with a significant bias towards high volatility stocks. These ETFs are typically sector-focused funds. They are obviously not labelled ‘high volatility funds’ but they do effectively neutralize the exposure of the low volatility ETFs. In other words, based on ETF data, one might just as well argue that high volatility stocks, as opposed to low volatility stocks, are overcrowded. Or that both are equally overcrowded, in which case the concept of overcrowding also loses its meaning.”



What if some opportunistic investors start betting massively on one specific premium?

“That’s a possibility, but again, despite the fact that some factors have been identified for more than 40 years in the academic literature and are now very well-known in the investment industry, we do not see it actually happening. To illustrate this, in another recent paper,³ I analyzed the exposure of hedge funds to low volatility, using indices from two leading providers, Hedge Fund Research and Credit Suisse, over the 2000-2016 period.”

“Hedge funds are by nature both opportunistic and flexible. Therefore, one would expect them to actively bet on low volatility stocks. But, as surprising as it may seem, that is not the case. On the contrary, the analysis showed very clearly that, despite their flexible approach to investing, these funds tend to bet strongly against the low volatility anomaly. This is another indication that the low volatility trade is still far from being overcrowded.”

OK. But these findings also seem to refute one of the most frequently mentioned reasons that explain the existence of factor premiums: limits to arbitrage.

“That is true. Investment restrictions faced by investors, such as constraints on leverage, short-selling and being evaluated against a benchmark, are often cited among the key reasons for the existence of factor premiums. But my analysis of hedge funds returns suggests this may not be the main reason after all, since these constraints do not really apply to this category of investors. Other explanatory factors that have been proposed in the academic literature, such as the willingness on the part of portfolio managers to overpay for high volatility stocks in order to maximize the expected value of their option-like compensation schemes, may be more important.”

One other critical debate about factor investing, is whether investors should, or should not, try to tactically time their exposures to different premiums. Where do you stand on this issue?

“You are right, this is a very hot topic, that receives a lot of attention in the media. Basically, you can find people, such as Rob Arnott from Research Affiliates, who claim that factors can be timed by looking at the valuation. Other people, like Cliff Asness from AQR, argue that it is very hard to time factors. At Robeco, we agree more with the latter camp.”

“We recently looked at various indicators for timing factors, and the evidence is pretty weak. Also, if you think about it, factor timing is very similar to market timing, which is notoriously difficult. So, in that sense, it is not surprising that it does not work very well. For instance, many investors also use valuation measures to time the market. And, if you look back at 1997, for example, the stock market was already very expensive by historical standards, which you could probably have interpreted as a ‘sell’ signal at the time. Despite that, valuations kept on rising in the years to follow.”

“So, you could eventually be right about using valuation to predict next year’s stock market performance. However, generally speaking, it is a pretty weak indicator. What’s more, factor timing may even be harder than classic market timing. Indeed, the market is sort of a relatively constant thing. What I mean is, the market portfolio today is roughly the same as it will be three months from now. But if you take a factor like momentum, where the whole portfolio is constantly in flux, then it does not really make sense to try to time it because you are taking a position on something that will be completely different quite rapidly.”

“Another issue with factor timing, that makes it even more challenging, is that it is quite costly. If you want to time the market, you can use instruments such as index futures, which are very liquid and have very low transaction costs. So, even with limited timing skills, you can still make a difference and make it profitable.”

“Investors lack the kind of cheap and liquid instruments required for factor timing. Therefore, they need to trade in and out of their value, momentum or low volatility fund or ETF, which is way more expensive. As a result, the hurdle that you need to overcome to make timing profitable is much higher. All these elements explain why we are quite reluctant to say that factor timing is really worth the effort.”

The rise of factor investing has come along with another major trend in the way people invest in financial markets: the rapid growth of passive strategies. What is your view concerning this phenomenon?

“First, I think it is important to define what passive means. To me, genuine passive investing is classic market capitalization-weighted passive investing. Replicating a smart beta index, like the value index, is not a

passive strategy, but an active one, because you need to make all kinds of choices and assumptions in order to define such a strategy, and you also need someone else to be on the other side of the trade.”

“If you talk about passive market-cap weighted investing, I think it is a brilliant concept, backed by decades of convincing academic insights. However, what worries me is that it seems to become the default mindset for most asset owners. Not only retail investors, but pension fund trustees and even financial regulators, all increasingly believe that passive investing is the way to go and that active management should be the exception.”

“I think they are embracing passive too enthusiastically. And I am not saying that just because this phenomenon is a threat to Robeco’s business, but I really think they are overlooking the serious pitfalls of passive. If you think about it, passive investing means that you buy assets without caring about what you are actually buying. It means not looking at things such as the price which you are paying, for example. The sole reason why you are buying it is because others have bought it.”

“While I acknowledge there may be a lot a wisdom in the crowds, just doing something because everyone else is doing it just doesn’t seem right. In fact, passive investing also means ignoring decades of literature showing that certain characteristics of a security, such as valuation, price momentum or price volatility, say something about the expected returns.”

“With passive investing you simply turn a blind eye to the fact that you are buying assets that can have a very high valuation, very poor profitability, very poor price momentum or very high price volatility. As long as markets keep on going up, I don’t think people will be very worried about this. But things will probably change, as soon as the market faces a more difficult period.”

“What will happen if a journalist asks someone responsible for the investment policy of a fund: ‘why did you deliberately choose to hold these assets that had a terrible return and cost you money?’ If the answer is: ‘we did passive, I bought them because everyone else did,’ will that be considered an acceptable explanation? Could trustees of a fund reasonably think they are acting in the best interest of their clients in that case?”

Could factor investing be an answer to these concerns about passive?

“Well, I think it is necessary to, at least, recognize the importance of factors. Moreover, you don’t need to abandon the whole idea of passive altogether. You can be skeptical about active management and about factors, but still acknowledge there might be something interesting there. There are ways to get the best of both the passive and factor investing worlds. It is what we call enhanced indexing: you take the market index as a starting point, and then you introduce some tilts in order to take into account factor characteristics, as well.”

Still, advocates of classic indexing argue that the costs implied by factor investing do not compensate for the potential benefits of factor investing. What’s your view?

“I think the costs implied by factor investing do not negate its added value. The current active-passive debate among practitioners is mostly based on empirical research looking at active funds with fees of over 1% per annum, as compared to what you can find with passive, where fees can be as low as 1 or 2 basis points.”

“Of course, such a large fee gap, creates a very big hurdle for active management. But if you look at how fees have evolved over time, the difference between active and passive is quite small nowadays. So the costs are less and less of a valid argument to simply dismiss active management and go passive.”

Where do you see factor investing headed next? What might be the limits to its development? What potential dangers should investors be aware of?

“I am not entirely convinced factor investing will continue to rise and gradually take over all of classic active and passive management. One thing we know about investors is that they tend to be very forgetful. As a result, they repeat past mistakes, usually in a different way, but the mistakes are still the same. I think there will be a growing number of true believers, committed investors, who stick to this concept when more difficult times come.”

“But, right now, there is also a lot of money flowing into factor investing from people buying it just because it has had a nice run. These investors

will probably move on to the next idea when they experience the first serious headwind. The investment industry is also a business of stories. Investors love good stories. And there will certainly be more appealing stories to come.”

What very basic recommendation would you give newcomers interested in factor investing?

“Take a good look at what you are really buying. Many factor based products available in the market claim to be based on sound empirical research but turn out to not be so reliable, or, at the very least, are clearly suboptimal. When it comes to selecting a strategy, passive investing is fairly simple. You have to make some choices concerning the exact investment universe, but the rest is relatively straightforward. With factor investing, however, this is much more challenging.”

“Simply opting for exposure to one or several factors is not enough. There is no such thing as the value factor, or the momentum factor out there. There are many different ways to capture these premiums and investors really need to think carefully how they want to do it. When we empirically examined the performance of mutual funds which provide a lot of exposure to the value factor, we observed a huge variation in their returns. Investors should definitely be aware of that.” ■

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TONY BERRADA

Quantitative approaches require good data



Tony Berrada is Associate Professor of Finance at the Geneva Finance Research Institute and the Swiss Finance Institute of the University of Geneva in Switzerland. We talked with him about the difference between sophisticated and naïve approaches to asset allocation. We also spoke about the importance of quality data for quantitative models, and the way to process such data.

Tony Berrada is Associate Professor of Finance at the Geneva Finance Research Institute and the Swiss Finance Institute of the University of Geneva in Switzerland. His research focuses on financial mathematics and asset pricing. In particular, he has studied the role of learning in financial models with incomplete information. Prior to joining the faculty of the University of Geneva, Tony was an assistant professor of finance at HEC Montréal and HEC Lausanne. He holds a PhD in Finance from the University of Lausanne and was recently a senior visiting fellow at the School of Banking and Finance, Australian School of Business of UNSW.

One important debate in the field of finance relates to the current opposition to advocates of sophisticated approaches to diversification in favor of a more naïve approach to portfolio allocation that does not bother with complicated mathematical models. What are your views on this issue?

“You are quite right: this is a hot debate. Some academics and practitioners think we should simply forget about any kind of quantitative approach, and stick to more traditional methods. I personally think this is not necessarily a good idea, because there are good quantitative methodologies that work if we have the correct input. It is really important to understand that a quantitative approach does not guarantee success. It is just a methodology that is useful if you have the correct input. And, in my opinion, the combination of these two elements is a very valid approach to asset allocation”

“Of course, if you have bad input, if you just have the machine but you don’t know what kind of fuel to put in it, that machine becomes useless. And perhaps this is what the advocates of the naïve side are saying. Indeed, some of them argue that the type of input we currently have is of relatively low quality or is rather imprecise. Therefore, we should not rely on sophisticated tools, because they actually make the mistakes even worse than if we were to just stick to very simple and naïve strategies. However, I think that if we make the effort to get the proper input, we can achieve good results.”

How do you get such good input?

“This is a key issue. Nowadays, academics and investors can access enormous quantities of valuable data. This is indeed a hot trend: big data. We have intraday, intra-minute data on changes in asset prices, and pretty soon we’ll have intra-second information. The question is how to process and structure all that data. And, in a way, this is what factor investing is about: trying to focus on the crucial elements and the statistical structure of asset prices and to just find the pieces that are the most relevant and common to all assets.”

“In my view, factor investing is not about identifying which stock is going to outperform or which little fund is going to do better than another. It is about understanding the global interdependence between asset classes or geographical areas. This can only be achieved if we manage to synthesize

the structure, and focus on a small number of key factors. For this purpose, we first need to identify the relevant factors. But we also need to measure the risk premiums associated with these risk factors over time, as new information becomes available. And we also need to be able to assess the interdependence of these risk factors.”

Could you give a specific example of how to process information?

“Well, the academic approach is to say that we should be able to falsify a methodology. This means being able to test it, for example looking back at past data and making sure that what we say we should have done would have actually been the right thing to do. It is important to statically assess the validity of your statement.”

“And I think this kind of very academic approach is very valuable for the financial industry, as well. It is very risky to base a strategy on something that works this week, may also work the week after, but that you cannot conclusively test over long periods of time with reasonable methods. On the contrary, practitioners should stick to a very systematic approach, a very formal testing phase, in which they can really falsify their assumptions, try to prove themselves wrong in a sense, instead of jumping on the most recently discovered and fashionable factor.”

You are right, hundreds of potential factors have been reported in the academic literature over the past couple of decades. But how can you identify the relevant ones?

“Well, there are different ways to do that. But first, I would start by taking the list of hundreds of factors that have been documented and apply some of the relatively new statistical methods to test them. Because there is no way investors can deal with so many factors, and it is very unlikely that all of them are important. And this is where good quantitative tools become very important, for example, so-called penalization approaches, with LASSO (Least Absolute Shrinkage and Selection Operator) regression analysis methods.”

“Such approaches are slowly gaining ground in finance, where they are considered relatively novel, but they have been used in other areas for years. As a matter of fact, LASSO regressions are very popular in genetics, where they help identify important markers in DNA. In this field of research, scientists are also confronted with millions of cross-sections and

need to distinguish those factors that are really relevant from those that are less important. A LASSO approach does exactly that: in a particular way, it penalizes the estimation of the factors’ structure to reduce those that are very close to zero to zero.”

“This is the kind of tool that can be employed to estimate factor structure quite successfully. In a paper¹ published in 2016 in the Review of Financial Studies, Campbell Harvey, Yan Liu and Heqing Zhu actually put over 300 hundred factors reported in the academic literature to the test and argued that most of the findings of financial economic research are likely false. In the end, I would say, there are probably no more than five to ten relevant factors. That is also the only quantity that investors can reasonably rationalize.”

Beyond statistical analysis, what other criteria would you use to identify a relevant factor?

“A statistical analysis can help you test the quality or the validity of a model. But, of course, it does not tell you which model to start with: it is just a selection mechanism. I think factors should be rooted in theory. So, before getting into any mathematical calculations, you should first be able to intuitively explain the very big picture of why a particular factor may exist. Let me give you some examples. Although it is not quite clear what the size factor or the book-to-market factors represent, you can actually come up with very plausible explanations for their existence. It could be credit risk, mean reversion or an exposure to reselling risk of large assets, for example.”

“I think investors are usually quite rational. Of course, there can be periods of temporary overreaction or underreaction, and all sorts of biases may have an impact in the short run. But believing that these biases can be treated as risk factors on which long-term allocation can be based, seems like more of a gamble. We shouldn’t be gambling, we should try to find out why we get a return. If you get a return and you don’t really know why, then you are actually taking a risk that you haven’t identified.”

“So, I would start with a good theoretical model that could explain the existence of a common factor and then make sure there is valid and falsifiable methodology to test the validity of the factor. If you cannot come up with a convincing economic theory to back a factor, I would not trust it.

Constructing a factor that seems to explain the cross-section of expected returns, by going long on one particular asset and going short on another one, but without knowing why, is certainly a bad start.”

Which factors stand out, in your view?

“The first one I would mention is obviously the market beta: the simple, systematic risk exposure to global wealth. I cannot think of a reason why this factor should not be included in the list, although it may not always be easy to measure. Indeed, many different confounding effects can sometimes make it look strange, but this is probably just a matter of misspecification. Anyway, to me, this would be the starting point.”

“Then I would also mention the momentum factor, which has clearly been identified as something we should take into account. However, the problem with momentum is determining the correct frequency. It is not clear whether we should look at price variations over 12 months, six months, three months or one month. Moreover, momentum crashes are very tough, which means investors are just getting a reward for a particular risk. Indeed, the momentum premium is not risk-free, it has exposure to massive crashes during a recession.”

“Another important factor to mention is volatility, although, in that case, too, some important issues should be raised. A number of recent academic studies have shown that the low-volatility anomaly tends

to fade if you integrate skewness approaches. In a recent paper² Paul Schneider, Christian Wagner and Josef Zechner argued that the beta and volatility-based low risk anomalies were driven by return skewness, which is the fact that investors might have preferences for asymmetry in the distribution of returns. Once you control for this asymmetry, the volatility anomaly tends to be dampened a little bit. So, volatility seems to be an important factor, but, again, the situation is not entirely clear.”

“More recently, there has also been a lot of discussion about quality-related factors. One example is the ‘quality minus junk’ factor that was reported a few years ago³. These different aspects of quality are interesting but they also remind us that this concept remains very difficult to define. It could be return on assets, it could be quality of credit history, it could be many things. Therefore, constructing a quality factor is almost like cooking: everybody has their own recipe to prepare a similar dish. As more research is carried out, maybe we’ll arrive at more consensual definitions. For now, however, things are still a bit up in the air.”

“In fact, I cannot think of any other factor besides the market where we fully understand what is going on. All other major factors seem to be important and provide interesting explanations for the cross-section of asset returns, but there are always surprises. Until the global financial crisis in 2008, for example, everybody thought of momentum as a great factor and a great strategy. And then, the market crashed.”



Maybe this just goes to show that factors do not work all the time. Don't you think?

"Well, obviously, this is a fundamental issue. It is clear that, out of the hundreds of factors Campbell Harvey and his co-authors studied, the vast majority of them don't work all the time. And even if some seem to come back again and again, that's probably because they represent genuine systematic risk. In other words: you may be rewarded for a specific risk, but it's not one you should be willing to take. There is no free lunch."

"So, even if targeting factor premiums is definitely better than holding on to a simple market cap-weighted index, this kind of strategy also comes with specific risks. And only if we correctly understand the factor structure, can we understand what types of exposures we have and actually manage the associated risks. Otherwise, if we don't have an appropriate factor structure, we won't even know where these premiums can be found. This should be a very important aspect of any factor approach: the risk management that comes with it and understanding what types of exposures it actually implies."

How do you see diversification across a large number of securities? Should we simply trust the mathematical model? Or should we also keep in mind the basic principles of naïve diversification?

"Hopefully the mathematical model will confirm the manager's initial intuition. This is typically what mathematical models do. They rationalize

and maybe make an hypothesis that already existed a little bit more precise. These models never produce anything that is entirely new. As a matter of fact, the idea that investors should diversify across asset classes, avoid being overexposed or concentrated in one particular asset, sector or geographic area, was at the root of the risk budgeting, or risk-parity, approach."

"And this is actually what smart beta is also about. We know that following passive market capitalization-weighted indices inevitably leads to being over-invested in large capitalization firms, which obviously seems counterintuitive as far as diversification is concerned. The concept of smart beta formalizes the idea of weighting portfolios differently, in order to achieve more balanced exposures in terms of risk factors. But the underlying need for diversification was already there. So, even the most quantitative methodology should correspond to some intuition of the investment manager. Maybe not with all the details but the idea should be there."

Still, some generic products in the current smart beta offering do not address concentration risk. Is there not a tendency to trust mathematical models too much and forget about basic investment principles?

"Yes, that's true. Maybe because some of the models used only focus on one very specific aspect at a time. One example would be the construction of a mean-variance efficient portfolio without imposing some particular constraints on the diversification, that may end up having extremely

'Even the most quantitative methodology should correspond to some intuition of the investment manager'



large positions in a particular asset and extremely large short positions in another. You could adjust the model to take into account these aspects of diversification in a formal way, but that would require imposing some constraints. And, these kinds of mechanisms are typically absent from standard basic products because they are complicated to implement.”

“It is much easier and cheaper to design a strategy that simply replicates the market index with just a slight factor tilt, and call that a smart beta strategy. Depending on the kind of business you are in, you might want to go for the simplest product offering and try to charge the highest fee for it. But actually integrating all these aspects – monitoring factor exposures, minimizing transaction costs, ensuring correct diversification levels and proper risk management – is a lot of work. That is why most generic products, most off-the-shelf standard factor ETFs, don’t do that.”

So far, we have mostly been talking about risk-related explanations for the different factors. What about behavioral causes?

“This is a complicated question. I think it is very important to analyze the individual behavior of investors to understand financial markets. I am actually doing quite a lot of research in this area, in particular on a number of experimental aspects. For example, my co-authors and I recently carried out an experiment on misrepresentations and risk assessment⁴, in order to get a better sense of the way humans perceive their physical environment and risk. Obviously, we found a number of biases.”

“We focused on some well-known sensory after-effects, which usually involve visual properties, such as color, contrast, size, and motion. For example, viewing the downward motion of a waterfall induces the anomalous biased experience of upward motion during the subsequent viewing of static rocks to the side. We were interested in assessing whether these after-effects distort our variance perception and found that perceived variance tends to be decreased after prolonged exposure to high variance and increased after exposure to low variance.”

“This is human behavior; we are programmed to have that bias. And with good reason: it would make us more likely to survive in the jungle. But, on the other hand, it does not help us perform well on the stock market. As a result, one can reasonably assume that, anytime individual investors are very active in one particular area of the financial markets, significant behavioral biases could be at play.”

“Having said that, I also think that in very efficient, very liquid markets, such behavioral effects are less likely to influence asset prices. If everybody agrees that there is a given systematic bias in investors’ behavior that generates a specific premium, this premium should by definition disappear. This kind of phenomenon could eventually persist in some very illiquid parts of the market, maybe in emerging markets, for example. But for the more established, highly liquid markets, I am not really convinced that behavioral aspects – something investors do wrong – have such an important impact.”



‘I think it is very important to analyze the individual behavior of investors to understand financial markets’

“I think the term ‘behavioral’ is sometimes misinterpreted. For example, we say: people have a preference for skewness, so for asymmetry in a particular aspect of the distribution. In my opinion, this is not a behavioral bias, this is just a preference.”

You mean it could be rational?

“Exactly! For example, an investor could indeed rationally explain his preference for less risk rather than more. This would just be an assessment of one’s own preferences, which can change over time, and may not be linked to any behavioral bias. It is perfectly rational for investors to be willing to take on more risk during good times, and to be more cautious during recessions. And if a given asset has a particularly attractive payoff structure during recessions they will logically value it more during bad times than good ones.”

“So, if these kinds of very rational and perfectly understandable reactions are what you mean by behavioral causes, then yes, they can have a significant impact on markets. If, on the other hand, you mean repeatedly making the same mistakes, I am not so sure. Because if you can identify an inefficiency or a mistake, some kind of bias in perception or action, then I don’t think it should be systematically rewarded. This is just an inefficiency and it will likely vanish at some point.”

So, these factors that we have been talking about, they should not disappear because they have very logical, rational causes, right?

“Absolutely. And that’s why it is a good idea to set up long-term investment strategies based on these factors. You would certainly not want to bet on something that is going to vanish in the next few months or years, right? Hopefully the ones we have been talking about are here to stay. And if we are able to identify the correct structure, they will work a bit like credit risk. If a specific firm has a high probability of default, then you expect to have a higher return. But this is not a magic trick: it is just compensation for a specific risk.”

“Another important aspect I would like to mention is that even if you found a factor that can explain the cross-section of expected returns, that does not necessarily mean you should take it into account in your allocation framework. Being able to explain the cross-section might be important, but maybe this factor does not generate a premium, or at least not a

significant one. So the fact that a factor explains the risk-return differences across different securities is one key criteria but it is not sufficient at all.”

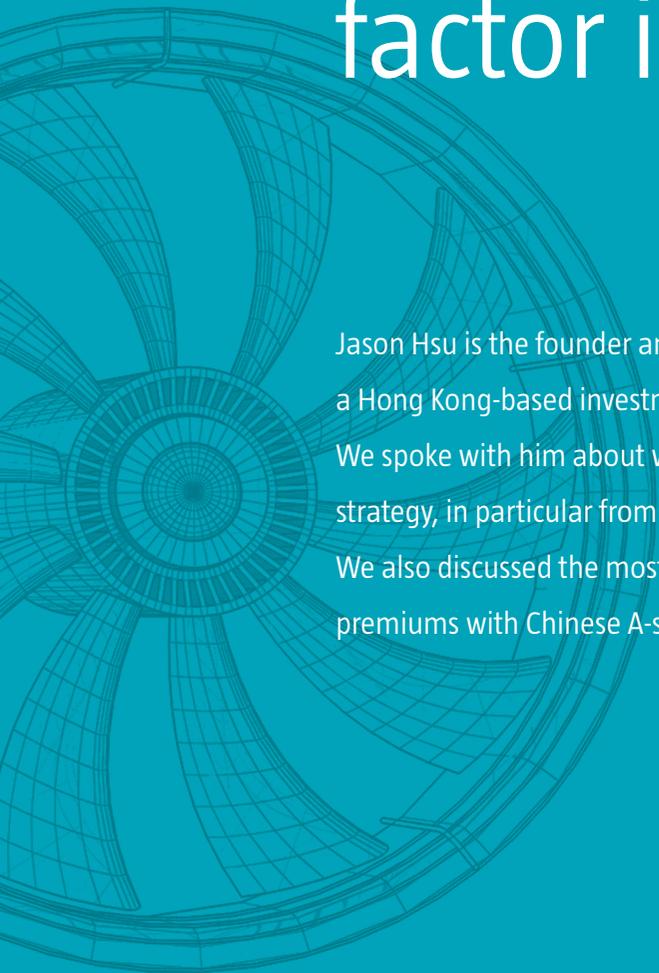
“Moreover, it is important to note that measuring the premium associated with a given factor is usually quite tricky and that this reward can change quite significantly over time. So another key challenge for investors, once they have identified the relevant factors, is to properly model risk premiums. So, understanding what causes factors across different assets is an important first step. But understanding how these factors work overtime is also crucial. This means that even basic factor-tilting strategies are not trivial at all. Indeed, an overexposure of 5% to particular kinds of securities during an expansion phase might be just as risky as a 1% exposure during a recession phase.” ■

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JASON HSU

A-shares as new frontier for factor investing research



Jason Hsu is the founder and CIO of Rayliant Global Advisors ('RGA'), a Hong Kong-based investment management group founded in 2012. We spoke with him about what makes a good factor-based investment strategy, in particular from a practical implementation point of view. We also discussed the most recent empirical findings concerning factor premiums with Chinese A-shares.

Jason Hsu is the founder and CIO of Rayliant Global Advisors (“RGA”), a Hong Kong-based investment management group founded in 2012. RGA specializes in Greater China equity strategies and provides services to global investors through research, IP licensing and asset management. Prior to his current role, Jason was the co-founder and vice chairman of Research Affiliates. He is a member of the board of directors at the Anderson School of Management at UCLA, as well as an adjunct Professor in Finance. For his service to UCLA’s Anderson School, he received the 2009 Outstanding Service Award. He has also held visiting professorships at UC Irvine Merage Business School, Taiwan National Chengchi University and Kyoto University. Jason has authored more than 40 peer-reviewed articles. He is an associate editor of the Journal of Investment Management and serves on the editorial board of the Financial Analysts Journal, the Journal of Index Investing, the Journal of Investment Consulting, and the Journal of Investment Management. He graduated with a BS (summa cum laude) in physics from the California Institute of Technology, was awarded an MS in finance from Stanford University, and earned his Ph.D. in finance from UCLA, where he conducted research on the equity premium, business cycles, and portfolio allocations.

Over the past couple of decades, dozens of factors have been documented in the academic literature. What is your view on the recent frenzy of research and product launches?

“From an academic point of view, the theory and the empirical research behind factor investing have been with us since the 1970s. So, factor investing is by no means new. It has been thoroughly vetted and is a standard tool for both conceptualizing the relationship between risk and return, and for empirically measuring portfolio performance and asset class returns. Today, there is very little question as to its merit and its applicability.”

“The actual products, rather than the academic theory or empirical research, however, are more controversial and have met with a degree of skepticism, driven by the recent explosion in product creation. Of course, many of the existing products are based on time-tested, well-embedded research, and that I don’t think that I, or other researchers, would have issues with most products.”

“Strategies based on the value or the low volatility factors have been very well studied. And while there may be different ways to build them, by and large, they result in portfolios with similar characteristics. So there isn’t really much controversy around what we see in terms of low volatility, value and other similar products. We should be more skeptical, however, about the more exotic products, that aren’t as firmly rooted in the academic literature.”

Are only a limited number of factors worth being considered? Or would you leave the list open?

“I would say there are not more than a handful, definitely less than ten. I would point to the ones that are well-vetted, persistent, and that make sense from an economic point of view. In particular, I would mention the value and low volatility factors. Momentum is also a case in point, although there are some issues as to its investability, and in terms of capacity and trading costs. The small caps factor, also referred to as the size factor, should also be mentioned, despite the fact that it has some capacity and investability issues, as well. In addition, you have the low investment and the gross profitability factors. On top of these factors that have emerged from the asset pricing literature, there are also a few in the accounting literature, that I consider quite credible. In particular, factors that are related to accrual-based anomalies.”

“All these are the fairly standard ones, that I think most researchers could easily get behind. However, the 400+ different investable factors that can be mined from the academic research platform SSRN, in particular the most esoteric ones, are much less defensible.”

“However, by and large, most of the products created recently have been more like the standard fare. So I am not so concerned about those. Sometimes it’s more a matter of naming conventions than anything else. That’s the case, for example, with some of the different factors that are being combined to form the quality factor. In such cases, I think it is more a matter of commercial packaging and less of a research debate.”

How concerned should we be about ‘data mining’ issues?

“In academia, we have long been aware of the challenges associated with data mining, also referred to as data snooping. There are currently thousands of professors and many more thousands of graduate students that are all looking at roughly the same dataset, trying to find patterns and doing their job with integrity. That means that in any given year, tens of thousands of regressions and back tests are being done, which naturally creates a data mining bias and certainly an upward bias in terms of the efficacy of these factor models.”

“When it comes to turning academic research into actual products, the problem gets compounded for two reasons. One is that people often forget that not everything that is published is necessarily true. There is a problem of misrepresentation, or at least omission, when we simplistically turn academic research into actual products.”

“Another issue has to do with the fact that practitioners sometimes think that if all they do is just take an existing academic factor model and apply it, they won’t be able to charge a lot for it. Plus, it’s not as intellectually exciting. So these practitioners try to come up with newer factor models, or aggressively recalibrate existing ones. I think that’s where it gets really dangerous because you are moving away from a peer-reviewed academic ecosystem. Moreover, some of the work may be done by less experienced researchers, without enough supervision from senior colleagues.”

Should academic journals change the way they select research papers?

“I think we have probably turned a corner in this area. Previously, we were just aware of the datamining issue and probably did not publicize it enough. And now, academics are aggressively promoting important papers by people such as Campbell Harvey or Robert Novy-Marx, that raise these issues. I think it’s great to remind everyone how skeptical we should be. And the fact that we’re talking about it is already very positive, right? It means awareness has increased.”

“But I also think there is a lot more work left to be done, in particular for the practitioners who must educate investors on this issue. This may be more difficult because practitioners are at times faced conflicting objectives in terms of scientific rigorousness and sales targets.”

What should investors do to properly assess factor-based strategies?

“First, I would like to underscore the difference between factor investing and quantitative investing in a more general sense. I think of factor investing as the exploitation of consistent sources of return, either due to additional risk taking or pricing anomalies. Other quant strategies, often based on mining big data and finding transient patterns, tend to get arbitrated away quickly. In this case, I will only talk about factor investing.”

“Investors should start with the classic well-vetted factor strategies, those we believe are likely to be persistent and repeatable for very long periods of time. They should not try to be too clever and ensure diversified exposure. Take, for example, six factors they understand, that make sense for them and that have been well studied. Weight those six factors equally and that should be your starting point. That would be my standard recommendation.”

“Avoid thinking: ‘this factor has the highest in-sample Sharpe ratio, according to some average over the last 25 years, so I am going to give that factor a lot more weight’. The reason is that even with a 20-year sample, the difference between a Sharpe ratio of 0.3 or 0.35 is not statistically significant enough for you to concentrate aggressively on one factor over another. So, do not try to optimize based on historical averages, because you’ll concentrate too much on a particular factor based on very little information.”

“And then, once they have diversified across factors, investors can start wondering whether they should time factors or not. But again, they should not start out by trying to outsmart other investors and to forecast which factor will do best during the next market phase. None of us have that kind of forecasting power, and the result might be an excessively concentrated portfolio that will probably not perform well.”

Any implementation aspects investors might want to delve into?

“I think it is crucial for investors to make sure that a factor strategy is designed such that it is sufficiently liquid, investable and low-turnover. For example, you certainly don’t want someone maximizing factor returns by concentrating on the very illiquid small-cap stocks, which we know have some issues with efficiency. We know some of these factors strategies do better in the illiquid small-caps space, but the drawback is that you are losing liquidity and incurring costs. Therefore, these solutions are not suitable for the larger institutions.”

“Moreover, because they should be looking at standard factors, investors should get quite concerned if a product provider has a very unique way of putting together a factor and claims to be able to squeeze 101% of it. I am not saying that’s completely impossible, but I would say it is difficult to verify empirically. Unless the theory behind it is very strong, I would be very skeptical of people claiming they can offer the world’s most extraordinary value factor or a low volatility factor, for example.”

What is your position concerning the ongoing debate over factor timing?

“There is definitely consensus among academics and practitioners on the fact that qualitatively, there are cyclical patterns that make factor timing possible. However, from a quantitative point of view, there is more disagreement. The main reason is that the investment horizon over which you could time factors needs to be at least three to five years long. Do people have the stomach or the investment governance to really do that? That is certainly the most important question.”

“And my sense is that, unless you are Warren Buffett, any kind of pattern that is statistically, or even economically, meaningful, is, with these horizons, just too difficult to incorporate into commercial products. This has to do with the whole investment ecosystem: clients don’t sit around for years before they decide to fire a manager. Their patience lasts somewhere between two and three years.”

“It is really important to look at that in context: we look at the quantifiable data and to make matters even more complicated, we also have a good theory that says: even if a factor could be timed, again, you may not want to do it with some factors, whereas with others, it could make sense to time them more aggressively. It depends on whether the factor has a meaningful Sharpe ratio.”



‘It is crucial to make sure that a factor strategy is sufficiently liquid, investable and low-turnover’

“Let’s take a very simple example: the market factor, based on the S&P 500 index. We know that, on average, the index generates an attractive Sharpe ratio and follows a cyclical pattern. So it might make sense to time it. However, if you time it wrong, for example when you short the index during a bull market, it can be incredibly costly. The opportunity cost is very high. So even if you could time factors, you may not want to, because of the high opportunity cost of being wrong.”

“Of course, the factor timing question still remains to be fully explored. But for now, I would say that although it is agreed that factors are qualitatively ‘timeable’, the governance structure of investors, the costs associated with timing and the opportunity cost of being wrong make the quantitative analysis far more difficult. And, at the same time, sensible people may passionately argue the other side.”

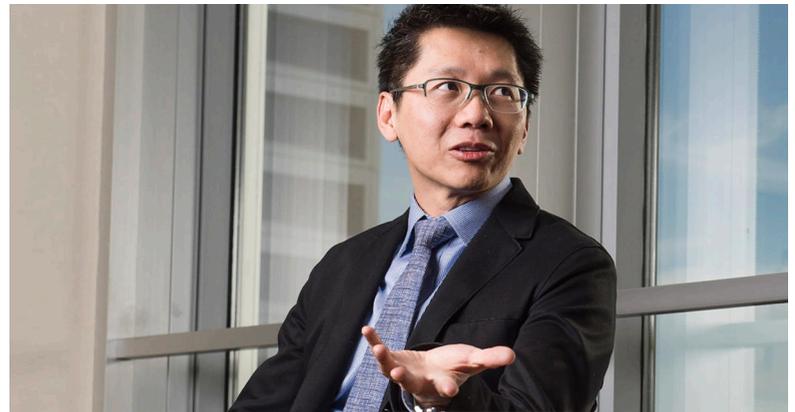
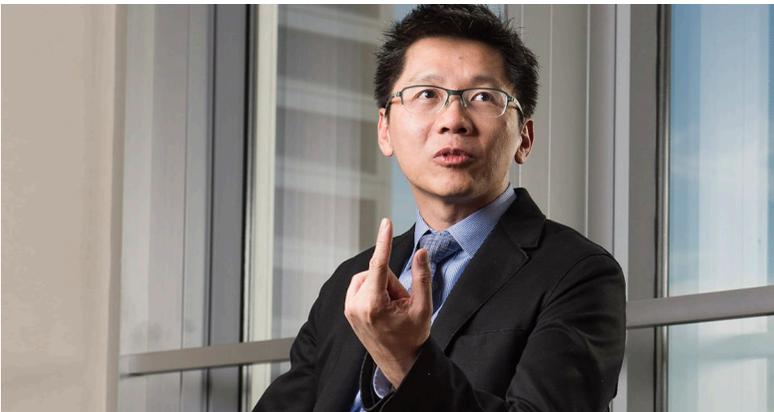
Should investors completely scrap the traditional diversification across asset classes?

“I would definitely argue they should diversify across both factors and asset classes. There are certainly reasons to think that diversification across factors feels more scientific, feels like it’s more informative. I would agree with all of that but I do think there is one caveat that should not be forgotten and that is valuation.”

“When you look at factors and ignore asset classes, you may reach the conclusion that getting exposure to a given factor through one asset class or another, leads to a similar result once you risk-adjust for the size, the volatility and the beta that you desire.”

“From a statistical standpoint, this statement may be correct. But what’s missing is an analysis that you definitely want to consider: although different asset classes can provide similar exposure to certain factors, these different asset classes trade at different valuation multiples. You are therefore paying different prices to buy otherwise identical factor exposures, and you don’t want to ignore that valuation information. And you certainly want to pick the asset class that allows you to have exposure to a given factor at a lower cost.”

“I think you do have to combine both sets of information, in order to take the right investment decision. The reason why people tend to forget that is because it is too easy, when you think about factors, to assume that markets are perfectly efficient, and therefore that there is no such thing as being able to buy factor exposure more cheaply through another asset class. But I think that viewing investing in that way is too black and white, and perhaps a bit naïve, as well.”



You have recently been focusing your research on China's A-shares'. Why?

"Over time, I have become much more of a behavioral finance person. I interpret a lot of the different factors as having their origin in the behavioral biases of investors. And I think that those who exhibit the most persistent biases are more likely to be the typically less sophisticated and less experienced retail investors."

"Instead of studying behavioral biases in a market completely dominated by institutional investors, such as in the US in recent years, you can certainly perform a much more useful assessment of behavioral biases by going into a market where 90% of trading arguably originates from retail and unsophisticated investors, which is the case for Chinese A-shares. So, there is just more to learn about the behavioral channels and how they influence asset prices."

"Another interesting question is whether factors become much more applicable and carry much higher premiums because there are more behavioral mistakes. Moreover, the Chinese A-shares market remains a virgin dataset, from an academic research point of view. As a result, there is actually a tremendous potential to say something new and interesting based on this dataset."

Do you think we have sufficient hindsight on A-shares to draw any conclusions?

"I think the fact that it is a noisy dataset and that we don't know very much about it presents opportunities for both researchers and people looking to create investment products. I think that with these challenges comes great opportunity."

"Of course, you are right to raise this issue, because relatively little research has been carried out so far and we ought to be that much more skeptical concerning research findings that have been reported. We may still discover that some of the studies can't be replicated, either because there was a mistake in the data or a methodology problem. Also, the academic community, for peer-to-peer reviews, remains limited."

"So, I think we should all be more skeptical when we look at earlier research and scrutinize it more closely. The major challenge is the smaller

dataset. Chinese equity markets were not reopened until the early 1990s, and they did not reach significant breadth and depth until the early 2000s. So, we are not talking about a lot of data. Moreover, there have been at least two very major regulatory reforms, which create non-stationary data and make the data even more challenging to examine."

"So you have non-stationary data for 20+ years and if you exclude it, you have stationary data for ten years. Ten years just isn't long enough for you to really say anything. This creates lots of challenges, but this is also where a good econometrician has a real edge."

What have been your main findings so far?

"There are two things that I am quite sure of. First, because there are a lot more retail investors active in Chinese A-shares market, you do observe a lot more behavioral biases that then lead to what seem like alpha opportunities. That's the kind of market where you don't have to be quite so skeptical and say: 'that seems so silly, that can't possibly be true'. In China, there is just so much anecdotal evidence supporting what proves to be considerable inefficiency. So, in that respect, I feel quite confident."

"The second thing I am quite sure of is the opportunities that are created by Chinese rules and regulations, and also the localizations that are necessary for an international investor. Chinese regulations don't quite work the same way we, in the Western world, expect them to. The Chinese regulatory authority, the CSRC, tends to change their rules more frequently than other regulators, and these changes can create huge opportunities. Because they may be poorly understood, the market may overreact to them. These regulation changes may also cause outright shifts in how financial ratios ought to be properly interpreted."

Would you say factor investing in A-shares is workable and really worth the effort for investors?

"Yes. I would definitely say that it is worth it. True, factor investing in A-shares is a lot more work than in other equity markets. You have to do a lot more data cleaning and you spend a lot more time talking to people who have been long-term market participants. They can provide valuable insight concerning the different regime shifts. However, if you do all that work, the pay-off is also well worth it, because you are then able to focus on the very considerable inefficiency in that market."

Could you give an example of some of differences you see with US or European equity markets, concerning the way anomalies should be analyzed?

“Yes. Let’s take, for example, dividend yield. I think in most equity markets, it is a reliable and a very sensible value signal. A large and steady dividend payout usually means your price is low. In other words: it is a great value signal. Well, this was true for A-shares too for part of the dataset, but then the trend ended and has reversed since 2010. And the reason behind that, beyond the usual noise, was that the rules concerning dividend payout were changed. The CSRC introduced a rule that says firms that issue a secondary offering need to pay out at least 30% of their earnings in dividends. Otherwise they can’t access the secondary market to sell equity shares.”

“Now, firms that need to raise money, for new projects or acquisitions, usually exhaust internal capital first – because that’s low cost of capital – and then go to the external market. It makes no sense for them to first pay out 30% of their earnings for a year, and then hire investment banks to float shares. That is slow and costly, if you really have important projects to undertake. So most firms that are willing to comply with this new regulation in order to be able to issue shares are not those that really need money but those that are already trading at a very high valuation multiple and therefore want to sell shares as a way to lock in cheap capital. As a result, a high dividend yield almost becomes an overvaluation signal.”

What about momentum signals?

“If you talk to anyone in China, you will quickly discover that –whether or not they admit it – they are momentum traders. They follow trends and their reasoning is: ‘prices are going up, let me get in on it quickly because it is going to go up some more’. All the retail investors assume that, and do the same. Of course, that kind of strategy does not work, and the average investor is not very successful. Doing the same thing they claim to be doing should not produce good results.”

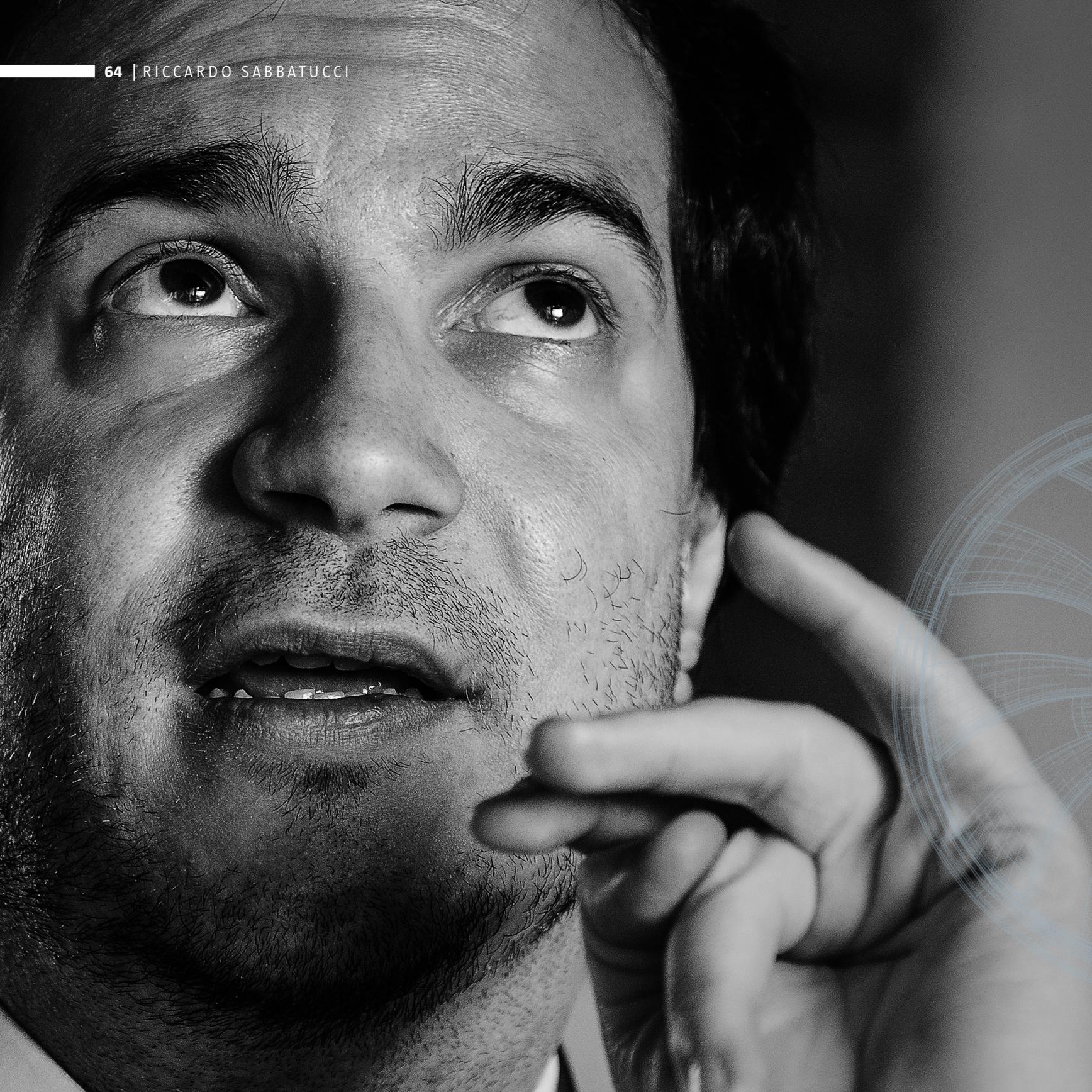
“And, in fact, that is exactly what we see. Any of the standard ways of constructing momentum –whether it really is short-term momentum, or slightly longer-term momentum as defined for the US, when you look at the past 12 months – it simply doesn’t work in China. In fact, with those horizons, the reversal trade strategies are far more profitable. So it just

goes to show that you want to be on the other side of what retail investors do. And that is also what we see in the data.”

Does that mean institutional investors should adapt their factor strategies if they want to invest in A-shares? For example, their factor mix, or the rebalancing frequency?

“I think that if you equal-weight factors and one of your factors has done really well, then in China, rebalancing and taking profit is definitely warranted, given what we just explained on momentum. So the rebalancing frequency in China can often be higher than elsewhere in the world. More generally, localization definitely makes sense for Chinese A-shares, as well as for certain other emerging markets. I think there is a lot of evidence to support why it makes sense, if for no other reason than because of local rules and regulations.” ■

1. J. Hsu, V. Viswanathan, C. Wang and P. Wool, ‘Anomalies in Chinese A-Shares’, working paper, 2017.



RICCARDO SABBATUCCI

The difficult task of predicting stock returns

Riccardo Sabbatucci is Assistant Professor in the Department of Finance at the Stockholm School of Economics. We spoke with him about the rapid expansion of factor investing, predictability of stock returns and possibility of timing factor exposures. We also discussed one of his recent papers, co-written with Christopher Parsons and Sheridan Titman, on 'geographic momentum'.

Riccardo Sabbatucci is an Assistant Professor in the Department of Finance at the Stockholm School of Economics (SSE). He joined SSE in 2016 after completing his Ph.D. at the University of California, San Diego. His research focus is on empirical asset pricing. He uses econometric tools to understand, explain, and predict aggregate and cross-sectional patterns and variation in stock prices. He has presented his papers at major conferences such as FIRS, European Finance Association and Utah Winter Finance Conference. Riccardo teaches Applied Financial Econometrics in the MSc Finance program at SSE.

Factor investing has become a very popular concept over the past decade. As a relatively young academic, how do you see this trend? Would you say that, in a way, factor based strategies have become mainstream?

“Yes. From my perspective, factor investing and smart beta have definitely become mainstream these days. This is obvious when you look at the amount of assets under management these strategies are collecting, which has risen quite substantially over the past ten years. We are talking now about billions of US dollars. And I expect this trend of allocating explicitly to different factors to continue gaining momentum in the years to come.”

“One of the reasons for this is the current proliferation of so-called smart beta products, such as ETFs, that offer cheap access to these kinds of factor-related strategies. About ten to 20 years ago, you had to pay high fees to an active manager to get such explicit exposures to different factors, and you often lost money after costs. Nowadays, it has become much cheaper, and so it is logical that this would attract more and more investors to these strategies. And I don’t see why this trend won’t persist in the coming years.”

Well before the rise of factors, one of the most important trends of the past three to four decades in investing has been a massive shift away from traditional active asset management to passive broad index-following strategies. Do you think factor investing could become the next passive?

“Indeed, that’s very likely. It is now well-known that beating the market is very difficult, in particular from a conventional active manager’s point of view. Only very few portfolio managers achieve consistent outperformance after costs. That explains, at least in part, why passive investment has become so popular nowadays.”

“In that context, I think investing in low-cost portfolios that are exposed to these well-known sources of risk, which people call factors, makes perfect sense. And I also think that targeting macro factors or individual asset-specific factors, such as value, growth or momentum, for example, is a smart way of doing it.”

Which factors are the most relevant for investors and why?

“As a rule of thumb, I would stick to those that have been extensively documented and tested in the academic literature and that generate a

substantial risk premium. Among the most commonly targeted factors are size, value, growth and momentum. These are, in my opinion, the most famous and the ones that attract the most money.”

“Having said that, it is also true that there has been this explosion of other factors documented in the academic literature in recent years. This is what some people call the factor ‘zoo’, and it should not be ignored. Over time, hundreds of newer, more exotic factors have been proposed by researchers. Some work, some don’t, it is not very clear. And many academics still doubt whether these are just statically significant patterns we should not rely on too much, or whether there is really some economic risk premium attached to them. This is still the subject of heated debate.”

“This is indeed an area where a lot of research is currently being done by academics and, personally, I don’t have a definitive answer. It could well be that there are more factors out there worth studying and exploiting, on top of the handful of very common ones we have discussed. But I also think this factor zoo is clearly something that poses dangers for practitioners. Because awareness concerning the most common factors has increased considerably, there is a temptation to look for ‘new’ factors, in order to get an edge on the competition, and maybe settle for a less rigorous approach.”

What criteria would use to differentiate a good factor from a not so good one?

“The two most important criteria to determine whether a factor is worth being exploited are replicability and performance over the long term. You don’t want to base a strategy on something – which in fact should not be considered a factor – that may work for one year or for a couple of years, and then become irrelevant.”

“We know that the very standard factors, such as value, growth or momentum generate consistent premiums, over the years and across asset classes. And in many ways, these premiums can be interpreted as compensation for risk: you are being exposed to a source of risk and you know one year you might lose money, but over a long period of time you will be compensated for that risk. So, a good strategy is a strategy that provides exposure to a factor that produces substantial returns as compensation for that risk, consistently over time.”

You have worked on the predictability of dividends and stock returns. Could you explain a bit what you were looking for, as well as your main conclusions?

“There is a long-standing debate in the academic literature concerning whether stock returns and dividends are predictable, both in the time series and cross-section. As far as return predictability is concerned, evidence is mixed. There is a huge gap between in-sample and out-of-sample predictability of stock returns. In-sample, predictability appears to be quite strong, while it appears to be much weaker out-of-sample. As a consequence, it is not clear whether this predictability can be really exploited in real time.

“Meanwhile, as far as dividends are concerned, findings really depend on what predictors, what variables, are used. Most practitioners and academic studies try to use dividend-price ratios to predict both returns and dividend growth, but many other variables have been proposed as well. Overall, no consensus has been reached. Moreover, findings often depend on the choice of the sample period used in the empirical tests. Concluding, it really depends on the kind of predictive variables you use, if you look at in-sample versus out-of-sample and if you are interested in time series or cross-sectional predictability.”

One key argument raised by advocates of broad passive investing is that stock prices move randomly by nature, and therefore it is pointless to try to forecast them. Given what you just said about stock return predictability, do market timing and, more generally, active management, make sense?

“In my opinion, it does make sense but only under limited conditions. As my answer to the previous question suggests, it’s very hard to time the market in general, and this is why passive investing makes a lot of sense. However, there are also times, during some specific phases of the economy, when that becomes much easier. From a time series point of view, for example, we know that it gets easier during recessions to anticipate stock returns over the next few years.”

“So even if market timing in general is very difficult, it can be worthwhile to focus on a subset. I mean, not trying to forecast returns every single year – this is very hard – but forecasting crashes or large drops in the market. And this appears to be doable. Indeed, a few recent papers argue that it is

possible to forecast stock price momentum, and in particular, momentum crashes.”

OK, but does that mean individual factor premiums and their evolution can be predicted as well? Or at least sometimes?

“Yes, in a way, forecasting premiums is a bit like forecasting the market. Even though we don’t quite know what the level of each factor premium should be on average – that is still a very hotly debated question among academics – I think it is worth trying to forecast extreme situations. Let’s imagine, for example, that I don’t know if the level of a given risk premium should normally be, say 6%, 7% or 8%. But maybe I am able to forecast when it will be getting close to -25%.”

“And if I am able to do that, the long-term performance of my strategy will improve mechanically. So, forecasting the very bad events as well as the very good events, the tails, is probably more meaningful than trying to understand what the level of each premium should be overall. As I already said, there is convincing empirical evidence that for some factors, such as momentum for example, huge crashes can be predicted relatively accurately.”

So, in practice, investors should try to tactically time factors to at least avoid bad times, right?

“Again, research has shown that market timing is usually not very successful. But if you want to avoid factor-specific crashes, then a tactical

allocation is certainly viable. I mean, getting in or out of a given factor when you expect a crash. So, even though I would not recommend trying to time factors systematically, I think it is possible to do a little bit of timing during very specific phases of the market.”

“But that, of course, means you need to be confident that your forecast is accurate. But if you can forecast with a relatively accurate confidence interval, that something very bad or something very good is going to happen, then tactical allocation, underweighting or overweighting your exposure to a given risk factor makes sense. And that is the case, in particular, during certain phases of the economic cycle, when forecasting gets easier.”

In your research, you have also analyzed the momentum effect in equity markets, within specific geographical areas. What were your main findings?

“These findings have been reported in a recent paper¹ I co-wrote with Christopher Parsons, from the University of Southern California, and Sheridan Titman, one of the pioneers in documenting the momentum effect, back in the early 1990s. In that study, we were trying to answer the following question: is it possible to predict the stock returns of any given firm using information of local firms, so firms from the same geographic area? And what we found is that there is indeed a ‘lead-lag’ relationship between firms located in the same area even if they belong to different industries.”

‘I think it is possible to do a little bit of factor timing during very specific phases of the market’



“Let me illustrate this with an example. So let’s take the city of Seattle, in the United States, for example. Both Starbucks and Microsoft have their headquarters and their main operations there. And we have found that it is possible to forecast Microsoft stock returns using information contained in Starbucks’ stock returns. In other words, the performance of Starbucks today helps predict and explain the future performance of Microsoft stocks, even though Starbucks belongs to the beverage industry and Microsoft to the tech industry.

“We found this ‘lead-lag’ relationship for portfolio of stocks of companies located in the same area but active in different industries. This effect seems quite robust, even for very large multinational firms. This is what scholars call ‘cross-serial predictability’. ‘Cross’, because it helps you predict the returns of a given stock based on information from another one, and ‘serial’, because we use today’s information to predict tomorrow’s returns. And the magnitude of this cross-serial predictability, which we call ‘geographic momentum’, is both economically and statistically relevant.”

How do you explain this ‘geographic momentum’ effect?

“This is a question many people have been asking us. Is this phenomenon somehow risk-related? If so, it could be considered a kind of ‘location risk’ premium. Indeed, some academic papers have argued the existence of premiums that reflect local risk factors. According to these studies, being based in the same city or region can be considered just as important as

doing business in the same industry. In which case, an investor also gets compensated for New York-specific risk, San Francisco-specific risk or Seattle-specific risk, for example.”

“However, this is not what we document in this paper. We believe geographic momentum has more to do with the fact that some relevant information at the very local level may, at first, be neglected or misunderstood by investors. And by local level, I mean very local. Take, for example, the difference in economic conditions between cities like Stockholm and Goteborg, in Sweden, or Brussels and Amsterdam, in Belgium and the Netherlands. This is the kind of information the market struggles to grasp.”

“So, to us, geographic momentum has more to do with a limited investor comprehension effect. And the reason for that limited comprehension is that investors tend to categorize stocks based on characteristics like market-capitalization size, valuation, business sector or listing venue, but never in terms of physical geographic location. And that means ignoring substantial information on local economic conditions that can be relevant to the firms’ profitability. Take local labor market conditions, for example.”

“Let’s go back to the Seattle example. Many important tech companies have their headquarters in that city, which means numerous engineers settle there with their families. This obviously has an impact on the local economy, since those people buy houses, shop in town, go to bars



and restaurants. But this is only one aspect: the suppliers of these tech companies are another. Oftentimes, competitors and suppliers all settle close to each other, creating a kind of local ecosystem.”

“Now, the fact that investors only tend to categorize firms by industry, size, valuation etc., means that this information, this local information is often ignored. For example, the chance that a financial analyst who works for an investment bank or an asset manager would be covering two firms headquartered in the same area, but doing business in different industries is very small. Most of the time, analysts specialize in one particular sector, and not one particular geographic area.”

“That’s why there tend to be quite a lot of analysts covering the same firms in the same industry; very few people look at firms from different industries that are established in the same area. As a result, there is information that only very few people are able to understand, and that most other people understand only with delay. And that’s the reason why we believe this lead-lag geographic momentum effect is due to slow diffusion of information.”

Right. But in your example, you take cities in the United States in which the local economy is heavily dependent on a limited number of business sectors. Do your findings apply to cities that have a much more diversified economy? Say, Paris, for example.

“This is a topic for future research, so I don’t really have an answer to this question. Having said that, you are quite right, many people have been asking us: what about Europe? Well, Europe is obviously a different animal because it is smaller than the United States, and large cities, such as Paris in France, and London in the UK, represent a large share of their domestic economy.”

“Actually, in the case of Europe, I think it would be more interesting to compare large cities across different countries. This would mean looking at local economic conditions in Paris relative to London, for example, instead of comparing Paris to Lyon or Marseille. Similarly, comparing Milan or Madrid to Paris or London would certainly be more interesting than looking at the differences between Florence or Seville. In short, whether there is some kind of a cross-country relationship at the local level.”

“Of course, this kind of comparison would also have a number of issues. European countries can be very different in terms of laws and regulations, as well as in terms of economic infrastructure. So, I wonder if any potential lead-lag effect we might be able to document would not be more country-specific than area-specific. Another way of looking at things could be to



‘I would not say factor premiums are only rational compensation for risk, nor entirely due to behavioral causes.’

determine economic regions within France, Germany or Italy, for example, and look at those regions. We have not done it, but I am sure it would be very interesting, both from an academic and a practitioner's point of view."

So far we have been talking about factor premiums as risk premiums. But some people say that beyond this aspect, there are also effects that have more to do with irrational behavior, well-entrenched biases, which do not really have to do with risk. What is your view on this?

"You are quite right. When people talk about risk factors, they always tend to focus on the rational explanations for an investor's behavior: there is a risk and they get rational compensation for it. But that's only one aspect and behavioral biases also play very important role. This has been shown by the extensive work carried out by recent Nobel prize winner, Richard Thaler. So, there is this idea that there is more to it than just risk."

"Personally, I don't want to be too definitive on this question. Both explanations are probably valid. I do think that there is a fundamental risk element in the size, value, growth or momentum factor premiums. But I also acknowledge that trading biases, behavioral biases, can affect this compensation for risk. So, what you get is a mixed signal made of a fundamental element and some noise. And the fundamental element is what I would call the fundamental risk premium, while the noise would be all these behavioral biases. That's why I would not say factor premiums are only rational compensation for risk, nor entirely due to behavioral causes. It is probably a little bit of both."

What about momentum? We hear people go both ways when it comes to momentum. Some argue it is completely irrational and it is just caused by behavioral biases, while others say it is perfectly rational, it is compensation for taking the risk of huge drawdowns when markets crash.

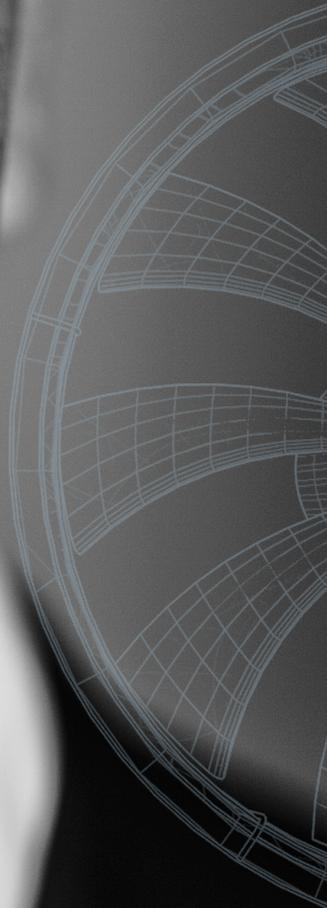
"Yes. You could probably argue the legitimacy of both explanations. I think it is not clearly one or the other. There was a time when everyone thought of these factors as being completely rational, but nowadays I think it is less and less the case. Behavioral biases definitely affect factor-based strategies, and the risk premiums associated with these strategies. So, again, I would say both effects matter, even for momentum."

You have looked at geographic momentum based on where firm headquarters are located. But did you look at the flip side? That is, based on where the investors are actually located?

"This is also a very important question, although I personally haven't looked at this aspect, this home bias in investment, that has been documented by other academics. However, I don't think these two phenomena are necessarily linked. The idea that a manager tends to overinvest in companies based in his location, is more of a demand-related behavioral bias. Then, it could simply be that an asset manager has easier access to top managers of a local firm and therefore may be more willing to invest in that company."

"Meanwhile, the geographic momentum effect appears to be related to the fact that some important local information is not properly understood by analysts and investors. In a way, this is more of an 'investor inattention' story. A key idea behind it is that investors tend to sort firms or securities according to a number of characteristics, and in doing so, they might overlook some important information. Paying attention to the kind of categorization used, or using a different one might uncover relationships underlying the dynamics of stock returns. I think this is the key contribution of our work to the academic literature." ■

1. C. A. Parsons, R. Sabbatucci and S. Titman, 'Geographic momentum'



JOOP HUIJ

Putting factor investing theory into practice

Joop Huij is Head of Factor Investing Equities and Head of Factor Indexing Research at Robeco. We spoke with him about some major trends in factor investing and the basic steps investors should take for practical implementation. We also talked about his views concerning the size factor, the dangers of following publicly available indices and potential capacity issues for factor investing as a whole.

Joop Huij is Head of Factor Investing Equities and Head of Factor Indexing Research at Robeco. As such, he is responsible for the Factor Investing strategies, which include the Value, Momentum, Quality and Multi-Factor Equities strategies, the Factor Indices, and the Bespoke Factor Solutions. As head of both teams, he coordinates portfolio management, factor index research and development of customized factor investing solutions. Joop Huij also holds a part-time position as Associate Professor (with tenure) of Finance at the Rotterdam School of Management. His own academic research has focused on empirical asset pricing and investment strategies. He has published papers in various academic journals, including the Journal of Portfolio Management, the Journal of Banking and Finance, the Journal of Empirical Finance, the Journal of Financial Markets and the Financial Analyst Journal. Joop Huij started his career as a researcher in 2007. He holds a PhD in Finance from the Rotterdam School of Management and a Master's degree in Informatics & Economics (cum laude) from Erasmus University Rotterdam.

Most of your empirical research of the past few years has had to do with very practical implementation aspects of factor investing strategies. How has the perception of this kind of approach among investors changed in recent years? Are there any major trends you could pinpoint?

"Developments have indeed taken place very quickly in recent years in this field. Personally, I see three major trends in the way factor investing is being considered these days. The first I would mention is that investors increasingly want to incorporate factor investing into their portfolio, but may not necessarily be interested in the more traditional active strategies. Implementing factor investing through index-based products is becoming extremely popular."

"In the beginning, factor investing was presented as a third way between active and passive management, showing features of both active and passive investing. But there is no single way to implement factor investing. In fact, there is a whole range of possibilities within the factor investing spectrum. There are active strategies, and this is how Robeco and other asset managers initially brought factor investing to the market, but there are also more passive approaches based on indices, not necessarily public ones."

"Another important trend that I see at the moment is the rise of multifactor strategies. While initially investors tended to allocate to one particular factor they were interested in, say value or low volatility for example, they are increasingly demanding solutions providing exposure to multiple premiums. This is a way for them to reduce stress in years when one particular factor delivers below-average performance."

"The third trend I see in the market is the rise of multi-asset factor investing. There is a growing demand for an implementation of factor investing strategies across multiple types of assets. And this is consistent with the fact that factors should be empirically well-documented and falsified over long periods of time, and across different markets and asset classes."

"Such requirements are part of the rigorous assessment researchers should apply in order to consider a factor as relevant. For decades now, academics have investigated factor premiums not only in the equity

market, but also the corporate bonds market, the high yield bond market, the commodities market and even for real estate investment trusts (REITs). And factor premiums have been documented basically everywhere.”

“This started as an academic exercise, a kind of robustness check. But more recently, I see growing interest from asset owners to implement factor investing in different markets, and in particular across various asset classes at the same time. And I can only support this of course, because it adds to the diversification benefits that you can achieve with factor investing.”

For investors interested in factor investing, where should they start? What key considerations should they focus on?

“The first thing investors need to realize – and I think most of them do by now – is that implementing factor investing is not a binary decision. It is not just a matter of deciding whether to go for factor investing or not, and then not really caring about how to go about it and simply looking for the cheapest solution on offer. I think more and more investors are realizing that the choices made after the decision to go for factor investing are of crucial importance to the success of their strategies.”

“The first important choice they will face is to determine the factors they should strategically allocate to. This may seem very basic, but it is far from trivial, and prominent academics are still debating this issue. Some experts argue that there are only two relevant factors, others argue that there are six factors, and others that there are 400 factors. So, for an investor, the related question is of course: when is a factor relevant?”

“At Robeco, we have actually conducted a lot of research on this topic. We have basically tested the more exotic factors and their effectiveness, comparing them to the effectiveness of a handful of more traditional factors. What our research¹ indicates is that the only factors that work - taking into account trading costs, taxes and all kinds of practical implementation restrictions - are those that have been thoroughly falsified in the academic literature.”

Any other important aspect you would highlight?

“Yes. The second major element investors will need to decide on is the weight they wish to give to each factor in their strategic allocation mix. I believe diversification is certainly one of the most important things when

it comes to factor investing, and I would always recommend a factor mix that is well diversified across the factors. In this respect, my default recommendation would be to give equal weight to all the relevant factors on a risk basis.”

“At the same time, I acknowledge that investors obviously have different preferences, different beliefs, different legacy portfolios. And the factor-based part of their investments should take these elements into account. As such, we give our clients insights in their current factor exposures and develop solutions, factor completion portfolios, to improve the factor exposures of the total equity portfolio. This is why I don’t believe there is one universally optimal mix of factors.”

“The third crucial step for investors opting for factor investing will be to make sure the solutions they choose efficiently harvest factor premiums. This implies being able to identify the risks to which you will be exposed when you engage in factor investing and to understand which risks are necessary and which risks are not. This is why I also think it is very important to be able to develop tools that will help to identify unrewarded risks and take them out. Another key element in a multi-factor portfolio is to efficiently combine the factors. Combining generic factor approaches could lead to off-setting factor exposures. For example, if you combine a Value index with a Momentum index and the stocks in the momentum index are all relatively expensive then this could wipe out the value exposure achieved by allocating to the Value index. Therefore, we avoid going against other factors when capturing the target factor”

“Turnover is also a characteristic to critically look at. Investors should be careful with turnover, as the costs associated with additional trading could easily wipe out any kind of advantage factor investing may have compared with purely passive strategies. In fact, this is one of the most important gaps identified between studies carried out in the academic literature and actual implementation. Empirical studies often ignore trading costs, just as they tend to overlook other practical implementation constraints. But I think these are crucial issues and investors should definitely take into account issues such as unrewarded turnover.”

You mentioned that only the more traditional, thoroughly researched factors are worth being considered. What criteria exactly would you apply to determine whether a factor is relevant or not?

“To me, the main criterion is that there needs to be ample empirical evidence that the factor exists over time, over the cross-section and across asset classes. There also needs to be robust economic intuition, or at least some kind of understanding of why the effect is there. And, at Robeco, we consider that the only factors that clearly fulfill these requirements are value, momentum, low volatility and quality.”

What would it take for you to consider an additional factor?

“All the features I already mentioned: overwhelming empirical evidence of its existence and a reasonable understanding of why the effect is there.”

You mention that one crucial step for investors considering factor investing is to make sure they harvest factor premiums efficiently. In part, this will depend on the exact definition that is applied to each factor, and definitions can differ greatly from one product to another. How can investors distinguish good from bad definitions?

“You are right: definitions are of the utmost importance for the success of a strategy. My view is that investors should always take a multidimensional approach to factor investing. This means that when you look at the value factor, for example, there are multiple definitions that have been

documented: book to price, earnings to price, sales to price and so on and so forth. I think it is important to look at all these measures.”

“The second aspect is to somehow ‘enhance’ these basic factor definitions by making sure they do not expose investors to unexpected or unrewarded risks. Let’s take again the value factor as an example, to give you an illustration of this. Some prominent academics argue that the value premium is a form of compensation for risk. For example, Eugene Fama and Kenneth French argue that it reflects a reward for taking on distress risk.”

“However, this may not necessarily always be the case. Indeed, no empirical evidence that distress risk drives the value premium has been reported so far. What’s more, in a paper² I co-wrote with Wilma de Groot a few years ago, we looked at the relationship between return and distress risk measures within value stocks and found that the value premium is not concentrated in high-risk firms.”

“More specifically, we looked at four measures of distress risk: credit spread, credit rating, distance to default and debt to asset. We found that value stocks with a low credit spread earned higher returns than value stocks with a high credit spread. In addition, value stocks with a low risk profile based on credit rating and distance to default also earned higher returns, while the returns were similar for stocks selected on debt to asset.”



“This shows that, although conventional value strategies are typically exposed to distress risk, it is not necessary to take on distress risk to profit from the value premium. And enhancing factor definitions is all about identifying the risks to which investors are exposed when they engage in factor investing, and taking out those risks that are unnecessary, or unrewarded.”

Numerous academic works, starting with Fama and French’s multi-factor models, consider market capitalization size a key determinant of expected stock returns. But you seem much more cautious. What is your view on the size effect?

“To me, size – the finding that smaller capitalization stocks tend to outperform larger capitalization stocks over long periods of time - is not a reliable factor. And the reason is that it is not consistent over time and it is not consistent over the cross-section. For example, there is no convincing evidence of a potential size effect in the UK equity market. However, what I do acknowledge is that other factor premiums such as value, quality or momentum, do manifest themselves more strongly in the small capitalization segment.”

“So, I see size just as an interaction variable. And this is why I prefer to implement factor strategies in the small and mid-capitalization segment. But that is very different from saying that there is a standalone size premium that can be harvested.”

Given the current appetite for factor investing, isn’t there a risk of massive disappointment, in particular if factor strategies suddenly have to go through tougher times in terms of performance?

“My perception is that most investors realize that when they make a strategic allocation to a factor, just like when they make a strategic allocation to equities, for example, they can’t expect returns to be positive each and every year. Factor-based strategies must be evaluated over a full business cycle. Also, I think that investors now have a better understanding of the concept of diversification, which they appreciate. I say this because what we have seen over the past few years is that while some factors actually did quite well, others did not.”

“Originally, an important feature of the concept of factor investing was to allocate to multiple factors at the same time in order to enhance diversification. However, what I see is that many investors who embrace factor investing in principle, actually only allocate to one factor, say value or low volatility for example. And some of these individual factors have of course achieved returns below investors’ initial expectations. Now, I don’t think these investors panic - they understand that this can happen frequently - but rather that they are starting to realize the benefits of multi-factor investing.”

‘Factor-based strategies must be evaluated over a full business cycle’



Still, given the significance of current inflows into factor investing strategies, don't you fear this trend might backfire?

"Well, this is often what you see when it comes to innovation. Initially, there is always an early adoption phase, and now we see that factor investing is becoming very popular. As a result, more and more asset managers are entering the factor investing arena and the product offering is booming. It seems inevitable that some investors will become disappointed."

"One reason for this is that there is quite a large dispersion in the quality of the products that are on offer. And it will take some time before the realized returns actually reveal the best quality products. As time goes by, there will probably be a shakeup, which won't necessarily be a bad thing. But there is also a more worrying aspect. This has to do with the flurry of generic, index-based products, often marketed as 'smart beta.'"

"Here is why: when you ask investors why they have invested in those index-based products, you typically get two answers. The first one is 'low fees', which is difficult to disagree with. As an asset owner, you logically want to pay low fees. The second answer you get is 'transparency', which is also difficult to disagree with. As an asset owner, you like to be in control."

"But what most people do not realize is that the transparency provided by these indices is not exclusive to them. It is public transparency and this means that other investors, including proprietary trading firms and hedge

'We found clear signs of overcrowding in public factor indices, which partly explains why products based on these indices are so cheap'

funds, can identify in advance which trades are going to be executed and can opportunistically take advantage of this."

And this might end up weighting on the performance of those who invest based on these indices, right?

"Exactly. And to me this is a very serious concern. To check whether this is already happening and what it means for index investors, we set up a large research project at Robeco. And together with my colleague Georgy Kyosev we ended up publishing an article³ on this topic that has been presented to the American Finance Association in Philadelphia early 2018."

"Our conclusion is that there is strong empirical evidence supporting that this front running is going on. We showed that many market participants anticipate upcoming trades in these public factor-based indices, at the cost of those who invest based on these indices, either via ETFs or index-funds. In particular, we focused on the US stock market, estimating the cost of transparency for public factor indices to be 16.5 basis points per year for investors."

"At the same time, we also found clear signs of overcrowding in these public factor indices, which partly explains why products based on these indices are so cheap. When I was a boy, my father used to say: 'You can buy shoes for 10 dollars, but you will typically get 10-dollar shoes'. I think the same applies to these index-based products. The reason why fees are so low is because they are a highly scalable business."

"Unlike an active asset manager who needs to close a fund to protect capacity, to protect existing investors from an inevitable decrease in average performance as the fund grows, an index provider does not have such responsibility. The same goes for asset managers offering products that replicate those indices. Unlike active funds that aim for outperformance, indices have been created for a different purpose: to serve as a benchmark. So you can sell your index to investor A, B, C and so on and so forth. There is almost no constraint."

"In fact, if you look at the money that is managed based on popular indices, such as the MSCI MinVol or RAFI Indices, estimates range up to USD 300 bn. And you can in fact easily calculate on the back of an envelope that you need to trade a very large portion of the daily average

transaction volume of a stock to take a position and to rebalance your portfolio. Clearly, this can't be good for investors."

So much for generic factor indices. But what about capacity issues for factor investing as a whole?

"My answer to your question would be... it depends! As we just saw, I think there will clearly be a capacity issue for some of the generic, less sophisticated products, especially for those based on public factor indices. And this is actually why we, at Robeco, try to distinguish ourselves from the crowd by taking an unconventional approach to factor investing. Obviously there will always be a broader capacity concern, but much less so."

"To give you a comparison, while the capacity of factor premiums is much smaller than the capacity of fully passive market-cap-weighted strategies, it is many times larger than the capacity that you can find with traditional fundamental managers. So there is still a lot of capacity left for factor investing as a whole, despite the fact that generic index-based products already show that they are suffering from capacity issues."

Some argue that with factor investing, traditional allocation frameworks across asset classes are no longer needed. Do you agree?

"I think this is true. There is very little empirical evidence that traditional allocation setups, where investors allocate first to different asset classes, then different geographic regions or sectors, and finally choose the best manager they can find for each pocket, are effective. It is notoriously difficult to find a manager that outperforms consistently all the time. So, to systematically select a manager that systematically outperforms after cost is almost impossible. Instead, I see a much better case for factor investing."

"And, by the way, this does not mean that I don't see added value in active asset management. In fact, my Ph.D. thesis⁴ looked precisely at this issue: measuring the added value of asset managers. And my results indicated that there definitely is a group of active managers who systematically add value after costs, and that this added value can be very significant, even above and beyond the returns you can achieve with factor investing."

"The problem is that this is a very small group of asset managers. We are talking about 10% to 20% of all active managers in the investment

industry, which makes it very difficult to identify them. As a result, if you are able to identify those managers, I would definitely recommend doing so in your portfolio. Unfortunately, only very few investors have this kind of ability. To do so, you need to have a good team to develop a rigorous framework to select such managers."

"In particular, you need to come up with measures of scale and negotiate fees and management contracts. Because one fundamental issue - when it comes to this added value of active management - is that the capacity of managers is usually quite limited. And when managers outperform, many studies document that this outperformance is noticed by asset owners and the capacity of these managers becomes quickly saturated. So, as an investor, you need to be able to address these issues. And for those who lack this kind of skill, well-designed and efficient factor investing is certainly preferable." ■

1. E. van Gelderen and J. Huij, 'Academic Knowledge Dissemination in the Mutual Fund Industry: Can Mutual Funds Successfully Adopt Factor Investing Strategies?', *The Journal of Portfolio Management*, 2014.
2. W. de Groot and J. Huij, 'Are the Fama-French Factors Really Compensations for Distress Risk?', working paper, 2015.
3. J. Huij and G. Kyosev, 'Price Response to Factor Index Additions and Deletions', 2016.
4. J. Huij, 'New Insights into Mutual Funds: Performance and Family Strategies', 2007.

ROBECO'S SOLUTIONS

Our approach to factor investing

In their bid to harvest factor premiums, investors might be tempted to opt for cheap generic products, usually based on so-called smart beta indices. But while most of these solutions do provide exposure to well-rewarded factors, they usually remain far from ideal. Many of these popular index-based products still involve excessive market index exposure as well as unexpected negative exposures to other factors.

Another severe drawback is that generic factor-based strategies also frequently imply inefficient portfolio construction processes. This may lead to unnecessary turnover, high concentration on some countries or business sectors, or excessive exposure to large capitalization stocks.

Moreover, many generic products are based on publicly available market indices and typically expose investors to significant arbitrage risk. The simplicity and transparency of these indices mean that other investors, such as hedge funds, can identify in advance which trades are going to be executed, and can opportunistically take advantage of this. Recent research¹ carried out by Robeco shows this can have very harmful consequences for those investing in these indices.

For more than a quarter century, our quantitative research team has focused on analyzing, evaluating, and designing efficient factor strategies that avoid these pitfalls and deliver more stable and consistent performance in the long run.

Enhanced factor definitions

To achieve this superior performance, we start by removing unrewarded risks with enhanced factor definitions. We optimize each factor separately in the first stage of the process instead of optimizing the aggregate portfolio characteristics at the final stage of the process only. We find that the common focus of most investors on optimizing at the aggregated level omits important information regarding individual factors.

When it comes to defining the value factor, for example, we include measures relating to operating profitability and conservative management of firms. Doing so, we avoid companies that may incur serious distress risk. We aim for reduced exposures to securities that are cheap for good reasons and may incur default risk.

Similarly, when defining the momentum factor, we apply advanced 'residualization' techniques. We use security-specific returns to measure momentum. This enables us to reduce considerably the general market reversal risk, which represents the Achilles' heel of conventional momentum strategies.

Our approach also focuses on efficiently combining factor premiums, in order to avoid missing out on the positive effects of harvesting one factor premium that could otherwise be canceled out by the negative effects of other premiums. In this respect, the risk of individual factor exposure creating a negative exposure to other factors is another form of unrewarded risk that affects generic factor strategies.

Another distinctive characteristic of our factor-based strategies is that they are implemented with proprietary portfolio construction algorithms, that focus on creating portfolios with the desired factor characteristics. This way, we aim to avoid unnecessary turnover and overcrowded trades. At the same time, we ensure appropriate diversification, as region, country, industry group, sector, size and single-security weights are all subject to strict concentration limits. Unlike commonly used mean-variance

optimization tools, our approach results in easily explainable portfolios and transactions.

Smart sustainability integration

Our factor-based strategies also feature numerous possibilities in terms of sustainability integration. For example, all of Robeco's quantitative equity strategies integrate ESG scores, based on RobecoSAM's annual Corporate Sustainability Assessments. For all portfolios, we ensure ESG scores are at least as high as the score of the relevant benchmark index.

But taking into account ESG scores and our general exclusion policy is just a starting point. Depending on their own preferences, investors can request stricter criteria to be applied to individual mandates. This can be done, for example, through the use of client-specific exclusion lists. Targeting precise objectives, such as reducing environmental footprints on four dimensions – CO₂, waste generation, water usage and energy consumption – is also possible.

Integrating sustainability factors helps to remove undesired risk exposures that do not improve our portfolios' return potential. Such risks include liability risks arising from pollution, and reputational risks as a result of human rights violations. This is becoming a major issue at a time when institutional and retail investors are increasingly asking for sustainability considerations to be fully integrated in the investment process.

Tighter investment rules and smaller investment universes obviously have an impact on a portfolio's exposure to factors premiums. However, this relationship is not linear because our approach to sustainability ensures that we prioritize the selection of sustainable stocks with the best possible momentum and valuation characteristics. As a result, we can implement stricter sustainability standards without losing too much exposure to factor premiums.

A wide range of factor-based solutions

As mentioned in the introduction of this booklet, there are many ways factors can be implemented to enhance the risk-return profile of a portfolio. Depending on their investment objectives, investors can use factor-based strategies in order to either reduce downside risk or to generate extra return, for example. They can also seek a balanced exposure to multiple well-rewarded factors, or specifically target one particular factor they consider of strategic interest.

To address the different needs of our clients, Robeco has developed a broad range of quantitative solutions for equity and fixed income markets, as well as for the multi-asset space. All these investment strategies have been designed to systematically and efficiently harvest factor premiums, but with a specific focus for each one of them.

For equities, we offer four main capabilities: Enhanced Index and Active Quant Equities, Conservative Equities, Factor Investing Solutions and our recently introduced Multi-Factor Indices. While our Enhanced Index and Active Quant Equities solutions focus on delivering stable alpha with limited tracking error, using an integrated multi-factor stock selection model, our factor solutions seek to capture four proven factors premiums – value, momentum, low volatility and quality – in a benchmark-agnostic way.

Meanwhile, Conservative Equities strategies aim at delivering higher risk-adjusted returns in the long run by losing less in down markets. However, the focus on absolute risk may lead to significant tracking error. And for clients interested in the transparent nature of generic smart beta solutions, our Multi-Factor Indices provide an attractive alternative that effectively addresses the major pitfalls of these products.

For fixed income investors, Robeco has also developed a number of strategies designed to address specific investment objectives. Our Conservative Credits strategy exploits the low-risk anomaly in the corporate bond market, while our Multi Factor Credit, Multi-Factor High Yield and Multi-Factor Bonds offer a balanced exposure to the low-risk, quality, value momentum and size factors in different segments of the fixed income universe.

In the multi-asset arena, our Conservative Multi-assets strategy focuses on the low-risk factor. It combines into one comprehensive solution our expertise in selecting low-risk stocks and bonds with our dynamic asset allocation know-how. The objective is to generate stable returns and, at the same time, to put a strong emphasis on limiting downside risk.

Conclusion

There are many roads to implementing factors in a portfolio. For investors interested in factor investing but also attracted to the low-cost, transparent and usually well-diversified nature of classic market capitalization-weighted passive investing, enhanced indexing represents a compelling proposition. It offers investors an attractive alternative to passive investing by delivering stable outperformance after costs, with a low tracking error and the option of adapting to a variety of specific requirements. For investors still weighing the benefits of factors, it can also be a first step into the factor investing world.

1. J. Huij and G. Kyosev, 'Price Response to Factor Index Additions and Deletions', 2016

ENHANCED INDEX EQUITIES:

a factor-based alternative to passive strategies

While factor-based solutions can help to significantly improve the risk-return profile of a portfolio, it is also important to bear in mind that allocating to factors can lead to significant tracking error and periods of strong relative underperformance compared to the broader market. This kind of rougher patch can continue uninterrupted for several years, testing the patience of asset owners, even those strongly committed to explicit factor allocation.

In the current context of massive shift of investment flows from traditional active management into passive strategies, this is obviously a major drawback. At the same time, classic passive market capitalization-weighted strategies are also far from ideal. For instance, passive portfolios do not discriminate between attractive and unattractive securities, from a factor perspective. They also expose investors to significant arbitrage risk and do not explicitly take into account sustainability aspects.¹

For equity investors interested in factor investing and willing to avoid the pitfalls of classic passive strategies, but reluctant to endure long and significant underperformance, our Enhanced Index offering provides a solution. These strategies are designed to systematically capture the market return and, in addition, benefit from well-rewarded factor premiums.

Enhanced Index portfolios take the selected capitalization-weighted index as a starting point. Then they give slightly more weight to stock with attractive factor characteristics and slightly less to those with unattractive factor characteristics. Investment decisions at portfolio level are the result of the signals from our multi-factor stock-selection model and the portfolio-construction algorithm.

This process ensures the investment remains relatively low-turnover and cost-effective, while keeping appropriate diversification and preventing

overcrowding and arbitrage. Portfolios are then rebalanced on a monthly basis to ensure the desired factor tilts, compared to the underlying market capitalization-weighted index.

Our Enhanced Index portfolios are expected to deliver moderate but stable outperformance, or at least market-like returns after costs, depending on how much portfolios are allowed to deviate from their reference index. The key performance indicator for this kind of product is the information ratio, which measures the excess returns of a portfolio relative to its benchmark, divided by the tracking error.

In general, portfolios with greater active share flexibility are a better choice for investors who aim to consistently capture more of the factor premium over time. On the other hand, tighter active share limits ensure underperformance risk is kept to a minimum. Our in-house research¹ shows that the looser the tracking error criteria, the higher the expected returns tend to be, in absolute terms.

In addition, our proprietary portfolio construction algorithm features a flexible set-up, so we can easily adapt to a variety of specific requirements in terms of investable universe, the risk-return profile and the integration of stricter sustainability criteria.² In fact, for over 15 years, Robeco has designed custom-made Enhanced Index Equity strategies, in close cooperation with its clients.

1. M. Strating, W. de Groot and W. Zhou, 'A partnership to customize your Core Quant portfolio', Robeco article, December 2016.
2. M. Zwanenburg and M. Strating, 'Optimizing alpha in Core Quant Equity: it's about risk, risk, risk', Robeco article, January 2017.

Important Information

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Additional Information for investors with residence or seat in the United Kingdom Robeco is subject to limited regulation in the UK by the Financial Conduct Authority. Details about the extent of our regulation by the Financial Conduct Authority are available from us on request.

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