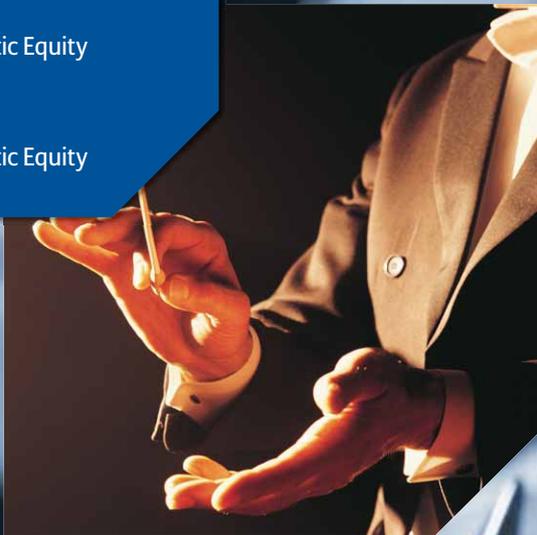


# Factor Investing: A reliable source of excess returns?

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## Executive Summary

In this thought piece we discuss frequently asked questions about factor investing such as ‘how did the current strong interest in the field develop?’, ‘which factors to choose?’, ‘does data mining overstate factor returns?’, ‘will returns be persistent or arbitrated away?’, ‘are factors relevant to all investors?’, ‘is factor timing an option?’ and ‘how should factors be combined?’.

The key insights are:

Factor investing already has a long history but many asset managers have only recently launched products.

Many institutional investors have noticed that a large part of their relative returns can be explained by factor returns even if they did not allocate to factor products explicitly.

As a consequence, they have embraced factor investing and regained control over their factor exposures by allocating explicitly to factors and by managing the associated risks.

Factor investing will not go away as an investment theme since factors carry risk premiums that cannot be arbitrated away.

The choice of factors is pretty straightforward as there is only a limited number of risk premiums available, the more challenging part is the choice of risk management measures when combining factors.

## A short history of factor investing: how did the current strong interest in the field develop?

Factor investing begins with a very basic question: 'where do extra returns within equities come from?'. The Latin word 'factor' means 'who/which acts', so factor research asks 'who's done it, which forces drive extra returns?'. One might think that the answer to such a simple question is an easy one: the portfolio outperforms because the portfolio manager picked the right stocks. But simple questions tend to have more subtle answers than initially thought. Consider the famous thought experiment by the finance professor Burton Malkiel.

In the experiment, a chimpanzee throws darts at the stock listings in the Wall Street Journal. If someone were to read the names of the stocks hit by the darts and create a portfolio of fifty names, equally weighted at 2% each, the result would be a portfolio that outperforms the broad market after ten years. The portfolio would certainly have a high tracking error and show large swings of over- and underperformance, but in the long run it would work.

If you had not known that the chimpanzee had picked the stocks, you might have been impressed by the stock-picking skills of the "manager". But as we know, there was no manager; there was only a chimp throwing darts at random. So imagine replacing the chimp with a random number generator and repeating the experiment on a computer several thousand times. As with the chimp's portfolio, the vast majority of the computer's randomly chosen portfolios would also outperform. Clearly, then, this outperformance cannot be explained by stock picking.

How about the role of the weighting scheme? Instead of using a 2% equal weighting for every holding, we could use weights which are inversely proportional to the inverse of the volatility of stocks—the so-called risk parity weighting. How would this affect results? It turns out that the randomly picked stocks would still outperform after this weighting scheme is applied.

Just to play devil's advocate, one can also use the opposite of the risk parity scheme by using weights that are proportional to the stock volatilities and again one finds that the portfolios outperform in the long run.

So what is going on here? Why did the chimp do better than the index? To answer this question, we must take a closer look at the index. Let us assume that the chimpanzee is throwing darts at a listing of the stocks in the S&P 500 Index. The market-capitalization weight distribution of this index is highly concentrated; there are just a handful of stocks that have

weights of more than 2%, with the majority weighted at less than 10 basis points each. Therefore, most of the stocks that get picked by the chimpanzee are small in the benchmark in terms of market cap size—yet they get a 2% weighting in the chimpanzee's "chosen" portfolios. For more than half of the stocks, this represents a 190-basis-point overweight or more. As a consequence, there is a strong small-cap bias in all the portfolios used in the chimpanzee experiment.

The risk-parity scheme and the opposite of the risk-parity scheme, on the other hand, allocate approximately 2% weightings to stocks with average volatility. They differ in how much they allocate to stocks with above-average or below-average volatility, but they both allocate more than 10 basis points to most names—which means they also create a significant small-cap bias as well as a value bias (though not necessarily at all times).

We see now that while the chimpanzee in a sense "picked" stocks, what mattered more were the exposures that implicitly resulted from the exercise. The stock picking and the weighting schemes created almost the same small-cap and value exposures. This shows that investment styles such as value and small caps play an important role in investing even if this role is not obvious when picking stocks and attaching weights to them.

Value and small-cap exposures are examples of the so-called factor exposures that are the driver behind the relative performance of most active managers. The existence of these factors is well-documented in academic literature; these factors exist in all investment regions of the world and they work over extended time spans. Here is a very small sample of the relevant literature:

- **Basu (1977)** showed that stocks with a low price-to-earnings ratio outperformed stocks with a high price-to-earnings ratio on the New York Stock Exchange.
- **Banz (1981)** described the size effect—i.e., smaller companies outperforming larger ones.
- **Jegadeesh and Titman (1993)** showed that stocks with strong price momentum tend to continue to lead the market.

Yet despite the existence of a wealth of academic research covering these factors, there is still disagreement over the true nature of these drivers. Are the returns ultimately driven by investor behavior and psychology? A sign of market inefficiency? Are the returns compensation for running greater business risks, in line with market efficiency? Or is there more than one answer?



The answers to those questions are relevant because portfolio construction will differ depending on the true nature of the drivers. If they are caused by inefficiencies, they can only work as long as the market stays inefficient and the aim of portfolio construction will be to condense as much inefficiency as possible in a concentrated portfolio. If they are caused by the presence of risk premiums, the ultimate aim of portfolio construction will be to diversify among the risk premiums and to create a broad and accurate representation of the factors that still works when markets are perfectly efficient.

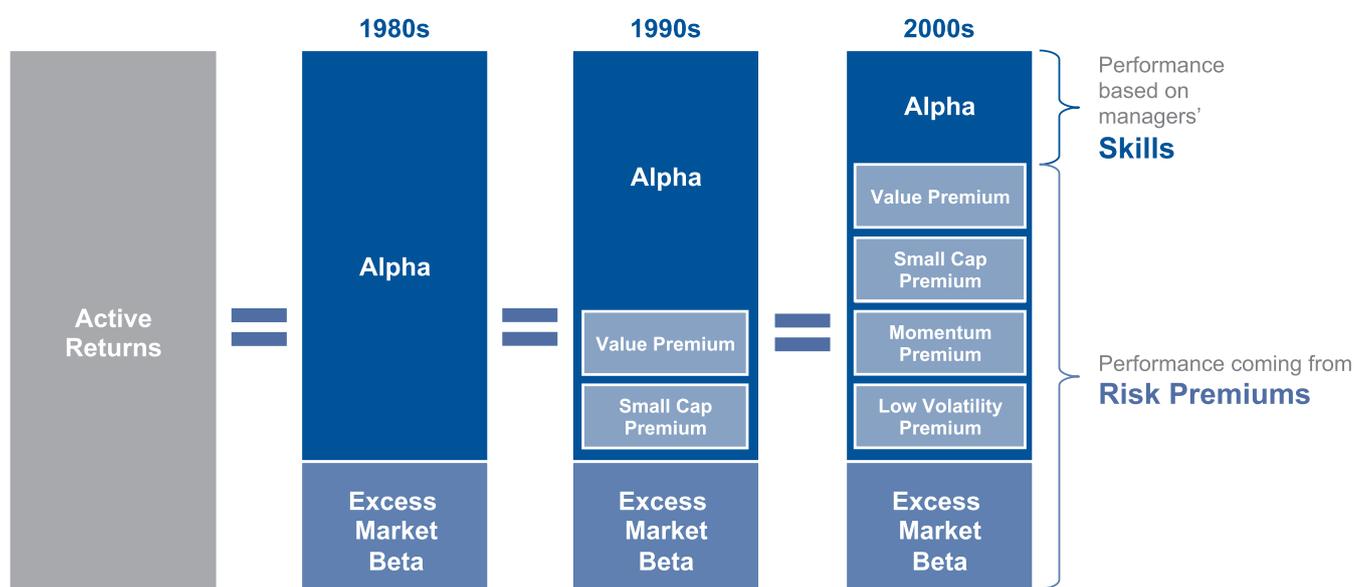
We at Allianz Global investors believe that investors are well advised not to underestimate the efficiency of the markets and to rather err on the side of caution. Fama and French (1992) proposed a pricing model for efficient equity markets that

assumed additional risk premiums on top of the broad market risk premium. In fact, Fama and French, in their seminal paper, claim there are sub-segments of the market that carry their own risk premiums above and beyond what the broad market offers. In effect, a portfolio has a market beta that measures its exposure to the broad market, yet it also has several other betas that measure its exposures to other risk premiums—like the value premium. This multi-premium concept was later extended by many authors, one of them being Carhart (1997) who added momentum as a factor.

Realizing the importance of factors as underlying performance drivers is leading to a wholesale change in the way investors and plan sponsors look at their asset managers.

## Where do extra returns come from?

Investment style risk premiums are the drivers of active equity returns



Source: MSCI, Allianz Global Investors. For illustration purpose only.

Decades ago, the relative return of a portfolio was fully attributed to the skills of the portfolio manager. With the advent of the capital asset pricing model (CAPM), the same portfolio's active return was decomposed into a component that describes the portfolio's sensitivity to the movement of the broad market, called beta, and a component that cannot be explained by market movement, called alpha. CAPM therefore made it clear that part of a portfolio's relative performance is explained by exposure to the broad market, not purely by stock picking or alpha. As an example, if you buy defensive, low-beta stocks in a down market, you will outperform—independently of any stock-selection skill involved in deciding which defensive stocks to buy.

This insight led most sponsors to ask their managers to keep the beta of the portfolio constant at one, and to instead concentrate on stock picking. Otherwise, if the managers were able to freely choose the market exposure, the sponsors would not be able to implement their asset allocation properly.

Decades later, additional work done by Eugene Fama and Kenneth French extended the CAPM concept to include more than one risk premium and therefore more than one beta; in so doing, they were able to demonstrate that according to their equity risk models, a much larger share of stock returns are in fact driven by factor exposures and factor timing. The concept was then extended to more factors, like in the Carhart four-factor model, and the role of alpha from stock selection

continuously diminished. In the autumn of 2013, Eugene Fama received the Nobel Memorial Prize in Economics for his explanation of the empirical outperformance of value and small caps as risk premiums. The investor will receive a risk premium for investing into stocks that have additional business risks, representing a margin of safety.

In aggregate, these discoveries meant that less and less of a portfolio's active relative return could be attributed to a manager's pure skill; instead, an ever-larger part of that same return was attributed to risk premiums. The risk premiums had always been there, but their role was discovered only slowly over time and the role of alpha turned out to be much smaller than previously thought.

As the importance of investment factors has become more widely acknowledged, many sponsors have moved from monitoring the market beta of their investments to actively monitoring their exposure to other factors, too.

You might say, this is all well and good (and perhaps a little bit dry and academic) but factors are still not interesting to me, I will pick asset managers that concentrate on pure alpha generation. After all, this is what most sponsors try to achieve when choosing asset managers. The general public's interest in factor investing received a big boost when some very large sponsors such as the Norwegian Pension Fund had a very close look at their managers and made a few interesting discoveries.

The fund had picked asset managers with positive relative returns. Was it possible to explain their results by factors? The first answer is “no”: Any single equity fund can be run with limited factor exposure, with the largest part of relative returns explained not by factors, but by independent stock-picking alone. However, most institutional sponsors will need to hire a considerable number of different managers. Once these holdings are aggregated and looked at as a consolidated entity, factor exposures will emerge and play much larger roles than they would in individual portfolios.

There are several reasons for this emergence of factors at an aggregate level. Portfolio managers tend to disagree more about the individual stocks they pick than the investment styles they follow. Either knowingly or unknowingly, managers prefer stocks with certain style characteristics such as value or quality, although they disagree about individual stocks. Therefore, *at an aggregate level, stock-picking decisions wash out and are less relevant than the choice of style characteristics.*

The mathematics of factors shows that an aggregate of four portfolios has only half the stock-specific orthogonal risk component of a single portfolio (sixteen portfolios have only one quarter). Factor risk does not diversify across managers—but stock-specific risk does.

Therefore, factor components dominate at an aggregate level—and many empirical results confirm this conclusion. For example, Kahn and Lemmon (2015) have shown with simulations that factor exposures in multi-manager portfolios, of at least ten portfolios, account for more than 50% of the aggregate relative risk. Very large institutional investors hold far more than ten portfolios, so factor exposures will dominate their investment results even more.

This is also what the Norwegian Pension Fund found empirically. As one of the largest sovereign wealth funds in the world—with a mission to invest Norway’s resource wealth in a long-term and sustainable manner—its decision-making process should be an enlightening one for investors of any size.

During the Great Financial Crisis of 2008 the fund’s assets dropped and underperformed their benchmark significantly. The sharp loss of value—and the public pressure resulting from the underperformance—triggered an analysis of the fund’s performance and asset managers. Part of this analysis came in a report by Ang, Goetzmann and Schaefer (2009), who are all renowned finance professors.

Their report found that despite the fund’s commitment to active investing, its return behavior was not significantly different from its benchmark’s; its different investment weights tended to cancel each other out at the aggregate portfolio level. Moreover, about two-thirds of the fund’s excess return could be explained

by including well-known factors and style risk premiums—in particular value, size, momentum and volatility.

As a result, the Norwegian Pension Fund decided to change central parts of its investment policy. Although the fund could not move to a completely factor-based approach given its size, it did include some key tenets of investment style premium harvesting in the fund’s official “Investment Beliefs”:

- The fund believes that markets are for the most part efficient, which negates any substantial effects from stock selection and thus alpha.
- Moreover, the fund now aims to increase risk-adjusted performance by seeking exposure to certain factors, and thus by harvesting risk premiums in addition to the equity risk premium.
- However, the risks associated with the factor premiums need to be managed instead of these risk exposures being simply a by-product of bottom-up active stock picking.

Given the empirical evidence that was confirmed by other large sponsors and which can also be explained theoretically (see Kahn and Lemmon 2015), the natural question for institutional investors to ask themselves is, why do we pay high active fees for individual managers if our aggregate portfolio is not only exposed to factors, but even dominated by them? Shouldn’t we pay lower fees and target the factors explicitly? Even if they adopt a two-pronged approach, chasing alpha and risk premiums at the same time, they have developed a realistic view on the scarcity of alpha. A large institutional investor is simply too big to generate a significant part of excess returns from alpha, a healthy dose of risk premiums will have to provide the much larger part of excess returns.

Index providers were quick to react to the new insights (which are actually not new to academia) and launched a plethora of new indexes that commoditize risk premium investing. Commoditization means two things: isolate and distribute separately. The new indexes carry many different labels such as smart beta indexes, style indexes or factor indexes, terms that are different but largely overlapping. This represents a very important development in the asset management industry. It represents a second round of commoditization. In the first round, broad market indexes were launched that allowed the sponsors to sidestep asset managers when they wanted to get access to the equity market premium. In the second round, sponsors can sidestep asset managers when they want to outperform the markets in a buy and hold approach by simply buying a basket of risk premium indexes that give them access to sources of long-term outperformance.

This concludes our short history on factor investing and leads us to the next question.



## Which factors to choose?

Let us first approach the question in the most general way: with the help of statistics. The concept of factors is actually a concept borrowed from statistics.

Looking at a set of random variables, one can ask whether there are some common forces that might explain at least some of the apparent randomness of the individual variables. These common forces are called factors in statistics. Turning to equities, if one thinks of equity prices as random variables, then factors are common drivers that can explain some commonalities of the movement of individual equities. The most important factor for explaining the returns of individual equities is the global market index that typically explains 50–70% of the returns of individual stocks. Next to the market index, investment styles like value, small caps or momentum are important factors. These factors are *common drivers* of equities because they relate to risks that are *common* to all members of subgroups of equities. As an example, all value stocks share a heightened vulnerability to the business cycle and therefore show a common reaction to macro developments.

But how many factors are there? Academic research is unambiguous here—not too many. Depending on what academic study you look at, up to 80% of the active returns of *diversified portfolios* can be explained by the exposure of these portfolios to a handful of risk factors. However, in *highly active or unconstrained* portfolios much less than 80% of the active return is explained by factors. But in the case of big institutional investors holding large and diversified aggregate portfolios comprising many different portfolio managers and many different investment approaches, a large chunk of active returns is explained by a rather small set of factors such as

- the market factor and
- the investment styles value, momentum and small caps

The importance of these four factors is undisputed in academic research. Many add the factors price volatility, revisions, quality and growth to the list of factors, although no consensus has been achieved yet as to whether all these additional factors are indispensable or whether some of them can be left out owing to their high correlation with other factors. But that's about it, no more than four to eight factors are needed to explain up to 80% of active returns.

## Does data mining overstate factor returns?

How can we be sure that the past success of these factors is not just data mining? It is important to note that factor investing is not immune to data mining. The good news is that the long term success of well-known factors like value, momentum, small caps or low volatility is most likely not the result of data mining. The long term success of these typical factors is well documented, over long time periods and in all major investment regions. These long-term results are robust in the sense that no matter how a value strategy is defined, whether as a low price/book-strategy or a low price/earnings strategy or indirectly by means of a fundamentally weighted index, all value strategies have outperformed in the long run, in all major regions.

In our experience, there are hardly any patterns in investing that are as persistent as the long term success of these factor strategies which has materialized in many real life funds. There is also a robust economic rationale that explains why we can expect these factors to work.

However, despite the general factor effects being persistent and robust, there are of course still a number of ways in which back-tests of particular factor strategies can be tweaked to look better, either intentionally or unintentionally. This can be a source of concern as typical factor indexes that are the basis of factor ETFs (exchange traded funds) only have a short real-life history, and, hence, most of the (appealing) performance history of these factor indexes is just a back-test that may not be repeatable. There is a risk that investors who are investing in a factor index based on the strong long-term back-test results of that index will end up being disappointed as the real life performance of the index might not meet the expectations that non-repeatable back-test numbers have raised.

In that sense, it is instructive to compare the performance of longer-existing factor ETFs (before costs, according to Glushkov (2015)), with the performance of newly invented factor indexes. In most categories, the long-existing factor ETFs did far worse than the newly created factor indexes that enter this performance comparison based mostly on only back-test performance. Are the creators of the new factor indexes so much smarter than the creators of earlier smart beta ETFs, or is the performance gap an indication of data mining? How can I know that a given way to implement a factor is not just the result of data mining, when all I can look at is back-test numbers? That's not an easy question but investors are certainly not helpless. There are some indications that might suggest that the back-test is non-repeatable in the future. Here is a small check-list:

Let us start, of course, with the 'too good-to-be-true' back-tests, where the performance of a new version of established factor

strategies like momentum or quality is doing so much better than longer-existing versions of those factor strategies.

Second, as a rule of thumb, more sophisticated models are certainly more prone to tweaking than simple models. Watch out, if many parameters have been chosen and fine-tuned.

Third, if the back-test results are very sensitive to slight changes to the parameters of the strategy, such as: slightly different rebalancing dates make a huge difference; slightly different rebalancing frequency makes a big difference; slightly different definition of the factor changes a lot or dynamic definitions change the result, e.g., moving within value from a low price/book-factor to a low price/earnings-factor over time; in other words, if small changes to the model have a significant impact.

Fourth, more generally, in statistics, in order to check the robustness of a model, often a technique called randomization is used where the training sample used for the estimation of the model is slightly randomized, and the same unchanged model is re-estimated on the randomized training sample. If the model is highly sensitive with respect to mild randomizations of the training sample (the world outside of the model), then again, that's a warning signal. This technique can also be applied to gauge the robustness of a back-test result.

## Will returns be persistent or arbitrated away?

How can I be sure that factor investing is not becoming the next crowded trade? Factor investing is the talk of the town, and many institutional investors are moving larger parts of their active or passive equity allocations into multi-factor equity products. But some are starting to worry that factor investing might be the next crowded trade, and that the factor premiums targeted might be disappearing quickly, or even might become negative. Are these worries justified?

According to estimates from J.P. Morgan assets under management of global pension funds invested in smart beta or factor investing strategies may have reached USD 2.3 trillion in 2015, more than six times the number in 2008. Still, this number is comparatively small and represents just 15% of the USD 15 trillion in total assets in equity funds. About half of the assets devoted to smart beta or factor investing ETFs sit in different kind of value strategies, according to Morningstar. Value stocks have been lagging behind global markets for most of the past 10 years, are outright cheap from an historical perspective vs. the broad market, and, in investors surveys conducted by Macquarie at the end of 2015, value turned out to be the least preferred investment factor. All of this does not look like the ingredients of a crowded trade.



In addition, the investment style value is structurally less prone to crowding than other investment styles. First, there are many different ways to define value, hence the flows into value strategies go to different subsegments of the equity market. Secondly, typical value indexes have relatively high capacity. The global RAFI fundamental value index, the MSCI and the FTSE value indexes all comprise more than 1000 names. And finally, isn't the value trade almost by definition the opposite of a crowded trade? Value investing is about investing in stocks that are currently out of favor as business is not doing so well for them at a given point in time. That doesn't go well with the notion of crowding.

Next to value strategies, low volatility strategies are the most important category of smart beta ETFs. Structurally, low volatility strategies are much more prone to crowding than value strategies. The MSCI MinVol index, by far the most popular low volatility index, comprises less than 300 stocks, hence has much less capacity than the MSCI or FTSE or RAFI value indexes with more than 1000 stocks each. There might be signs that the flows into low volatility stocks have pushed up the valuations of these stocks as the valuation premium for low volatility stocks is at historical highs.

However, most likely this is not mainly the result of flows from factor investors into outright low volatility indexes, but the result of a more general preference of all kinds of investors for more defensive quality names in times of lower growth in the aftermath of the Great Financial Crisis. In numbers, if active

managers were to increase their allocation to low volatility stocks by a mere 1%, that would trigger flows into low volatility stocks equivalent to last year's full flow from outright factor investors into low volatility stocks.

Finally, looking at factor indexes like quality or momentum, it seems that assets under management are still far too small for crowding to have happened.

But of course, that could change in the future, and factor premiums could become smaller over time should the market share of factor strategies grow significantly further. Will factor premiums eventually disappear, or even turn negative?

We think that this is highly unlikely. To see why, it is crucial to understand the nature of factor premiums. If factor premiums are risk premiums, then they are the fair compensation that investors receive in the long run for taking on higher business risk. Take, for example, the value factor. Value stocks are fundamentally more risky than other stocks as value stocks are typically more highly leveraged, less profitable and more cyclical than other stocks. This means a higher business risk for value stocks like energy stocks or materials in a prolonged cyclical downturn, and this higher risk is compensated by a risk premium. If this risk premium were to disappear, who would still take on the higher risk of value stocks? The best guess is that all investors would go for the stocks with a record of relatively stable growth, and sell the cyclical names, and this trade would once again re-establish the risk premium for value stocks.

It is important to understand that factor investing is not about exploiting inefficiencies and that factor investing is not about exploiting the mispricing of a particular category of stocks. Those inefficiencies can indeed disappear when investors start pricing stocks correctly. Factor investing is about earning a risk premium for holding fairly priced, but structurally more risky, stocks.

Factor investing is about harvesting risk premiums. Investors with a long-term time horizon who are well-positioned to shoulder the risks associated with factors like value or small caps can harvest the associated risk premiums even in a fairly efficient market environment.

## Implementation: is factor timing an option and how should factors be combined?

Many intuitive investment style factors like value, momentum and small caps have been successful in the long run, but short term volatility has been high. The momentum investor suffered a painful setback at the end of the '90s, underperforming by

around 30% and it then took seven years to recuperate all the losses in relative performance, only to see another period of strong underperformance from which the index—after nearly seven years—has not yet recovered fully. How to deal with the long-term performance success of investment styles, on the one hand, and the high short-term volatility on the other hand?

Different investors have given different answers here. There are the **single factor investors** who just invest for the long-term risk premium and ignore the short-term volatility (think Warren Buffett and high quality, attractive valuation). But these investors need to stick to their guns when the going gets very tough.

Then, there are the **factor timers**. These investors opportunistically switch from value to momentum and vice versa. Of course, if this worked, performance would be great. But how realistic is that? We think, factor timing is elusive. In fact, the major turnarounds in factor performance have often coincided with major turnarounds in the overall markets, which makes **factor timing as challenging as market timing**. Empirically, the track records of market timing strategies are not really encouraging.

## The elusive nature of factor timing—a deeper look

The time series properties of factors or investment styles like value or momentum already suggest that building a successful style timing model will be challenging, if not impossible.

- Looking at the performance of value vs momentum reveals that there **have been only a few major turnarounds** in the performance of value vs momentum.
- Therefore, a **model will have been successful in the past if and only if the model had been successful at these few major turnarounds**.

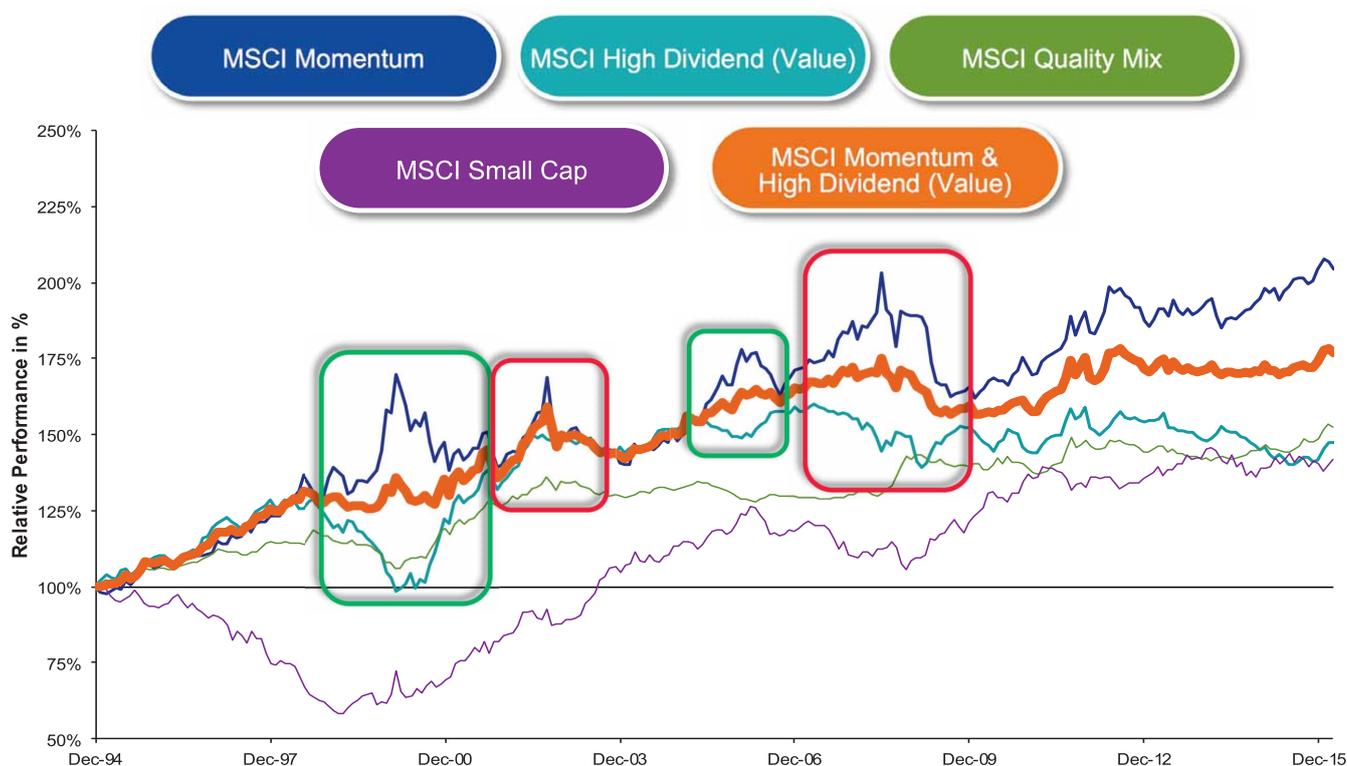
But these few turnarounds most likely give too little observations to successfully calibrate a model that is able to separate the general and repeatable patterns around turnarounds in investment style performance, from the specific patterns around these particular turnarounds, and mere noise. Most likely, the model will be over-fitted to explain well the past few turnarounds, but will be weak in predicting the next.

- Any successful style timing strategy needs to be a strategy involving low trading otherwise the combination of a large number of trades coupled with a high turnover per signal and with generally low exploitable return spreads will render the strategy inefficient from an after cost perspective. But a strategy with a low number of trading signals will have only a low expected information ratio (IR) according to the *fundamental law of active management*,  $IR = IC \sqrt{Breadth}$ , where IC refers to the predictive power of the style timing signal, and breadth refers to the number of independent trades.
- Because of the **small number of observations** for major turnarounds in investment style performance, **IC will likely be low**, and due to the **low number of trading signals**, the **breadth of the strategy will also be narrow**, hence the IR of any style timing strategy must be relatively modest.

On the other hand, as the realized IR of a diversified investment style mix of factors is relatively high, maximizing the IR of a combined strategy including timing leaves little space for the style timing part.

## Investment style diversification has led to more stable outperformance

Relative performance of MSCI World Risk Premium Indexes



Source: Allianz Global Investors, MSCI; as of 31/03/2016. Past performance is not indicative of future results.

A more modest and also realistic answer is investment style diversification. By using diversification, it is possible to participate in the long-term outperformance of investment style factors at considerably lower levels of short-term risk compared to an investment in a single factor only. The **outperformance path of a diversified mix of value and momentum is much more stable** than the performance of the individual factors.

The line chart above shows the relative performance of established factors, using the MSCI risk premium indexes vs. the MSCI World Index. Yes, these investment styles have been successful in the long run, but short-term volatility has been high.

The orange line shows diversification at work: the out-performance path of a diversified mix of value and momentum styles is much more stable than the performance of the individual styles.

Diversification helped during the tech bubble at the end of the '90s, and also in 2005, but to a lesser degree in the Great Financial Crisis. What went wrong with diversification in 2007–2009? The sobering answer is that the assumption that a simple

blend of simplistically defined risk premium indexes could offer some protection in the Great Financial Crisis was just too much to hope for. Under normal circumstances, if you combine momentum stocks with dividend stocks, you should expect to see some diversification. Momentum stocks are stocks that have strongly risen in price and therefore are typically more on the expensive side and typically have lower dividend yields. Therefore, the overlap between momentum stocks on the one hand side and high dividend names on the other hand side tends to be small. This makes the investment styles diverse enough for diversification to work. Indeed, diversification worked just fine in the tech-bubble around the turn of the century, or in 2005.

But things can be different at times. When there is an extended rally of dividend names, the investment styles dividend and momentum can go hand in hand and the overlap might then be almost total. If the overlap becomes too big, if the investment styles high dividend and momentum are more or less the same thing, then diversification is bound to fail and this is what happened at the beginning of the Great Financial Crisis.

But there is a couple of other reasons why diversification could fail. Another occasion when diversification could fail is when all

investment styles are biased towards the same macro risk factor. As an example, if both momentum and dividend stocks are biased toward low beta, then again diversification will not work. This is exactly what happened in 2009. From March 2009 onwards, when there was a strong market recovery, the blend of dividend and momentum was underperforming because both investment styles were biased towards the same risk factor “low beta”, and low beta stocks were lagging in that relief rally, unsurprisingly.

There is a number of other risk factors that are important besides the market beta and all could derail the effectiveness of diversification, such as interest rate sensitivity or oil price sensitivity.

Now imagine you are an investor in a basket of prefabricated smart beta ETFs and you observe that there is a high overlap between your indexes, or that all are biased towards low beta stocks or another macro risk? What can you do about it? Well, nothing. In whichever way you weight these indexes in your basket you will always end up with a high overlap of the investment styles, and hence with the macro biases.

But portfolio managers—operating at the single stock level—still have the leeway to change the composition of the value and the high dividend segment of the portfolio. What should they do?

First, it's important to note that these macroeconomic risks are non-rewarding risks in the sense that there is no risk premium attached to these kinds of risks for a buy and hold investor. There is no risk premium for taking on oil price risks, or interest rate risk. Of course, there are periods when oil price risk pays off, and investors could try to benefit from that by trying to time those periods. However, we think that timing of the oil price or the interest rate cycle is elusive. We think investors are better off neutralising the implicit exposures to all of these non-rewarding risks when harvesting investment style risk premiums. Certainly, the worst thing to do with these exposures to the non-rewarding risks, is to leave them unmanaged, like factor ETFs do, as this can create a lot of short-term volatility without any compensation for it.

The problem with unmanaged non-rewarding risks doesn't go away by simply combining different factor beta ETFs as *unmanaged exposures plus unmanaged exposures still give unmanaged exposures*. Of course, when diversifying across different risk premium indexes, there are good reasons to expect that the exposures to non-rewarding risks might be somehow mitigated and contained. Sometimes that's the case, but there is just no guarantee for this to happen. On the contrary, investors in a blend of risk premium ETFs may end up with a portfolio that is not driven by the targeted risk premiums, but by non-targeted, unmanaged non-rewarding risks. The

performance impact of those risks can be very beneficial in a back-test and this is indeed one explanation for the puzzling fact that back-tests tend to be better than future realizations. Often they capture more than the targeted factors, placing an implicit bet on other non-targeted risk factors as well and win big by pure chance. Portfolio managers—operating at the single stock level—can deal with these non-rewarding risks efficiently in order to isolate the long-term rewarding risks from the non-rewarding risks and thereby separating repeatable results from non-repeatable ones.

They will buy dividend stocks and momentum stocks to get the desired exposures to the investment styles high dividend and momentum, but at the same time will make sure that the overlap of these investment styles does not become too big, by not only buying names that display high dividends and high momentum at the same time, but also by buying high dividend stocks with low momentum, and high momentum stocks with low dividends.

They can also make sure that they do not only buy low beta names but also high beta names. They will buy stocks with high oil price sensitivity and stocks with low oil price sensitivity. The same can be done with respect to interest rate sensitivity and so on. In this way, they can establish the exposure to the desired risk factors high dividend and momentum, while at the same time spreading out the portfolio in many more risk dimensions than smart beta indexes could do and therefore can earn the risk premiums in a much more stable way than a basket of smart beta indexes.

This is what we call the success factors of risk premium investing: harvesting investment style risk premiums should be done firstly in a well-diversified way that keeps up the diversification potential and secondly should be largely independent from the economic or the market environment by neutralizing the corresponding macro exposures.

We have seen that details of implementation are highly important and back-tests can overstate the realizable returns, therefore a successful track record is an important proof statement.

## Conclusions

By now, the existence of investment style risk premiums in the equity markets—in addition to the equity risk premium—has become a familiar concept and is supported by extensive and diverse research in academia, as well as by practitioners' live experience.

Although there is no full consensus yet on how many risk premiums there are, certain economically significant and persistent premiums have been identified as important drivers of return.

Risk premiums can be used as a reliable source of excess returns when placed in the driver's seat of risk allocation. Ignoring them could well lead to a portfolio positioning that turns these performance tailwinds into headwinds.

Details of implementation are crucial and back-tests can overstate the realizable returns, therefore a successful track record is an important proof statement.

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