DWS

FACTORS

September 2018

DYNAMIC FACTOR INVESTING

There has never been a better time to look at factors. Not only have single and multi-factor approaches been refined, but dynamic strategies offer a powerful new way to invest.

SUMMARY

Factor investing can deliver huge advantages to clients and thankfully there are many strategies to choose from. Combining factors, say, enables portfolios to harvest different risk premiums whilst enjoying diversification benefits. Meanwhile a more integrated multi-factor approach avoids some of the pitfalls of simply implementing factors top-down. So-called dynamic factor investing is different again. It allocates between factors in response to changing market environments. Such an adaptive approach is the focus of this introductory paper.

It may not be for everyone. For example single factors can be more appropriate for clients already invested with active managers or those with strong market views. Likewise a static yet diversified exposure to various factors may be the way to go – multi-factor strategies help boost risk adjusted returns via diversification. For investors concerned with achieving stable returns across volatile conditions – or fearful of a structural break in markets – we believe that a more adaptive approach could be the answer.

Dynamic factor investing does not rely on forecasting the future. It allocates to factors with the most predictive power, along with those with the most statistically significant persistence in terms of returns. Historical data shows that years of outperformance in a single factor can be followed (or proceeded) by a long stretch of underperformance. That is why it can help to move between them – ideally beforehand but even after markets have moved to a new regime.

Structural breaks not only affect the returns of broadly defined factors such as value, but also the optimal definitions or representations of those factors. For example, while price to earnings or price to book may work well in a normal market environment, cash-flow related measures often deliver superior performance in times of market turmoil.

Factors are then re-selected or re-weighted each month to reflect changing conditions. The key to dynamic factor investing is to draw from a broad range of factors within a cluster in order to adapt to changing markets. As mentioned, in some environments one ratio may be offering a better signal within a valuation cluster, while in another month it may be a different metric.

By reacting to signals in this way and combining this with a given stock's exposure to these signals, it is possible to give holdings an attractiveness score. This becomes the basis of a robust and dynamic portfolio construction process.

The beauty of factors is there is now a suite of strategies to choose from. Where appropriate, investors should investigate dynamic factors as a compliment to their existing strategies.

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Beyond single factor investing

Factor investing has been around for decades and it is easy to see why investors have gravitated towards the concept: it makes intuitive sense. After all, if certain stock attributes are linked to excess returns, why not overweight securities that have those qualities and underweight the ones without the right characteristics?

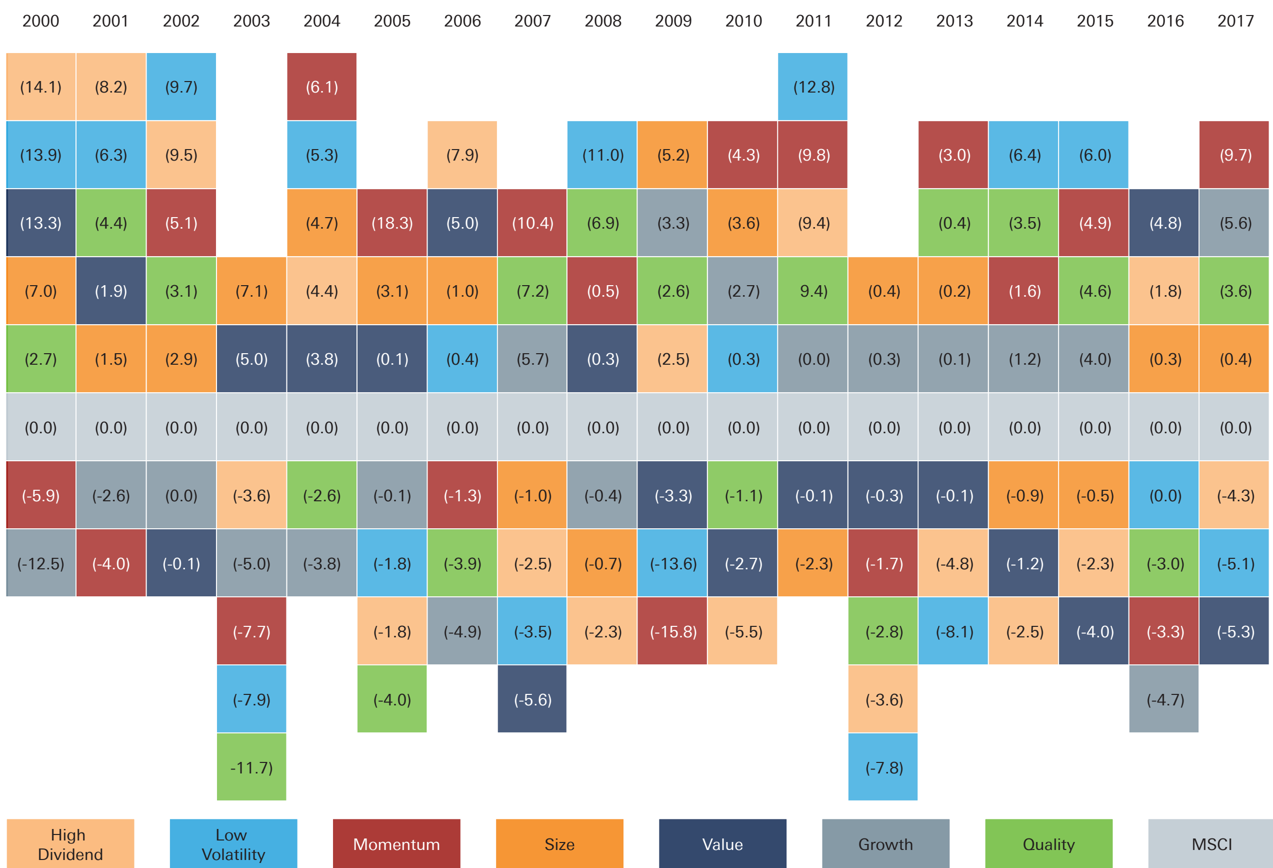
This line of thinking was behind the first wave of factor strategies, which included tactics that focused on qualities such as value, low volatility, size, and momentum – allowing a variety of investors to find a technique that suited their personal approach.

Recent research into factors not only expands on the original idea, but eliminates some of the pitfalls this approach produces. Not often mentioned is the fact that individual factor returns are often volatile and prone to long stretches of underperformance as well as outperformance.

That is not to say single factors do not have an important role to play. They do, and a single factor approach is perfectly suited to clients already invested with active managers or those with strong market views. The reality, however, is that picking just one factor is sometimes risky. Over the past two decades, data show that factors can often deliver years of outperformance in a row, but this is often followed (or preceded) by a stretch of sluggish returns.

Take the high dividend factor. It was top or second top performing factor for three years at the turn on the millennium [Chart 1]. However, ten out of the next 15 years its returns were below that of the overall market. Low volatility strategies also suffered extreme variance from 2011 to 2015. In each of those years they were either the best or worst performing factor.

Chart 1: MSCI factor returns relative to MSCI World[1]



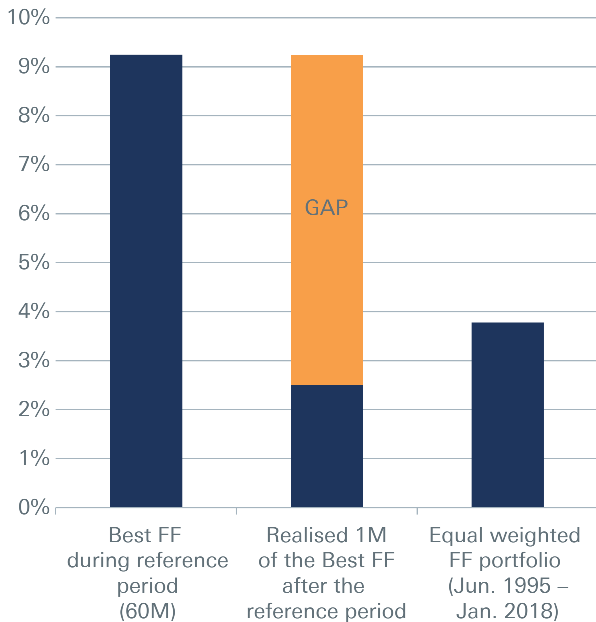
Past performance is not a reliable indicator of future returns

[1] Source: DWS, Bloomberg Finance L.P., own calculation (end of December 2017)

Factor returns do not even seem to follow a textbook model of a simple random walk. They have good and bad runs and fall in and out of favour. If anything, factor returns behave more like fixed income instruments in that they generate a yield that is inversely related to past returns.

In fact, extrapolating past returns overestimates returns and leads to inferior results. Between 1995 and 2018, for example, an equally weighted factor portfolio based on so-called Fama/French factors (size, value, operating profitability, investment) would have outperformed one in which investments were made in the best performing factor each month. (Chart 2).

Chart 2: Naive return extrapolation versus realised returns[2]



What can investors do?

So the question becomes how can investors select factors that are most likely to be predictive of outperformance – instead of reactive to previous market trends? The answer is that it is harder than many care to admit. Historical data suggest that figuring out which single factor is going to work in future is not feasible on a consistent basis. One thing investors can do is to combine factors in order to build a portfolio that gives the greatest potential chance for outperformance.

Luckily, factors often have little in common in terms of correlation. Therefore combining factors can help to produce a better return. Some factors, such as growth and value, have significant negative correlations in terms of excess returns, while others – such as minimum volatility and growth, or small caps and momentum – have close to no correlation at all. (Chart 3)

Chart 3: Correlation of MSCI factor returns from 2003 to 2017[3]

	Value	Quality	Growth	Momentum	Small Caps	Div Yield	Min Vol
Value		-44%	-100%	-42%	-10%	54%	-1%
Quality	-44%		43%	36%	-48%	2%	52%
Growth	-100%	43%		41%	11%	-53%	0%
Momentum	-42%	36%	41%		2%	-12%	29%
Small Caps	-10%	-48%	11%	2%		-36%	-36%
Div Yield	54%	2%	-53%	-12%	-36%		39%
Min Vol	-1%	52%	0%	29%	-36%	39%	

Thus combining factors together in a portfolio can help to produce a more balanced portfolio. It can also lower the risk of underperformance in a single factor, or buying in too early based on what appears to be a fresh trend.

Building a better factor-focused portfolio

Utilising multiple factors can help to smooth out returns. But this must be done carefully. That is because often there is significant overlap between factors in terms of constituents and drivers of excess return.

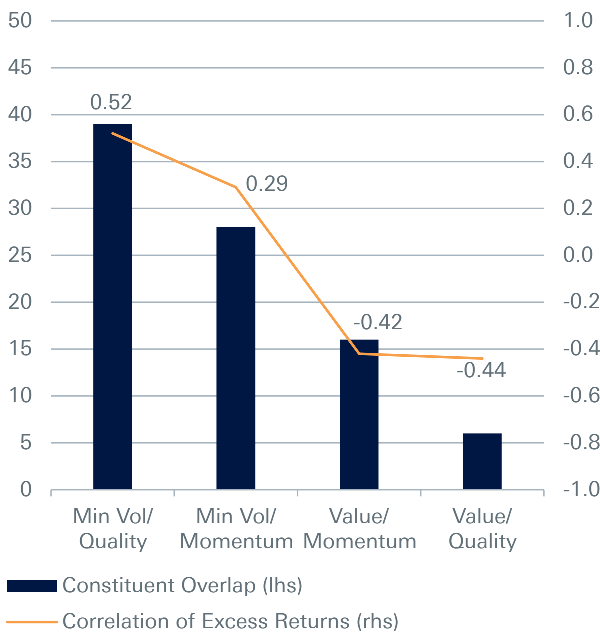
For example, DWS research finds that over the past 15 years the factors of minimum volatility and quality overlapped in terms of constituents close to 40 per cent of the time, while excess return drivers had a correlation of 0.52. Factors which showed the least overlap – such as value and quality – also offered the most negative correlation of excess returns. (Chart 4). In other words, the combination of low correlated factors also offered the highest degree of diversification.

Past performance is not a reliable indicator of future returns

[2] Source: DWS, Kenneth R. French Data Library (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html; retrieved on 30/12/2016), own calculations (end of January 2018)

[3] Source: DWS, Bloomberg, own calculation (end of March 2017)

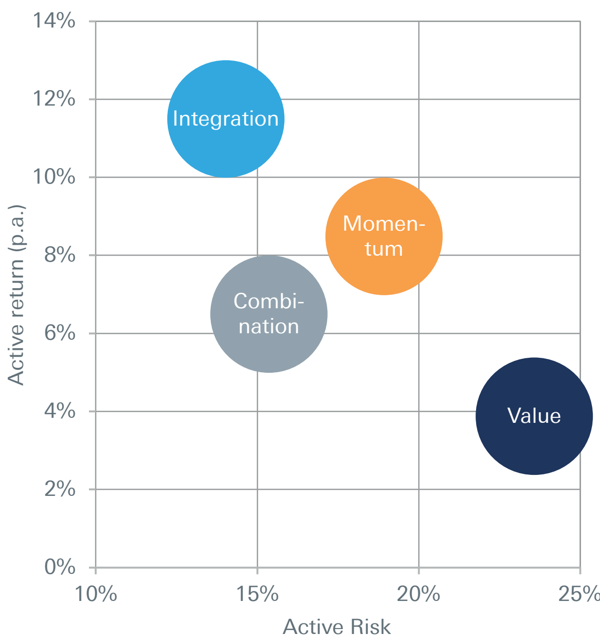
Chart 4: Constituent overlaps vs. correlation of two-factor portfolios[4]



While constituent overlaps remain a challenge, they become subdued when combining low correlated factors (which conveniently offer the highest degree of diversification).

However, building a multi-factor portfolio is more nuanced than simply taking the stocks with the highest ranks for each relevant factor and putting them into a basket. A portfolio that combines two factors – for example taking the best momentum and the best value names and lumping them together – ends up producing different results compared with a more integrated portfolio of factor characteristics. A holistic approach that takes into account issues such as correlation and overlap beats not only individual factor performance but also a traditional combination approach as well. (Chart 5)

Chart 5: Risk return profile of holistic approach[4]



A portfolio that finds the best value and then the best growth characteristics compared with a portfolio that finds the best combined value and growth properties may appear to be a small distinction, but it can have a dramatic impact on not only risk but return as well.

This makes sense. Buying stocks that have better scores in multiple categories focuses a portfolio in names that should be able to survive and prosper in a variety of market environments. More than just combining a number of seemingly disparate factors into a portfolio, securities need to be integrated holistically.

Introducing dynamic factors

While an integrated multi-factor approach avoids some of the pitfalls of static factors, so-called adaptive dynamic strategies are different again. They actively allocate between factors in response to changing market environments. Often times, markets operate in a certain regime until there is a sharp break into a new system. Unexpected market shocks – such as 9/11 or the financial crisis – hit the market suddenly and without warning, much like an earthquake. And also like a big seismic event, these market shocks tend to reshape the investing landscape for years to come.

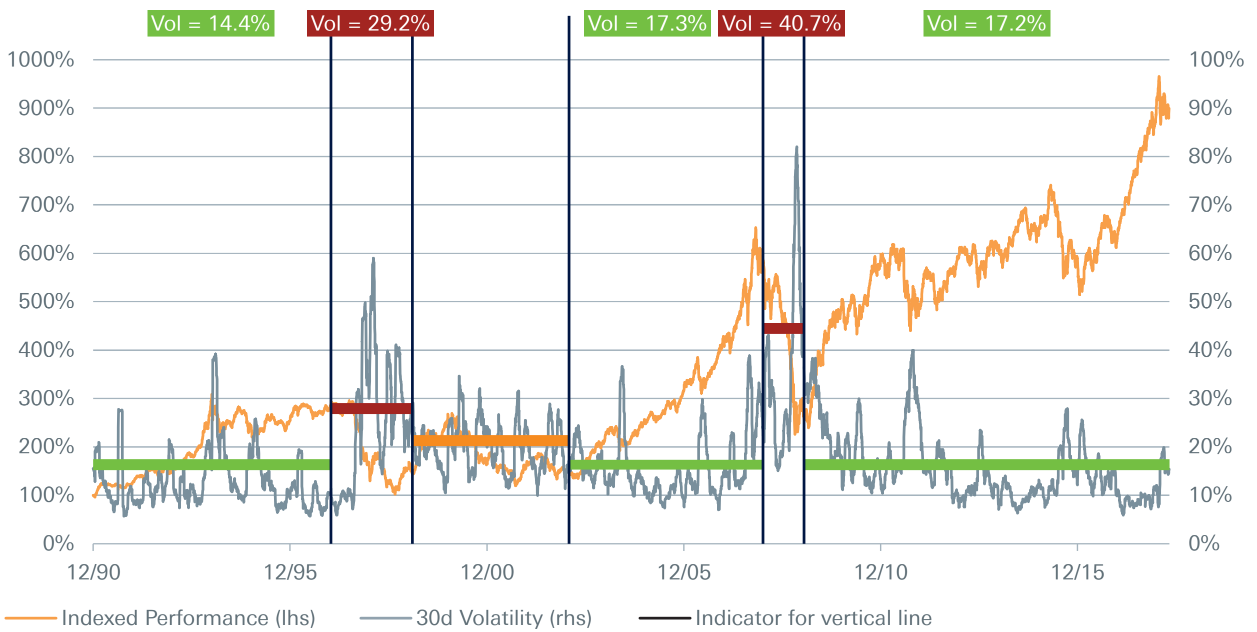
Take for example the performance of the MSCI AC Asia ex-Japan Total Return index since the end of 1990. Total gains approached 800 per cent over this time frame, while volatility averaged just under 20 percent. However, as demonstrated in the chart at the top of the next page, markets seem not to have operated in one and the same regime, but often experience very different leadership periods that betray not only the 8.4 per cent annual gain figure, but also the 20 per cent average volatility level. (Chart 6)

While there were long periods of volatility staying relatively low, these periods were interrupted by briefer but more volatile stretches – including during the financial crisis when volatility averaged over 40 per cent, more than double the long-term average. In other words, simple averages often fail to describe just how complex markets can be. Or that long time periods tend to produce anything but a stable regime. Approaches that ignore this fact expose investors to significant risk.

Past performance is not a reliable indicator of future returns. For illustrative purposes only.

[4] Source: DWS, MSCI BARRA International LLC, own calculation (Time period from January 2003 to March 2017).

Chart 6: Different market regimes are linked by structural breaks[5]



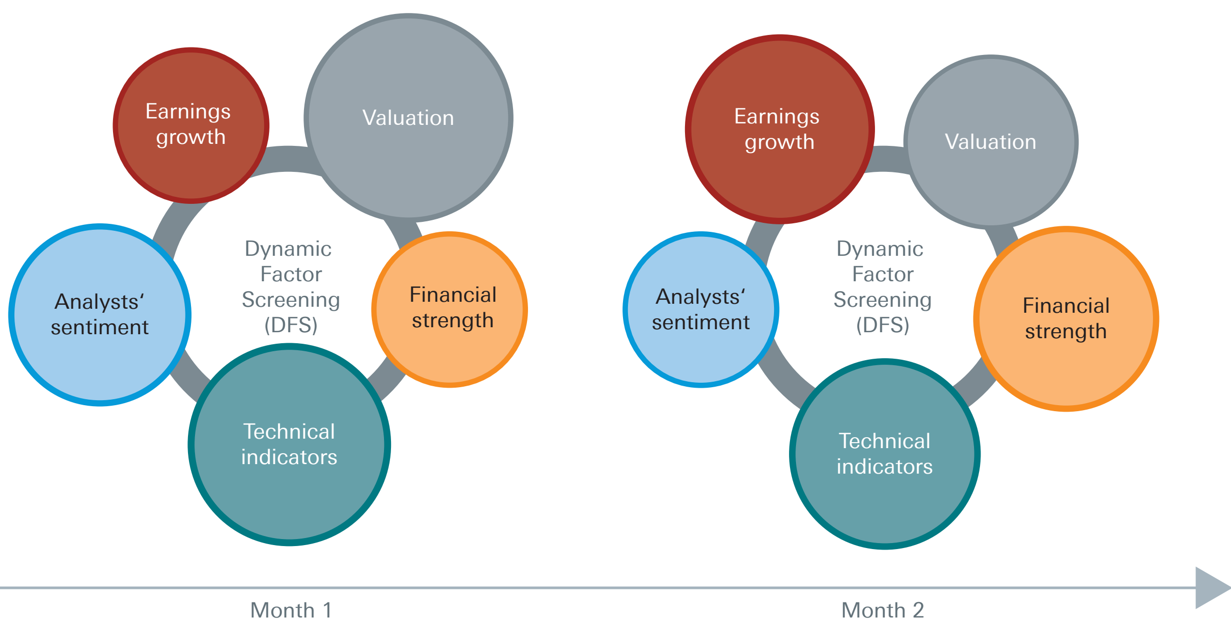
How to implement a dynamic factor system

It is obviously quite difficult to recognise breaks in market regimes without the benefit of hindsight. But certain models can help to at least give investors a more dynamic application of factor characteristics with a more adaptive system.

One approach is to pick factors with the most significant predictive power, along with those that have the most statistically significant persistence in terms of outperformance. Factors are weighted each month in order to give investors a more dynamic approach to markets that adapts to changing conditions in a way that static multi-factor models do not. (Chart 7)

The key to such an approach is to draw from a broad range of factors within different clusters. For example,

Chart 7: A dynamic model adapts to changing markets



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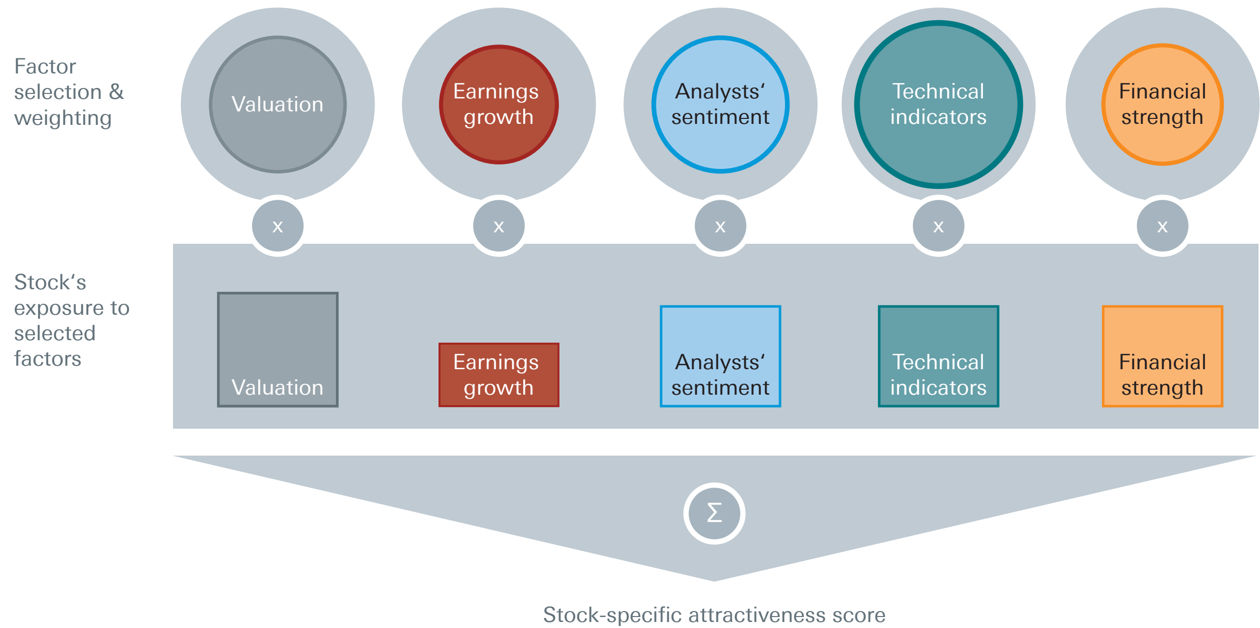
[5] Source: DWS, Bloomberg Finance L.P., own calculation (end of April 2018)

in some months price to earnings ratios may be offering a better signal within the valuation cluster, while in other markets it may be dividend yield. By reacting to signals in this way and combining this with a given stock's exposure to these signals, it is possible to give stocks a specific attractiveness score. This can become the basis of a portfolio construction process. (Chart 8)

Chart 8: Evaluate a stock's exposure to selected factors simultaneously



Stock-specific attractiveness score

Dynamic factor investing in practice

How does such a dynamic system hold up when put to the test against a static approach? The chart below cover the period from June 2008 until December 2016 and compares monthly one, three, and five year periods. (Chart 9)

For clarity, the dynamic model features monthly reweighted and reselected factors, in-line with the approach described above. Meanwhile, the static version of the model utilises factors that are selected once at the beginning of each rolling period and then held for five years – although they were reweighted on a monthly basis. Both approaches could go short[7].

Chart 9: Static versus dynamic returns for long/short portfolios[6]

	1 year			3 years			5 years		
	Static	Dynamic	Excess	Static	Dynamic	Excess	Static	Dynamic	Excess
Max	34.4%	34.3%	30.2%	23.5%	26.3%	35.8%	19.3%	21.9%	25.4%
Q3	20.6%	22.7%	7.4%	16.6%	21.9%	7.8%	16.0%	20.1%	8.2%
Median	16.1%	18.1%	2.2%	15.2%	18.8%	4.5%	13.3%	19.6%	6.3%
Q1	9.0%	13.0%	-1.6%	10.8%	16.3%	1.1%	8.8%	19.3%	3.3%
Min	-17.9%	3.1%	-9.1%	-10.8%	14.0%	-3.3%	-5.1%	16.4%	0.5%

Past performance is not a reliable indicator of future returns

[6] Source: DWS, MSCI BARRA International LLC, own calculation (end of December 2016)

[7] Investors should be aware that many stocks are difficult to short in practice. Hence the much higher returns of the long/short model versus the long only model are not representative.

The results show a wide disparity of returns – especially over rolling five-years where a dynamic approach easily beats static in terms of maximum and median performance. There is a vast difference for minimum performance observed as well. Most strikingly, the dynamic model even becomes dominant. Its worst result beats the best result from the static strategy.

Another observation is the relative tightness of the returns for the dynamic model compared with the static. This again showcases how volatile a static strategy can be and that it cannot be relied upon for durable outperformance. And while both models show statistically significant levels of outperformance – underscoring that factors do matter no matter how they are utilised – it is hard to deny the more optimal results for the dynamic model.

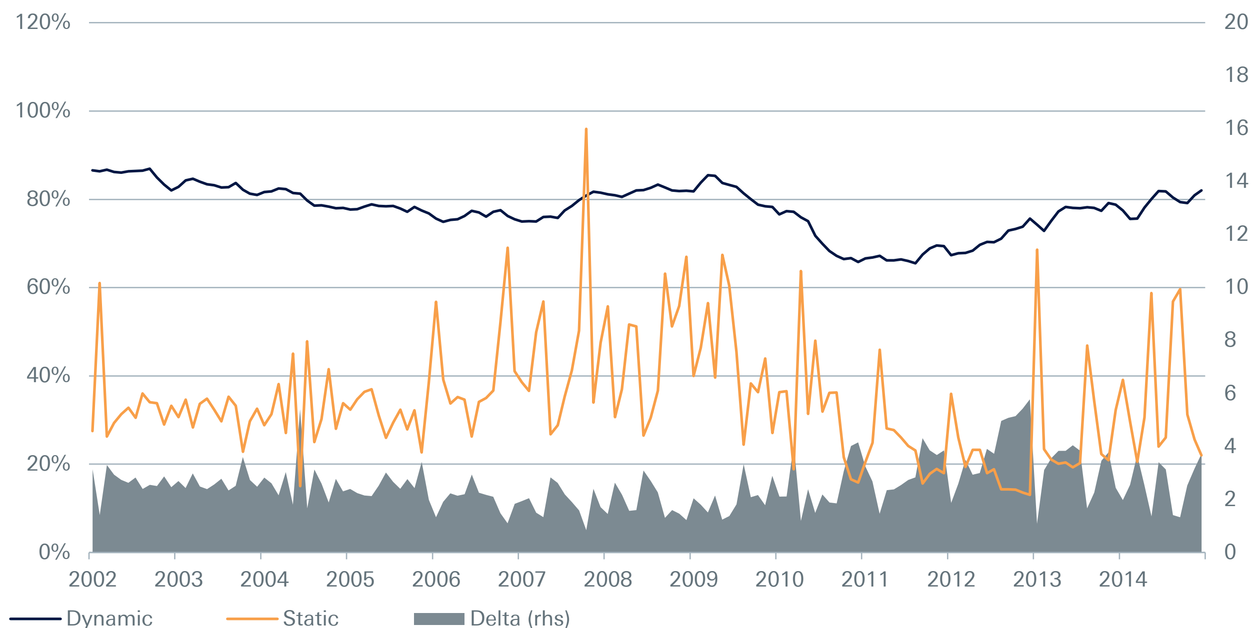
It is also worth mentioning that the findings are similar for a long-only approach, though there is less of a variance (Chart 10). The latter suggests that avoiding or shorting the worst rated and ranked securities is often just as important – if not more so – to delivering outperformance.

Chart 10: Static versus dynamic returns for long-only portfolios[8]

	1 year			3 years			5 years		
	Static	Dynamic	Excess	Static	Dynamic	Excess	Static	Dynamic	Excess
Max	3.6%	3.7%	5.1%	2.2%	1.9%	2.6%	1.6%	1.9%	2.6%
Q3	1.7%	1.9%	0.5%	1.3%	1.5%	0.7%	1.4%	1.9%	0.7%
Median	1.4%	1.5%	0.2%	1.1%	1.4%	0.3%	1.2%	1.7%	0.6%
Q1	0.7%	1.1%	-0.1%	0.6%	1.3%	0.1%	0.8%	1.7%	0.3%
Min	-2.4%	-0.6%	-1.0%	-1.2%	0.9%	-0.4%	-0.8%	1.3%	0.1%

With a long-only system though, there is a much tighter spread in terms of possible returns for a dynamic approach, particularly on the downside. Indeed, for both long only investors and those who can short, this is arguably one of the main benefits of a dynamic system: avoiding some of the worst performance stretches that arguably come from hanging on to factors long after their efficacy has dissipated. One obvious caveat to a dynamic system – and factor investing in general – is an increase in the number of transactions and thus the cost of implementing a factor-driven approach. Static factor implementation creates sizable turnover on its own, but dynamic goes beyond that. (Chart 11).

Chart 11: Average annual turnover of long/short portfolios (1-sided)[8]



Past performance is not a reliable indicator of future returns

[8] Source: DWS, MSCI BARRA International LLC, own calculation (end of December 2016)

Thus, a rigorous and disciplined policy in terms of trading goes a long way in terms of extracting the most benefit from a dynamic factor model. Transaction costs are not an overriding negative for the factor market, but something for investors to keep in mind nonetheless.

Conclusion

It should not be a surprise that factor investing has increased in popularity as an easy way to attempt to capture outperformance. However, like most things in the investing world, the real test is how to implement a factor approach to achieve the best results. All clients are different and each may require a different approach to factor investing.

This paper has shown that simply buying and holding a single factor is not necessarily the best approach for everyone. For investors with long time horizons, they may worry that performance trends change and there is little warning for when a new regime is about to take place that favours another factor. Instead, a multi-factor approach could help to reduce some of these risks, while improving overall diversification in the portfolio as well.

Another strategy still is to embrace the changing nature of the market and utilise a more adaptable approach. Such a technique would take into account a number of key factors and dynamically choose which to over or underweight depending on the current market environment.

Dynamic factor investing can have benefits compared with a more static approach, particularly when utilising a long/short investing style. But even for long-only investors, a multi-factor dynamic system demonstrates a versatility and ability to adapt to a variety of market conditions.

Investors must embrace the factor revolution but be sure to use the most suitable approach.

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