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Unpacking the alpha components behind the STOXX U.S. Equity Factor Index

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1. Introduction

I have been involved in factor investing in one way or another for 40 years. As a result, I can confidently state that – despite some views to the contrary – factor investing is not dead. On the contrary: upgraded and more sophisticated models, and better portfolio construction techniques mean that it seems to be enjoying a new level of popularity. In fact, some measures even produced their best returns for the past 20 years in 2021.

The recent launch of the STOXX U.S. Equity Factor Index,[2] which underlies the iShares US Equity Factor ETF (LRGF), highlights the real-world performance benefits of a factor-based approach that seeks to manage risk relative to a capitalization-weighted benchmark. The STOXX U.S. Equity Factor Index has beaten its parent index, the STOXX USA 900, by roughly 126 basis points a year since 2003. What is more, it has done so with a relatively small level of predicted and realized active risk, producing an information ratio very close to 1. Performance has been consistent as well: The factor index has outpaced its benchmark in more than 75% of the rolling 12-month periods, and more than 88% of the rolling three-year periods, since 2003.

The index is constructed by trading off an alpha forecast against active risk, constraining certain risks such as industry exposures, and trading just four times a year while also limiting turnover[3]. Since the active risk target is 1% the alpha needs to be robust, while the quarterly rebalance schedule and turnover limitations means that it also needs to be stable. Therefore, we thought that digging a little deeper into this alpha and its component parts might provide comfort in the rigor of the strategy for investors seeking a factor-based approach with the potential to outperform. This allows us to highlight some of the forces driving the expected return that is in turn behind the index performance. In other words, this examination represents a "prequel to this performance".

2. Using alpha forecasts to define a best-case scenario

Our first step was to construct a "factor-mimicking portfolio" (FMP) similar to those used in standard risk models so as to calculate a "pure" factor return. In this first iteration, we used the alpha forecast rather than focusing on a standard single factor. An FMP is a long-short, dollar-neutral portfolio that has an exposure of 1 to the factor in question and no exposure to any other factor. In other words, it is the minimum variance portfolio that meets the return criterion. It is largely uninvestible, since it holds every stock in the investment universe at a very small long or short weight and rebalances without regard to transaction costs. Nevertheless, it is essentially the "best-case" scenario for investing in the factor concerned. This evaluation method is also an improvement on another common method of determining factor effectiveness – calculating the difference in returns between the top and bottom deciles or quintiles of a factor. This is because the performance produced by the latter methodology may be driven by other, unintended exposures in the "portfolio," and is likely to be far more volatile than our FMP, but is likely similarly uninvestible.

We initially calculated an FMP for the investment universe (the STOXX USA 900 index) using monthly alpha forecasts. Over the test period, this alpha FMP produced a return of 1.79% per year and an annualized risk of 2.26%. Turnover averaged about 18% per month. Since results can always be driven by a few good periods, we also wanted to ensure that our excess returns would be as stable as possible. A time series plot (Figure 1) confirms the consistency of the active returns, although there are two periods of significant

[2] The index was launched on March 8, 2022.

[3] See STOXX Index Methodology Guide for more details about index construction.

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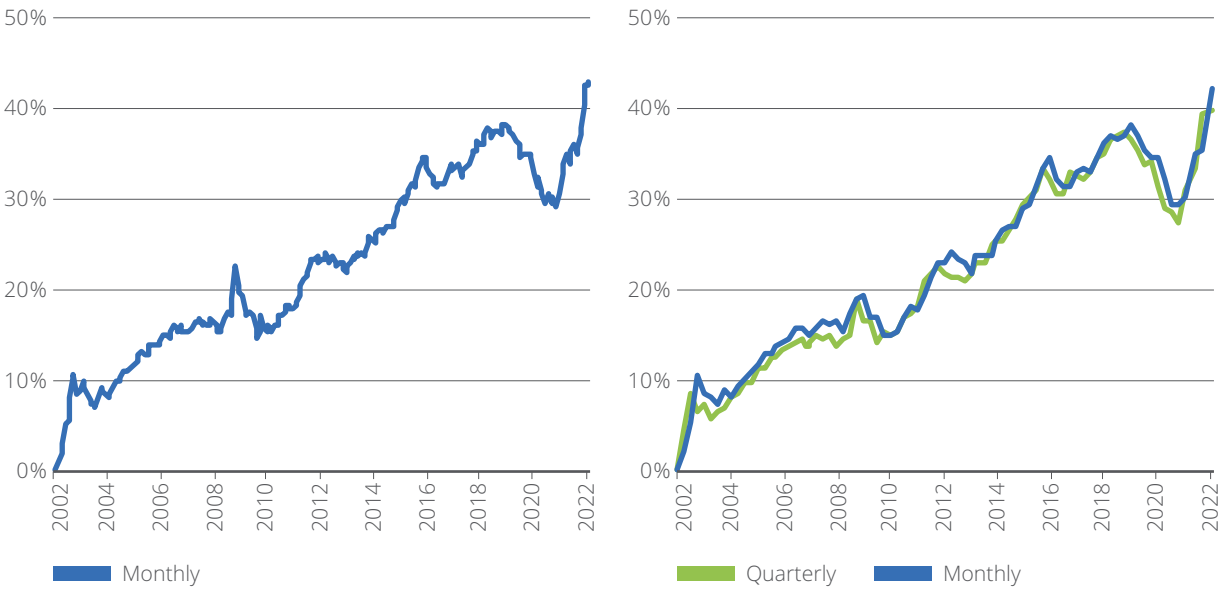
drawdown – from October 2008 through August 2009 and again from January 2019 through November 2020. The first period subsequently took roughly two years to regain the former high-water mark, whereas the second one took a year. It is also important to note that both post-drawdown periods were followed by unusually strong returns.

Since the plan was to rebalance once a quarter, however, it was also important to ensure that the strategy did not require more frequent turnover.

We found that rebalancing the alpha on a quarterly basis (on the expected index rebalance dates) produced nearly identical results to monthly rebalancing. The right-hand graph in Figure 1 shows the cumulative return for both the monthly and the quarterly rebalanced portfolios. Volatility of the quarterly variant was slightly higher (2.53%) over the full period, but annual turnover was 150% compared to more than 210% for the monthly version. Overall, therefore, we were convinced that quarterly rebalancing would be sufficient to achieve our final portfolio alpha goals.

Figure 1: Alpha FMP – Cumulative return monthly (left) and cumulative monthly vs. quarterly returns (right)



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3. Alpha building blocks…

In a next step, our prequel looked back even farther in the research process to examine the components of the alpha score described above. The final alpha score comprised five "factor blocks," each of which contained one or more underlying components. Ideally, all alpha components should produce positive returns, but what is most important is that they should be un-correlated or negatively correlated with each other. This creates a diversified alpha: If one component doesn't "work" in a given period, another should.

The factor blocks comprising the alpha score are **Value**, **Momentum**, **Quality**, **Low Size** and **Low Volatility**. We calculated quarterly FMPs for each of these factor blocks over the same test period as for the alpha FMP. Figure 2 shows the cumulative returns.

Quality, which looks for profitable companies with low leverage and favorable ESG scores, realized the highest annual return out of the five factor blocks. It also did so with one of the lowest levels of volatility, hence producing the highest information ratio. In addition, it produced strong results, yielding the highest returns among all factors in 2006, 2012, 2013, 2014 and 2018 and negative returns only in 2009, 2019 and 2020.

Low Size, which expects smaller-capitalization stocks to fare better than their larger-cap counterparts, had the next-highest return for the full period, and like Quality even outpaced the final alpha. However, this was largely the result of strong returns for 2002–2010. Low Size had the highest returns of any of the factors from 2002 – 2005. Its returns flattened out after 2010 and it had a particularly tough 2017. Low Size also saw higher volatility of returns than any other factor except Value.

The return for the **Momentum** block was positive over the test period and, although lower than that for Quality or Low Size, still produced an acceptable information ratio of 0.45. It outpaced the other factors in six years – 2007, 2011, 2015, 2017, 2020 (negative, but still better than any of the other factors) and 2021. However, it lagged in 2006, 2016 and especially in 2009, when its return was –8.28% – the worst return in any year for any factor apart from Value in 2007 and 2020. It is not surprising that Momentum struggled in a year like 2009, when the market turned suddenly early in the year from focusing on the perils of the financial crisis to the hope of recovery. Stocks that had poor Momentum going into that sentiment shift suddenly became the best performers, while relatively safer names subsequently lagged.

Not all component factors produced such good results over the full test period. **Low Volatility's** return was marginally positive, while **Value** produced negative returns. Value's poor showing was most apparent from 2017 through 2020 – a period in which the US market was largely driven by high-tech and other growth stocks that tended to have very poor value scores — and in 2007, when the rumblings of the upcoming financial crisis started. In 2020, Value had the poorest return of any of the factor blocks in any year of the study. Nevertheless, we do not believe that this negative return indicates that "value is dead", as some commentators would like to believe.

These results are also reflected in the high factor volatility. Low Volatility had the highest return of any of the factor blocks in 2019, but fared the worst among the set in 2003, 2004, 2005 and 2013. However, the risk-adjusted return for both Value and Low Volatility was apparently not so low as to substantially hurt the return from the final alpha…

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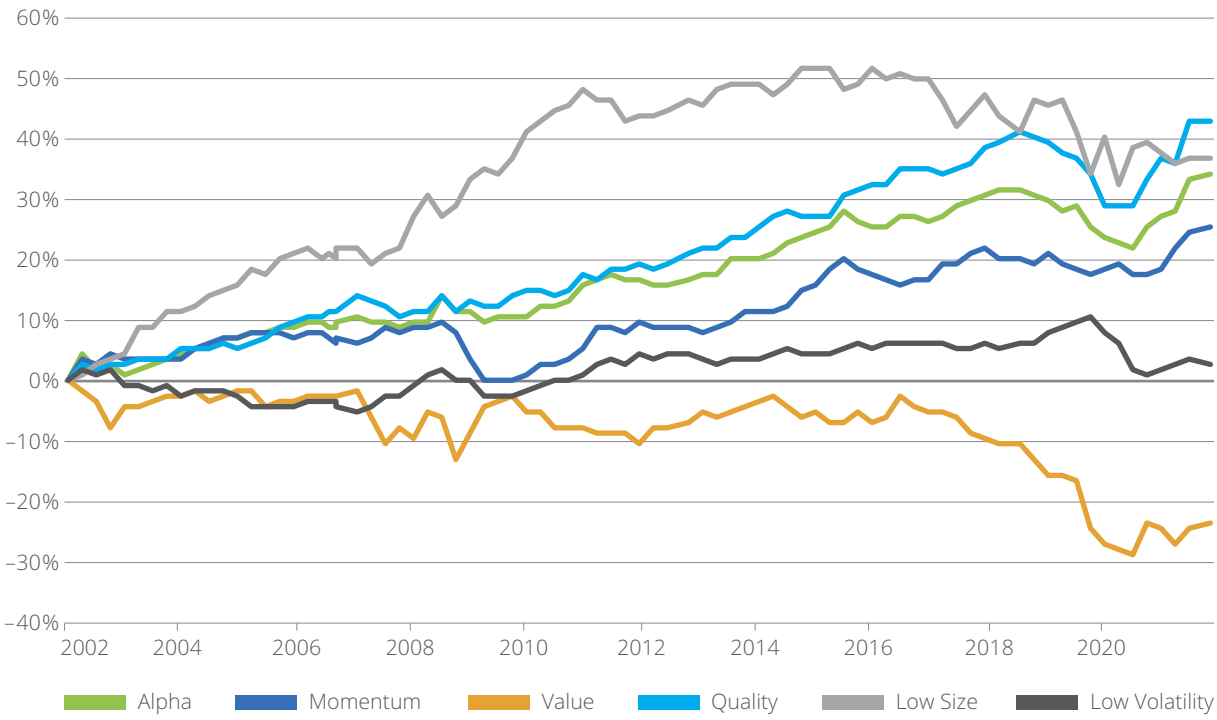
Figure 2: Cumulative return for alpha and component factors



Source: Qontigo.

Figure 3: Annualized return and risk, alpha and factor block FMPs

Annualized	Alpha	Momentum	Value	Quality	Low Size	Low Volatility
Return	1.66%	1.16%	–1.22%	1.92%	1.74%	0.12%
Risk	2.53%	2.59%	5.06%	2.60%	3.90%	2.21%
Information ratio	0.66	0.45	–0.24	0.74	0.45	0.05

Source: Qontigo.

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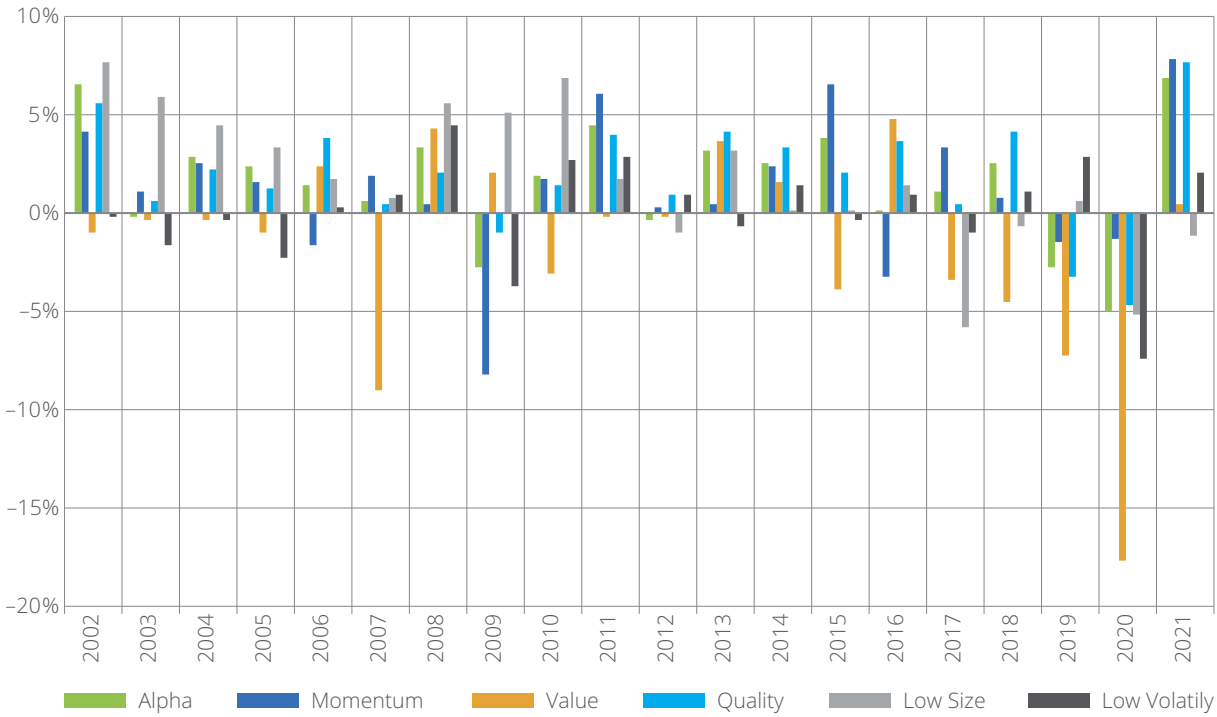
Figure 4: Year-by-year returns, alpha and factor block FMPs



Source: Qontigo.

4. …and the impact of correlations

There was only one year in the 20-year test period in which all factors produced positive returns – 2008. This is interesting, given that this was a year of such turmoil. Of course, the return to alpha was also quite strong in that year, as there was nothing in its components to drag it down. As noted earlier, the idea behind choosing several factors is that when one doesn't "work," another will pick up the slack. Three or four factors fared well in most years and the corresponding return from alpha was positive in all but two (2003 and 2012), when it was only marginally below zero. Only two factors produced positive returns in 2009, 2017 and 2019, but even in 2017 alpha eked out a gain. None of the factors were able to produce positive returns in the worst year for alpha (2020). However, as we know, that year saw an extremely unusual economic and market environment due to the initial COVID-19 crisis, extreme action by central banks and a dramatic shift in exposures for many stocks in the US.

One might question the inclusion of Value in a composite model, given its overall negative return and occasional large drawdowns. However, its correlation with other factors make Value a strong diversifier. Over time, the three-year rolling correlation of quarterly returns between Value and the other factors was low or negative. The correlation with Quality was an exception, however, and saw a positive relationship over the past seven years. This also suggests that high-quality stocks were relatively cheaper. Momentum and Value have seen a consistent negative correlation, the benefit of was clear in 2009 when Momentum tanked but Value (and Low Size) helped prevent alpha from being even more unprofitable.

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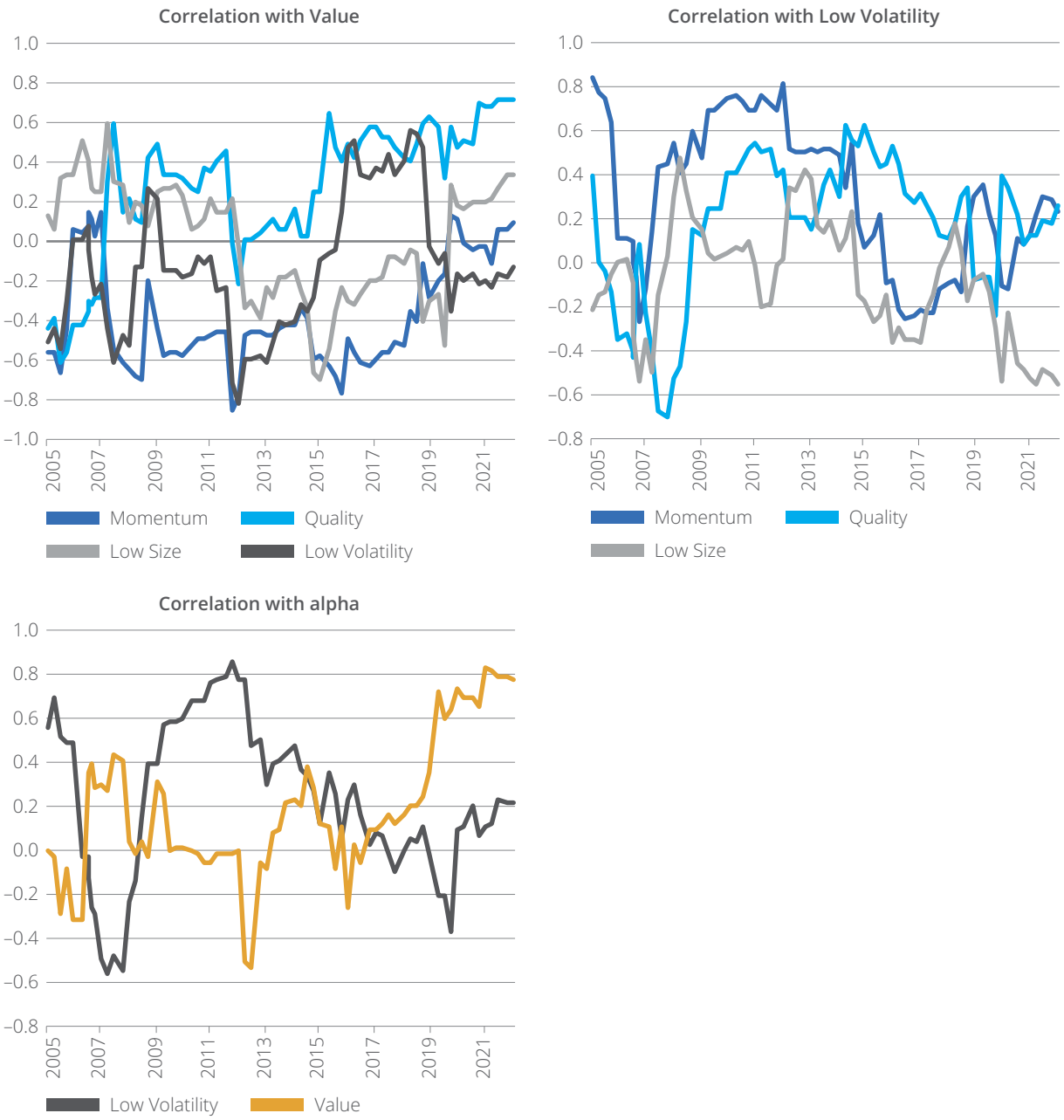
Correlations between Low Volatility and other factors were also low, although quite variable. Low Size had a negative correlation on average, as did Value. The correlation between Low Volatility and Momentum ranged from slightly negative to highly positive, reflecting periods when higher volatility was in favor versus times when investors preferred lower volatility. In addition, other factors picked up the slack in those years in which Low Volatility produced negative returns.

Both Value and Low Volatility returns were positively correlated with the return from alpha, but their correlations were almost a mirror image of each other. This confirms that both factors remained important in the overall process, but at different times.

Figure 5: 12-month rolling correlations for Value and Low Volatility versus the other factors and alpha



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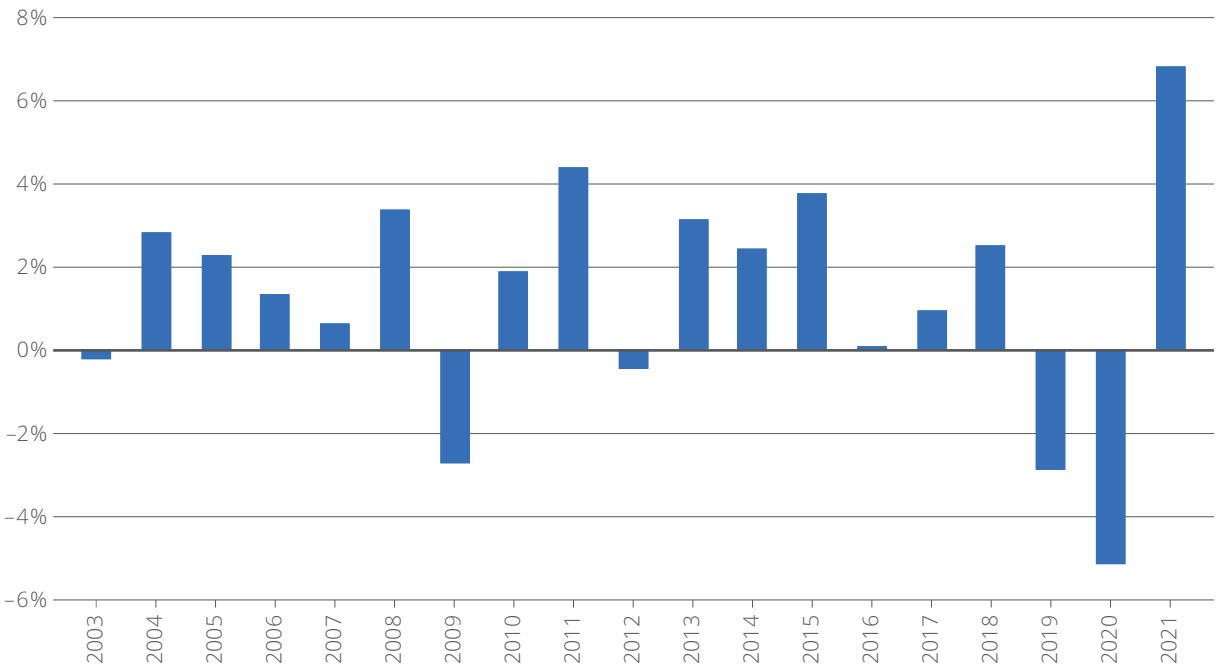
Finally, we noted at the start of this paper that, to paraphrase Mark Twain, rumors of factor investing's demise have been greatly exaggerated. True, 2019 and 2020 were disappointing years, but every style of investing has good and less good periods of performance. In our experience over at least the past 20 years (and even longer in some cases), poor periods tend to be followed by unsually good ones. We certainly saw this in 2021, when Low Size was the only factor to have a difficult year. By contrast alpha, Momentum and Quality had their best year ever (Figure 6). Alpha produced return that was more than two percentage points higher than in 2011, the next-best year, Momentum's return exceeded its 2015 performance by 1.3%, and Quality 's return was almost two percentage points higher than in 2002.

In summary, we believe strongly in these factors given their demonstrated performance and their contribution to the overall success of the final alpha. We look forward to continued outperformance being driven by this alpha building block approachunderlying the STOXX U.S. Equity Factor Index.

Figure 6: Annual return to the alpha FMP



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