

## Quantitative Equities

# What valuations and interest rates tell us about equity factors

Sustainable Investing Expertise by  
**ROBECOSAM**

- Value, Low risk, Quality and Momentum trade at attractive valuations
- Fundamentals of Value stocks have improved
- Factor premiums persist across interest rate cycles

**Given the current market environment, numerous questions have cropped up regarding factor premium expectations. To address some of these, we delve into whether factors currently trade at attractive valuations; we frame the strong first-quarter performance delivered by value and its pullback thereafter; we contextualize the recent sharp changes in the portfolio holdings of momentum strategies; and we investigate the relationship between factors and interest rates.**

In general, we find that the low risk, momentum, quality and value factors are trading at attractive valuations relative to their historical levels. More specifically, the spread in valuation multiples between value and growth stocks has reached a new high. Meanwhile, we observe that cheap stocks are also currently more profitable than their expensive counterparts and exhibit better earnings revisions.

In terms of the relationship between the value factor and yield changes, we argue that while it is evident in the recent period, it is much weaker over the long run. Furthermore, we also find similarly dynamic relationships for the low risk, momentum and quality factors. In our view, this implies that a multi-factor portfolio does not only diversify factor risk, but also factor sensitivities to interest rates as these vary widely across factors and time.

### 2021 has been a mixed bag for Value

After enduring a harsh quant winter, value strategies generated strong returns in the last quarter of 2020 and the first quarter of 2021, leading us to conclude that 'spring had

Article  
For professional investors  
September 2021

Guido Baltussen, PhD  
Matthias Hanauer, PhD, CFA  
Sebastian Schneider  
Laurens Swinkels, PhD



sprung'.<sup>1</sup> In recent months, however, the long-awaited value comeback has lost some of its steam. Figure 1 depicts the cumulative performance of the enhanced value factor in global equity markets since 1985 and over the last 10 years, respectively.<sup>2</sup> This illustrates that value has delivered attractive long-term returns, although it encountered a challenging period between 2019 and mid-2020. But in the fourth quarter of 2020, it displayed a strong resurgence before slowing down in June 2021.

Figure 1 | Cumulative return for the enhanced Value factor



Source: Refinitiv. The figure shows the cumulative return of an enhanced value strategy (see footnote 2 and the appendix for more details on the enhanced value strategy). The investment universe consists of constituents of the MSCI Developed and Emerging Markets indices. Before 2001, we use the FTSE World Developed index for developed markets (going back to December 1985), and for emerging markets, the largest 800 constituents of the S&P Emerging BMI at the semi-annual index rebalance (going back to December 1995). The sample period is January 1986 to August 2021 (left side) and September 2011 to August 2021 (right side), respectively.

## Value factor remains attractive on valuation and fundamental grounds

The poor performance of value strategies from 2019 to mid-2020 stemmed from an extreme widening of valuation multiples between value and growth stocks, with the former getting cheaper relative to the latter.<sup>1</sup> Figure 2 shows the valuation spread of the value factor, i.e. the differences in valuation multiples of value and growth stocks.<sup>3</sup> As we control for valuation differences that are normally observed between both portfolios, a valuation spread above 1 indicates cheapness and a valuation spread below 1 indicates that the factor is more expensive. In the last few years, we saw this spread surpass levels last observed at the height of the tech bubble in the late 1990s, indicating extreme levels of cheapness for the value factor from a historical perspective.

But is the value style less attractive now given the upswing over the first quarter of 2021? We argued the 2019-2020 drawdown mainly resulted from an extreme widening of valuation multiples between value and growth stocks. Thus,

<sup>1</sup> See: Baltussen, G., and Van Vliet, P., August 2020, "[Will Value survive the quant winter?](#)", Robeco article; Hanauer, M. X., and Schneider, S., May 2021, "[Spring has sprung for Value investing](#)", Robeco article.

<sup>2</sup> We define value as in Blitz, D. C., and Hanauer, M. X., January 2021, "[Resurrecting the value premium](#)", Journal of Portfolio Management. More specifically, the enhanced value strategy is based on a composite of book-to-market (R&D adjusted), EBITDA/EV, CF/P, and NPY metrics. Value stocks are sorted into quintile portfolios based on the valuation composite, in a region and sector neutral manner for developed markets and in a country neutral manner for emerging markets. Quintile portfolios are equal-weighted and rebalanced monthly. Our sample comprises the standard MSCI All Countries Index constituents, i.e., large and mid-cap stocks across both developed and emerging markets. Details regarding the universe, value definition, and neutralities are provided in the appendix.

<sup>3</sup> The 'value spread' is expressed as the ratio of a basket of valuation multiples of the top and bottom quintile value portfolios. We control for value spread differences that are normally observed between both portfolios, such that a value spread above one indicates cheapness. Since cheap stocks by definition have higher fundamental value to price ratios than their expensive peers, it is particularly important for the value factor to scale the value spread by its historical normal level.

following the same logic, a sharp narrowing of this spread could have been responsible for the recent positive value returns. Figure 2, however, illustrates that it only shrunk slightly during this period.

More recently, the spread has widened again – scaling new highs in August 2021 – as the tepid second- and third-quarter returns delivered by value stocks coincided with improvements in the operating performance of the same companies (more on this below). Therefore, we believe the value factor remains very attractive from a fundamental perspective.

Figure 2 | Composite valuation spread for the enhanced Value factor



Source: Refinitiv. The figure shows the composite valuation spread between the top and bottom quintile portfolios of the enhanced value strategy. The investment universe consists of constituents of the MSCI Developed and Emerging Markets indices. Before 2001, we use the FTSE World Developed index for developed markets (going back to December 1985), and for emerging markets, the largest 800 constituents of the S&P Emerging BMI at the semi-annual index rebalance (going back to December 1995). The value spread is the average spread of the book-to-market (R&D adjusted), EBITDA/EV, and CF/P. The sample period is January 1986 to August 2021.

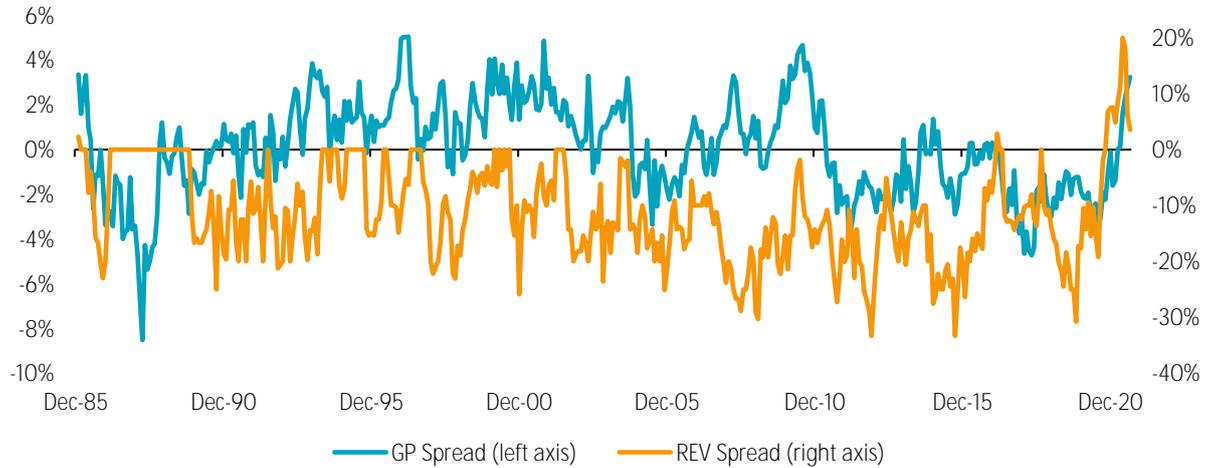
In terms of operating performance, Figure 3 depicts the gross profitability and earnings revisions of value versus growth stocks. On average, cheap stocks displayed gross profitability levels that were more than 3% higher than those of their expensive counterparts as at the end of August 2021. This represents a strong improvement from the 2018-2020 period, when the profitability of value stocks was markedly lower.<sup>4</sup>

Earnings expectations, as proxied by analyst earnings per share (EPS) revisions, for value stocks versus those of their growth peers have also improved since the end of 2020. Figure 3 shows that analysts have tended to issue more earnings upgrades than downgrades for expensive stocks compared to cheap ones in our sample period. However, earnings revisions for value stocks have been better than those for their growth counterparts over the last few months. In fact, the spread in earnings revisions between value and growth stocks has only been positive in recent history.

A question that often arises is whether the widening of the value spread is driven by the cheap or the expensive side, i.e., are value stocks cheaper than in history or growth ones more expensive? To address this, we calculated two valuation spreads in a similar vein to the analysis in Figure 2. But this time around, we compared the valuations of the extreme top and bottom value quintile portfolios with the middle quintile portfolio, i.e. value/middle and middle/growth. For each series, we made the cheaper portfolio the numerator so that they both reflect higher figures when value is cheaper.

<sup>4</sup> Other profitability measures, such as ROE, show a similar trend.

Figure 3 | Spreads in gross profitability and analyst EPS revisions (FY2) for the enhanced Value factor



Source: Refinitiv. The figure shows the spread in gross profitability (GP Spread, left axis) and spread in analyst EPS FY2 revisions (REV Spread, right axis) between the top and bottom quintile portfolios of the enhanced value strategy. The investment universe consists of constituents of the MSCI Developed and Emerging Markets indices. Before 2001, we use the FTSE World Developed index for developed markets (going back to December 1985), and for emerging markets, the largest 800 constituents of the S&P Emerging BMI at the semi-annual index rebalance (going back to December 1995). The sample period is January 1986 to August 2021.

Figure 4 illustrates these two valuation spreads. Based on this assessment, growth stocks are still much more expensive than their middle-priced peers, with the current valuation spread between the two only marginally below the all-time peak in January 2021. Similarly, value stocks are much cheaper than their middle-priced counterparts, as the valuation spread between the two reached a new peak at the end of July 2021 and only marginally decreased in August. This indicates that value investing can benefit from overweighting cheap stocks and underweighting expensive ones in a long-only setting, given that value stocks currently trade at very cheap levels and growth stocks at very expensive levels.

Figure 4 | Composite valuation spreads for value/middle and middle/growth for the enhanced Value factor



Source: Refinitiv. The figure shows the composite valuation spread between the top (value) and the middle and the middle and bottom (growth) quintile portfolios of an enhanced value strategy, respectively. The investment universe consists of constituents of the MSCI Developed and Emerging Markets indices. Before 2001, we use the FTSE World Developed index for developed markets (going back to December 1985), and for emerging markets, the largest 800 constituents of the S&P Emerging BMI at the semi-annual index rebalance (going back to December 1995). The sample period is January 1986 to August 2021.

## A sharp shift in Momentum valuations

Given the recent considerable changes in portfolio holdings for many momentum strategies, we performed the same analysis on the momentum factor.<sup>5</sup> Figure 5 depicts the valuation spreads for the value and momentum factors. In recent years, the momentum style has leaned heavily towards more expensive (growth) stocks. But this shifted very swiftly in March 2021, as momentum strategies became significantly tilted towards cheaper (value) stocks. As a result, the factor is now trading at attractive valuations.

Note, however, that when the momentum factor experiences such sudden changes in its portfolio holdings, it can cause it to have a significant overlap with the value factor in terms of its underlying exposure. This could result in a strong positive correlation between the performance of the two factors. Therefore, we believe it is important to account for these dynamic style tilts when constructing the momentum factor in order to offer multi-factor investors a well-diversified portfolio and to reduce the risk of the momentum factor. For example, this can be accomplished by following a residual momentum approach.<sup>6</sup> Indeed, the orange line in Figure 5 shows that the valuation spread of the residual momentum approach is less volatile over time.

Figure 5 | Composite valuation spreads for the Momentum and Residual Momentum factors



Source: Refinitiv. The figure shows the composite valuation spread between the top and bottom quintile portfolios of the momentum and residual momentum factors. The investment universe consists of constituents of the MSCI Developed and Emerging Markets indices. Before 2001, we use the FTSE World Developed index for developed markets (going back to December 1985), and for emerging markets, the largest 800 constituents of the S&P Emerging BMI at the semi-annual index rebalance (going back to December 1995). The sample period is January 1986 to August 2021.

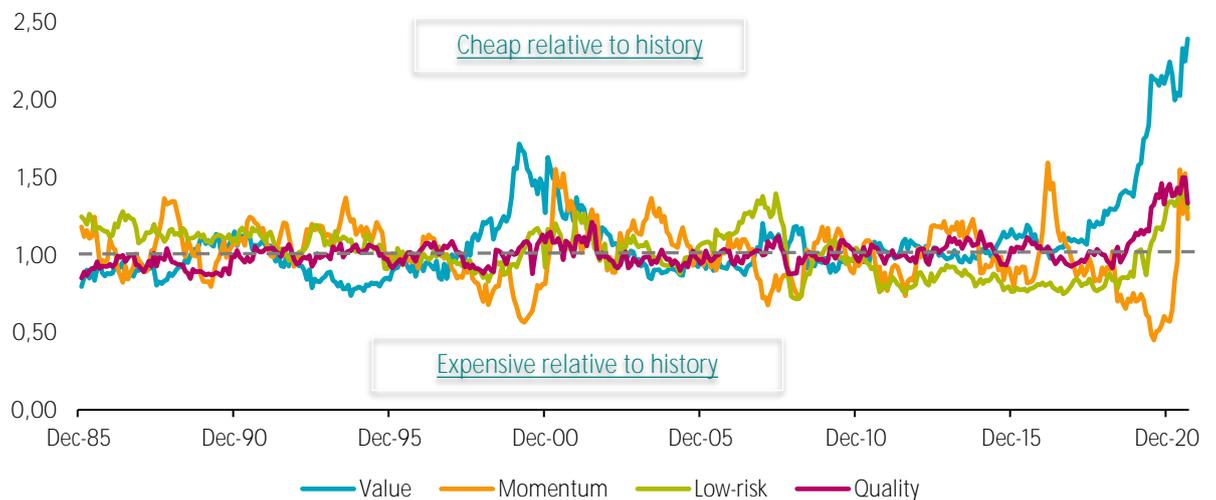
## Low-risk and Quality factors look more enticing

We also carried out the same exercise on two other factors: low risk and quality. Figure 6 shows the valuation spreads for the value, momentum, low risk and quality factors. In line with value and momentum, we observed that low risk and quality have also become more attractively valued. For the latter two, this trend became quite apparent around the start of the Covid-19 pandemic. Overall, Figure 6 indicates that all four factors are currently attractively priced from a fundamental point of view, i.e. they currently trade at lower valuations compared to their history.

<sup>5</sup> See Boyde E., April 2021, "[Growth-value rotation to prompt major rebalancing of \\$15bn ETF](#)", Financial Times article.

<sup>6</sup> See: Blitz, D. C., Huij, J., and Martens, M., June 2011, "[Residual Momentum](#)", Journal of Empirical Finance. For further perspective on the momentum factor, see: Baltussen, G., Lansdorp, S., and Vidojevic, M., February 2021, "[What's up with Momentum?](#)", Robeco article.

Figure 6 | Composite valuation spreads for the Value, Momentum, Low-risk and Quality factors



Source: Refinitiv. The figure shows the composite valuation spread between the top and bottom quintile portfolios of the value, momentum, low-risk, and quality factors. The investment universe consists of constituents of the MSCI Developed and Emerging Markets indices. Before 2001, we use the FTSE World Developed index for developed markets (going back to December 1985), and for emerging markets, the largest 800 constituents of the S&P Emerging BMI at the semi-annual index rebalance (going back to December 1995). The sample period is January 1986 to August 2021.

Table 1 also confirms this phenomenon as it compares the current composite valuation spreads of the four factors with their respective historical levels. The valuation spread for value, as at the end of August 2021, is in the 100th percentile when taking into account more than 35 years of monthly data. Moreover, this peak probably falls outside of the range of typical assumptions based on historical distributions, given that it is a remarkable 4.8 standard deviations above the historical average. Similarly, the valuation spread for quality is in the 97th percentile versus its own history and more than 3 standard deviations away from its long-term average. The valuation spreads for low risk and momentum are also above the 90th percentile, but with less extreme deviations compared to their own history.

Given that all four factors currently trade at lower valuations compared to their normal historical levels, the equal combination of the factors (1/N) is also attractively valued when viewed over the same time period. Indeed, the composite valuation spread for this multi-factor portfolio is in the 99th percentile as at the end of August 2021, significantly above its long-term average to the tune of 5.5 standard deviations.

Table 1 | Percentiles and Z-Scores for current versus historical composite valuation spreads

	Value	Low Risk	Quality	Momentum	1/N
<b>Percentile</b>	100%	97%	97%	91%	99%
<b>Z-Score</b>	4.8	1.9	3.3	1.2	5.5

Source: Robeco, Refinitiv, Bloomberg. The table shows the percentiles and Z-Scores of the current versus historical composite valuation spreads for the value, momentum, low-risk and quality factors. The investment universe consists of constituents of the MSCI Developed and Emerging Markets indices. Before 2001, we use the FTSE World Developed index for developed markets (going back to December 1985), and for emerging markets, the largest 800 constituents of the S&P Emerging BMI at the semi-annual index rebalance (going back to December 1995). The sample period is January 1986 to August 2021.

## Diversification benefits across factors continue to persist

Despite the attractive valuations of all four factors, the correlations between them remain relatively low. This is illustrated in Figure 7 which shows the average pairwise rank correlation across factor scores over time. The value, momentum, low risk and quality factors typically exhibit a low average pairwise rank correlation, with a long-term average of 0.02 over our sample period. While this correlation has increased slightly to an average of 0.09 as at the end of August 2021, it is still economically small, especially in contrast to the historically high valuation spreads. Moreover, it remains within the range of previous observations. Consequently, diversification benefits across factors continue to persist in our view.

We also find similar results when we look at the correlation of historical 12-month returns across factors. That said, we do believe it is important to manage the balance between exposures to individual factors, both in single and multi-factor solutions, when constructing portfolios.

**Figure 7 |** Average pairwise rank correlation across Value, Momentum, Low risk and Quality factor scores



Source: Refinitiv. The figure shows the average pairwise rank correlation across value, momentum, low risk, and quality factors scores. The investment universe consists of constituents of the MSCI Developed and Emerging Markets indices. Before 2001, we use the FTSE World Developed index for developed markets (going back to December 1985), and for emerging markets, the largest 800 constituents of the S&P Emerging BMI at the semi-annual index rebalance (going back to December 1995). The sample period is January 1986 to August 2021.

### Value has become slightly responsive to interest rates increases in recent times

We also often get questions on how factor premiums relate to interest rates. For instance, a topical issue is whether factor premiums are driven especially by falling yields, as we have seen over the last few decades, or whether they will benefit equally from rising interest rates. In particular, there is a growing dialogue around the possible connection between the value premium and yield changes nowadays. Many investors inquire whether the recent value performance swings are instigated by increasing and declining yields.

The typical argument is that as growth stocks exhibit longer duration than their value counterparts, they should benefit from a lower discount rate being applied to their cash flows and suffer from rising yields. We acknowledge this line of reasoning. Indeed, it is hard not to notice the apparent link between climbing yields and the rally in value stocks in the first quarter of 2021.

That said, we believe the important question is whether this apparent relationship is structural and can be embedded in portfolios. Several observations suggest it is not. Firstly, yields have generally declined since 1980 and value has performed well over the majority of this period. Secondly, value has been one of the strongest factors in Japan, despite a trend of falling and very low interest rates for more than 30 years. Thirdly, one could argue that value stocks are 'bond-like' as their prices are driven less by growth expectations and more by their earnings and dividend power in the years

ahead. This argument is especially true for dividend-tilted value portfolios. Therefore, a drop in bond yields should benefit value stocks, while a rise should hurt them.

In 2012, several Robeco authors<sup>7</sup> released a paper on investors' (myopic) investment horizons. They found that value stocks tended to have a positive bond beta and usually benefited when yields dropped. This was particularly visible on an annual basis as value stocks typically performed well in the years in which bond yields fell. Furthermore, many of these explanations are also relevant to other factors, most notably low risk. Indeed, low-risk stocks are more 'bond-like' in nature, while their high-risk counterparts tend to be more speculative and driven by potential long-term growth considerations.

Therefore, an important question to answer is how stock factor premiums relate to yield changes. To examine this, we ran several empirical tests. We took the global sample of factor premiums between January 1986 and August 2021 and regressed them on the contemporaneous 1-month change in the global (average) 10-year government bond yield.<sup>8</sup> As equity market beta is an important driver of returns, we included the equity market return as a control variable. In Table 2, Panel A depicts the resulting coefficients and t-statistics on the yield changes over our full sample period (January 1986 - August 2021) as well as the last 10-year subperiod (September 2011 and August 2021) and the interval before (January 1986 and August 2011).

<sup>7</sup> See: Baltussen, G., Post, T., and Van Vliet, P., February 2009, "Downside risk aversion, fixed income exposure, and the value premium puzzle", *Journal of Banking and Finance* 36, p.3382-3398.

<sup>8</sup> We take the average across the following developed government bond markets: US, UK, Germany and Japan.

Table 2 | Factor premiums and sensitivity to yield changes

Panel A: Sensitivity of factor premiums to 1-month yield changes						
	January 1986 to August 2021		January 1986 to August 2011		September 2011 to August 2021	
	Coefficient	<i>t</i>	Coefficient	<i>t</i>	Coefficient	<i>t</i>
Value	1.86*	(3.31)	1.14	(1.91)	5.60*	(3.82)
Low risk	-3.46*	(-5.85)	-3.20*	(-4.91)	-5.40*	(-3.49)
Quality	-0.42	(-1.40)	-0.64	(-1.85)	0.81	(1.17)
Momentum	-2.00*	(-2.55)	-1.26	(-1.39)	-6.12*	(-3.68)
Residual Momentum	-0.81	(-1.92)	-0.43	(-0.88)	-3.00*	(-3.40)

Panel B: Sensitivity of factor premiums to 12-month yield changes						
	January 1986 to August 2021		January 1986 to August 2011		September 2011 to August 2021	
	Coefficient	<i>t</i>	Coefficient	<i>t</i>	Coefficient	<i>t</i>
Value	1.23	(0.71)	-0.42	(-0.22)	8.43	(1.78)
Low risk	-2.83	(-1.62)	-2.36	(-1.21)	-3.59	(-1.11)
Quality	0.12	(0.17)	-0.74	(-1.22)	4.89	(1.73)
Momentum	-0.69	(-0.31)	-0.62	(-0.24)	0.06	(0.02)
Residual Momentum	-0.10	(-0.07)	-0.21	(-0.15)	0.10	(0.07)

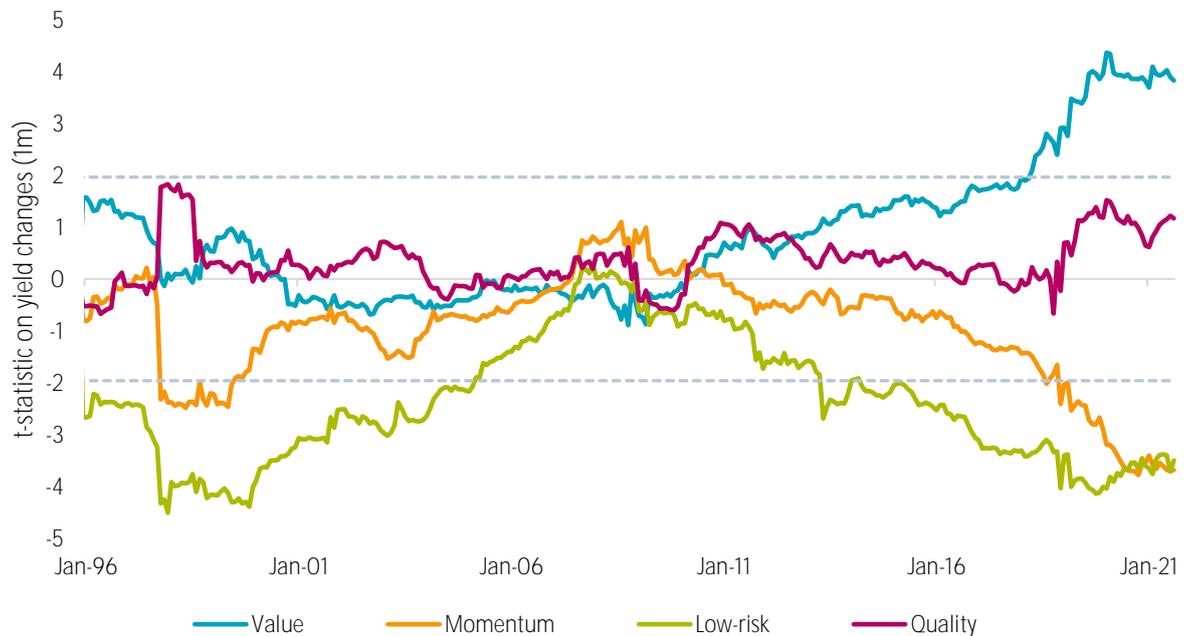
  

Panel C: Predicting next month's factor performances						
	January 1986 to August 2021		January 1986 to August 2011		September 2011 to August 2021	
	Coefficient	<i>t</i>	Coefficient	<i>t</i>	Coefficient	<i>t</i>
Value	-0.28	(-0.49)	-0.17	(-0.29)	-0.82	(-0.54)
Low risk	1.20	(1.46)	0.73	(0.79)	4.08*	(2.02)
Quality	0.79*	(2.41)	0.84*	(2.23)	0.49	(0.70)
Momentum	1.50	(1.85)	0.94	(1.01)	4.86*	(2.74)
Residual Momentum	0.46	(1.06)	0.13	(0.27)	2.48*	(2.73)

Source: Robeco, Refinitiv, Bloomberg. The investment universe consists of constituents of the MSCI Developed and Emerging Markets indices. Before 2001, we use the FTSE World Developed index for developed markets (going back to December 1985), and for emerging markets, the largest 800 constituents of the S&P Emerging BMI at the semi-annual index rebalance (going back to December 1995). Regressions explain or predict annualized factor premiums with change in global yields (in percentage points) and in Panel A and B include the global equity market return as a control variable (not reported in the table). Standard errors are, where applicable, Newey-West corrected. A '\*' indicates significance at the 5% confidence level. The sample period is January 1986 to August 2021.

We observed that the value factor tended to perform better in the months in which yields rose over the full sample period. However, this relationship is also highly dynamic as the value factor was not significantly related to changes in bond yields before August 2011, but it became considerably linked in the last 10-year subperiod. Figure 8 illustrates these dynamics over time by showing the t-statistic on the change in bond yields based on 10-year rolling regressions. The chart reveals that the relationship between the value premium and yield increases was largely concentrated in the last 10 years.

Figure 8 | Factor premiums and their sensitivity to yield changes



Source: Robeco, Refinitiv, Bloomberg. The investment universe consists of constituents of the MSCI Developed and Emerging Markets indices. Before 2001, we use the FTSE World Developed index for developed markets (going back to December 1985), and for emerging markets, the largest 800 constituents of the S&P Emerging BMI at the semi-annual index rebalance (going back to December 1995). Regressions use 10-year rolling yield changes and include the global equity market return as a control variable. The sample period is January 1986 to August 2021.

### But interest rate sensitivities diminish over longer horizons, vary across factors and are economically small

We also looked at the relationship between annual value returns and annual yield changes. As demonstrated in the previously mentioned research paper, it is important to evaluate the relationship between the value premium and yield changes annually, given this is an evaluation horizon commonly employed by investors. The results are shown in Panel B of Table 2. Over the full sample period, value was not significantly related to annual yield changes, indicating that any relationship is relatively short-lived.

In our analysis, we also found that the impact of yield changes on the global value premium is relatively limited. This is demonstrated by the coefficients in Panel A and B of Table 2. For example, a 1% decrease in yields infers a decline in the value premium of 5.6 and 8.4 basis points over a month and year, respectively. Conversely, this also holds as a 1% increase in yields implies a rise in the value premium of 5.6 and 8.4 basis points over a month and year, respectively. If we were to find ourselves in a scenario in which inflation and yields surge, then the impact on the value premium would be greater. For instance, a 3% spike in yields would coincide with a value premium that is around 17 and 25 basis points higher over a month and year, respectively.

Interestingly, other factor premiums also have a dynamic relationship with yield changes. Low risk had a somewhat negative link, albeit limited, as highlighted in earlier publications on the low-risk factor<sup>9</sup>. However, this was not uniform over the sample period as the connection was largely absent around the 2000s. Moreover, these sensitivities are less prevalent in our enhanced low-risk portfolios as we account for other factor exposures and explicitly manage interest rate sensitivity.

<sup>9</sup> See: Blitz, B., Van der Grient, B., Van Vliet, P., June 2014, “[Interest rate risk in low-volatility strategies](#)”, Robeco article.

Momentum was negatively related to yield changes over the full sample period. But similar to value, this effect seemed to be mostly concentrated in the last years of the sample. Moreover, a residual momentum approach significantly reduces the size of this sensitivity as depicted by the substantially smaller coefficients in Panel A of Table 2. Finally, quality returns were generally unrelated to yield changes over the entire interval.

Further, over the full sample period, none of the factor premiums were significantly related to annual yield changes and all coefficients decreased for the annual horizon compared to the monthly, indicating that any relationship is relatively short-lived. Therefore, we can conclude that most factor premiums do not have a stable or economically material relationship with bond yield changes on an annual basis.

A final question is whether investors can use the information on bond yield changes to predict factor premiums? To examine the predictive power of this information, we ran regressions of future factor premiums on past yield changes. The results are shown in Panel C of Table 2. Over the full sample period, yield changes told us little about future factor premiums. This observation was also similar for the two subperiods. The only exception was that declining yields had some predictive power on momentum premiums over the last 10 years of our sample.

However, we believe investors should be wary of relying on a small number of observations. As such, we can conclude that information on yield changes provides little information for factor timing. Moreover, the pervasive low-yield environment of the last few decades does not tell us a lot about the return prospects of factor premiums.

Ultimately, we believe there is an important takeaway from our analysis. In our view, having exposure to multiple factors in a portfolio does not only diversify individual factor and stock risks, but it also diversifies factor sensitivities to yield movements as these vary widely across factors and time.

## Conclusion

In our analysis, we examined the value, momentum, low risk and quality factors through a fundamental lens. We established that the spread in valuation multiples between expensive and cheap stocks remains at historically unprecedented levels, while the value factor has also displayed substantial improvements in its fundamentals. Currently, value stocks are more profitable and have better analyst revisions than their growth peers. Furthermore, we determined that the low risk, momentum and quality factors have also recently become cheap relative to their history. In our view, this suggests the value comeback might not be over yet, while other factors also offer attractive opportunities.

We also investigated the relationship between factor premiums and interest rates. Looking at the recent period, it is not difficult to see where this question stems from, given that the outperformance of value coincided with rising yields. However, we observed that this relationship is relatively new and does not appear to be structural. It changes over time, it is evident in monthly but not annual factor returns, it is only witnessed over recent years, and it seems to be economically small. In the long run, it is much weaker or absent. That said, we do acknowledge that interest rate risk is an important element to take into account when managing risk in factor portfolios. In addition, we looked into the yield sensitivity of the low risk, momentum and quality factors and found similarly dynamic relationships. Thus, we believe a multi-factor portfolio does not only diversify factor risk, but also factor sensitivities to interest rates.

## Appendix – factor definitions and construction

The enhanced value strategy and the calculation of the value spread follow the methodology described in Blitz, D. C., and Hanauer, M. X., January 2021, "[Resurrecting the value premium](#)", Journal of Portfolio Management.

### Universe

The investment universe for the enhanced value factor consists of constituents of the MSCI Developed and Emerging Markets indices. Before 2001, we use the FTSE World Developed index for developed markets (going back to December 1985), and for emerging markets, the largest 800 constituents of the S&P Emerging BMI at the semi-annual index rebalance (going back to December 1995).

### Factor definitions

The enhanced value strategy is based on a composite of book-to-market (R&D adjusted), EBITDA/EV, CF/P, and NPY metrics. For quality, we follow [Kyosev et al. \(2020\)](#) and use a composite of gross profitability, accruals and asset growth. (Residual) momentum is defined as the composite of both 12-1 and 6-1 month (residual) price momentum. Low risk is measured by the past 156-week return volatility.

### Factor construction

Stocks are sorted into quintile portfolios based on the factor composites and the quintile portfolios are equal-weighted. Factor returns are the return spreads between the top and bottom quintile portfolios.

### Neutralities

We apply region and sector neutrality for developed markets by independently ranking stocks within each region/GICS level 1 industry (11 sectors) bucket. Developed market regions are North America, Europe, and Pacific. For emerging markets, we use country neutrality.

### Calculation valuation spread

For each multiple and month, we compute the median valuation multiple for both the cheapest and most expensive quintile and compute the spread as the ratio between the two. The three valuation multiples that we use are book-to-market (R&D adjusted), EBITDA/EV, and CF/P. For the composite valuation spread, we first standardize each of the three time series by dividing them by their median. Next, we average the three standardized spreads.

### Other spreads

We follow a similar approach for the other spreads but use the difference in the median gross profitability and EPS FY2 revision ratio, respectively, between the cheapest and most expensive quintiles.

## Important Information

### Robeco Institutional Asset Important Information

Robeco Institutional Asset Management B.V. (Robeco B.V.) has a license as manager of Undertakings for Collective Investment in Transferable Securities (UCITS) and Alternative Investment Funds (AIFs) ("Fund(s)") from The Netherlands Authority for the Financial Markets in Amsterdam. This document is solely intended for professional investors, defined as investors qualifying as professional clients, who have requested to be treated as professional clients or who are authorized to receive such information under any applicable laws. Robeco B.V. and/or its related, affiliated and subsidiary companies, ("Robeco"), will not be liable for any damages arising out of the use of this document. The contents of this document are based upon sources of information believed to be reliable and comes without warranties of any kind. Any opinions, estimates or forecasts may be changed at any time without prior notice and readers are expected to take that into consideration when deciding what weight to apply to the document's contents. This document is intended to be provided to professional investors only for the purpose of imparting market information as interpreted by Robeco. It has not been prepared by Robeco as investment advice or investment research nor should it be interpreted as such and it does not constitute an investment recommendation to buy or sell certain securities or investment products and/or to adopt any investment strategy and/or legal, accounting or tax advice. All rights relating to the information in this document are and will remain the property of Robeco. This material may not be copied or used with the public. No part of this document may be reproduced, or published in any form or by any means without Robeco's prior written permission. Investment involves risks. Before investing, please note the initial capital is not guaranteed. This document is not directed to, nor intended for distribution to or use by any person or entity who is a citizen or resident of or located in any locality, state, country or other jurisdiction where such distribution, document, availability or use would be contrary to law or regulation or which would subject Robeco B.V. or its affiliates to any registration or licensing requirement within such jurisdiction.

### Additional Information for US investors

This document may be distributed in the US by Robeco Institutional Asset Management US, Inc. ("Robeco US"), an investment adviser registered with the US Securities and Exchange Commission (SEC). Such registration should not be interpreted as an endorsement or approval of Robeco US by the SEC. Robeco B.V. is considered "participating affiliated" and some of their employees are "associated persons" of Robeco US as per relevant SEC no-action guidance. Employees identified as associated persons of Robeco US perform activities directly or indirectly related to the investment advisory services provided by Robeco US. In those situation these individuals are deemed to be acting on behalf of Robeco US. SEC regulations are applicable only to clients, prospects and investors of Robeco US. Robeco US is wholly owned subsidiary of ORIX Corporation Europe N.V. ("ORIX"), a Dutch Investment Management Firm located in Rotterdam, the Netherlands. Robeco US is located at 230 Park Avenue, 33rd floor, New York, NY 10169.

### Additional Information for investors with residence or seat in Canada

No securities commission or similar authority in Canada has reviewed or in any way passed upon this document or the merits of the securities described herein, and any representation to the contrary is an offence. Robeco Institutional Asset Management B.V. is relying on the international dealer and international adviser exemption in Quebec and has appointed McCarthy Tétrault LLP as its agent for service in Quebec.

© Q3/2021 Robeco