

Equity Factor Insights

QUARTERLY REPORT: APRIL 2023

FOR PROFESSIONAL INVESTORS ONLY

Quality offers shelter from Q1 risk-off storms

Quality stands tall in March rout

Quality was the star performer in most markets in the volatile Q1, as the banking-sector scare in March drove a massive rotation into stocks viewed as less vulnerable to the possible economic and credit-market fallout.

Tech, Discretionary and Financial stocks hold sway

Factor performance hinged mostly on exposures to the hefty rebounds in Tech and other growth stocks and to the carnage in Financials stocks in March — boosting Quality and hampering Value, Size and Yield.

Once again, UK factors take a different path

Size was the sole outperformer and Quality lagged in the UK in Q1, bolstered by the rebound in small-cap Discretionary and Industrials. Given its tiny Tech exposure, moves in the sector have little impact on UK returns.

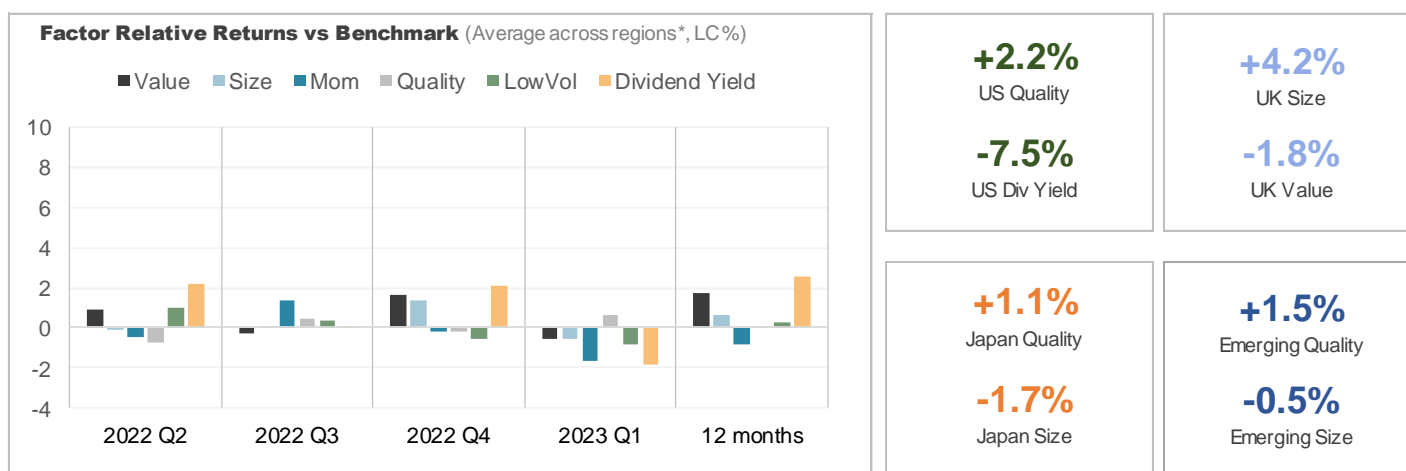
Factor re-ratings continue in Q1

Despite re-ratings, forward P/Es of most factors remain in line or below 10-year averages across markets. Quality/Value premiums are mostly back to historical norms.

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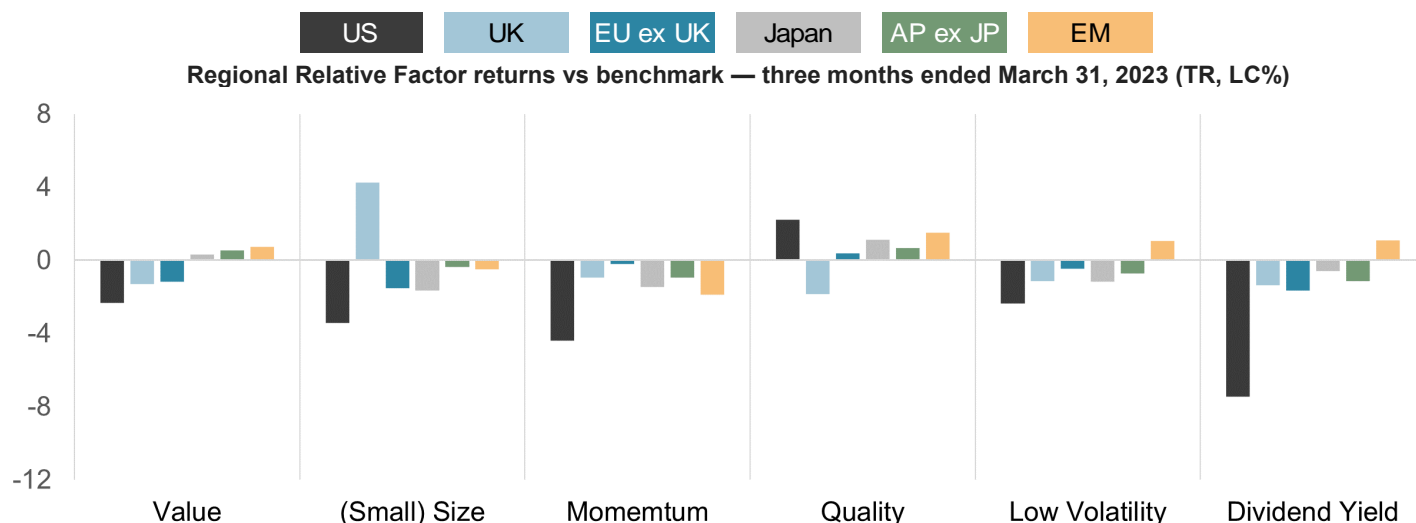
Regional Factor Performance Highlights — First Quarter 2023 Relative Returns



Source: FTSE Russell / Refinitiv. *Combined average of factor performance across FTSE USA, FTSE UK, FTSE Europe ex UK, FTSE Japan, FTSE Asia Pacific ex Japan and FTSE Emerging regional indexes. All data as of March 31, 2023. Results shown for regional factor returns represent hypothetical, historical performance, at Tilt 1, based on FTSE Global Equity Index Series and the FTSE Global Factor Index Series. Past performance is no guarantee of future results. This report should not be considered 'research' for the purposes of MIFID II. Please see Appendices at the end and FTSE Russell website for important legal disclosures and details on rules-based factor indicator calculations and construction methodology.

Global View – Factor and Benchmark Performance Highlights – Q1 2023

In a stunning reversal from patterns of the past year, Quality broadly outpaced all other factors in Q1, notably pandemic-era winners Value and Yield. It was the sole outperformer in the US and Europe. The exception was the UK, where (small) Size was the lone outperformer and Quality its biggest laggard. And unlike DM peers, most EM factors outperformed the benchmark.

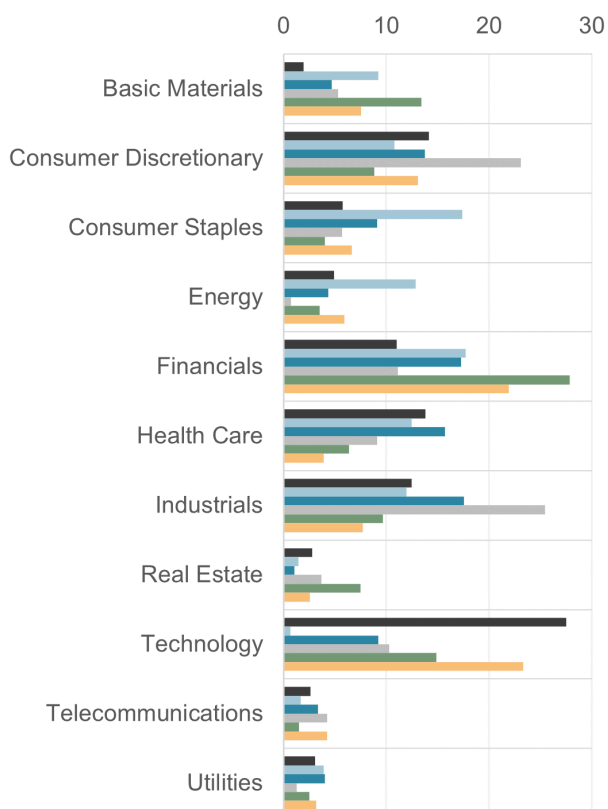


Regional Equity Market Returns Q1 2023 (TR, LC %) – Europe leads the global rally

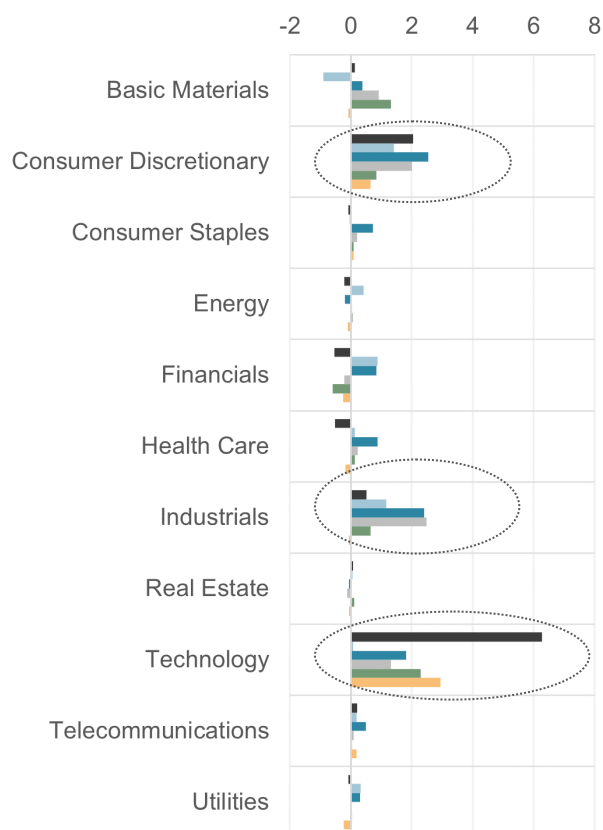
Europe topped the charts in the global Q1 rally. Technology, Discretionary & Industrials dominated the gainers across markets, while Financials, Energy & defensive groups were flat or fell. Materials stocks were a notable drag in the UK.



Benchmark Industry Weights, 3M average (%)



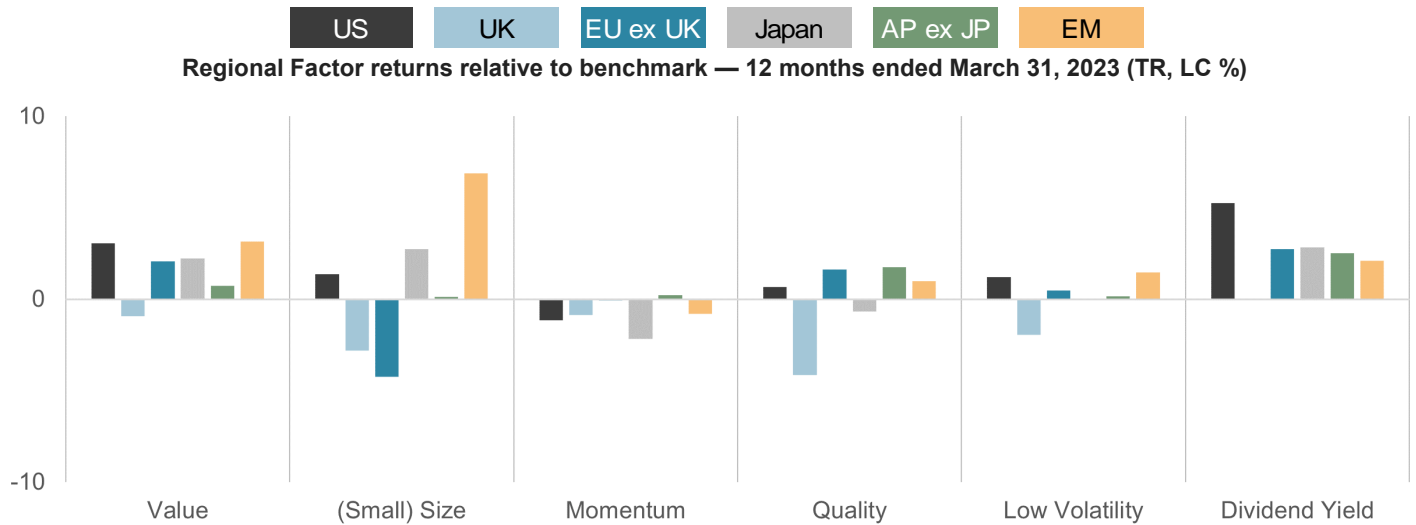
3M – Contributions to Total Benchmark Returns (%)



Source: FTSE Russell / Refinitiv. All data as of March 31, 2023. Results shown for regional factor returns represent hypothetical, historical performance, at Tilt 1, based on FTSE Global Equity Index Series and the FTSE Global Factor Index Series. Industry results based on Industry Classification Benchmark (ICB) data. Past performance is no guarantee of future results. Please see end for important disclosures and information on factor calculations. For professional investors only.

Global View – Factor and Benchmark Performance Highlights – Last 12 Months

Value and Yield retained leadership across regions for the 12 months, while Quality and Size also modestly outperformed in most markets. The outlier was the UK, where all factors trailed the benchmark, among the most resilient of global equity markets over the period. UK Quality and European (small) Size ranked as the worst-performing factors globally.

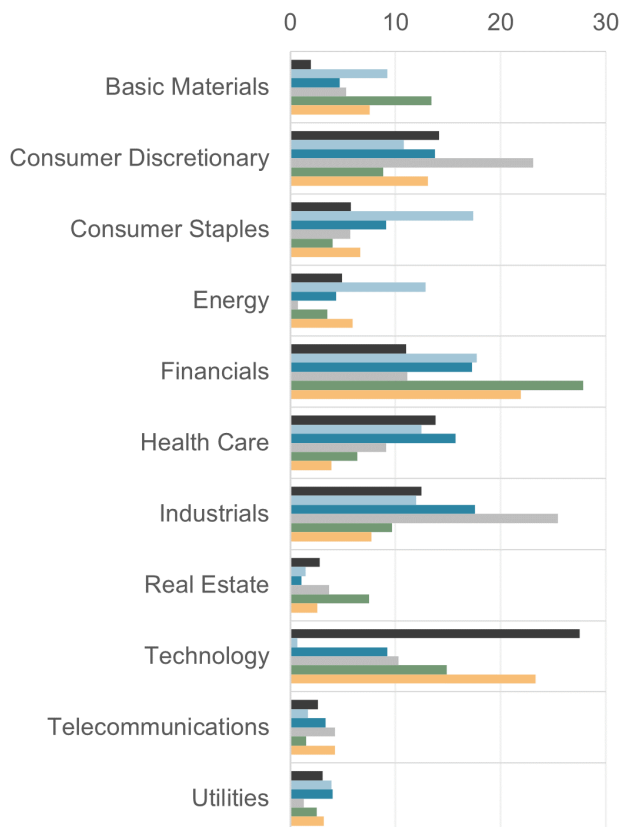


Regional Equity Market Returns 12M (TR, LC %) – UK & Japan fare best, US & EM trail

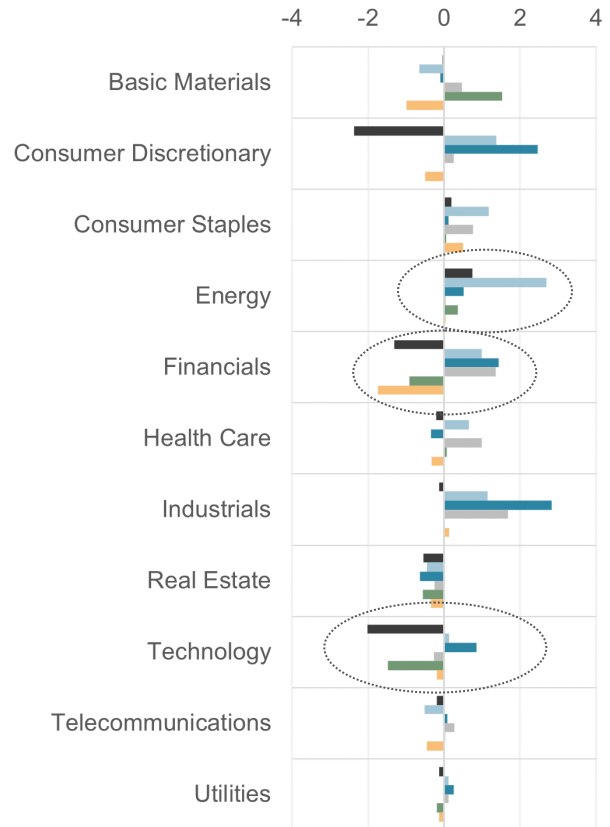
The UK, Japan and Europe tallied sizable 12-month gains, contrasting starkly with losses in the US, EM and Asia Pacific. Energy led in the UK, while Industrials did so in Europe and Japan. Tech and Financials were the biggest drags on US and EM returns.



Benchmark Industry Weights, 3M average (%)



12M – Contributions to Total Benchmark Returns (%)



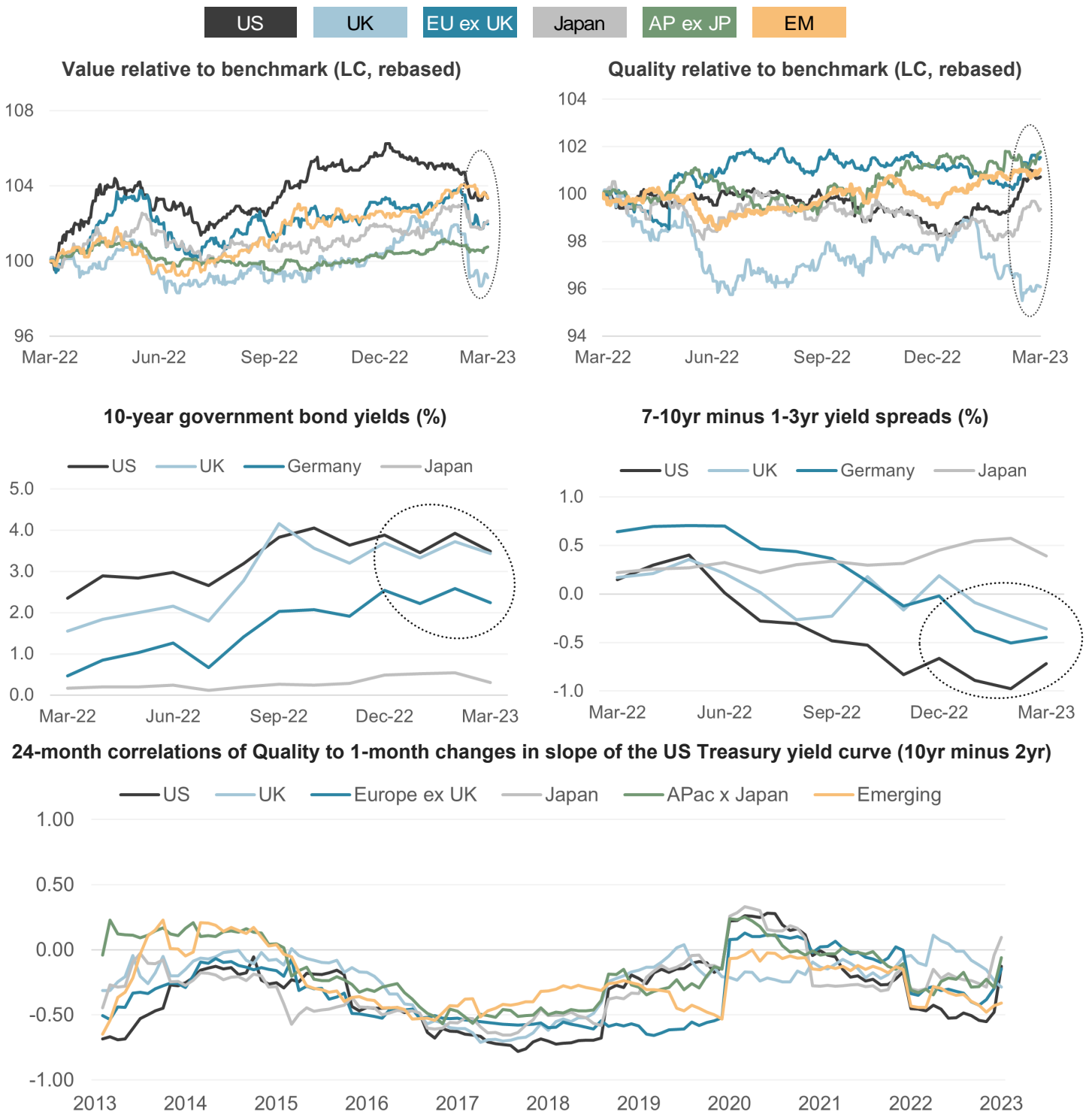
Source: FTSE Russell / Refinitiv. All data as of March 31, 2023. Results shown for regional factor returns represent hypothetical, historical performance, at Tilt 1, based on FTSE Global Equity Index Series and the FTSE Global Factor Index Series. Industry results based on Industry Classification Benchmark (ICB) data. Past performance is no guarantee of future results. Please see end for important disclosures and information on factor calculations. For professional investors only.

Global View – Factor rotation

Quality takes a star turn in Q1

In a dramatic U-turn from the trends of the past year, Quality overtook Value in most markets in the volatile Q1 (top charts), with most of its outperformance coming amid the massive flight from risk driven by a global banking scare in March. Bond markets broadly rallied, while nervous equity investors gravitated to Tech-heavy Quality and away from Financials and other more cyclical Value stocks viewed as more exposed to the possible economic and credit-market shocks. Quality valuations also benefited from the drop in long bond yields (middle chart, left). Many yield curves remained inverted, reflecting rising recession risks. By Q1-end, however, 10yr/2yr yield spreads had recovered from YTD lows as fears of contagion waned. Worries about the potential fallout from lingering credit-market stresses renewed expectations for an earlier end to Fed rate hikes.

As the bottom chart shows, 24-month correlations between Quality and shifts in the slope of the US yield curve have generally been negative and have grown less so recently, particularly in Japan, posing a modest tailwind for Quality.

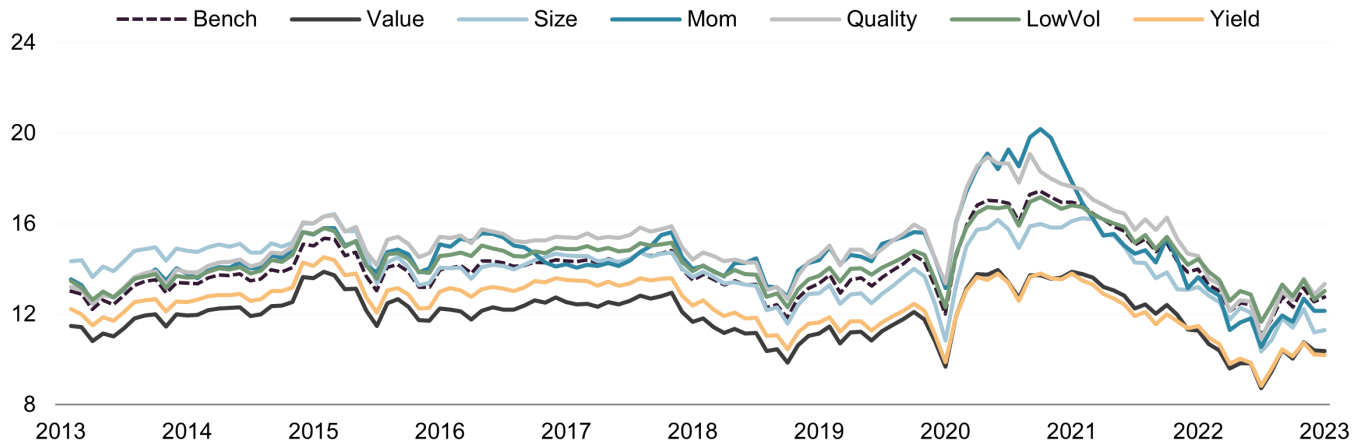


Source: FTSE Russell / Refinitiv. All data as of March 31, 2023. Results shown for regional factor returns represent hypothetical, historical performance, at Tilt 1, based on FTSE Global Equity Index Series and the FTSE Global Factor Index Series. Past performance is no guarantee of future results. Please see end for important disclosures and information on factor calculations. For professional investors only.

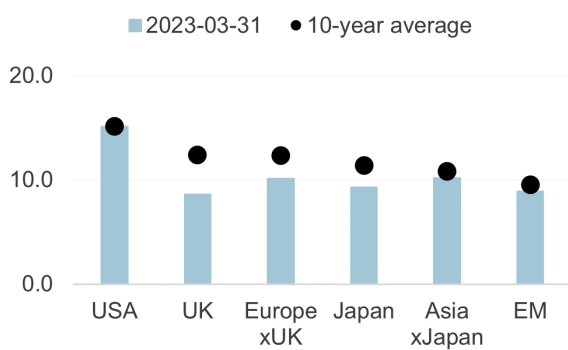
Global View – Factor Valuations

Despite strong Q1 rebounds, forward P/Es across factors remain at or below 10-year averages in most markets (except Value, Quality and Low Vol in the US and Low Vol in Asia Pac). Most factors also continue to trade at discounts to the global benchmark, particularly Value and Yield. As has long been the case, US factors are the most expensive globally.

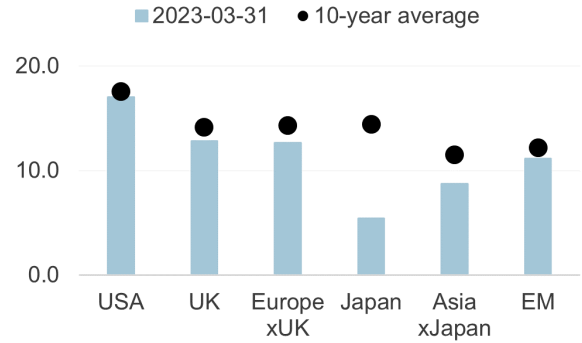
12-month forward factor P/E ratios, average of six regions*



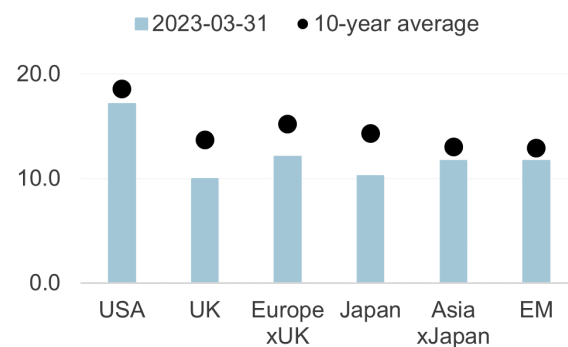
Value - 12M forward P/E



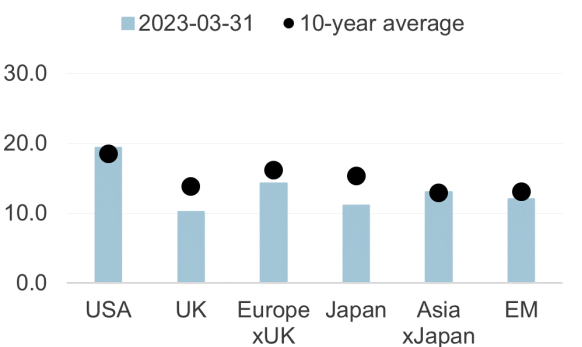
Size - 12M forward P/E



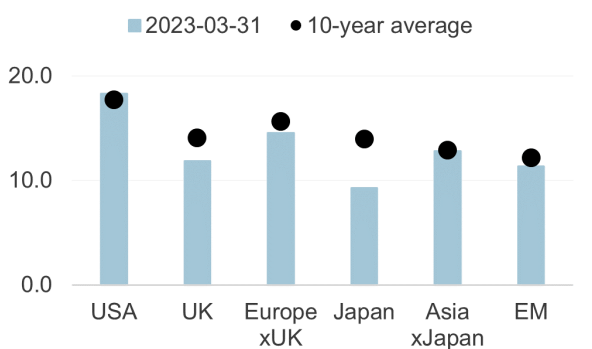
Momentum - 12M forward P/E



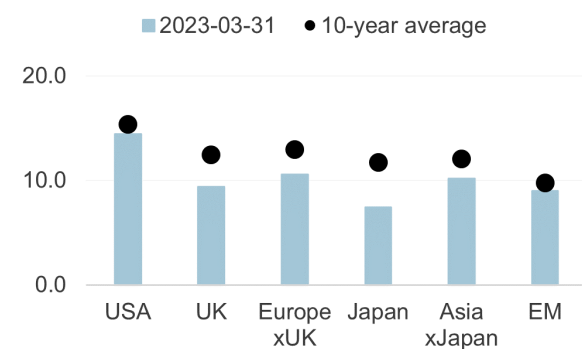
Quality - 12M forward PE



Low Volatility - 12M forward PE



Yield - 12M forward PE



Source: FTSE Russell/Refinitiv. All data as of March 31, 2023. *Combined average 12M forward P/Es for FTSE USA, FTSE UK, FTSE Europe ex UK, FTSE Japan, FTSE Asia Pacific ex Japan and FTSE Emerging regional indexes. Results shown for regional factor returns represent hypothetical, historical performance, at Tilt 1, based on FTSE Global Equity Index Series and the FTSE Global Factor Index Series. Past performance is no guarantee of future results. Please end for important disclosures and information on factor calculations. For professional investors only.

US Equity Factor Insights

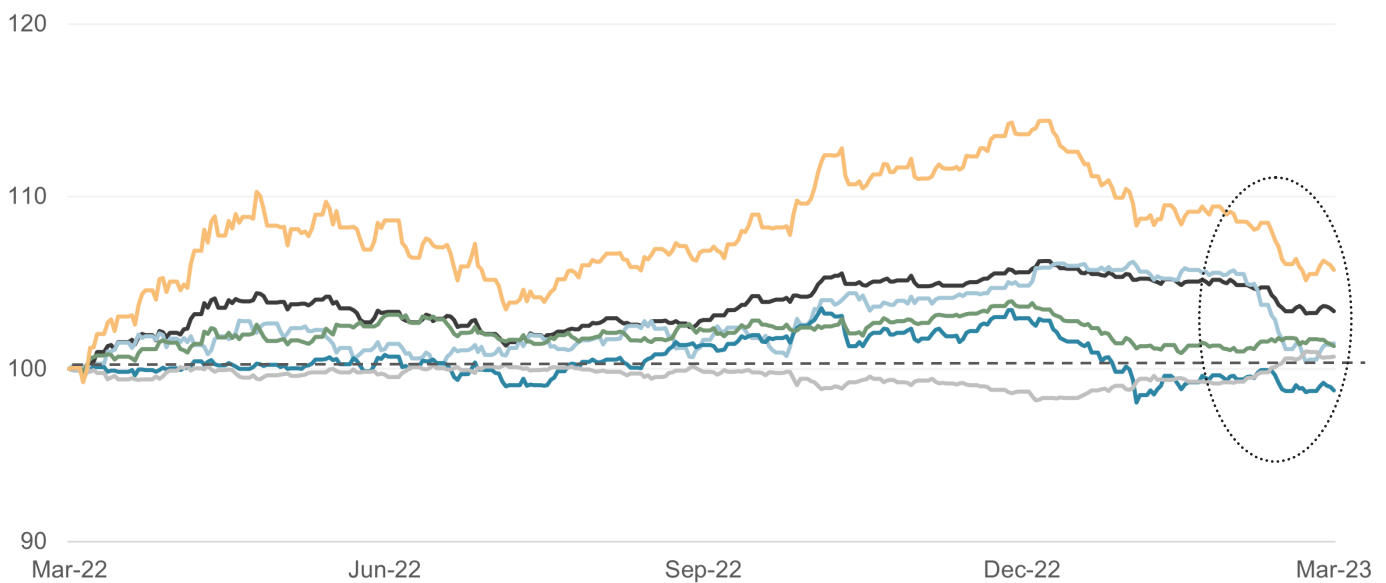
First Quarter 2023

Key Observations

- In a sharp trend reversal, Quality was the only US factor to outpace the benchmark in Q1, with most of its outperformance coming in March amid an fierce investor flight from risk triggered by a series of US bank failures.
- Quality benefited overwhelmingly from the strong comeback in large-cap Tech and from its relatively smaller exposure to the sell-off in Financials, particularly among smaller-cap banks.
- Momentum badly lagged the benchmark, reflecting the sharp performance reversal for pandemic-era winners Value and Yield.
- Following Q1 re-ratings, forward P/Es for most factors are at or modestly above 10-year averages.
- With its recent outperformance, Quality now trades in line with its historical premium to the market and well above its long-term premium to Value. Yield remains the least expensive factor in both absolute and relative terms.



Factor returns relative to benchmark (rebased)



Source: FTSE Russell / Refinitiv. All data as of March 31, 2023. Results shown for regional factor returns represent hypothetical, historical performance, at Tilt 1, based on FTSE Global Equity Index Series and the FTSE Global Factor Index Series. Past performance is no guarantee of future results. Please see end for important disclosures and information on factor calculations. For professional investors only.

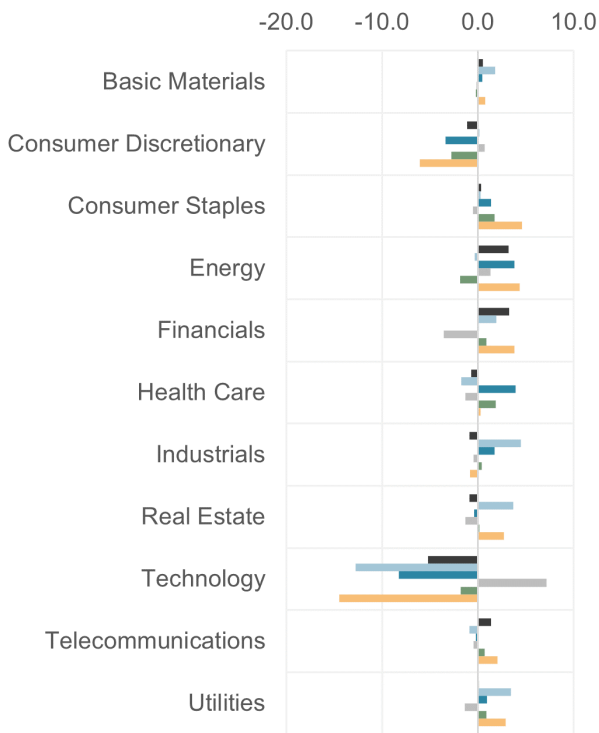
US Factor Performance & Industry Attributions — First Quarter 2023

Tech rebound pushes Quality into the winner's column

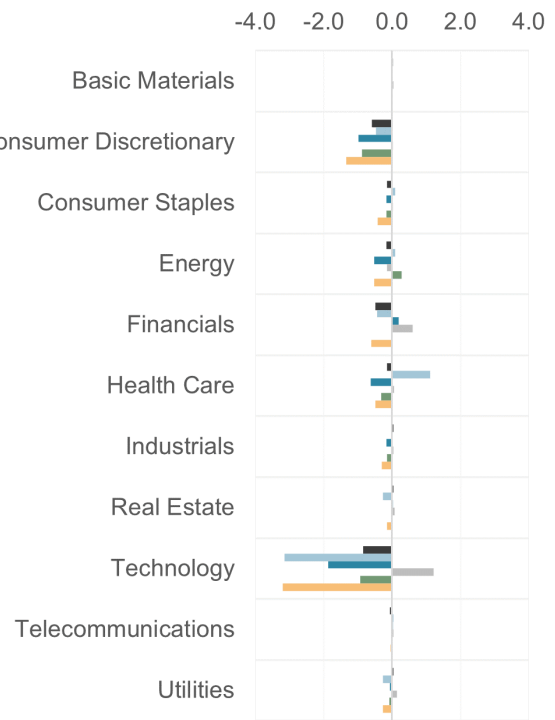
In a striking reversal of fortunes, Quality was the sole outperformer among US factors in Q1, particularly versus long-time winners Yield, (small) Size and Value. The factor overwhelmingly benefited from its much bigger exposure to outperforming large-cap Tech stocks and far smaller exposure to the sell-off in Financials, particularly small-cap banks.

Q1 2023	Relative to Benchmark (TR %)					
FTSE USA	Value	Size	Mom	Quality	Low Vol	Yield
7.7%	-2.3	-3.4	-4.4	2.2	-2.4	-7.5

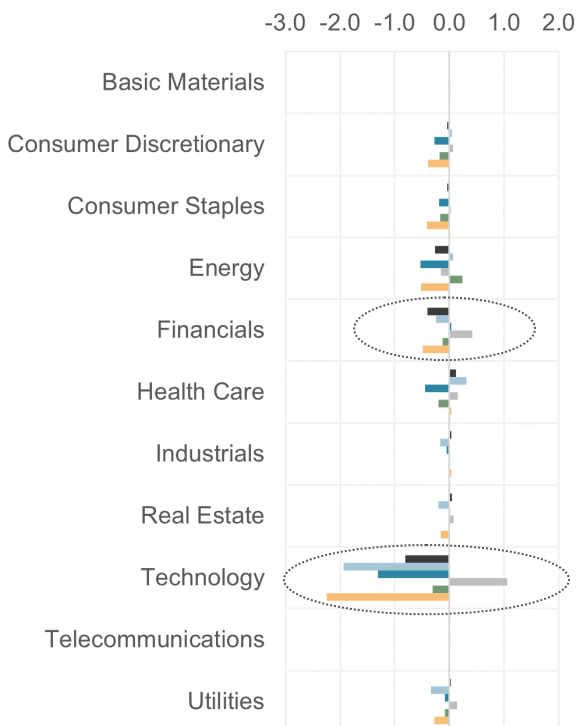
Industry active weights, Q1 2023 average



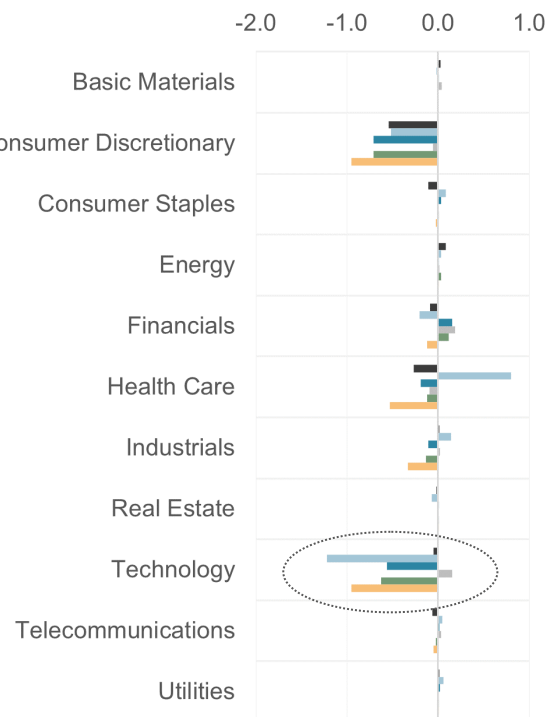
Total industry effects, Q1 2023



Industry allocation effects, Q1 2023



Stock selection within industry, Q1 2023

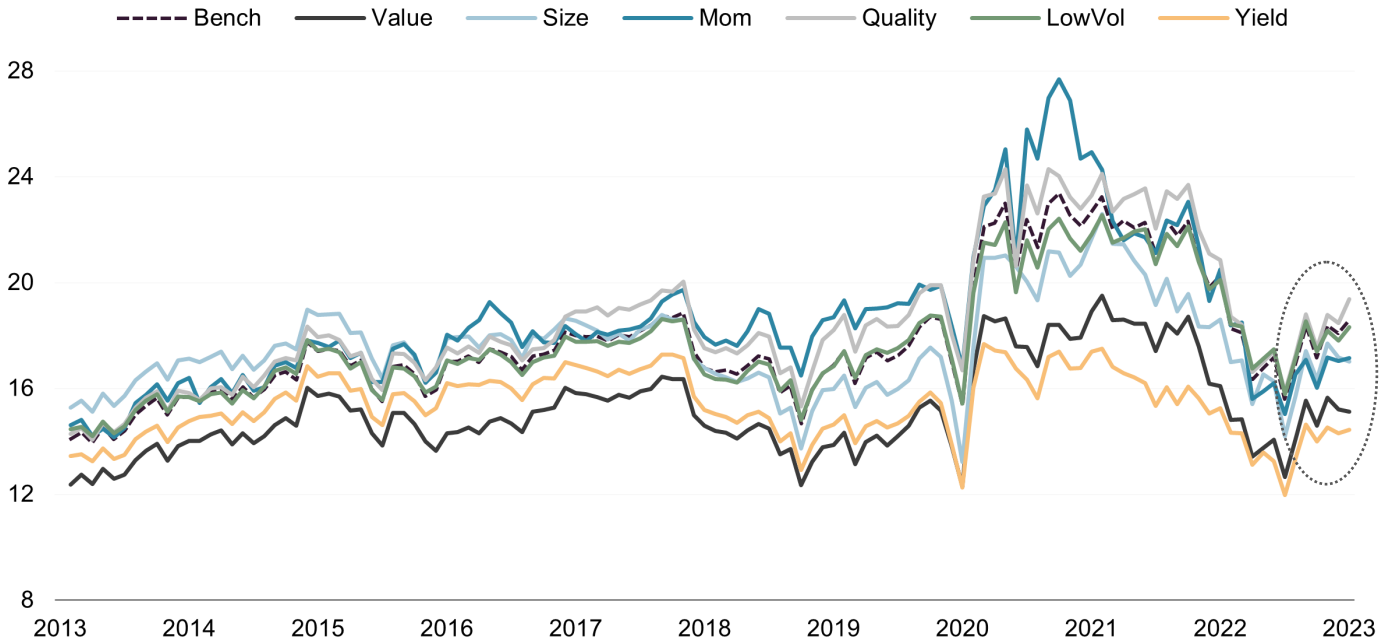


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US Factor Valuations

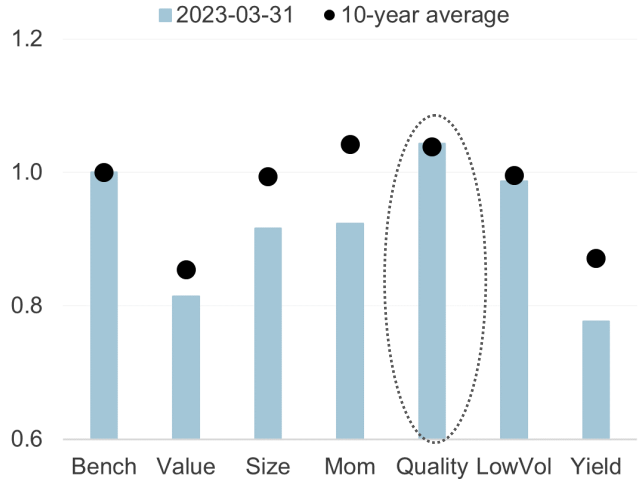
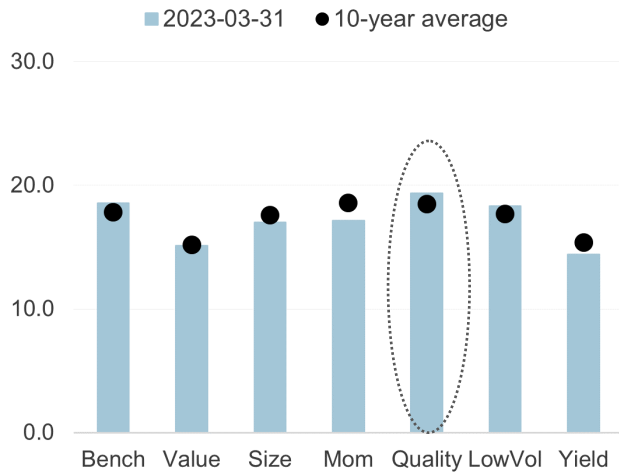
Forward P/Es for most factors continued to recover from their post-crisis lows in Q1. All now stand close to or slightly above their 10-year averages in absolute terms. With its recent outperformance, Quality has returned to its historical premium vs the benchmark, while Yield, Size, Value and Momentum remain at deeper discounts to the market. In turn, the Quality premium to Value widened sharply, to 4.3 points, or well above its long-term average of 3.3 points.

FTSE USA – Absolute 12M forward P/Es



Current Absolute 12M forward P/E vs history

Current Relative 12M forward P/E vs history



Source: FTSE Russell / Refinitiv. All data as of March 31, 2023. Results shown for regional factor returns represent hypothetical, historical performance, at Tilt 1, based on FTSE Global Equity Index Series and the FTSE Global Factor Index Series. Past performance is no guarantee of future results. Please see end for important disclosures and information on factor calculations. For professional investors only.

UK Equity Factor Insights

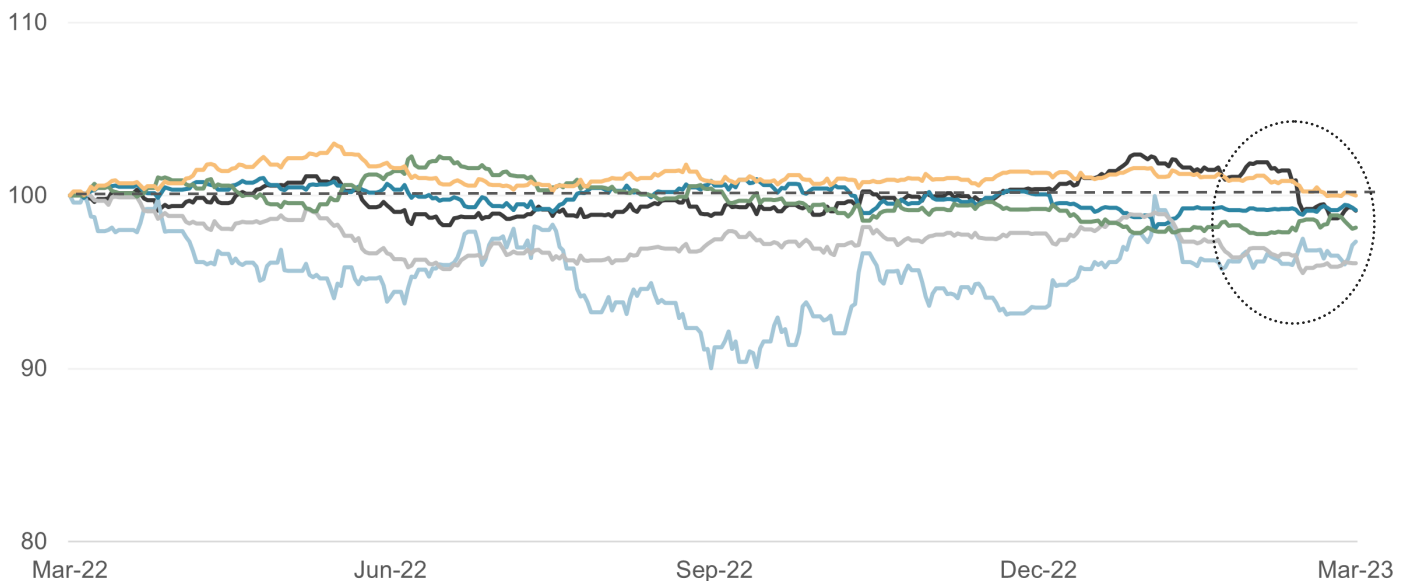
First Quarter 2023

Key Observations

- In stark contrast to trends elsewhere, (small) Size was the only factor to beat the UK benchmark in the Q1 upturn, while Quality was the worst performer. Only Yield did better than the market for the 12 months (albeit barely).
- Size outperformance vs the market and peers in Q1 came mostly from its larger exposure to outperforming Discretionary stocks, better stock selection in Staples and far less exposure to the slump in Materials stocks.
- Even after strong Q1 upticks, forward P/Es for most factors remain well below 10-year averages, particularly Quality and Momentum, which now stand at discounts to the market (versus premiums historically).
- With its recent upturn, Size remains the most expensive factor, trading at even larger premiums to the market and other factors versus history. The Quality/Value premium rose modestly in Q1 but remains around its historical average.



Factor returns relative to benchmark (rebased)



Source: FTSE Russell / Refinitiv. All data as of March 31, 2023. Results shown for regional factor returns represent hypothetical, historical performance, at Tilt 1, based on FTSE Global Equity Index Series and the FTSE Global Factor Index Series. Past performance is no guarantee of future results. Please see end for important disclosures and information on factor calculations. For professional investors only.

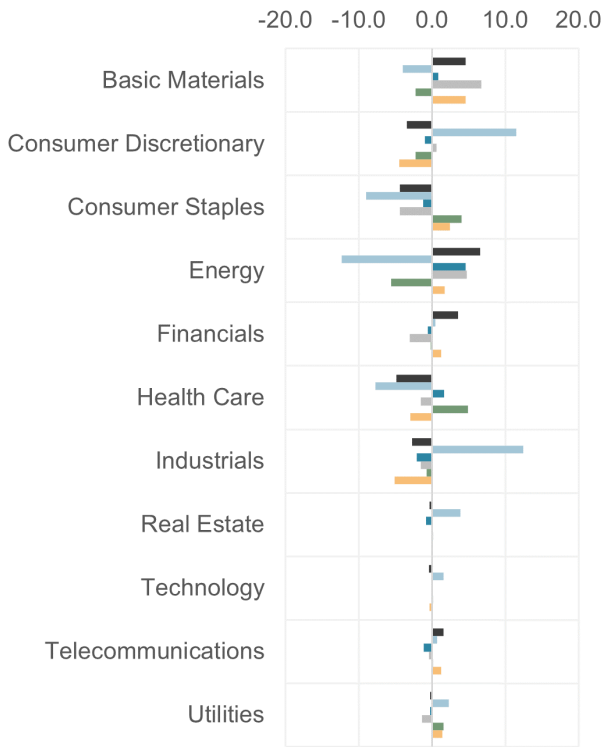
UK Factor Performance & Industry Attribution — First Quarter 2023

UK Size takes the prize in Q1, Quality struggles

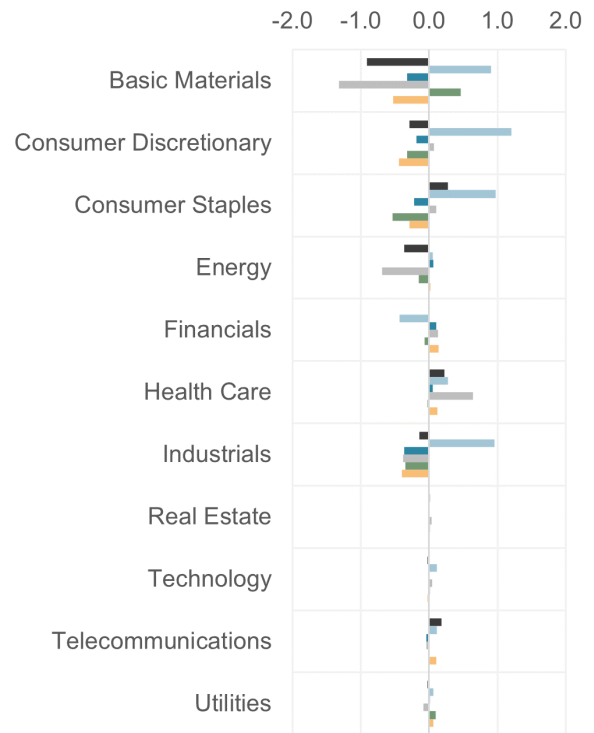
In stark contrast to trends elsewhere, (small) Size was the lone outperformer in the UK in Q1, while Quality was the biggest laggard. Size strongly benefited from its large overweights in Discretionary and Industrials, positive stock selection in Staples and and far smaller exposure to the sharp sell-off in Materials stocks — which offset the huge hit from stock selection in Financials.

Q1 2023	Relative to Benchmark (TR %)					
FTSE UK	Value	Size	Mom	Quality	Low Vol	Yield
3.7%	-1.3	4.2	-0.9	-1.8	-1.1	-1.4

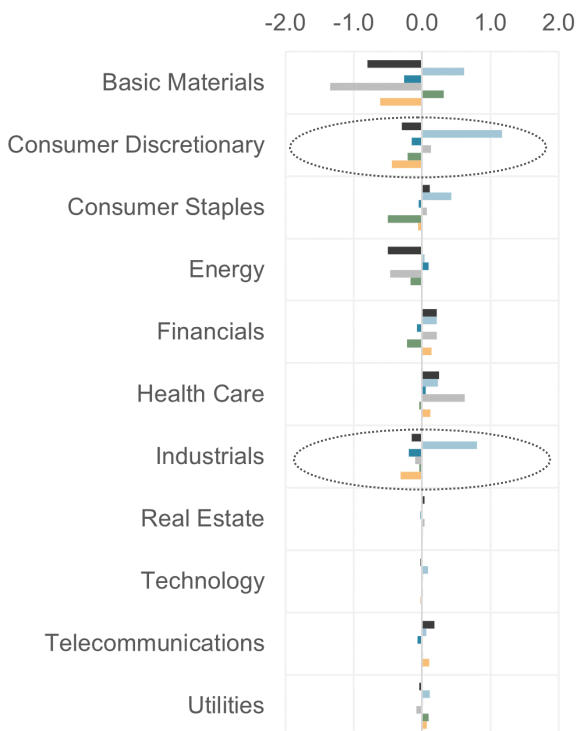
Industry active weights, Q1 2023 average



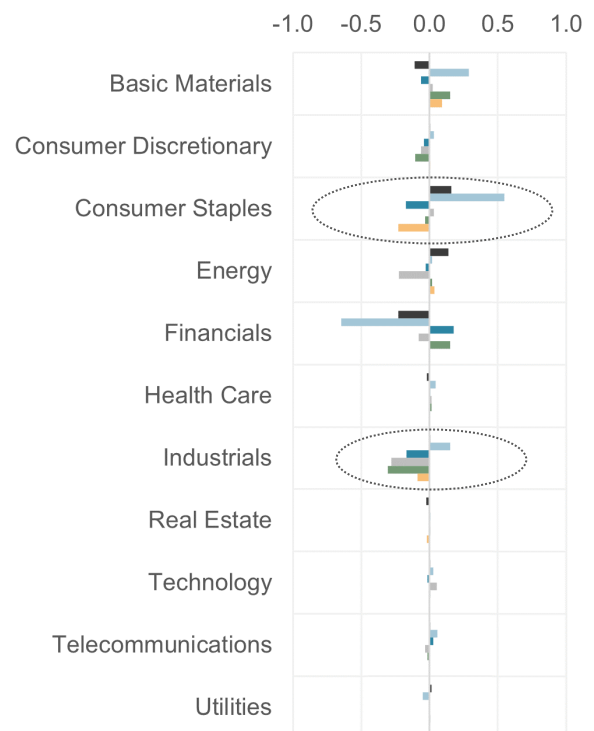
Total industry effects, Q1 2023



Industry allocation effects, Q1 2023



Selection effect within industry, Q1 2023

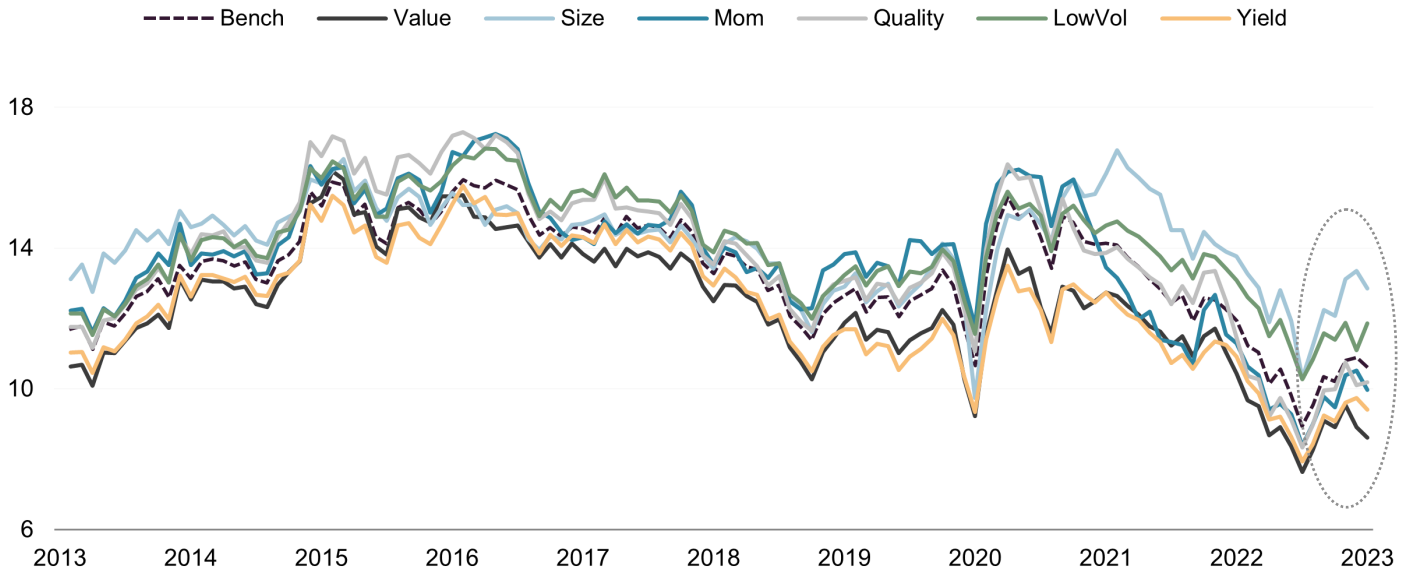


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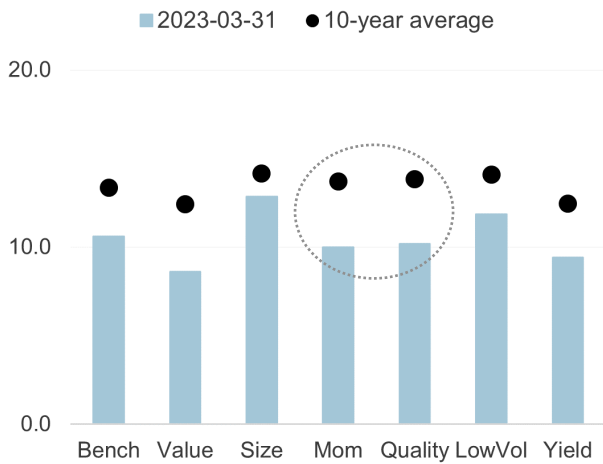
UK Factor Valuations

Despite Q1 re-ratings, forward P/Es for most factors remain well below 10-yr averages in both absolute and relative terms. Value and Yield continue to trade at bigger discounts to the benchmark versus history, while Quality and Momentum remain at discounts to the market (vs historical premiums). With its recent rebound, Size remains the most expensive factor, followed by Low Vol: both carry bigger-than-normal premiums to the market. The Quality/Value premium widened slightly, to 1.6 points, or roughly in line with its long-term average of 1.4 points.

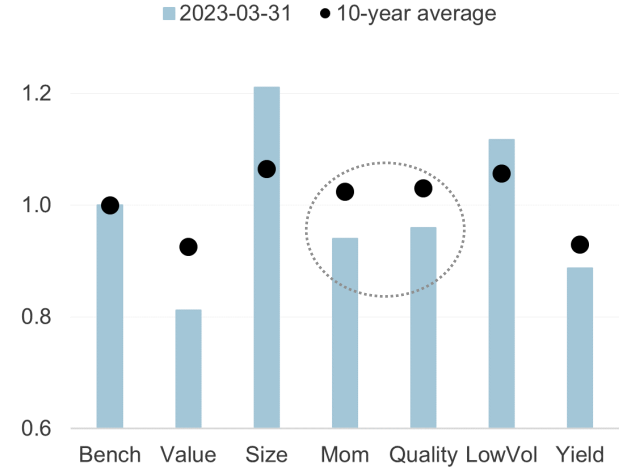
FTSE UK – Absolute 12M forward P/Es



Current Absolute 12M forward P/Es vs history



Current Relative 12M forward P/Es vs history



Source: FTSE Russell / Refinitiv. All data as of March 31, 2023. Results shown for regional factor returns represent hypothetical, historical performance, at Tilt 1, based on FTSE Global Equity Index Series and the FTSE Global Factor Index Series. Past performance is no guarantee of future results. Please see end for important disclosures and information on factor calculations. For professional investors only.

Europe ex UK Equity Factor Report

First Quarter 2023

Key Observations

- As in the US, Quality was the only factor to outpace the benchmark in Q1, adding traction to its 12-month performance and narrowing the gap with long-time leaders Yield and Value.
- Factor performance in Q1 largely revolved around exposures to the rebound in Tech and other growth stocks and to the sell-off in Financials in March — a boon for Quality and major drags for Yield, Size and Value.
- Despite strong Q1 re-ratings, most forward P/Es (except Low Vol) remain below 10-year averages in both absolute and relative terms.
- Value and Yield remain at deeper-than-normal discounts to the broad market and other factors. Despite recent outperformance, Quality still trades below its long-term premium versus the market, and around its historical premium versus Value.



Factor returns relative to benchmark (rebased)



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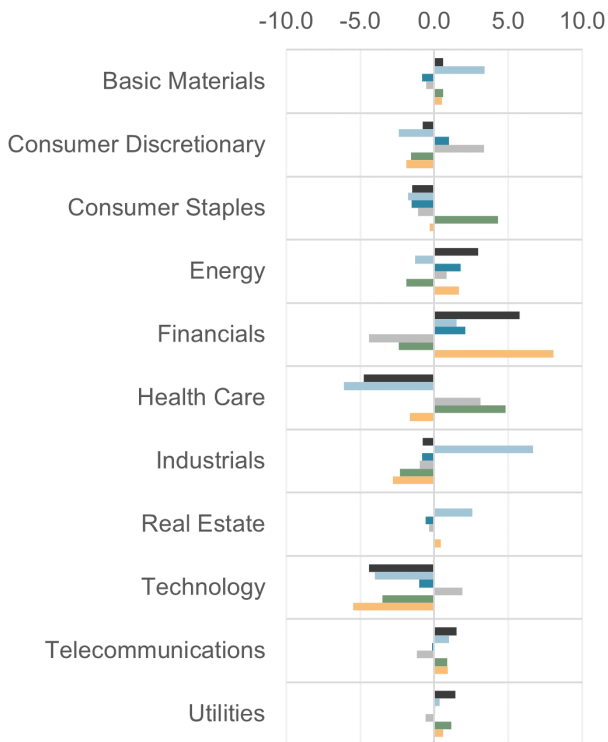
Europe ex UK Factor Performance & Industry Attribution — First Quarter 2023

Growth-stock rebound puts Quality in the spotlight

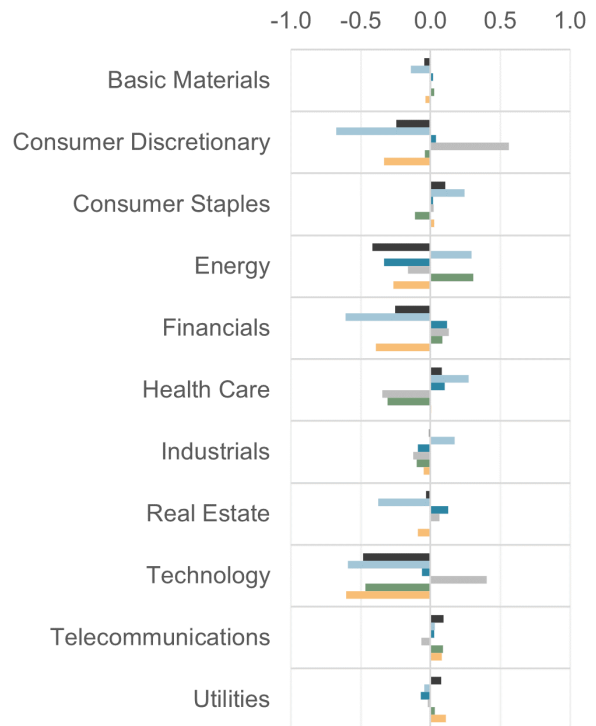
As in the US, Quality was the only factor to beat the benchmark in Q1, while Yield and Size suffered the biggest setbacks. Quality outperformance owes much to its larger exposure to the huge rebounds in Discretionary and Tech stocks, as well as to its large underweight to lagging Financials (offset partly by poor stock selection in that sector).

Q1 2023	Relative to Benchmark (TR %)					
FTSE Dev Europe ex UK	Value	Size	Mom	Quality	Low Vol	Yield
10.3%	-1.2	-1.5	-0.2	0.4	-0.5	-1.7

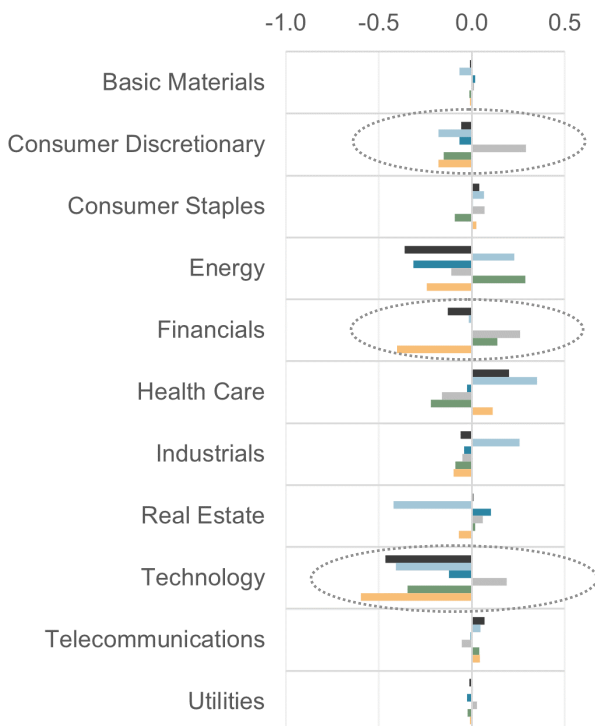
Industry active weights, Q1 2023 average



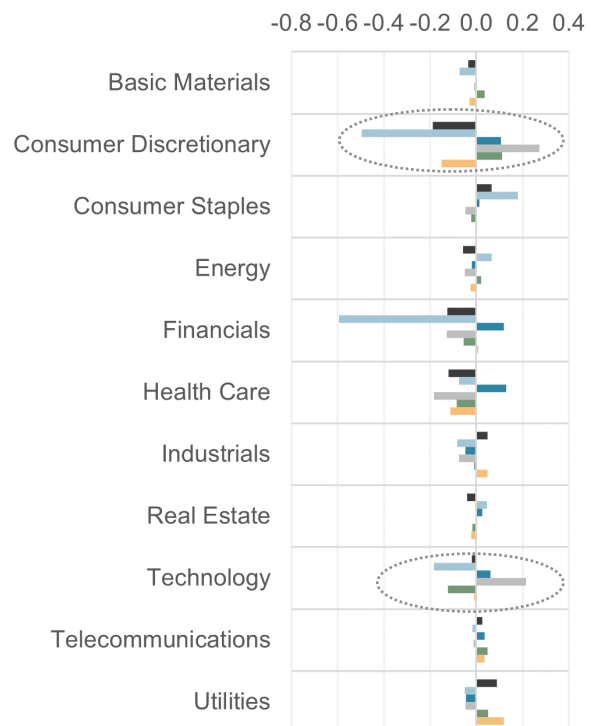
Total industry effects, Q1 2023



Industry allocation effects, Q1 2023



Selection effect within industry, Q1 2023

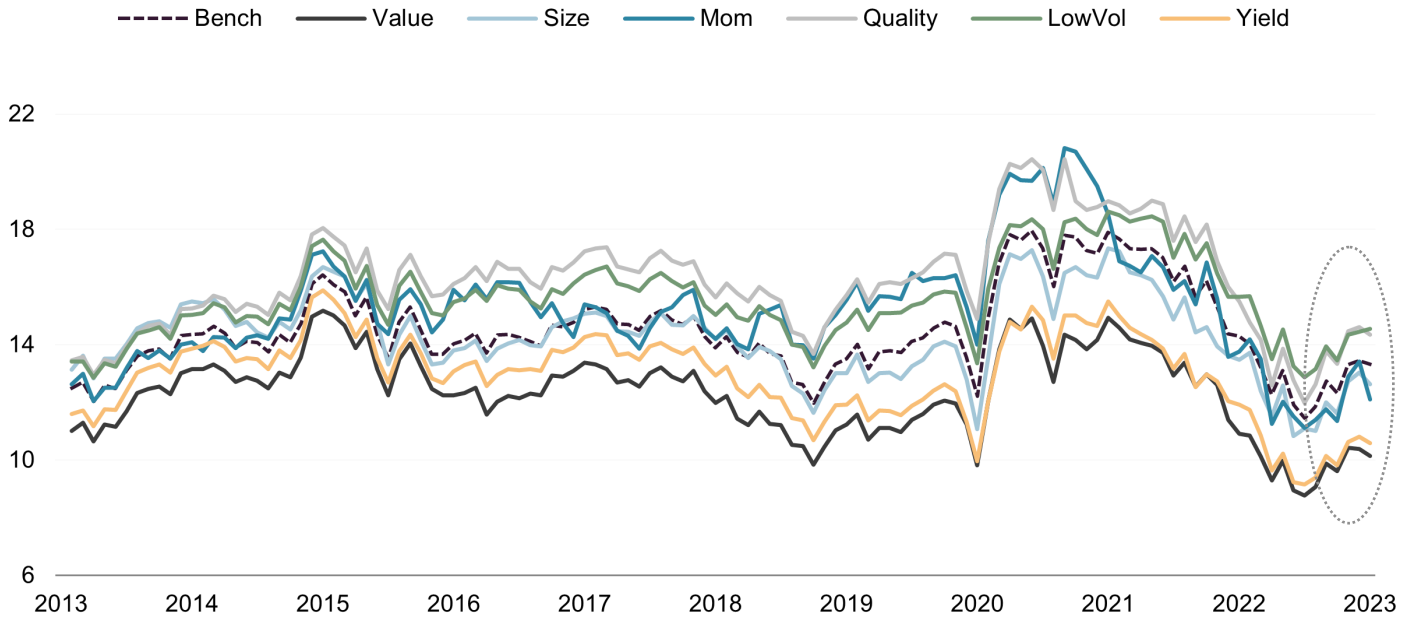


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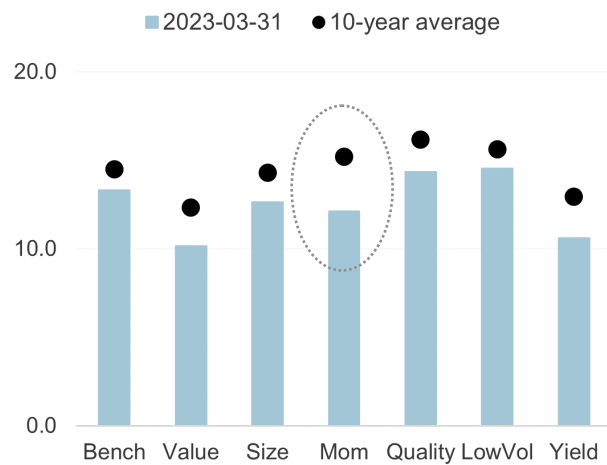
Europe ex UK Factor Valuations

Despite modest upticks in Q1, forward P/E's for most factors (except Low Vol) remain below 10-year averages in both absolute and relative terms. Value, Yield and Momentum continue to trade at deeper-than-average discounts to the broad market and other factors. Quality's premium to the market remains below its long-term average, despite recent outperformance. Though the premium versus Value widened modestly in Q1, it remains around its 10-year average spread of 3.9 points.

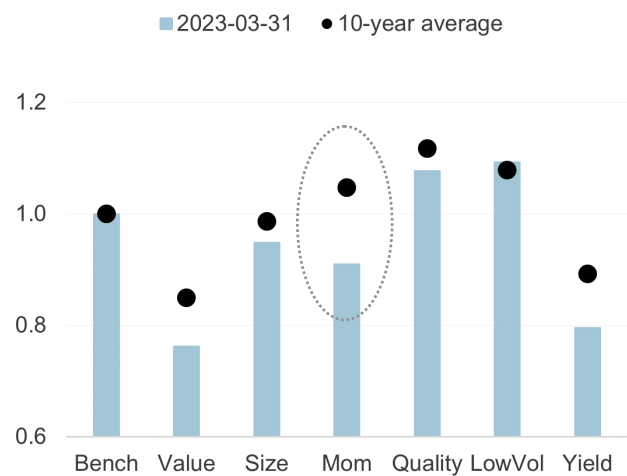
FTSE Europe ex UK – Absolute 12M forward P/E's



Current Absolute 12M forward P/E's vs history



Current Relative 12M forward P/E's vs history



Source: FTSE Russell / Refinitiv. All data as of March 31, 2023. Results shown for regional factor returns represent hypothetical, historical performance, at Tilt 1, based on FTSE Global Equity Index Series and the FTSE Global Factor Index Series. Past performance is no guarantee of future results. Please see end for important disclosures and information on factor calculations. For professional investors only.

Japan Equity Factor Report

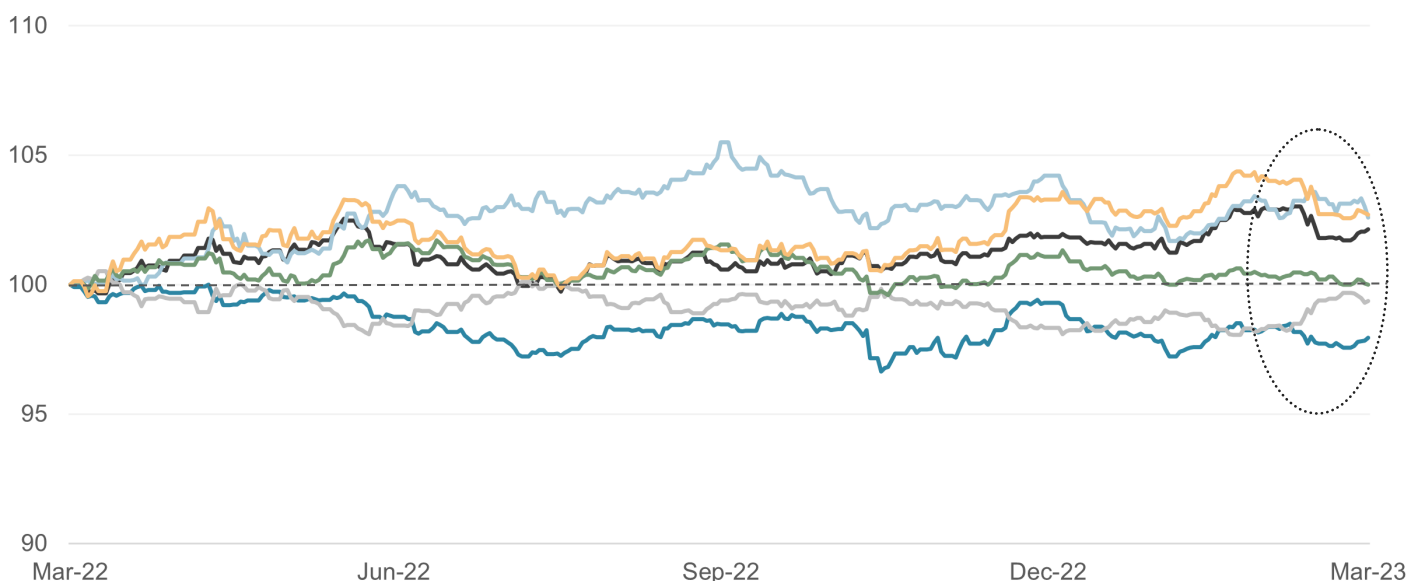
First Quarter 2023

Key Observations

- Quality regained favor amid the banking-sector turmoil in March, the stronger of the only two factors (along with Value) to outperform in Q1. This recent strength significantly shrank Quality's 12-month underperformance and badly dented the longer-term advances of Yield, Value and Size.
- Quality's advantage mainly came from its overweights and positive stock selection within Industrials, Tech and Materials stocks and its underweight in slumping Financials.
- Size, the worst Q1 performer, was hit hardest by its overweight in lagging Real Estate and broadly negative stock selection, particularly within Materials.
- Forward P/Es remain below 10-year averages in absolute terms. Size trades at a far bigger-than-normal discount to the market, while Quality and Momentum looks the most expensive, trading above their long-term premiums to the market. Yet, the Quality/Value premium is less than half its long-term average.



Factor returns relative to benchmark (rebased)



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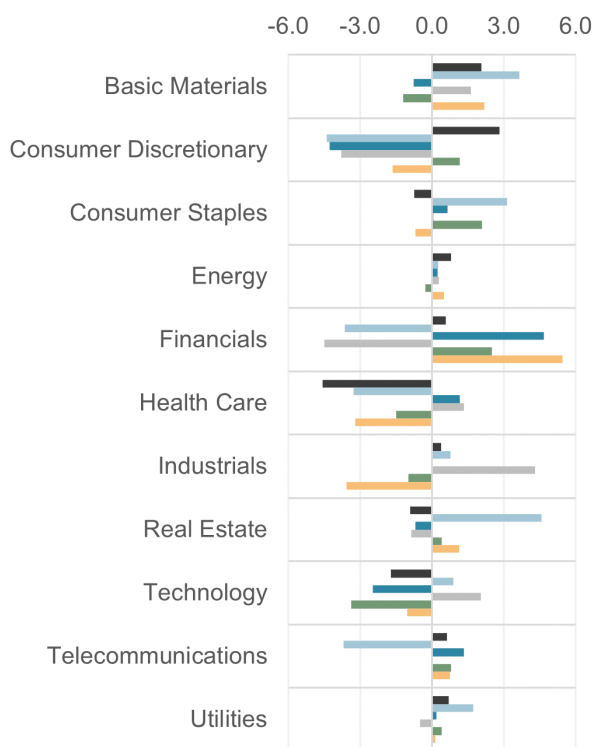
Japan Factor Performance & Industry Attribution — First Quarter 2023

Growth-stock rebound lifts Quality, hurts Size

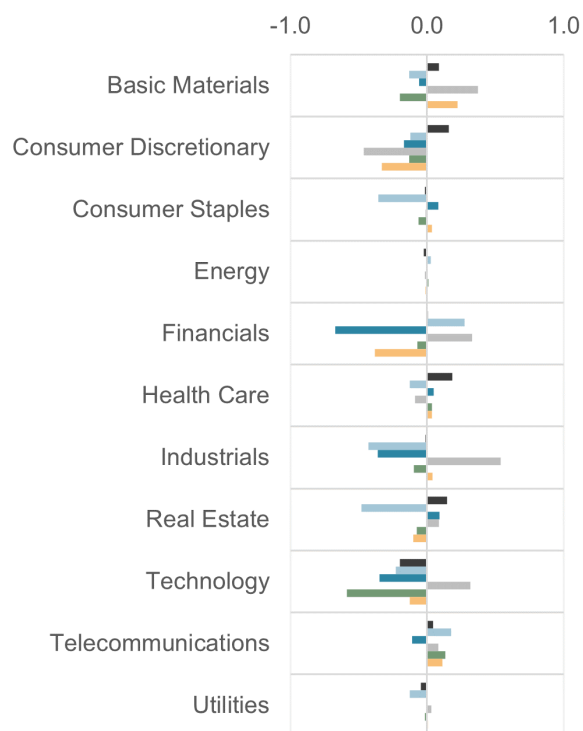
Quality strongly outpaced the market and other factors in Q1, particularly Size. Quality's edge came mostly from its large underweight in slumping Financials, and positive stock selection within Industrials, Materials and Technology. Size was hurt most by its large overweight in lagging Real Estate, and broadly negative stock selection, particularly within Materials and Industrials.

Q1 2023	Relative to Benchmark (TR %)					
FTSE Japan	Value	Size	Mom	Quality	Low Vol	Yield
7.1%	0.3	-1.7	-1.5	1.1	-1.2	-0.6

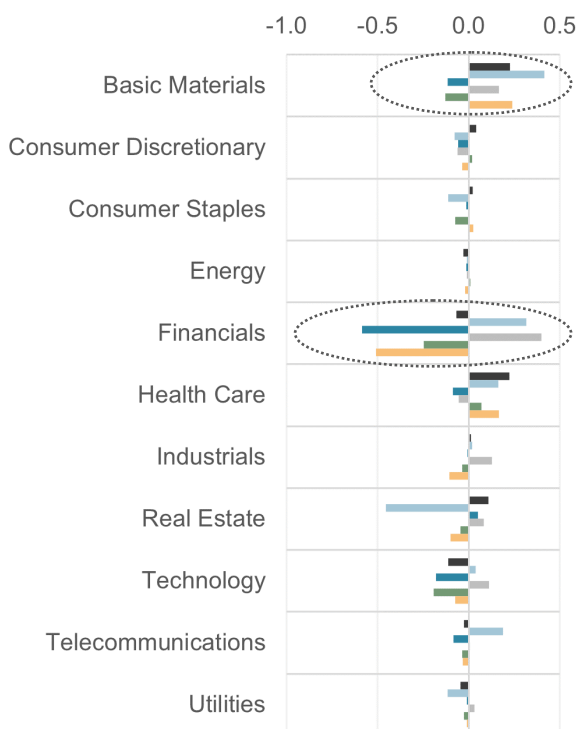
Industry active weights, Q1 2023 average



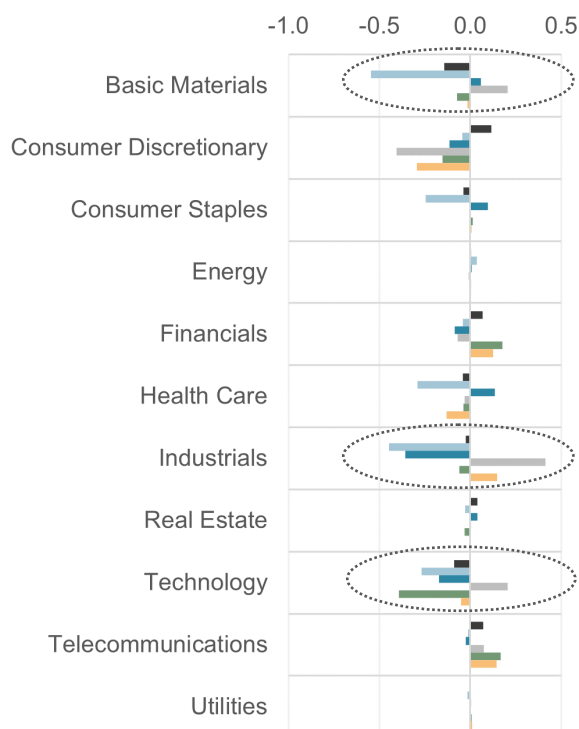
Total industry effects, Q1 2023



Industry allocation effects, Q1 2023



Selection effect within industry, Q1 2023

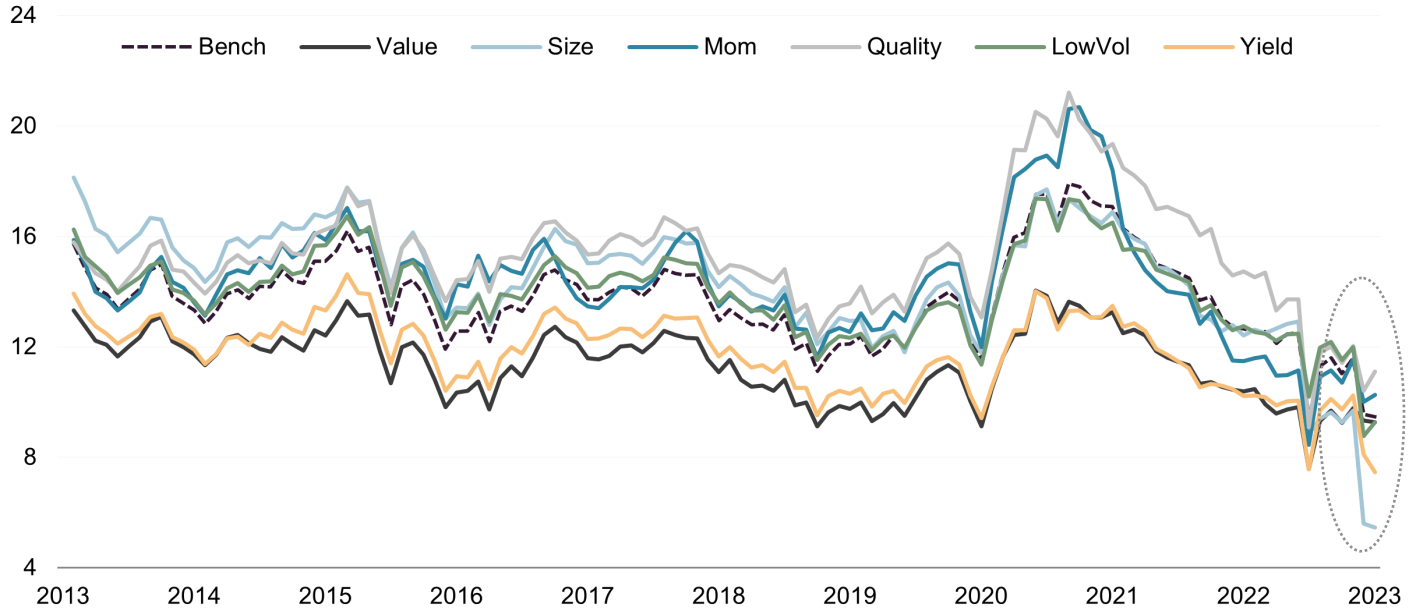


Source: FTSE Russell / Refinitiv. All data as of March 31, 2023. Results shown for regional factor returns represent hypothetical, historical performance, at Tilt 1, based on FTSE Global Equity Index Series and the FTSE Global Factor Index Series. Industry results based on Industry Classification Benchmark (ICB) data. Past performance is no guarantee of future results. Please see end for important disclosures and information on factor calculations. For professional investors only.

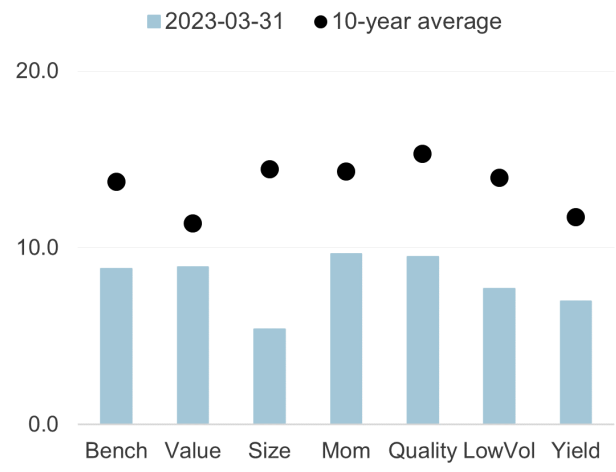
Japan Factor Valuations

Despite a far more muted Q1 rebound than its DM peers, forward P/E's across factors remain below 10-year averages in absolute terms. Size is by far the least expensive factor, carrying a much bigger-than-normal discount to the broad market in both absolute and relative terms. But Value, Quality and Momentum trade well above their historical averages relative to the market. Notably, Quality's premium to Value, at 1.8 points, is less than half its long-term average spread of 3.9 points.

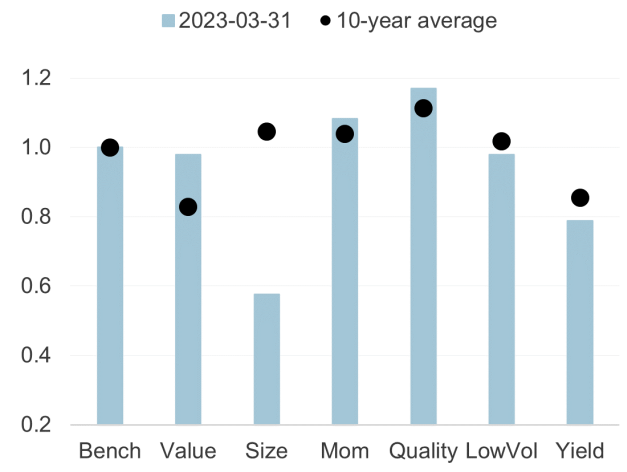
FTSE Japan – Absolute 12M forward P/E's



Current Absolute 12M P/E's vs history



Current Relative 12M P/E's vs history



Source: FTSE Russell / Refinitiv. All data as of March 31, 2023. Results shown for regional factor returns represent hypothetical, historical performance, at Tilt 1, based on FTSE Global Equity Index Series and the FTSE Global Factor Index Series. Past performance is no guarantee of future results. Please see end for important disclosures and information on factor calculations. For professional investors only.

Asia Pacific ex Japan Equity Factor Insights

First Quarter 2023

Key Observations

- Only Quality and Value outpaced the benchmark in Q1 (albeit modestly), while Yield was the biggest laggard. All factors fared better than the benchmark for the 12 months, with Quality closing in on Yield for the lead.
- Quality benefited most from its overweights in rebounding Materials and Tech in Q1 (offset by poor stock selection in those sectors), as well as its underweight and stock selection in slumping Financials.
- Value got a major boost from positive stock selection within Discretionary, Materials, Staples and Financials.
- Forward P/Es for most factors remain below 10-year averages, with Size and Yield trading at much bigger-than-normal discounts to the market and other factors in both absolute and relative terms.
- After recent outperformance, Quality now ranks as the most expensive factor, trading at slightly bigger-than-average premiums to the market and Value.



Factor returns relative to benchmark (rebased)



Source: FTSE Russell / Refinitiv. All data as of March 31, 2023. Results shown for regional factor returns represent hypothetical, historical performance, at Tilt 1, based on FTSE Global Equity Index Series and the FTSE Global Factor Index Series. Past performance is no guarantee of future results. Please see end for important disclosures and information on factor calculations. For professional investors only.

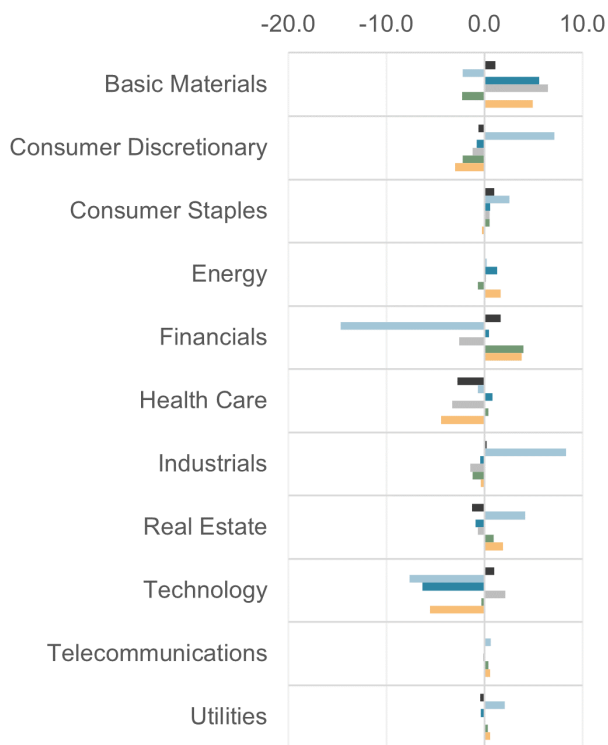
Asia Pac ex Japan Factor Performance & Industry Attribution — Q1 2023

Quality stands out amid mostly muted factor performances in Q1

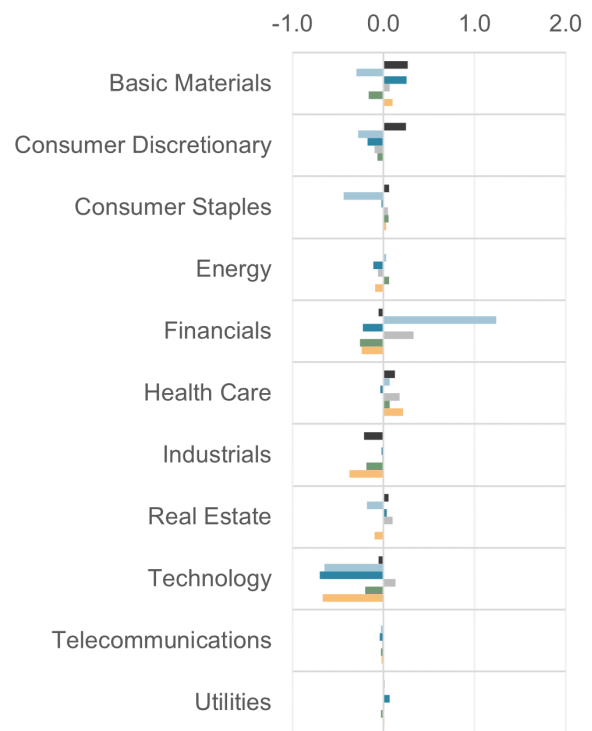
Quality and Value were the lone outperformers in Q1, while long-time winner Yield was the biggest laggard. Quality gained most from its overweights in rebounding Materials and Tech (offset by poor stock selection), and underweights and stock selection within Financials. Value got a major boost from stock selection within Discretionary, Materials, Staples and Financials.

Q1 2023	Relative to Benchmark (TR%)					
FTSE Dev Asia Pacific ex JP	Value	Size	Mom	Quality	Low Vol	Yield
4.8%	0.5	-0.4	-1.0	0.7	-0.7	-1.1

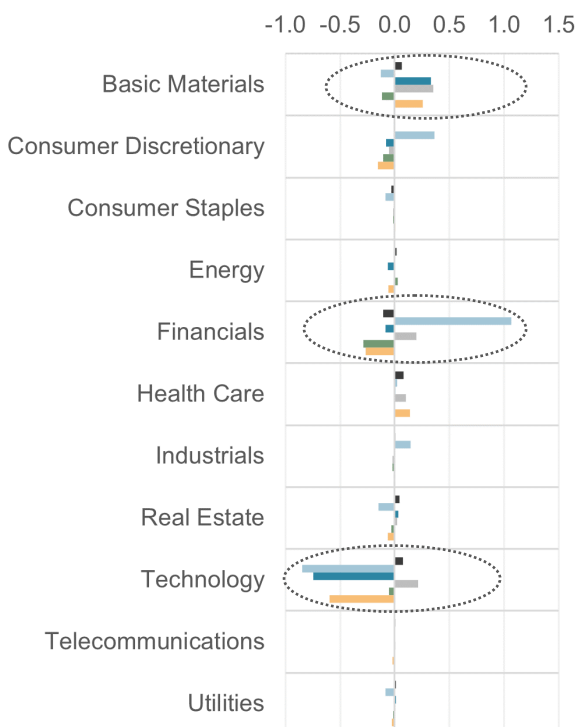
Industry active weights, Q1 2023 average



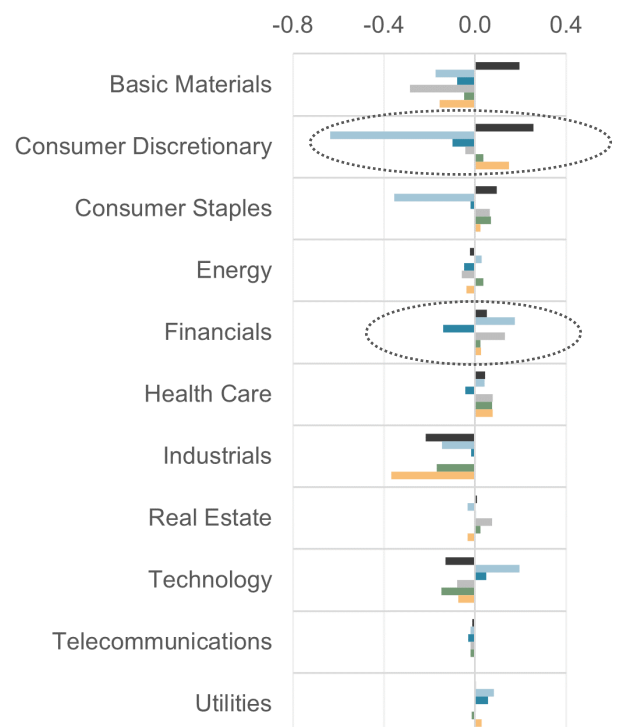
Total industry effects, Q1 2023



Industry allocation effects, Q1 2023



Selection effect within industry, Q1 2023

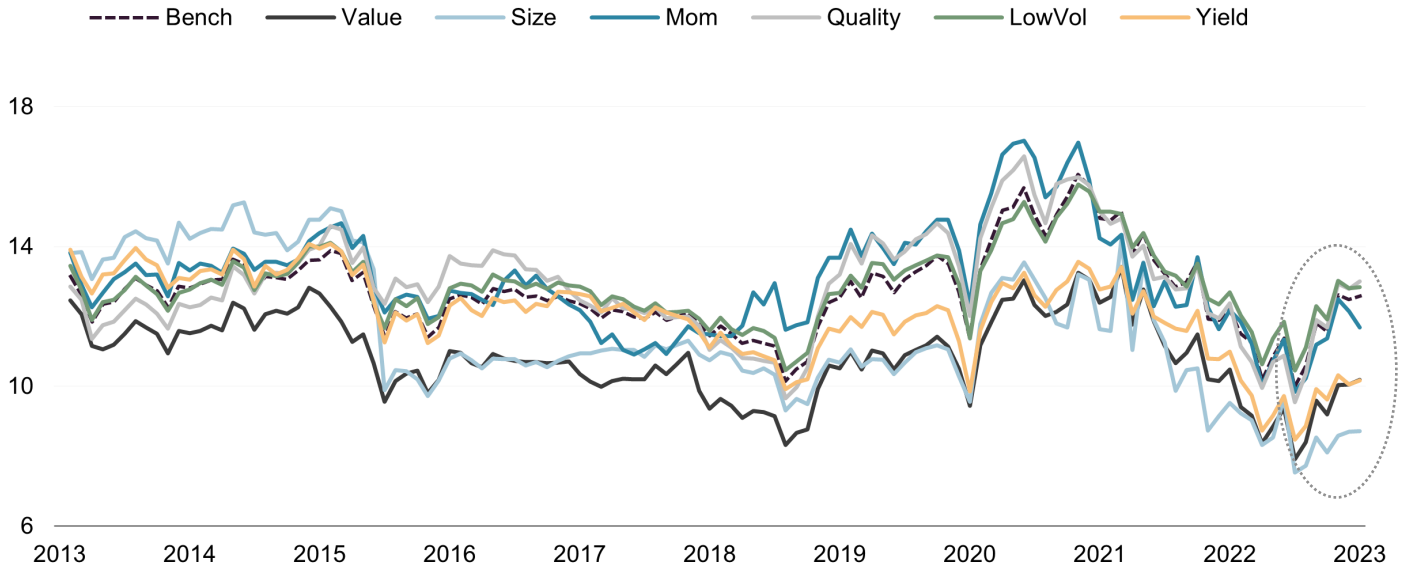


Source: FTSE Russell / Refinitiv. All data as of March 31, 2023. Results shown for regional factor returns represent hypothetical, historical performance, at Tilt 1, based on FTSE Global Equity Index Series and the FTSE Global Factor Index Series. Industry results based on Industry Classification Benchmark (ICB) data. Past performance is no guarantee of future results. Please see end for important disclosures and information on factor calculations. For professional investors only.

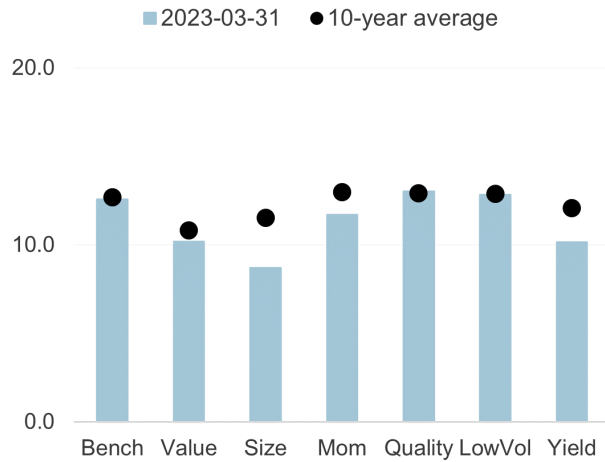
Asia Pacific ex Japan Factor Valuations

Despite big Q1 re-ratings, forward P/Es for most factors remain below 10-year averages in absolute and relative terms (except for Quality and Low Vol). Size and Yield are the cheapest factors, trading at much deeper discounts to the benchmark and other factors versus history. Quality ranks as the most expensive, trading at a higher-than-average premium to the market. The Quality/Value premium, at 2.8 points, remains above its long-term average of 2.0 points.

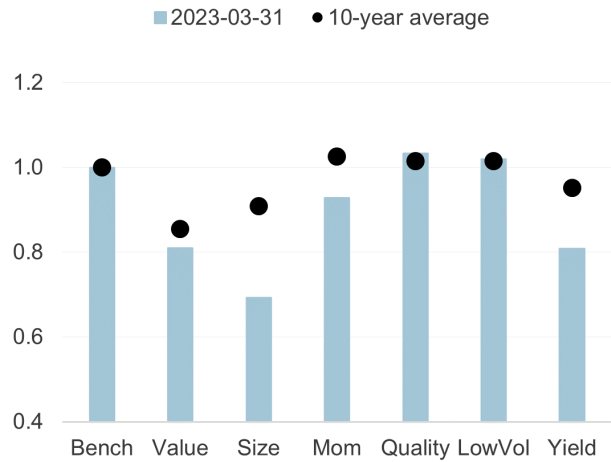
FTSE Asia Pacific ex Japan – Absolute 12M forward P/Es



Current Absolute 12M forward P/Es vs history



Current Relative 12M forward P/Es vs history



Source: FTSE Russell / Refinitiv. All data as of March 31, 2023. Results shown for regional factor returns represent hypothetical, historical performance, at Tilt 1, based on FTSE Global Equity Index Series and the FTSE Global Factor Index Series. Past performance is no guarantee of future results. Please see end for important disclosures and information on factor calculations. For professional investors only.

Emerging Markets Factor Report

First Quarter 2023

Key Observations

- Deviating from DM trends, most EM factors beat the benchmark in Q1, led by Quality and Yield, tipping the former into positive territory for the 12-month period. Size lagged the most in Q1, paring its longer-term lead.
- Allocation effects in Discretionary, Technology and Financials accounted for most of the performance divergences between Quality and other factors. Quality also benefited more than the others from positive stock selection within Discretionary.
- Reflecting the broad market's more subdued Q1 recovery, the uptick in forward P/E's was more muted for EM factors than their DM counterparts, and all remain below 10-year averages in absolute and relative terms.
- Value and Yield still trade at far bigger-than-normal discounts to the market, while Quality and Low Vol multiples are roughly in line with the broad market, versus their historical premiums. The Quality/Value premium is close to its long-term average.



Factor returns relative to benchmark (rebased)



Source: FTSE Russell / Refinitiv. All data as of March 31, 2023. Results shown for regional factor returns represent hypothetical, historical performance, at Tilt 1, based on FTSE Global Equity Index Series and the FTSE Global Factor Index Series. Past performance is no guarantee of future results. Please see end for important disclosures and information on factor calculations. For professional investors only.

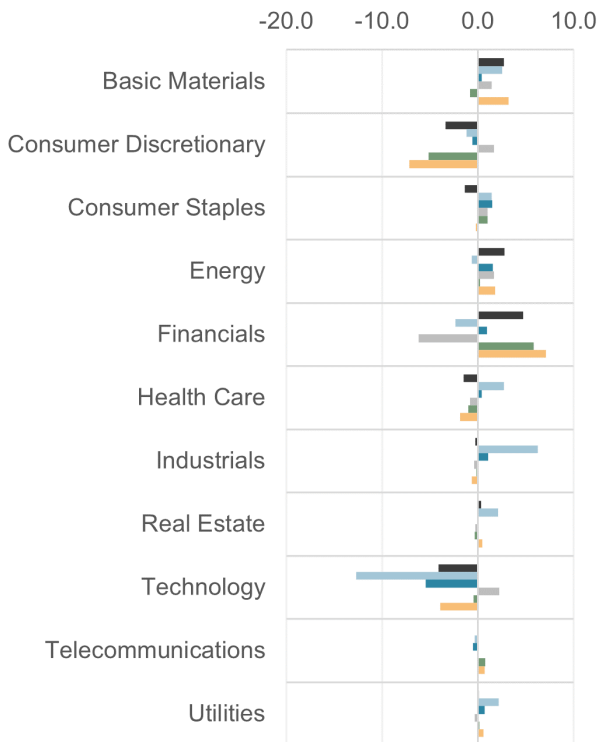
Emerging Markets Factor Performance & Industry Attribution — Q1 2023

Growth-stock rebound drives Quality leadership in Q1

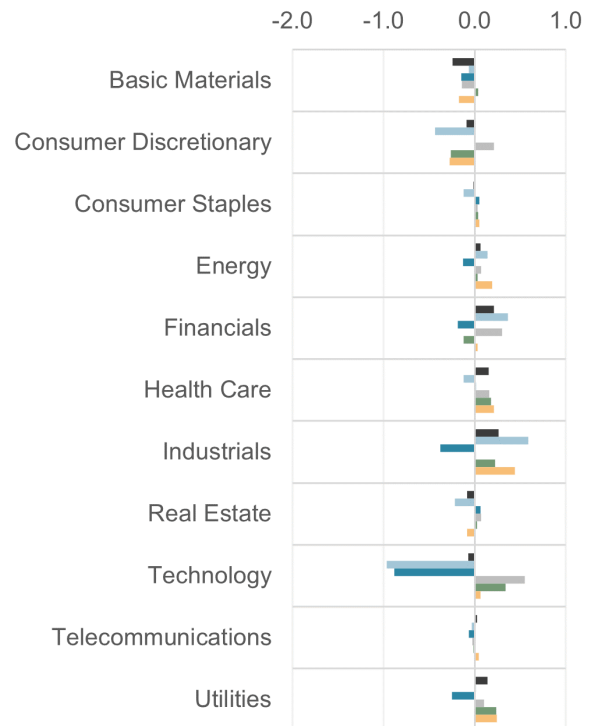
In contrast to DM peers, most EM factors outperformed the benchmark in Q1, with Quality and Yield topping the charts. Quality's leadership in Q1 was an outgrowth of its much larger exposures to the robust rebounds in Tech and Discretionary stocks, and its much smaller exposure to the sell-off in Financials. Broadly positive stock selection helped lift Yield.

Q1 2023	Relative to Benchmark (TR %)					
FTSE Emerging	Value	Size	Mom	Quality	Low Vol	Yield
2.5%	0.7	-0.5	-1.9	1.5	1.0	1.1

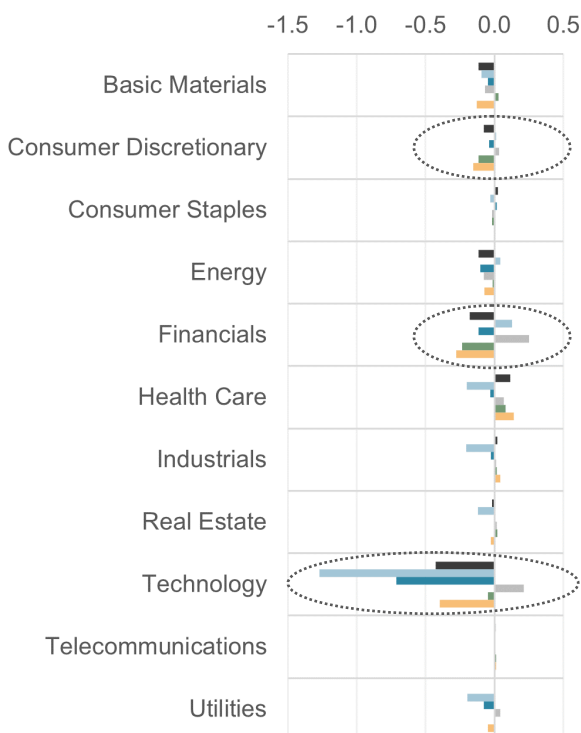
Industry active weights, Q1 2023 average



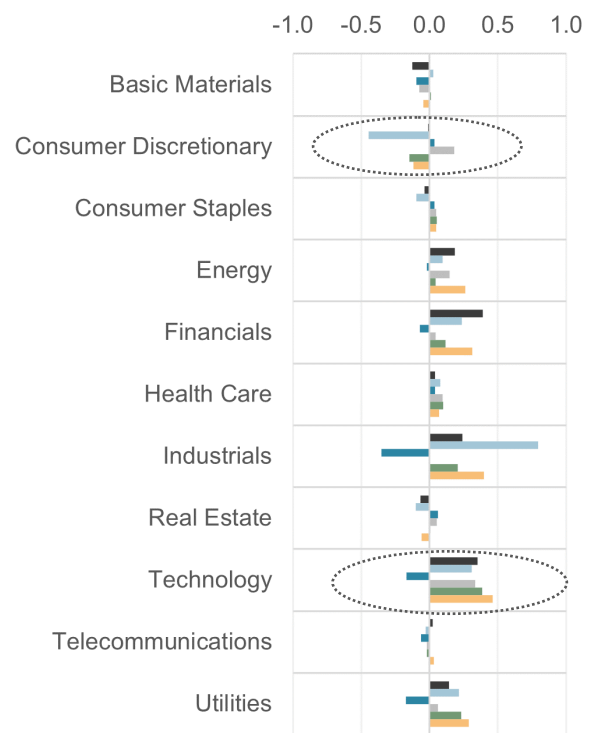
Total industry effects, Q1 2023



Industry allocation effects, Q1 2023



Selection effect within industry, Q1 2023

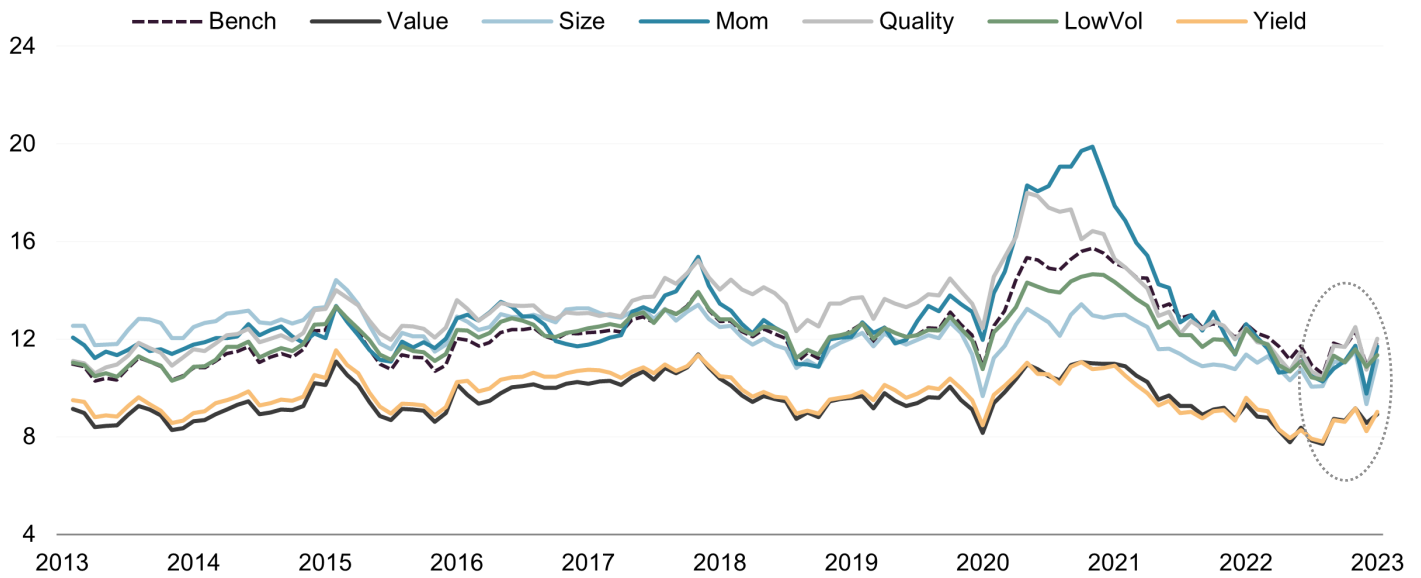


Source: FTSE Russell / Refinitiv. All data as of March 31, 2023. Results shown for regional factor returns represent hypothetical, historical performance, at Tilt 1, based on FTSE Global Equity Index Series and the FTSE Global Factor Index Series. Industry results based on Industry Classification Benchmark (ICB) data. Past performance is no guarantee of future results. Please see end for important disclosures and information on factor calculations. For professional investors only.

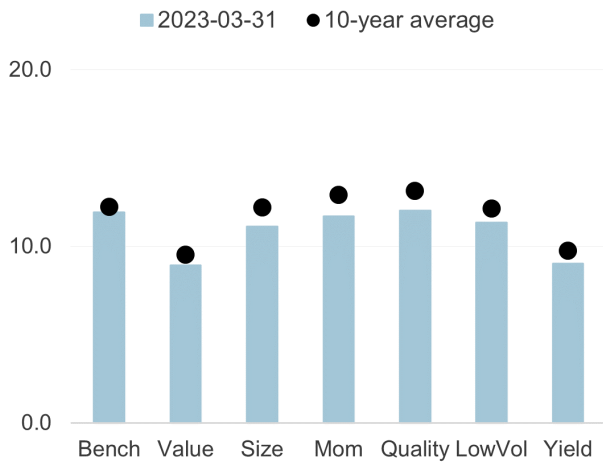
Emerging Markets Factor Valuations

The Q1 rebound in forward P/E's was more muted for EM than its developed peers. All remain well below 10-year averages in both absolute and relative terms, some significantly so. Notably, Value and Yield look particularly cheap, trading at bigger discounts to the market and other factors versus history. Quality trades in line with the market, compared to its historical premium, while its premium to Value widened slightly to 3.1 points by quarter-end, closer to its historical spread of 3.6 points.

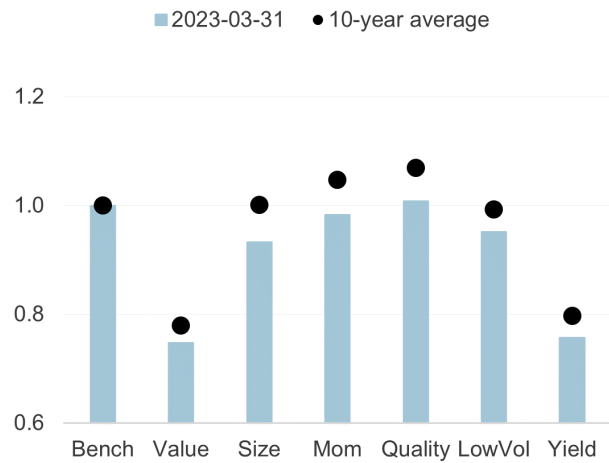
FTSE Emerging – Absolute 12M forward P/E's



Current Absolute 12M forward P/E's vs history

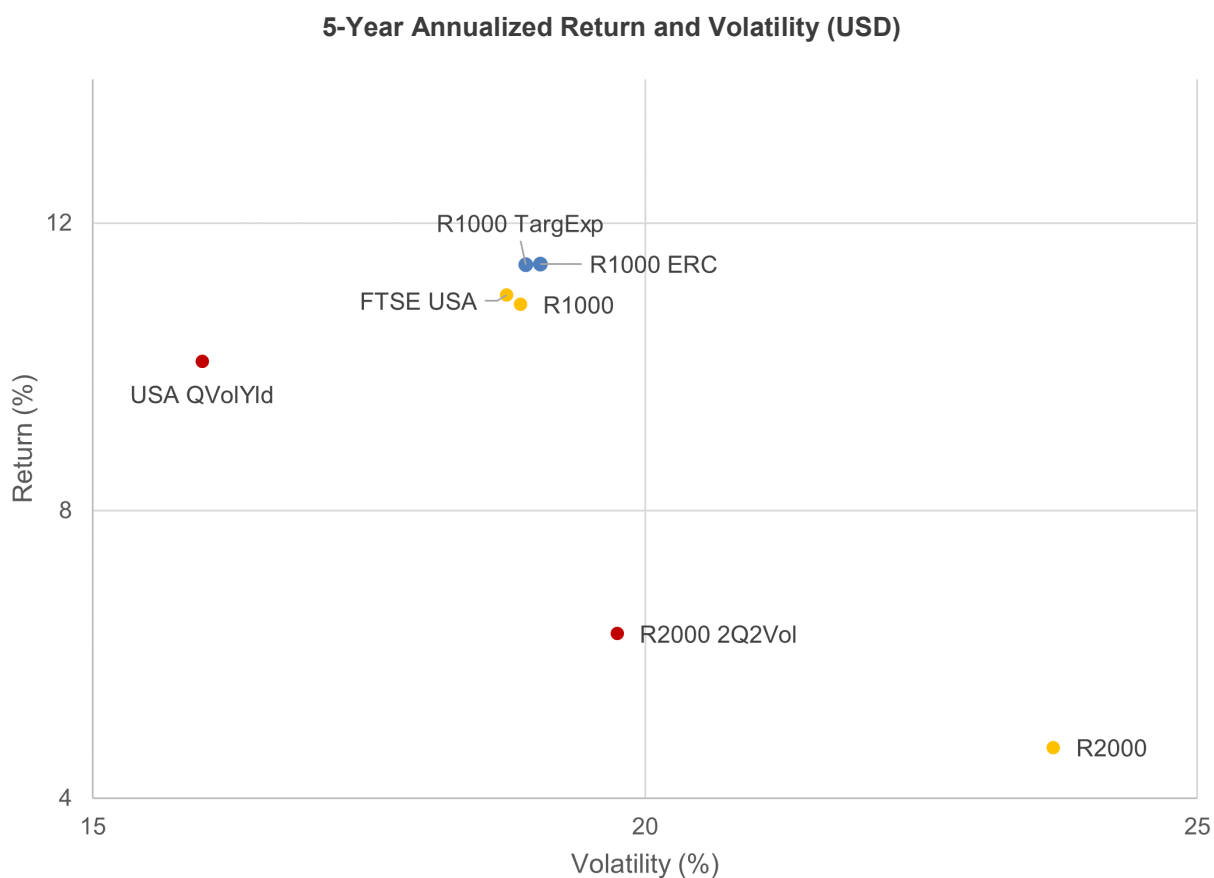


Current Relative 12M forward P/E's vs history



Source: FTSE Russell / Refinitiv. All data as of March 31, 2023. Results shown for regional factor returns represent hypothetical, historical performance, at Tilt 1, based on FTSE Global Equity Index Series and the FTSE Global Factor Index Series. Past performance is no guarantee of future results. Please see end for important disclosures and information on factor calculations. For professional investors only.

FTSE Russell US Factor Index Risk/Return Performance



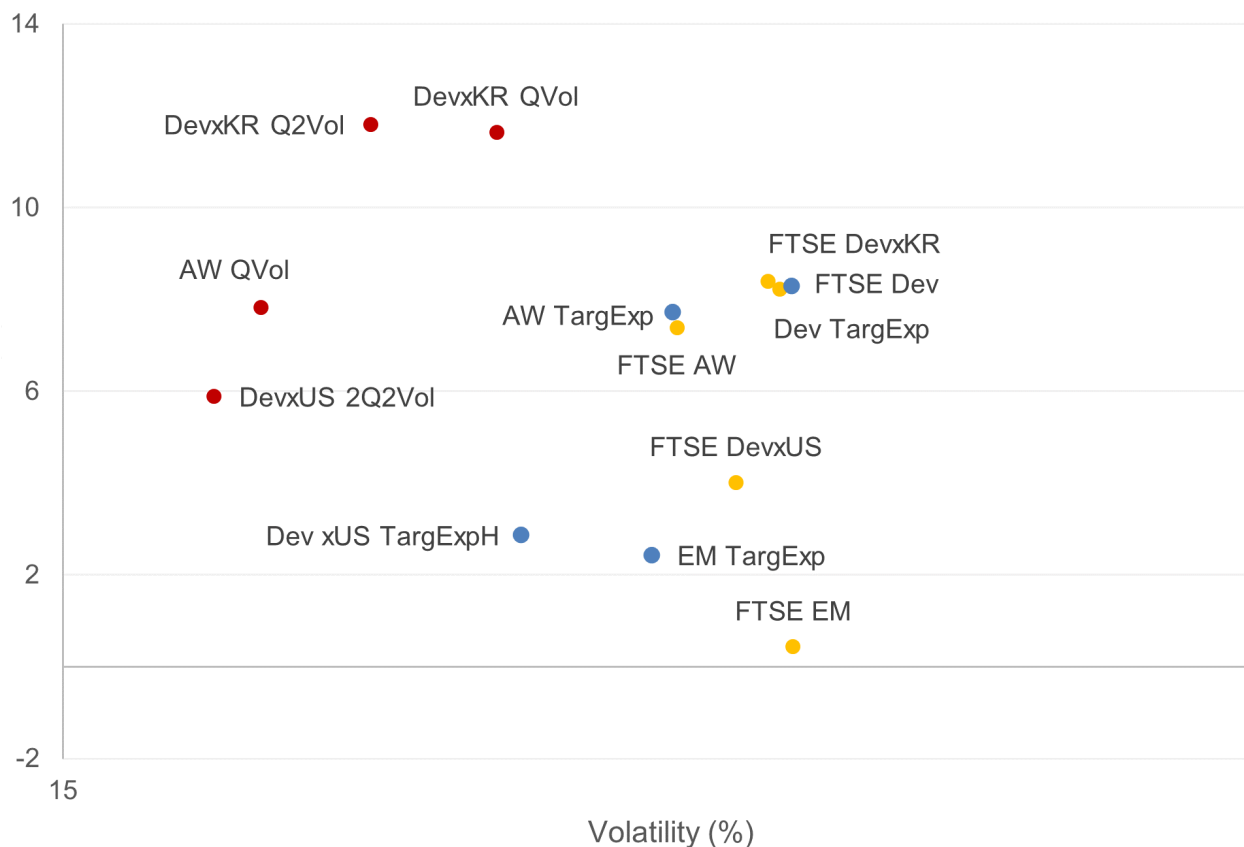
Annualized Returns and Volatility (USD %)

Label	Index	1-yr return	5-yr return	5-yr volatility
Diversified Indexes				
● R1000 ERC	Russell 1000 Comprehensive Equal Factor Risk Contribution	-5.3	11.4	19.0
● R1000 TargExp	Russell 1000 Comprehensive Target Exposure Factor Index	-2.9	11.4	18.9
Defensive Indexes				
● R2000 2Q2Vol	Russell 2000 2Qual/2Vol 3% Capped Factor Index	-4.4	6.3	19.7
● USA QVolYld	FTSE USA Qual/Vol/Yield Factor Index	-1.8	10.1	16.0
Benchmarks				
● FTSE USA	FTSE USA Index	-8.3	11.0	18.7
● R1000	Russell 1000® Index	-8.4	10.9	18.9
● R2000	Russell 2000® Index	-11.6	4.7	23.7

Source: FTSE Russell / Refinitiv. All data as of March 31, 2023. Past performance is no guarantee of future results. Please see end for important disclosures. For professional investors only.

FTSE Russell Global Factor Index Risk/Return Performance

5-Year Annualized Return and Volatility (USD)



Annualized Return and Volatility (USD)

Label	Index	1-yr return	5-yr return	5-yr volatility
Diversified Indexes				
● AW TargExp	FTSE All-World Comprehensive Target Exposure Factor Index	-3.9	7.7	17.5
● Dev TargExp	FTSE Developed Comprehensive Target Exposure Factor Index	-3.4	8.3	18.0
● Dev xUS TargExpH	FTSE Developed ex US Comprehensive High Target Exposure	-9.0	2.9	16.9
● EM TargExp	FTSE Emerging Comprehensive Target Exposure Factor Index	-6.2	2.4	17.4
Defensive Indexes				
● AW QVol	FTSE All-World Target Exposure Qual Vol Factor Index	-4.9	7.8	15.8
● DevxKR Q2Vol	FTSE Developed ex Korea Qual/2 Vol Factor Index	-5.6	11.8	16.3
● DevxKR QVol	FTSE Developed ex Korea Qual/Vol Factor Index	-5.8	11.7	16.8
● DevxUS 2Q2Vol	FTSE Developed ex US 2Qual/2Vol 5% Capped Factor Index	-1.8	5.9	15.6
Benchmarks				
● FTSE AW	FTSE All-World Index	-6.9	7.4	17.5
● FTSE DevxKR	FTSE Developed ex Korea Index	-6.4	8.4	17.9
● FTSE DevxUS	FTSE Developed Ex US Index	-3.0	4.0	17.8
● FTSE Dev	FTSE Developed Index	-6.6	8.2	17.9
● FTSE EM	FTSE Emerging Index	-9.7	0.4	18.0

Source: FTSE Russell / Refinitiv. All data as of March 31, 2023. Past performance is no guarantee of future results. Please see end for important disclosures. For professional investors only.

Important Notes and Information

Note on Market Maps Factor Data

FTSE Russell employs a bottom-up “tilting” approach to create factor indexes. Factor scores are calculated that range from 0 to 1, with higher scores being better. The underlying cap-weighted benchmark weights are multiplied by these scores, and this product is renormalized to give the factor index weights.

Intuitively, the index weights start with the benchmark weights and “tilt” towards stocks with better factor scores and away from stocks with worse factor scores. The magnitude of the index’s factor exposure can be controlled by raising the factor scores by an exponent, with higher exponents yielding higher factor exposure. All data in the Market Maps Equity Factor Insights report uses an exponent (or tilt size) of 1.

See FTSE Global Factor Index Series Ground Rules v4.4, January 2019, below for further details on rules-based factor calculations and construction methodology.

Information on Factor Index Ground Rules and Construction Methodology

[FTSE Global Factor Index Series Ground Rules v4.4, January 2019](#)

[Factor Exposure Indexes: Index Construction Methodology \(Aug 2014\)](#)

Links to FTSE Russell Factor Research Papers

[The role of diversification return in factor portfolios \(July 2021\)](#)

[Comparing Value factor performance in global equity markets \(June 2021\)](#)

[SI indexes: Top-down targets or bottom-up aesthetics? \(June 2021\)](#)

[Do factors carry information about the economic cycle, part 2 \(Feb 2021\)](#)

[Do factors carry information about the economic cycle, part 1 \(Dec 2020\)](#)

[Russell Growth and Value indexes: the enduring utility of style \(Dec 2020\)](#)

[Inverting factor strategies: No more monkey business \(Sept 2020\)](#)

[Portfolio factor allocation schemes \(March 2020\)](#)

[Target factor exposure investment applications and solutions \(February 2020\)](#)

[Factor investing considerations: questions and answers \(Nov 2019\)](#)

[Size exposure spectrum and factor tilts \(July 2019\)](#)

[Factor behavior through the cycle \(June 2019\)](#)

[Factor valuation considerations \(Feb 2019\)](#)

[Implementation considerations for defensive strategies: A look at three approaches \(Feb 2019\)](#)

[Alternative approaches to multi-factor index construction: Like-for-like comparisons \(Nov 2018\)](#)

[Factor indexes and factor exposure matching: Like-for-like comparisons \(Oct 2018\)](#)

[Multi-factor indexes: The power of tilting \(August 2018\)](#)

[Implementation considerations for factor investing \(Mar 2018\)](#)

Glossary of Terms

VALUE

Earnings Yield (E/P) – Latest reported annual earnings per share divided by full market capitalization. Earnings are based on net income from continuing operations, before amortization of goodwill and extraordinary items and after tax, minority interests, preferred dividend, at fiscal year end.

Cash-Flow Yield (CF/P) – Latest reported annual cash-flow yield is cash earnings per share divided by full market capitalization. Cash earnings are earnings plus depreciation, amortization, deferred taxes, other non-cash items, extraordinary item and changes in working capital for the most recent fiscal year.

Sales-to-Price (S/P) – Latest annual sales from continuing operations per share for the full fiscal year divided by full market capitalization. Sales values are generally as reported but occasional adjustments may be made. They are also computed for banks, insurance and other financial companies based on appropriate definitions. Sales are attributed across different share classes, where common equity is comprised of more than one share type.

MOMENTUM

Measure of changes in total stock returns in local currency terms over those of the previous year excluding the most recent month.

SIZE

Size is calculated as the natural logarithm of each company's full market capitalization in US dollars.

QUALITY

PROFITABILITY

Return on Assets (ROA) – Net income divided by average total assets, calculated relative to the regional median stock level.

Delta Turnover – Net sales revenue divided by average total assets, calculated relative to the regional median stock level.

Accruals – Net operating assets (NOA) for the most recent reporting period minus NOA from the previous reporting period, as calculated with following formula: Change in working capital + change in non-current net operating assets + change in net financial assets ([short-term investments + long-term investments] – [long-term debt + short-term debt + preferred stock]), divided by average total assets. Calculated relative to the regional median stock level.

LEVERAGE

Leverage Ratio – Operating cash flow divided by total debt. A company whose net operating cash flow is greater than total debt or has no debt is assigned a maximum Leverage Ratio of one.

VOLATILITY (LOW)

Standard deviation of five years of weekly local total returns prior to the rebalance month. A minimum of 52 weekly return observations are required to calculate volatility.

YIELD

Dividend Yield 12M – Calculated as the natural logarithm of each company's 12-month trailing dividend yield.



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