T. Rowe Price
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Integrated Equity Quarterly Newsletter

Q1 2023

T. Rowe Price Integrated Equity Team

Quarterly Factor Returns

(Fig. 1) January 1, 2023–March 31, 2023

Universe	Total Return	Valuation	Growth	Momentum	Quality	Profitability	Risk	Size
Russell 1000 Growth	14.37%	-8.63%	10.79%	-9.66%	-7.97%	-12.98%	14.56%	-4.68%
MSCI Europe	8.81%	-3.06%	-1.55%	-3.59%	2.43%	6.21%	1.86%	0.91%
Russell 1000	7.46%	-10.35%	9.22%	-5.77%	-5.87%	-7.29%	8.61%	-3.33%
MSCI Japan	7.30%	6.25%	5.29%	-4.19%	-3.21%	5.13%	4.57%	4.01%
MSCI Emerging Markets	3.84%	8.19%	-3.07%	-7.03%	1.23%	-1.18%	-1.89%	-4.00%
Russell 2500	3.39%	2.64%	5.71%	-4.71%	4.68%	5.74%	-3.51%	6.05%
MSCI Pacific ex-Japan	3.07%	-5.52%	7.80%	-4.58%	2.13%	2.92%	4.13%	-4.55%
Russell 1000 Value	1.01%	-7.18%	3.60%	-5.20%	-5.51%	-6.19%	5.91%	-4.29%

Past performance is not a reliable indicator of future performance.
Sources: IDC data/Refinitiv, Compustat, Worldscope/Refinitiv, Russell, and MSCI. Analysis by T. Rowe Price. See Additional Disclosures. MSCI returns are in local currency. Factor returns are calculated as equal-weighted quintile spreads. Please see Appendix for more details on the factors.

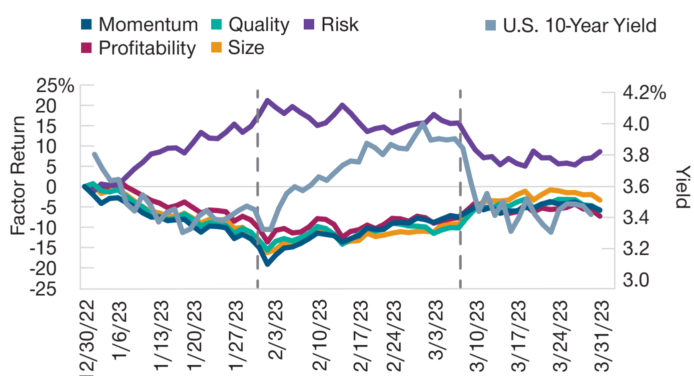
We highlight two key observations from the first quarter of 2023:

(1) This quarter had three distinct periods, reflecting the economic uncertainty.

- **January:** The market experienced a significant reversal from 2022 performance as investors priced in peaking inflation, which led to falling nominal interest rates and a risk-taking, long-duration environment. The 10-year U.S. Treasury note yield fell from 3.8% to 3.4%, high-risk stocks outperformed low-risk stocks by over 20%, and various quality metrics underperformed in unison (Figure 2).
- **February–March 9:** Sentiment shifted following a surprisingly high January CPI report, leading to a reversal of January's performance. The 10-year U.S. Treasury yield rose from 3.4% to 4.0% on expectations that a hawkish Federal Reserve would be determined to fight rising inflation, and that the economy could tolerate higher rates for longer without tipping into a recession. Higher-quality (shorter-duration) stocks outperformed as risk tailed off.
- **March 10–March 31:** Turmoil in the U.S. banking industry triggered concerns of a hard landing, leading to a drop in interest rates, a steep sell-off in risk, and a continued recovery in quality.

U.S. Large-Caps: Select Factors and 10-Year Yield

(Fig. 2) December 30, 2022–March 31, 2023



Past performance is not a reliable indicator of future performance.
Sources: Refinitiv/IDC data, Compustat, and Russell. Analysis by T. Rowe Price. See Additional Disclosures. The U.S. large-cap universe is the Russell 1000 Index. Factor returns are calculated as equal-weighted quintile spreads. Please see Appendix for more details on the factors.

(2) Valuation factor performance suggests a different 2023 playbook if market declines resume.

Last year, we wrote about the dynamics underpinning the 2022 market correction: a significant P/E multiple contraction as rising interest rates popped the speculative bubble caused by an extended period of low rates. This led to significant outperformance of value over growth, as long-duration growth stocks (including companies with negative earnings) underperformed shorter-duration stocks with more reasonable valuations.

From here, if the economy enters recession, the next leg down would likely be driven by earnings declines rather than multiple contraction. In this environment, growth stocks might hold up better, with economically sensitive value stocks leading the decline. The first quarter gave anecdotal evidence to support that view.

First, we use the mid-March banking industry turmoil as a case study. Figure 3 shows a sector-neutral valuation factor within the Russell 1000 Value Index. We chose this index to focus on banks and economic cyclicals, and we use a sector-neutral valuation factor to remove sector effects. When the turmoil hit in mid-March, the result was a precipitous decline in the valuation factor—in other words, as the market priced in a significantly higher chance of a recession, with anticipated forced Fed rate cuts later this year, we saw value stocks underperform.

Second, we look at the performance of growth versus valuation among U.S. large-caps (Figure 4). Despite the rotations discussed above, the one constant was growth outperforming valuation this quarter. Last year, we had significant conviction that value was attractive relative to growth; this year, valuation spreads have narrowed, economic and interest rate uncertainty looms, and, consequently, our outlook on value and cyclicality is more muted.

Market Insight—What We're Monitoring

This quarter we expand on two topics:

- Our framework for opportunistic tilts
- Our framework for price-implied expectations

Opportunistic tilts

In addition to our stock selection model, we employ a market surveillance platform to identify dislocations at the factor level. This could include factors, regions, or sectors that look cheap, expensive, or risky.

Valuation Factor Performance Within Russell 1000 Value Index

(Fig. 3.) December 30, 2022–March 31, 2023

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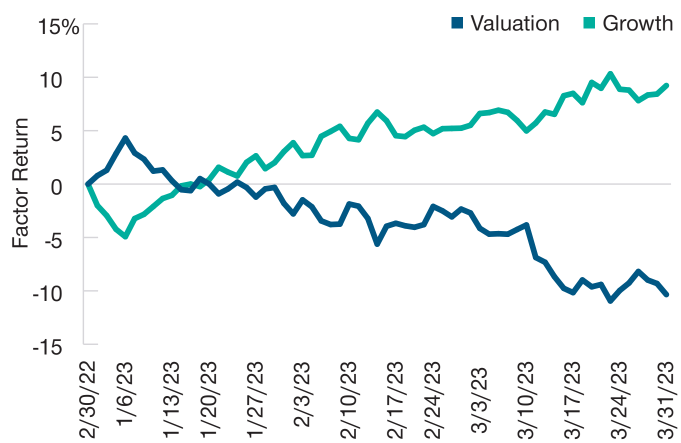
U.S. Large-Caps: Growth Versus Valuation

(Fig. 4) December 30, 2022–March 31, 2023



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We have a rigorous standard for taking opportunistic tilts that generally necessitates three criteria:

- **Data dislocation:** We must be able to effectively observe and quantify the dislocation with our data. This is not only important to initiate an opportunistic tilt, but it is also helpful in sizing and later removing the opportunistic tilt. Generally, we would look to initiate a tilt when the dislocation reaches a historical extreme (two-plus standard deviations), increase it as the dislocation widens, and reduce it as it converges.

- **Economic intuition:** We must understand why the dislocation exists. That helps us avoid situations where secular trends are posing as dislocations, or, where relationships are spurious or misleading, and ultimately ensures there is an economic rationale behind the tilt.

- **Likely catalyst:** We prefer, although we do not always require, to see a catalyst that would cause the dislocation to revert (and the tilt to be rewarded). This helps us avoid investing in "dead money" or being too early.

One example is the tilt we wrote about in 2022 in which we underweighted negative earners among small-caps. The data suggested that nonearners were historically expensive, the intuition was that artificially low rates had fueled speculative behavior in long-duration stocks, and the catalyst was the Fed's intention to raise interest rates to fight inflation. Not all examples will be so clear, but it's illustrative of the framework.

Currently, we lack an opportunistic tilt that meets all three criteria. However, we can highlight a potential dislocation to illustrate the approach. In this quarter's newsletter, we examine the price-implied earnings expectations in the U.S. and European stock markets.

Price-implied expectations

Price-implied expectations are a valuable tool in our market surveillance platform. We use the stock's current price, something we know with certainty, as a starting point to derive the embedded fundamentals, such as earnings growth. These fundamentals, which are backed out of the stock's price, are known as price-implied expectations. This approach allows us to evaluate the embedded reasonableness of what the market is pricing in, even if it is difficult to forecast exact outcomes.

The approach can be generalized as:

- Choose a metric to evaluate—e.g., earnings growth
- Determine what the market is pricing in today—this is the "inside view"
- Look at the historical distribution of that metric—this is the "outside view"
- Evaluate whether the value priced in today (inside view) is reasonable in the context of the historical distribution (outside view)

For example, our research to unearth an insight starts with our intuition and observation that the U.S. market valuation is historically expensive, inconsistent with the direction and volatility of the macro backdrop, and absolutely and relatively inconsistent with European valuations. The market appears to be pricing in overly optimistic growth for the U.S. market and overly pessimistic growth in Europe. However, only two of the criteria are met thus far, and this is something we continue to monitor.

Our Framework: Equity Risk Premium

We begin with our simplified definition of the forecast equity risk premium (ERP):

Equity risk premium = Equity market earnings yield (E/P) minus the risk-free rate (Rf)

Using this definition, we can calculate the forecast ERP over the last 25 years (Figure 5).

The U.S. equity market's forecasted ERP has been consistently lower than that of the European market over the last 25 years. This difference reflects sector composition, with more technology, growth, and higher quality in the U.S. and more cyclical value in Europe, along with structurally higher leverage,

Forecast ERP*: U.S. and Europe

(Fig. 5) March 31, 1998–March 31, 2023

Actual outcomes may differ significantly from forecasted data.

Sources: IDC data/Refinitiv, Compustat, Worldscope/Refinitiv, Federal Reserve Board/Haver Analytics, Refinitiv/Haver Analytics, FactSet, Russell, and MSCI. Analysis by T. Rowe Price. The U.S. universe is the S&P 500 Index; the Europe universe is the MSCI Europe Index. T. Rowe Price calculations using data from FactSet Research Systems, Inc. All rights reserved. See Additional Disclosures for more source information.

*ERPs are calculated monthly. The calculation for E/P is a simple aggregation of net income for index constituents divided by the aggregate market caps for index constituents. The risk-free rates are the 10-year U.S. Treasury yield for the U.S. and the 10-year German bund yield for Europe.

earnings volatility, and stock price volatility over this time frame. These differences explain a higher justified forecasted ERP for Europe than for the U.S.

While our analysis has a limited history, we can draw on academic research to provide a longer historical perspective. We consider base rates from Jeremy Siegel's "Stocks for the Long Run"[1] that calculates realized ERPs over the last 120 years, then we qualitatively adjust our estimates to better reflect today's market environment. In the end, we assume a 3.5% ERP for the U.S. to reflect its higher quality today versus history, and a 4.5% ERP for Europe to reflect market differences discussed above.

Implied growth analysis

Going back to the ERP definition, we calculate market-implied earnings. Conceptually, this is the level of earnings needed to "justify" today's market capitalization. Analytically, we can rearrange the equation as follows:

Market-implied earnings (E) = Market capitalization (P) * (ERP + Rf)

We can therefore calculate the market-implied earnings using the following assumptions:

- Market capitalization is known.
- The long-term ERP is assumed to be 3.5% in the U.S. and 4.5% in Europe, per above. We recognize that this could be debated and have included sensitivity analysis related to the assumptions.
- The risk-free rates are assumed to be the 10-year U.S. Treasury yield and the 10-year German bund yield.

Next, market-implied growth is equal to the percentage increase from today's earnings to the market-implied earnings.

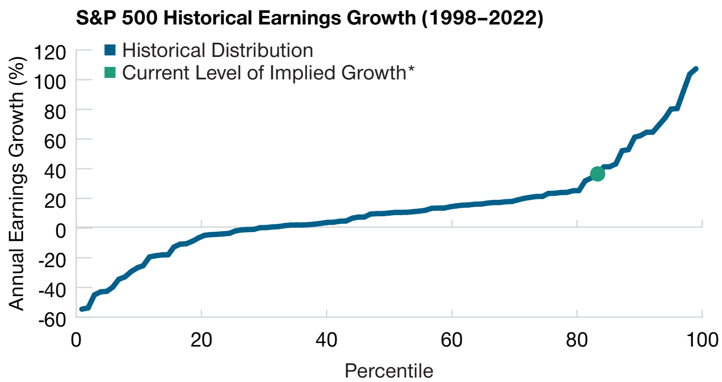
Finally, we can compare this market-implied growth rate with historically realized growth rates to assess the likelihood that growth is achieved. In other words, is today's implied growth feasible given historical growth rates?

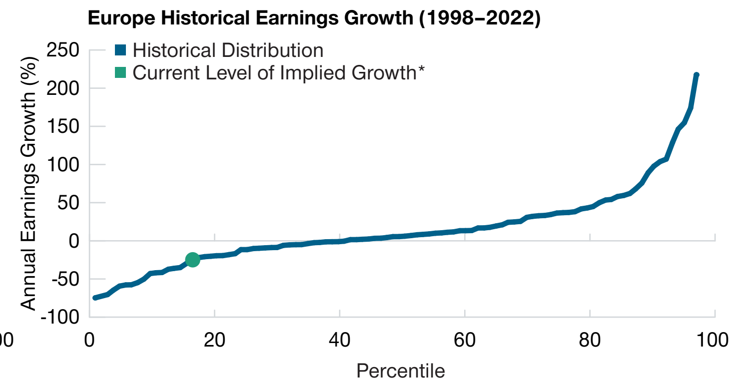
Based on our analysis, the U.S. equity market is currently implying earnings 37% higher than today's earnings, while the European market is implying a 25% earnings contraction. This makes intuitive sense, as the S&P 500 Index remains richly priced despite rising interest rates and falling earnings, whereas the MSCI Europe Index trades at a much more significant discount.

How do these growth rates compare with historical realized growth? The U.S. forecast would be in the 83rd percentile of historically realized growth rates, whereas the European forecast would be in the 17th percentile (Figures 6 and 7). In other words, this implies that the U.S. equity market has historically high expectations, whereas the European equity market has historically low expectations.

U.S. and European Historical Earnings Growth

(Figs. 6 and 7)





Past performance is not a reliable indicator of future performance. Actual future outcomes may differ materially from estimates.

Sources: IDC data/Refinitiv, Compustat, Worldscope/Refinitiv, Federal Reserve Board/Haver Analytics, Refinitiv/Haver Analytics, FactSet, Russell, and MSCI. Analysis by T. Rowe Price. The U.S. universe is the S&P 500 Index; the Europe universe is the MSCI Europe Index.

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*The current level of implied growth is 36.50% in the U.S. and -24.86% in Europe as of March 31, 2023.

[1] Siegel, Jeremy, "Stocks for the Long Run," 6th edition, McGraw Hill, 2022.

U.S. Implied Growth

(Fig. 8)

	ERP						
Risk-Free Rate	1.0%	2.0%	3.0%	4.0%	5.0%	6.0%	7.0%
0.5%	-71%	-51%	-32%	-12%	8%	27%	47%
1.0%	-61%	-41%	-22%	-2%	17%	37%	56%
1.5%	-51%	-32%	-12%	8%	27%	47%	66%
2.0%	-41%	-22%	-2%	17%	37%	56%	76%
2.5%	-32%	-12%	8%	27%	47%	66%	86%
3.0%	-22%	-2%	17%	37%	56%	76%	96%
3.5%	-12%	8%	27%	47%	66%	86%	105%
4.0%	-2%	17%	37%	56%	76%	96%	115%
4.5%	8%	27%	47%	66%	86%	105%	125%
5.0%	17%	37%	56%	76%	96%	115%	135%

Sources: IDC data/Refinitiv, Compustat, Worldscope/Refinitiv, Federal Reserve Board/Haver Analytics, Refinitiv/Haver Analytics, FactSet, Russell, and MSCI. Analysis by T. Rowe Price. The U.S. universe is the S&P 500 Index; the Europe universe is the MSCI Europe Index. T. Rowe Price calculations using data from FactSet Research Systems, Inc. All rights reserved. The current market capitalization and earnings for the S&P 500 Index as of March 31, 2023, are assumed. Actual results may differ materially. Analysis is subject to limitations. Altering the assumptions may yield differences in the outputs and conclusions made.

European Implied Growth

(Fig. 9)

	ERP						
Risk-Free Rate	1.0%	2.0%	3.0%	4.0%	5.0%	6.0%	7.0%
0.5%	-83%	-72%	-61%	-50%	-39%	-28%	-17%
1.0%	-78%	-67%	-56%	-45%	-34%	-22%	-11%
1.5%	-72%	-61%	-50%	-39%	-28%	-17%	-6%
2.0%	-67%	-56%	-45%	-34%	-22%	-11%	0%
2.5%	-61%	-50%	-39%	-28%	-17%	-6%	5%
3.0%	-56%	-45%	-34%	-22%	-11%	0%	11%
3.5%	-50%	-39%	-28%	-17%	-6%	5%	16%
4.0%	-45%	-34%	-22%	-11%	0%	11%	22%
4.5%	-39%	-28%	-17%	-6%	5%	16%	27%
5.0%	-34%	-22%	-11%	0%	11%	22%	33%

Sources: IDC data/Refinitiv, Compustat, Worldscope/Refinitiv, Federal Reserve Board/Haver Analytics, Refinitiv/Haver Analytics, FactSet, Russell, and MSCI. Analysis by T. Rowe Price. The U.S. universe is the S&P 500 Index; the Europe universe is the MSCI Europe Index. T. Rowe Price calculations using data from FactSet Research Systems, Inc. All rights reserved. The current market capitalization and earnings for the MSCI Europe Index as of March 31, 2023, are assumed. Actual results may differ materially. Analysis is subject to limitations. Altering the assumptions may yield differences in the outputs and conclusions made.

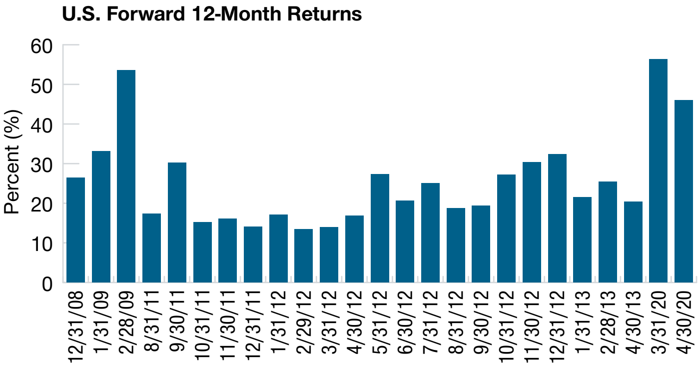
Implied growth sensitivities

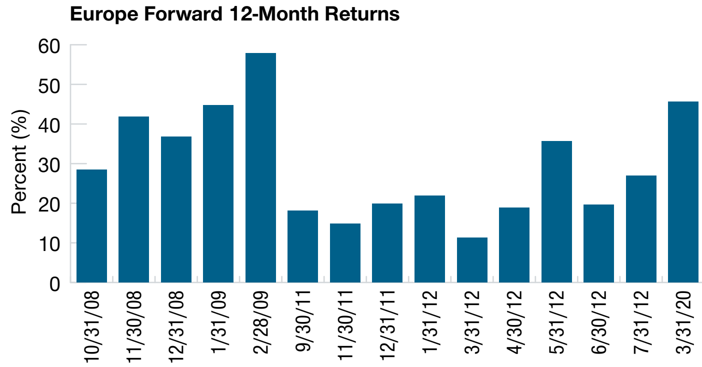
Because we realize that the ERP and risk-free rate are variable, we look at the sensitivity of our implied growth expectations across a range of assumptions, recalling that negative growth is good (green) since it indicates low expectations, and positive growth is bad (red) since it indicates high expectations (Figures 8 and 9). We see that when ERPs are in their historical

U.S. and European Realized Returns Following ERP Extremes

(Figs. 10 and 11)

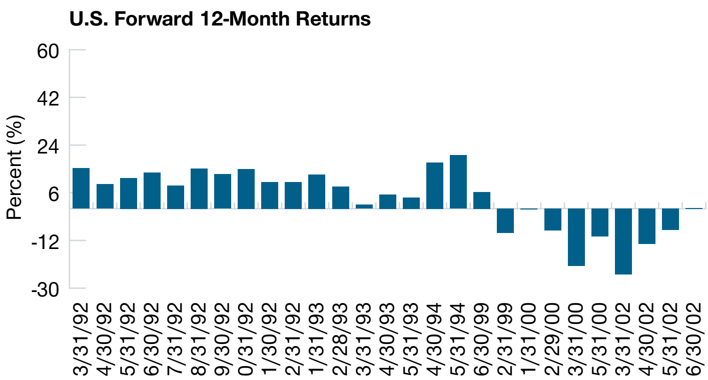
High ERP

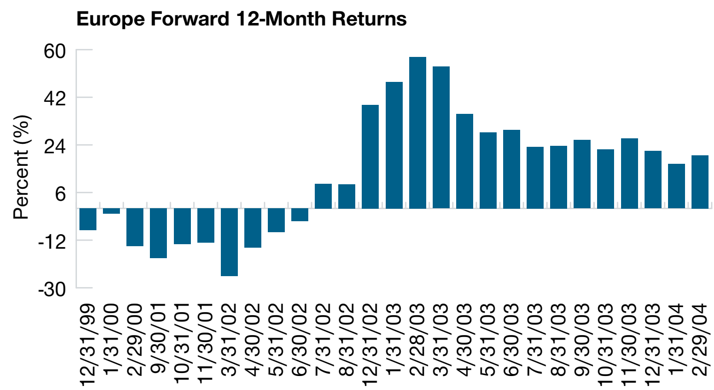




(Figs. 12 and 13)

Low ERP





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Sources: IDC data/Refinitiv, Compustat, Worldscope/Refinitiv, Federal Reserve Board/Haver Analytics, Refinitiv/Haver Analytics, FactSet, Russell, and MSCI. Analysis by T. Rowe Price. T. Rowe Price calculations using data from FactSet Research Systems, Inc. All rights reserved. See Additional Disclosures for more source information. Dates are not consecutive and date intervals are not even because we are focusing on left-to-right tail periods for ERP. For each tail period identified in each region's ERP sample, the forward 365-calendar-day total return is calculated.

The U.S. universe is the S&P 500 Index; the Europe universe is the MSCI Europe Index. ERPs in the U.S. are calculated monthly from December 31, 1989, through February 28, 2023. ERPs in Europe are calculated monthly from March 31, 1998, through February 28, 2023. Forward returns are not calculated beyond March 31, 2022.

We determined high and low ERPs by first reviewing the entire sample of ERPs for each respective region and noting the average and standard deviation. If a single period's ERP falls outside of +1.5 standard deviations from the mean from its respective sample, it is considered a high ERP. If a single period's ERP falls outside of -1.5 standard deviations from the mean from its respective sample, it is considered a low ERP.

range (3%–5%) and interest rates are not extremely low, the U.S. tends to have aggressive growth expectations, while Europe tends to have negative growth expectations.

We use our methods, tools, and models to understand the probabilities of meeting market expectations. Specifically, we look to identify extreme expectations that are outside the range of what historical probabilities would suggest. Our analysis suggests that the market-implied expectations in the U.S. are historically high (and likely too high), whereas market-implied expectations in Europe are historically low (and likely too low). This leads us to believe that the European market is currently more attractive than the U.S. market and that a more defensive approach may be warranted in the U.S. than in Europe.

For informational purposes, we show historical market returns at the extremes of forecast ERPs (Figures 10–13). When ERPs are high, returns have tended to be consistently higher; when ERPs are low, returns have been more volatile and lower.

Having met our first requirement of identifying a dislocation, we now consider the second: economic rationale. We believe the excesses from more than a decade of historically low interest rates have not fully reverted yet. Also, we think investors hold an overly complacent view of U.S. large-cap technology stocks as "safe" or lower-risk investments without fully recognizing the risks of the closed ecosystem (many tech businesses depend on the health of the broader ecosystem), the impact of the start-up lending pullback following the Silicon Valley Bank failure, and the recent impact of tech sector overhiring. We believe this complacency has likely contributed to investor bias against Europe given the past decade of relative returns.

However, we don't have conviction that our third requirement is met, a clear catalyst for this relative mispricing to reverse. We acknowledge that the dislocation could move in the other direction if the world heads into recession and if U.S. large-cap technology behaves like a relative safe haven compared with the cyclical sectors in Europe.

Summary

Currently, we do not see any dislocations that are ready to be acted on, but we note that growth expectations in the U.S. appear unreasonably high given current market levels, while they appear much more reasonable in Europe. The current dislocation justifies a small tilt, allowing room to increase should we identify a catalyst or if the dislocation expands further. We continue to monitor this relationship closely and believe that the odds likely favor Europe to outperform the U.S. over the next market cycle. Just as importantly, we use this example as an introduction to our frameworks on opportunistic tilts and price-implied expectations.

APPENDIX

Factors are our internally constructed metrics defined as follows:

Valuation: Proprietary composite of valuation metrics based on earnings, sales, book value, and dividends. Specific value factor weighting may vary by region and sector.

Growth: Proprietary composite of growth metrics based on historical and forward-looking earnings and sales growth. Factor selection and weighting vary by region and industry.

Momentum: Proprietary measure of medium-term price momentum.

Quality: Proprietary measure of quality based on fundamental and stock price stability, balance sheet strength, various measures of profitability, capital usage, and earnings quality.

Profitability: Return on equity.

Risk: Proprietary composite capturing stock return stability over multiple time horizons (positive return means risky stocks outperform stable stocks).

Size: Market capitalization (positive return means larger stocks outperform smaller stocks).

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