Quarterly Themes

4Q | 2023

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Touchstone Quarterly Themes booklet seeks to provide timely insights on various asset allocation themes and investment topics. Content is organized into sections covering major asset classes and geographies. In developing this content, historical data and statistical relationships were evaluated with an objective of identifying those that have been important drivers, or signals related to particular themes or asset class performance. While certainly not exhaustive, we believe these signals can serve as a good framework for discussion and further analysis.

Our perspective is formed through the lens of the market cycle. Historically, different asset classes shine during different phases of the cycle. Our cycle analysis attempts to determine where we are in the cycle and likely characteristics of the next stage. We then employ fundamentals, valuation, and market internals to identify actionable tactical shifts based on forward-looking views.

The periods reflected in charts and data series typically extend as far back as data was available from credible sources. In some instances, shorter time frames are applied to provide greater insight to more recent trends, or particular market or economic environments. Charts using daily, weekly, or monthly data are typically as of August 2023, while charts reflecting quarterly data are as of June 2023 unless otherwise noted. Sources, investment terms, index definitions, and disclosures can be found in the Appendix. Sources are color coded by section.

Touchstone Investments models have been developed to present trends, forecasts, and projections, and to represent assumptions in light of currently available information. Actual results will differ from those projected, consequently, no guarantee is presented or implied as to the accuracy of specific trends, forecasts, and projections contained herein.

If you would like to discuss the content and themes in this quarterly book, please contact your Touchstone Investments Partner at TouchstoneInvestments.com/resources or call Touchstone at 800.638.8194.

Summary: Globally, risk assets have continued to rally, though with little fundamental support. We have been advocating a more cautious approach to risk assets, but are looking for opportunities to add risk where valuations allow us to look through near-term threats. Currently, we are finding value in fixed income and domestic small- and mid-cap stocks. We are a bit more concerned about international developed stocks, especially with stagflationary conditions in Europe.

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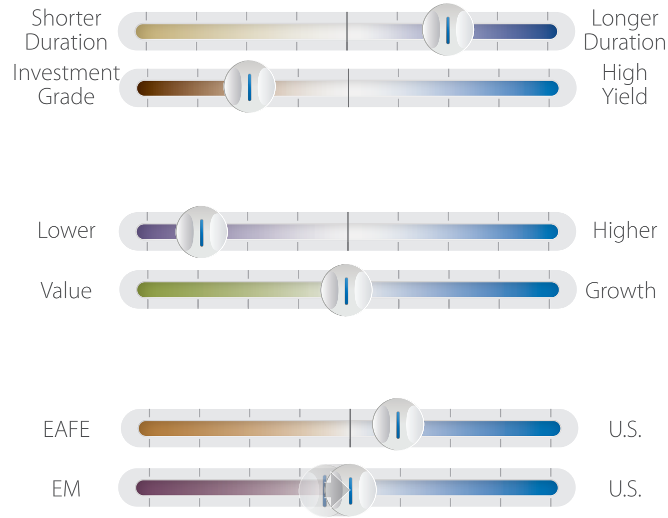
Summary Signals at a Glance



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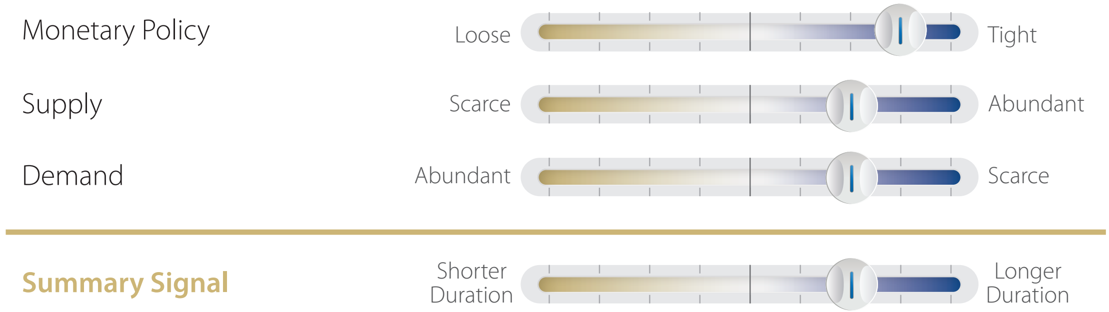
Interest Rate Risk



Conclusion: With the U.S. Federal Reserve Board (Fed) nearing the end of its rate raising cycle and economic growth slowing, we have grown concerned about reinvestment risk at the short end of the curve. Historically inverted yield curves un-invert at a fairly rapid pace. We acknowledge that history may not repeat in this cycle. The trend in inflation and the economy will play an important role in how quickly or slowly the Fed lowers interest rates.

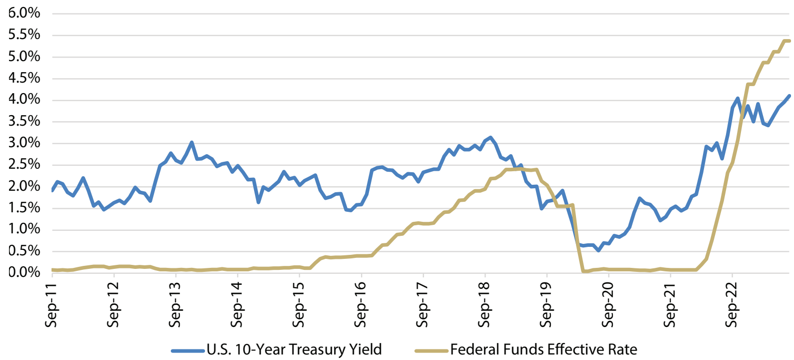
Monetary Policy

Loose — Tight

- In its effort to accomplish its dual goals of maximum employment and stable inflation, the Fed tends to adjust its policy in a counter cyclical fashion. Efforts to stimulate (restrict) the economy through monetary policy generally led to higher (lower) long-term interest rates and vice versa over time.
- The Federal Funds rate has significantly moved above the yield on the 10-year Treasury bond and the Fed still may do more.
- 10-year yields may have broken out of a four-decade pattern of making lower lows in each cycle. We believe it is possible that rates settle at a higher level than seen in the last two cycles, though we do not anticipate moving into a secular period of rising rates.

U.S. 10-Year Treasury Yields and Federal Funds Effective Rate

Monthly observations: September 2011 through August 2023



Source: Bloomberg

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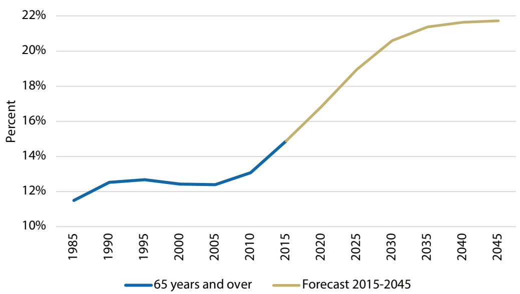
Supply

Supply refers to lending and is represented by savings and investments. Excess supply puts downward pressure on interest rates.

- The vast majority of U.S. savings are held by consumers, including contributions to pension plans.
- Retirement savings have swelled as the Baby Boom generation nears retirement age. Typically, there has been a tendency to accelerate the pace of savings and begin to make asset allocation changes toward less risky, more income-generative assets (e.g., bonds), as one gets closer to retiring and into retirement.
- The supply/demand approach to interest rates can also be thought of as savings versus investment. Savings represents money looking to lend, while investment represents money looking to borrow, and rates adjust to accommodate changes in these two factors. The right chart below broadly depicts this relationship. Fiscal stimulus measures to offset the pandemic significantly added to savings. Consumers, though, had been spending down their savings. As a partial offset, higher interest rates are likely to attract more supply and discourage investment.

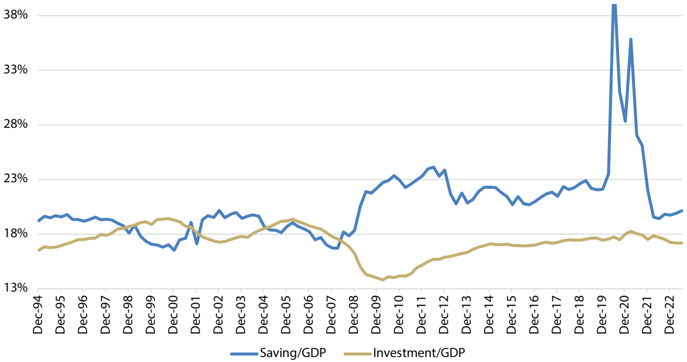
Share of U.S. Population

Quinquennial: 1985 through 2045



Savings vs. Investment

Quarterly: December 1994 through June 2023



Sources: Bloomberg, U.S. Census Bureau, Bureau of Economic Analysts

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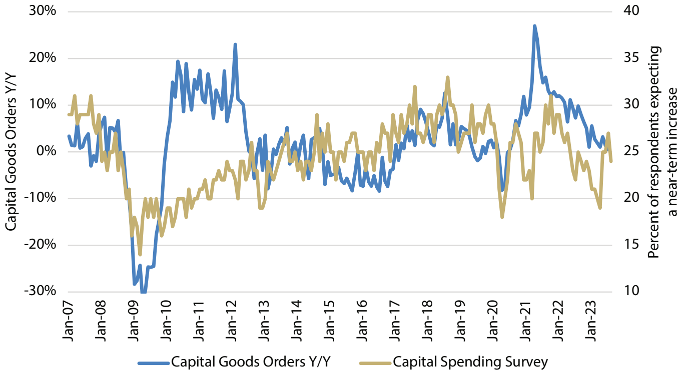
Demand

- Demand refers to borrowing (or investment). Excess demand puts upward pressure on interest rates, while insufficient demand puts downward pressure on interest rates. In the past, we have used measures of the change in debt outstanding to indicate whether demand is abundant or scarce. There had been a dramatic increase in borrowing by the government and business sector, but we believe showing these figures would be distortionary. The vast majority of debt issuance has gone not toward investment, but toward replacing lost income and the building up of cash.
- One of the main channels of monetary policy is to encourage or discourage investment. Certainly higher mortgage rates are having an impact. Business investment had begun to roll over, though spending intentions increased significantly since April, possibly related to the CHIPS and IRA spending acts.

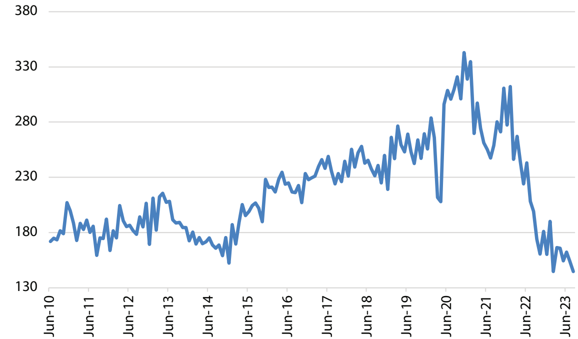
Capital Spending Intentions

Monthly: January 2007 through July 2023 (Capital Goods) and August 2023 (Capital Spending)



Mortgage Applications

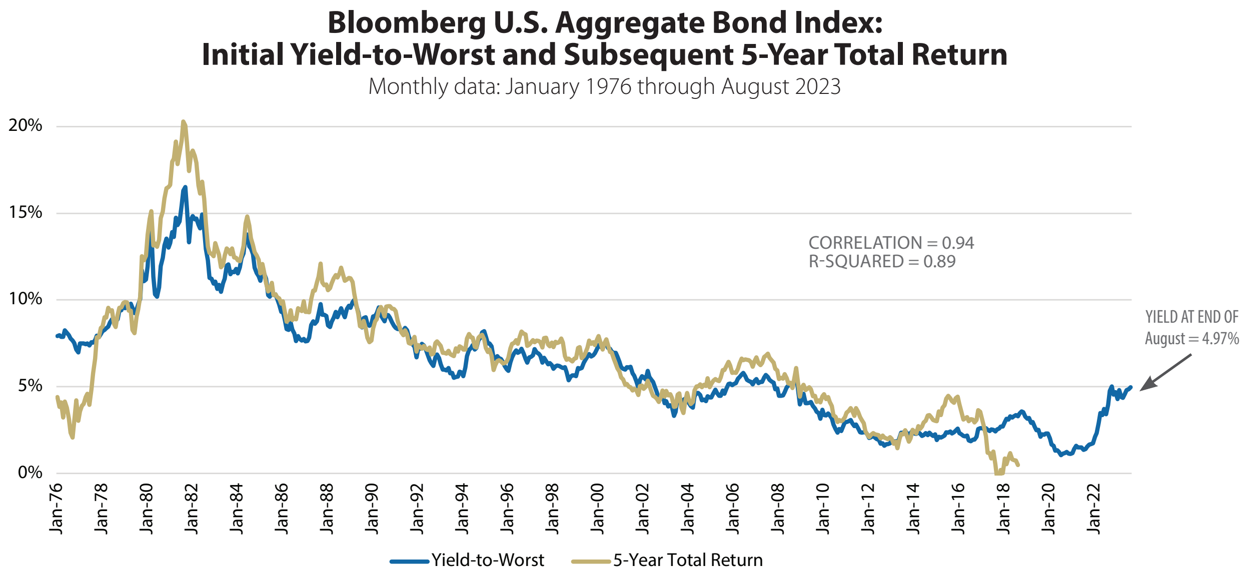
Monthly: June 2010 through August 2023



Sources: Bloomberg, U.S. Census Bureau, National Federation of Independent Businesses, Mortgage Bankers Assoc.

Simple Bloomberg U.S. Aggregate Bond Index Model

Given that the Bloomberg U.S. Aggregate Bond Index typically had a duration of around five years, its current yield has historically tended to be a reasonable estimate for the total return of the index over the next five years. More recently, a higher level of duration has increased the volatility of returns. The yield on the Bloomberg U.S. Aggregate Bond Index has risen to a level that is more attractive.



Source: Bloomberg

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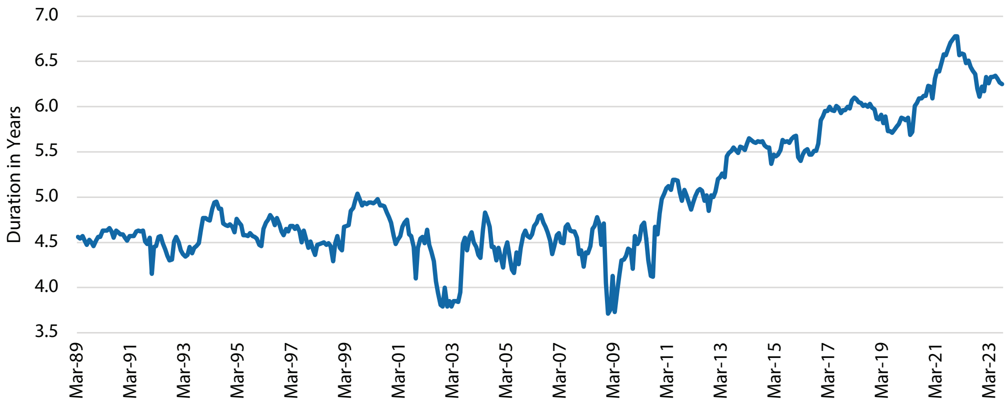
Bloomberg U.S. Aggregate Bond Index Duration Extended

Duration is a measure of a bond's price sensitivity to changes in interest rates. As duration rises, bonds become more sensitive to changes in interest rates. Lower interest rates and longer maturity Treasury and corporate bond issuance extended the duration over the course of the last decade. This higher level of duration has increased the price volatility of the Index.

Bloomberg U.S. Aggregate Bond Index
Modified Adjusted Duration

Monthly data: March 1989 through August 2023



Source: Bloomberg

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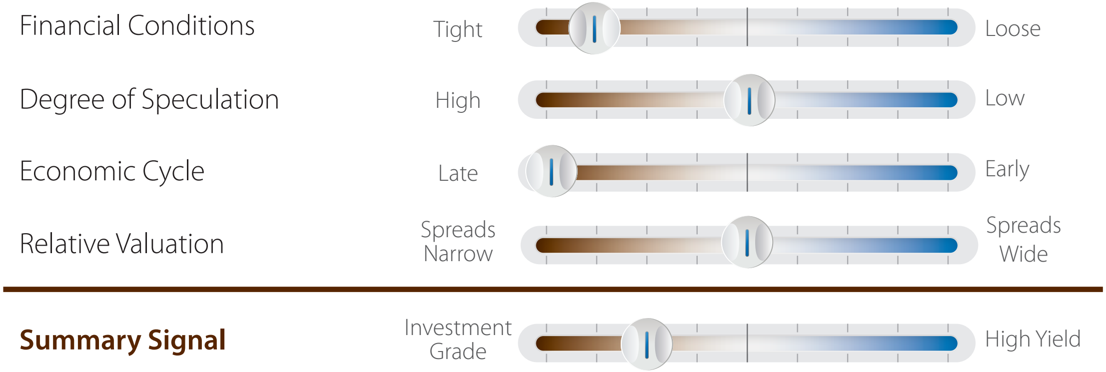
Credit Risk

Corporate bonds have a higher yield than duration-equivalent Treasuries, mainly to compensate investors for default risk. This difference in yield, termed the credit spread, fluctuates over time. Credit risk refers to the risk of rising (or widening) credit spreads. In the following pages we broadly evaluate credit spread drivers to help gauge where the opportunity lies across the quality spectrum.



Conclusion: Financial conditions moved swiftly toward being tight as the Fed shifted to a more aggressive approach to monetary tightening and suggested it was willing to sacrifice economic growth to tame inflation. The changed backdrop of a more aggressive Fed led us to shift toward higher quality exposure. Despite a pick-up in default rates, credit spreads have narrowed. Much higher yields across fixed income have us leaning toward investment grade where we can manage economic risk and earn a decent return.

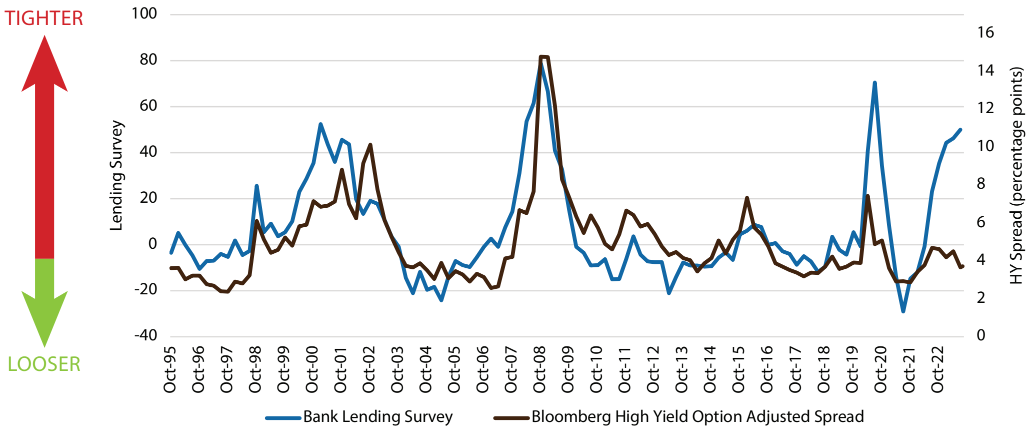
Financial Conditions

Financial conditions refers to how easy or difficult it is to access credit. We look at a number of indicators including monetary policy, lending surveys, financial condition indexes, and rating agency upgrades and downgrades. Tighter financial conditions historically have been accompanied by a widening in high yield spreads, and vice versa.

- There are a number of different ways to measure financial conditions. One way is through public markets looking at risk asset price trends and credit spreads. By this measure, financial conditions appear loose, but a low level of net issuance suggests otherwise. Also, private market conditions continue to tighten as can be seen in the bank lending survey below. Interest rates themselves have risen significantly, raising borrowing costs across the board, raising the cost of capital.

Bank Lending Conditions

Quarterly: October 1995 through July 2023 (Lending Survey)
August 2023 (High Yield Spread)



Sources: Bloomberg, Federal Reserve

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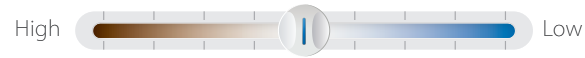
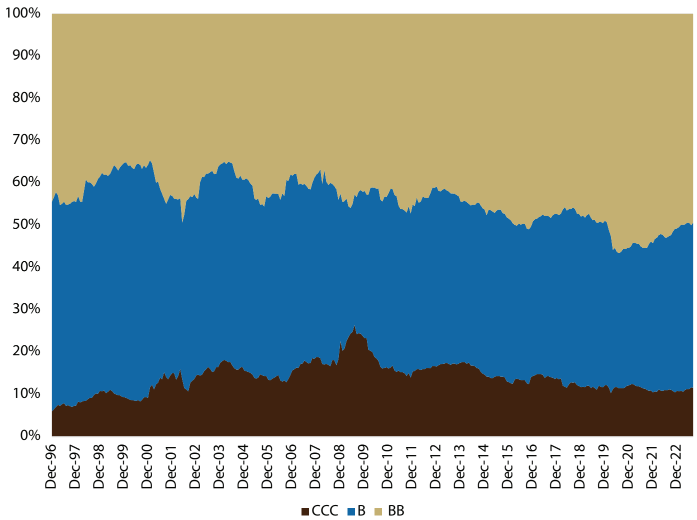
Degree of Speculation



The degree of speculation built up during an expansion can significantly compound the subsequent decline. It can also cause the universe to be more vulnerable to economic weakness and/or tighter financial conditions. We evaluate three broad areas: credit issuance, quality of debt outstanding, and debt coverage. We have seen some mixed results for these factors, with less speculation seen in the fixed high yield market and more speculation in leveraged loans.

High Yield Index Exposure by Credit Rating

Monthly observations: December 1996 through August 2023



Source: Bloomberg

Issuance: Both high yield bond and leverage loan new issuance remain depressed following a significant rise in rates.

Quality: Exposure to the lowest tranche of credit quality for fixed high yield debt did not get extended as seen in past cycles and exposure to the highest tranche accounted for over half the index.

The story is just the opposite for floating rate debt, where the highest quality tranche has been shrinking. Additionally strong demand for loans has led to a significant deterioration in covenants.

Coverage: Coverage ratios have improved as a significant portion of issuance had been rolling older debt into lower interest rates and longer maturities. That also means there is a lower than typical percentage of bonds coming due in the next 12-18 months—this is often referred to as the maturity wall.

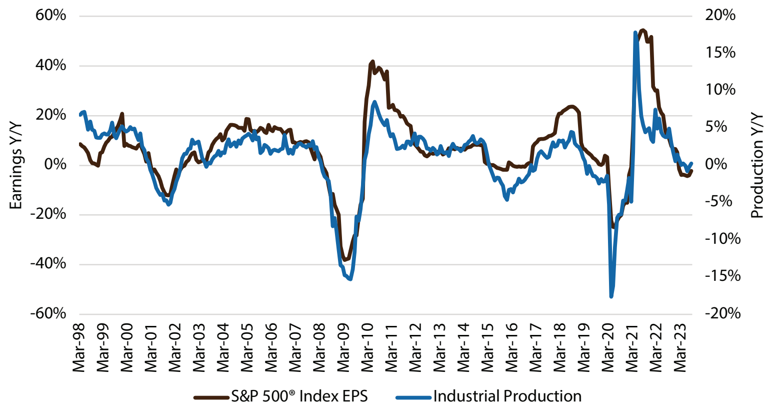
Economic Cycle

Late
Early

Credit spreads compensate investors for the risk of default. Default risks are cyclical. Credit spreads tend to narrow as the economy expands and widen as the economy contracts. The chart below looks at industrial production and profits growth. Defaults tend to rise when profits fall and vice versa. Profits are now down year-over-year and defaults have begun to rise. Current high yield credit spreads are not consistent with weakening economic conditions.

Industrial Production and Earnings

Monthly data: March 1998 through August 2023



Sources: Bloomberg, U.S. Bureau of Labor Statistics

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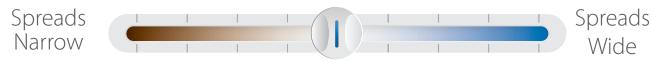
Relative Valuation

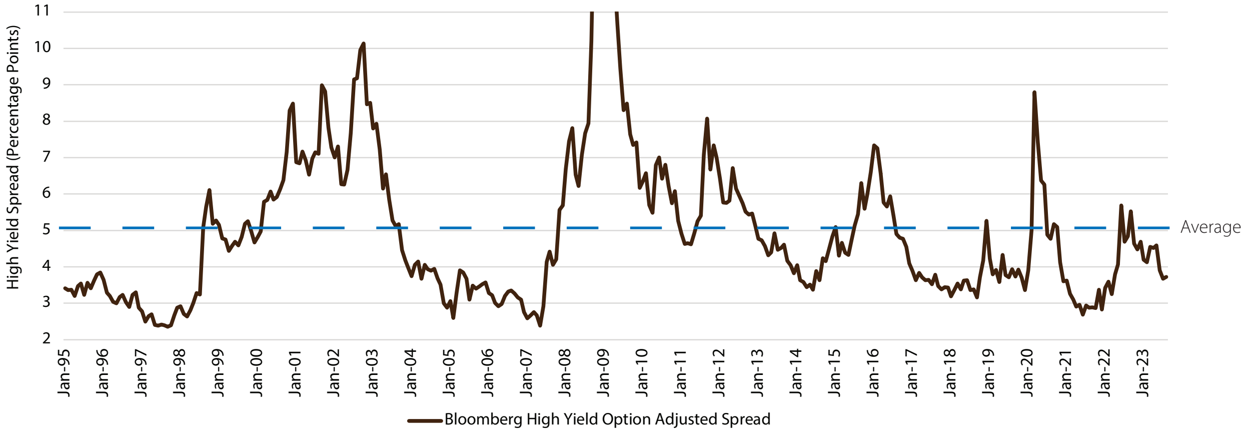


The previous sections covered fundamental considerations with respect to lending conditions, the economic backdrop, and the amount and quality of debt outstanding. We believe that the current valuation of debt (as measured by the credit spread) should be at least reflective of the underlying fundamentals to appropriately compensate investors for taking on additional credit risk.

- At the end of February, the high yield credit spread was 372 basis points above duration equivalent Treasury yields, putting it in the 35th percentile of historical monthly observations. These spreads are not indicating any signs of economic stress. We do acknowledge that many issuers have refinanced into lower coupon debt with longer maturities lessening default risks, but don't believe that would fully insulate the sector from economic weakness.

High Yield Credit Spread

January 1995 through August 2023



Source: Bloomberg

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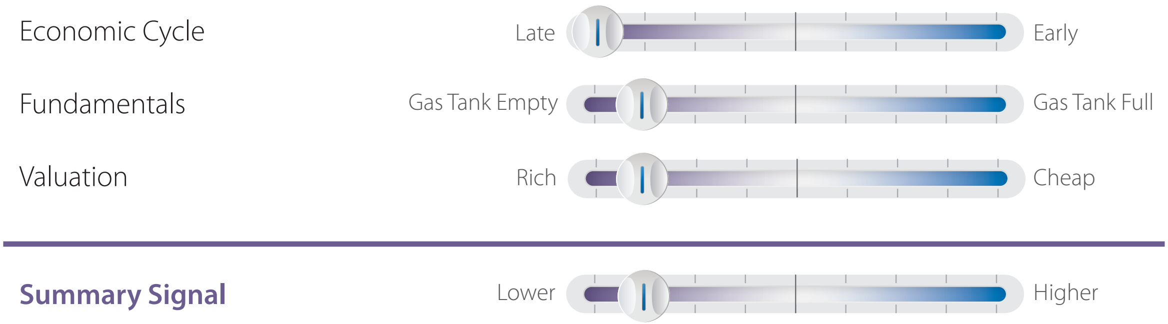
Equity Return Potential



Conclusion: The top heavy S&P 500® continues to skew the interpretation of returns with the top 10 highest weighted stocks rising 52% to-date through August. Meanwhile the equal weighted S&P 500® Index is up just 6%. Earnings estimates have begun to rise, reflecting better-than-expected economic conditions. Yet, economic growth is expected to decelerate in 2024, which is in contrast with consensus analyst estimates for EPS growth of 11%.

Market Cycles

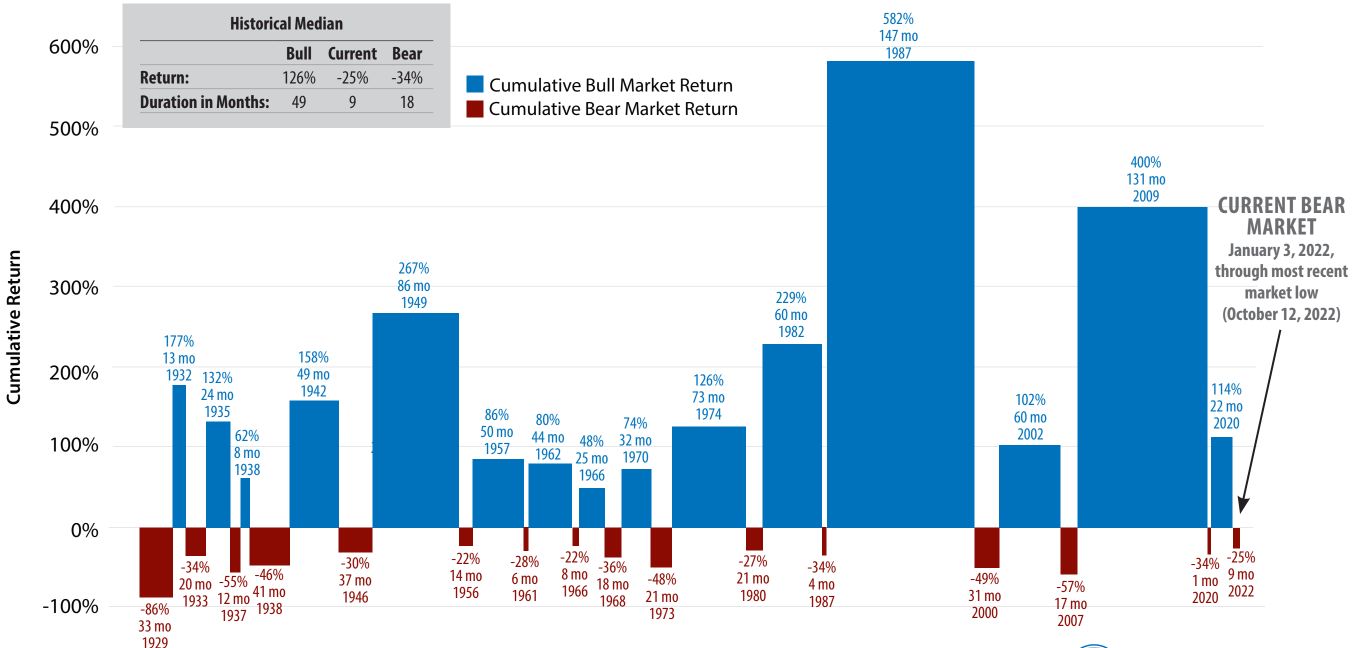
The S&P 500® officially entered a bear market in January 2022. Many believe that a new bull market started in October 2022, though the nature of the rally is uncharacteristic of an early cycle. We are waiting for more data before determining whether a new cycle has begun.

Bull and Bear Markets Since 1928

S&P 500® Index cycle returns: 1928 through August 2023

Historical Median

	Bull	Current	Bear
Return:	126%	-25%	-34%
Duration in Months:	49	9	18



Source: Bloomberg (based on daily closing prices)

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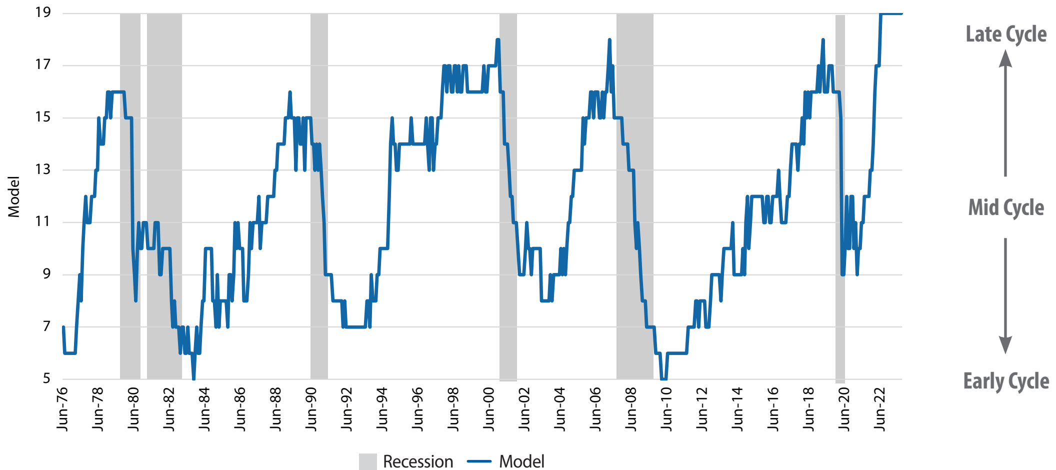
Economic Cycle

The speed of this cycle speaks to the truly unique circumstances surrounding it. Customarily, the economy takes the elevator down and the stairs back up. High levels of cash savings and pent up demand have allowed for a rapid economic recovery. We continue to believe there is a high risk of recession in the next 12 months, which would be consistent with our model indicating late cycle conditions. No recession would indicate limited economic sensitivity to higher interest rates. We believe there are factors that have insulated the economy from higher interest rates, though many of these are related to fiscal policies that are depleting (e.g., savings) or expiring (e.g., student loan forgiveness).

Stage of the Economic Cycle Model*

June 1976 through August 2023



*Model based on Capacity Utilization, Unemployment Rate, Treasury yield spreads, Consumer Confidence Indexes, and Conference Board business cycle indicators

Source: Bloomberg

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Fundamentals

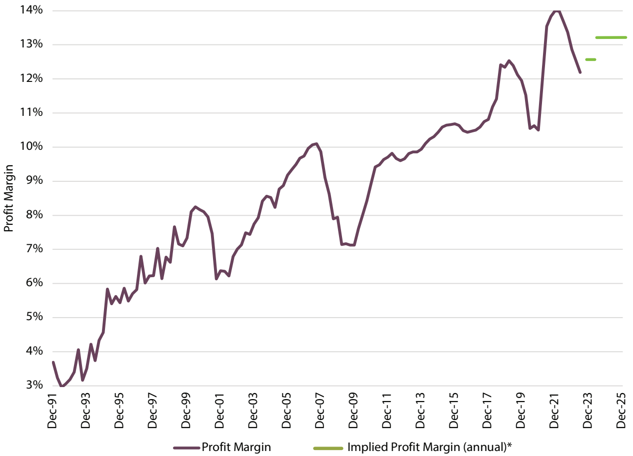
We see earnings growth as the key to the market cycle, with profit margin expansion and contraction being the key source of earnings cyclicality. The previous short bull market saw strong earnings growth with profit margin expansion being the dominant driver. Profit margins rose 300 basis points during that short cycle. The limited ability to expand margins from here is likely to lower longer term EPS growth potential. Our proprietary EPS model suggests that S&P 500® EPS will decline over the next 8 months, though it is showing signs of bottoming.

S&P 500® Index EPS Model

Monthly: March 1996 through August 2023 (EPS) and March 2024 (Model)

S&P 500® Index Profit Margin (trailing 12 months)

Quarterly data: December 1991 through December 2025



The EPS Model is based on the 10 year Treasury yield, Leading Economic Index, and PMI New Orders.

*Based on analysts' annual estimates for revenue and EPS. Source: Bloomberg, S&P Dow Jones Indexes

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Valuation

All valuation measures have their flaws, this is why we use numerous and different measures. Most valuation measures have been rising as the market rally has been unsupported by improving fundamentals.

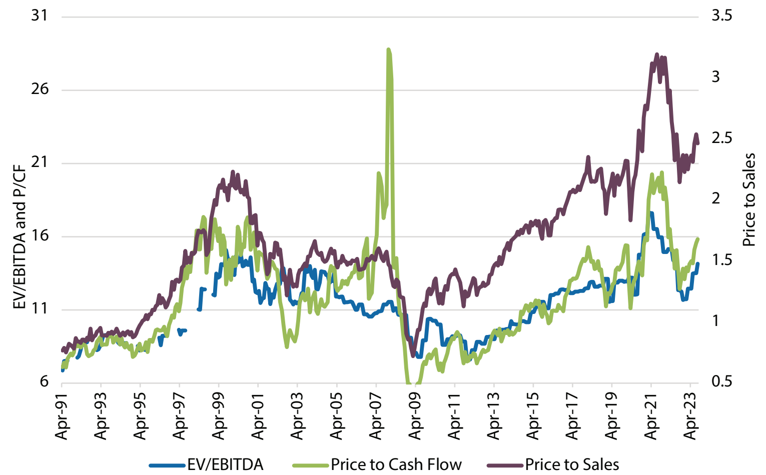
Valuation Measures

Based on the S&P 500® Index
as of August 2023

	Rank 1–5*
Shiller CAPE**	5
Trailing EV/EBITDA	5
Trailing Price/Cash Flow	4
Trailing Price/Sales	5
10-Year Treasury Yield	4
Profit Margin	5
Summary Signal (Average)	**4.7**

S&P 500® Index Valuation Multiples

Monthly data: April 1991 through August 2023



* Ranked 1 through 5, with 5 representing historically high levels

** Cyclically Adjusted Price-to-Earnings ratio. It is the current S&P 500® Index price divided by the 10-year moving average of earnings adjusted for inflation

Sources: Bloomberg, Robert Shiller – Yale University

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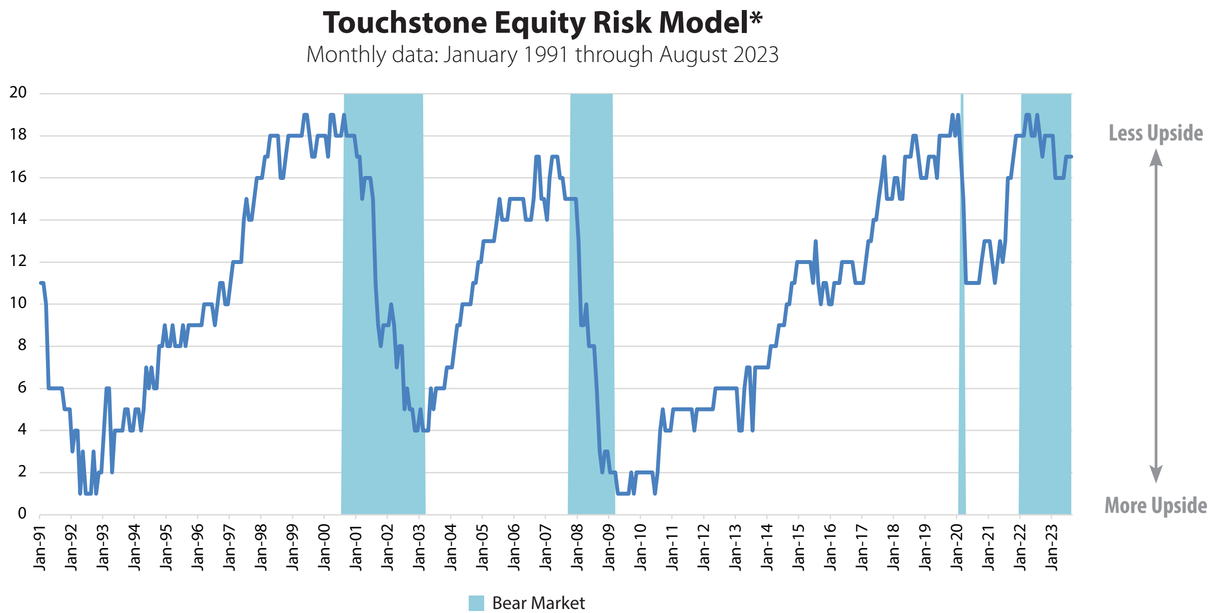
Touchstone Equity Risk Model

The Touchstone Equity Risk Model brings together the economic cycle, market fundamentals, and valuation considerations (depicted in previous sections). It is a way to measure potential upside based on fundamentals, though we recognize that sentiment can carry the market beyond what the fundamentals suggest. While the model has improved modestly, it continues to suggest caution.



* Risk Model based on S&P 500® Index valuation metrics (EV/EBITDA, P/S, P/CF) and profit margin, Unemployment Rate and Term Spread.

Sources: Bloomberg, Touchstone Investments

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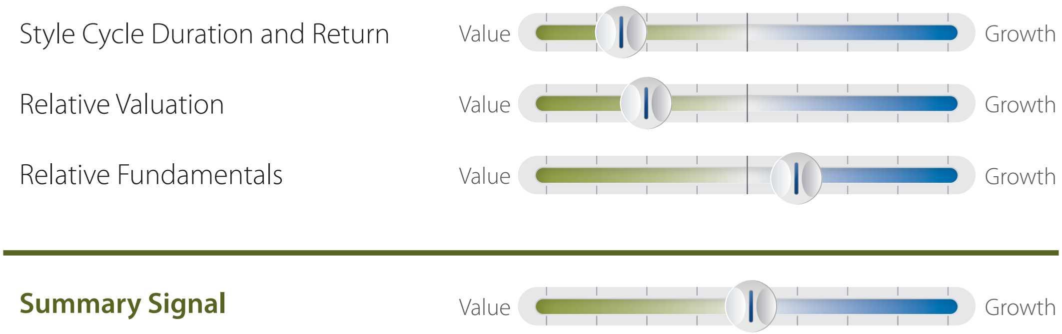
Style Drivers



Conclusion: Both Value and Growth stocks declined in 2022, though Growth stocks fell much further than Value stocks. Growth stocks have recaptured some of those relative losses year-to-date. But just like the broad market, the performance within the Growth index has been very narrow with the 10 largest stocks accounting for nearly all of the gains. The vast majority of these gains have come from P/E multiple expansion as opposed to rising earnings estimates. Admittedly, capturing the swings between Growth and Value has been a struggle; we remain comfortable maintaining equal exposure to both styles until we get better visibility on the fundamental drivers.

Style Cycle Duration and Return

Value | Growth

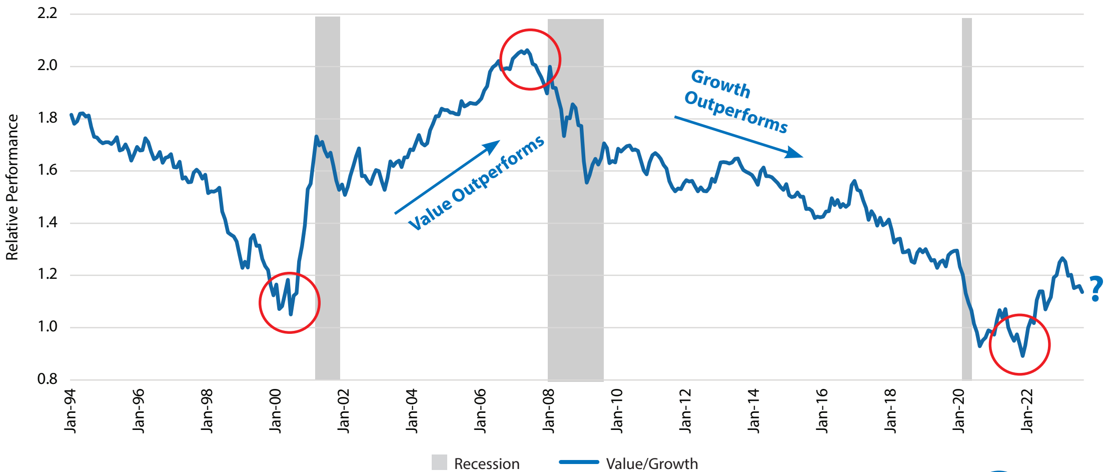
Historically, style leadership changes have typically occurred near the end of an economic cycle. This did not occur in the COVID-19-driven downturn. We believe this is due in part to the nature of the environment that materially benefited many Growth companies and had the opposite effect on many Value companies. The pandemic may have delayed the transition.

Recently, the relative performance of the Value Index moved up through a long-term downward trendline, which could indicate the beginning of a more sustainable period of outperformance, though we would want to see some relative earnings strength for confirmation.

Value Versus Growth

S&P 500® Value Index/S&P 500® Growth Index

Monthly data: January 1994 through August 2023



Sources: Bloomberg

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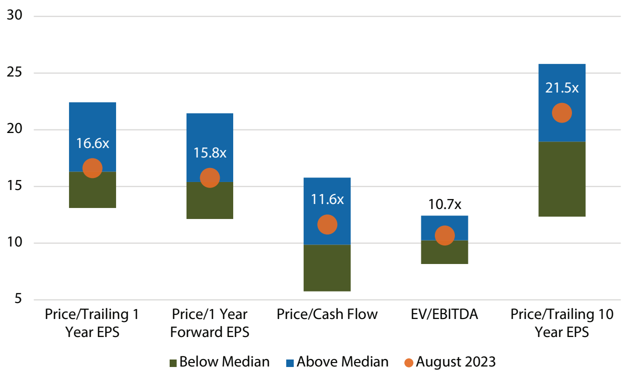
Relative Valuation

Comparative valuation is difficult, as Value sectors and stocks tend toward valuation measures that differ from Growth sectors and stocks. In recognition of this, we have incorporated a number of different valuation measures. While relative valuation certainly leans Value, on an absolute basis the Value index is not cheap relative to its own history.

Valuation Ranges*

Russell 1000® Value Index

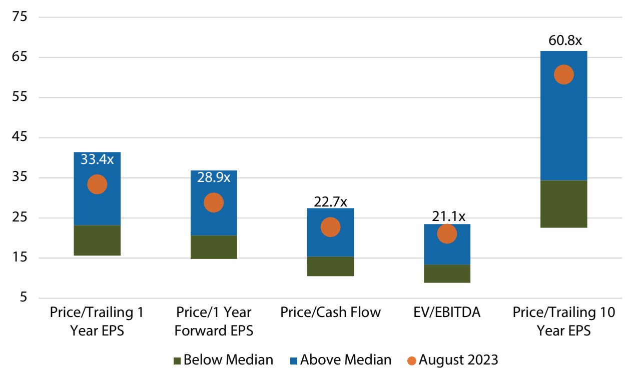
Monthly data: January 1996 through August 2023



Valuation Ranges*

Russell 1000® Growth Index

Monthly data: January 1996 through August 2023



* Valuation ranges date back to 1996. The minimum and maximum ranges are set to the 5th and 95th percentiles, respectively, to remove outliers.

Sources: Frank Russell Company, Bloomberg

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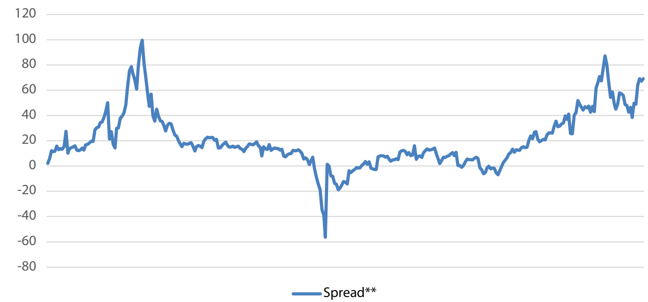
Relative Fundamentals

- Generally, relative price performance follows relative earnings. It is difficult to compare earnings between the Growth and Value indexes as the Value index has both cyclical (e.g., Financials) and defensive (e.g., Utilities) stock exposure while the Growth index is composed of mostly less cyclical companies.
- It is interesting to note that Value's outperformance in 2022 was not accompanied by relative earnings strength. This is consistent with the notion that Growth stocks underperformed as they repriced lower due to higher interest rates and not a change in relative fundamentals. This year, through August, the relative earnings trend has slightly favored the Growth index, though it doesn't explain the magnitude of Growth's outperformance.

Russell 1000® Growth Index / Russell 1000® Value Index

Monthly data: April 1996 through August 2023



*Normalization adjusts or rescales the values of different time series to a notionally common scale to allow for comparability.

**The spread is the difference in the normalized units in the chart above.

Sources: Frank Russell Company, Bloomberg

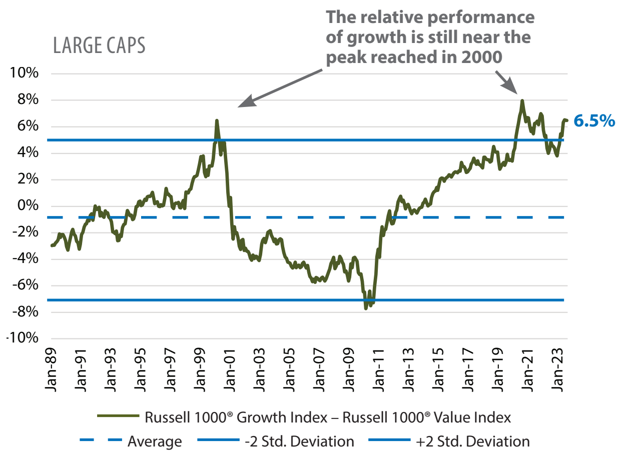
Value Poised to Do Better?

On a rolling 10 year basis, the Growth indexes continue to dominate. Historically, Value has outperformed, as the average for both charts is below zero. Will there be a reversion to the mean? Small caps have been demonstrating a greater predilection toward mean reversion versus large caps.

Annualized Trailing 10-Year Relative Total Return

Russell 1000® Growth Index - Russell 1000® Value Index

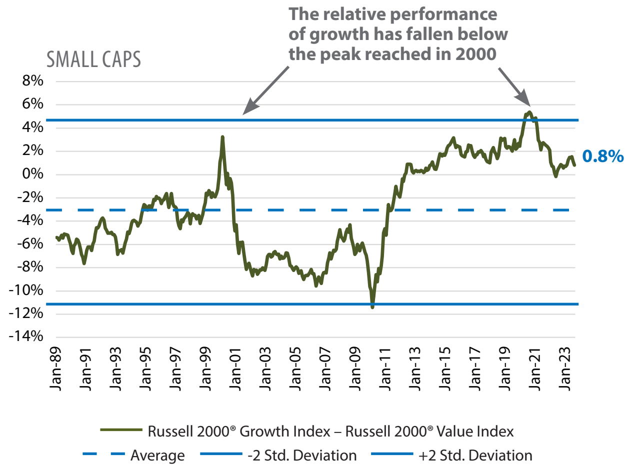
Monthly data: January 1989 through August 2023



Annualized Trailing 10-Year Relative Total Return

Russell 2000® Growth Index - Russell 2000® Value Index

Monthly data: January 1989 through August 2023



Source: Frank Russell Company

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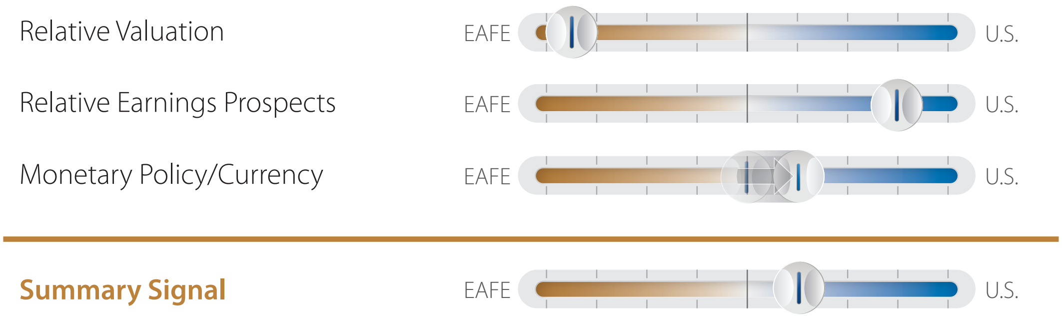
International Developed (EAFE) versus U.S.

Investing in developed international stocks has historically provided investors with:

- Diversification: portfolios that included international stocks have historically produced higher risk-adjusted returns (Flavin and Panopoulou).
- Opportunity: 76% of publicly traded companies are not U.S.-based (Source: MSCI) and 40% of the global market cap resides outside of the U.S. (Source: Bloomberg). Why limit equity exposure to just a fraction of the total market opportunity set?

But why now…



Conclusion: We moved to an EAFE underweight at the start of Russia's invasion of Ukraine. While relative valuation remains attractive, we see near-term risk to relative earnings prospects. We are also concerned about tighter monetary conditions in Europe as core inflation remains high, while economic growth slows.

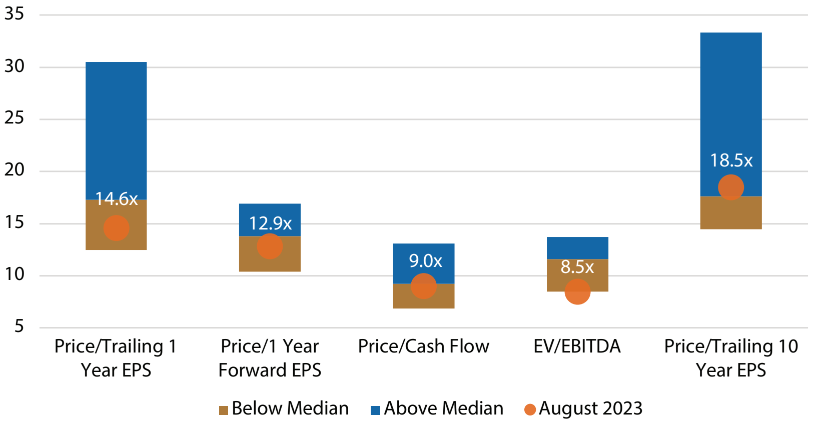
Relative Valuation

Relative valuation in a historical perspective clearly favors EAFE, and versus its own history, our combined valuation measures rank the MSCI EAFE Index in the bottom third. For the active manager, we believe there may be opportunities to uncover, but we also recognize that the risk profile has also increased, partly offsetting the valuation differential.

Valuation Ranges*

MSCI EAFE® Index

Monthly data: January 1996 through August 2023



*Valuation ranges date back to 1996. The minimum and maximum ranges are set to the 5th and 95th percentiles, respectively, to remove outliers.

Sources: Bloomberg, MSCI

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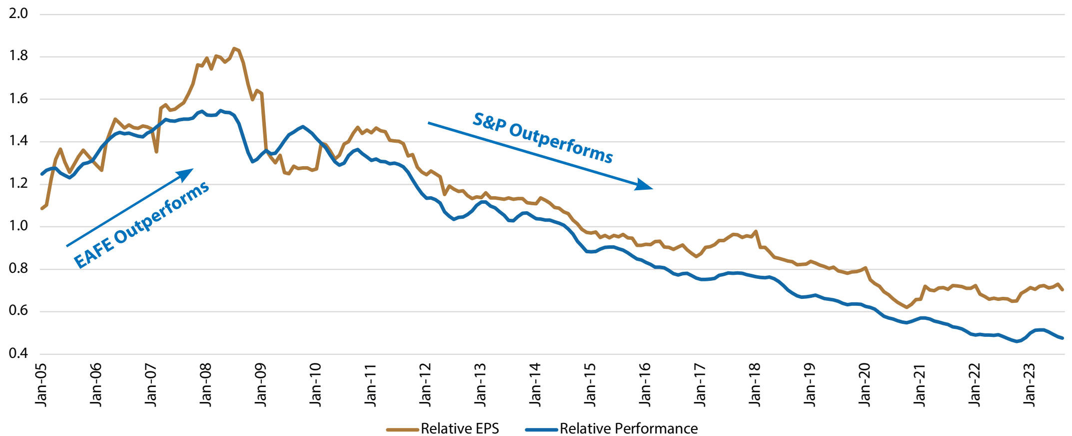
Relative Earnings Prospects

- Relative price performance and relative earnings growth have historically followed a similar path. Relative earnings growth since mid-2008 has favored the S&P 500® Index versus the MSCI EAFE® Index.
- After some relative gains in 2022, MSCI EAFE forward earnings have simply kept pace with the S&P 500®. These earnings measures, though, are in U.S. dollars. In local currency terms, MSCI EAFE earnings have done slightly better, namely due to stronger growth out of Japanese equities. European equities have benefited from price increases, though we question the sustainability of these gains, especially given signs of economic weakness.

Relative Earnings*

MSCI EAFE® Index/S&P 500® Index

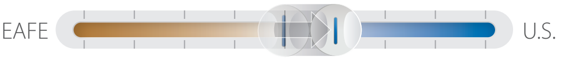
Monthly data: January 2005 through August 2023



*In U.S. dollars.

Sources: Bloomberg, MSCI

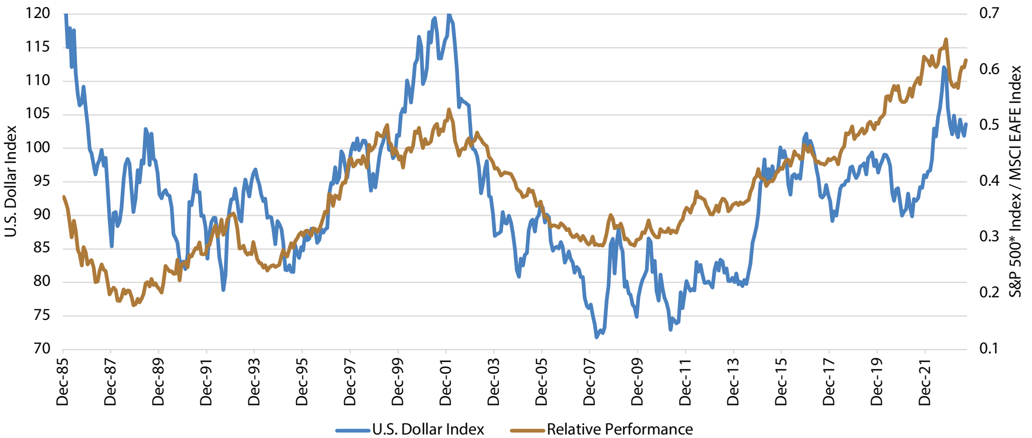
Monetary Policy/Currency



- Historically the U.S. dollar typically moves directionally with U.S. stock relative performance. A sustained period of U.S. dollar weakness would provide a tailwind for international stocks.
- The dollar has been relatively stable this year versus the pound and euro. This is mainly due to similar monetary policy tightening paths. The inflation picture in the U.S. looks better than for Europe, which is helping the dollar.
- The yen, though, has been quite weak as the Japanese central bank has been maintaining a much looser policy stance. The Bank of Japan has started a measured relaxing of its yield curve control policy.

Currency and Relative Performance

Monthly data: December 1985 through August 2023



Sources: Bloomberg, Intercontinental Exchange

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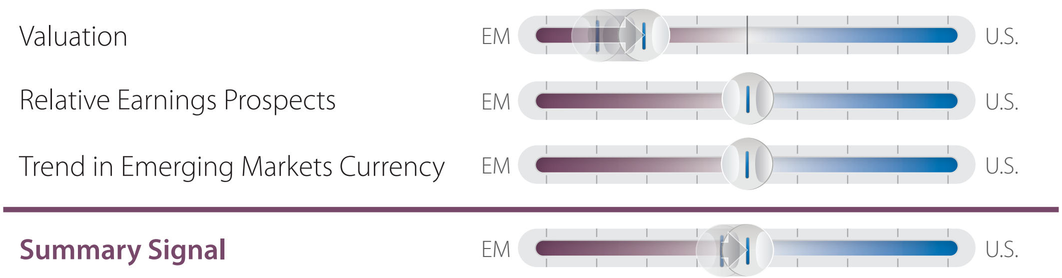
Emerging Markets versus U.S.

We believe equity investors should consider emerging market stock exposure due to the following more secular qualities:

- Diversification: portfolios that included emerging market stocks have historically produced higher risk-adjusted returns (Bouslama and Ouda).
- Relative Economic Growth: Emerging markets are expected to account for 70% of global economic growth through 2025 with middle class spending growth being the main driver (McKinsey & Co).
- Growing Middle Class: by 2025 emerging market consumption will represent approximately half of global consumption (McKinsey & Co).
- Equity Market Expansion: Emerging market equities represent only 11% of global equity market capitalization (Source: MSCI), yet their economies represent approximately 45% of global GDP (Source: International Monetary Fund).

But why now…?



Conclusion: We removed our overweight after seeing signs that China's rebound was losing steam. China's growth prospects have stalled with a property sector slowdown, weak exports, and consumers choosing savings over spending. But the government has the capacity to add stimulus, valuations are low, and sentiment is very negative. Outside of China, the picture is brighter as inflation recedes and pressure from the Fed is likely done.

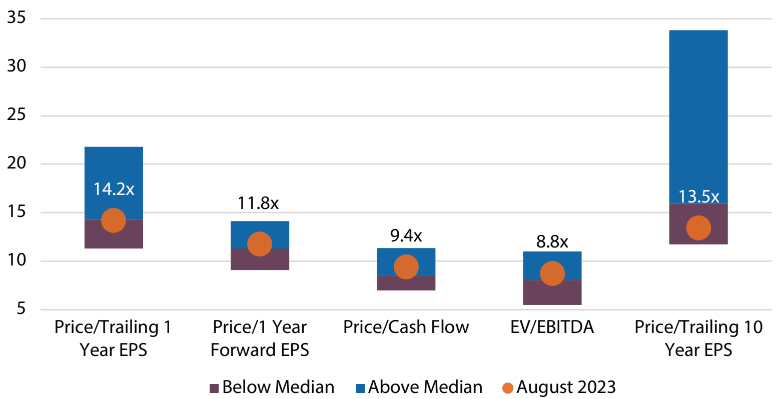
Valuation

- Emerging markets have historically experienced significant price swings, creating large valuation peaks and valleys. Currently, the MSCI Emerging Markets Index looks attractive relative to the S&P 500® Index. On a price-to-trailing-10-year-earnings basis, which smooths earnings cycles, the MSCI Emerging Markets Index traded at 13.5x versus 33.5x for the S&P 500® Index (as of August 31, 2023).
- Relative to its own history, the MSCI Emerging Markets Index is generally trading below its historical medians. It should be noted that the composition of the Index has changed fairly dramatically over the last 10 years, making historical comparisons more difficult. The absolute levels of the various valuation measures are well below those of developed market indexes.

Valuation Ranges*

MSCI Emerging Markets Index

Monthly data: January 1996 through August 2023



*Based on monthly data starting in 1996. The minimum and maximum ranges are set to the 5th and 95th percentiles, respectively, to remove outliers.

Sources: Bloomberg, MSCI

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Relative Earnings Prospects

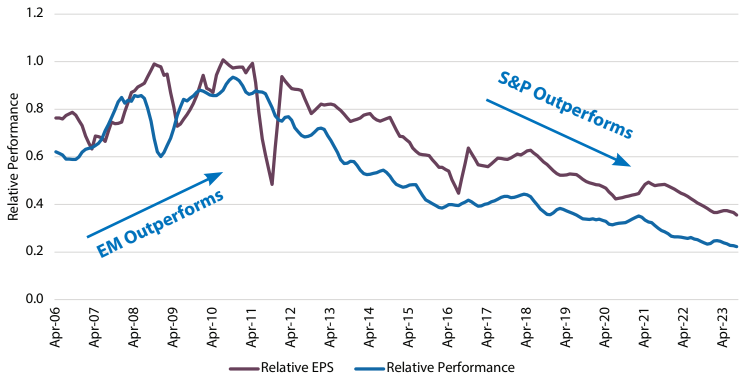
EM U.S.

- Relative price performance and relative earnings growth have historically followed similar paths. S&P 500® Index earnings have been outpacing MSCI Emerging Markets Index earnings since 2008, helping explain S&P 500® Index outperformance. Compositional changes to the EM Index (not fundamentals) explain much of this underperformance, and they are unlikely to be repeated.
- MSCI EM earnings are down 20% from their 2022 peak and are below where they were in 2019. While disappointing, we believe that when the global economy begins to turn up, EM is likely to lead the way with strong earnings growth.

Relative Earnings

MSCI Emerging Markets Index/S&P 500® Index

Historical EPS: monthly data: April 2006 through August 2023



Sources: Bloomberg, Bloomberg Consensus Estimates, MSCI

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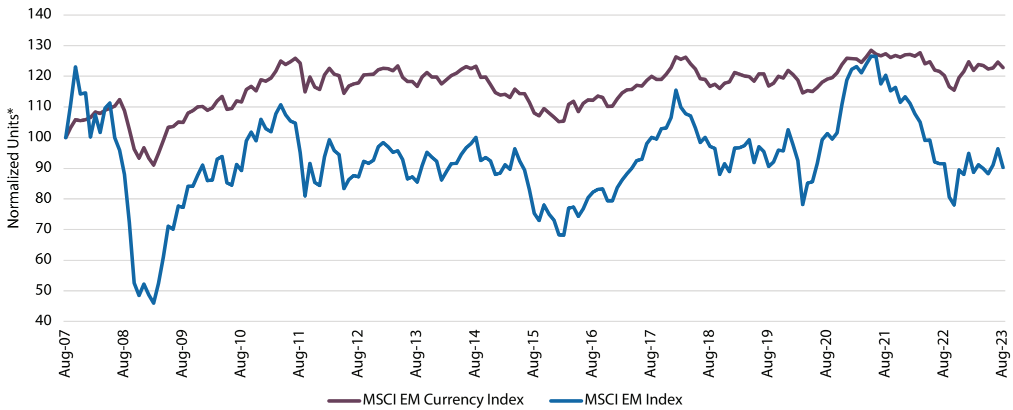
Trend in Emerging Markets Currency

EM U.S.

- The MSCI Emerging Markets Index is quoted in U.S. dollars (USD). As such, currency shifts between the USD and emerging markets currencies will impact returns directly, though it is interesting to note that over the last 10 years, the dollar has been much less volatile versus emerging markets than versus developed markets.
- While the USD has moved higher relative to developed country currencies, the move has been much more modest versus emerging markets. This is despite more hawkish signals from the Fed and the war in Ukraine. In the past, this type of stress would be more apparent in the emerging markets. Emerging markets have held up through the pandemic and now slowing monetary tightening and inflation is suggestive of a generally more stable emerging markets landscape.

Emerging Markets Stock and Currency Indexes

Monthly data: August 2007 through August 2023



*Normalization adjusts or rescales the values of different time series to a notionally common scale to allow for comparability.

Source: MSCI

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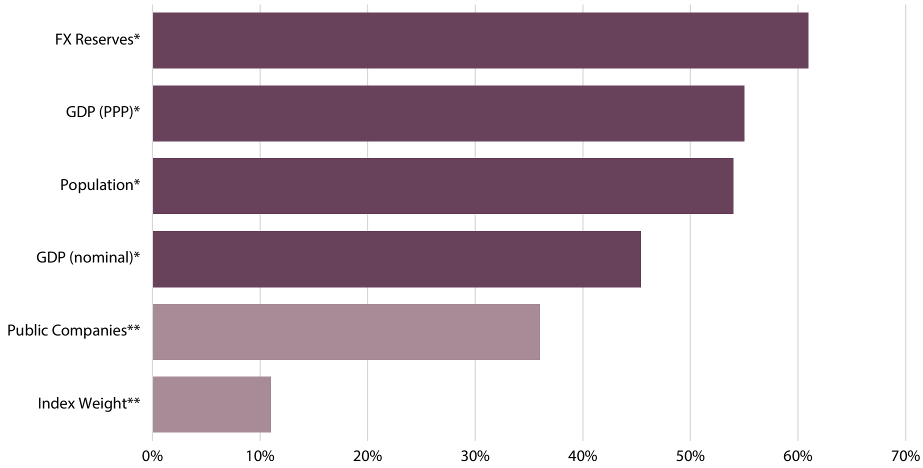
Emerging Markets Perspective

The emerging market equity index weight is under-represented in a global context given their relative size by other measures.

In March, MSCI removed Russia from the Emerging Markets Index. This led to a significant drop in the number of companies in the Index and a more modest decline in the index weight. We also adjusted the gross domestic product (GDP) and population estimates, using 2021 estimates from the International Monetary Fund (IMF).

Emerging Markets as a Percent of the World



Sources: *International Monetary Fund (IMF) (2017, 2021), **MSCI (August 2023)

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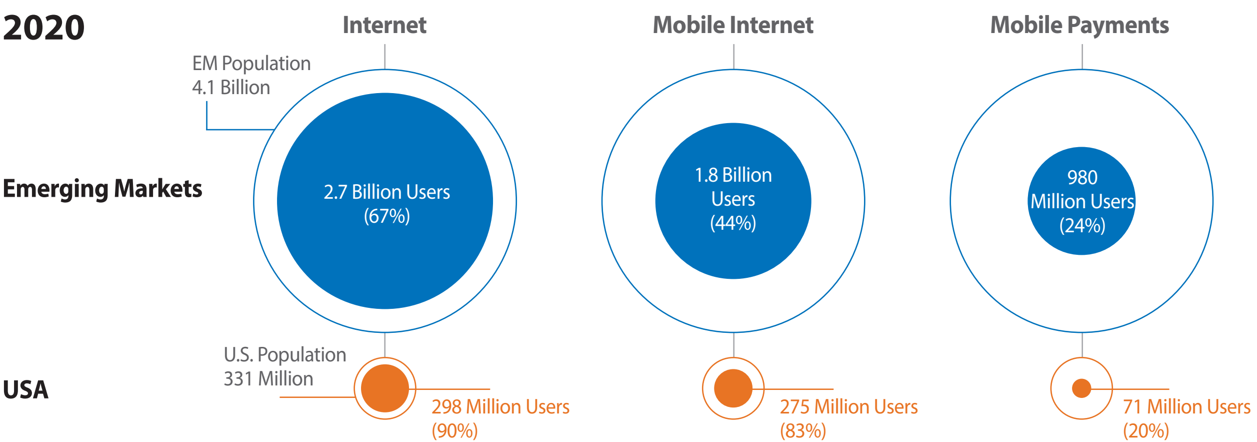
Emerging Markets Perspective

One of the biggest growth opportunities for emerging markets relates to the smartphone. It is not the smartphone itself, but all the applications and industries that come along with it. Just think about when the automobile became ubiquitous and all the industries it created that didn't exist prior—from highways to gas stations, fast food chains, housing (suburbs), billboards, motels, and many other businesses not directly associated with making cars. The smartphone is having a similar impact and it remains an underpenetrated market in emerging markets. The following chart creates perspective on not just the penetration, but also the sheer size of the emerging markets. Another factor to consider when looking at this chart is that a user is not an owner. It is not unusual for a whole family in an emerging market to share one smartphone, but each family member will still be counted as a separate user. As such, these rates likely overstate the true level of market penetration.



Sources: World Bank, DataReportal, VentureBeat, Juniper Research, SPMP Research, Pew Research

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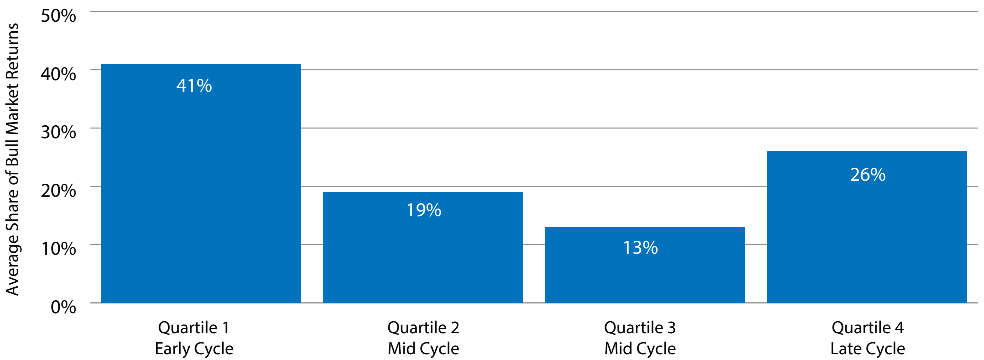
In this section, we include charts and concepts that are not necessarily thematic in nature and may, at times, even be in contrast to our own views. Some of these charts are sourced from our sub-advisors who allow for differentiated insight into a variety of asset classes on a global scale. Others we have sourced ourselves as we find them compelling and may reflect views that are somewhat unique and may not be emphasized by the financial media.

Phase Shift

This cycle is unique and difficult to characterize. It has also moved at a very rapid pace. We use a number of economic signals to help gauge where we are in the cycle, and today, those signals cover the gambit, from very early cycle, to late cycle, and many in between. Our Economic Cycle Model suggests we have moved into the late cycle. Signs such as an inverted yield curve and even characteristics of the market rally off October 2022 lows are consistent with the late cycle. We don't believe this rally is the start of a new bull market. Possibly, it is a rally within an extended bear market, or, after pandemic interruption, we are back at the late cycle conditions of 2019.

S&P 500® Index Full Bull Market* Total Return Allocation by Quartile Since 1935



*Our definition of a bull market is met when the market has produced a return of approximately 30% from the trough and is sustained for at least 6 months.
Source: Bloomberg

The Search for Yield

When trying to understand current low Treasury yields, we explored a number of different fundamental Treasury models. The Model below has been historically robust. It is important to recognize that the unique circumstances surrounding the pandemic could mean this historically derived Model is currently less informative. Our bond yield model has moved up with 2-year Treasury yields and inflation. It appears the 10-year bond yield may have peaked, as our model has not made new highs.

10-Year Treasury Bond Yield Model

Based on monthly observations: June 1976 through August 2023

*Model based on: Core CPI, Unemployment Rate, Federal Funds Rate, 2-year Treasury yield.

Source: Bloomberg

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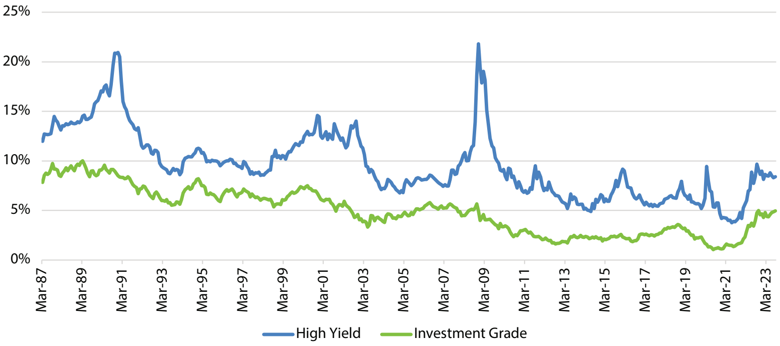
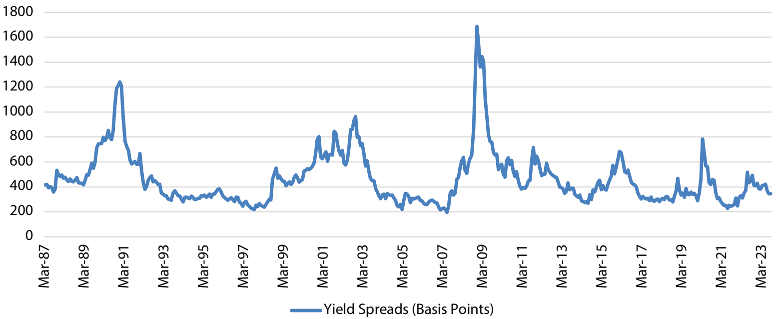
The Search for Yield

The relative yield gain from moving out the credit spectrum doesn't appear that attractive given tight monetary policy conditions and increased risk of economic slowing. We are putting more emphasis on higher quality credit.

Yield to Worst

Based on monthly observations: March 1987 through August 2023





Source: Bloomberg

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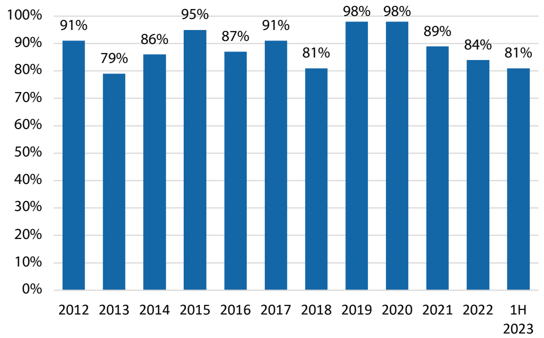
Active versus Passive

While the S&P 500® Index has outperformed the MSCI EAFE® and Emerging Markets indexes over the last cycle, international stocks still represent a healthy hunting ground for active managers given the consistently high representation in the top 100 performing stocks.

The weight of the top 10 stocks in the S&P 500® Index reached a new high in September of 2020, representing 34% of the Index's market cap. With the top 10 stocks accounting for most all of the performance year-to-date, it is not surprising that their weight in the index has increased.

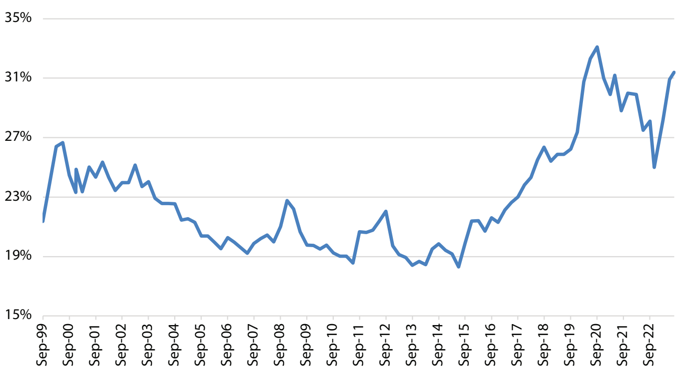
Percent of Non-U.S. Stocks in Top 100*

2012 through June 2023



Weight of Top 10 Stocks in S&P 500® Index

Quarterly data: September 1999 through August 2023



*For the following indexes: S&P 500® Index, MSCI EAFE®, MSCI Emerging Markets, the top 100 represents the stocks with the highest total return in each year.

Source: Bloomberg

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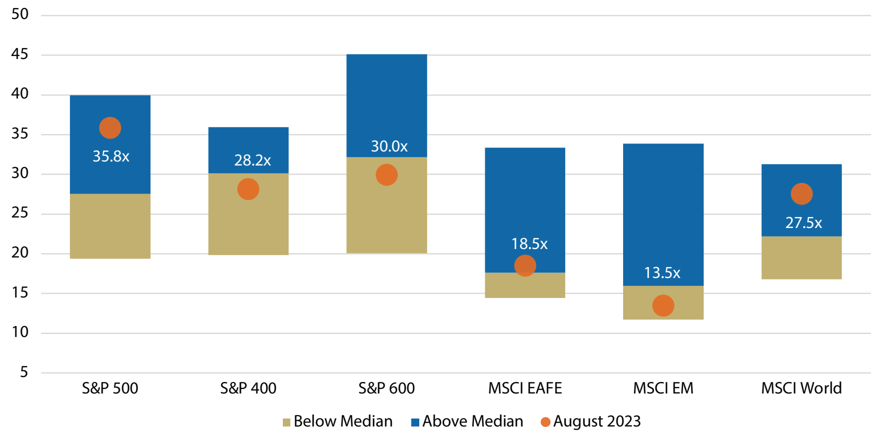
Valuations Around the World

As a reference, we provide valuation measures for various domestic and international indexes. The valuation range dates back to 1996.

Price to Trailing 10-Year EPS*

Monthly data: January 1996 through August 2023



* The minimum and maximum ranges are set to the 5th and 95th percentiles, respectively, to remove outliers.

Sources: Bloomberg, MSCI, S&P, Dow Jones Indexes

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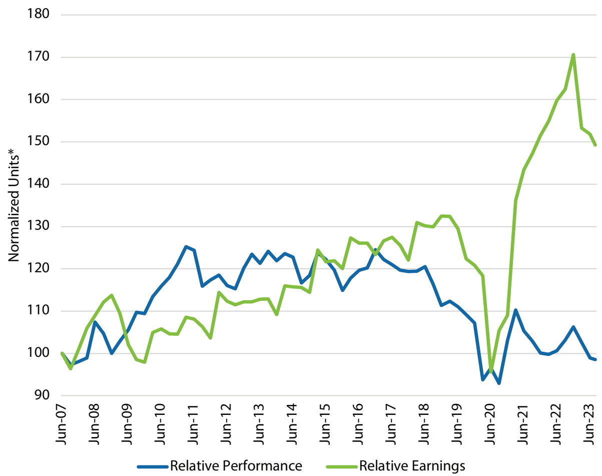
The Mid-Cap Gap

Mid cap earnings rebounded relative to large cap, but they have yet to pull relative prices up with them. It is important to note that this relative underperformance year-to-date is simply a function of the strength of the top stocks in the S&P 500®. The S&P 400® Index has outperformed the equal weighted S&P 500® Index to-date through August. The mid-cap index earnings have been mainly helped by less international exposure.

Looking at valuations, historically current low valuations have led to healthy longer term returns.

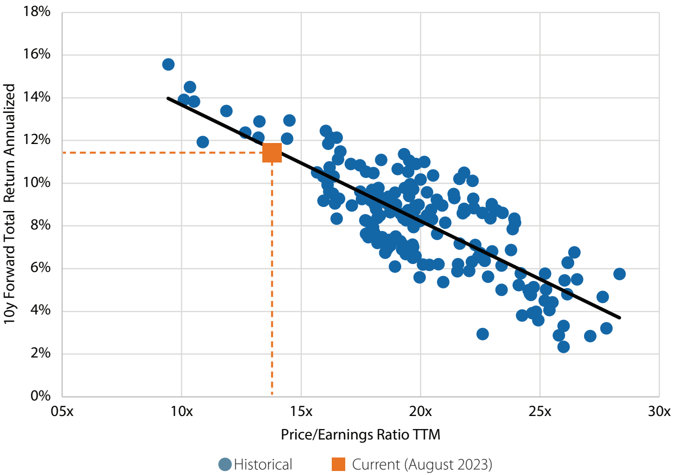
S&P 400® Index/S&P 500® Index

Quarterly data: June 2007 through August 2023



S&P 400® Index Valuation and Subsequent Returns

Historical monthly observations: October 1998 through August 2023



*Normalization adjusts or rescales the values of different time series to a notionally common scale to allow for comparability.

Source: Bloomberg.

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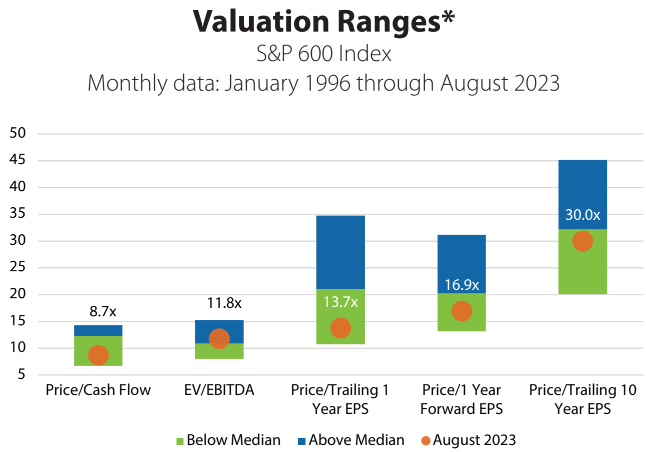
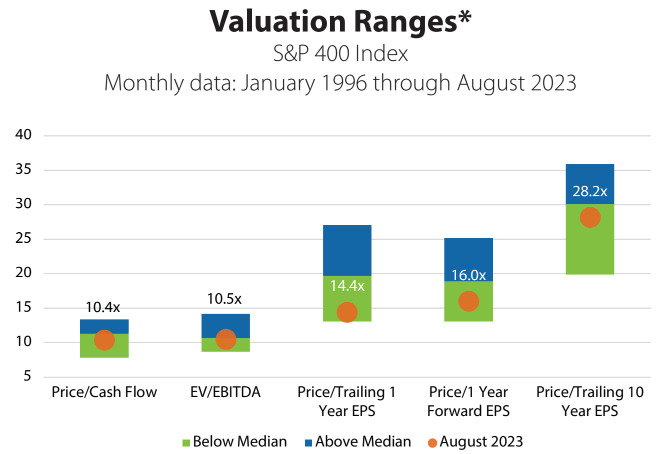
Small and Mid-Cap Valuations

Small and Mid-Cap valuations appear very attractive versus history based on the S&P Indexes.





*Based on monthly data starting in 1996. The minimum and maximum ranges are set to the 5th and 95th percentiles, respectively, to remove outliers.

Source: Bloomberg

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- Eugene Fama & Kenneth French, The Cross Section of Expected Stock Returns, Journal of Finance, June 1992
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Investment Terms

Asian Financial Crisis: The Asian financial crisis took place between 1997 and 1998. While there remains much debate about the specific causes, the crisis encompassed much of Southeast Asia starting in Thailand and expanding to South Korea, Singapore, Malaysia, Indonesia and the Philippines. The crisis caused significant currency devaluations, debt defaults, and market crashes. Earnings fell significantly in these markets and were further reduced when translated into U.S. dollar terms.

Average Hourly Earnings: The Bureau of Labor Statistics calculates average hourly earnings based on payroll data and are computed by dividing the total worker payroll for the U.S. by the sum of total worker hours and one-half of total overtime hours.

Average Interest Coverage Ratio: The "average" refers to the arithmetic mean, the sum of the numbers divided by how many numbers are being averaged. The Interest coverage ratio measures how many times over a company could pay its current interest payment with its available earnings. It measures the margin of safety a company has for paying interest during a given period, which a company needs in order to survive any financial hardship that may arise. A company's ability to meet its interest obligations is an aspect of a company's solvency, and is thus a very important factor in the return for shareholders.

Bank Lending Survey: Bank Lending Surveys (also known as Senior Loan Officer Surveys) attempt to track bank lending conditions within a specific economy. The Commercial and Industrial (C&I) business survey measures the tightening or loosening of lending standards to both large and small C&I businesses and is conducted among senior loan officers at lending institutions by the Federal Reserve. A diffusion index is created with the results whereby a number above zero indicates a tightening trend while a number below zero indicates a loosening trend in bank lending conditions.

Bear Market Cycle: We define a bear market cycle as one that covers a period of time where the equity market (as measured by the S&P 500® Index) falls at least 20 percent from a peak and does not recover for at least three months. The trough is established by the start of the next bull market. The bear market captures the period between the market peak and trough.

Bloomberg High Yield Option Adjusted Spread: The Bloomberg High Yield Option Adjusted Spread looks at the yield spread between the Bloomberg High Yield Index and the duration equivalent Treasury bond yield and then adjusts for any call features.

Bull Market Cycle: We define a bull market cycle as one that covers a period of time where the equity market (as measured by the S&P 500® Index) rises approximately 30 percent from the trough and lasts until the next bear market begins. The bull market cycle spans from the previous bear market trough to bull market peak.

Capital Goods Orders: Measures the dollar value of new orders for manufactured goods. Orders for aircraft and defense are excluded to control for the volatile impact of large single orders of items such as an airplane or ship. These orders provide an indication of future capital spending.

Investment Terms (continued)

Capital Spending Survey: A survey conducted by the NFIB Research Foundation of small businesses provides an indication of future capital outlays over the coming six months. The survey provides and indication of future capital spending by smaller businesses, which tend to be more economically sensitive.

Cash Flow: A measure of cash generated by a company's regular business operations. We use a trailing four quarter sum of cash flow.

CBOE Volatility Index (VIX): A measure of market expectations of near-term volatility conveyed by S&P 500® stock index option prices. Expected volatility is measured by averaging the weighted prices of S&P 500® puts and calls over a wide range of strike prices. The VIX is quoted in percentage points and reflects the implied movement in the S&P 500® over the next 30 days, which is then annualized (with the assumption of a 68 percent probability, i.e., one standard deviation). For example a VIX of 20 implies an expectation that the S&P 500® will rise or fall by less than 20 percent over the next year, with a 68 percent likelihood.

Collateralized Loan Obligation: A collateralized loan obligation is a security backed by a pool of debt, often low-rated corporate loans (aka leveraged loans or floating rate loans). A CLO manager purchases the individual loans, bundles the loans together and then sells stakes in the CLO to outside investors.

Consumer Price Index for All Urban Consumers: All Items Less Food & Energy: An aggregate of prices paid by urban consumers for a typical basket of goods, excluding food and energy. This measurement, known as "Core CPI," is widely used by economists because food and energy have very volatile prices. The Bureau of Labor Statistics defines and measures the CPI.

Convexity: As interest rates change, a bond's duration changes. Convexity measures the sensitivity of a bond's duration to changes in yield. A bond with positive convexity indicates that duration increases as the interest rates declines. In other words, a bond with positive convexity will see a larger increase in price due to a decline in yield than indicated solely by duration.

Credit Spread: A credit spread is the difference in yield between debt securities of the same maturity but different qualities. Credit spreads are measured in basis points, with a 1 percent difference in yield equal to a spread of 100 basis points.

Diversification Ratio: Measures to what extent a portfolio is diversified. Technically the diversification ratio is the ratio of the weighted average of the volatilities of each stock in a portfolio divided by the volatility of the portfolio as a whole.

Duration: A measure of sensitivity of the price of a bond to interest rate changes. Technically it is an estimate of the number of years it will take to receive the bond's price from the total cash flows.

Enterprise Value (EV): A more comprehensive measure of a company's value by including net debt with equity. The calculation adds the equity market value to total debt outstanding and subtracts any cash.

Investment Terms (continued)

EBITDA stands for Earnings Before Interest, Taxes, Depreciation, and Amortization and acts as a rough estimate for the amount of cash generated in a given time period. We use a trailing four quarter time period for our calculations.

Eurozone: Europe is defined as the 28 nations within the European Union. Nineteen of those nations currently use the euro as their currency, and the European Central Bank (ECB) serves as the central bank for these countries. These 19 nations are collectively known as the Eurozone nations. The Eurozone nations include: Germany, France, Italy, Spain, the Netherlands, Belgium, Austria, Greece, Finland, Portugal, Ireland, Slovakia, Slovenia, Luxembourg, Latvia, Cyprus, Estonia, Malta and Lithuania.

Eurozone Money Supply M1: Money supply is a measure of the amount of monetary assets outstanding. Measures of money supply differ in liquidity, or ease of access. M1 is considered one of the narrowest measures of money supply as it includes only those monetary assets that can accessed immediately. M1 includes cash and checking accounts. Narrower measures of money like M1 are believed to be most directly influenced by monetary policy actions.

Eurozone Economic Sentiment: The Economic Sentiment Indicator is calculated from the European Commission's Business and Consumer Surveys. It is constructed from the following indicators: the industrial confidence indicator (40 percent), the service confidence indicator (30 percent), the consumer confidence indicator (20 percent), the construction confidence indicator (5 percent) and the retail trade confidence indicator (5 percent).

Eurozone Industrial Production: Industrial production measures the output of industrial establishments in the following industries: mining and quarrying, manufacturing and public utilities (electricity, gas and water supply). Production is based on the volume of the output.

FX Reserves: Foreign exchange reserves is money or other assets held by a monetary authority (or central bank).

Inflation: A general increase in prices and fall in the purchasing value of money. Inflation is generally measured by comparing the price of a basket of goods with the price of a similar basket in past periods.

Intercontinental Exchange (ICE) U.S. Dollar Index: The ICE U.S. Dollar Index is a measure of the value of the U.S. dollar relative to a basket of foreign currencies. The index is a geometrically averaged calculation of six currencies weighted against the U.S. dollar. The index was established in 1973 and includes six currencies: the Euro, Japanese yen, British pound, Canadian dollar, Swedish krona and Swiss franc.

Leveraged Loan: A leveraged loan is debt from companies with below investment grade credit ratings. Leveraged loans are typically secured with a lien on the company's assets and are generally senior to the company's other debt. The vast majority of leverage loans are floating-rate instruments that periodically reset to a spread over a base rate (typically LIBOR). Leveraged loans are first structured, arranged, and administered by one or several commercial or investment banks, known as arrangers. They are then sold (or syndicated) to other banks or institutional investors. Leveraged loans can also be referred to as senior secured credits, bank loans, and floating-rate loans.

Investment Terms (continued)

Modified Adjusted Duration: Modified Adjusted Duration is a measure of the sensitivity of a bond to changes in interest rates. This measure can be used to estimate the effect of a 100 basis point (1 percent) change in interest rates will have on the price of a bond. The calculation of modified adjusted duration takes into account any bond option provisions.

Monetary Policy: Monetary Policy is the macroeconomic policy laid down by the central bank. It involves management of money supply and interest rate and is the demand side economic policy used by the government of a country to achieve macroeconomic objectives like inflation, consumption, growth and liquidity.

Money Supply – M2: The Federal Reserve publishes data on two measures of money supply, M1 and M2. M2 is the broader measure of money. M1 is mostly made up of currency and checking accounts – the most liquid assets. M2 includes M1 plus other transaction accounts that can be readily accessed with little or no loss of principal such as savings accounts, money market accounts, and small denomination time deposits.

Mortgage Applications: As measured by the Mortgage Bankers Association through a survey covering 75% of U.S. mortgage applications originated through retail and consumer direct channels. It does not distinguish whether the application is for a new loan or the refinancing of an existing loan.

National Federation of Independent Business Small Business Optimism Index: Known as a leading index, it is based on a survey of small business owners covering 10 different components that include hiring plans, expansion plans, credit conditions, and inventory levels.

Nominal GDP: Nominal gross domestic product (Nominal GDP) is calculated by the Bureau of Economic Analysis that serves as a measure of total market value of the goods and services produced (output) in the U.S. (un-adjusted for price changes). Nominal GDP is the sum of consumer spending, investments made by industry, the excess of Exports over Imports and Government Spending.

Normalized Unit: Normalization adjusts or rescales the values of different time series to a notionally common scale to allow for comparability.

Option Adjusted Spread: Attempts to measure the additional yield received for taking credit risk. It is the difference between the yield to worst on a bond and the duration equivalent yield on a risk free bond.

Par Weighted Price: Weights the price of each bond by its relative size in the index. It indicates whether the index is generally selling at prices above or below face value which can influence interest rate sensitivity.

PPP: Purchasing Power of Parity is a theoretical concept that adjusts a currency value for its purchasing power in another country and currency. For example, a basket of goods is purchased in U.S. and then the same basket of goods is purchased in China in Yuan. The PPP of the Yuan would be the exchange rate between the U.S. dollar and Yuan that would make that basket of goods cost the same.

Profit Margin (S&P 500® Index): Trailing 12-month Earnings before extraordinary items divided by trailing 12-month Sales.

Investment Terms (continued)

Quantitative Easing: Quantitative easing is defined as large scale purchases of securities, typically fixed income, by a monetary authority such as the Federal Reserve. In theory, the result is an increase in demand for those securities, putting upward pressure on their prices and pushing yields down. Quantitative easing allows a monetary authority the ability to influence longer duration securities, while traditional monetary tools can only directly influence shorter duration securities.

Real Business Spending: Known as nonresidential fixed investments, real business spending is calculated by the Bureau of Economic Analysis as the summation of business expenditures for structures, equipment and software adjusted for inflation.

Real Consumer Spending: Known as personal consumption expenditures, real consumer spending is calculated by the Bureau of Economic Analysis as the summation of the goods and services purchased by U.S. residents adjusted for inflation.

Real GDP: Real gross domestic product (GDP) is calculated by the Bureau of Economic Analysis that serves as a measure of total market value of the goods and services produced (output) in the U.S. adjusted for inflation. GDP is the sum of consumer spending, investments made by industry, the excess of Exports over Imports and Government Spending.

Relative Earnings Growth: Earnings estimates are compiled by Bloomberg and are based on weighted Wall Street bottom-up estimates for each stock in the index. Historical forward earnings capture earnings expectations at past points in time.

Relative Price-to-Book: By dividing the Price-to-Book of one index by that of another, over time one can observe relative changes in Price-to-Book and identify past peaks and troughs.

Sales/Share Growth (S&P 500®): Calculates the year-over-year change in quarterly sales per share.

Standard Deviation: A measure of how far a data series moves above or below its average.

Stock Market Cycle: We define a stock market cycle as the time period that encompasses a full bull market and bear market and can be measured either from trough-to-trough or peak-to-peak.

Tail Risk: A potential economic or geopolitical event that is currently perceived to be fairly remote, but should it occur it would be consequential.

Total Household Debt Outstanding: Includes all U.S. consumer debt and credit obligations such as mortgages, student loans, auto loans and credit cards.

Total Non-financial Business Debt Outstanding: Includes all domestic corporate and noncorporate credit market instruments. Financial firms are excluded to avoid double counting.

Total Public Debt Outstanding: Includes all Federal, Federal Agency, State and Local government debt outstanding, including any intra-government holdings.

Investment Terms (continued)

Total Retirement Assets: Compiled by Investment Company Institute (ICI), total retirement assets include assets held in IRAs, defined contribution plans (DC), public and private defined benefit plans (DB), and annuities. Sources for this data include ICI, Federal Reserve Board, Department of Labor, National Association of government Defined Contribution Administrators, American council of Life Insurers, Internal Revenue Services Statistics of Income Division and Government Accountability Office.

Unemployment Rate: Represents the number of unemployed as a percentage of the labor force. Labor force data are restricted to people 16 years of age and older, who currently reside in one of the 50 states or the District of Columbia, who do not reside in institutions (e.g., penal and mental facilities, homes for the aged), and who are not on active duty in the Armed Forces. The Bureau of Labor Statistics defines and measures the unemployment rate.

Unit Labor Cost: Unit labor costs are calculated by dividing total labor compensation by real output. Labor compensation is a measure of the cost to the employer of securing the services of labor. It includes wages and salaries, supplements (e.g., paid leave, bonus and incentive payments, and employee discounts) and employer contributions to employee-benefit plans (e.g., medical and life insurance, workmen's compensation, and unemployment insurance). Business sector real output is based on real GDP, but includes only a subset of the goods and services included in GDP since it must exclude those portions of the economy for which productivity measures cannot be constructed. The business sector comprises about 75 percent of GDP.

University of Michigan Current Economic Conditions Index: Known as a coincident index, it is based on survey data that attempts to provide a representative sample of U.S. residents on how they view prospects for the general economy over the near-term.

U.S. Personal Consumption Expenditure Core Price Index: Tracks overall price changes for goods and services purchased by consumers excluding the more volatile and seasonal food and energy prices. This index, known as "Core PCE" uses a Fisher price index based on expenditure data from the current and preceding period. This differs from the CPI methodology which is based on a fixed basket of goods. The PCE methodology is generally preferred by the Federal Reserve as it assumes that consumers make product substitutions based on price changes. The Bureau of Economic Analysis defines and measures the PCE price index.

U.S. Personal Savings Rate: The savings rate is the percentage of people's incomes left after they pay taxes and spend money and is calculated by the Bureau of Economic Analysis.

Velocity of Money: The velocity of money is the frequency at which one unit of currency is used to purchase domestically produced goods and services within a year. If the velocity of money is increasing, then more transactions are occurring between individuals in an economy. The velocity of money can provide some insight into whether consumers and businesses are saving or spending their money.

Yield-to-Worst: Expected yield assuming the earliest allowable retirement date.

Index Definitions

The indexes mentioned are unmanaged statistical composites of stock market or bond market performance. Investing in an index is not possible.

Bloomberg 1-3 year Government/Credit Index includes all securities in the Bloomberg U.S. Aggregate Index that have a maturity of 1-3 years.

Bloomberg Emerging Markets U.S. Dollar Index includes all investment grade and non-investment grade emerging markets debt issued in U.S. Dollars. Issuers include sovereign, quasi-sovereign, and corporations.

Bloomberg Muni Bond Index includes all U.S. Dollar denominated long-term tax exempt bonds.

Bloomberg U.S. Aggregate ABS Index includes all ABS (asset backed securities) that are included in the Bloomberg U.S. Aggregate Index.

Bloomberg U.S. Aggregate Bond Index is an unmanaged index comprised of U.S. investment grade, fixed rate bond market securities, including government, government agency, corporate and mortgage-backed securities between one and 10 years.

Bloomberg U.S. Aggregate MBS Index includes all MBS (mortgage backed securities) that are included in the Bloomberg U.S. Aggregate Index

Bloomberg U.S. Corporate Bond Index measures the investment grade, fixed-rate, taxable corporate bond market. It includes USD denominated securities publicly issued by U.S. and non-U.S. corporations.

Bloomberg U.S. Corporate High Yield Bond Index measures the USD-denominated, high yield, fixed-rate corporate bond market. Securities are classified as high yield if the middle rating of Moody's, Fitch and S&P is Ba1/BB+/BB+ or below. Bonds from issuers with an emerging markets country of risk, based on EM country definition, are excluded.

Bloomberg U.S. Treasury 5-10 year Index is composed of U.S. Treasury issued fixed-rate securities with 5-10 years to maturity.

Bloomberg U.S. Treasury 10-20 year Index is composed of U.S. Treasury issued fixed-rate securities with 10-20 years to maturity.

CRB – Raw Industrials Index is a measure of price movements of 19 basic commodities that are presumed to be among the first to be influenced by economic conditions.

Dow Jones Equity REIT Index is comprised of REITs (real estate investment trusts) that directly own all or part of the properties in their portfolios.

Index Definitions (continued)

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MSCI EAFE® Index is a free-float-adjusted market capitalization index that is designed to measure developed market equity performance excluding the U.S. and Canada.

MSCI Emerging Markets Index is a free-float-adjusted market capitalization index that is designed to measure equity market performance of emerging markets.

MSCI Emerging Markets Currency Index tracks the performance of the currencies of the MSCI Emerging Markets Index relative to the U.S. Dollar. Each emerging market currency is weighted the same as in the MSCI Emerging Markets Index.

MSCI EAFE® Small Cap Index is an equity index which captures small cap representation across Developed Markets countries around the world, excluding the U.S. and Canada. The index covers approximately 14 percent of the free float-adjusted market capitalization in each country.

MSCI Europe Index captures large and mid cap representation across 15 Developed Markets (DM) countries in Europe. The index covers approximately 85 percent of the free float-adjusted market capitalization across the European Developed Markets equity universe.

MSCI Japan Index is designed to measure the performance of the large and mid cap segments of the Japanese market. The index covers approximately 85 percent of the free float-adjusted market capitalization in Japan.

MSCI World Index captures large and mid cap representation across 23 Developed Markets (DM) countries. With 1,648 constituents, the index covers approximately 85 percent of the free float-adjusted market capitalization in each country.

NASDAQ 100 Index includes 100 of the largest domestic and international non-financial companies listed on the NASDAQ Stock Market based on market capitalization.

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Russell 1000® Index measures the performance of the 1,000 largest companies in the Russell 3000® Index.

Russell 1000® Growth Index measures the performance of those Russell 1000® companies with higher price-to-book ratios and higher forecasted growth values.

Index Definitions (continued)

Russell 1000® Value Index measures those Russell 1000® companies with lower price-to-book ratios and lower expected growth values.

Russell 2000® Index measures the performance of the small-cap segment of the U.S. equity universe.

Russell 2000® Growth Index measures the performance of those Russell 2000® companies with higher price-to-book ratios and higher forecasted growth values.

Russell 2000® Value Index measures the performance of those Russell 2000® companies with lower price-to-book ratios and lower forecasted growth values.

Russell Midcap® Index measures the performance of the 800 smallest companies in the Russell 1000® Index.

Russell Midcap® Growth Index measures the performance of those Russell Midcap® companies with higher price-to-book ratios and higher forecasted growth values.

Russell Midcap® Value Index measures the performance of those Russell Midcap® companies with lower price-to-book ratios and lower forecasted growth values.

S&P 400® Index is an unmanaged index considered representative of mid-sized U.S. companies.

S&P 500® Index is a group of 500 widely held stocks and is commonly regarded to be representative of the large capitalization stock universe.

S&P 600® Index is an unmanaged index considered representative of U.S. small-capitalization stocks.

U.S. Dollar Index is maintained by Intercontinental Exchange, Inc. (ICE) and is a measure of the value of the U.S. dollar relative to a basket of major currencies including the euro, Japanese yen, and pound sterling.

VIX Index is maintained by the Chicago Board Options Exchange (CBOE) and is an estimate of future volatility of the S&P 500® Index. It is measured through S&P 500® Index options and based on the weighted average of the implied volatilities in the pricing of those options.

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