# THE FACTOR APPROACH

A New Way to Look at Investing

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MARKET
PERSPECTIVES

## EXECUTIVE SUMMARY

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The essence of portfolio management has traditionally been framed in terms of asset classes, countries and sectors, with tactical asset allocation and risk management best described as the process of managing these exposures. While this is a valid way of viewing markets, there is another dimension that investors are increasingly focused on: factor exposures, in other words, persistent drivers of return in the equity market, such as value, quality, momentum, size and volatility.

Factor exposures come in a variety of flavors, but all provide a different prism through which to view return and risk. By adding a factor overview, investors can help isolate risks such as interest rate or economic sensitivity that cut across various asset classes. In addition, factors provide another mechanism for viewing country and sector bets.

As investors tilt toward specific sectors, countries or themes, they are also exposing their portfolio to various factors. In some cases, these exposures may be inconsistent with an investor's forecast of the economic or financial environment. Awareness of how these exposures might manifest in a portfolio is critical for helping to ensure that a portfolio is built in a way that is consistent with an investor's market views. To the extent that the portfolio is tilted in unintentional ways, there is an increasing array of tools and instruments that can be employed to fine-tune the allocations.

Investors may also want to consider adjusting their portfolios' exposures based on their expectations for the economic climate. Historically, returns to the various factors have been at least partly driven by such conditions as growth, inflation and volatility. Just as with sectors or countries, investors may want to consider tilting their portfolio toward or away from these factors as another potential source of return or another mechanism for managing risk.

*"Everything we hear is an opinion, not a fact. Everything we see is a perspective, not the truth."*

*— Marcus Aurelius*

Traditionally, investors have tended to divide their investments by asset class and more granularly into sectors and industries. Factor investing instead focuses on the broad, persistent drivers of return that are common across asset classes. As such, factors can be thought of as another prism through which to view sources of return and risk.

For example, while equities are naturally exposed to economic growth, high dividend sectors such as utilities also tend to embed a fair amount of interest rate risk. Similarly, high yield bonds typically embed a significant amount of equity risk. By not taking into account the impact of these factors, traditional asset allocation may result in a less diversified portfolio than expected.

Factors can be broadly divided into three categories: rewarded factors that have outperformed the market over long periods of time, the result of a risk premium, structural impediment or behavioral anomaly (value and momentum are two widely recognized examples); explanatory risk factors that help explain the variability of security returns in the short term but do not have a positive expected return over the long term, such as foreign exchange; and alpha factors used in active portfolio management that quantitatively capture a manager's insights. (For an overview of factors and their performance, see "Factors: What Are They, Why They've Worked, Ways to Get Started" by Andrew Ang, accessible for financial professionals on blackrock.com.)

Our main focus is on five well-understood equity style factors: value, momentum, quality, size and (minimum) volatility:

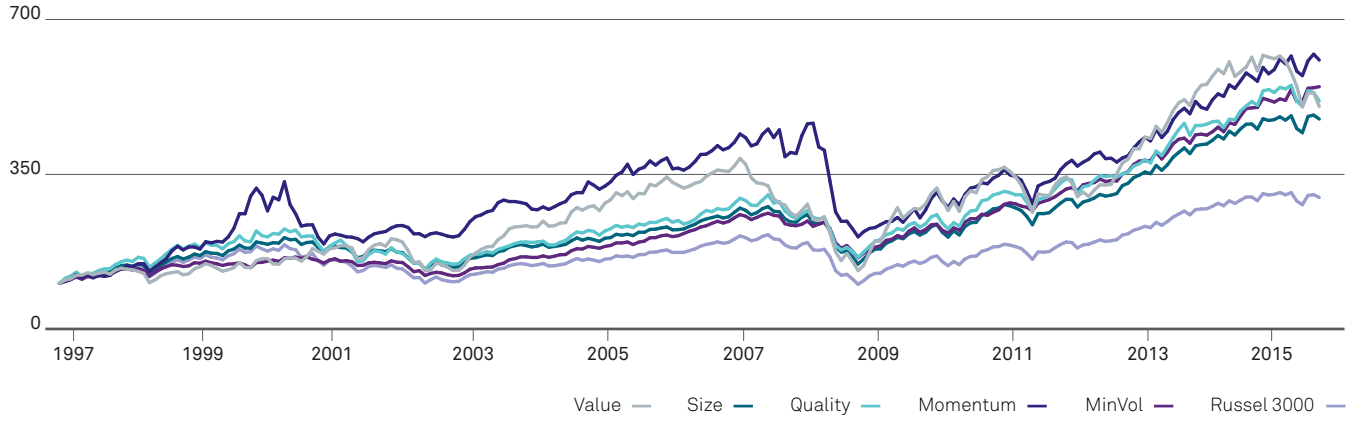
Value: Value stocks appear cheap in light of their sales, earnings and cash flow trends, in other words, the stock is priced at a discount to its fundamental value. Historically, value stocks have performed well in the early stages of a business cycle, according to analysis of Russell 3000 data. Value investing has worked well in the past because investors have been rewarded by the risk of value firms tending to have higher fixed costs, which investors typically view as riskier than growth firms. There is also a behavioral bias, in which investors assume past performance of growth firms will continue, leaving value stocks undervalued.

Momentum: Momentum stocks have strong price momentum, i.e., they have performed well over the past 6 to 12 months (usually excluding the most recent month), and strong fundamental momentum, i.e., they have seen upward earnings estimate revisions by security analysts. Momentum investing is based on the notion that winning stocks continue winning, and it may represent a reward for bearing the risk of reversals (momentum can swing the other way and investors can be exposed to sudden losses) and the behavioral bias of overconfidence compounding, leading to a momentum effect in stock prices.

Quality: Quality stocks are typically profitable as measured by their return on equity and have stable earnings growth and low financial leverage. These have tended to perform well historically during market downturns, based on the idea that companies with healthier balance sheets make better use of

FIGURE 1: STYLE FACTORS VS. BROAD MARKET PERFORMANCE AS REPRESENTED BY THE RUSSELL 3000 INDEX

(1997-2016)




Source: BlackRock, as of 1/30/16, using Russell data from Thompson/Reuters. Market is represented by the Russell 3000 Index, factors are segments of that index. Indexes are unmanaged. It is not possible to invest directly in an index. Past performance is not indicative of future results.

their capital, have more stable operations and as a result have outperformed their less-efficient peers.

Size: Smaller firms, as measured by their market capitalization, have been found to have historically higher risk-adjusted returns on average than larger firms.[1] Small-cap investors may be compensated for taking more risk and smaller-size companies have historically performed well in the early stages of an economic upswing.

Volatility: Compared to the market at large, low volatility stocks have relatively low return volatility, beta (a measure of how much a stock moves relative to the broader market) and idiosyncratic risk (risk specific to a stock or sector, as opposed to the market at large). Historically, minimum volatility strategies have outperformed the broader market over the longer term, delivering returns with less risk.[2]

In short, while some of the style factor drivers are better understood than others, usually these factors' outperformance is attributed to a combination of market frictions and behavioral reasons. Indeed, while style factors have a high correlation to behavior of the overall market on a long-only basis, they nonetheless have individually historically outperformed the broad market over the longer term (see Figure 1).[3]

Momentum, despite having the highest volatility among the factors, historically has delivered the highest risk-adjusted returns. Minimum volatility has lived up to its name with the lowest volatility among the factors, although its risk-adjusted returns have been the lowest among these factors (see Figure 1).

## STYLE FACTOR SECTOR EXPOSURES

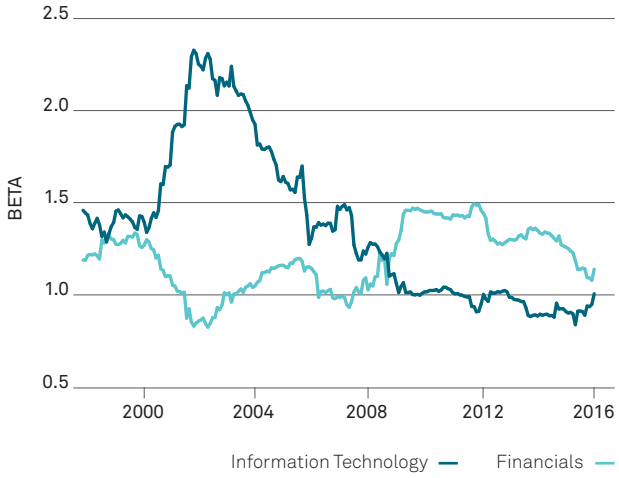
We would favor taking a sector-neutral approach when investing in factors, but depending on construction methodologies, style factor indexes may result in sector or country biases that can have a marked impact on performance. Further, the sector weightings within a style factor index change over time depending on fundamental and price performance; momentum, for example, had a much higher defensives exposure through health care (which includes biotech) only a few months ago. After the sell-off that has occurred over the last several months, many energy companies now have very reasonable valuations and energy has become a value play. The advantage of the sector-neutral approach is that it allows the investor to take more "pure" bets on specific factors only, rather than sectors, in the market.

It is important to note that while style factors tend to have distinct sector tilts, the opposite can be true and sectors and countries also embed style factor tilts. For example, emerging market stocks in the MSCI Emerging Markets Index currently have a positive value tilt, while the developed markets value tilt of the MSCI World Index is negative.[4]

Sectors' style exposures also change over time. For example, consumer stocks had an increasing momentum tilt during 2015, while the health care and information technology sectors' momentum tilt decreased, perhaps related to slowing, if still high, revenue growth.

The sectors exhibiting the least volatility also change over time. During the past two decades, the information technology sector's volatility exposure peaked leading up to and during the bursting of the Internet bubble. Financial stocks have had a generally lower volatility exposure in comparison, although it rose markedly during the financial crisis (see Figure 2).

FIGURE 2: SECTOR BETA TO EQUITY MARKET




Source: BlackRock, using S&P data from Bloomberg as of 1/30/16. Historical beta is measured by 36-month trailing regression of S&P 1200 technology and financial global sectors on S&P 1200 benchmark return. Beta of 1.0 represents the equity market at large. Past performance is not a reliable indicator of future performance.

1. Source: Bloomberg.
2. Source: BlackRock using Russell 3000 Index data. See Footnote 3 for more info.
3. The research in Figure 1, as well as in Figures 3-5 and 9 below, was conducted by BlackRock analyzing the Russell 3000 Index. The value segment is determined by combined book/price, earnings/price (realized), and cash-flow/price. Quality looks at return on equity adjusted for debt and earnings variability. Momentum is the combined 12-month relative strength and 6-month relative strength of returns. Data, including returns, are all from Thompson/Reuters. For value and quality, portfolios were built by taking the top 200 names within the Russell 3000 according to the value and quality factors, respectively, then sector-neutralizing the final weights. The same process applies to the momentum portfolio but without the sector-neutralization. Minimum volatility is created by optimizing Russell 3000 names using the Barra risk model.
4. Source: Bloomberg, as of 1/30/16.

## STYLE FACTOR PERFORMANCE IN DIFFERENT MACROECONOMIC CONDITIONS

While style factors have exhibited consistent outperformance over the longer term, there have also been notable periods of underperformance. Value underperformed during the 1990s, and from 2010 onward after the stock rally following the 2009 market trough. Minimum volatility and size underperformed from 1998 to 2002 during the Internet bubble. After the bubble burst, momentum and quality underperformed from 2000 to 2002, giving back their earlier outperformance. The 2008 financial crisis hit momentum the hardest, and it surrendered all of its returns for the previous five years.[5]

As such, understanding how style factors fare in different macro and market environments can help shed light on how a longer-term strategic portfolio with distinct style factor exposures is likely to perform under different outlook scenarios. It can also be beneficial for more tactically minded investors who use single-factor strategies to time the market.

In assessing how style factors perform in different macroeconomic and trading environments, we focus on economic growth, inflation, interest rates and market sentiment. We start by looking at growth and inflation, as measured by quarterly GDP growth and monthly headline Consumer Price Index data. We split our sample period from June 1997 to January 2016 into four quadrants based on high/low GDP and high/low inflation, where high and low refer to the highest and lowest quartile growth and inflation during the sample period, respectively. We then calculate total style factor index returns in each. Figure 3 shows the average total monthly outperformance or underperformance versus the market for the factors.

Generally speaking, high growth and low inflation is the most market-friendly scenario, although returns across the different style factors are dispersed with momentum outperforming and value underperforming. This corresponds during our sample period with the buildup of the technology bubble in 1998 and 1999. Low growth and low inflation is the second most market-friendly scenario, with the widest performance dispersion across style factor returns. Value strategy took the lead in the early stage of the post-financial crisis recovery of 2009-2010, while momentum and minimum volatility lagged.

Unsurprisingly, the market has tended to see the worst returns in a low-growth high-inflation environment, where return dispersion across style factors is fairly small. Minimum volatility and quality have performed modestly better than the market in this kind of environment. Relevant periods include Q4 2000, Q2 2001 and Q3 2006, when a runup in energy prices led to an increase in inflation and hit growth with Fed tightening, and Q2 2008 and Q4 2011, with elevated oil prices and growth struggling to recover from the financial crisis. High growth and high inflation, which occurred in Q2 2006, has been a relatively mediocre environment for the equity market, though dispersion remains wide with momentum being a major laggard as this period coincided with the bursting of the tech bubble in 2000.

Our real rate scenarios are based on the highest and lowest quartile five-year Treasury Inflation Protected Securities (TIPS) yields[6] during our sample period. During low real rate periods,

### FIGURE 3: MACROECONOMIC GROWTH/INFLATION SCENARIO

Average Monthly Return

| | Value | Size | Quality | Momentum | MinVol | Market |
|---|---|---|---|---|---|---|
| **High Growth, Low Inflation**<br>g>3.9, i<1.7 | 0.18% | 0.42% | 0.63% | 0.66% | 0.30% | 0.42% |
| **High Growth, High Inflation**<br>g>3.9, i>3.2 | 0.43% | 0.19% | 0.21% | -0.13% | 0.18% | 0.09% |
| **Low Growth, High Inflation**<br>g<1.3, i>3.2 | -0.14% | -0.16% | -0.13% | -0.18% | -0.07% | -0.36% |
| **Low Growth, Low Inflation**<br>g<1.3, i<1.7 | 0.79% | 0.35% | 0.41% | 0.18% | 0.31% | 0.33% |

g=growth, i=inflation

Source: BlackRock, as of 1/30/16, using Russell data from Thompson/Reuters. Factors are segments of the Russell 3000 Index. Indexes are unmanaged. It is not possible to invest directly in an index. Past performance is not indicative of future results. For illustrative purposes only. See Footnote 3 for more information of how factors were analyzed.

5. BlackRock, as of 1/30/16, using Russell data from Thompson/Reuters. Broad market index is represented by the Russell 3000 Index, factors are segments of that index.
6. TIPS since data became available in July 1997, for the period before we use (5-year nominal Treasury yield – CPI).

the market on average returned less than during high real rate periods, with the latter prevailing in the 1990s' fast-growth environment, until the technology bubble burst in the 2000s. Momentum and quality were particularly sensitive to the level of real rates, and they also outperformed other style factors when real rates were high (see Figure 4).

Our measure of investor risk appetite is the VIX index, which tracks the implied volatility of the S&P 500. Under the lowest quartile VIX values during our sample period, indicating high investor appetite for risk, the market and all style factors had large positive returns. Under the highest quartile VIX, momentum suffered the largest setback, while minimum volatility experienced the shallowest decline (see Figure 5). The results are similar if we look at change in VIX, rather than the level. This risk appetite measure is relatively fast moving compared to our other macro regime indicators, spiking when uncertainty is high, such as following 9/11, at the beginning of the financial crisis, and during the debt ceiling debacle of 2011.

## MACROECONOMIC FACTORS IN PORTFOLIOS

Let us turn now to analyzing the impact of factors on the expected returns and risks in a portfolio, as well as how investment vehicles based on factor exposures can be incorporated into a portfolio. In our analysis of the drivers of our multi-asset model portfolio returns and risk in the next section, we also look at macroeconomic factors, or macro factors. Macro factors are broad, persistent drivers of returns that provide compensation for bearing exposure to non-diversifiable macroeconomic risks. While the choice of the exact macro factors used and their construction methodology may differ, these factors usually focus on broad economic growth uncertainty, real interest rates, bearing inflation exposure and credit, and also sometimes investing in emerging markets and asset class liquidity. Each macro factor here can be thought of as a portfolio designed to capture the potential return associated with having exposure to a given asset class. Our focus will be on the following macro factors:

Equity: Broad market equity index returns;

Real Rates: Inflation-linked bond returns;

Inflation: Return of long nominal bonds, short inflation-linked bonds portfolio;

Credit: Return of long corporate bonds, short inflation-linked bonds portfolio;

Foreign Exchange (FX): Additionally, FX macro factors were constructed to capture and collapse aggregate FX exposure onto a single factor. Although this is a risk for investors, it is important to note that it has not been rewarded over the long term.

### FIGURE 4: REAL RATE SCENARIO

Average Monthly Return

| | | Value | Size | Quality | Momentum | MinVol | Market |
|---|---|---|---|---|---|---|---|
| **Real Rate Signal** r<0.0, or r>2.7 | Low | 0.22% | 0.25% | 0.24% | 0.29% | 0.29% | 0.22% |
| | High | 0.25% | 0.33% | 0.35% | 0.48% | 0.23% | 0.25% |

r=real rate

Source: BlackRock, as of 1/30/16, using Russell data from Thompson/Reuters. Factors are segments of the Russell 3000 Index. Indexes are unmanaged. It is not possible to invest directly in an index. Past performance is not indicative of future results. For illustrative purposes only. See Footnote 3 for more information of how factors were analyzed.

### FIGURE 5: RISK APPETITE SCENARIO

Average Monthly Return

| | | Value | Size | Quality | Momentum | MinVol | Market |
|---|---|---|---|---|---|---|---|
| **Risk Signal (VIX)** v<14.0, or v>23.2 | Low | 0.42% | 0.30% | 0.32% | 0.41% | 0.32% | 0.30% |
| | High | -0.07% | -0.05% | -0.07% | -0.15% | -0.03% | -0.14% |

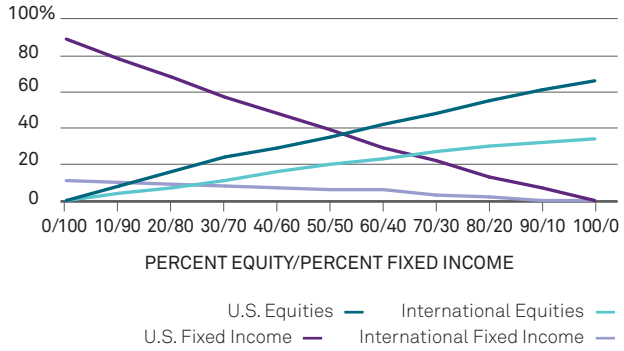
v=volatility

Source: BlackRock, as of 1/30/16, using Russell data from Thompson/Reuters. Factors are segments of the Russell 3000 Index. Indexes are unmanaged. It is not possible to invest directly in an index. Past performance is not indicative of future results. For illustrative purposes only. See Footnote 3 for more information of how factors were analyzed.

In this section, we examine macro and style factor exposures in sample portfolios that represent common strategic asset allocations that many investors use as long-term investments depending on their time horizon, goals and risk tolerance. They include 10 allocations, ranging from very conservative (consisting of all bonds) to very aggressive (all stocks). For example, the 60/40 portfolio is 60% stocks and 40% bonds. We are interested in both deliberate and incidental factor exposures in a typical U.S.-based investor's portfolio, taking into account not just assets' expected future returns but also their riskiness as measured by volatilities and correlations with other assets, and setting some reasonable constraints for position sizes.

Our sample strategic portfolios include equity/fixed income allocations ranging from 0%/100% to 100%/0%. Figure 6 depicts these portfolios' broad asset class segment allocations.

## FIGURE 6: SAMPLE ASSET ALLOCATIONS




Source: BlackRock. Asset allocations range from 100% bonds on the left, and thus a very conservative portfolio, to 100% stocks on the right, with allocations of international stocks and bonds represented. For illustrative purposes only. This should not be construed as an investment recommendation.

As is typical in a U.S.-based investor's portfolio, these portfolios have a home bias toward U.S. equities and fixed income at the expense of international equities and fixed income. Not surprisingly, the portfolios with higher allocations to equities contain higher equity risk as a fraction of total risk, and lower rate and credit risk. In fact, equity risk dominates in all but the 0/100 and 10/90 equity/fixed income portfolios. Rate risk currently only provides a modest amount of diversification. See Figure 7 for the macro factor risk contributions as a percentage of total risk in the sample portfolios.

Next, we incorporate style factors, using the relevant indexes as illustration, into the growth-oriented, longer-term portfolios. Figure 8 shows the portfolio allocations to the momentum and minimum volatility style factors alongside U.S. large-cap value and growth allocations, as well as U.S. small and mid cap.

The sample portfolios assume long-term total return outperformance for momentum stocks, based on historical precedent, and similar returns as the broad equity market but with lower volatility for minimum volatility stocks. The return outperformance assumption for momentum helps increase its weight in these portfolios, which also helps balance the otherwise present value bias that exists in these sample portfolios.

In considering the riskiness of the sample portfolios, we focus on the style indexes' monthly return correlations

## FIGURE 7: RISK CONTRIBUTIONS TO SAMPLE PORTFOLIOS

| Equity/Fixed Income (%) | 0/100 | 10/90 | 20/80 | 30/70 | 40/60 | 50/50 | 60/40 | 70/30 | 80/20 | 90/10 | 100/0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rate Risk | 70.2% | 36.4% | 13.9% | 3.6% | 0.4% | -1.4% | -2.3% | -2.2% | -1.9% | -1.2% | 0.0% |
| Credit Spread Risk | 28.1% | 34.2% | 29.8% | 19.5% | 12.7% | 9.2% | 7.5% | 3.7% | 2.0% | 0.7% | 0.0% |
| Equity Risk | 0.0% | 26.2% | 53.3% | 72.6% | 82.1% | 86.5% | 89.3% | 92.8% | 94.4% | 95.4% | 95.2% |
| FX Risk | 0.0% | 1.2% | 1.0% | 3.1% | 3.9% | 4.8% | 4.9% | 5.2% | 5.2% | 5.0% | 4.7% |
| Other Risk | 1.7% | 2.0% | 2.0% | 1.1% | 1.0% | 0.8% | 0.6% | 0.6% | 0.3% | 0.1% | 0.1% |
| Total Standard Deviation | 3.56% | 4.09% | 4.97% | 6.14% | 7.25% | 8.55% | 9.98% | 11.23% | 12.62% | 13.73% | 14.84% |

Source: BlackRock, as of 1/30/16, based on analysis of sample portfolio allocations of U.S. equities, international equities, U.S. fixed income, and international fixed income. For illustrative purposes only. This should not be construed as an investment recommendation. Rate Risk contribution captures volatility associated with portfolio covariation with benchmark government interest rates. Credit Risk contribution captures volatility associated with portfolio covariation with investment grade, high yield and distressed debt credit spreads over benchmark interest rates. FX Risk contribution captures volatility associated with portfolio covariation with foreign exchange rate fluctuations. Other Risk contribution captures the remaining portion of volatility that is idiosyncratic relative to Rate, Credit, Equity and FX Risk. Standard deviation is a statistical estimate measuring how dispersed returns are around an average.

## FIGURE 8: U.S. EQUITY ALLOCATIONS IN SAMPLE PORTFOLIOS

| Equity / Fixed Income (%) | 0/100 | 10/90 | 20/80 | 30/70 | 40/60 | 50/50 | 60/40 | 70/30 | 80/20 | 90/10 | 100/0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S&P MidCap 400 Index | - | - | 3.0% | 3.0% | 4.0% | 4.0% | 4.0% | 4.0% | 5.0% | 6.0% | 6.0% |
| S&P SmallCap 600 Index | - | - | - | - | - | - | 2.0% | 4.0% | 6.0% | 7.0% | 8.0% |
| MSCI USA Minimum Volatility Index | - | 3.0% | 4.0% | 5.0% | 5.0% | 5.0% | 5.0% | 4.0% | 4.0% | 4.0% | 4.0% |
| MSCI USA Momentum Index | - | - | - | 2.0% | 2.0% | 4.0% | 4.0% | 6.0% | 6.0% | 6.0% | 6.0% |
| S&P 500 Growth Index | - | 2.0% | 4.0% | 7.0% | 9.0% | 11.0% | 12.0% | 12.0% | 13.0% | 16.0% | 18.0% |
| S&P 500 Value Index | - | 3.0% | 5.0% | 7.0% | 9.0% | 11.0% | 15.0% | 18.0% | 21.0% | 22.0% | 24.0% |
| Total U.S. Equity | - | 8.0% | 16.0% | 24.0% | 29.0% | 35.0% | 42.0% | 48.0% | 55.0% | 61.0% | 66.0% |

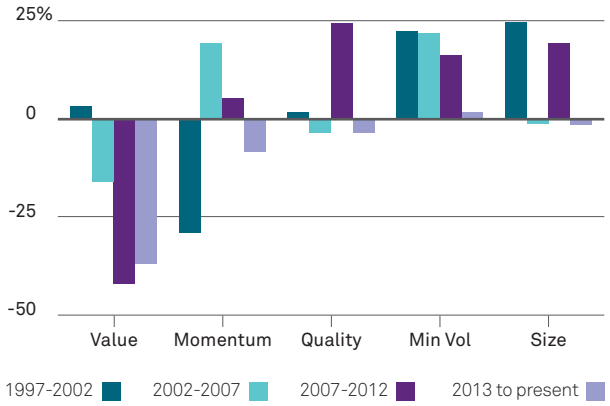
Source: BlackRock, analysis of sample sector and factor allocations of U.S. equities in sample portfolios. For illustrative purposes only. This should not be construed as an investment recommendation. Indexes are unmanaged. It is not possible to invest directly in an index. Past performance is not indicative of future results.

with each other and broad U.S. and global equity market indexes. Given these are long-only indexes with hefty market exposure, all the correlations are quite close to 1.0 (a correlation of 1 means assets move in lockstep; the lower the correlation the more diversification benefits for the portfolio); small- and mid-cap stock, momentum and minimum volatility, however, provide some diversification benefits to a portfolio. So, for example, while momentum itself has a relatively high return volatility, increasing its weight in a portfolio does not usually increase the portfolio's total risk, as measured by standard deviation of returns (in other words, how far a return deviates from the mean), proportionally. Further, this type of correlation changes over time. Figure 9 illustrates the correlations between the various factors in five-year increments dating back to 1997, using Russell 3000 index data. Value has the lowest correlation with other factor strategies. In addition, the correlations have declined significantly for the past five years, reflecting an increasing dispersion and divergence among factor performance.

We also analyzed portfolios whose goal is to achieve a particular income level. We looked at sample portfolios that aim to achieve income levels, namely those that could produce moderate, high or aggressive yields. The portfolios consist of Treasuries, credit, mortgage-backed securities and international debt; the more aggressive income levels consist of larger allocations to riskier bonds, such as credit. The core income portfolio seeks to generate a yield similar to the Barclays U.S. Aggregate Bond Index with less risk, while the moderate, high and aggressive portfolios seek to generate yields progressively greater than the Barclays U.S. Aggregate Bond Index, but taking on more risk. Figure 10 depicts these portfolios' broad asset class segment allocations.

## FIGURE 9: AVERAGE CORRELATION OF FACTORS

(1997 to present)




Source: BlackRock, using Russell 3000 Index data, as of 1/30/16. For illustrative purposes only. Past performance is not a reliable indicator of future performance. See Footnote 3 for more information of how factors were analyzed.

Prior to the recent era of quantitative easing and in more normal policy circumstances, there was arguably more opportunity to deploy longer-duration bonds to achieve higher-income targets. Now, in today's low-yield environment, more aggressive income targets mean taking on more credit risk. Figure 11 depicts Treasury yields and credit spreads since the mid-1990s, and Figure 12 illustrates the target income sample portfolios' macro factor risk contributions.

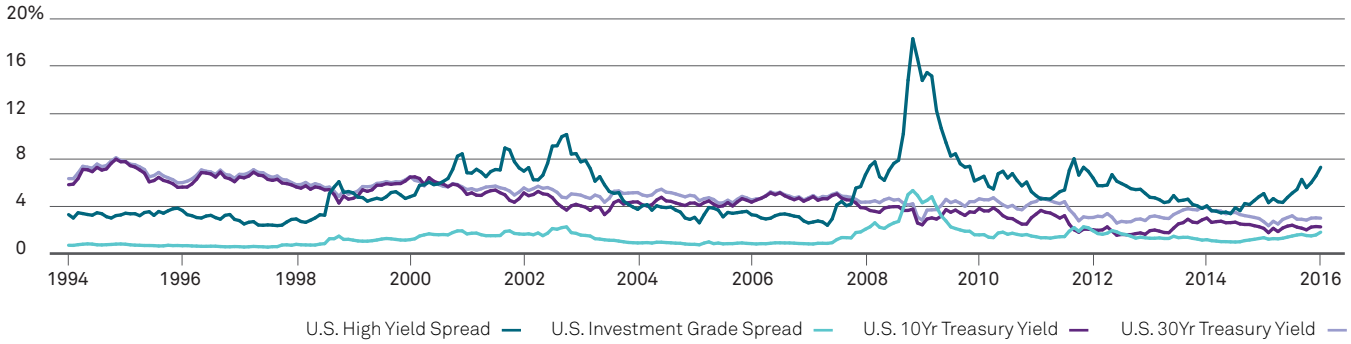
## FIGURE 10: TARGET INCOME SAMPLE PORTFOLIOS

| | Conservative | Moderate | High | Aggressive |
|---|---|---|---|---|
| Treasuries | 16.00% | 6.30% | – | 4.00% |
| MBS | 15.30% | 13.00% | – | – |
| Credit | 68.70% | 80.70% | 91.40% | 86.00% |
| Non-U.S. Govt | – | – | 8.60% | 10.00% |
| Total | 100.00% | 100.00% | 100.00% | 100.00% |

Source: BlackRock, as of 1/30/16, based on analysis of sample portfolio allocations to achieve income levels similar to or greater than that of the Barclays U.S. Aggregate Bond Index. Treasuries include short- and long-term duration as represented by Barclays Treasury Bond Indexes. Mortgages represented by Barclays US MBS Index. Credit includes investment grade and high yield. Credit represented by Barclays U.S. 1-3 Year Credit Bond Index, Barclays U.S. Intermediate Credit Bond Index, Barclays U.S. Long Credit Bond Index, and the Markit iBoxx USD Liquid Investment Grade Index. Non-U.S. Govt. includes emerging markets as represented by the JP Morgan USD Emerging Markets Index. For illustrative purposes only. This should not be construed as an investment recommendation.

## FIGURE 11: TREASURY YIELD AND CREDIT SPREADS

(1994-Present)




Source: BlackRock, Bloomberg, as of 1/30/16. For illustrative purposes only. Past performance is not a reliable indicator of future performance.

## FIGURE 12: RISK CONTRIBUTORS TO SAMPLE INCOME PORTFOLIOS

| | Barclays U.S. Aggregate Index | Conservative | Moderate | High | Aggressive |
|---|---|---|---|---|---|
| Rate Risk | 104.1% | 94.3% | 63.9% | 41.7% | 47.7% |
| Credit Spread Risk | -5.6% | 4.3% | 35.4% | 58.3% | 52.2% |
| FX Risk | 1.5% | 1.4% | 0.7% | 0.0% | 0.2% |
| Total Standard Deviation (annual %) | 3.4% | 2.1% | 3.0% | 4.6% | 5.8% |

Source: BlackRock, as of 1/30/16, based on analysis of sample portfolio allocations to achieve income levels similar to or greater than that of the Barclays U.S. Aggregate Bond Index as described above. For illustrative purposes only. This should not be construed as an investment recommendation. Past performance is not a reliable indicator of future performance. Rate Risk contribution captures volatility associated with portfolio covariation with benchmark government interest rates. Credit Risk contribution captures volatility associated with portfolio covariation with investment grade, high yield and distressed debt credit spreads over benchmark interest rates. FX Risk contribution captures volatility associated with portfolio covariation with foreign exchange rate fluctuations. Standard deviation is a statistical estimate measuring how dispersed returns are around an average.

## FIGURE 13: BALANCED INCOME SAMPLE PORTFOLIOS

| | Volatility Mitigation | Rising Rates Mitigation | Inflation Mitigation |
|---|---|---|---|
| Treasuries | 4.80% | – | 9.00% |
| Credit | 64.90% | 52.50% | 45.40% |
| MBS | 4.00% | 7.80% | – |
| Non-U.S. Govt | – | 4.00% | – |
| Equities | 26.30% | 35.70% | 45.60% |
| Total | 100.00% | 100.00% | 100.00% |

Source: BlackRock based on analysis of sample portfolio allocations that seek to provide yield while managing for specific risks of volatility, rising rates and inflation. Treasuries include short and long-term duration as represented by Barclays Treasury Bond Indexes. Mortgages represented by Barclays US MBS Index. Credit includes investment grade and high yield. Credit represented by Barclays U.S. 1-3 Year Credit Bond Index, Barclays U.S. Intermediate Credit Bond Index, Barclays U.S. Long Credit Bond Index, and the Markit iBoxx USD Liquid Investment Grade Index. Non-US Govt. includes emerging markets as represented by the JP Morgan USD Emerging Markets Index. For illustrative purposes only. This should not be construed as an investment recommendation. Past performance is not a reliable indicator of future performance.

## FIGURE 14: BALANCED INCOME PORTFOLIO RISK CONTRIBUTIONS

| | Volatility Mitigation | Rising Rates Mitigation | Inflation Mitigation |
|---|---|---|---|
| Rate Risk | 24.0% | -2.7% | -2.2% |
| Credit Spread Risk | 38.7% | 43.4% | 34.0% |
| Equity Market Risk | 32.2% | 53.8% | 54.8% |
| FX Risk | 4.6% | 5.2% | 10.5% |
| Other Risk | 0.5% | 0.4% | 2.8% |
| Total Standard Deviation (annual %) | 6.1% | 5.6% | 8.1% |

Source: BlackRock, as of 1/30/16, based on analysis of sample portfolio allocations that seek to provide yield while managing for specific risks of volatility, rising rates and inflation. For illustrative purposes only. This should not be construed as an investment recommendation. Past performance is not a reliable indicator of future performance. Rate Risk contribution captures volatility associated with portfolio covariation with benchmark government interest rates. Credit Spread Risk contribution captures volatility associated with portfolio covariation with investment grade, high yield and distressed debt credit spreads over benchmark interest rates. Equity risk contribution captures portfolio volatility associated with portfolio covariation with equity market returns. FX Risk contribution captures volatility associated with portfolio covariation with foreign exchange rate fluctuations. Other Risk contribution captures the remaining portion of volatility that is idiosyncratic relative to Rate, Credit, Equity and FX Risk. Standard deviation is a statistical estimate measuring how dispersed returns are around an average.

Finally, we look at sample portfolios that seek to generate multi-asset income while protecting against volatility, rising rates or rising inflation. Figure 13 depicts these portfolios' broad asset class segment allocations.

Overall, for the rising rates focused model, equity risk makes the highest contribution to total risk, while for the volatility focused portfolio, credit risk is the largest contributor. The inflation focused portfolio has the most foreign exchange and other risks of the three portfolios. Figure 14 depicts the macro factor risk contributions for the balanced income portfolios.

## CONCLUSION

*"The Guide is definitive. Reality is frequently inaccurate."*

*— Douglas Adams*

Recent market volatility has affected asset classes from equities to fixed income and TIPS and high yield. Most recently, investors have become obsessed with the decline in oil. Last summer, many were fixated on the volatile situation in Greece. Finally, for much of the post-financial crisis environment, the direction and magnitude of central bank policy has been the primary driver of market returns. In each instance, a defining factor—whether inflation expectations, volatility or rates—explained a significant portion of return and risk across wildly different markets.

While timing factors is no easier than timing markets, an awareness of factor exposures in a portfolio may prove profitable. Certain exposures, such as value or momentum, may justify a strategic tilt. Over the long term, explicitly adding these risk premia factors to a portfolio may improve risk-adjusted returns.

Other factors, such as quality, can be additive under certain circumstances. To the extent an investor has a view on the economic or financial market conditions, these views can be expressed by tilting toward those factors that have a propensity to outperform in certain environments. Finally, the framework of factor investing may be most useful as a tool for helping to manage risk. Investors often wind up making the same bet, such as being long cyclical stocks, multiple times. Under these circumstances, a portfolio may not be nearly as diversified as the number of securities suggests. By viewing the portfolio through the prism of factor exposures, an investor can gain a deeper understanding of their portfolio. This will help portfolio managers better answer a fundamental question: Are the risks in the portfolio those the investor intended to take?

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