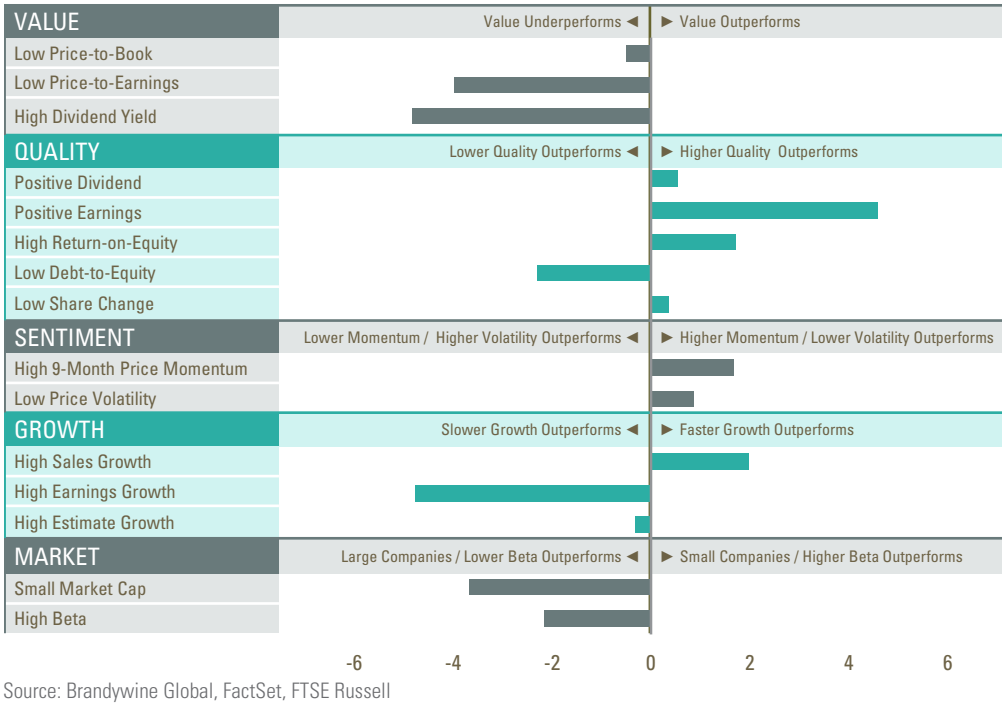
Quantitative Review of U.S. Equities

Second Quarter 2019

- Early in the quarter, U.S. equity markets continued to rally off their late December 2018 lows. In May, the rally faltered with the S&P 500 falling over 6%, but the market made up for most of these losses in June. As a result, the market had gains for both the second quarter and year to date.
- Value factors were among the weakest performing factors for both the quarter and year to date, including higher dividend-paying stocks—despite sharp declines in interest rates this year.
- The Russell growth indices have done better than the value indices for both the year and the quarter, but growth factors have been mixed for both periods.
- Quality factors were also mixed for the quarter, mostly negative year to date, and surprisingly were not very defensive in May when the market was down.
- Stocks with strong price momentum did well in the second quarter after lagging in the first quarter, leading mostly to the factor's small underperformance for the year to date.
- Despite the market rally, smaller companies, higher beta, and higher price-volatility stocks did worse for the quarter though high beta, and volatility did better for the year. Much of the weakness for these factors came during May's market decline.
- Last quarter we reviewed how an inverted yield curve, as measured by long-term rates falling below short-term rates, historically affected the economy and U.S. equity market. After a brief inverted period in March, the curve again inverted in late May and currently remains in that position. This quarter we review how various equity factors perform given an inverted curve.

Figure 1 Broad Market U.S. Equity Factor Returns
QTD; % Return Difference between Factor's[1] High and Low Quartile; Russell 1000 Index; As of 6/30/2019



Source: Brandywine Global, FactSet, FTSE Russell

A NOTE FROM BRANDYWINE GLOBAL'S DIVERSIFIED EQUITY TEAM

This paper is the quarterly report by Brandywine Global's Diversified Equity team on quantitative factors impacting the U.S. equity markets. In each publication, we will provide a standardized report on factor behavior for the quarterly and year-to-date periods. In addition, we will provide brief comments highlighting important and interesting trends in factor behavior and discuss recent work we are engaged in to better understand these trends. Understanding market performance through the unique lens of factor returns often brings early illumination to equity opportunities as well as areas of risk concentration. We use a longer-term perspective on the behavior of various factor returns to develop Diversified Equity strategies at Brandywine Global.

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Figure 2A U.S. Equity Factor Returns
YTD; % Return Difference between Factor's[1] High and Low Quartile; As of 6/30/2019

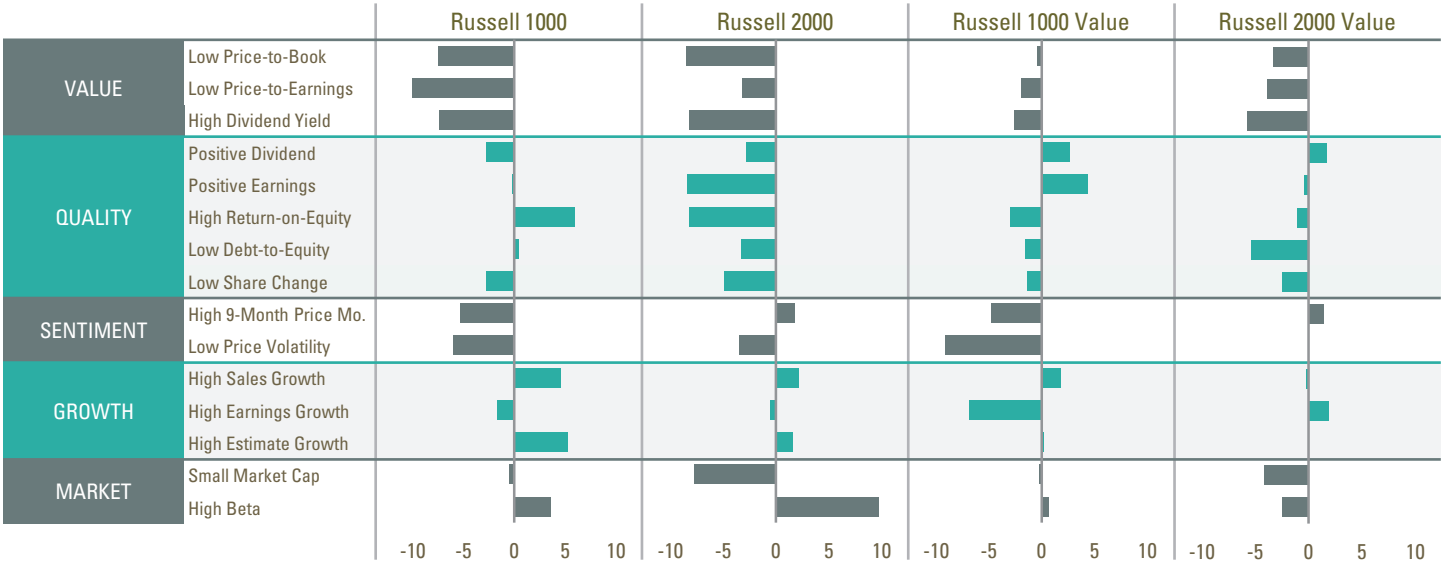
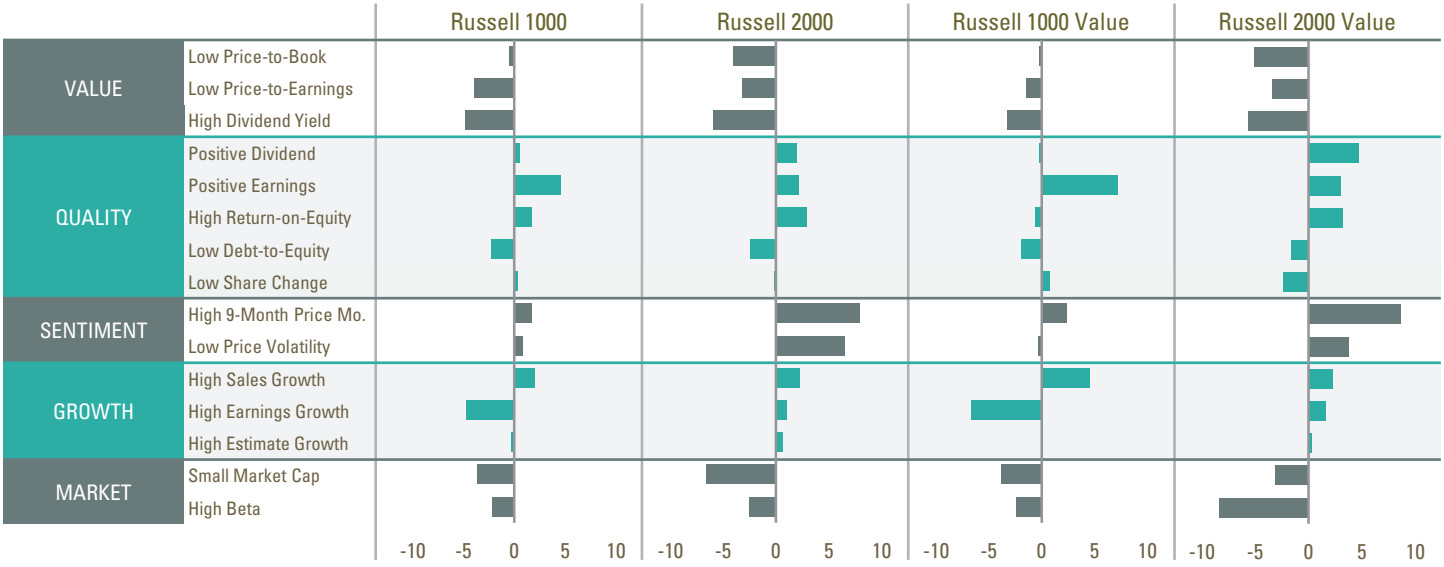


Figure 2B U.S. Equity Factor Returns
QTD; % Return Difference between Factor's[1] High and Low Quartile; As of 6/30/2019



Source: Brandywine Global, FactSet, FTSE Russell

SECOND QUARTER 2019 FACTOR RETURNS

The Federal Reserve Board's indication in late 2018 that it would likely hold off on additional short-term rate hikes—and perhaps even cut rates—ignited a U.S. equity rally that lasted through April 2019. Renewed focus on U.S. tariffs against Mexico, China, and Europe and concerns about the global economy sent the market lower in May. However, in June, the market rebounded and mostly erased May's losses. For the year, the Russell 1000 Index gained 18.8% and was up 4.2% in the second quarter.

The strong equity market returns in 2019 would suggest that investors are optimistic about the U.S.'s economic growth outlook. Normally a stronger economy is associated with rising short- and long-term interest rates. However, this year rates fell as the equity market rose, with the 10-year U.S. Treasury yield falling substantially to 2.01% on June 30, 2019, from 2.68% on December 31, 2018. The 3-month U.S. Treasury yield was flat for the first

few months of the year but eventually dropped to 2.09% at quarter end from 2.36% at year end. The 10-year yield decline was greater than the shorter-term drop, so the Treasury yield curve inverted in late May with the 3-month rate below the 10-year yield. The curve has remained inverted since May, although the inverted yield spread has remained relatively narrow at less than 30 basis points (bps). As we discussed in last quarter's letter, an inverted yield curve is often associated with weaker equity markets, but in June, the market rallied despite the inversion.

Despite the significant interest rate declines, higher-yielding stocks lagged for the quarter and the year. Traditionally defensive high-yield sectors such as utilities, real estate investment trusts, and consumer staples are weak performers in a strong up market as their defensiveness outweighs the benefit they gain from falling rates. In addition, energy stocks have a large weight among the highest-yielding stocks, and oil and gas stocks were generally down in the second quarter as oil prices declined.

Other value factors also performed poorly in the quarter and year to date. Low price-to-earnings (P/E) and low price-to-book (P/B) stocks underperformed higher-valuation stocks in both periods. The low P/E and low P/B stocks are heavily weighted toward financials, which had underperformed in the first quarter but did well in the second quarter even as interest rates fell and the yield curve narrowed. However, the large weight among the value stocks in energy hurt performance this quarter after serving as a benefit last quarter. The higher P/E and P/B stocks have a large weight in two sectors that outperformed year to date: technology and consumer discretionary.

Growth factors were more mixed for the quarter and the year. Five-year sales growth was generally positive, as the high-growth stocks consisted of healthcare, media, technology, and perhaps surprisingly, financials. All these groups except healthcare outperformed in the quarter and the year to date. On the other hand, the low sales-growth stocks have a very large weight in energy stocks, which have generally seen revenue declines since 2014—though rebounding off the sales lows in 2016—and these stocks generally lagged in the second quarter with falling oil prices. High-earnings growth has been more negative, particularly among larger-cap stocks. The high-earnings growth names have a large energy weight as the relative recovery in oil prices over the last two years boosted their earnings; however these stocks have not done well this year. Financials, technology, healthcare, and consumer staples have significant weights among the low-earnings growth stocks, and these groups did well this year. Finally, earnings estimate growth has been mostly neutral across the large-cap, small-cap, value, and growth indices.

While growth factors were mixed, value performed poorly enough that the Russell growth indices significantly outperformed almost all of the value indices across the market-cap spectrum in both the second quarter and year to date, as seen in **Figure 3**.

Figure 3
As of 6/30/2019

	Second Quarter 2019		2019 Year-to-Date	
	Growth	Value	Growth	Value
Russell 1000 Index	4.6%	3.8%	21.5%	16.2%
Russell Midcap Index	5.4%	3.2%	26.1%	18.0%
Russell 2000 Index	2.8%	1.4%	20.4%	13.5%
Russell Microcap Index	0.4%	1.4%	16.5%	12.0%

Source: FTSE Russell

Higher-momentum stocks, heavily weighted toward technology in the second quarter, performed well this period. In the first quarter, technology also performed well, but because these stocks had lagged badly at the end of 2018, many tech stocks were ranked as low momentum and their strong returns drove the outperformance of low momentum over higher momentum in the first quarter. With their market-leading returns this year, tech stocks have moved back into the high-momentum category. The momentum groupings tend to show the largest change in composition quarter-to-quarter and year-to-year, since the rankings are so dependent on recent stock performance.

The higher-quality variables, such as high return-on-equity (ROE), positive earnings, low share change, low debt-to-equity, are generally defensive and thus perform relatively poorly in an up market. However, in the second quarter these factors generally did well across the domestic Russell indices. In the first quarter, these factors performed more in line with expectations by trailing in an up market. Combining both quarters' results, the quality variables lagged for the year to date. Similarly, in the second quarter, the higher-beta, smaller-cap, and higher-volatility stocks all underperformed, even though these groups tend to do well in an up market. However, because these stocks had performed well in the first quarter's market rally, for the year to date they were positive in most indices except for the smaller-cap variable. **Figure 4** shows that small-cap indices underperformed for the quarter and the year to date.

Figure 4
As of 6/30/2019

	Second Quarter 2019	2019 Year-to-Date
Russell 1000 Index	4.3%	18.8%
Russell Midcap Index	4.2%	21.4%
Russell 2000 Index	2.1%	17.0%
Russell Microcap Index	0.9%	14.2%

Source: FTSE Russell

INVERTED YIELD CURVES AND FACTOR RETURNS

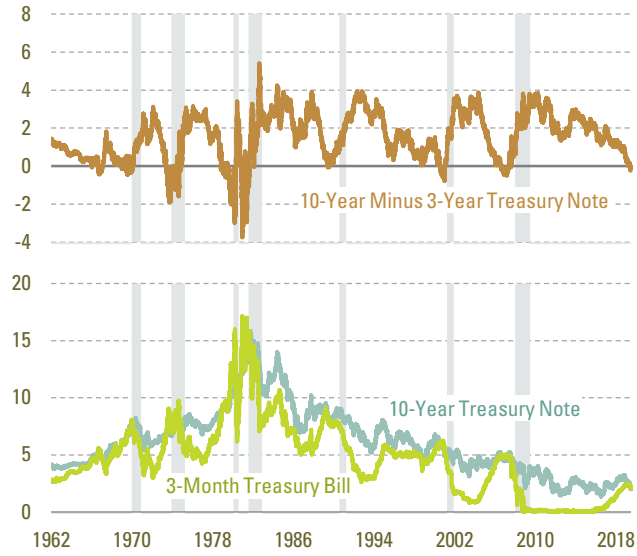
As we discussed in last quarter's review, both short- and long-term U.S. Treasury interest rates rose through 2017 and 2018 reaching five-year highs, supported by robust U.S. economic growth. In late 2018, concerns grew about the sustainability of U.S. economic growth and, as might be expected, interest rates fell. However, when the equity markets rallied in 2019, signaling greater economic optimism, rates surprisingly continued to fall. Long-term rates fell below short-term rates; the inverted yield curve first occurred briefly in March and then for all of June. In **Figure 5**, we show the history of the 10-year Treasury and 3-month Treasury rates since 1962; economic recessions are indicated by the vertical boxes. At this point, the current yield curve inversion is both short in length and very shallow relative to past occurrences.

In last quarter's review, we discussed how historically the market and the U.S. economy reacted to an inverted yield curve. To briefly summarize, an inverted yield curve was bad for both the economy and the U.S. stock market. In six out of seven occurrences since 1962, an inverted yield curve was followed by an economic recession within 18 months. On average, U.S. equity returns were well below long-term historical averages for the first 12 months after the yield curve inverted and for the entire period where long-term rates were below short-term rates. Here, we review how several stock market factors have performed in past periods of yield curve inversion, including low P/E, low P/B, high-dividend yield, high ROE, low share change, nine-month price momentum, and sales growth.

The blue bar in **Figure 6** shows the average return for each of these factors over the first 12 full calendar months following the first day of yield curve inversion. The figures in the chart represent the excess return for each factor relative to its long-term historical averages from 1962-2018. The value factors of low P/E, low P/B, and high yield outperformed or were neutral after the yield curve inverted, relative to their historical averages. The sales growth factor, on the other hand, did relatively poorly after long-term rates fell below short-term rates. However, these results were affected heavily by the July 2000 yield curve inversion, which occurred just after the tech bubble began to collapse. In this period, value factors, which had dramatically underperformed during the 1999-2000 tech bubble, now significantly outperformed as value stocks provided positive absolute returns while the market was down overall. The green bar in **Figure 6** shows the average excess factor returns excluding this 2000 period. Without this extraordinary period, value factors performed poorly after the yield curve inverted and the growth factor did well. The quality factors such as high ROE and low share change did better than their long-term averages with or without the 2000 period, but the excess return is more muted when excluding the tech bubble results. The nine-month momentum factor slightly underperforms its long-term record regardless of whether the 2000 period is included or excluded.

The tech bubble experience may be particularly relevant to the current inverted

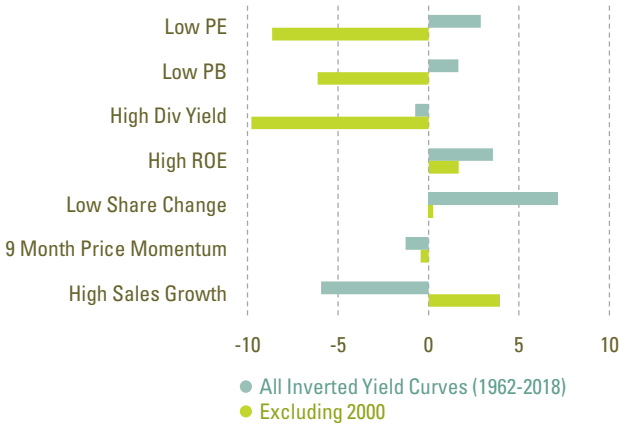
Figure 5 10-Year and 3-Month Treasury Yields and Spread Comparison % | As of 6/28/2019



Gray areas indicate U.S. recession

Source: National Bureau of Economic Research (NBER), FRED Graph Observations, Economic Research Division, Federal Reserve Bank of St. Louis

Figure 6 Returns Relative to Long-Term Historical 12 Months After First Day Yield Curve Inverted



Source: Compustat, FactSet, Federal Reserve Bank of St. Louis

yield curve. Prior to the inverted yield curve in 2000, value factors underperformed much more than they had prior to the yield curve inversion and growth factors performed much better than in the other occasions. In fact, excluding 2000, value factors on average—prior to the yield curve inverting—had performed better than their long-term average while the sales-growth factor did worse. In parallel with the 2000 period, over the last several years, growth factors have done much better than value factors, suggesting that value could, as in 2000, outperform following the yield curve inversion.

The circumstances surrounding this recent yield curve inversion are somewhat unique in other ways as well. Typically, the crossover has occurred with both long and short rates rising, but the short rates accelerating faster to catch and surpass longer yields. In this case, short-term rates were rising, but the long-term rates were falling, dropping over 65 bps this year. Only the shorter-than-average inverted curves of 1989 for two months and in 2000 for five months were preceded by a similar drop in the 10-year Treasury yield. This period is unusual in another aspect: as in the current period, the Federal Reserve (Fed) typically has been raising short-term rates in the run up to the inverted yield curve. However, unlike in the past, the Fed currently is not seeking to wring out inflation, slow an overheated economy, or shut down other market or economic excesses. Instead, the central bank is merely moving rates back to "normal" levels after an extended period near zero. Since this inverted yield curve is not a sign of the Fed's desire to rein in the economy, coupled with the extremely short and shallow inversion so far and the fact that long-term rates have been falling, perhaps the yield curve impact will be less pronounced on economic growth, stock market returns, and factor performance.

[1] Factor returns represent return differences between top quartile (75%) and low quartile (25%) equities by each characteristic. **Market**: Market Capitalization and Market Beta (*Market Sensitivity Coefficient*); **Value**: Price-to-Earnings *(P/E based on trailing 12-month operating earnings)*, Price-to-Book, Dividend Yield *(Among dividend-paying stocks)*; **Quality**: Positive Earnings *(Positive earnings stocks - Stocks with no earnings)*, Positive Dividend (Dividend-paying stocks - Stocks with no dividend), Share Change *(12-month change in shares outstanding)*, Return-on-Equity, Debt-to-Equity; **Sentiment**: Price Momentum *(9-month price change)*, Price Volatility; and **Growth**: Earnings Growth *(1-year earnings growth)*, Sales Growth *(1-year sales growth)*.