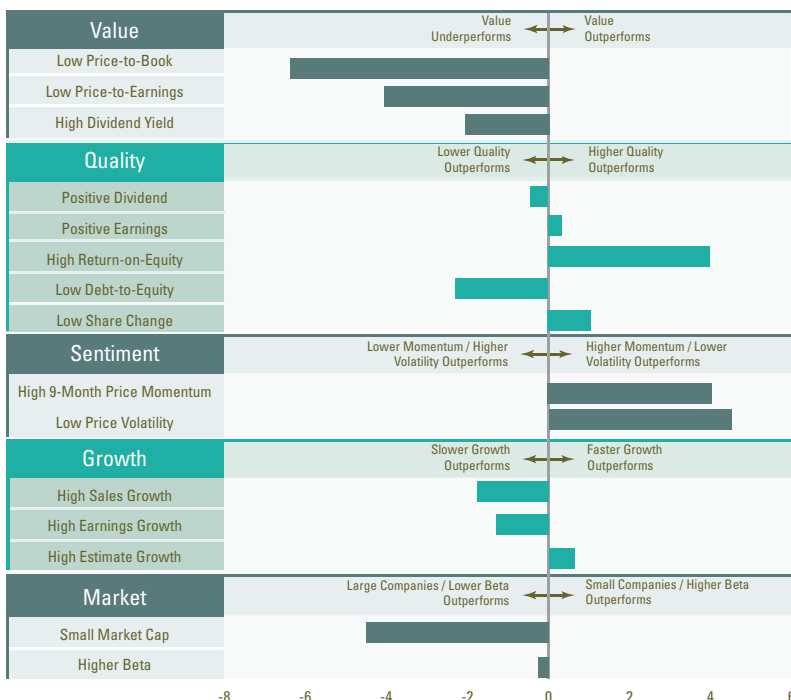


Quantitative Review of U.S. Equities

Third Quarter 2018

- U.S. equity indices reached new highs in the third quarter, buoyed by a strong economy, solid corporate earnings, and somewhat relaxed trade tensions as the U.S. reached trade deals with Mexico and Canada as the quarter ended.
- The continued outperformance by the Russell growth indices is clearly reflected in weak returns for the value factors, including low price-to-earnings (P/E), low price-to-book (P/B), and high dividend yields. However, the returns for high growth factors, such as high sales and earnings growth, also were negative for the quarter; only high estimate growth was modestly positive.
- For the year to date, the growth factors were generally quite positive while the value factors were solidly negative for almost all the Russell indices reviewed.
- High stock price momentum was a strong positive factor across the market as the best-performing stocks in this rally generally continued to lead the gains.
- With incrementally lower trade concerns, larger-cap stocks rebounded relative to small caps. The Russell 1000 Index gained 7.4% compared to the Russell 2000 Index's 3.6% return. Year to date, small caps are still ahead for the value indices but not for the growth benchmarks.
- Despite rising markets, quality factors, which can be defensive at times, performed well this quarter, although they generally trail for the year.
- As growth continues to lead the market higher, we analyze how a narrow group of as few as 10 stocks is driving the growth index returns.

Figure 1 Broad Market U.S. Equity Factor Returns
 QTD; % Return Difference between Factor's High and Low Quartile; Russell 1000 Index; As of 9/30/2018



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

QTD; % Return Difference between Factor's High and Low Quartile; As of 9/30/2018

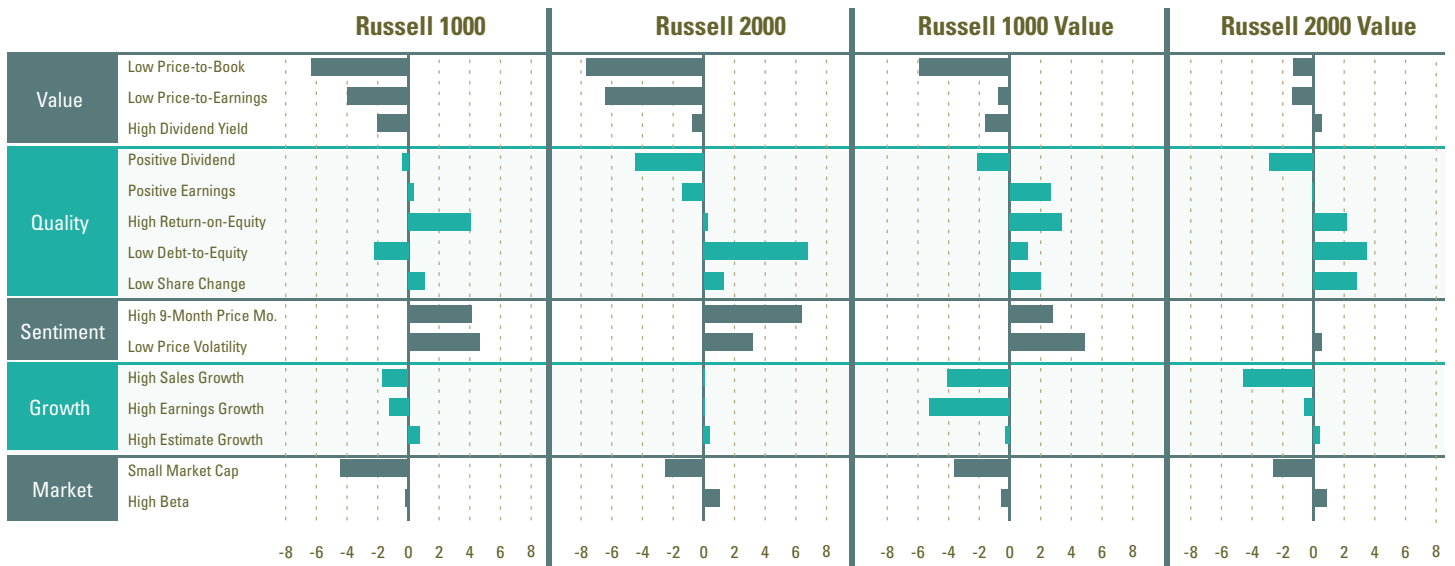
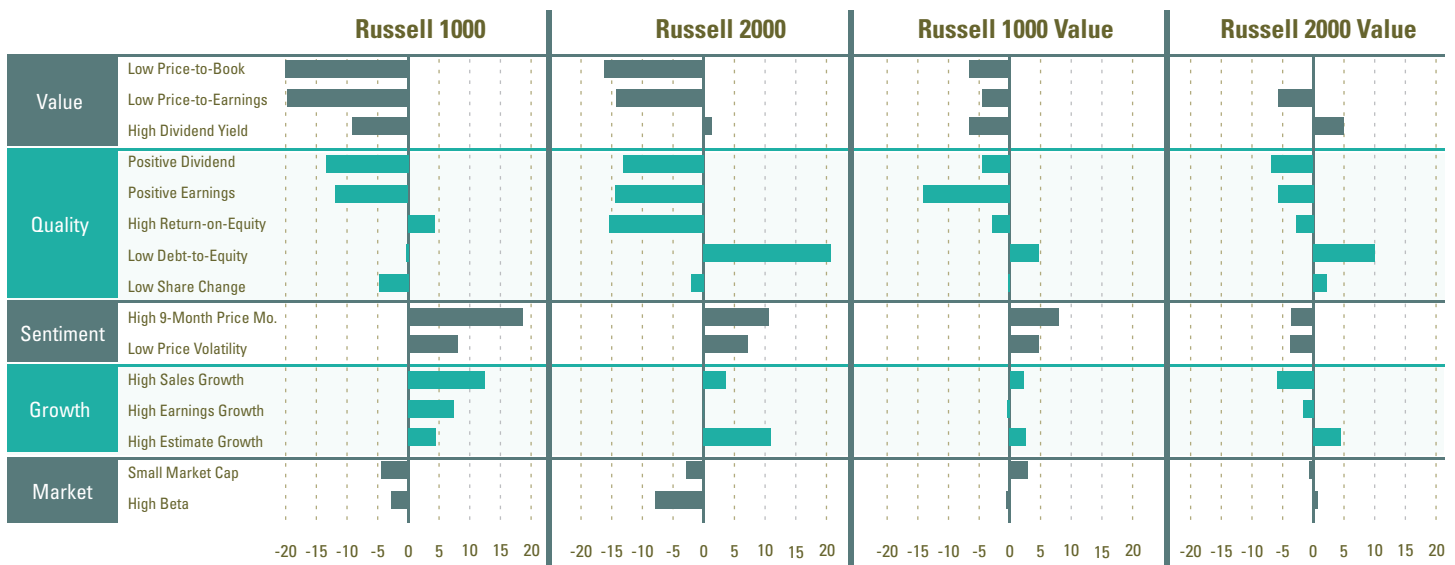


Figure 2B U.S. Equity Factor Returns

YTD; % Return Difference between Factor's High and Low Quartile; As of 9/30/2018



Source: Brandywine Global, FactSet, FTSE Russell

THIRD QUARTER 2018 FACTOR RETURNS

The Russell Growth indices again dominated the value indices this quarter as they have for the year as a whole and for the last 3, 5, and 10 years as well (see **Figure 3**). We discuss in greater depth below the concentration of growth's performance in a small number of stocks, which are largely responsible for the superior returns. The growth dominance is clearly

Figure 3

As of 9/30/2018

	3rd Quarter 2018		2018 Year to Date	
	Growth	Value	Growth	Value
Russell 1000 Index	9.2%	5.7%	17.1%	3.9%
Russell Midcap Index	7.6%	3.3%	13.4%	3.1%
Russell 2000 Index	5.5%	1.6%	15.8%	7.1%
Russell Microcap Index	3.2%	-1.3%	14.3%	9.3%

Source: FTSE Russell

expressed in the poor returns of the low P/B and low P/E value factors. Earlier this year, the value factors were positive at times within value and smaller-cap stocks. This quarter, however, value trailed across the market spectrum. This current weakness has led to poor results for the year to date as well. With interest rates rising this quarter and for the year, higher-dividend stocks also trailed over both periods.

The very poor value factor performance was sufficient to drive the relative returns of the Russell Growth and Value indices because surprisingly some of the growth factors were also negative this quarter. Strong estimate growth was a modestly positive factor, but the stocks with strong sales and earnings growth underperformed in the third quarter. Strong returns among certain large, lower-revenue growth stocks, such as Coca-Cola, Berkshire Hathaway, Walmart, Merck, and Disney, coupled with negative returns from some large, high-growth stocks, such as Facebook and Netflix, overcame the high stock returns from other strong growers like Amazon this quarter. The coincidence of both weak value and growth factor returns this quarter highlights that value factors and growth factors do not necessarily capture the same stocks as clear “value” or “growth” stocks. For instance, a stock with low P/E is not necessarily a low sales growth stock nor is a high earnings growth stock necessarily a high P/B stock. The two sets of factors identify unique stock characteristics that are not always correlated among stocks. For the year to date, given their strong performance earlier in 2018, the growth factors were more consistently positive, with the exception of small-cap value stocks.

As growth indices continued to lead the market rally, growth stocks were the key contributors to the positive returns among high stock price momentum stocks, one of the strongest equity factors this quarter and for the year as a whole. Technology and the small group of FANG (Facebook, Amazon, Apple, Netflix, Alphabet (Google)) stocks have been among the market’s highest performers the last few years. Even with weaker returns from Netflix, they have continued to drive a large high price momentum return. Facebook has lagged enough this past year due to data privacy and revenue and user growth concerns that it fell to the lower half of price momentum among large-cap stocks. Therefore, Facebook’s weak third quarter was actually a positive for high momentum stocks’ outperformance. However, the stock’s poor recent performance has not significantly slowed the overall growth stock rally. Other groups also contributed to momentum factor performance this quarter, including some groups that detracted from the factor’s return last quarter. For instance, since last quarter’s energy stock rally was relatively new, these stocks were still classified as low momentum and their strong returns detracted from the factor’s return. This quarter, many energy stocks have rallied sufficiently such that they now qualify as high momentum, and their third quarter gains were strong enough to contribute to the high momentum factor.

Early in 2018, the Trump administration ignited trade and tariff battles with Mexico, Canada, Asia, and Europe by imposing significant targeted import tariffs while threatening to cancel existing trade deals unless these pacts were renegotiated. In today’s globally integrated economy, almost all companies face some impact from these moves, but generally larger companies have greater involvement in international commerce and, therefore, face greater risk from increasing barriers to global trade. As a result, the smaller market-cap factor was positive for the first half of the year, and the Russell small-cap indices outperformed. However, with the resolution of at least the North American trade deals in the third and early fourth quarters incrementally improving the trade outlook, larger caps rebounded. This shift was reflected by the market-cap factor turning negative (see **Figures 2A-2B** on previous page) and by the larger-cap Russell indices outperforming small-cap indices in the third quarter (see **Figure 4**).

Figure 4
As of 9/30/2018

	3rd Quarter 2018	Year to Date
Russell 1000 Index	7.4%	10.5%
Russell Midcap Index	5.0%	7.5%
Russell 2000 Index	3.6%	11.5%
Russell Microcap Index	0.8%	11.6%

Source: FTSE Russell

Quality factors often exhibit defensive performance and therefore produce trailing returns in strong market rallies. This result held true earlier in the year for most of the quality factors we review. However, this quarter the quality factors of high return-on-equity (ROE), low share issuance, low debt-to-equity (D/E), and positive earnings performed relatively well in most of the Russell indices. This positive performance was not sufficient to overcome the earlier weakness, and most of these factors are still well negative for the year to date. The noticeable exception is for low D/E stocks, which have done well throughout the year. As described in last quarter’s letter, low D/E stocks are concentrated in technology, including Facebook and Alphabet, as well as in energy and financials. Technology was strong based on growth factors while energy stocks benefitted from the steady rise in oil prices since June 2017. Strength in these two sectors overcame poor performance among the financials, another sector concentrated among stocks with low debt burdens.

RETURN CONCENTRATION IN THE RUSSELL 1000 GROWTH INDEX

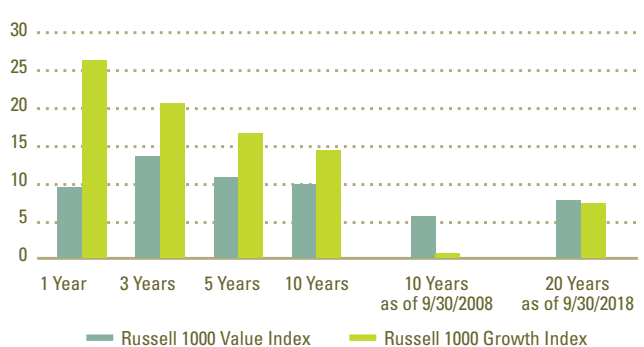
The Russell 1000 Growth Index has outperformed the Russell 1000 Value Index for an extended period, including the last 1, 3, 5, and 10 years (see **Figure 5**). Note that the value index is still ahead for the latest 20-year period ending this quarter due to the impressive value performance following the tech bubble's collapse.

We review here the extreme concentration of this outperformance by calculating the impact of the top 10 contributors to the Russell 1000 Growth Index's return over the last three years.

Comparing the total return for the Russell 1000, 1000 Growth, and 1000 Value indices for the three years ending September 30, 2018, the Russell 1000 Growth Index's nearly 30% advantage over the Russell 1000 Value Index completely disappears if the top 10 contributors to its total return are excluded (see **Figure 6**). This result demonstrates how dependent the growth index's outperformance is on a narrow group of very high return stocks. Of course, any index's return is disproportionately driven by its top contributors, but this example is a more extreme case. For instance, removing the top 10 contributors to the Russell 1000 Value Index's return for this period reduces its return by only 13% compared to almost 30% for the Russell 1000 Growth Index. **Figure 7** lists those top 10 contributors for the growth index and their total return over this period. Most of the stocks at least doubled in price, with Amazon up nearly four-fold and NVIDIA rising 11-fold.

As a comparison, we perform this same analysis for the three years ending March 31, 2000, a period which includes the peak of the tech bubble and its dominating growth index performance. **Figure 8** shows the impact of excluding the top 10 contributors to performance from the Russell 1000 Growth Index during this period, and **Figure 9** lists those largest contributors.

Figure 5 Russell 1000 Value Index vs. Russell 1000 Growth Index %



Source: FactSet, FTSE Russell

Figure 6 Russell 1000 Growth Index: Top Contributors to Index Returns Sept 2015 - Sept 2018

	Total Return
Russell 1000 Growth Index	75.2%
Russell 1000 Index	60.4%
Russell 1000 Value Index	46.4%
Russell 1000 Growth Index ex Top 10 Contributors ²	43.0%

Source: FactSet, FTSE Russell

Figure 7 Russell 1000 Growth Index: Top 10 Contributors Sept 2015 - Sept 2018

	Total Return
Apple	104.7%
Amazon.com	291.3%
Microsoft	158.4%
Facebook	82.9%
Alphabet	89.1%
UnitedHealth Group	129.3%
Visa	115.5%
Boeing	184.0%
Home Depot	79.4%
NVIDIA	1040.0%

Source: FactSet, FTSE Russell

Figure 8 Russell 1000 Growth Index: Top Contributors to Index Returns Sept 1997 - Sept 2000

	Total Return
Russell 1000 Growth Index	156.8%
Russell 1000 Index	109.7%
Russell 1000 Value Index	64.4%
Russell 1000 Growth Index ex Top 10 Contributors ²	94.5%

Source: FactSet, FTSE Russell

Figure 9 Russell 1000 Growth Index: Top 10 Contributors Sept 1997 - Sept 2000

	Total Return
General Electric	213.6%
Cisco Systems	1345.8%
Microsoft	363.5%
Intel	279.3%
Pfizer	160.8%
Lucent Technologies	366.7%
Walmart	305.4%
Merck	47.5%
Home Depot	442.5%
Dell Computer	1176.2%
AOL (11th Largest Contributor)	2438.8%

Source: FactSet, FTSE Russell

For this period, removing these top contributors does not reduce the growth return to the level of the value return, but the total return does decrease significantly, falling by over 60%. The two growth rallies are not completely comparable in that the Russell 1000 Growth Index return was almost twice as high during the tech bubble while the Russell 1000 Value Index return was less than 50% higher in the earlier period. In addition, the individual growth stock returns were even more extraordinary, including the nearly 2500% return from AOL over the three years, which is actually not included in this analysis since it was only the eleventh largest contributor. While history may not be exactly repeating itself, parallels do exist. Using history as a guide, we may now be entering the late stages of another overextended growth stock cycle.

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 (*PE 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*).

² Russell 1000 Growth Index ex Top 10 Contributors calculated by Brandywine Global

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