

Price Gaps Segmentation

QUANTITATIVE RESEARCH

O'NEIL GLOBAL ADVISORS INC.

Price Gaps: Growing by Leaps and Bounds

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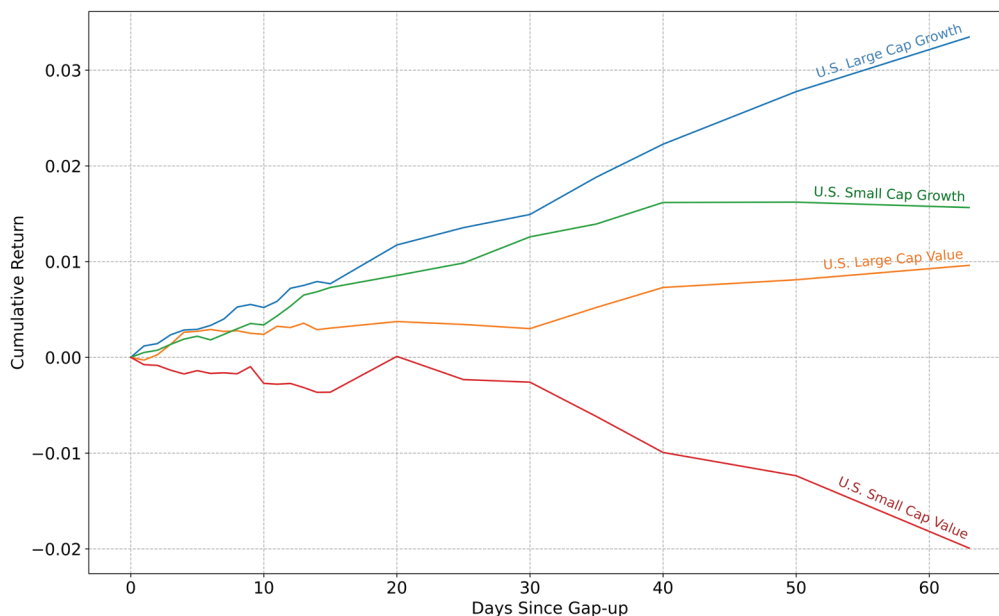


Figure 1: Cumulative average returns by number of days since a gap-up event standardized gap size of $2\sigma+$ across a matrix of size-style segments from 1995 to 2020. The returns are standardized by the average volatility of the companies with the event. Results for the gap-up events occurring on the same day are aggregated and liquidity weighted then averaged over time.

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KEY FINDINGS:

- Style: For both gap-ups and gap-downs, there are much stronger momentum-like signals for growth stocks than for value stocks.
- Size: For gap-downs, there are stronger effects for large-cap stocks than small-cap stocks.
- Size-Style matrix: The signal is strongest for large-cap growth stocks.

EXECUTIVE SUMMARY

We compared post-event performance for one quarter (63 trading days) following price gaps of at least two standard deviations (2σ) of daily log returns in size, segmenting our results by size (large caps/small caps), style (growth/value), and by a matrix of size-style segments. We find generally that gaps generate **much stronger momentum-like signals for growth stocks than for value stocks**. This was true for both bullish gap-ups and bearish gap-downs. For **gap-downs**, we saw a **stronger bearish momentum effect for large-cap stocks than smaller-cap stocks**. Across the size-style matrix, the signal was **strongest among large-cap growth stocks**.

INTRODUCTION

In our prior papers on gaps (Marble & Ognar, 2021, 2021), we identified a momentum-type relationship between the size of the gap and subsequent excess returns. To the extent that discontinuities associated with gaps in price are explained by the arrival of new information, it stands to reason that different market segments whose price formation patterns incorporate higher or lower degrees of uncertainty and incomplete information about the future may respond differently to such arrival events. In these instances, we reason that certain market segments are likely to be more or less prone to momentum effects such that gap events may work well in some but poorly in others. In this paper, we compare the performance of gap events across the dimensions of size, style, and a matrix of size-style segments to demonstrate robustness and to further isolate the source of the momentum-like excess returns we uncovered.

METHODOLOGY

We empirically tested, over a broad cross-section of market segments, the conditional, marginal expectations of cumulative excess returns¹ following gaps in price of at least 2σ from January 1995 to December 2020. We segmented price gap events by size, style, and size-style segments as follows: Each day we sorted stocks in our U.S. equity universe by size, style, and size-style characteristics to assign them a bucket for growth/value², large caps/small caps³, and a matrix of the two sets. We measured cumulative excess returns each day over a subsequent 63-day window and standardized by each stock's individual volatility. We then aggregated the normalized excess returns according to days since the gap event and weighted them by liquidity so that our results are driven by the most well-known companies.

¹ Each day, for each stock in our universe, we apply a forward-looking beta estimate using our proprietary model that weights the results of multiple OLS regressions over various timeframes with expectations of coefficient drift and mean reversion. Excess returns are equivalent to CAPM alphas under zero risk-free rate and zero dividend yield assumptions with the S&P 500 used as a proxy for market returns.

² We assign stocks to growth or value buckets by calculating a growth rank. We rank stocks from 1 to 99 using these components: average daily return (five-year trailing), volatility (five-year trailing), dividend yield, dividend payout ratio, sales yields, recent sales growth, and EPS Rank. Stocks with ranks of 50 and greater are considered growth stocks and stocks with ranks 1 to 49 are considered value stocks.

³ We assign stocks to highly liquid (large cap) or less liquid (small cap) buckets based on their expected liquidity ranking among all U.S. equities. Those in the 80th percentile or greater are considered highly liquid and those in percentiles 50–79 are considered less liquid. Stocks in less than the 50th percentile are considered not investable.

RESULTS

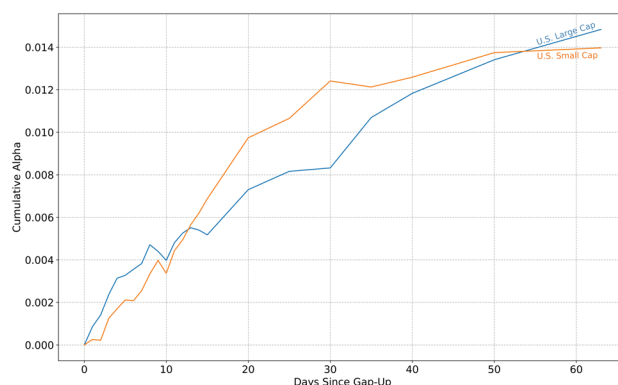


Figure 2: Cumulative excess returns by number of days since a gap-up event by standardized gap size of $2\sigma+$ for the U.S. size segments from 1995 to 2020. Excess returns are standardized by the average volatility of the companies with the event. Results for gap-up events occurring on the same day are aggregated and liquidity weighted then averaged over time.

There seems to be no distinguishable difference in results between the two size segments in terms of excess returns following a gap-up in price. Figure 2 shows that both segments produced about 1.4% in excess returns for 63 days after the gap-up event. However, the large-cap segment produced average returns of 2.38%, compared with 0.26% for small-cap stocks. This difference in average returns and average excess returns could be interpreted as a result of market effects where gap-ups are correlated with bull markets for large-cap stocks and with bear markets for small-cap stocks. In other words, small-cap stocks are more idiosyncratic in nature.

2 Sigma Gap-Ups, 63D Post Event Performance by Size

2 Sigma Gap-Ups - By size	U.S. Large Cap	U.S. Small Cap
Cumulative Log Return	2.37%	0.26%
Cumulative Alpha	1.48%	1.40%
Hit Rate	61.20%	55.16%
Average Gain	12.15%	17.05%
Average Loss	-11.95%	-17.67%
Average Maximum Favorable Excursion	12.07%	16.14%
Average Maximum Adverse Excursion	-9.77%	-14.65%

Table 1: Average post-event performance statistics for 63 days following a gap-up of $2\sigma+$ by U.S. size segment from 1995 to 2020. Returns and excess returns are statistically significant at the 99% confidence level. Cumulative Alpha is based on the CAPM, with the S&P 500 as a proxy for market returns. Hit Rate refers to the percentage of events on average yielding positive returns. Average Daily Frequency is the average proportion of our investable U.S. equity universe experiencing a gap-up on a given day.

SIZE: GAP-DOWNS

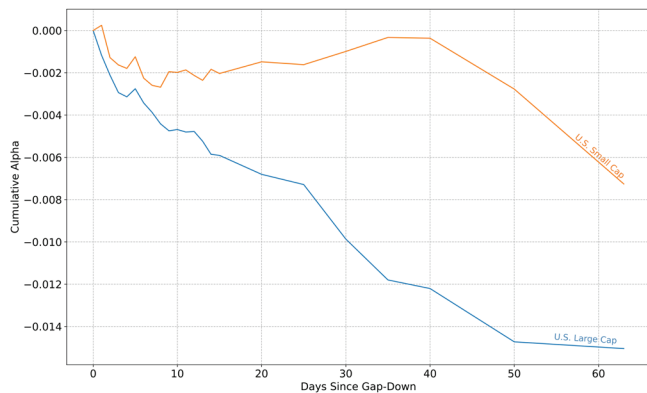


Figure 3: Cumulative excess returns by number of days since a gap-down event by standardized gap size of $2\sigma+$ for the U.S. size segments from 1995 to 2020. Excess returns are standardized by the average volatility of the companies with the event. Results for gap-down events occurring on the same day are aggregated and liquidity weighted then averaged over time.

For gap-downs, we found there to be **stronger effects for large-cap stocks than small-cap stocks**. Figure 3 shows the average alpha for up to 63 days following gap-downs of at least 2σ . Forty days after the event, cumulative alpha for smaller stocks has reverted to approach zero, while for larger stocks it is below -1.2%. Given that, in our formulation, such stocks are axiomatically less liquid, differences in signal strength along these lines could be explained in terms of liquidity-driven market impact. We can observe this mean reversion effect in the form of resistance to the downtrend caused by the gap-down for up to two months afterward. On the other hand, large-cap stocks reflect the arrival of new information and the initiation of negative capital outflows, and that tends to persist through time. The volatility of large-cap stocks also contributes to their outperformance. If we did not normalize excess returns by stock-level individual trailing volatility, we would not see this clear distinction between size segments. Looking into the average returns suggests that gap-downs by large-cap stocks are correlated with bull markets since they generate more excess returns than average returns in the direction of the gap.

2 Sigma Gap-Downs, 63D Post Event Performance by Size

2 Sigma Gap-Downs - By size	U.S. Large Cap	U.S. Small Cap
Cumulative Log Return	-0.50%	-1.68%
Cumulative Alpha	-1.50%	-0.73%
Hit Rate	55.29%	52.50%
Average Gain	12.61%	17.56%
Average Loss	-15.73%	-19.83%
Average Maximum Favorable Excursion	12.18%	16.62%
Average Maximum Adverse Excursion	-14.11%	-17.97%

Table 2: Average post-event performance statistics 63 days following a gap-down of $2\sigma+$ by U.S. size segment from 1995 to 2020. Returns and excess returns are statistically significant at the 99% confidence level. Cumulative Alpha is based on the CAPM, with the S&P 500 as a proxy for market returns. Hit Rate refers to the percentage of events on average yielding positive returns. Average Daily Frequency is the average proportion of our investable U.S. equity universe experiencing a gap-down on a given day.

SIZE: GAP-UPS

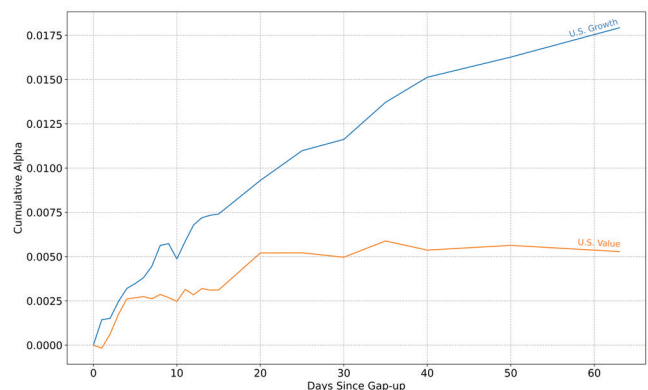


Figure 4: Cumulative excess returns by number of days since a gap-up event standardized gap size of $2\sigma+$ for the U.S. style segments from 1995 to 2020. Excess returns are standardized by the average volatility of the companies with the event. Results for gap-up events occurring on the same day are aggregated and liquidity weighted then averaged over time.

We discovered **significant outperformance of gap-ups by growth stocks compared with value stocks**. Figure 4 shows average cumulative excess returns for up to 63 days following gap-ups. Growth stocks generated about 1.79% in excess returns, whereas value stocks generated about 0.53% for the same period. The difference can be explained by the sensitivity of growth stocks to new information. Since growth companies are valued more on expectations about future earnings, they are more sensitive to changes in information about the probability of their future earnings flow than value companies, which are valued more on current earnings and assets. Therefore, a minor change in the growth rate can dramatically change future cash

flows. This can be expected to result in an instantaneous increase in a company's fair valuation and, in an efficient market, lead to an instantaneous increase in price and, after which, a reversion to performance equal to the market average. However, what we find instead is that this repricing occurs with a tradeable delay that is more significant in the case of growth stocks. The average returns for U.S. growth stocks in Table 3 show that these gap-ups were correlated with the market being in an uptrend, nevertheless, they outperformed value stocks with both better relative and absolute returns.

2 Sigma Gap-Ups, 63D Post Event Performance by Style

2 Sigma Gap-Ups - By style	U.S. Growth	U.S. Value
Cumulative Log Return	2.88%	0.41%
Cumulative Alpha	1.79%	0.53%
Hit Rate	60.82%	57.39%
Average Gain	14.16%	12.03%
Average Loss	-13.46%	-14.30%
Average Maximum Favorable Excursion	14.02%	11.88%
Average Maximum Adverse Excursion	-10.86%	-11.60%

Table 3: Average post-event performance statistics 63 days following a gap-up of $2\sigma+$ by U.S. style segment from 1995 to 2020. Returns and excess returns are statistically significant at the 99% confidence level. Cumulative Alpha is based on the CAPM, with the S&P 500 as a proxy for market returns. Hit Rate refers to the percentage of events on average yielding positive returns. Average Daily Frequency is the average proportion of our investable U.S. equity universe experiencing a gap-up on a given day.

SIZE: GAP-DOWNS

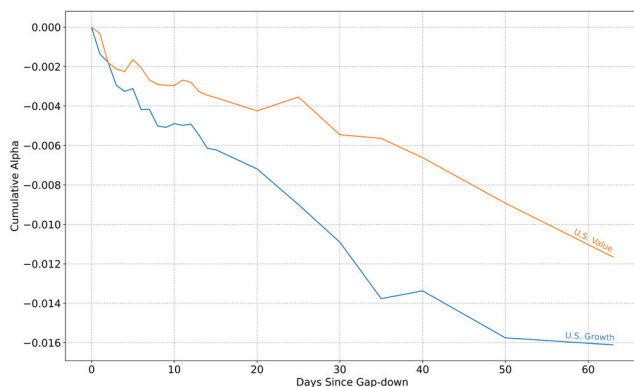


Figure 5: Cumulative excess returns by number of days since a gap-down event standardized gap size of $2\sigma+$ sigma for the U.S. style segments from 1995 to 2020. Excess returns are standardized by the average volatility of the companies with the event. Results for gap-down events occurring on the same day are aggregated and liquidity weighted then averaged over time.

For gap-downs, we see a mirroring of the signal strength differential by style that we saw for gap-ups. Excess returns

for growth stocks are greater in negative magnitude than for value stocks at each point in our 63-day post-event window. Over the full 63 days, we saw excess returns for growth stocks of -1.6%, compared with -1.2% for value. Seeing the same effect in the bearish case provides further evidence as to greater response to new information as a function of greater degrees of future earnings and valuation uncertainty.

In terms of raw returns, however, the relationship was reversed, with growth stocks losing a mere -0.41%, compared with -1.12% for value stocks. This differential is best explained by the timing of the events, which for growth stocks tends to occur more often during bull markets, where gap-downs are expressed by rotation out of disappointing growth names, causing returns to subsequently lag the market.

2 Sigma Gap-Downs, 63D Post Event Performance by Style

2 Sigma Gap-Downs - By style	U.S. Growth	U.S. Value
Cumulative Log Return	-0.41%	-1.12%
Cumulative Alpha	-1.61%	-1.17%
Hit Rate	54.39%	54.56%
Average Gain	15.18%	13.04%
Average Loss	-17.62%	-16.46%
Average Maximum Favorable Excursion	14.46%	12.65%
Average Maximum Adverse Excursion	-15.89%	-14.71%

Table 4: Average post-event performance statistics 63 days following a gap-down of $2\sigma+$ by U.S. style segment from 1995 to 2020. Returns and excess returns are statistically significant at the 99% confidence level. Cumulative Alpha is based on the CAPM, with the S&P 500 as a proxy for market returns. Hit Rate refers to the percentage of events on average yielding positive returns. Average Daily Frequency is the average proportion of our investable U.S. equity universe experiencing a gap-down on a given day.

SIZE: GAP-UPS

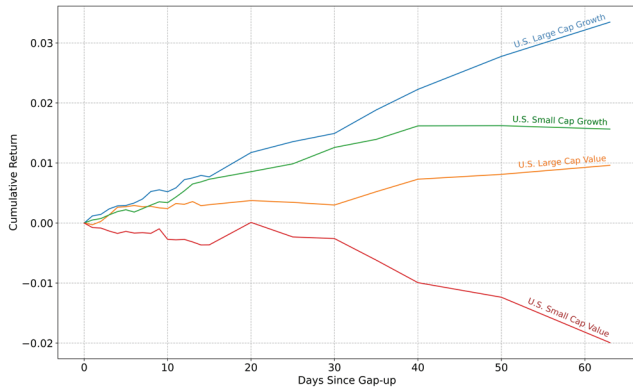


Figure 6: Cumulative average returns by number of days since a gap-up event standardized gap size of 2σ +sigma across a matrix of size-style segments from 1995 to 2020. The returns are standardized by the average volatility of the companies with the event. Results for gap-up events occurring on the same day are aggregated and liquidity weighted then averaged over time.

Across the full matrix of Size-Style, we similarly found differential signal strength along the size dimension as evidenced by significant outperformance by growth stocks compared with value stocks. As table 5 shows, excess returns for small-cap growth stocks exceed those of their average returns, which suggests that the gap-ups by small-cap stocks are correlated with bear markets. Therefore, since we are interested in the efficacy of gap-ups in bull markets, we chose to evaluate average returns instead of excess returns as they contain the bull market effects. Large-cap growth stocks have the best average returns of 3.35%, which reduces to excess returns of about 1.9% after accounting for market effects. This is significant because 1.9% is the excess returns while the market is in an uptrend.

2 Sigma Gap-Ups, 63D Post Event Performance by Size Style

2 Sigma Gap-Ups - By size style	U.S. Large Cap Growth	U.S. Large Cap Value	U.S. Small Cap Growth	U.S. Small Cap Value
Cumulative Log Return	3.35%	0.96%	1.56%	-1.99%
Cumulative Alpha	1.89%	0.61%	2.11%	0.46%
Hit Rate	62.77%	58.72%	56.08%	52.82%
Average Gain	13.08%	10.52%	17.31%	16.51%
Average Loss	-12.02%	-11.93%	-16.04%	-20.20%
Average Maximum Favorable Excursion	13.07%	10.56%	16.49%	15.31%
Average Maximum Adverse Excursion	-9.68%	-9.94%	-13.62%	-16.47%

Table 5: Average post-event performance statistics 63 days following a gap-up of 2σ + by U.S. size-style segments from 1995 to 2020. Returns and excess returns are statistically significant at the 99% confidence level. Cumulative Alpha is based on the CAPM, with the S&P 500 as a proxy for market returns. Hit Rate refers to the percentage of events on average yielding positive returns. Average Daily Frequency is the average proportion of our investable U.S. equity universe experiencing a gap-up on a given day.

SIZE: GAP-DOWNS

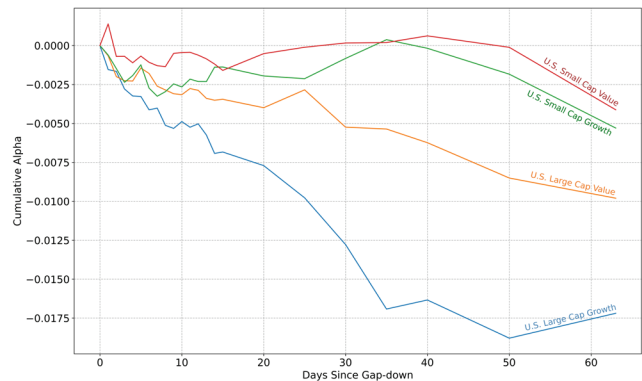


Figure 7: Cumulative excess returns by number of days since a gap-down event standardized gap size of 2σ + across a matrix of size-style segments from 1995 to 2020. Excess returns are standardized by the average volatility of the companies with the event. Results for gap-down events occurring on the same day are aggregated and liquidity weighted then averaged over time.

We found significant outperformance of gap-downs by large-cap growth stocks. The excess return was -1.7%, which was significantly higher than the rest of the sub-segments. This can be explained by the fact that growth companies are valued more on expectations of future earnings and thus are sensitive to any changes in that information. In addition, those growth stocks that are also large caps are easier to trade, so the response to the new information gets amplified because the stock is highly liquid as well. Comparing average versus excess returns for the large-cap

growth segment suggests that gap-downs for these stocks are correlated with bull markets, and so in a rising market, these stocks will lag.

2 Sigma Gap-Downs, 63D Post Event Performance by Size Style

2 Sigma Gap-Downs - By size style	U.S. Large Cap Growth	U.S. Large Cap Value	U.S. Small Cap Growth	U.S. Small Cap Value
Cumulative Log Return	-0.24%	-0.51%	-0.51%	-2.49%
Cumulative Alpha	-1.72%	-0.98%	-0.53%	-0.41%
Hit Rate	54.50%	56.03%	54.15%	51.13%
Average Gain	13.73%	11.93%	18.61%	16.61%
Average Loss	-16.80%	-14.92%	-19.54%	-19.96%
Average Maximum Favorable Excursion	13.19%	11.58%	17.48%	15.91%
Average Maximum Adverse Excursion	-15.22%	-13.35%	-17.62%	-18.38%

Table 6: Average post-event performance statistics 63 days following a gap-down of $2\sigma+$ by U.S. size-style segments from 1995 to 2020. Returns and excess returns are statistically significant at the 99% confidence level. Cumulative Alpha is based on the CAPM, with the S&P 500 as a proxy for market returns. Hit Rate refers to the percentage of events on average yielding positive returns. Average Daily Frequency is the average proportion of our investable U.S. equity universe experiencing a gap-down on a given day.

CONCLUSION

Our results provide evidence that momentum-like effects following gaps are relatively stronger among growth stocks than value stocks. If we hypothesize that gaps in price reflect the arrival of new information, and that larger gaps implicitly reflect a greater gravity of such information, we might also theorize that different types of stocks are relatively more or less susceptible to new information. Valuation methods such as Discounted Cash Flow analysis (DCF) consider the present value of future cash flows. Cash flows of established businesses that are steady and not predicted to grow by much involve little uncertainty about the future and are perhaps less fragile in the face of new information associated with earnings reports, for example. However, present values that are derived from uncertain estimates of future growth can prove highly fragile to new information, such as decelerating sales growth. Such stocks may find their ownership base to be of the fair-weather variety, bidding up shares aggressively chasing recent growth prospects and fleeing just as quickly at the first sign that such prospects may be overly optimistic. This could explain the differential performance, particularly of large-cap growth names, following gaps in price, a phenomenon that we believe represents a tactical trading opportunity.

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