JAG CAPITAL MANAGEMENT LLC

Strike Down the Band

AUTHOR

Joseph Kinnison, CFA
Director of Equity Research

Joe coordinates JAG's equity research activities and serves as Senior Analyst on JAG's managed equity strategies.

Shaun White just won his third gold medal in the halfpipe. The sport has advanced a lot in the 12 years since his first Olympic medal. The 2006 winning run contained a front-side 1080, a McTwist, and a 900. By 2018, this collection of moves would not even qualify for the Olympics. The winning run in 2018 contained a switch 1440, a double McTwist, and a 1260. Technical stock analysis is a lot like the halfpipe. The tricks that worked decades ago would not work today. The "sport" of technical analysis has evolved with experience and training. Performing a moving average or a volume-at-price analysis no longer adds alpha to an equity investment process. However, if those technical tools are inverted, extended, and arrayed they can yield insights. The degree of difficulty is rising.

About four decades ago, John Bollinger developed a stock trading system that relied on three factors: a 20-day moving average of stock prices along with an upper and lower band each two standard deviations away from the middle band. His finding was that when stocks advanced beyond the upper two standard deviation band that they would continue to outperform for some time. This method was publicized in television appearances throughout the 1990's, and Bollinger published a book on his findings in 2001. In recent years, investors have grown suspicious of the performance results of the Bollinger Band investment framework, and a 2017 research paper from Fang, Jacobsen, and Qin determined that returns from a Bollinger Band-based method "are mostly negative... and such losses have worsened over time." Our own analysis agrees with that finding.

>> Bollinger Bands are so well understood as a technical tool that doing the opposite works.

>> Problems with the traditional Bollinger Band method can be fixed by changing the moving average.

>> Inverting, extending, and arraying produces a useful factor.

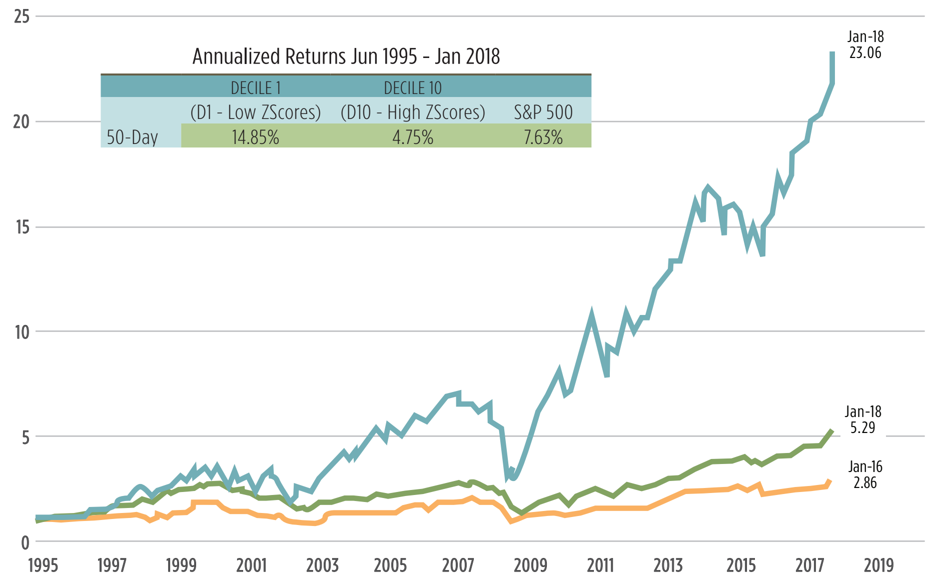
Sample stock market graph using Bollinger Band analysis

Opposite Day

Bollinger Bands are comprised of readily available price information and simple statistical concepts. As such, the bands were pretty easy to copy, especially as computer resources became more inexpensive and more available. As investors widely reproduced the Bollinger Bands, the returns from what was once a market anomaly have disappeared. So much did the performance change, in fact, that using the Bands the opposite of the original design yields performance in excess of broad market benchmarks. Looking at the chart below you will see equity security performance distinguished by Z-scores. Z-scores represent the “bands” set two standard deviations away from a central moving average. Our data shows that the lowest Z-scores, or stocks two or more standard deviations below the middle band, have outperformed both the S&P 500 and, even more so, the highest Z-scored stocks over the last 20+ years. Since a year after the publication of Bollinger’s book in 2001, what could be described as the opposite of his recognized anomaly has performed well.

Buying stocks after a significant gap up, consolidation, and then new high, Bollinger’s method has been a loser both cumulatively and in 13 of the last 16 years. Instead, buying stocks after a significant gap DOWN yields substantial relative performance over time. This is the sort of thing that happens on Wall Street. When everyone believes the same thing, often the investment opportunity is to take the other side. That was true in the financial crisis and true in this year’s volatility correction.

Cumulative Return for Russell 1000 Growth Firms with Low 50-Day ZScores* (blue line) **High 50-Day ZScores**** (orange line), **S&P 500** (green line)



*Low 50-day ZScores = Russell 1000 Growth constituents in top decile (D1) when sorted by 50-day ZScores based on price

**High 50-day ZScores = Russell 1000 Growth constituents in bottom decile (D10) when sorted by 50-day ZScores based on price

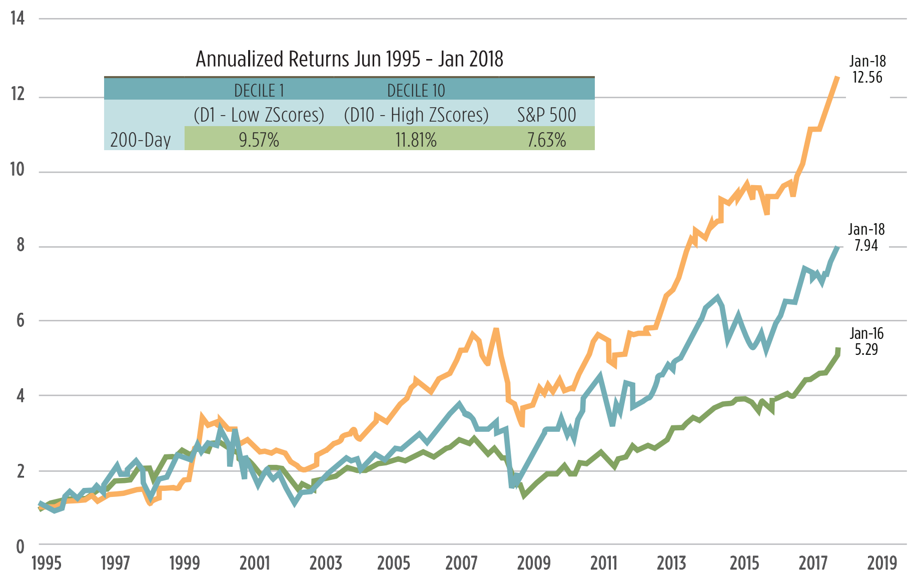
Source: Bloomberg, JAG Capital Management

JAG

"Recalculating" My GPS Device

The Bollinger Band method no longer works structurally as originally designed. However, shifts to the time frame of the moving average used for the center point of the Bollinger Band system can yield positive results. While our tests show that looking for positive gaps two deviations above a 21-day moving average may be the worst performing application of the Bollinger Band (this is the original design), applying the technique to a 200-day moving average does generate a positive return profile. In the chart below high Z-scores relative to a 200-day moving average beat both the S&P500 and the low Z-score constituent. Time frame appears to be an issue for those using Bollinger Bands. Using a 21-day moving average, the opposite of the traditional methodology works best. Using a 200-day moving average, buying upward gaps does work to the benefit of the investor. To the best of our knowledge, John Bollinger did not consider this timeframe himself. In a 1997 interview in AIQ, John Bollinger described his process as centering on a three-to-six month time frame. Using a full trading year moving average, we believe that a Bollinger Band break-out may help identify momentum stocks whose performance persists for a long period following a sudden positive move.

Cumulative Return for Russell 1000 Growth Firms with Low 200-Day ZScores* (blue line) **High 200-Day ZScores**** (orange line), **S&P 500** (green line)



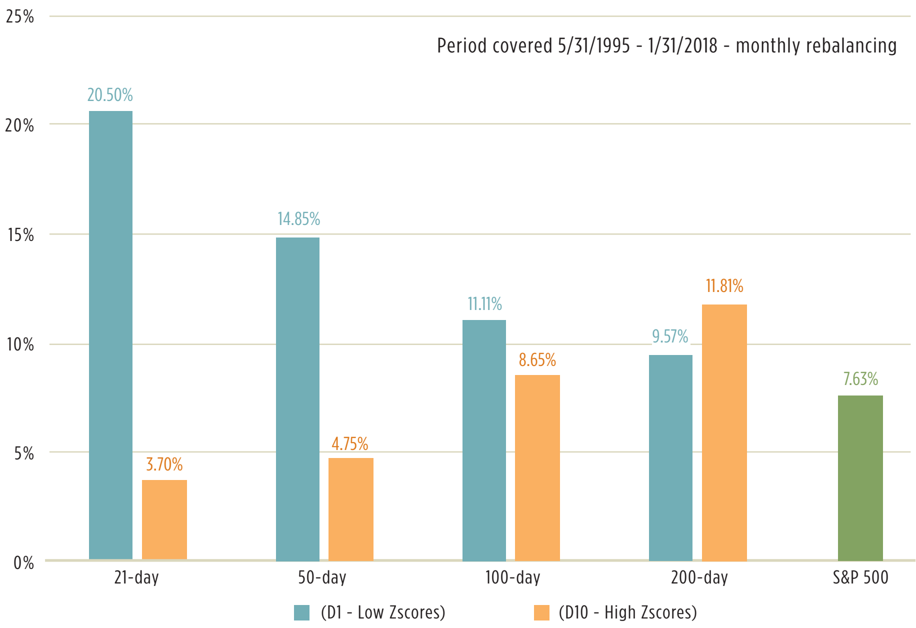
*Low 200-day ZScores = Russell 1000 Growth constituents in top decile (D1) when sorted by 200-day ZScores based on price
**High 200-day ZScores = Russell 1000 Growth constituents in bottom decile (D10) when sorted by 200-day ZScores based on price

Source: Bloomberg, JAG Capital Management

Next Level

Although utilizing a Bollinger Band-based method using a 200-day central moving average does work, JAG believes that there are better momentum factors. As such, our focus remains on shorter term central moving averages as a basis for the trading tool. Again, our research supports using the INVERSE of the traditional Bollinger Band design. We would be buyers of stocks gapping down and sellers of stocks gapping up, all other factors equal. Our experience with using Bollinger Bands is that trading costs can be high using an indicator based on 21-days of price data. We experimented with other data sets, and we concluded that using a longer moving average as the basis for our Z-scores preserved much of the alpha generated by the inverse Bollinger Band trade while reducing the turnover prompted by the factor. Second, JAG believes that perspective is required for the useful interpretation of Z-scores. We percentile rank Z-scores to view results in comparison to those of other growth stocks. In so doing, we believe that we see the relative significance of the measure, giving more perspective.

Annualized Returns Low Z-Score Stocks (blue bars)
vs. High Z-Score Stocks (orange bars)



Source: Bloomberg, JAG Capital Management

Conclusion

Some traditional methods of technical analysis have been so well incorporated by equity market participants that it has created a situation where the opposite of the original method is now true. At JAG Capital Management, we believe that re-analyzing traditional methods, adjusting parameters, and adding some modern upgrades can produce differentiated and impactful investment factors. These factors comprise our J-score tool.

ABOUT JAG

JAG Capital Management is an independent, 100% employee-owned registered investment advisor headquartered in St. Louis, Missouri. The firm provides portfolio management services for institutions, individuals, investment advisory firms and corporations. In addition to managing the JAG Large Cap Growth mutual fund, equity and fixed income separate accounts are also offered.

JAG
CAPITAL MANAGEMENT LLC

9841 Clayton Road | St. Louis, MO 63124
800.966.4596 **www.jagcapm.com**
Securities offered through JA Glynn Investments LLC, Member FINRA and SIPC