markit®

Factor Crowdedness

Research / March 2016

Neerav Aggarwal

neerav.aggarwal@markit.com

Shan Gao, FRM

shan.gao@markit.com

David Riehl

david.riehl@markit.com

For more information, please contact us at **MSF-support@markit.com** or call one of our regional offices:

London +44 20 7260 2000
New York +1 212 931 4900
Amsterdam +31 20 50 25 800
Boulder +1 303 417 9999

Dallas +1 972 560 4420
Frankfurt +49 69 299 868 100
Hong Kong +852 3478 3948
Tokyo +81 3 6402 0130

Toronto +1 416 777 4485
Singapore +65 6922 4200
Sydney +61 2 8076 1100

Abstract

Securities lending data can be highly valuable to portfolio managers allowing them to identify factors that are getting crowded by short sellers and to understand the directional views of institutional investors[1]. In this research paper, we demonstrate how Markit's Securities Finance and Research Signal dataset can be combined together to measure factor crowdedness. We took the average Utilization differential between the lowest ranked and the highest ranked stocks within a factor and demonstrate how the trend has evolved over the last four years. We also took a deep dive on the Book-to-Market factor in Markit's US Large Cap universe and found:

- Trend reversal in the Book-to-Market factor: short sellers were shorting more of value[2] stocks in the last three quarters of 2015 as compared to prior periods in the study where they were shorting more of growth stocks.

- Average Utilization in value stocks stood close to its four year high of 18% as at 31st Dec 2015.

- Sharpe ratios from the value and growth universes improved by 113% and 42% respectively when combined with the low Utilization factor.
  - ➢ annual growth stock returns improved by 477 bps
  - ➢ annual value stock returns improved by 689 bps

- From July 2014, shorting highly utilized value stocks and buying low utilized value stocks yielded a hefty 50% return on an annual basis.

1 Introduction

Markit Securities Finance covers more than 3 million intraday transactions dating back 10 years, spanning $15 trillion of securities in the lending programs of over 20,000 institutional funds globally, capturing around 90% of the securities lending market in developed markets, though the coverage can be lower for emerging and frontier areas where the securities lending market is not yet fully developed. This comprehensive dataset includes a wide range of securities lending metrics collected on a daily frequency. Content includes shares borrowed, inventory of available shares on loan, level of utilization, loan concentration, and stock borrowing costs.

Markit Research Signals delivers valuable investment insights through a comprehensive library of stock selection and strategy factors, which covers over 260 global factors. In this study, we attempted to measure crowdedness in the following factors sourced from their factor suite: Book-to-Market, Price Momentum, Beta and Realized Volatility.

---

[1] We took inspiration from Hanson and Sunderam (2011), Deutsche Bank 2012 paper on factor crowdedness and our internal research that we did in 2012.

[2] Stocks in the top decile of the Book-to-Market factor are defined as value (cheap) stocks and stocks in the bottom decile of the factor are defined as growth (expensive stocks).

2 Universe and data

We used Markit's US Large Cap universe in our study which contains around 1000 large cap stocks in the US market and our test period ran monthly from December 2011 to December 2015. The universe and its historical constituents are maintained by Markit's Research Signals team.

We used the Utilization metric from Markit's Securities Finance dataset to measure shorting activity and factor crowdedness. It is the percentage of stocks that are currently lent by the custodians relative to the amount of stock held by them in their lendable inventory pool. It is a better measure than short interest because it gauges both supply and demand within the securities lending market. The Utilization coverage on Markit US large cap universe is over 99%.

It is worth mentioning that this method can be applied to any factor on the Research Signals factor library to gauge crowdedness by short sellers.

3 Factor crowdedness

The table below summarizes the crowdedness for the universe and the studied factors in their top and bottom decile stocks by annual breakdown represented by average Utilization levels. We observed that in general, growth stocks, low momentum, high beta and volatile stocks had a higher utilization level than the universe.

	Rank	2012	2013	2014	2015
US Large Cap		**12%**	**11%**	**10%**	**11%**
Book to Market	Low (Growth)	18%	17%	15%	15%
	High (Value)	10%	10%	9%	15%
Price Momentum	Low	21%	19%	17%	21%
	High	8%	7%	6%	6%
Beta	Low	11%	10%	10%	7%
	High	15%	12%	12%	16%
Realized Volatility	Low	9%	8%	7%	6%
	High	25%	22%	22%	26%

Table 1: Average Utilization by factors, US Large Caps, Dec 2011 – Dec 2015

Book to Market ratio

In order to measure short selling crowdedness in the Book-to-Market factor, we took the average difference of the Utilization factor between growth (lowest ranked) and value stocks (highest ranked) at the end of every month over the last four years. As seen in Figure 1, growth stocks were heavily crowded by short sellers in most of our sample period with a Utilization differential of 7% on average between growth and value stocks. Growth stocks started to get less crowded from September 2014 onwards with short sellers increasing their positions in value stocks. It was from March 2015 onwards that we saw value stocks getting more crowded than growth stocks and with the exception of May and June 2015, short sellers have maintained higher positions in value stocks.

It is noteworthy that Deutsche Bank research[2] also found a similar reversal: before the start of the financial crisis expensive stocks were more heavily shorted than cheap stocks and the relationship reversed during the crisis.
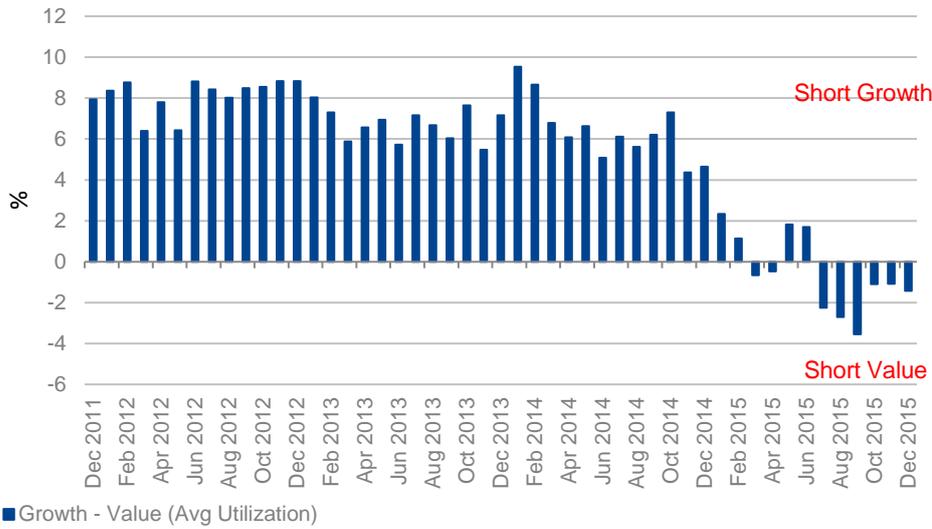
Growth vs Value (Average Utilization)

Figure 1: Average Utilization difference between growth stocks and value stocks, US Large Caps, Dec 2011 – Dec 2015

Figure 2 below shows average Utilization for the overall universe and our growth and value stocks over the sample period. For the overall universe, Utilization had been decreasing gradually since the begining of the period but started to increase from Q4 2014. Utilization for growth stocks, which was generally higher than value stocks and the overall universe, saw a declining trend as well. The most interesting trend happened in value stocks which saw a declining Utilization trend until Q3 2014. After that, Utilization in value stocks picked up pretty rapidly and increased from 8% in September 2014 to 18% in December 2015.
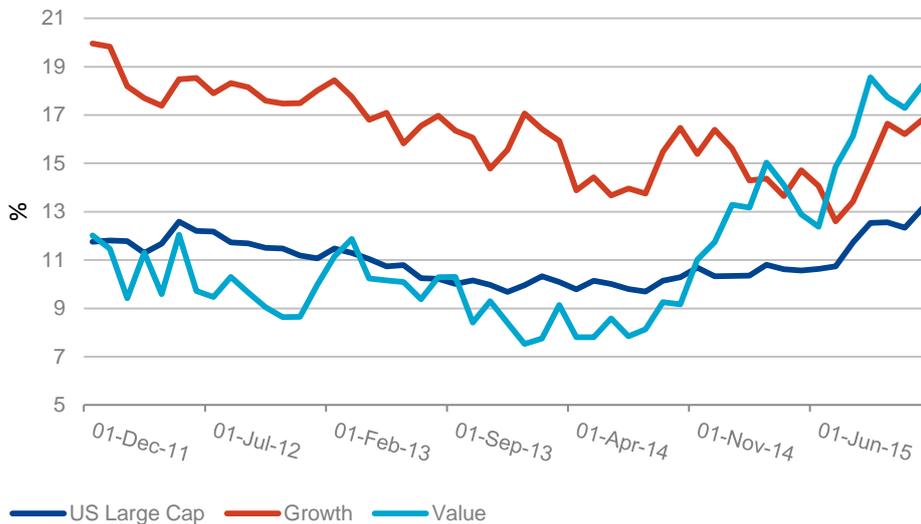
Average Utilization

Figure 2: Average Utilization for growth stocks and value stocks, US Large Caps, Dec 2011 – Dec 2015

Price Momentum

We then performed the same analysis on price momentum. Figure 3 below shows the average Utilisation differential between stocks with low price momentum and those with high price momentum. Figure 4 shows the individual trends in average Utilization along with the overall universe.

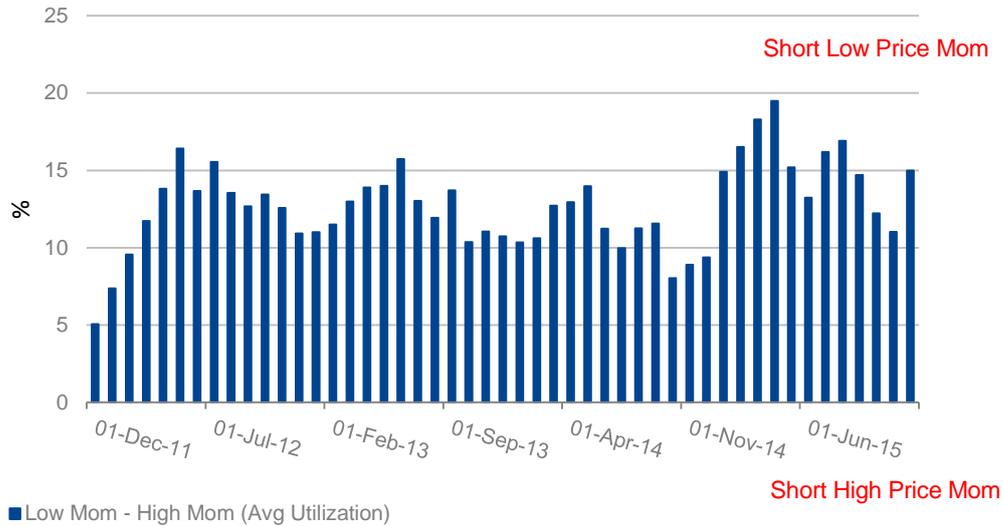**Low Price Mom vs High Price Mom (Average Utilization)**

Figure 3: Average Utilization difference between LPM stocks and HPM stocks, US Large Cap, Dec 2011 – Dec 2015

Average Utilization

Figure 4: Average Utilization of LPM stocks and HPM stocks, US Large Cap, Dec 2011 – Dec 2015

We can observe that short sellers were mainly targeting stocks with low price momentum. The average Utilization differential widened from the last quarter of 2014 but reverted back to a more typical 10-15% level more recently.

Beta

Figure 5 below shows the average Utilization differential between high beta stocks and low beta stocks. Figure 6 presents the individual trends in average Utilization along with the overall universe.

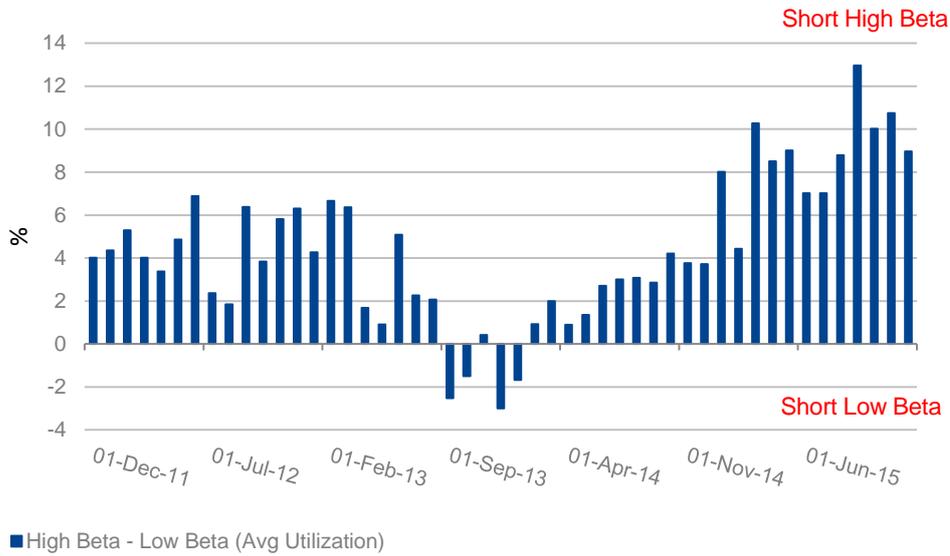**High Beta vs Low Beta (Average Utilization)**

Figure 5: Average Utilization difference between high and low beta stocks, US Large Cap, Dec 2011 – Dec 2015

Average Utilization

Figure 6: Average Utilization of high beta stocks and low beta stocks, US Large Cap, Dec 2011 – Dec 2015

The average Utilization differential between high beta and low beta stocks was around 4% at the beginning of the study period and had been declining since the bull market in 2012. The fact that investors shorted less of high beta stocks and more of low beta stocks for a few months supports the theory that investors tend to overweight high beta stocks and underweight low beta stocks in an up market.

What happened next was interesting. The Utilization differential that had fallen to negative in 2013 started increasing again from the beginning of 2014, while the market was still going up. It kept going up and reached 13% in September 2015. Considering the recent market decline, one could argue that short sellers anticipated the beginning of it and adjusted their weightings before the market went down.

Realized Volatility

Figure 7 below shows the average Utilization differential between stocks with a high volatility and those with low volatility. Figure 8 plots the individual trends in average Utilization along with the overall universe.
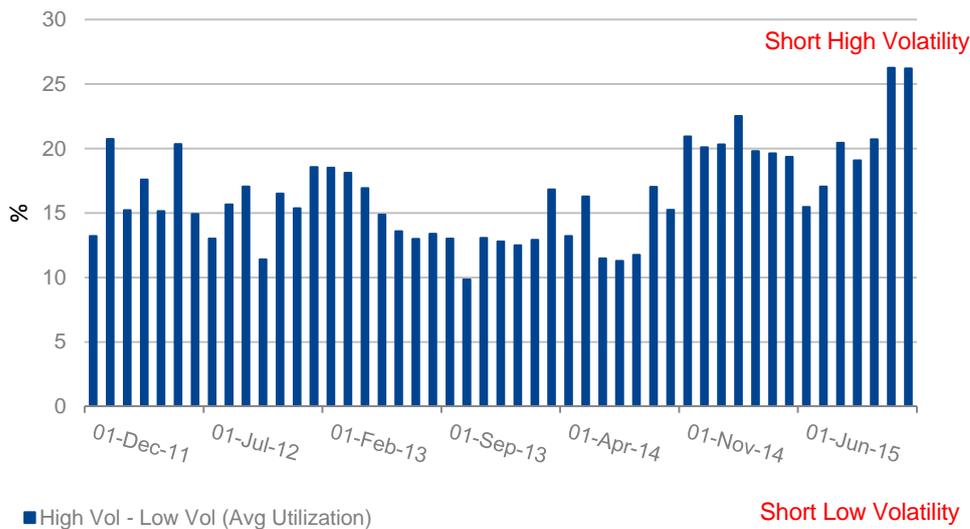
High Vol vs Low Vol (Average Utilization)

Figure 7: Average Utilization difference between HRV and LRV stocks, US Large Cap, Dec 2011 – Dec 2015
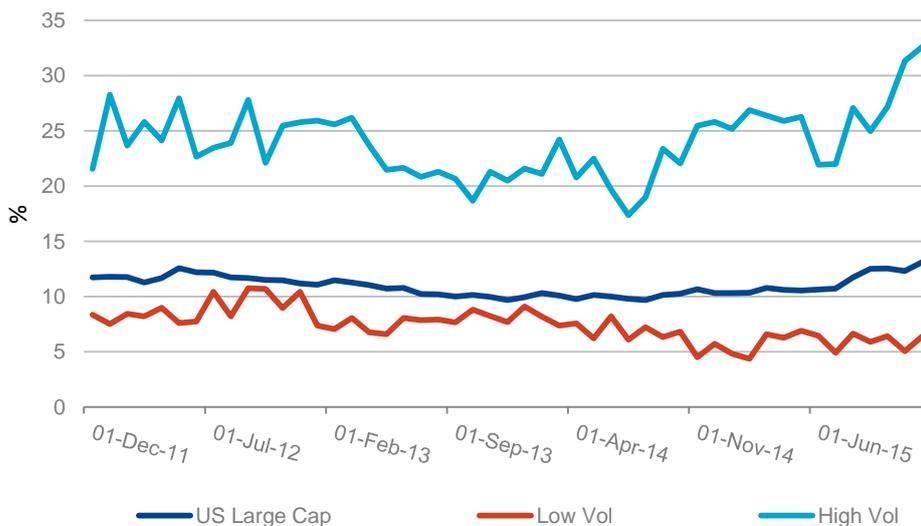
Average Utilization

Figure 8: Average Utilization of HRV stocks and LRV stocks, US Large Cap, Dec 2011 – Dec 2015

As observed, the average Utilization differential between stocks with high volatility and those with low volatility was quite big, around 15% from 2012 to 2014. The gap increased further to the range of 20% in 2015, which was mainly driven by the increased shorting of volatile stocks.

4. Factor performance and Utilization overlay

In this section, we focused on the performance of the Book-to-market factor and also overlaid it with Utilization to see if any enhancements could be made.

To begin with, we looked at the return generated by growth and value stocks, and compared it against the overall universe, assuming equal weightings. Detailed performance statistics are presented in Table 2 below and Figure 9 shows the cumulative return over the 4 year period.

Performance Summary	US Large Cap	Growth	Value
Cumulative Return	65.7%	95.2%	48.0%
Annual Return	13.5%	18.2%	10.3%
Annual Volatility	11.6%	13.2%	16.2%
Sharpe ratio	1.16	1.38	0.63

Table 2: Performance statistics, US Large Caps, growth vs. value, Jan 2012 – Dec 2015
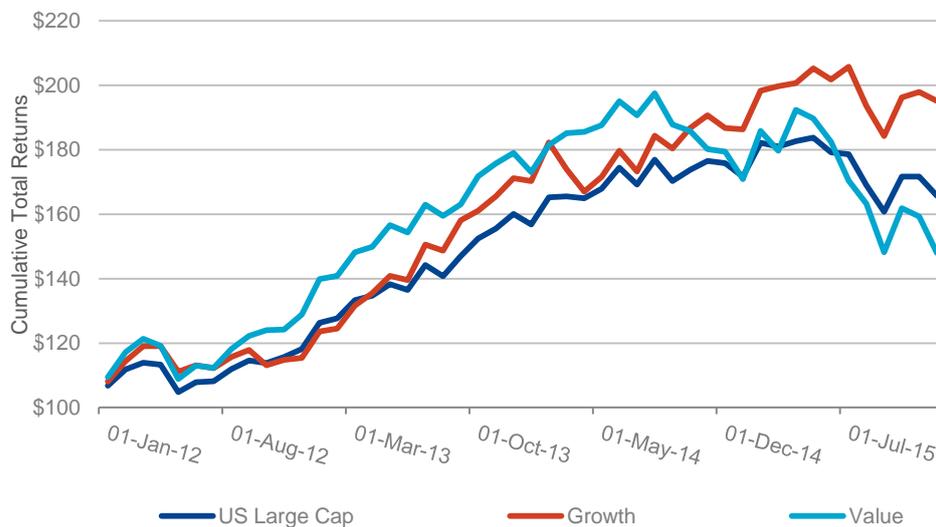

Figure 9: Cumulative returns, US Large Caps, growth vs. value, Jan 2012 – Dec 2015

We found that growth stocks outperformed the US large cap universe and value stocks underperformed the universe over the sample period. Growth stocks had the best return to risk ratio (Sharpe ratio) of 1.38. Value stocks offered the lowest return and highest volatility in terms of portfolio performance, which resulted in the lowest Sharpe ratio. It is worth highlighting that value was outperforming growth and the overall universe until

July 2014. However, from Aug 2014 onwards the performance started to decline. This coincided with the rise in borrowing of value stocks, as seen in Figure 1 earlier.

It is not surprising to see that short sellers, who are more likely to be sophisticated investors, have correctly predicted the decline in return generated from value stocks. The Utilization of value stocks is still at a high point currently and would be an interesting area to watch in the coming months.

After we analysed the performance of growth and value stocks, we wanted to see if the Utilization metric could be used within the growth and value universes to see if the performance could be improved.

Table 3 shows the performance statistics for four different strategies within the growth universe: all growth stocks, stocks with high and with low Utilization, and a combined strategy where we bought stocks with low Utilization and sold stocks with high Utilization within the growth universe. The threshold used to identify high and low utilized stocks is top and bottom 30% stocks within the growth universe. The cumulative returns of the four strategies are plotted in Figure 10.

Performance Summary	Growth	Growth (High Util)	Growth (Low Util)	Growth (Low - High Util)
Cumulative Return	95.2%	66.8%	128.6%	29.1%
Annual Return	18.2%	13.6%	23%	6.6%
Annual Volatility	13.2%	18.2%	11.7%	11.5%
Sharpe ratio	1.38	0.75	1.96	0.57

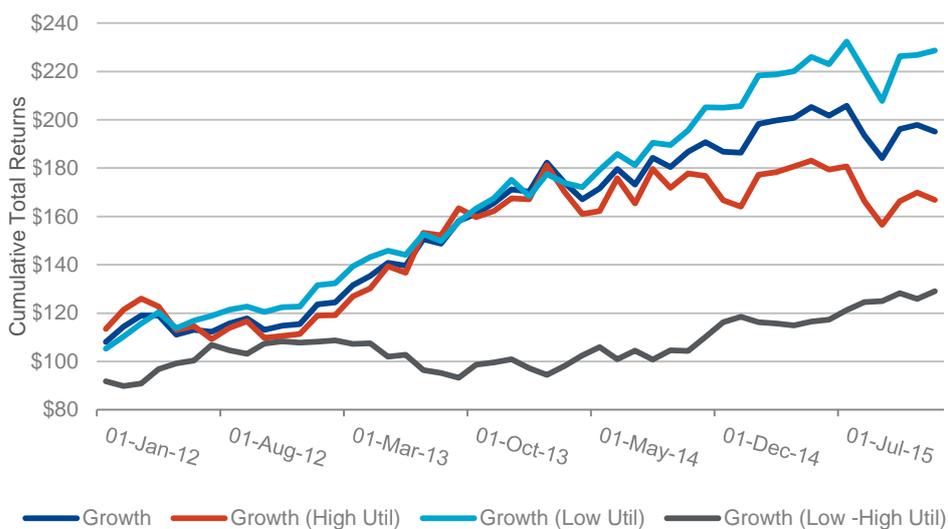**Table 3: Performance statistics, US Large Caps, Growth stocks, Jan 2012 – Dec 2015**

Figure 10: Cumulative returns, US Large Caps, Growth stocks, Jan 2012 – Dec 2015

Compared to the growth universe, growth stocks with low Utilization level offered a much higher and less volatile return that gave a Sharpe ratio of close to 2. On the other hand, the return from growth stocks with high Utilization levels was the lowest and most volatile when compared to other strategies. This indicates that a fund manager of growth stocks could enhance their portfolio returns by buying only those growth stocks with low Utilization levels or avoid those with high Utilization.

We did the same analysis within the value universe and combined the value stocks with the Utilization metric to see if we could achieve enhanced returns for a fund manager buying value stocks. Table 4 shows the performance statistics for the four strategies within the value universe and Figure 11 shows the cumulative returns over time.

Performance Summary	Value	Value (High Util)	Value (Low Util)	Value (Low - High Util)
Cumulative Return	48.0%	-7.3%	88.6%	80.3%
Annual Return	10.3%	-1.9%	17.2%	15.9%
Annual Volatility	16.2%	22.7%	12.8%	16.2%
Sharpe ratio	0.63	-0.08	1.34	0.98

Table 4: Performance statistics, US Large Caps, Value stocks, Jan 2012 – Dec 2015
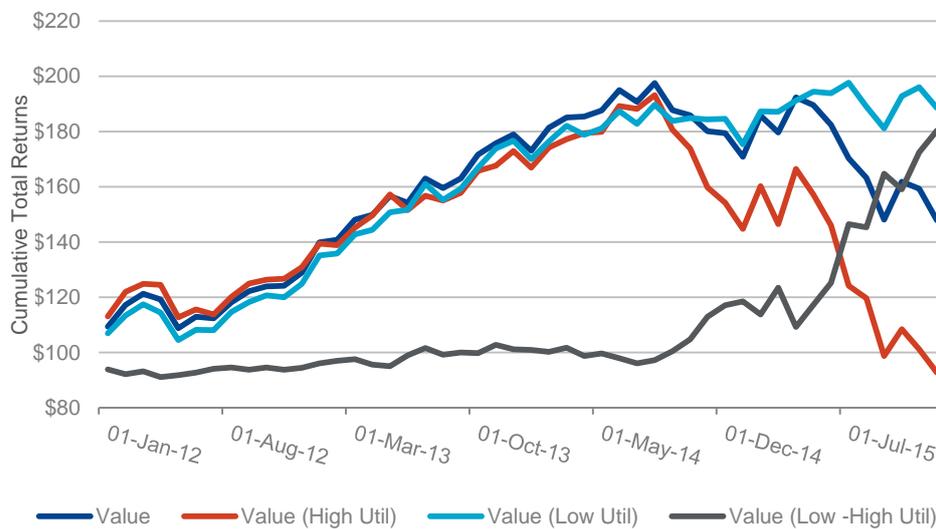

Figure 11: Cumulative returns, US Large Caps, Value stocks, Jan 2012 – Dec 2015

Again, values stocks with low Utilization produced the best return and lowest risk with a Sharpe ratio of 1.34. It is worth noting that the last column, which shows the return of the long- short strategy: long value stocks with low Utilization and short value stocks with high Utilization, offered a higher Sharpe ratio than buying all value stocks. This means that a market neutral strategy within the value universe using Utilization pays even more than the value universe overall.

Average rank correlation of 0.07 between Utilization and Book-to-Market during our sample period proves that signals coming from Utilization are different than those from Book-to-Market ratio. Therefore we can conclude that whether fund managers are chasing value or growth stocks, including Utilization in their screening process add significant value to their overall portfolio.

It is also worth highlighting an interesting trend from July 2014 onwards. Prior to that, the returns from all value, highly utilized and lowly utilized stocks were quite similar. After that, returns started to diverge. Fund managers who had taken short positions in value stocks with high Utilization, would have made gross returns of over 50% or avoided a substantial loss by not buying those value stocks. Investors who held long positions solely in low utilized value stocks would also have beaten the average value investors.

Value Portfolio performance since July 2014

In this section, we focused on value stocks from July 2014 onwards and took a practical approach to see whether our long-short portfolio can be incorporated in the real world by considering borrowing costs and availability. The next table shows the performance of different strategies from July 2014.

Performance Summary	Value	Value (High Util)	Value (Low Util)	Value (Low - High Util)
Cumulative Return	-24.1%	-51.0%	0.6%	84.0%
Annual Return	-17%	-38%	0%	50%
Annual Volatility	18%	29%	12%	23%
Sharpe ratio	-0.91	-1.32	0.03	2.17

Table 5: Performance statistics, US Large Caps, Value stocks, Jul 2014 – Dec 2015

Holding low utilized stocks helped value investors avoid a loss of 24% between July 2014 and Dec 2015.Shorting highly utilized value stocks generated higher return than shorting all value stocks as expected. This indicated a fruitful market neutral strategy by buying low utilized stocks together with shorting highly utilized value stocks. It gave the highest Sharpe ratio of 2.17 during the 18 months studied. This strategy led to a significant annual return of 50%.

Borrowing costs need to be considered when implementing a short selling strategy. We wanted to see whether the returns generated from shorting highly utilized value stocks is eroded after deducting borrowing costs. We used the Markit's Securities Finance Indicative Fee as a measure of borrowing costs. It shows the expected borrow cost for a hedge fund on a given day. This is a derived rate using Markit's proprietary analytics and data set. Table 6 below compares the performance of the long -short portfolio before and after this adjustment.

Performance Summary	Value (Low -High Util) before cost adjustment	Value (Low -High Util) after cost adjustment
Cumulative Return	84.0%	75.4%
Annual Return	50%	45%
Annual Volatility	23%	23%
Sharpe ratio	2.17	1.97

Table 6: Performance statistics, US Large Caps, Value stocks (long short portfolio), before and after borrowing cost adjustments, Jul 2014 – Dec 2015

We observed that by incorporating shorting costs, the return was reduced from 50% to 45% annually, which still left a good Sharpe ratio of 1.97. We can conclude that borrowing costs did not erode alpha significantly.

We also examined the dollar value of long/short positions that can be taken based on the market volume and availability. We calculated the holding value for each stock based on the fund size, assuming equal weightings. For the long portfolio, which contains low utilized value stocks, we compared the holding value with averaged value traded on the market to see how much of the position could be traded in the market. Whereas for the short portfolio, we considered both value traded and short availability value by taking the minimum of two. The data in table 7 shows the % of stocks in both portfolios that can be traded for positions of different fund sizes. We see that 75% of the long portfolio can be implemented when the fund size is USD 50 million and 86% of the short portfolio can be shorted. Percentage of stocks that can be traded in both portfolios decreases to less than 40% as the fund size increases to USD 500 million.

Fund size	Long Portfolio (lowly utilized value stocks	Short Portfolio (highly utilized value stocks
USD 50 Million	75%	86%
USD 100 Million	63%	74%
USD 500 Million	30%	36%

Table 7: Portfolio application at different fund size, US Large Caps, Value stocks (long short portfolio), Jul 2014 – Dec 2015

Market Cap weighted Value performance

So far we had assumed equal weighting in portfolio construction, meaning every stock in the portfolio had the same weight, regardless of the size of the company. In this session we studied the performance of long short portfolio based on value stocks where individual stocks were weighted according to their market capitalization, so that larger stocks carry a larger percentage weighting. The next table shows the performance from Jul 2014 to Dec 2015.

Performance Summary	Value	Value (High Util)	Value (Low Util)	Value (Low - High Util)
Cumulative Return	-0.4%	-38.5%	8.6%	61.0%
Annual Return	0%	-28%	5.7%	37%
Annual Volatility	17%	28%	18%	26%
Sharpe ratio	-0.01	-0.99	0.32	1.44

Table 8: Performance statistics, US Large Caps, Value stocks (long short portfolio), before and after borrowing cost adjustments, Market cap weighted, Jul 2014 – Dec 2015

Again, holding low utilized stocks beat average value investors, by 5.7% annually between July 2014 and Dec 2015. Note that both offered a better return when they were market cap weighted. Whereas the return from shorting high utilized value stocks generated a lower annual return of 28% compared to 38% when it was equally weighted. This is because large cap stocks are assigned higher weights as compared to before and returns from shorting large cap stocks have historically been lower when compared to returns from shorting small cap stocks.

As we saw with our equally weighted portfolios, buying low utilized stocks together with shorting highly utilized value stocks gave the highest Sharpe ratio of 1.44 during the period studied. This shows whether a value focused portfolio is market cap weighted or equally weighted, forming a long short portfolio based on Utilization is always better than investing in all value stocks.

Since large cap stocks carried more weighting, the tradable position based on trade value and availability to borrow improved for different fund sizes. The data in table 9 shows the % of stocks in both portfolios that can be traded. We see that over 90% of the long and short portfolio can be implemented when the fund size is USD 50 million. Percentage of stocks that can be traded in both portfolios decreases to less than 50% as the fund size increases to USD 500 million.

Fund size	Long Portfolio (lowly utilized value stocks	Short Portfolio (highly utilized value stocks
USD 50 Million	92%	90%
USD 100 Million	85%	80%
USD 500 Million	48%	42%

Table 9: Portfolio application at different fund size, US Large Caps, Value stocks (long short portfolio), Market cap weighted, Jul 2014 – Dec 2015

5 Conclusions

Markit's Securities lending dataset can be combined with Markit's Research Signals to analyse which factors are getting crowded by short sellers. In this research note, we studied the shorting activity of stocks based on several popular factors over the past 4 years. Focusing on the Book–to-Market ratio, we analysed the effects of adding utilization into the portfolio construction process. We found that

- Growth stocks were heavily shorted as compared to value stocks prior to Sep 2014, after which the opposite occurred. This was mainly driven by the significant increase in the crowdedness of value stocks. Average Utilization in value stocks stood close to its four year high of 18% at the end of 2015.

- Investors have been overweighting high beta stocks and underweighting low beta stocks since beginning of 2014. The Utilization gap was around 10% in the last quarter of 2015.

- By focusing on stocks with low Utilisation within the value and growth universes, the Sharpe ratios improved by 113% and 42% respectively based on the sample period.

- From July 2014, shorting highly utilized value stock generated 38% annual return. Combining it with buying lowly utilized value stock increased the return to a hefty 50% on an annual basis. Performance remained strong after accounting for borrowing costs.

Appendix

References

1. Hanson, S. and A. Sunderam, 2011, "The growth and limits of arbitrage: Evidence from short interest"

2. Deutsche Bank, 2012, "Portfolios under construction: Standing out from the crowd"

3. Markit, 2012, Research note 2012, "European equities: Signals in value and growth stock universes"