**Do Outsized Money Flows Predict Forward Market Prices? If So, Can We Visualize Capitulation?**

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**Abstract:**

Outsized money flows can be a useful indicator to predict stock prices. Intuitively, when money flows into stocks, they rise and when money flows out, stocks fall. Yet extremes of both may be observed and extreme data from MAPsignals can be used to predict future market price direction with statistical significance. MAPsignals' dataset since 1990 approximates daily unusual institutional level capital inflows and outflows according to proprietary algorithms. When analyzed in terms of unusually large selling, extreme selling often becomes unsustainable. These oversold instances of the corresponding Big Money Index have historically been shown to preface substantial forward price appreciation in US equity indexes. Oversold instances lead to outperformance versus average returns for the S&P 500 Index. Similar, yet inverse behavior can be observed when analyzed in terms of unusually large buying. Extreme buying also becomes unsustainable, yet it can stay protracted for extended periods of time. However, overbought periods of the Big Money Index have been shown to preface substantial forward underperformance versus average returns of the S&P 500 Index. When this analysis is further broken down, we can observe MAPsignals data for extreme unusual buying and selling of US stocks. We also observe a similar pattern of outperformance over averages for major market indexes for extreme selling and underperformance for extreme buying. Finally, we observe similar patterns when examining sector indexes: extreme selling foreshadows outperformance while extreme buying foreshadows underperformance versus the averages for the associated sector index ETF as proxy for the index itself.

This data suggests that unusually large institutional trading can indicate market entry and exit points with predictive value. Price is set by supply and demand each day. Imbalances can trigger a statistically significant relevant predictor of forward prices for indexes, ETFs, stocks, and sectors.

The paper summarizes our findings based on statistical tests performed which are found in their entirety in the appendix. This backtest suggests there's a quantifiably strong relationship between extreme money flow observations and forward relative market performance. All data was sourced from MAPsignals and performance metrics were sourced from FactSet.

Do Outsized Money Flows Predict Forward Market Prices? Our findings show the answer to be *yes.* Many have long believed large institutional investment activity drives stock market prices and movements. MAPsignals, a quantitative equity analytics research firm has repeatedly observed this to be the case. In this paper we will look at proof in the form of data and statistical analysis.

To begin understanding the impact of outsized money flows, we will start with an analysis of the Big Money Index. This is MAPsignals' most powerful money flow indicator. Generally speaking, with plenty of substantive observation, where the BMI goes, the stock market follows.

**BIG MONEY INDEX (BMI)**

Let's familiarize ourselves with the construction of the BMI. Each day, MAPsignals' quant models analyze millions of data points spread across more than 6,000 stocks. Each stock is then ranked in accordance with technical and fundamental qualities on our proprietary scoring metrics. Additionally, the model seeks to identify potential unusual trading patterns. The algorithms were designed specifically to identify when potential unusually large institutional trading activity occurs. The daily average for occurrences is 311 since January 1, 1990, and 483 since January 1, 2005. We can visualize them with amber columns representing the number of unusual institutional trades each day like this:
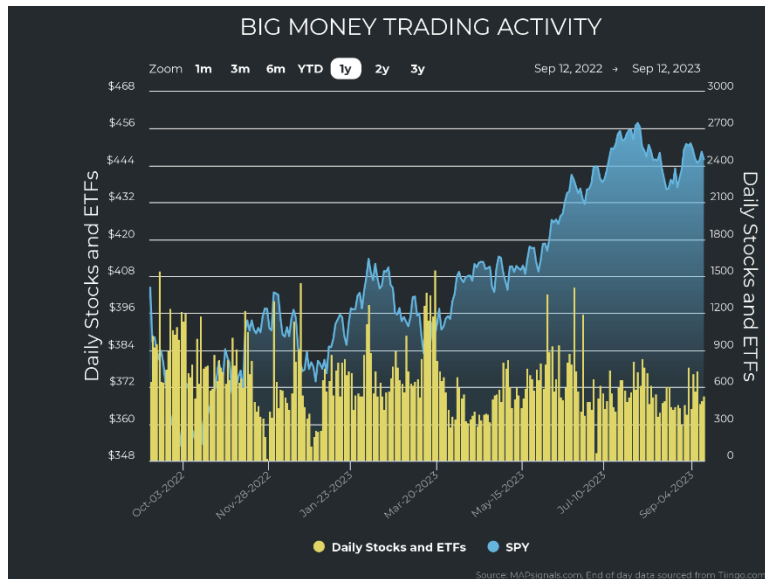


MAPsignals further quantifies unusual institutional trading into buys or sells. Simply put, when the volume and volatility criteria are met for the above chart of *Big Money Trading Activity,* when coupled with a periodic high or low price, we can identify money flows in and out of individual stocks or ETFs. This occurs less frequently than Big Money Trading Activity. The daily average for unusual buys since January 1, 1990, is 49 and for unusual sells it is 36. Since January 1, 2005, the average daily buys are 63 and average daily sells is 49. We can visualize this activity with green columns for aggregate daily unusual buys and red inverted columns for average daily unusual sells. The chart then looks like this:

BIG MONEY STOCK BUYS AND SELLS
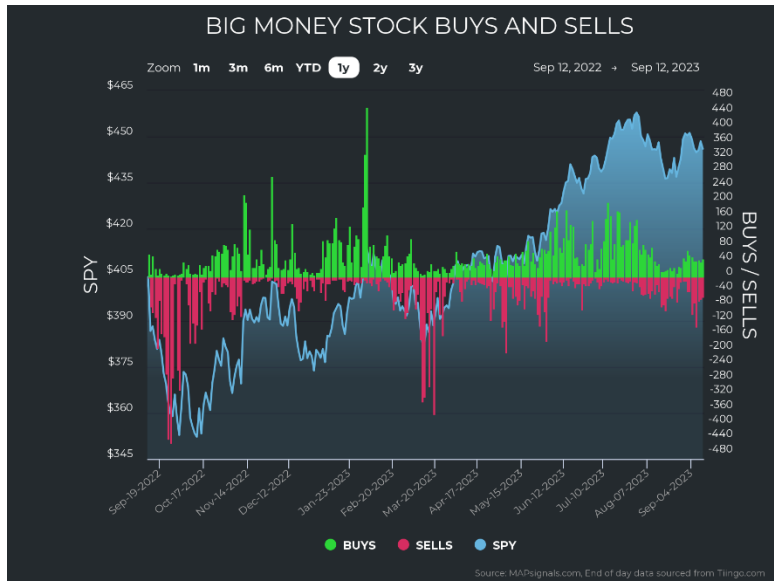
We begin to see a correlation to intense periods of unusual buying or selling. More on that shortly, but for now we can evolve this daily analysis into a powerful money flow indicator: the Big Money Index. It is constructed using the 25-day moving average of a ratio of unusual buys and sells defined by MAPsignals' proprietary algorithms stated in terms of buying. The Big Money Index is mathematically expressed as:

$$BMI = \frac{A_1 + A_2 + \dots A_n}{n}$$

*Whereby: $A_1 = b/(b + |s|)$*

*b = Buys, s = Sells, n = 25 days*

For example:

| DATE | BUYS | SELLS | DAILY RATIO |
|------|------|-------|-------------|
| 8/8/2023 | 53 | -58 | 47.7% |
| 8/9/2023 | 78 | -37 | 67.8% |
| 8/10/2023 | 43 | -47 | 47.8% |
| 8/11/2023 | 29 | -23 | 55.8% |
| 8/14/2023 | 34 | -39 | 46.6% |
| 8/15/2023 | 15 | -82 | 15.5% |
| 8/16/2023 | 15 | -75 | 16.7% |
| 8/17/2023 | 16 | -93 | 14.7% |
| 8/18/2023 | 19 | -57 | 25.0% |
| 8/21/2023 | 25 | -53 | 32.1% |
| 8/22/2023 | 18 | -58 | 23.7% |
| 8/23/2023 | 26 | -27 | 49.1% |
| 8/24/2023 | 10 | -68 | 12.8% |
| 8/25/2023 | 27 | -31 | 46.6% |
| 8/28/2023 | 26 | -13 | 66.7% |
| 8/29/2023 | 51 | -11 | 82.3% |
| 8/30/2023 | 43 | -11 | 79.6% |
| 8/31/2023 | 71 | -41 | 63.4% |
| 9/1/2023 | 58 | -40 | 59.2% |
| 9/5/2023 | 54 | -102 | 34.6% |
| 9/6/2023 | 43 | -72 | 37.4% |
| 9/7/2023 | 43 | -136 | 24.0% |
| 9/8/2023 | 45 | -67 | 40.2% |
| 9/11/2023 | 41 | -61 | 40.2% |
| 9/12/2023 | 49 | -56 | 46.7% |
| BMI (25DMA) | | | 43.0% |

$A_7 = b/(b + |s|)$

$n = 25 \ days$

BMI

This can be visualized with an amber line denoting the Big Money Index. When it rises, market prices generally follow higher. When it falls, generally market prices follow lower:
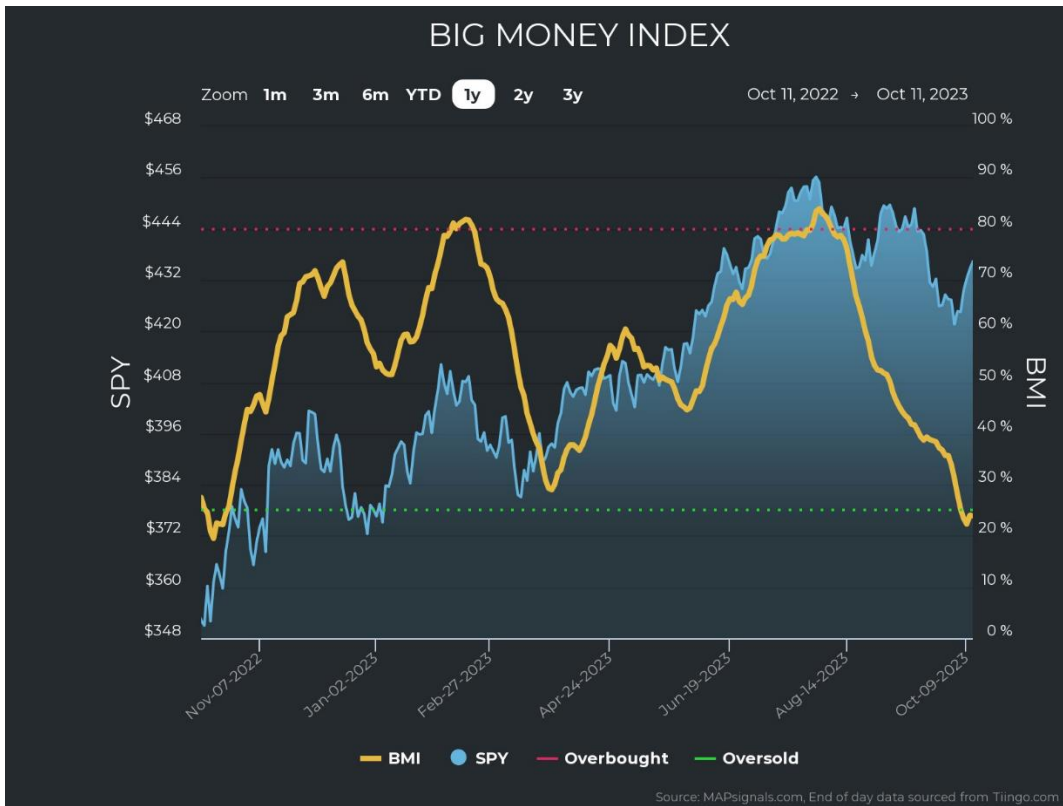


**CAPITULATION INDICATOR**

Sought after for as long as markets have existed, is a reliable indicator of when market prices will rise. We have observed that extreme readings of the BMI have been excellent predictors of future market direction. Extreme selling particularly has been shown with statistical significance to forecast higher stock index (ETF) prices. At first this may sound counterintuitive. When selling exhausts itself however, it becomes intuitive that prices must rise thereafter.

Revisiting the Big Money Index chart above, we observe a horizontal green line and horizontal red line. The red line is when all unusual trading, stated in terms of buying over 25-days (the BMI) is 80% buy signals. The green horizontal line is when the BMI is only 25% buy signals. It is when the amber BMI line exceeds 80% that the BMI is in overbought territory. When the BMI falls below 25% or 26%, it is oversold.

A BMI at or near oversold is an excellent *Capitulation Indicator*. Let's visualize this with historical examples. Below we see visual confirmation in several instances. We observe:

- August 2011
- June 2012
- October 2014
- October 2015
- February 2016
- Fall of 2018
- COVID-19 2020
- Most recently: October of 2022

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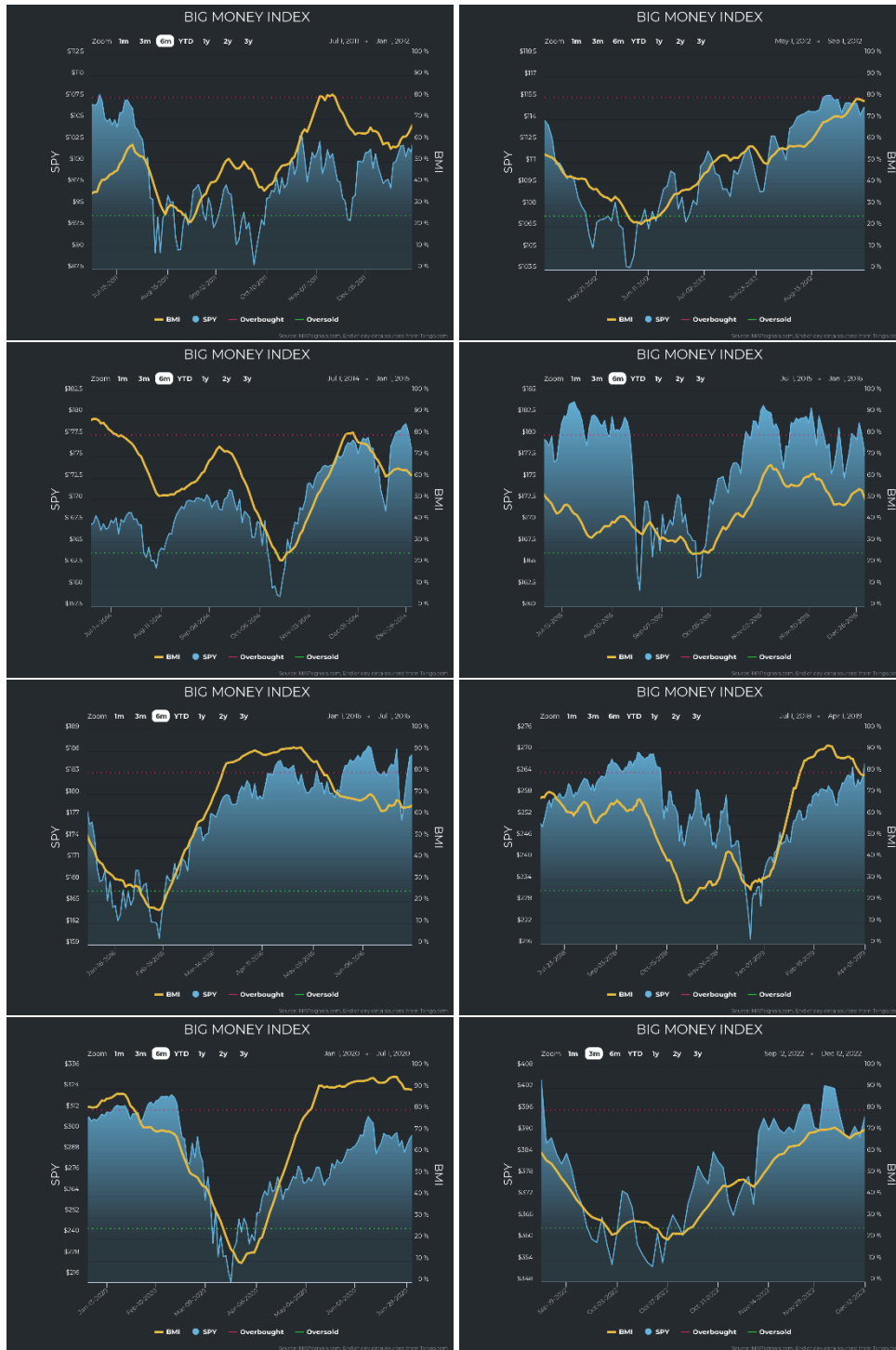
These and additional oversold observances were studied using data since 1990 until August 2023. The hypothesis was that extreme selling as denoted by the BMI is in fact, a significant reversion signal. That is, extreme selling prefaces a market rise. Our research shows support of our hypothesis, finding large sell ratios tend to predict higher forward returns compared to overall average market returns.  For this study, based on the confidence interval of the hypothesis test, we identify when the Big Money Index first fell

below 26 as the buy signal. Our findings were that when the Big Money Index drops below 26, the 3-month returns of the SPY as proxy for the S&P 500, are +7.45% versus the seasonal average return of 2.23%. With 95% confidence, we found that the average return after oversold events ranges between 2.91% to 11.99%, significantly higher than the 2.23% total seasonal average return. We see the outperformance summarized in the chart below:

## BMI first below 26 Returns VS Overall Avg Returns



Legend:
- BMI first reach 26 Avg. Returns
- Overall Avg. Returns

MAPSignals
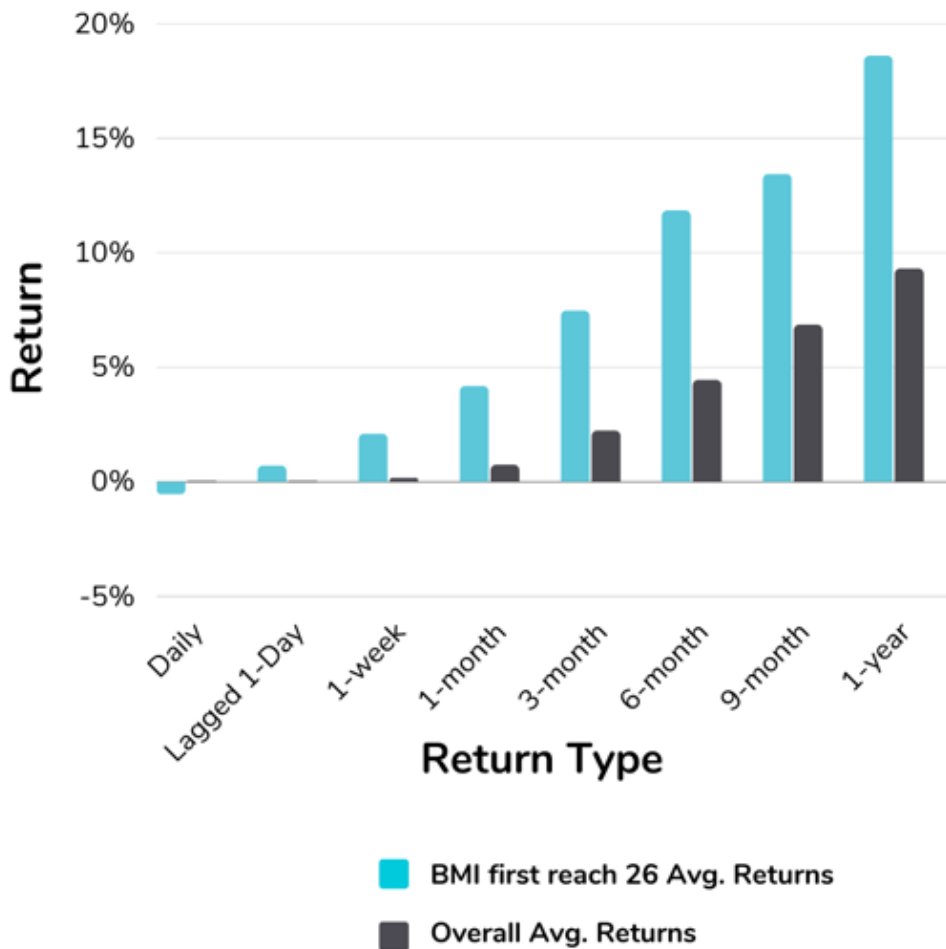
All study details can be found in the Appendix section.

**GREED INDICATOR**

Also of great importance, is an indicator of extreme greed. If we can rely on the Big Money Index as an indication of capitulation selling, can we also rely on it to reveal periods of exuberance? The answer, while not equally strong as an oversold BMI, is also *yes*. Like an oversold BMI but with less reliability, an overbought BMI can be used as an indication of a near-term market top. A BMI at or near overbought can

be a useful indication of forward underperformance. Let's visualize this with historical examples. Below we see visual confirmation in several instances. We observe:

- January 2018
- January 2019
- May 2020
- August 2022
- February 2023
- July 2023
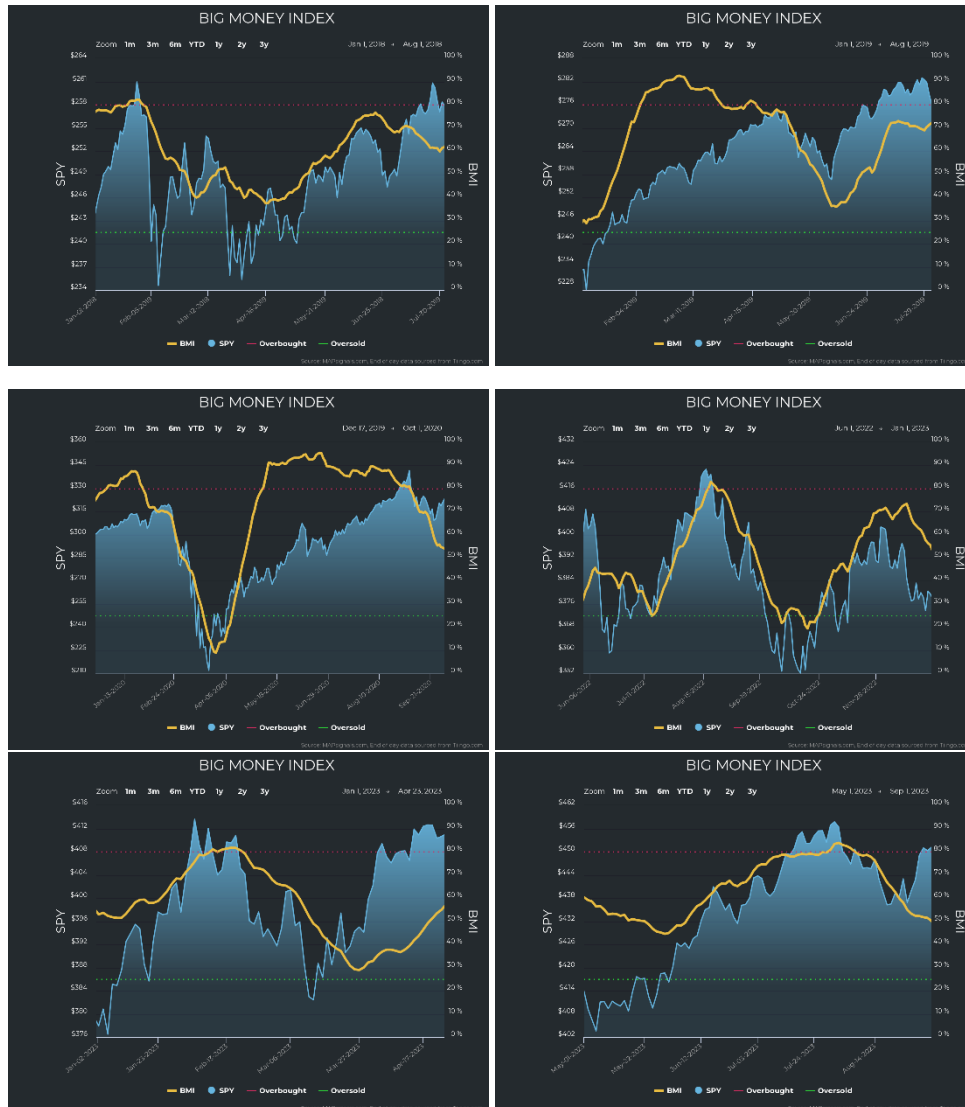


These and all additional overbought observances were also studied using data from 1990 until August 2023. The hypothesis was that extreme buying as denoted by the BMI is a significant reversion signal. That is, extreme buying prefaces a market fall. Interestingly, our research shows by observation, against the hypothesis, that large buy ratios tend to predict significantly higher monthly and longer-term forward returns rather than lower. The threshold of 80% held no statistical significance. Lower forward market returns were observed *once the BMI fell from overbought territory*. We did, however, observe that overbought instances of the BMI lead to underperformance near-term versus average seasonal returns of SPY as proxy for the S&P 500.

We see underperformance from 1-day through 9-months summarized in the chart below:

## BMI first reach 80 Returns VS Overall Avg Returns
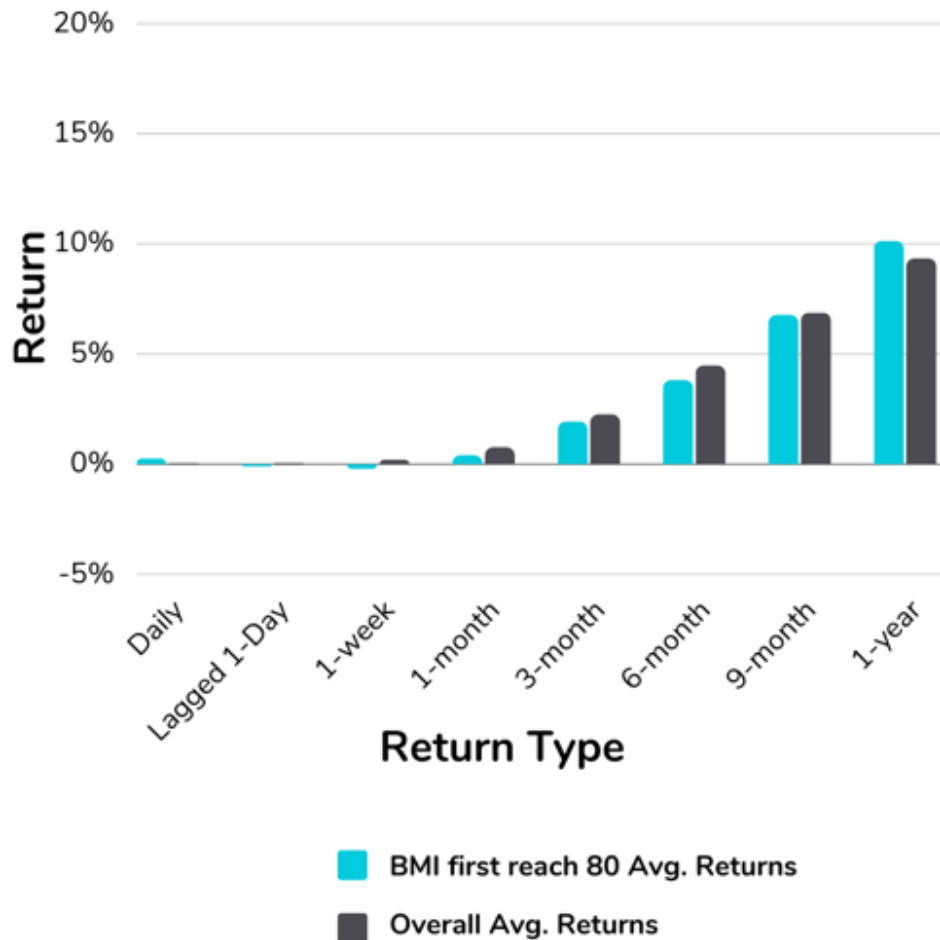


**OUTSIZED STOCK BUY/SELL EXTREMES CAN BE USED TO GENERATE ALPHA**

Revisiting our chart of individual stock buying and selling, we can use the extreme readings to also identify market pivot points. This information can be useful as a market timing indicator. In the chart below left we see extreme selling coinciding with a market trough. This extreme example was during the spring of 2020 when COVID-19 became our new reality. The chart on the right shows the near-term predictive potential of extreme buy readings in June of 2020:
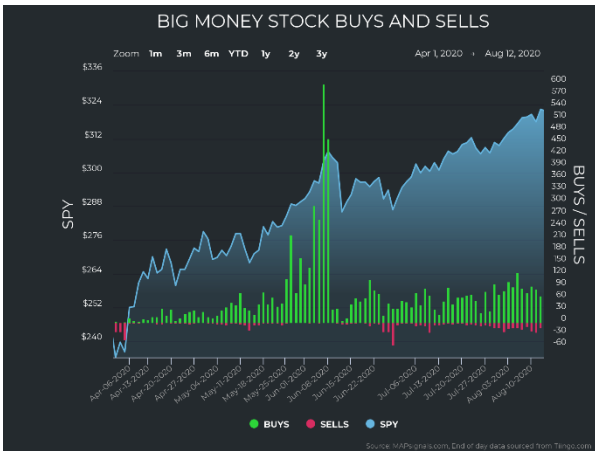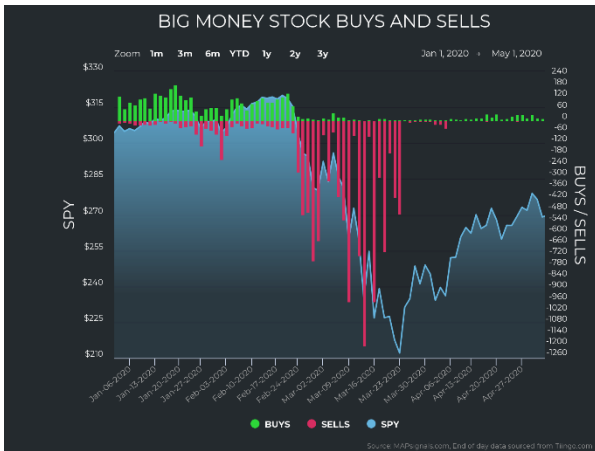
Investigating this, we posed the hypothesis like that of the BMI: extreme selling is a reversion buy signal while extreme buying is a reversion sell signal. Our observations using data from January 1, 1990, through August 2023, supported the hypothesis that large sell ratios tend to predict higher seasonal and longer term forward returns. Observations also supported the hypothesis that large buy ratios tend to predict significantly lower monthly forward returns. Based on the confidence interval of the hypothesis test, we identify a buy signal when the Big Money Stock Buys and Sells dataset registers sells of -146 or less. We found with 95% confidence that the seasonal average return after extreme selling events (selling ratio below -146) the SPY as proxy for the S&P 500 Index, returns three months after the extreme selling events are, on average, +4.94% versus the seasonal average return of +2.22%.

Similarly, based on the confidence interval of the hypothesis test, we identify a sell signal when the Big Money Stock Buys and Sells dataset registers buys of 150 or more. We observed when this happens that the SPY as proxy for the S&P 500, forward returns after one month are +.03% versus the seasonal average return of 0.74%. We are 95% confident that the monthly average return after extreme buying events (buys above 150) is between -0.49% to 0.37%, significantly lower than that of 0.74% of the total monthly average return.

Returns are summarized here:

**OUTSIZED ETF BUY/SELL EXTREMES CAN BE USED TO GENERATE ALPHA**

We observe similar market behavior and prescient indicator potential when we analyze data surrounding extreme buying and selling of ETFs. In the chart below, like aggregate stock buys and sells on given days, we see the same plots for ETFs according to MAPsignals' data.
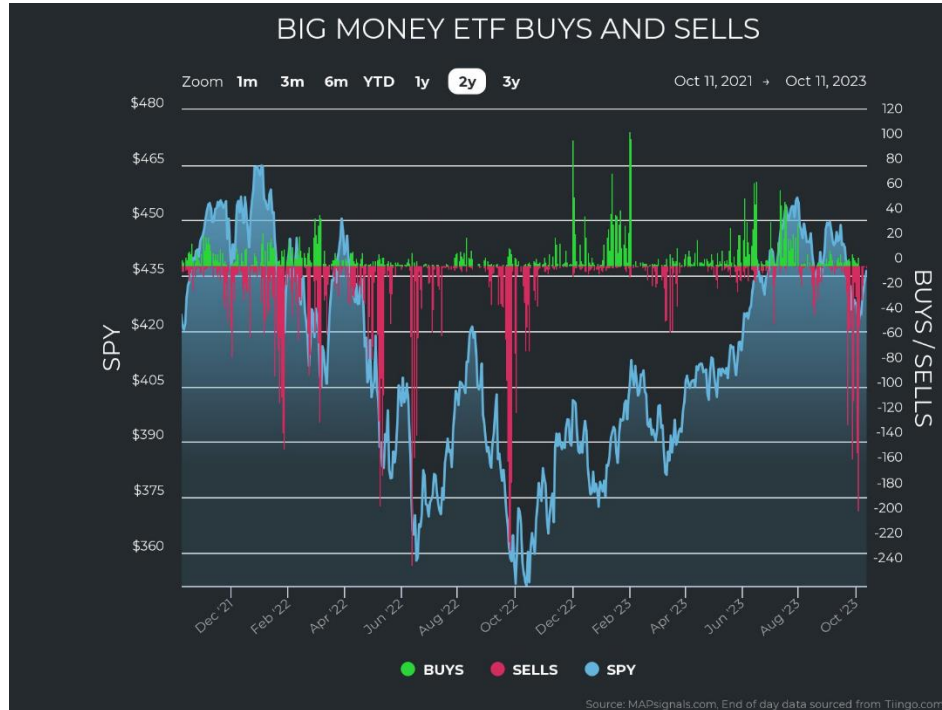


Visually, we see a similar pattern: extreme selling of ETFs coincides with market troughs prefacing a market rise. Also, extreme buying of ETFs coincides with market crests prefacing market pullbacks. We sought to test the following hypothesis: extreme ETF selling presents a buy signal. Conversely, we hypothesize that extreme ETF buying presents a sell signal. By observation, large ETF sell ratios tend to predict higher forward returns, especially monthly and seasonally forward returns. On the contrary, we observed that large ETF buy ratios tend to predict significantly lower monthly and seasonal forward returns. Based on the confidence interval of the hypothesis test, we identify a buy signal when the Big Money ETF Buys and Sells dataset registers sells of -55 or less. When this occurs, we have observed the SPY as proxy for the S&P 500 index, forward returns after three months are +5.2 % versus the seasonal average return of 2.2%. With 95% confidence, we found that the seasonal average return after extreme selling events (selling ratio below -55) are between 3.5% to 7.4%, significantly higher than that of 2.2% of the total seasonal average return. Conversely, we observe underperformance of the SPY 1 to 3 months after extreme buying events:

SPY VS Big Money ETF Data 1/1/05 - 8/11/23

- Top 1% SELLS Avg Returns
- Overall Avg. Returns


SPY VS Big Money ETF Data 1/1/05 - 8/11/23

- Top 1% BUYS Avg Returns
- Overall Avg. Returns
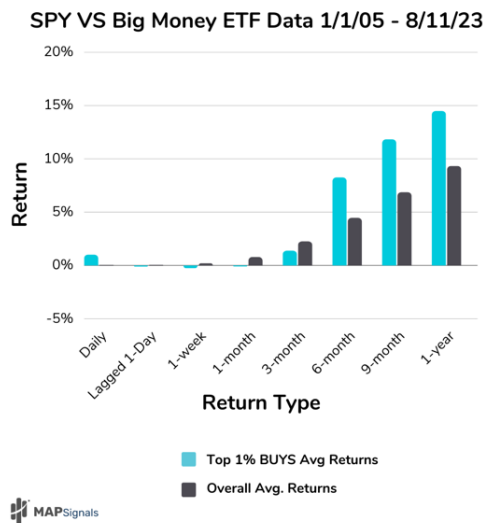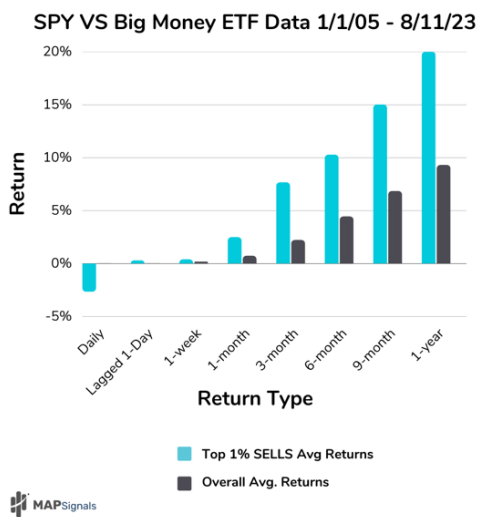
## OUTSIZED SECTOR BUY/SELL EXTREMES CAN ALSO BE USED AS PREDICITIVE INIDCATORS

As we move downward through layers of market depth, from macro level lower to stocks and ETFs, we find that sector extremes can also be used as a forward predictive indicator. Here we framed similar hypotheses along the central theme of identifying extreme buying and selling as pivot points.

In summary: we studied the 9 sectors as defined by MAPsignals which is based upon both the Standard & Poor's Sector Indexes and Russell Business Industry Classifications System (RBICS). The associated SPDR sector index ETF is listed with each sector being:

- Energy (XLE)
- Technology (XLK)
- Discretionary (XLY)

- Industrials (XLI)
- Financials (XLF)
- Materials (XLB)

- Real Estate (IYR)
- Health Care (XLV)
- Utilities (XLU)

For observational data, we utilized MAPsignals sector data for 10 years of duration. MAPsignals sector data is composed by observing individual stock unusual institutional buying and selling data catalogued by sector assignment. The aggregate signals for a particular sector look like the Big Money Stock Buys and Sells data. Here is an example chart of the Energy sector overlaid against the associated ETF XLE:

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Energy Buys and Sells vs XLE

Zoom ▾     Jan 1, 2022 → Oct 11, 2023

Source: MAPsignals.com, End of day data sourced from Tiingo.com

● XLE    ● Buys    ◆ Buys 25 SMA    ● Sells    ╪ Sells 25 SMA
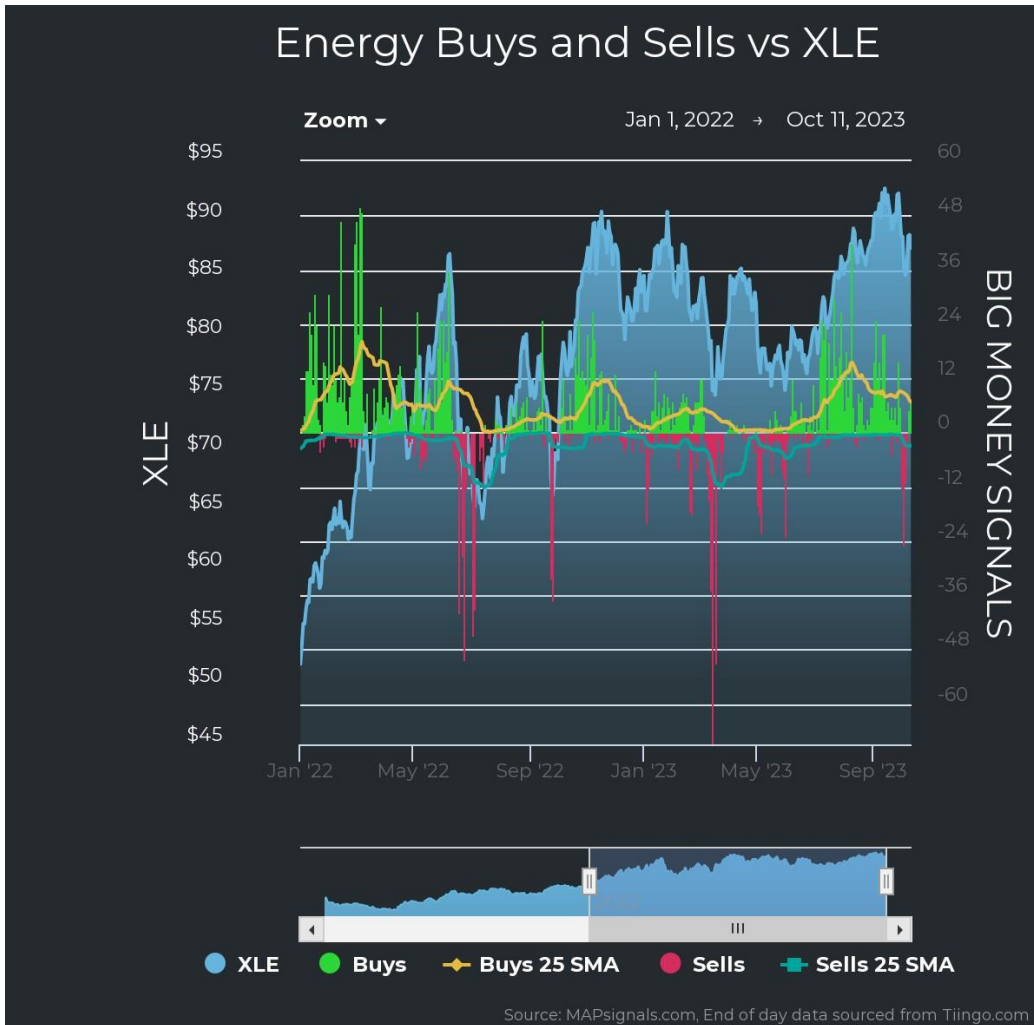
Once again, the green vertical bars above the zero axis represent all aggregate unusual institutional buying in Energy stocks on a given day. The red vertical bars below the zero axis denote all unusual institutional selling in Energy stocks on a given day.

We found that most sectors exhibit useful predictive value at extreme points of buying and selling. These extreme points can be used as pivot point markers for forward market price predictive value.

We summarize our findings below. Details of each study can be found in the appendix.

**REAL ESTATE - IYR**

Hypothesis: High forward returns of IYR usually happen in peak with extreme sell ratios, while low forward returns occur after large buy ratios. Some extreme buy ratios even coincide with sector index ETF peaks. We wanted to see how large sell days correspond to forward market returns statistically. To study this we gathered all MAPsignals data from the 2013 to 2023 period and selected the 2% largest sell days in the dataset. We found via regression analysis that there is a strong negative correlation to higher market prices versus the seasonal average return after extreme buying takes place. There is a positive correlation to higher market prices versus the seasonal average return after extreme selling takes place. Large buy ratios tend to predict lower forward weekly returns. Contrarily, large sell ratios tend to predict higher forward

seasonal and longer-term returns. To test out the validity of our observations, we used all MAPsignals data from the 2013 to 2023 period and selected the 2% largest buy and sell days in the dataset for hypothesis testing. Based on the hypothesis test, we identify a buy signal when the Real Estate sector has a selling ratio of 9% or more. When the selling ratio is above 9% for Real Estate stocks, returns after three months are +4.8% versus a seasonal average return of 1.6%. Additionally, we are 95% confident that the seasonal average return after extreme selling (selling ratio 9% or above) events are between 2.1% to 4.4%, also significantly higher than that of 1.6% of the total seasonal average return.



**MATERIALS - XLB**

Hypothesis: High forward returns of XLB usually happen in peak with extreme sell ratios, while low returns occur after extreme buy ratios. Some extreme buy ratios occur at sector index ETF peaks. We wanted to see how large sell days correspond to forward market returns statistically. To study this we gathered all MAPsignals data from the 2013 to 2023 period and selected the 2% largest sell days in the dataset. We found there is a strong positive correlation to higher market prices versus the seasonal average return after extreme selling takes place via the regression analysis. Large buy ratios tend to predict negative weekly and monthly returns. Contrarily, large sell ratios tend to predict slightly higher monthly and much higher seasonal and longer-term returns. To test out the validity of our observations, we used all MAPsignals data from the 2013 to 2023 period and selected the 2% largest buy and sell days in the dataset for hypothesis testing. We found strong evidence supporting the hypothesis that when extreme selling occurs in material stocks, returns after 3 months are +9.0% versus a seasonal average return of 2.7%. Additionally, we are 95% confident that the seasonal average return after extreme selling events range between 5.3% to 12.7%, significantly higher than that 2.7% of the seasonal average return. Based on the hypothesis test, we identify a buy signal when the Materials sector has a selling ratio of 6% or more. When the selling ratio is above 6% for Material stocks, returns after three months are +4.3% versus a seasonal average return of 2.7%. Additionally, we are 95% confident that the seasonal average return after extreme selling (selling ratio 6% or above) events are between 3.3% to 5.4%, also significantly higher than that of 2.7% of the total seasonal average return.

XLB



XLB
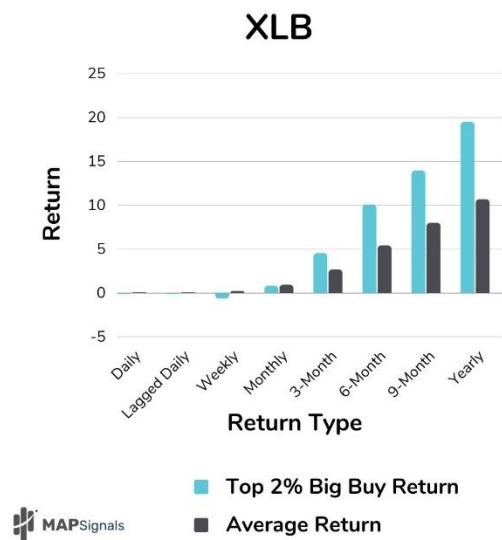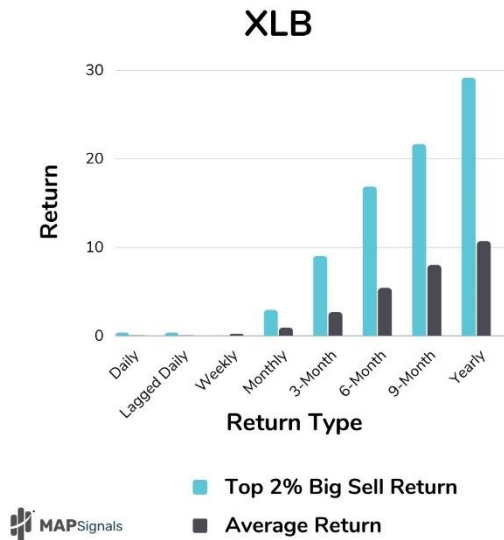
**ENERGY - XLE**

Hypothesis: High returns of XLE usually occur in peak with large sell ratios, while low returns occur after large buy ratios. To see how large sell days correspond to forward market returns statistically, we fit a regression for the correlation analysis. However, the regression results for XLE index versus Big Buy/Sell Index are inconclusive. From the graphs below, it is inconclusive to see whether big buy/sell days predict positive/negative abnormal returns. To test out our hypothesis, we used all MAPsignals data from the 2013 to 2023 period and selected the 2% largest buy and sell days in the dataset for hypothesis testing. We found there is a positive correlation to higher market prices versus the 9-months average return after extreme buying takes place via the regression analysis. Meanwhile, there is also a strong negative correlation to higher market prices versus the 9-months average return after extreme selling events. To test out the validity of our observations, we used all MAPsignals data from the 2013 to 2023 time period and selected the 2% largest buy and sell days in the dataset for hypothesis testing. We found strong evidence against the hypothesis that when extreme buying occurs in Energy stocks, returns after 9 months are +18.5% versus the 9-months average return of 6.5%. Additionally, we are 95% confident that the 9-months average return after extreme buying events range between 14.9% to 22.2%, significantly higher than that 6.5% of the 9-months average return. Based on the hypothesis test, we identify a buy signal when the Energy sector has a buying ratio of 9% or more. When the buying ratio is above 9% for Energy stocks, returns after nine months are +10.5% versus a 9-month average return of 6.5%. Additionally, we are 95% confident that the 9-months average return after extreme buying (buying ratio 9% or above) events are between 8.0% to 12.9%, also significantly higher than that of 6.5% of the 9-months average return.

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## XLE



## XLE



Top 2% Big Sell Return
Average Return

Top 2% Big Buy Return
Average Return
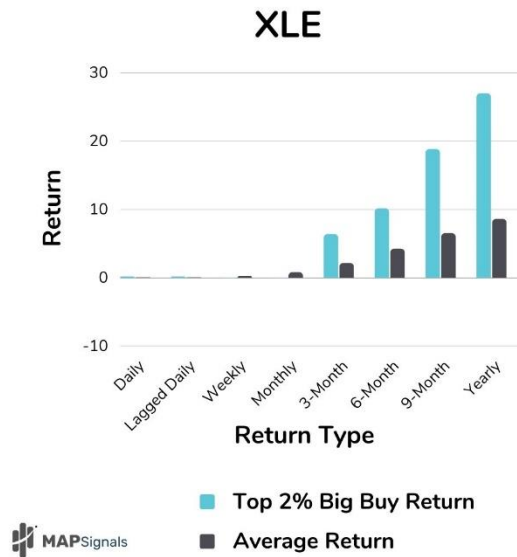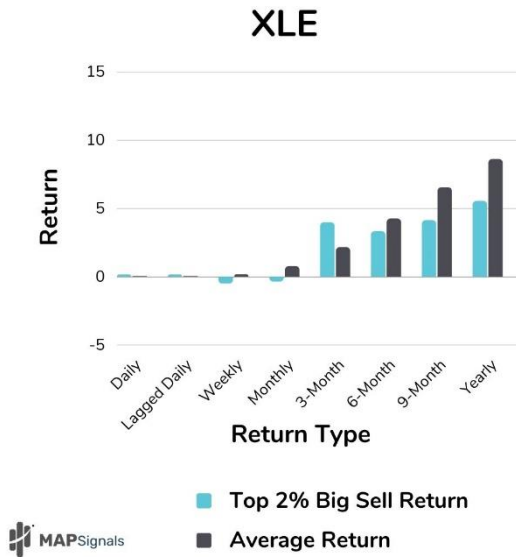
**FINANCIALS - XLF**
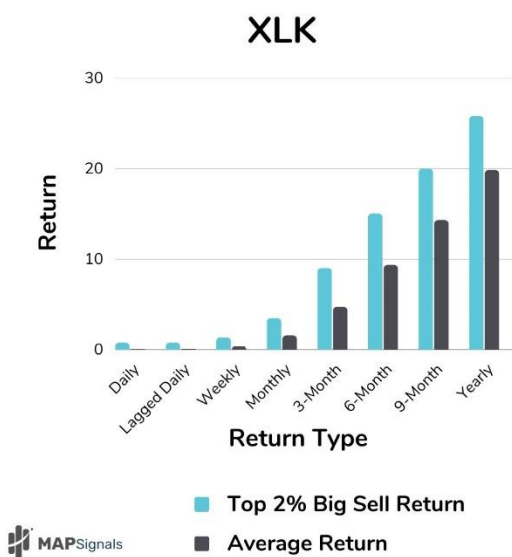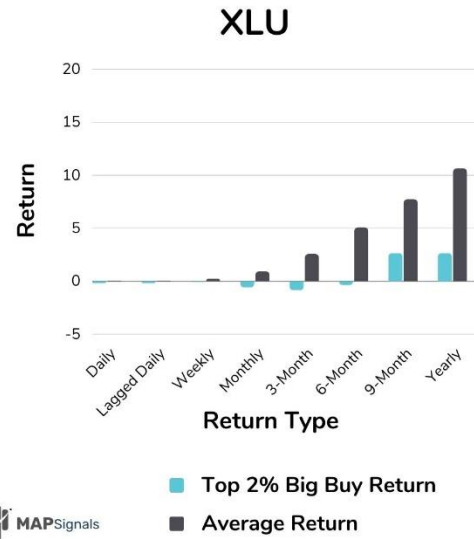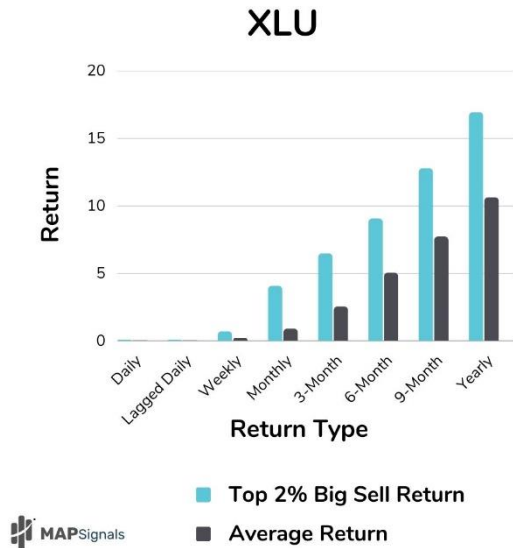
Hypothesis: High returns usually happen in peak with large sell ratios, while low returns occur with large buy ratios. We wanted to see how large buy and sell days correspond to forward market returns statistically. To study this we gathered all MAPsignals data from the 2013 to 2023 period and selected the 2% largest sell days in the dataset. We found there is a positive correlation to higher market prices versus the seasonal average return after extreme selling takes place via the regression analysis. Meanwhile, there is also a strong negative correlation to higher market prices versus the seasonal average return after extreme buying events. Large buy ratios tend to predict slightly lower weekly and monthly forward returns. Contrarily, large sell ratios tend to predict significantly higher seasonal and longer-term forward returns. To test out the validity of our observations, we used all MAPsignals data from the 2013 to 2023 period and selected the 2% largest buy and sell days in the dataset for hypothesis testing. We found strong evidence supporting the hypothesis that when extreme selling occurs in financial stocks, returns after 3 months are +6.5% versus a seasonal average return of 3.0%. Additionally, we are 95% confident that the seasonal average return after extreme selling events range between 3.2% to 9.9%, significantly higher than that 3.0% of the seasonal average return. Based on the hypothesis test, we identify a buy signal when the Financials sector has a selling ratio of 18% or more. When the selling ratio is above 18% for Financials stocks, returns after three months are +5.7% versus a seasonal average return of 3.0%. Additionally, we are 95% confident that the seasonal average return after extreme selling (selling ratio 18% or above) events are between 7.6% to 3.8%, also significantly higher than that of 3.0% of the total seasonal average return.
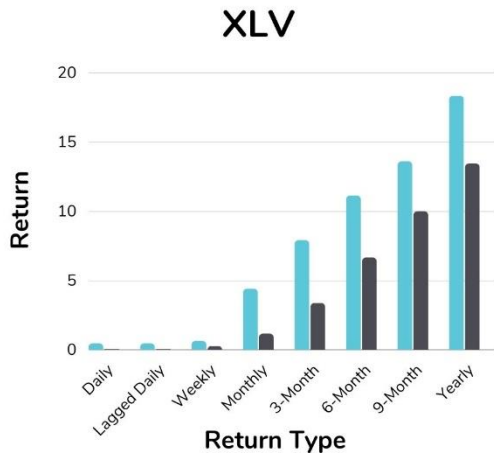
## XLF



## XLF
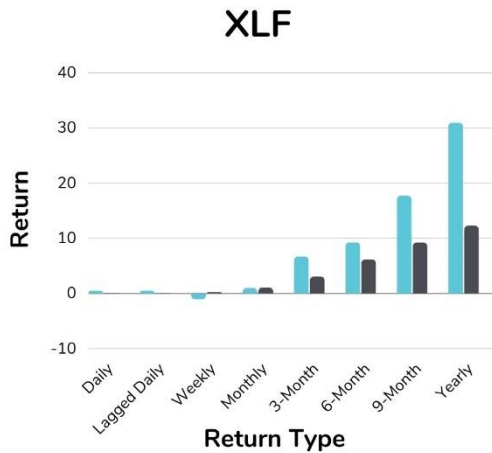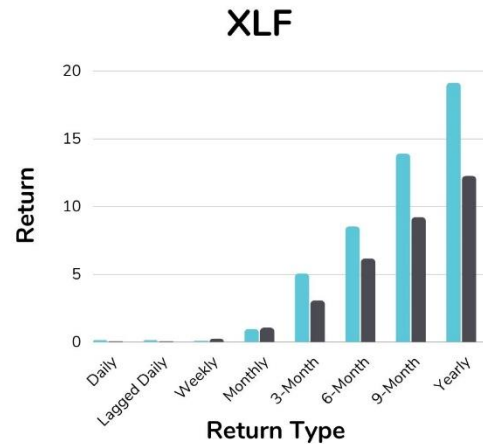


**INDUSTRIALS - XLI**

Hypothesis: High returns usually happen in peak with large sell ratios, and low returns occur with large buy ratios. To study this we gathered all MAPsignals data from the 2013 to 2023 period and selected the 2% largest sell days in the dataset. We found there is a positive correlation to higher market prices versus the monthly average return after extreme selling takes place via the regression analysis. Meanwhile, there is also a strong negative correlation to higher market prices versus the monthly average return after extreme buying. Large buy ratios tend to predict lower forward monthly returns. Contrarily, large sell ratios tend to predict higher seasonal and longer-term forward returns. To test out the validity of our observations, we used all MAPsignals data from the 2013 to 2023 period and selected the 2% largest buy and sell days in the dataset for hypothesis testing. We found strong evidence supporting the hypothesis that when extreme selling occurs in industrial stocks, returns after 3 months are +8.1% versus a seasonal average return of 3.1%. Additionally, we are 95% confident that the seasonal average return after extreme selling events range between 4.7% to 11.4%, significantly higher than that 3.1% of the seasonal average return. Based on the hypothesis test, we identify a buy signal when the selling ratio reaches 7% or more. When the selling ratio is above 7% for Industrials stocks, returns after three months are +5.1% versus a seasonal average return of 3.1%. Additionally, we are 95% confident that the seasonal average return after extreme selling (selling ratio 7% or above) events are between 4.1% to 6.2%, also significantly higher than that of 3.1% of the total seasonal average return. Contrarily, we also found strong evidence supporting the hypothesis that when extreme buying occurs in industrial stocks, returns after 1 month are -0.4% versus the monthly average return of 1.1%. Additionally, we are 95% confident that the monthly average return after extreme buying events range between -1.4% to 0.6%, significantly lower than that 1.1% of the monthly average return. Based on the hypothesis test, identify a sell signal when the buying ratio goes beyond 14.0%.

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XLI

Return vs Return Type

- Top 2% Big Sell Return
- Average Return

MAPsignals



XLI

Return vs Return Type

- Top 2% Big Buy Return
- Average Return

MAPsignals
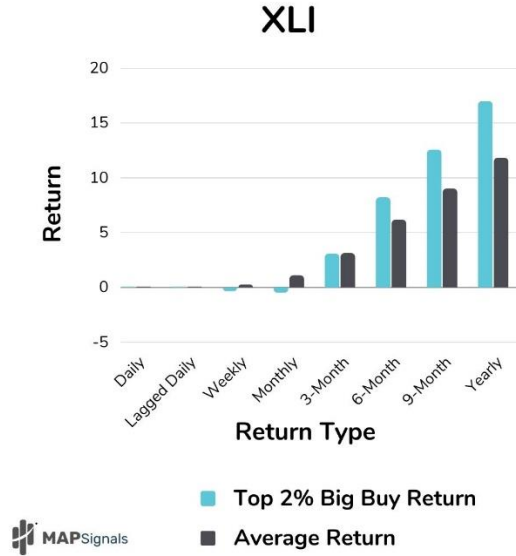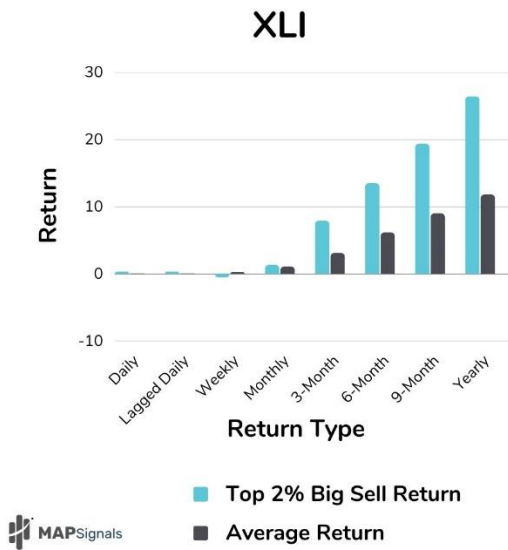
## TECHNOLOGY - XLK

Hypothesis: High returns usually happen in peak with large sell ratios, and low returns occur with large buy ratios. To see how large sell days correspond to forward market returns statistically, a regression model was fitted with data from the 2013 to 2023 period and selected the 2% largest sell days in the dataset. We found a strong positive correlation to higher market prices versus the monthly average return after extreme selling takes place via the regression analysis. Large buy ratios tend to predict lower forward monthly and seasonal returns. Contrarily, large sell ratios tend to predict higher monthly and longer-term forward returns. To test out the validity of our observations, we used all MAPsignals data from the 2013 to 2023 period and selected the 2% largest buy and sell days in the dataset for hypothesis testing. We found strong evidence supporting the hypothesis that when extreme selling occurs in Technology stocks, returns after 3 months are +8.9% versus a seasonal average return of 4.7%. We are 95% confident that the seasonal average returns after extreme selling events range between 5.5% to 12.3%, significantly higher than that 4.7% of the seasonal average return. Based on the hypothesis test, we identify a buy signal when the selling ratio surpasses 20% or more. When the selling ratio is above 20% for Technology stocks, forward three-month returns are +7.8% versus a seasonal average return of 4.7%. We are 95% confident that the seasonal average return after extreme selling (selling ratio 20% or above) events are between 5.1% to 10.5%, significantly higher than the 4.7% of the total seasonal average return.

## XLK (Top 2% Big Sell Return)

**Return** vs **Return Type** (Daily, Lagged Daily, Weekly, Monthly, 3-Month, 6-Month, 9-Month, Yearly)

- Top 2% Big Sell Return
- Average Return

## XLK (Top 2% Big Buy Return)

**Return** vs **Return Type** (Daily, Lagged Daily, Weekly, Monthly, 3-Month, 6-Month, 9-Month, Yearly)

- Top 2% Big Buy Return
- Average Return

**MAP**Signals
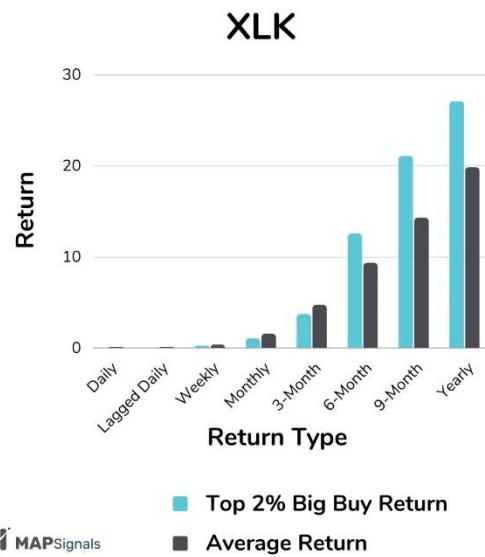
**UTILTIES - XLU**

Hypothesis: High returns of XLU usually happen in peak with large sell ratios, and low returns occur with large buy ratios. We wanted to see how large buy days correspond to forward market returns. Conversely, we did the same for large sell days. To study this we gathered all MAPsignals data from the 2013 to 2023 period and selected the 2% largest sell days in the dataset. We found there is a strong positive correlation to higher market prices versus the monthly average return after extreme selling takes place via the regression analysis. Large buy ratios tend to predict significantly lower monthly and longer term forward returns. Contrarily, large sell ratios tend to predict higher monthly and longer-term forward returns. To test out the validity of our observations, we used all MAPsignals data from the 2013 to 2023 time period and selected the 2% largest buy and sell days in the dataset for hypothesis testing. We found strong evidence supporting the hypothesis that when extreme selling occurs in utility stocks, returns after 3 months are +6.5% versus a seasonal average return of 2.4%. Additionally, we are 95% confident that the seasonal average returns after extreme selling events range between 4.3% to 8.6%, significantly higher than that 2.4% of the seasonal average return. Contrarily, we also found strong evidence supporting the hypothesis that when extreme buying occurs in Utility stocks, returns after 3 months are -0.8% versus a seasonal average return of 2.4%. Additionally, we are 95% confident that the seasonal average return after extreme buying events range between -2.8% to 1.1%, significantly lower than that 2.4% of the seasonal average return. Based on the hypothesis test, identify a sell signal when the buying ratio goes beyond 13.1%. When the selling ratio is above 17.5% for utility stocks, returns after three months are +5.9% versus a seasonal average return of 2.4%. Additionally, we are 95% confident that the seasonal average return after extreme selling (selling ratio 17.5% or above) events are between 4.5% to 7.2%, also significantly higher than that of 2.4% of the total seasonal average return. When the buying ratio is above 13.1% for utility stocks, returns after three months are -0.2% versus a seasonal average return of 2.4%. Additionally, we are 95% confident that the seasonal average return after extreme buying (buying ratio 13.1% or above) events are between -1.1% to 0.7%, also significantly lower than that of 2.4% of the total seasonal average return.

XLU



XLU

**HEALTHCARE - XLV**

High returns of XLV usually happen in peak with large sell ratios, and low returns occur with large buy ratios. (Some large buy ratio happens at peak) We wanted to see how large sell days correspond to forward market returns statistically. To study this we gathered all MAPsignals data from the 2013 to 2023 period and selected the 2% largest sell days in the dataset. We found via regression analysis that: There is a positive correlation to higher market prices versus the seasonal average return after extreme selling takes place. Large buy ratios tend to predict lower forward weekly returns. Contrarily, large sell ratios tend to predict higher forward seasonal and longer-term returns. To test out the validity of our observations, we used all MAPsignals data from the 2013 to 2023 period and selected the 2% largest buy and sell days in the dataset for hypothesis testing. We found strong evidence supporting the hypothesis that when extreme selling occurs in healthcare stocks, returns after 3 months are +8.0% versus a seasonal average return of 3.3%. Additionally, we are 95% confident that the seasonal average returns after extreme selling events are between 6.0% to 10.0%, also significantly higher than that of 3.3% of the total seasonal average return. Based on the hypothesis test, we identify a buy signal when the selling ratio surpasses 7% or more. When the selling ratio is above 7% for healthcare stocks, returns after three months are +5.8% versus a seasonal average return of 3.3%. Additionally, we are 95% confident that the seasonal average return after extreme selling (selling ratio 7% or above) events are between 5.2% to 6.5%, also significantly higher than that of 3.3% of the total seasonal average return. Contrarily, we also found strong evidence supporting the hypothesis that when extreme buying occurs in healthcare stocks, returns after 3 months are 0.48% versus a seasonal average return of 3.3%. Additionally, we are 95% confident that the seasonal average return after extreme buying events range between -1.5% to 2.45%, significantly lower than that 3.3% of the seasonal average return. Based on the hypothesis test, identify a sell signal when the buying ratio goes beyond 16.0%.

**XLV** — Top 2% Big Sell Return / Average Return
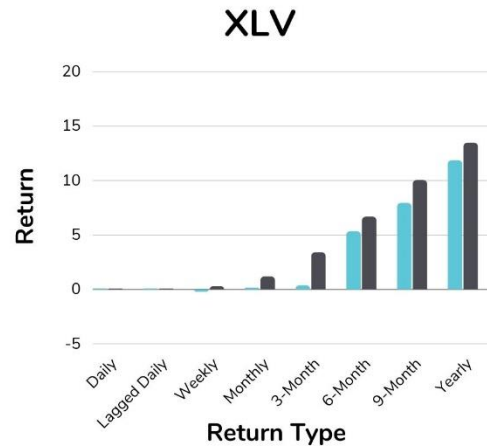
**XLV** — Top 2% Big Buy Return / Average Return

## DISCRETIONARY - XLY

High returns of XLY usually happen in peak with large sell ratios, and low returns occur with large buy ratios. (Some large buy ratio happens at peak) We wanted to see how large sell days correspond to forward market returns statistically. To study this we gathered all MAPsignals data from the 2013 to 2023 time period and selected the 2% largest sell days in the dataset. We found via regression analysis that: There is a strong negative correlation to higher market prices versus the seasonal average return after extreme buying takes place. There is a positive correlation to higher market prices versus the seasonal average return after extreme selling takes place. Large buy ratios tend to predict lower forward weekly and monthly returns. Contrarily, large sell ratios tend to predict higher forward seasonal and longer-term returns. To test out the validity of our observations, we used all MAPsignals data from the 2013 to 2023 time period and selected the 2% largest buy and sell days in the dataset for hypothesis testing. We found strong evidence supporting the hypothesis that when extreme selling occurs in Discretionary stocks, returns after 3 months are +8.9% versus a seasonal average return of 3.3%. Additionally, we are 95% confident that the seasonal average returns after extreme selling events are between 5.0% to 12.8%, also significantly higher than that of 3.3% of the total seasonal average return. Based on the hypothesis test, we identify a buy signal when the selling ratio surpasses 14% or more. When the selling ratio is above 14% for discretionary stocks, returns after three months are +5.8% versus a seasonal average return of 3.3%. Additionally, we are 95% confident that the seasonal average return after extreme selling (selling ratio 14% or above) events are between 4.1% to 8.9%, also significantly higher than that of 3.3% of the total seasonal average return. Contrarily, we also found strong evidence supporting the hypothesis that when extreme buying occurs in discretionary stocks, returns after 1 month are -0.13% versus the monthly average return of 1.1%. Additionally, we are 95% confident that the seasonal average return after extreme buying events range between -1.4% to 1.1%, lower than that 1.1% of the seasonal average return. Based on the hypothesis test, identify a sell signal when the buying ratio goes beyond 16.4%.

## XLY



**XLY**
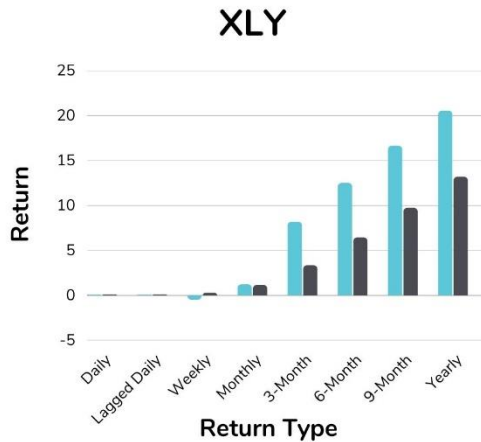


Top 2% Big Sell Return
Average Return
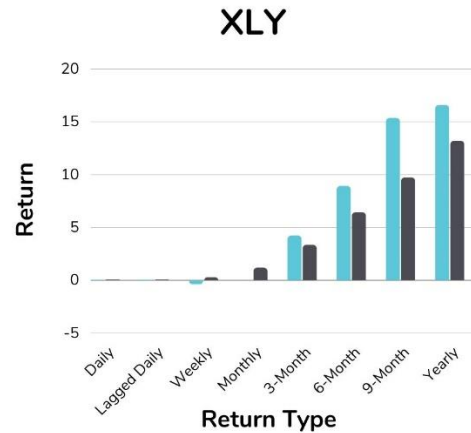
Top 2% Big Buy Return
Average Return

**Investment Research Disclaimer:**

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**APPENDIX**

**Big Money Index**

| Big Money Index | | |
|---|---|---|
| **Return Type** | **BMI first reach 80 Return (Average)** | **Overall Market Return (Cumulative)** |
| Daily | 0.22% | 0.04% |
| Lagged 1 Day | -0.07% | 0.04% |
| 1 Week | -0.18% | 0.18% |
| 1 Month (21d) | 0.36% | 0.74% |
| 3 Month (62d) | 1.91% | 2.23% |
| 6 Month (124d) | 3.81% | 4.45% |
| 9 Month (188d) | 6.75% | 6.85% |
| 1 Year (252d) | 9.96% | 9.31% |

| Big Money Index | | |
|---|---|---|
| **Return Type** | **BMI first below 26 Return (Average)** | **Overall Market Return (Cumulative)** |
| Daily | -0.52% | 0.04% |
| Lagged 1 Day | 0.69% | 0.04% |
| 1 Week | 2.08% | 0.18% |
| 1 Month (21d) | 4.17% | 0.74% |
| 3 Month (62d) | 7.45% | 2.23% |
| 6 Month (124d) | 11.84% | 4.45% |
| 9 Month (188d) | 13.43% | 6.85% |
| 1 Year (252d) | 18.59% | 9.31% |



BMI first reach 80 Returns VS Overall Avg Returns

- BMI first reach 80 Avg. Returns
- Overall Avg. Returns
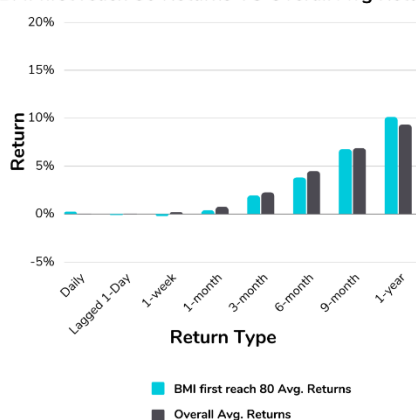
MAPsignals



BMI first below 26 Returns VS Overall Avg Returns
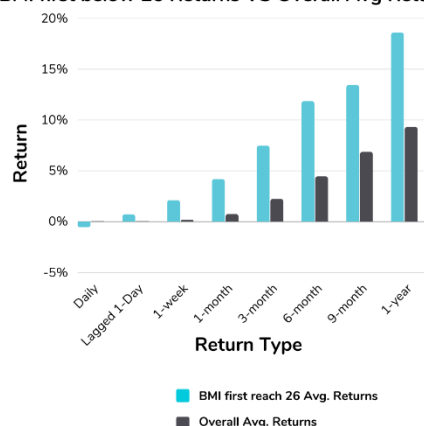
- BMI first reach 26 Avg. Returns
- Overall Avg. Returns

MAPsignals

- Hypothesis: Extreme buying represents a sell signal; extreme selling represents a buy signal.
- Findings: By observation, against the hypothesis, large buy ratios tend to predict significantly higher monthly and longer-term forward returns rather than lower returns. Contrarily, in support of our hypothesis, large sell ratios tend to predict higher forward returns compared to overall average returns.
- Extreme buying when the Big Money Index is above 80 has no statistical significance.
- **Based on the confidence interval of the hypothesis test, we identify a buy signal when the Big Money Index first falls below 26.**
  - o **We found that when the Big Money Index drops below 26, it can be identified as an extreme selling event. The average S&P 500 gains three months after extreme selling events are 5.22% versus the seasonal average return of 2.23%.**
  - o Additionally, given the p-value of 0.03, we are 95% confident that the seasonal average return after extreme selling events ranges between 2.91% to 11.99%, significantly higher than the 2.23% total seasonal average return.

o   Test Results:

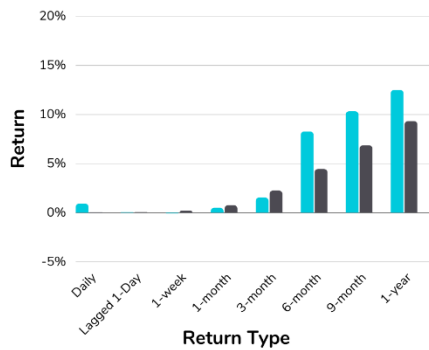| | T | dof | alternative | p-val | CI95% | cohen-d | BF10 | power |
|---|---|---|---|---|---|---|---|---|
| **T-test** | 2.34 | 32 | two-sided | 0.03 | [2.91, 11.99] | 0.41 | 1.994 | 0.62 |

o   Key Metrics

| t-Test 1-sample (Threshold Testing) ▼ | ▼ |
|---|---|
| Test Mean (Average Seasonly Return Total) | 2.23% |
| Sample Mean (Threhold Seasonly Return) | 7.45% |
| Confidence Level | 0.95 |
| Number of Observations | 33 |
| P-value (Two-sided) | 0.03 |
| Upper Confidence Interval | 11.99% |
| Lower Confidence Interval | 2.91% |

## Big Money Stock Buys and Sells

| Big Money Stock | | |
|---|---|---|
| **Return Type** | **Top 1% BUYS Return (Average)** | **Overall Market Return (Cumulative)** |
| Daily | 1.16% | 0.04% |
| Lagged 1 Day | 0.01% | 0.04% |
| 1 Week | -0.09% | 0.18% |
| 1 Month (21d) | 0.21% | 0.74% |
| 3 Month (62d) | 3.55% | 2.23% |
| 6 Month (124d) | 7.38% | 4.45% |
| 9 Month (188d) | 10.34% | 6.85% |
| 1 Year (252d) | 12.61% | 9.31% |

| Big Money Stock | | |
|---|---|---|
| **Return Type** | **Top 2% BUYS Return (Average)** | **Overall Market Return (Cumulative)** |
| Daily | 0.99% | 0.04% |
| Lagged 1 Day | -0.12% | 0.04% |
| 1 Week | -0.13% | 0.18% |
| 1 Month (21d) | 0.03% | 0.74% |
| 3 Month (62d) | 2.58% | 2.23% |
| 6 Month (124d) | 5.59% | 4.45% |
| 9 Month (188d) | 8.05% | 6.85% |
| 1 Year (252d) | 10.50% | 9.31% |



SPY VS Big Money Stock Data



SPY VS Big Money Stock Data

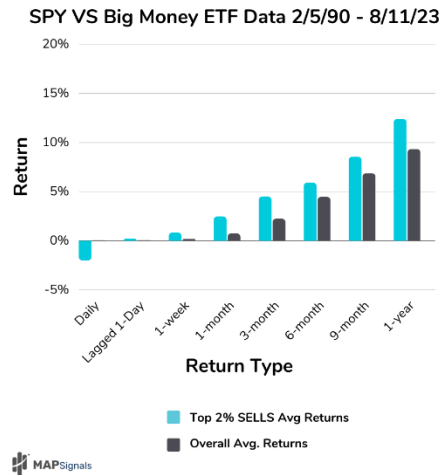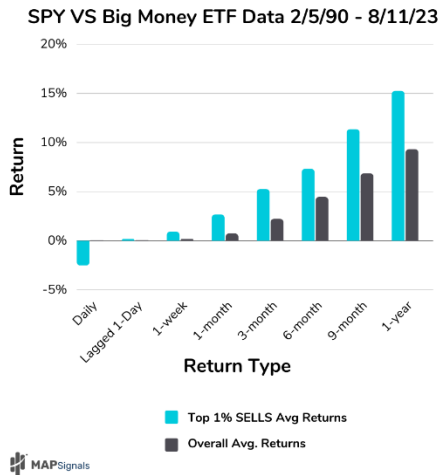| Big Money Stock | | |
|---|---|---|
| Return Type | Top 1% SELLS Return (Average) | Overall Market Return (Cumulative) |
| Daily | -2.85% | 0.04% |
| Lagged 1 Day | 0.23% | 0.04% |
| 1 Week | 0.21% | 0.18% |
| 1 Month (21d) | 1.48% | 0.74% |
| 3 Month (62d) | 4.95% | 2.23% |
| 6 Month (124d) | 5.78% | 4.45% |
| 9 Month (188d) | 8.85% | 6.85% |
| 1 Year (252d) | 13.64% | 9.31% |

| Big Money Stock | | |
|---|---|---|
| Return Type | Top 2% SELLS Return (Average) | Overall Market Return (Cumulative) |
| Daily | -2.27% | 0.04% |
| Lagged 1 Day | 0.17% | 0.04% |
| 1 Week | 0.66% | 0.18% |
| 1 Month (21d) | 1.98% | 0.74% |
| 3 Month (62d) | 3.87% | 2.23% |
| 6 Month (124d) | 5.00% | 4.45% |
| 9 Month (188d) | 6.78% | 6.85% |
| 1 Year (252d) | 9.85% | 9.31% |
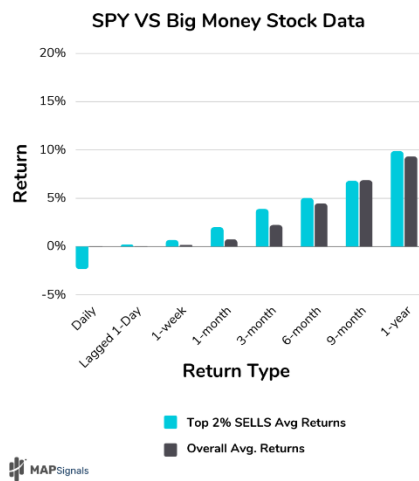


SPY VS Big Money Stock Data

Top 1% SELLS Avg Returns
Overall Avg. Returns

MAPSignals



SPY VS Big Money Stock Data

Top 2% SELLS Avg Returns
Overall Avg. Returns

MAPSignals

- Hypothesis: Extreme buying represents a sell signal; extreme selling represents a buy signal.
- Findings: By observation, supporting the hypothesis, extreme buy ratios tend to predict significantly lower monthly forward returns. Contrarily, supporting the hypothesis, extreme sell ratios tend to predict higher seasonal and longer term forward returns.
- To test out the validity of our hypothesis and observations, we used all available MAPsignals data from the 1990 to 2023 time period for hypothesis testing.

**Buy Signal Threshold**
- **Based on the confidence interval of the hypothesis test, we identify a buy signal when the Big Money Stock Buys and Sells Count reaches -146 or less.**
  - **We found that when the Big Money Stock Buys and Sells Count drops below -146, it can be identified as an extreme selling event. The S&P 500 index returns three months after extreme selling events are, on average, 1.2% versus the seasonal average return of 2.2%**
  - Also, given p-value of 0.03, we are 95% confident that the seasonal average return after extreme selling events (selling ratio below -146) are between 2.32% to 4.42%, significantly higher than that of 2.23% of the total seasonal average return.

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o    Test Results:

| | T | dof | alternative | p-val | CI95% | cohen-d | BF10 | power |
|---|---|---|---|---|---|---|---|---|
| T-test | 2.16 | 377 | two-sided | 0.03 | [2.33, 4.42] | 0.11 | 0.571 | 0.58 |

o    Key Metrics

| t-Test 1-sample (Threshold Testing) ▼ | ▼ |
|---|---|
| Test Mean (Average Seasonly Return Total) | 2.23% |
| Sample Mean (Threhold Seasonly Return) | 3.37% |
| Confidence Level | 0.95 |
| Number of Observations | 378 |
| P-value (Two-sided) | 0.03 |
| Upper Confidence Interval | 4.42% |
| Lower Confidence Interval | 2.33% |

**Sell Signal Threshold**
- **Based on the confidence interval of the hypothesis test, we identify a sell signal when the Big Money Stock Buys and Sells Count reaches a count of 150 buys or more.**
    - o    **We found that when the Big Money Stock Buys and Sells Count increases above 150, it can be identified as an extreme buying event. The S&P 500 Index returns one month after the extreme buying events are -0.8% versus the monthly average return of 0.74%**
    - o    Also, given p-value of 0, we are 95% confident that the monthly average returns after extreme buying events (buys above 150) are between -0.49% to 0.37%, significantly lower than that of 0.74% of the total monthly average return.
    - o    Test Results

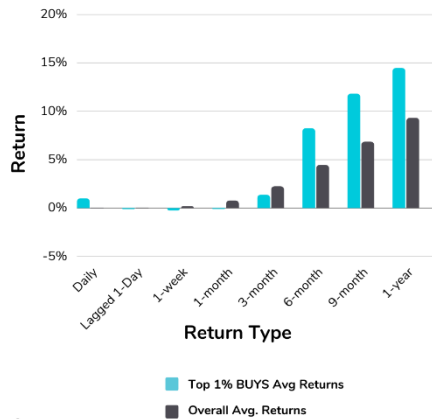| | T | dof | alternative | p-val | CI95% | cohen-d | BF10 | power |
|---|---|---|---|---|---|---|---|---|
| T-test | -3.68 | 334 | two-sided | 0.0 | [-0.49, 0.37] | 0.2 | 43.536 | 0.96 |

- Key Metrics

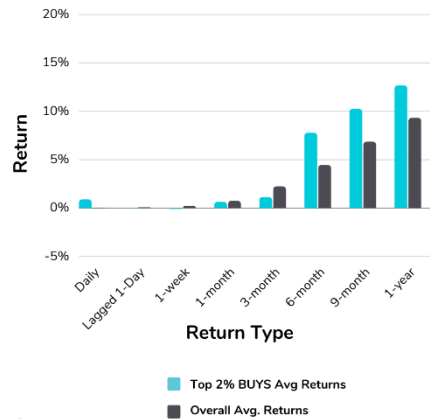| t-Test 1-sample (Threshold Testing) ▼ | ▼ |
|---|---|
| Test Mean (Average Monthly Return Total) | 0.74% |
| Sample Mean (Threhold Monthly Return) | -0.06% |
| Confidence Level | 0.95 |
| Number of Observations | 335 |
| P-value (Two-sided) | 0.00 |
| Upper Confidence Interval | 0.37% |
| Lower Confidence Interval | -0.49% |

# Big Money ETF 2/5/90-8/11/23

| Big Money ETF 2/5/90-8/11/23 | | |
|---|---|---|
| Return Type | Top 1% BUYS Return (Average) | Overall Market Return (Cumulative) |
| Daily | 0.91% | 0.04% |
| Lagged 1 Day | 0.03% | 0.04% |
| 1 Week | -0.06% | 0.18% |
| 1 Month (21d) | 0.49% | 0.74% |
| 3 Month (62d) | 1.53% | 2.23% |
| 6 Month (124d) | 8.24% | 4.45% |
| 9 Month (188d) | 10.31% | 6.85% |
| 1 Year (252d) | 12.48% | 9.31% |

| Big Money ETF 2/5/90-8/11/23 | | |
|---|---|---|
| Return Type | Top 2% BUYS Return (Average) | Overall Market Return (Cumulative) |
| Daily | 0.76% | 0.04% |
| Lagged 1 Day | 0.03% | 0.04% |
| 1 Week | 0.06% | 0.18% |
| 1 Month (21d) | 1.19% | 0.74% |
| 3 Month (62d) | 2.48% | 2.23% |
| 6 Month (124d) | 7.72% | 4.45% |
| 9 Month (188d) | 11.00% | 6.85% |
| 1 Year (252d) | 11.14% | 9.31% |



SPY VS Big Money ETF Data 2/5/90 - 8/11/23

Top 1% BUYS Avg Returns
Overall Avg. Returns

MAPsignals



SPY VS Big Money ETF Data 2/5/90 - 8/11/23

Top 2% BUYS Avg Returns
Overall Avg. Returns

MAPsignals

| Big Money ETF 2/5/90-8/11/23 | | |
|---|---|---|
| Return Type | Top 1% SELLS Return (Average) | Overall Market Return (Cumulative) |
| Daily | -2.46% | 0.04% |
| Lagged 1 Day | 0.16% | 0.04% |
| 1 Week | 0.91% | 0.18% |
| 1 Month (21d) | 2.65% | 0.74% |
| 3 Month (62d) | 5.24% | 2.23% |
| 6 Month (124d) | 7.30% | 4.45% |
| 9 Month (188d) | 11.34% | 6.85% |
| 1 Year (252d) | 15.23% | 9.31% |

| Big Money ETF 2/5/90-8/11/23 | | |
|---|---|---|
| Return Type | Top 2% SELLS Return (Average) | Overall Market Return (Cumulative) |
| Daily | -1.94% | 0.04% |
| Lagged 1 Day | 0.20% | 0.04% |
| 1 Week | 0.81% | 0.18% |
| 1 Month (21d) | 2.45% | 0.74% |
| 3 Month (62d) | 4.47% | 2.23% |
| 6 Month (124d) | 5.89% | 4.45% |
| 9 Month (188d) | 8.53% | 6.85% |
| 1 Year (252d) | 12.38% | 9.31% |

SPY VS Big Money ETF Data 2/5/90 - 8/11/23

- Top 1% SELLS Avg Returns
- Overall Avg. Returns

MAPSignals



SPY VS Big Money ETF Data 2/5/90 - 8/11/23

- Top 2% SELLS Avg Returns
- Overall Avg. Returns

MAPSignals

- Hypothesis: Extreme buying represents a sell signal; extreme selling represents a buy signal.
- Findings: By observation, extreme buy ratios tend to predict significantly lower monthly and seasonal forward returns. Contrarily, extreme sell ratios tend to predict higher forward returns, especially monthly and seasonal forward returns.

**Buy Signal Threshold**
- **Based on the confidence interval of the hypothesis test, we identify a buy signal when the Big Money ETF Buy and sell Count reaches -55 or less.**
    - o **We found that when there is extreme selling event where the Big Money ETF Buy and sell Count drops below -55, the S&P 500 Index returns after three months are +5.4% versus the seasonal average return of 2.2%**
    - o Also, given p-value of 0, we are 95% confident that the seasonal average return after extreme selling events (selling ratio below -55) are between 3.5% to 7.4%, significantly higher than that of 2.2% of the total seasonal average return.
    - o Test Results:

| | T | dof | alternative | p-val | CI95% | cohen-d | BF10 | power |
|---|---|---|---|---|---|---|---|---|
| **T-test** | 3.29 | 101 | two-sided | 0.0 | [3.5, 7.37] | 0.33 | 16.295 | 0.9 |

- Key Metrics

| t-Test 1-sample (Threshold Testing) | | |
|---|---|---|
| Test Mean (Average Monthly Return Total) | | 2.23% |
| Sample Mean (Threhold Monthly Return) | | 5.44% |
| Confidence Level | | 0.95 |
| Number of Observations | | 102 |
| P-value (Two-sided) | | 0.00 |
| Upper Confidence Interval | | 7.37% |
| Lower Confidence Interval | | 3.50% |

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## Big Money ETF 1/1/05-8/11/23

| Big Money ETF 1/1/05-8/11/23 | | | Big Money ETF 1/1/05-8/11/23 | | |
|---|---|---|---|---|---|
| Return Type | Top 1% BUYS Return (Average) | Overall Market Return (Cumulative) | Return Type | Top 2% BUYS Return (Average) | Overall Market Return (Cumulative) |
| Daily | 0.97% | 0.04% | Daily | 0.88% | 0.04% |
| Lagged 1 Day | -0.07% | 0.04% | Lagged 1 Day | -0.02% | 0.04% |
| 1 Week | -0.24% | 0.18% | 1 Week | -0.08% | 0.18% |
| 1 Month (21d) | -0.09% | 0.74% | 1 Month (21d) | 0.63% | 0.74% |
| 3 Month (62d) | 1.36% | 2.23% | 3 Month (62d) | 1.14% | 2.23% |
| 6 Month (124d) | 8.22% | 4.45% | 6 Month (124d) | 7.76% | 4.45% |
| 9 Month (188d) | 11.79% | 6.85% | 9 Month (188d) | 10.23% | 6.85% |
| 1 Year (252d) | 14.46% | 9.31% | 1 Year (252d) | 12.65% | 9.31% |



SPY VS Big Money ETF Data 1/1/05 - 8/11/23

Top 1% BUYS Avg Returns
Overall Avg. Returns

MAPSignals



SPY VS Big Money ETF Data 1/1/05 - 8/11/23

Top 2% BUYS Avg Returns
Overall Avg. Returns

MAPSignals

| Big Money ETF 1/1/05-8/11/23 | | | | Big Money ETF 1/1/05-8/11/23 | | |
|---|---|---|---|---|---|---|
| Return Type | Top 1% SELLS Return (Average) | Overall Market Return (Cumulative) | | Return Type | Top 2% SELLS Return (Average) | Overall Market Return (Cumulative) |
| Daily | -2.60% | 0.04% | | Daily | -2.31% | 0.04% |
| Lagged 1 Day | 0.28% | 0.04% | | Lagged 1 Day | 0.18% | 0.04% |
| 1 Week | 0.38% | 0.18% | | 1 Week | 0.80% | 0.18% |
| 1 Month (21d) | 2.47% | 0.74% | | 1 Month (21d) | 2.58% | 0.74% |
| 3 Month (62d) | 7.65% | 2.23% | | 3 Month (62d) | 5.24% | 2.23% |
| 6 Month (124d) | 10.27% | 4.45% | | 6 Month (124d) | 7.29% | 4.45% |
| 9 Month (188d) | 15.01% | 6.85% | | 9 Month (188d) | 11.30% | 6.85% |
| 1 Year (252d) | 20.23% | 9.31% | | 1 Year (252d) | 15.60% | 9.31% |



SPY VS Big Money ETF Data 1/1/05 - 8/11/23
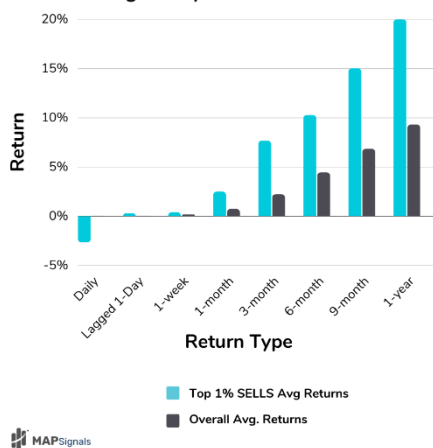


SPY VS Big Money ETF Data 1/1/05 - 8/11/23
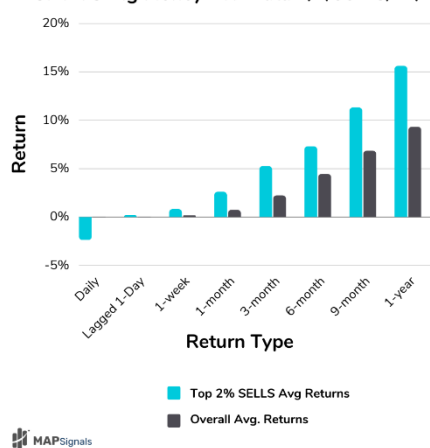
- Hypothesis: Hypothesis: Extreme buying represents a sell signal; extreme selling represents a buy signal.
- Findings: By observation, large buy ratios tend to predict significantly lower monthly and seasonal forward returns. Contrarily, large sell ratios tend to predict higher forward returns, especially monthly and seasonally forward returns.

**Buy Signal Threshold**
- **Based on the confidence interval of the hypothesis test, we identify a buy signal when the Big Money ETF sells -55 or less.**

  o **We found that when extreme selling occurs where the Big Money ETF drops below -55, the S&P 500 stocks returns after three months are 5.4% versus the seasonal average return of 2.1%**
  o Also, given p-value of 0, we are 95% confident that the seasonal average return after extreme selling events (selling ratio below -55) are between 3.5% to 7.4%, significantly higher than that of 2.2% of the total seasonal average return.
  o Test Results:

| | T | dof | alternative | p-val | CI95% | cohen-d | BF10 | power |
|---|---|---|---|---|---|---|---|---|
| T-test | 3.41 | 101 | two-sided | 0.0 | [3.5, 7.37] | 0.34 | 23.668 | 0.92 |

o   Key Metrics:

| t-Test 1-sample (Threshold Testing) | |
|---|---|
| Test Mean (Average Monthly Return Total) | 2.10% |
| Sample Mean (Threhold Monthly Return) | 5.43% |
| Confidence Level | 0.95 |
| Number of Observations | 102 |
| P-value (Two-sided) | 0.00 |
| Upper Confidence Interval | 7.37% |
| Lower Confidence Interval | 3.50% |

**IYR**

- High returns of IYR usually occur in peak with extreme sell ratios, and low returns occur in peak with extreme buy ratios. (Some extreme buy ratios occur at peak)
- We wanted to see how large sell days correspond to forward market returns statistically.
- To study this we gathered all MAPsignals data from the 2013 to 2023 time period and selected the 2% largest sell days in the dataset. We found via regression analysis that:
  o   There is a strong negative correlation to higher market prices versus the seasonal average return after extreme buying takes place.
  o   There is a positive correlation to higher market prices versus the seasonal average return after extreme selling takes place.

| Regression Statistics | |
|---|---|
| R Square | 0.36 |
| Adjusted R Square | 0.34 |
| Significance F (Model Significane) | 2.61E-05 |
| Observations | 50 |

| | Coefficients | P-value |
|---|---|---|
| Intercept | 0.017 | 0.64 |
| Big Money Buy Index | -2.77 | 0.001 |
| Big Money Sell Index *** | 0.88 | 0.001 |

Monthly Return = 0.017 - 2.77 Buy Index + 0.88 Sell Index

## IYR

| | Return Type | Top 1% Big Buy Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.03 | 0.03 |
| 1 | Lagged Daily | 0.03 | 0.03 |
| 2 | Weekly | -0.78 | 0.13 |
| 3 | Monthly | 2.00 | 0.61 |
| 4 | 3 Months | 3.50 | 1.71 |
| 5 | 6 Months | 8.13 | 3.35 |
| 6 | 9 Months | 8.74 | 5.24 |
| 7 | Yearly | 14.19 | 7.56 |

## IYR
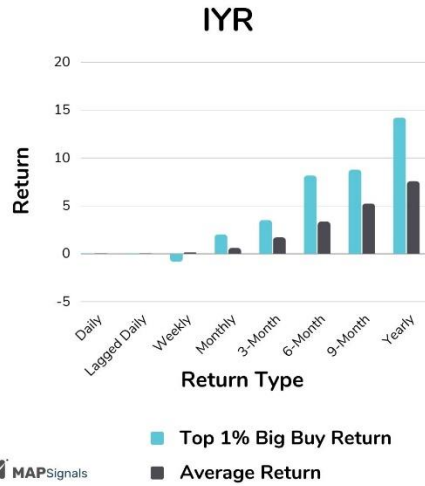
| | Return Type | Top 2% Big Buy Return | Average Return |
|---|---|---|---|
| 0 | Daily | -0.06 | 0.03 |
| 1 | Lagged Daily | -0.06 | 0.03 |
| 2 | Weekly | -0.51 | 0.13 |
| 3 | Monthly | 1.84 | 0.61 |
| 4 | 3 Months | 4.17 | 1.71 |
| 5 | 6 Months | 11.20 | 3.35 |
| 6 | 9 Months | 13.63 | 5.24 |
| 7 | Yearly | 17.94 | 7.56 |

## IYR
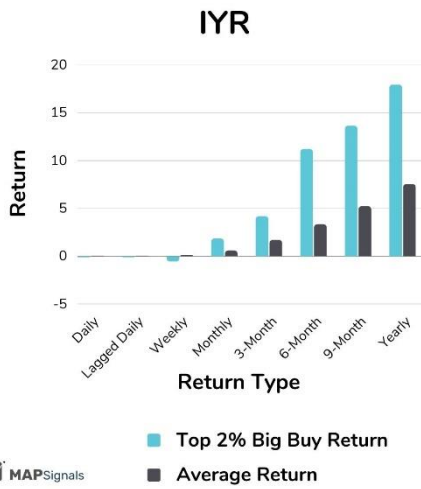
| | Return Type | Top 1% Big Sell Return | Average Return |
|---|---|---|---|
| 0 | Daily | -0.05 | 0.03 |
| 1 | Lagged Daily | -0.05 | 0.03 |
| 2 | Weekly | -2.54 | 0.13 |
| 3 | Monthly | -1.04 | 0.61 |
| 4 | 3 Months | 3.34 | 1.71 |
| 5 | 6 Months | 4.72 | 3.35 |
| 6 | 9 Months | 6.71 | 5.24 |
| 7 | Yearly | 13.44 | 7.56 |

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## IYR
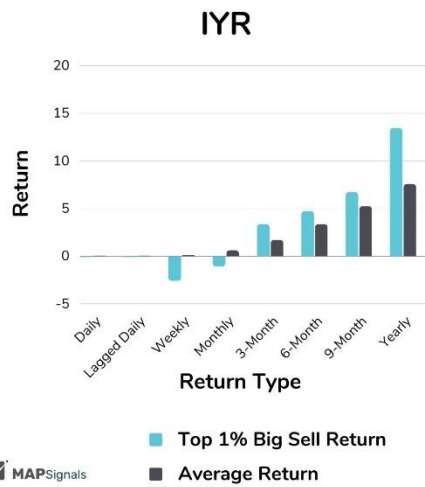
| | Return Type | Top 2% Big Sell Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.27 | 0.03 |
| 1 | Lagged Daily | 0.27 | 0.03 |
| 2 | Weekly | -0.44 | 0.13 |
| 3 | Monthly | 0.78 | 0.61 |
| 4 | 3 Months | 4.83 | 1.71 |
| 5 | 6 Months | 7.16 | 3.35 |
| 6 | 9 Months | 7.66 | 5.24 |
| 7 | Yearly | 14.46 | 7.56 |
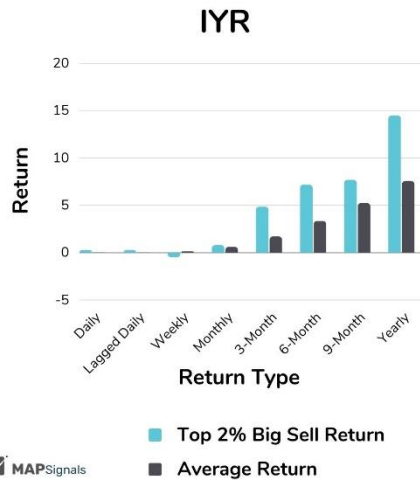


- Extreme buy ratios tend to predict lower forward weekly returns. Contrarily, extreme sell ratios tend to predict higher forward seasonal and longer-term returns.
- To test out the validity of our observations, we used all MAPsignals data from the 2013 to 2023 time period and selected the 2% largest buy and sell days in the dataset for hypothesis testing.
  - **With a P-value of 0.07, We found weak evidence supporting the hypothesis: when extreme selling occurs in Real Estate stocks, returns after 3 months are 4.8% versus a seasonal average return of 1.6%.**

| t-Test 1-sample | |
|---|---|
| Test Mean (Average Seasonal Return Total) | 1.6% |
| Sample Mean (After Big-Selling Return) | 4.8% |
| Confidence Level | 0.95 |
| Number of Observations | 49 |
| P-value (Two-sided) | 0.07 |
| Upper Confidence Interval | 1.4% |
| Lower Confidence Interval | 8.3% |

- Based on the hypothesis test, we identify a buy signal when the Real Estate sector has a selling ratio of 9% or more.
  - **When the selling ratio is above 9% for Real Estate stocks, returns after three months are +4.8% versus a seasonal average return of 1.6%.**
  - Additionally, we are 95% confident that the seasonal average return after extreme selling (selling ratio 9% or above) returns are between 2.1% to 4.4%, also significantly higher than that of 1.6% of the total seasonal average return.

**XLB**

- High returns of XLB usually occur in peak with extreme sell ratios, and low returns occur with extreme buy ratios. (Some extreme buy ratios occur at peak)
- We wanted to see how extreme sell days correspond to forward market returns statistically.
- To study this we gathered all MAPsignals data from the 2013 to 2023 time period and selected the 2% largest sell days in the dataset.
    - We found there is a strong positive correlation to higher market prices versus the seasonal average return after extreme selling takes place via the regression analysis:

| Regression Statistics | |
|---|---|
| R Square | 0.51 |
| Adjusted R Square | 0.49 |
| Significance F (Model Significane) | 5.14E-08 |
| Observations | 47 |

| | Coefficients | P-value |
|---|---|---|
| Intercept | -0.05 | 0.15 |
| Big Money Buy Index | -1.24 | 0.10 |
| Big Money Sell Index ** | 1.51 | 0.00 |

Monthly Return = -0.05 -1.124 Buy Index + 1.51 Sell Index

| | Return Type | Top 1% Big Buy Return | Average Return |
|---|---|---|---|
| 0 | Daily | -0.05 | 0.06 |
| 1 | Lagged Daily | -0.05 | 0.06 |
| 2 | Weekly | -1.32 | 0.21 |
| 3 | Monthly | 0.96 | 0.93 |
| 4 | 3 Months | 3.47 | 2.68 |
| 5 | 6 Months | 8.66 | 5.41 |
| 6 | 9 Months | 12.62 | 8.00 |
| 7 | Yearly | 21.15 | 10.69 |



XLB

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## XLB
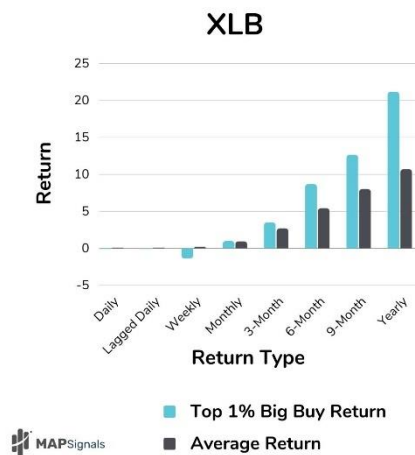
| | Return Type | Top 2% Big Buy Return | Average Return |
|---|---|---|---|
| 0 | Daily | -0.08 | 0.06 |
| 1 | Lagged Daily | -0.08 | 0.06 |
| 2 | Weekly | -0.59 | 0.21 |
| 3 | Monthly | 0.81 | 0.93 |
| 4 | 3 Months | 4.52 | 2.68 |
| 5 | 6 Months | 10.07 | 5.41 |
| 6 | 9 Months | 13.94 | 8.00 |
| 7 | Yearly | 19.49 | 10.69 |



## XLB
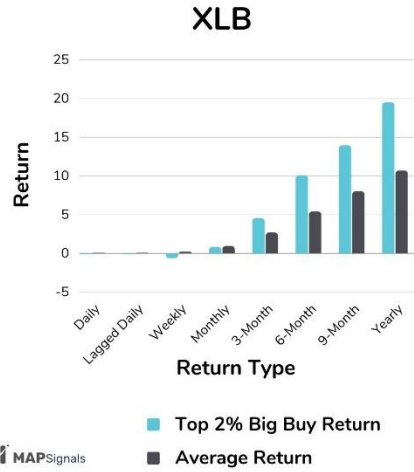
| | Return Type | Top 1% Big Sell Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.14 | 0.06 |
| 1 | Lagged Daily | 0.14 | 0.06 |
| 2 | Weekly | -0.77 | 0.21 |
| 3 | Monthly | 1.89 | 0.93 |
| 4 | 3 Months | 9.30 | 2.68 |
| 5 | 6 Months | 18.00 | 5.41 |
| 6 | 9 Months | 24.92 | 8.00 |
| 7 | Yearly | 32.01 | 10.69 |



## XLB
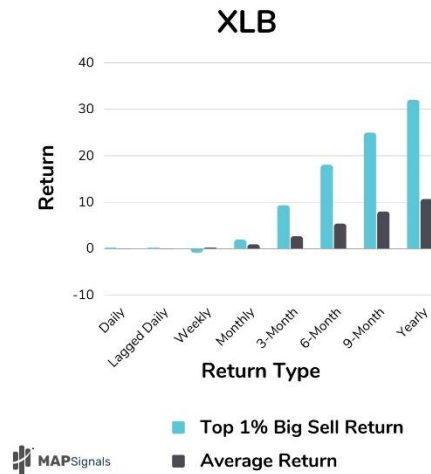
| | Return Type | Top 2% Big Sell Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.32 | 0.06 |
| 1 | Lagged Daily | 0.32 | 0.06 |
| 2 | Weekly | 0.04 | 0.21 |
| 3 | Monthly | 2.90 | 0.93 |
| 4 | 3 Months | 9.01 | 2.68 |
| 5 | 6 Months | 16.85 | 5.41 |
| 6 | 9 Months | 21.65 | 8.00 |
| 7 | Yearly | 29.15 | 10.69 |



- Extreme buy ratios tend to predict negative weekly and monthly returns. Contrarily, extreme sell ratios tend to predict slightly higher monthly and much higher seasonal and longer-term returns.

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- To test out the validity of our observations, we used all MAPsignals data from the 2013 to 2023 time period and selected the 2% largest buy and sell days in the dataset for hypothesis testing.
  - **We found strong evidence supporting the hypothesis that when extreme selling occurs in material stocks, returns after 3 months are +9.0% versus a seasonal average return of 2.7%.**
  - Additionally, we are 95% confident that the seasonal average return after extreme selling events range between 5.3% to 12.7%, significantly higher than that 2.7% of the seasonal average return.

| t-Test 1-sample | |
|---|---|
| Test Mean (Average Seasonal Return Total) | 2.7% |
| Sample Mean (Post Big-Selling Return) | 9.0% |
| Confidence Level | 0.95 |
| Number of Observations | 50 |
| P-value (Two-sided) | 0.00 |
| Upper Confidence Interval | 5.3% |
| Lower Confidence Interval | 12.7% |

- Based on the hypothesis test, we identify a buy signal when the material sector has a selling ratio of 6% or more.
  - **When the selling ratio is above 6% for Material stocks, returns after three months are 4.3% versus a seasonal average return of 2.7%.**
  - Additionally, we are 95% confident that the seasonal average return after extreme selling (selling ratio 6% or above) events are between 3.3% to 5.4%, also significantly higher than that of 2.7% of the total seasonal average return.

| t-Test 1-sample (threshold testing) | |
|---|---|
| Test Mean (Average Seasonal Return Total) | 2.7% |
| Sample Mean (Threshold Seasonal Return) | 4.3% |
| Confidence Level | 0.95 |
| Number of Observations | 328 |
| P-value (Two-sided) | 0.00 |
| Upper Confidence Interval | 3.3% |
| Lower Confidence Interval | 5.4% |

**XLE**

- High returns of XLE usually occur in peak with extreme sell ratios, and low returns occur with extreme buy ratios, exactly the reverse of what we are trying to search for.
- To study this we gathered all MAPsignals data from the 2013 to 2023 time period and selected the 2% largest sell days in the dataset.
  - Via the regression analysis, we found there is a positive correlation to higher market prices versus the seasonal average return after extreme buying takes place and a negative correlation after extreme selling events:

| Regression Statistics | |
|---|---|
| R Square | 0.09 |
| Adjusted R Square | 0.05 |
| Significance F (Model Significane) | 1.37E-01 |
| Observations | 48 |

| | Coefficients | P-value |
|---|---|---|
| Intercept | 0.16 | 0.02 |
| Big Money Buy Index*** | 0.47 | 0.28 |
| Big Money Sell Index * | -3.65 | 0.11 |

Monthly Return = 0.16 + 0.49 Buy Index - 3.65 Sell Index

| | Return Type | Top 1% Big Buy Return | Average Return |
|---|---|---|---|
| 0 | Daily | -0.03 | 0.04 |
| 1 | Lagged Daily | -0.03 | 0.04 |
| 2 | Weekly | -0.44 | 0.18 |
| 3 | Monthly | -0.10 | 0.76 |
| 4 | 3 Months | 7.41 | 2.16 |
| 5 | 6 Months | 12.42 | 4.25 |
| 6 | 9 Months | 21.76 | 6.53 |
| 7 | Yearly | 31.07 | 8.60 |
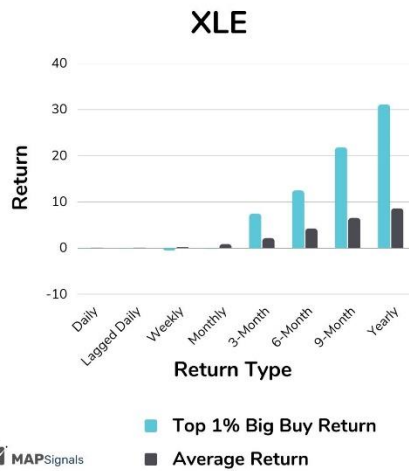


XLE

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## XLE



| | Return Type | Top 2% Big Buy Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.15 | 0.04 |
| 1 | Lagged Daily | 0.15 | 0.04 |
| 2 | Weekly | -0.04 | 0.18 |
| 3 | Monthly | -0.08 | 0.76 |
| 4 | 3 Months | 6.36 | 2.16 |
| 5 | 6 Months | 10.12 | 4.25 |
| 6 | 9 Months | 18.81 | 6.53 |
| 7 | Yearly | 26.98 | 8.60 |

## XLE
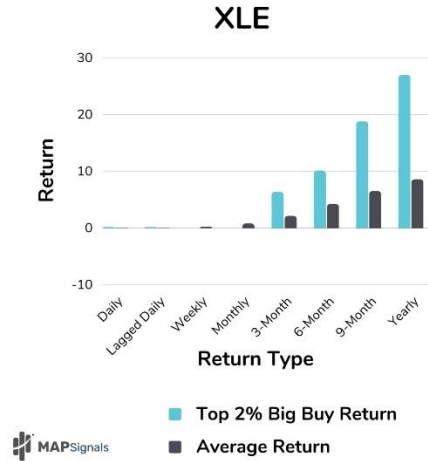


| | Return Type | Top 1% Big Sell Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.28 | 0.04 |
| 1 | Lagged Daily | 0.28 | 0.04 |
| 2 | Weekly | 0.64 | 0.18 |
| 3 | Monthly | 2.75 | 0.76 |
| 4 | 3 Months | 3.14 | 2.16 |
| 5 | 6 Months | 5.98 | 4.25 |
| 6 | 9 Months | 5.25 | 6.53 |
| 7 | Yearly | 0.56 | 8.60 |
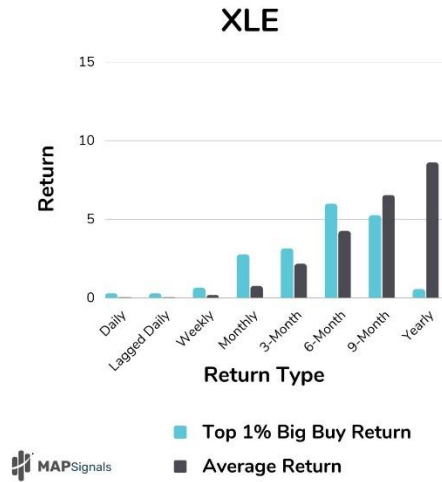
## XLE



| | Return Type | Top 2% Big Sell Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.15 | 0.04 |
| 1 | Lagged Daily | 0.15 | 0.04 |
| 2 | Weekly | -0.47 | 0.18 |
| 3 | Monthly | -0.33 | 0.76 |
| 4 | 3 Months | 3.97 | 2.16 |
| 5 | 6 Months | 3.33 | 4.25 |
| 6 | 9 Months | 4.13 | 6.53 |
| 7 | Yearly | 5.55 | 8.60 |
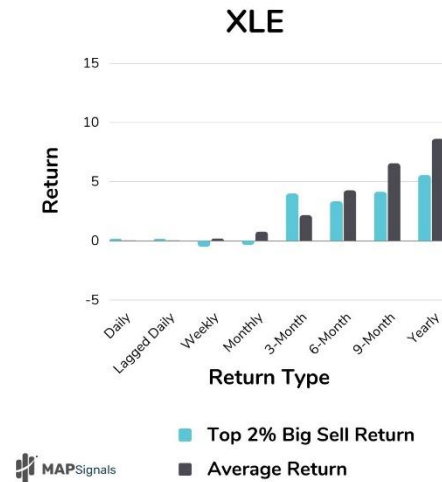
- From the graph above, it is hard to see whether big buy/sell days predict positive/negative abnormal returns.

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- Extreme buy ratios tend to predict higher seasonal and longer-term forward returns. Contrarily, extreme sell ratios tend to predict lower seasonal and longer term forward returns.
- To test out the validity of our observations, we used all MAPsignals data from the 2013 to 2023 time period and selected the 2% largest buy and sell days in the dataset for hypothesis testing.
  - **We found strong evidence contrary to the hypothesis: when extreme buying occurs in Energy stocks, returns after 9 months are 18.5% versus a 9-months average return of 6.5%.**
  - Additionally, we are 95% confident that the 9-months average return after extreme selling events range between 13.1% to 24.0%, significantly higher than that 6.5% of the 9-months average return.

| t-Test 1-sample | | |
| --- | --- | --- |
| Test Mean (Average 9-months Return Total) | 6.5% | |
| Sample Mean (Post Big Selling Return) | 18.5% | |
| Confidence Level | 0.95 | |
| Number of Observations | 45 | |
| P-value (Two-sided) | 0.00 | |
| Upper Confidence Interval | 24.0% | |
| Lower Confidence Interval | 13.1% | |

- Based on the hypothesis test, we identify a buy signal when the energy sector has a buying ratio of 9% or more.
  - **When the buying ratio is above 9% for Energy stocks, returns after 9 months are 10.4% versus a seasonal average return of 6.5%.**
  - Additionally, we are 95% confident that the 9-months average return after extreme buying (buying ratio 9% or above) are between 8.0% to 12.9%, also significantly higher than the average return of 6.5%.


**XLF**

- High returns usually happen in peak with extreme sell ratios, and low returns occur with extreme buy ratios.
- We wanted to see how extreme buy and sell days correspond to forward market returns statistically.
- To study this we gathered all MAPsignals data from the 2013 to 2023 time period and selected the 2% largest sell days in the dataset.
  - We found there is a positive correlation to higher market prices versus the seasonal average return after extreme selling takes place via the regression analysis.
  - Meanwhile, there is also a strong negative correlation to higher market prices versus the seasonal average return after extreme buying events:

| Regression Statistics | ▼ | ▼ |
|---|---|---|
| R Square | | 0.67 |
| Adjusted R Square | | 0.65 |
| Significance F (Model Significane) | | 1.94E-11 |
| Observations | | 48 |

| | ▼ Coefficients | ▼ P-value ▼ |
|---|---|---|
| Intercept | 0.03 | 0.28 |
| Big Money Buy Index*** | -2.88 | 0.00 |
| Big Money Sell Index * | 0.73 | 0.00 |

Monthly Return = 0.03 - 2.88 Buy Index + 0.73 Sell Index

## XLF

| | Return Type | Top 1% Big Buy Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.07 | 0.05 |
| 1 | Lagged Daily | 0.07 | 0.05 |
| 2 | Weekly | 0.30 | 0.24 |
| 3 | Monthly | 1.96 | 1.04 |
| 4 | 3 Months | 8.63 | 3.06 |
| 5 | 6 Months | 12.98 | 6.15 |
| 6 | 9 Months | 18.40 | 9.20 |
| 7 | Yearly | 24.09 | 12.26 |



XLF — Top 1% Big Buy Return / Average Return

## XLF
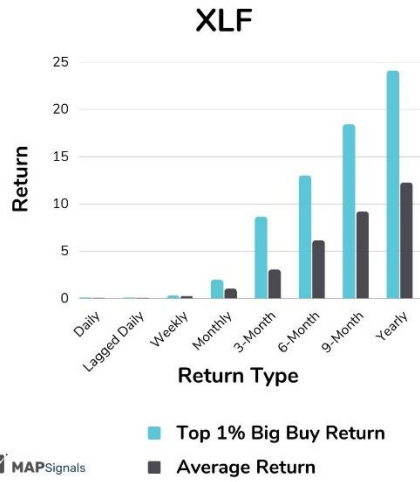
| | Return Type | Top 2% Big Buy Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.13 | 0.05 |
| 1 | Lagged Daily | 0.13 | 0.05 |
| 2 | Weekly | 0.08 | 0.24 |
| 3 | Monthly | 0.94 | 1.04 |
| 4 | 3 Months | 5.04 | 3.06 |
| 5 | 6 Months | 8.52 | 6.15 |
| 6 | 9 Months | 13.89 | 9.20 |
| 7 | Yearly | 19.12 | 12.26 |



XLF — Top 2% Big Buy Return / Average Return

## XLF
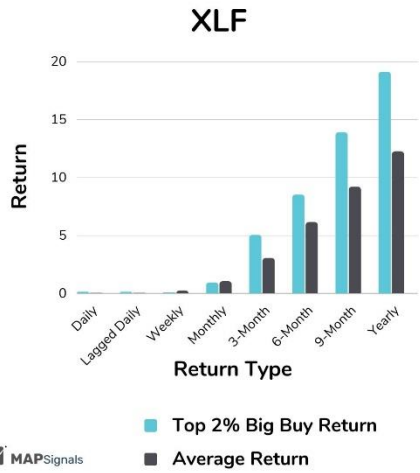
| | Return Type | Top 1% Big Sell Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.82 | 0.05 |
| 1 | Lagged Daily | 0.82 | 0.05 |
| 2 | Weekly | -1.91 | 0.24 |
| 3 | Monthly | -1.08 | 1.04 |
| 4 | 3 Months | 6.36 | 3.06 |
| 5 | 6 Months | 9.38 | 6.15 |
| 6 | 9 Months | 20.09 | 9.20 |
| 7 | Yearly | 37.90 | 12.26 |



## XLF
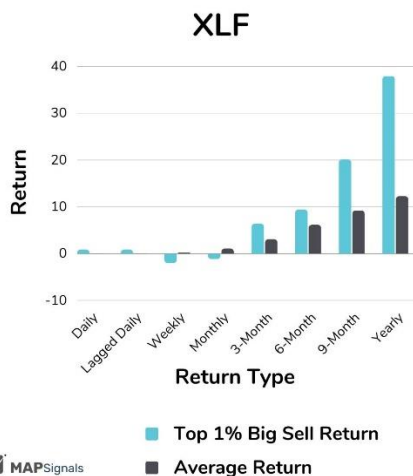
| | Return Type | Top 2% Big Sell Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.47 | 0.05 |
| 1 | Lagged Daily | 0.47 | 0.05 |
| 2 | Weekly | -0.98 | 0.24 |
| 3 | Monthly | 0.94 | 1.04 |
| 4 | 3 Months | 6.63 | 3.06 |
| 5 | 6 Months | 9.20 | 6.15 |
| 6 | 9 Months | 17.66 | 9.20 |
| 7 | Yearly | 30.92 | 12.26 |
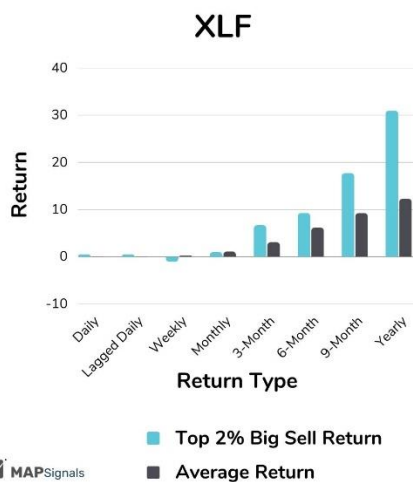


- Extreme buy ratios tend to predict slightly lower weekly and monthly forward returns. Contrarily, extreme sell ratios tend to predict significantly higher seasonal and longer term forward returns.
- To test out the validity of our observations, we used all MAPsignals data from the 2013 to 2023 time period and selected the 2% largest buy and sell days in the dataset for hypothesis testing.
  - **We found strong evidence supporting the hypothesis that when there's extreme selling in financial stocks, returns after 3 months are 6.5% versus a seasonal average return of 3.0%.**
  - Additionally, we are 95% confident that the seasonal average return after extreme selling events range between 3.2% to 9.9%, significantly higher than that 3.0% of the seasonal average return.

| t-Test 1-sample | | |
|---|---|---|
| Test Mean (Average Seasonal Return Total) | | 3.0% |
| Sample Mean (Post Big Selling Return) | | 6.5% |
| Confidence Level | | 0.95 |
| Number of Observations | | 48 |
| P-value (Two-sided) | | 0.04 |
| Upper Confidence Interval | | 9.9% |
| Lower Confidence Interval | | 3.2% |

- Based on the hypothesis test, we identify a buy signal when the Financials sector has a selling ratio of 18% or more.
    - **When the selling ratio is above 18% for financial stocks, returns after three months are 5.7% versus a seasonal average return of 3.0%.**
    - Additionally, we are 95% confident that the seasonal average return after extreme selling (selling ratio 18% or above) events are between 7.6% to 3.8%, also significantly higher than that of 3.0% of the total seasonal average return.

| t-Test 1-sample | | |
|---|---|---|
| Test Mean (Average Seasonal Return Total) | | 3.0% |
| Sample Mean (Threshold Seasonal Return) | | 5.7% |
| Confidence Level | | 0.95 |
| Number of Observations | | 98 |
| P-value (Two-sided) | | 0.01 |
| Upper Confidence Interval | | 7.6% |
| Lower Confidence Interval | | 3.8% |

**XLI**

- High returns usually occur in peak with extreme sell ratios, and low returns occur with extreme buy ratios.
- To study this we gathered all MAPsignals data from the 2013 to 2023 time period and selected the 2% largest sell days in the dataset.
    - We found there is a positive correlation to higher market prices versus the monthly average return after extreme selling takes place via the regression analysis.
    - Meanwhile, there is also a strong negative correlation to higher market prices versus the monthly average return after extreme buying:

| Regression Statistics | | |
|---|---|---|
| R Square | | 0.67 |
| Adjusted R Square | | 0.66 |
| Significance F (Model Significane) | | 2.36E-12 |
| Observations | | 51 |

| | Coefficients | P-value |
|---|---|---|
| Intercept | 0.05 | 0.05 |
| Big Money Buy Index*** | -2.87 | 0.00 |
| Big Money Sell Index ** | 1.03 | 0.00 |

Monthly Return = 0.05 - 2.87 Buy Index + 1.03 Sell Index

## XLI



| | Return Type | Top 1% Big Buy Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.03 | 0.05 |
| 1 | Lagged Daily | 0.03 | 0.05 |
| 2 | Weekly | -0.62 | 0.24 |
| 3 | Monthly | 0.16 | 1.08 |
| 4 | 3 Months | 4.90 | 3.11 |
| 5 | 6 Months | 11.63 | 6.17 |
| 6 | 9 Months | 15.93 | 9.01 |
| 7 | Yearly | 23.75 | 11.82 |

## XLI
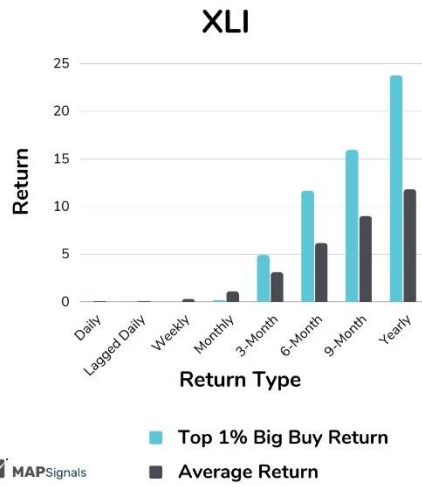


| | Return Type | Top 2% Big Buy Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.05 | 0.05 |
| 1 | Lagged Daily | 0.05 | 0.05 |
| 2 | Weekly | -0.30 | 0.24 |
| 3 | Monthly | -0.47 | 1.08 |
| 4 | 3 Months | 3.06 | 3.11 |
| 5 | 6 Months | 8.20 | 6.17 |
| 6 | 9 Months | 12.54 | 9.01 |
| 7 | Yearly | 16.97 | 11.82 |

## XLI
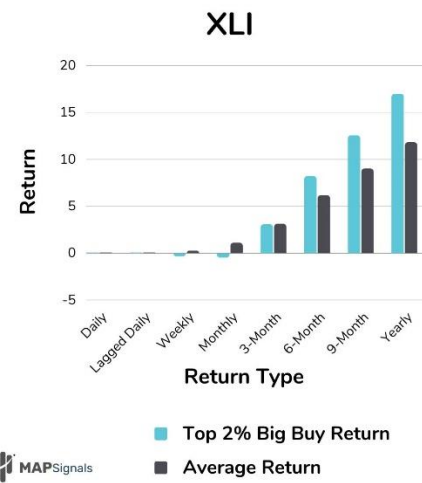


| | Return Type | Top 1% Big Sell Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.50 | 0.05 |
| 1 | Lagged Daily | 0.50 | 0.05 |
| 2 | Weekly | -0.90 | 0.24 |
| 3 | Monthly | 1.60 | 1.08 |
| 4 | 3 Months | 10.20 | 3.11 |
| 5 | 6 Months | 19.10 | 6.17 |
| 6 | 9 Months | 27.99 | 9.01 |
| 7 | Yearly | 35.42 | 11.82 |

## XLI
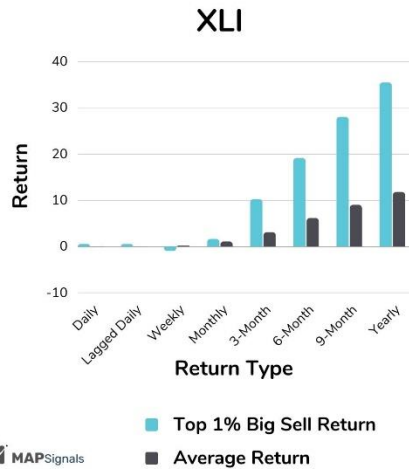


| | Return Type | Top 2% Big Sell Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.29 | 0.05 |
| 1 | Lagged Daily | 0.29 | 0.05 |
| 2 | Weekly | -0.46 | 0.24 |
| 3 | Monthly | 1.32 | 1.08 |
| 4 | 3 Months | 7.89 | 3.11 |
| 5 | 6 Months | 13.48 | 6.17 |
| 6 | 9 Months | 19.35 | 9.01 |
| 7 | Yearly | 26.40 | 11.82 |
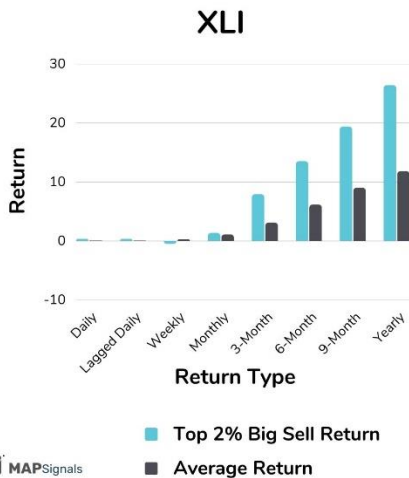
- Extreme buy ratios tend to predict lower forward monthly returns. Contrarily, extreme sell ratios tend to predict higher seasonal and longer-term forward returns.
- To test out the validity of our observations, we used all MAPsignals data from the 2013 to 2023 time period and selected the 2% largest buy and sell days in the dataset for hypothesis testing.
  - o **We found strong evidence supporting the hypothesis that when there's extreme selling in industrial stocks, returns after 3 months are +8.1% versus a seasonal average return of 3.1%.**
  - o Additionally, we are 95% confident that the seasonal average return after extreme selling events range between 4.7% to 11.4%, significantly higher than that 3.1% of the seasonal average return.

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| t-Test 1-sample | | |
|---|---|---|
| Test Mean (Average Monthly Return Total) | | 3.1% |
| Sample Mean (Post Big Sell Return) | | 8.1% |
| Confidence Level | | 0.95 |
| Number of Observations | | 51 |
| P-value (Two-sided) | | 0.00 |
| Upper Confidence Interval | | 11.4% |
| Lower Confidence Interval | | 4.7% |

- Based on the hypothesis test, we identify a buy signal when the selling ratio reaches 7% or more.
    - **When the selling ratio is above 7% for industrial stocks, returns after three months are 5.1% versus a seasonal average return of 3.1%.**
    - Additionally, we are 95% confident that the seasonal average return after extreme selling (selling ratio 7% or above) events are between 4.1% to 6.2%, also significantly higher than that of 3.1% of the total seasonal average return.

| t-Test 1-sample (Threshold Testing) | | |
|---|---|---|
| Test Mean (Average Monthly Return Total) | | 3.1% |
| Sample Mean (Threshold Seasonal Return) | | 5.1% |
| Confidence Level | | 0.95 |
| Number of Observations | | 270 |
| P-value (Two-sided) | | 0.00 |
| Upper Confidence Interval | | 6.2% |
| Lower Confidence Interval | | 4.1% |

- **Contrarily, we also found strong evidence supporting the hypothesis that when there's extreme buying in industrial stocks, returns after monthly are -0.4% versus a monthly average return of 1.1%.**
    - Additionally, we are 95% confident that the monthly average return after extreme buying events range between 0.6% to -1.4%, significantly lower than that 1.1% of the monthly average return.

| t-Test 1-sample | | |
|---|---|---|
| Test Mean (Average Monthly Return Total) | | 1.1% |
| Sample Mean (Post Big Buy Return) | | -0.4% |
| Confidence Level | | 0.95 |
| Number of Observations | | 61 |
| P-value (Two-sided) | | 0.00 |
| Upper Confidence Interval | | 0.6% |
| Lower Confidence Interval | | -1.4% |

- Based on the hypothesis test, we identify a sell signal when the buying ratio reaches 8% or more.

- When the buying ratio is above 8% for industrial stocks, returns after one month are -0.3% versus a monthly average return of 1.1%.
- Additionally, we are 95% confident that the monthly average return after extreme buying (buying ratio 8% or above) events are between -0.9% to 0.4%, also significantly lower than that of 1.1% of the monthly average return.

| t-Test 1-sample (Threshold Testing) | |
|---|---|
| Test Mean (Average Monthly Return Total) | 1.1% |
| Sample Mean (Threshold Monthly Return) | -0.3% |
| Confidence Level | 0.95 |
| Number of Observations | 308 |
| P-value (Two-sided) | 0.00 |
| Upper Confidence Interval | 0.4% |
| Lower Confidence Interval | -0.9% |

**XLK**

- To see how extreme sell days correspond to forward market returns statistically, a regression model is fitted with data from the 2013 to 2023 time period and selected the 2% largest sell days in the dataset.
- We found there is a strong positive correlation to higher market prices versus the monthly average return after extreme selling takes place via the regression analysis:

| Regression Statistics | |
|---|---|
| R Square | 0.28 |
| Adjusted R Square | 0.25 |
| Significance F (Model Significane) | 0.0007 |
| Observations | 48 |

| | Coefficients | P-value |
|---|---|---|
| Intercept | -0.08 | 0.07 |
| Big Money Buy Index | 1.12 | 0.08 |
| Big Money Sell Index *** | 1.37 | 0.00 |

Monthly Return = -0.08 + 1.12 Buy Index + 1.37 Sell Index

## XLK

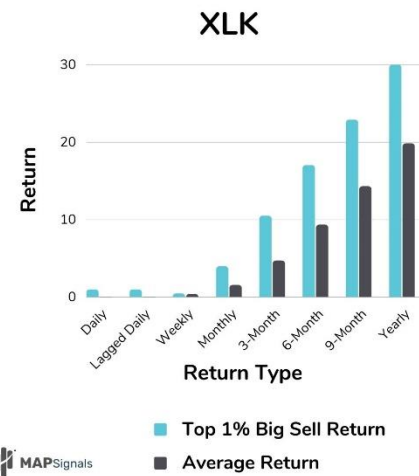| | Return Type | Top 1% Big Buy Return | Average Return |
|---|---|---|---|
| 0 | Daily | -0.07 | 0.06 |
| 1 | Lagged Daily | -0.07 | 0.07 |
| 2 | Weekly | 0.42 | 0.37 |
| 3 | Monthly | 1.67 | 1.57 |
| 4 | 3 Months | 3.55 | 4.72 |
| 5 | 6 Months | 14.40 | 9.35 |
| 6 | 9 Months | 23.55 | 14.31 |
| 7 | Yearly | 31.84 | 19.84 |



## XLK
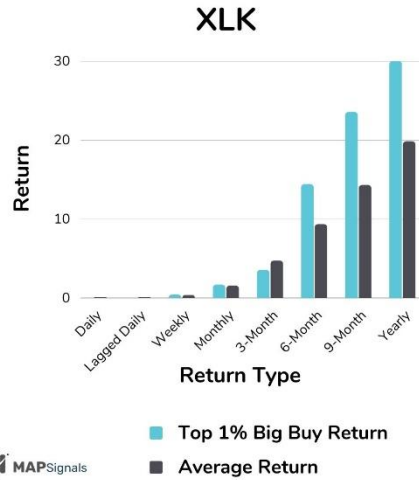
| | Return Type | Top 2% Big Buy Return | Average Return |
|---|---|---|---|
| 0 | Daily | -0.04 | 0.06 |
| 1 | Lagged Daily | -0.04 | 0.07 |
| 2 | Weekly | 0.24 | 0.37 |
| 3 | Monthly | 1.06 | 1.57 |
| 4 | 3 Months | 3.71 | 4.72 |
| 5 | 6 Months | 12.54 | 9.35 |
| 6 | 9 Months | 21.07 | 14.31 |
| 7 | Yearly | 27.09 | 19.84 |



## XLK
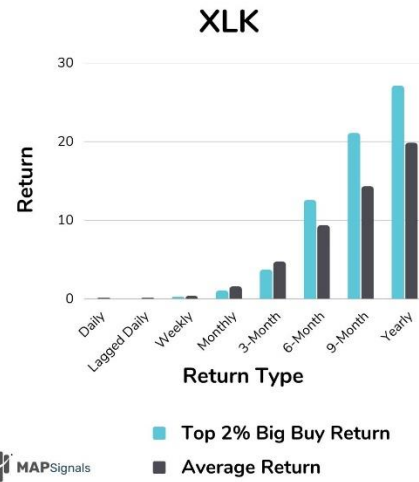
| | Return Type | Top 1% Big Sell Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.97 | 0.06 |
| 1 | Lagged Daily | 0.97 | 0.07 |
| 2 | Weekly | 0.45 | 0.37 |
| 3 | Monthly | 3.95 | 1.57 |
| 4 | 3 Months | 10.48 | 4.72 |
| 5 | 6 Months | 17.03 | 9.35 |
| 6 | 9 Months | 22.90 | 14.31 |
| 7 | Yearly | 30.13 | 19.84 |



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## XLK

| | Return Type | Top 2% Big Sell Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.74 | 0.06 |
| 1 | Lagged Daily | 0.74 | 0.07 |
| 2 | Weekly | 1.34 | 0.37 |
| 3 | Monthly | 3.45 | 1.57 |
| 4 | 3 Months | 8.99 | 4.72 |
| 5 | 6 Months | 15.02 | 9.35 |
| 6 | 9 Months | 19.98 | 14.31 |
| 7 | Yearly | 25.80 | 19.84 |
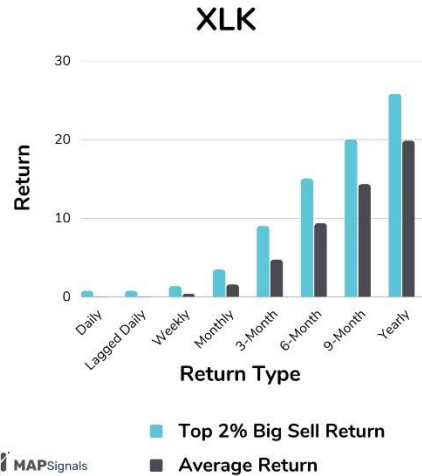


- Extreme buy ratios tend to predict lower forward monthly and seasonal returns. Contrarily, extreme sell ratios tend to predict higher monthly and longer-term forward returns.
- To test out the validity of our observations, we used all MAPsignals data from the 2013 to 2023 time period and selected the 2% largest buy and sell days in the dataset for hypothesis testing.
  - **We found strong evidence supporting the hypothesis that when there's extreme selling in Technology stocks, returns after 3 months are 8.9% versus a seasonal average return of 4.7%.**
  - Additionally, we are 95% confident that the seasonal average return after extreme selling events range between 5.5% to 12.3%, significantly higher than that 4.7% of the seasonal average return.

| t-Test 1-sample | |
|---|---|
| Test Mean (Average Seasonal Return Total) | 4.7% |
| Sample Mean (Post Big Sell Return) | 8.9% |
| Confidence Level | 0.95 |
| Number of Observations | 48 |
| P-value (Two-sided) | 0.02 |
| Upper Confidence Interval | 12.3% |
| Lower Confidence Interval | 5.5% |

- Based on the hypothesis test, we identify a buy signal when the selling ratio surpasses 20% or more.
  - **When the selling ratio is above 20% for Technology stocks, returns after three months are 7.8% versus a seasonal average return of 4.7%.**
  - Additionally, we are 95% confident that the seasonal average return after extreme selling (selling ratio 20% or above) events are between 5.1% to 10.5%, also significantly higher than that of 4.7% of the total seasonal average return.

| t-Test 1-sample (Threshold Testing) | |
|---|---|
| Test Mean (Average Seasonal Return Total) | 4.7% |
| Sample Mean (Threshold Seasonal Return) | 7.8% |
| Confidence Level | 0.95 |
| Number of Observations | 52 |
| P-value (Two-sided) | 0.00 |
| Upper Confidence Interval | 5.1% |
| Lower Confidence Interval | 10.5% |

**XLU**

- High returns of XLU usually occur in peak with extreme sell ratios, and low returns occur with extreme buy ratios.
- We wanted to see how extreme buy days correspond to forward market returns. Conversely, we also wanted to see the same for extreme sell days.
- To study this we gathered all MAPsignals data from the 2013 to 2023 time period and selected the 2% largest sell days in the dataset.
  - We found there is a strong positive correlation to higher market prices versus the monthly average return after extreme selling takes place via the regression analysis.

| Regression Statistics | |
|---|---|
| R Square | 0.22 |
| Adjusted R Square | 0.19 |
| Significance F (Model Significane) | 2.70E-03 |
| Observations | 51 |

| | Coefficients | P-value |
|---|---|---|
| Intercept | 0.03 | 0.10 |
| Big Money Buy Index*** | -0.62 | 0.07 |
| Big Money Sell Index * | 0.47 | 0.00 |

Monthly Return = 0.03 - 0.62 Buy Index + 0.47 Sell Index

## XLU

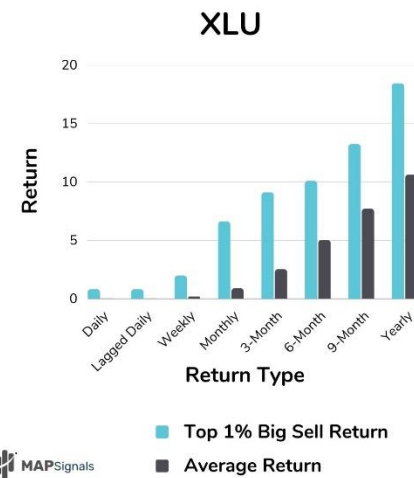| | Return Type | Top 1% Big Buy Return | Average Return |
|---|---|---|---|
| 0 | Daily | -0.08 | 0.04 |
| 1 | Lagged Daily | -0.08 | 0.04 |
| 2 | Weekly | -0.22 | 0.20 |
| 3 | Monthly | -0.47 | 0.91 |
| 4 | 3 Months | -1.79 | 2.54 |
| 5 | 6 Months | 0.80 | 5.04 |
| 6 | 9 Months | 1.53 | 7.72 |
| 7 | Yearly | 1.65 | 10.63 |



## XLU
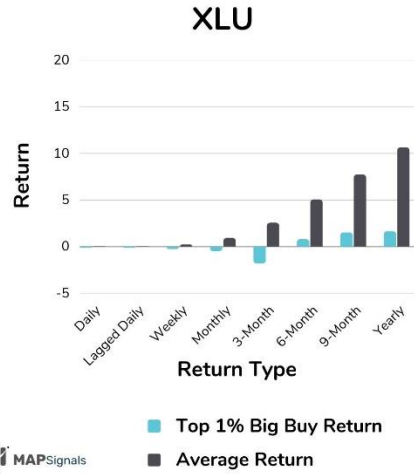
| | Return Type | Top 2% Big Buy Return | Average Return |
|---|---|---|---|
| 0 | Daily | -0.13 | 0.04 |
| 1 | Lagged Daily | -0.13 | 0.04 |
| 2 | Weekly | -0.06 | 0.20 |
| 3 | Monthly | -0.55 | 0.91 |
| 4 | 3 Months | -0.83 | 2.54 |
| 5 | 6 Months | -0.35 | 5.04 |
| 6 | 9 Months | 2.65 | 7.72 |
| 7 | Yearly | 2.65 | 10.63 |



## XLU
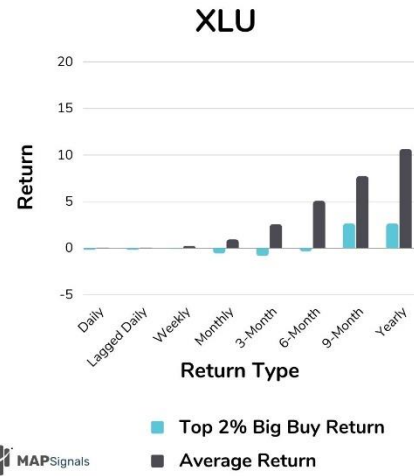
| | Return Type | Top 1% Big Sell Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.81 | 0.04 |
| 1 | Lagged Daily | 0.81 | 0.04 |
| 2 | Weekly | 1.98 | 0.20 |
| 3 | Monthly | 6.61 | 0.91 |
| 4 | 3 Months | 9.10 | 2.54 |
| 5 | 6 Months | 10.09 | 5.04 |
| 6 | 9 Months | 13.24 | 7.72 |
| 7 | Yearly | 18.44 | 10.63 |

## XLU

| | Return Type | Top 2% Big Sell Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.07 | 0.04 |
| 1 | Lagged Daily | 0.07 | 0.04 |
| 2 | Weekly | 0.69 | 0.20 |
| 3 | Monthly | 4.05 | 0.91 |
| 4 | 3 Months | 6.46 | 2.54 |
| 5 | 6 Months | 9.04 | 5.04 |
| 6 | 9 Months | 12.77 | 7.72 |
| 7 | Yearly | 16.91 | 10.63 |
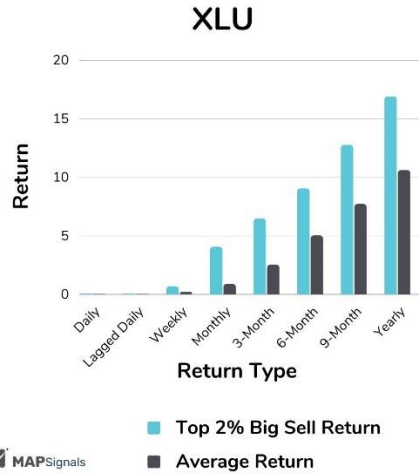


- Extreme buy ratios tend to predict significantly lower monthly and longer term forward returns. Contrarily, extreme sell ratios tend to predict higher monthly and longer-term forward returns.
- To test out the validity of our observations, we used all MAPsignals data from the 2013 to 2023 time period and selected the 2% largest buy and sell days in the dataset for hypothesis testing.
  - **We found strong evidence supporting the hypothesis that when there's extreme selling in utility stocks, returns after 3 months are 6.5% versus a seasonal average return of 2.4%.**
  - Additionally, we are 95% confident that the seasonal average return after extreme selling events range between 4.3% to 8.6%, significantly higher than that 2.4% of the seasonal average return.

| t-Test 1-sample (Big Selling Ratio) | | |
|---|---|---|
| Test Mean (Average Seasonal Return Total) | | 2.4% |
| Sample Mean (Post Big Sell Return) | | 6.5% |
| Confidence Level | | 0.95 |
| Number of Observations | | 50 |
| P-value (Two-sided) | | 0.00 |
| Upper Confidence Interval | | 8.6% |
| Lower Confidence Interval | | 4.3% |

- **Contrarily, we also found strong evidence supporting the hypothesis that when there's extreme buying in utility stocks, returns after 3 months are -0.8% versus a seasonal average return of 2.4%.**
- Additionally, we are 95% confident that the seasonal average return after extreme buying events range between -2.8% to 1.1%, significantly lower than that 2.4% of the seasonal average return.

| t-Test 1-sample (Big Buying Ratio) | | |
|---|---|---|
| Test Mean (Average Monthly Return Total) | | 2.4% |
| Sample Mean (Post Big Buy Return) | | -0.8% |
| Confidence Level | | 0.95 |
| Number of Observations | | 48 |
| P-value (Two-sided) | | 0.00 |
| Upper Confidence Interval | | 1.1% |
| Lower Confidence Interval | | -2.8% |

- Based on the hypothesis test, we identify a sell signal when the buying ratio goes beyond 13.1%,
  - **When the selling ratio is above 17.5% for Utilities stocks, returns after three months are 5.9% versus a seasonal average return of 2.4%.**
  - Additionally, we are 95% confident that the seasonal average return after extreme selling (selling ratio 17.5% or above) events are between 4.5% to 7.2%, also significantly higher than that of 2.4% of the total seasonal average return.

| t-Test 1-sample (Big Selling Ratio) | | |
|---|---|---|
| Test Mean (Average Seasonal Return Total) | | 2.4% |
| Sample Mean (Post Big Sell Return) | | 5.9% |
| Confidence Level | | 0.95 |
| Number of Observations | | 99 |
| P-value (Two-sided) | | 0.00 |
| Upper Confidence Interval | | 7.3% |
| Lower Confidence Interval | | 4.5% |

- **When the buying ratio is above 13.1% for Utilities stocks, returns after three months are -0.2% versus a seasonal average return of 2.4%.**
- Additionally, we are 95% confident that the seasonal average return after extreme buying (buying ratio 13.1% or above) events are between -1.1% to 0.7%, also significantly lower than that of 2.4% of the total seasonal average return.

| t-Test 1-sample (Big Buying Threshold) | | |
|---|---|---|
| Test Mean (Average Monthly Return Total) | | 2.4% |
| Sample Mean (Post Big Buy Return) | | -0.2% |
| Confidence Level | | 0.95 |
| Number of Observations | | 244 |
| P-value (Two-sided) | | 0.00 |
| Upper Confidence Interval | | 0.7% |
| Lower Confidence Interval | | -1.1% |

**XLV**

- High returns of XLV usually occur in peak with extreme sell ratios, and low returns occur with extreme buy ratios. (Some extreme buy ratio happens at peak)
- We wanted to see how extreme sell days correspond to forward market returns statistically.
- To study this we gathered all MAPsignals data from the 2013 to 2023 time period and selected the 2% largest sell days in the dataset. We found via regression analysis that:
  - There is a positive correlation to higher market prices versus the seasonal average return after extreme selling takes place.

| Regression Statistics | | |
|---|---|---|
| R Square | | 0.70 |
| Adjusted R Square | | 0.68 |
| Significance F (Model Significance) | | 1.43E-12 |
| Observations | | 49 |

| | Coefficients | P-value |
|---|---|---|
| Intercept | -0.023 | 0.15 |
| Big Money Buy Index | 0.12 | 0.70 |
| Big Money Sell Index *** | 1.11 | 0.000 |

Monthly Return = -0.023 + 0.12 Buy Index + 1.11 Sell Index

| | Return Type | Top 1% Big Buy Return | Average Return |
|---|---|---|---|
| 0 | Daily | -0.04 | 0.06 |
| 1 | Lagged Daily | -0.04 | 0.06 |
| 2 | Weekly | -0.42 | 0.26 |
| 3 | Monthly | -0.06 | 1.17 |
| 4 | 3 Months | 0.18 | 3.38 |
| 5 | 6 Months | 3.61 | 6.66 |
| 6 | 9 Months | 6.29 | 10.01 |
| 7 | Yearly | 9.58 | 13.45 |



XLV

## XLV
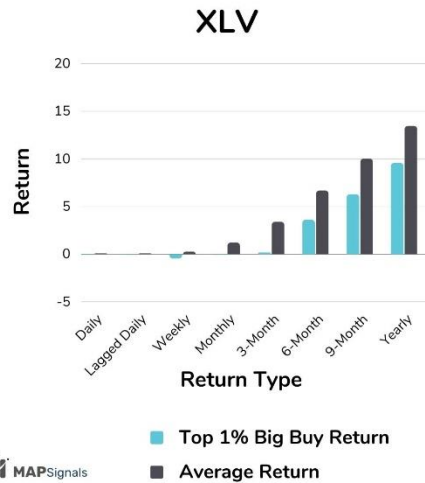


| | Return Type | Top 2% Big Buy Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.07 | 0.06 |
| 1 | Lagged Daily | 0.07 | 0.06 |
| 2 | Weekly | -0.20 | 0.26 |
| 3 | Monthly | 0.16 | 1.17 |
| 4 | 3 Months | 0.38 | 3.38 |
| 5 | 6 Months | 5.32 | 6.66 |
| 6 | 9 Months | 7.92 | 10.01 |
| 7 | Yearly | 11.84 | 13.45 |

## XLV
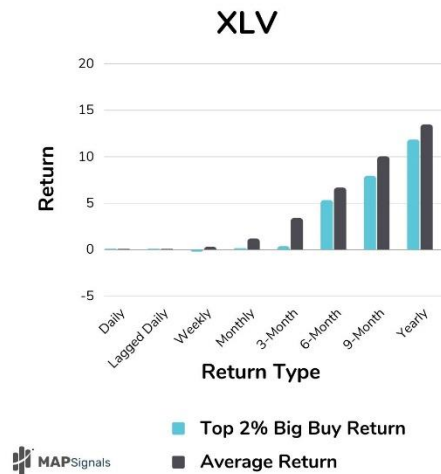


| | Return Type | Top 1% Big Sell Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.78 | 0.06 |
| 1 | Lagged Daily | 0.78 | 0.06 |
| 2 | Weekly | 1.06 | 0.26 |
| 3 | Monthly | 4.80 | 1.17 |
| 4 | 3 Months | 10.32 | 3.38 |
| 5 | 6 Months | 12.46 | 6.66 |
| 6 | 9 Months | 15.42 | 10.01 |
| 7 | Yearly | 19.91 | 13.45 |

## XLV
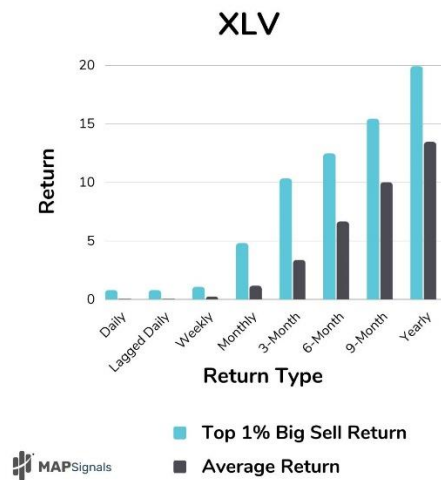


| | Return Type | Top 2% Big Sell Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.45 | 0.06 |
| 1 | Lagged Daily | 0.45 | 0.06 |
| 2 | Weekly | 0.64 | 0.26 |
| 3 | Monthly | 4.40 | 1.17 |
| 4 | 3 Months | 7.91 | 3.38 |
| 5 | 6 Months | 11.13 | 6.66 |
| 6 | 9 Months | 13.60 | 10.01 |
| 7 | Yearly | 18.34 | 13.45 |
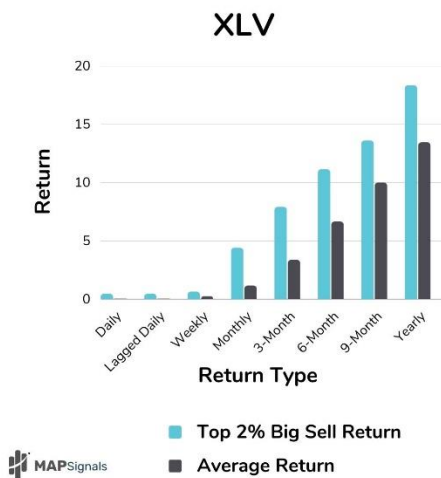
- Extreme buy ratios tend to predict lower forward weekly returns. Contrarily, extreme sell ratios tend to predict higher forward seasonal and longer-term returns.
- To test out the validity of our observations, we used all MAPsignals data from the 2013 to 2023 time period and selected the 2% largest buy and sell days in the dataset for hypothesis testing.

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- o **We found strong evidence supporting the hypothesis that when extreme selling occurs in the Health Care stocks, returns after 3 months are 8.0% versus a seasonal average return of 3.3%.**
- o Additionally, we are 95% confident that the seasonal average returns after extreme selling events are between 6.0% to 10.0%, also significantly higher than that of 3.3% of the total seasonal average return.

| t-Test 1-sample | |
|---|---|
| Test Mean (Average Seasonal Return Total) | 3.3% |
| Sample Mean (Posts Big Selling Return) | 8.0% |
| Confidence Level | 0.95 |
| Number of Observations | 49 |
| P-value (Two-sided) | 0.00 |
| Upper Confidence Interval | 10.0% |
| Lower Confidence Interval | 6.0% |

- Based on the hypothesis test, we identify a buy signal when the selling ratio surpasses 7% or more.
  - o **When the selling ratio is above 7% for Health Care stocks, returns after three months are 5.8% versus a seasonal average return of 3.3%.**
  - o Additionally, we are 95% confident that the seasonal average return after extreme selling (selling ratio 7% or above) events are between 5.2% to 6.5%, also significantly higher than that of 3.3% of the total seasonal average return.

| t-Test 1-sample (Threshold Testing) | |
|---|---|
| Test Mean (Average Seasonal Return Total) | 3.3% |
| Sample Mean (Threhold Seasonal Return) | 5.8% |
| Confidence Level | 0.95 |
| Number of Observations | 256 |
| P-value (Two-sided) | 0.00 |
| Upper Confidence Interval | 6.5% |
| Lower Confidence Interval | 5.2% |

- **Contrarily, we found strong evidence supporting the hypothesis that when there's extreme buying in the Health Care stocks, returns after 3 months are 0.3% versus a seasonal average return of 3.3%.**
  - o Additionally, we are 95% confident that the seasonal average returns after extreme buying events are between -1.7% to 2.2%, also significantly lower than that of 3.3% of the seasonal average return.

| t-Test 1-sample | | |
|---|---|---|
| Test Mean (Average Seasonal Return Total) | | 3.3% |
| Sample Mean (Posts Big Buying Return) | | 0.3% |
| Confidence Level | | 0.95 |
| Number of Observations | | 42 |
| P-value (Two-sided) | | 0.00 |
| Upper Confidence Interval | | 2.2% |
| Lower Confidence Interval | | -1.7% |

- Based on the hypothesis test, we identify a sell signal when the buying ratio surpasses 6% or more.
  - **When the buying ratio is above 6% for Health Care stocks, returns after three months are 1.7% versus a seasonal average return of +3.3%.**
  - Additionally, we are 95% confident that the seasonal average return after extreme buying (buying ratio 6% or above) events are between 1.3% to 2.2%, also significantly lower than that of 3.3% of the seasonal average return.

| t-Test 1-sample (Threshold Testing) | | |
|---|---|---|
| Test Mean (Average Monthly Return Total) | | 3.3% |
| Sample Mean (Threhold Seasonal Return) | | 1.7% |
| Confidence Level | | 0.95 |
| Number of Observations | | 616 |
| P-value (Two-sided) | | 0.00 |
| Upper Confidence Interval | | 2.2% |
| Lower Confidence Interval | | 1.3% |

**XLY**

- High returns of XLY usually happen in peak with extreme sell ratios, and low returns occur with extreme buy ratios. (Some extreme buy ratio happens at peak)
- We wanted to see how extreme sell days correspond to forward market returns statistically.
- To study this we gathered all MAPsignals data from the 2013 to 2023 time period and selected the 2% largest sell days in the dataset. We found via regression analysis that:
  - There is a strong negative correlation to higher market prices versus the seasonal average return after extreme buying takes place.
  - There is a positive correlation to higher market prices versus the seasonal average return after extreme selling takes place.

| Regression Statistics | |
|---|---|
| R Square | 0.68 |
| Adjusted R Square | 0.67 |
| Significance F (Model Significane | 3.73E-12 |
| Observations | 49 |

| | Coefficients | P-value |
|---|---|---|
| Intercept | -0.04 | 0.21 |
| Big Money Buy Index | -2.21 | 0.005 |
| Big Money Sell Index * | 1.52 | 0.000 |

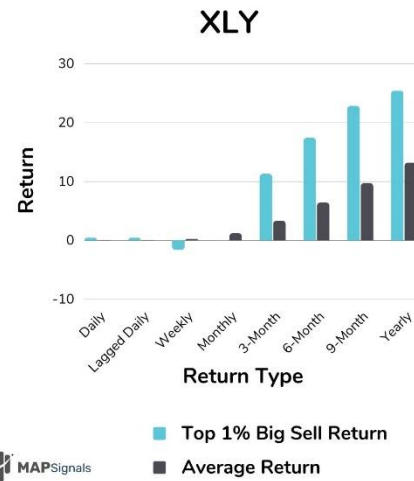Monthly Return = -0.04 -2.21 Buy Index + 1.52 Sell Index

## XLY



| | Return Type | Top 1% Big Buy Return | Average Return |
|---|---|---|---|
| 0 | Daily | -0.11 | 0.05 |
| 1 | Lagged Daily | -0.11 | 0.05 |
| 2 | Weekly | -0.73 | 0.26 |
| 3 | Monthly | -0.20 | 1.14 |
| 4 | 3 Months | 4.04 | 3.34 |
| 5 | 6 Months | 9.81 | 6.43 |
| 6 | 9 Months | 15.93 | 9.72 |
| 7 | Yearly | 20.43 | 13.19 |
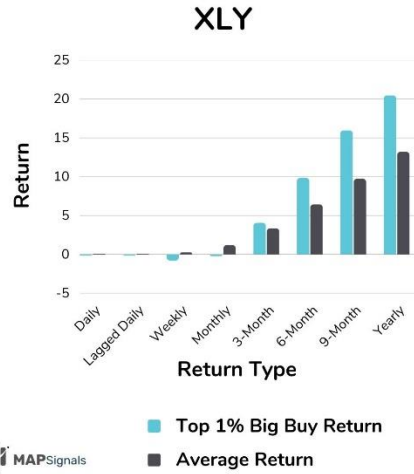
## XLY



| | Return Type | Top 2% Big Buy Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.04 | 0.05 |
| 1 | Lagged Daily | 0.04 | 0.05 |
| 2 | Weekly | -0.36 | 0.26 |
| 3 | Monthly | -0.01 | 1.14 |
| 4 | 3 Months | 4.21 | 3.34 |
| 5 | 6 Months | 8.91 | 6.43 |
| 6 | 9 Months | 15.34 | 9.72 |
| 7 | Yearly | 16.58 | 13.19 |

## XLY
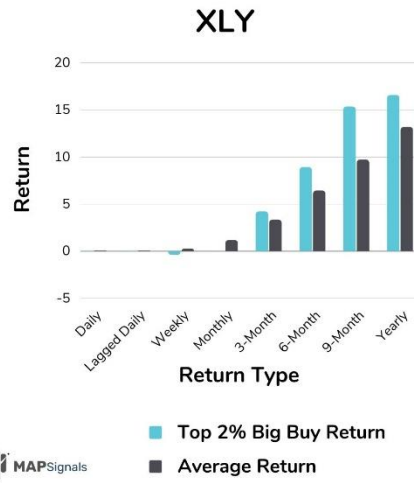


| | Return Type | Top 1% Big Sell Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.43 | 0.05 |
| 1 | Lagged Daily | 0.43 | 0.05 |
| 2 | Weekly | -1.52 | 0.26 |
| 3 | Monthly | -0.02 | 1.14 |
| 4 | 3 Months | 11.28 | 3.34 |
| 5 | 6 Months | 17.41 | 6.43 |
| 6 | 9 Months | 22.82 | 9.72 |
| 7 | Yearly | 25.41 | 13.19 |

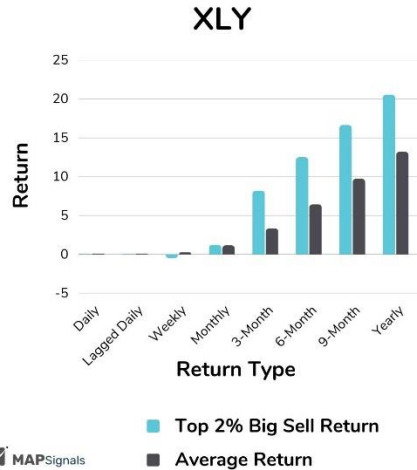| | Return Type | Top 2% Big Sell Return | Average Return |
|---|---|---|---|
| 0 | Daily | 0.04 | 0.05 |
| 1 | Lagged Daily | 0.04 | 0.05 |
| 2 | Weekly | -0.43 | 0.26 |
| 3 | Monthly | 1.20 | 1.14 |
| 4 | 3 Months | 8.17 | 3.34 |
| 5 | 6 Months | 12.48 | 6.43 |
| 6 | 9 Months | 16.62 | 9.72 |
| 7 | Yearly | 20.53 | 13.19 |


XLY

- Extreme buy ratios tend to predict lower forward weekly and monthly returns. Contrarily, extreme sell ratios tend to predict higher forward seasonal and longer-term returns.
- To test out the validity of our observations, we used all MAPsignals data from the 2013 to 2023 time period and selected the 2% largest buy and sell days in the dataset for hypothesis testing.
- **We found strong evidence supporting the hypothesis that when there's extreme selling in discretionary stocks, returns after 3 months are 8.9% versus a seasonal average return of 3.3%.**
  - o Additionally, we are 95% confident that the seasonal average return after extreme selling events is between 5.0% to 12.8%, also significantly higher than that of 3.3% of the total seasonal average return.

| t-Test 1-sample | |
|---|---|
| Test Mean (Average Seasonal Return Total) | 3.3% |
| Sample Mean (Post Big Sell Return) | 8.9% |
| Confidence Level | 0.95 |
| Number of Observations | 52 |
| P-value (Two-sided) | 0.01 |
| Upper Confidence Interval | 12.8% |
| Lower Confidence Interval | 5.0% |

- Based on the hypothesis test, we identify a buy signal when the selling ratio surpasses 14% or more.
  - o **When the selling ratio is above 14% for discretionary stocks, returns after three months are 5.8% versus a seasonal average return of 3.3%.**
  - o Additionally, we are 95% confident that the seasonal average return after extreme selling (selling ratio 14% or above) events are between 4.1% to 8.9%, also significantly higher than that of 3.3% of the total seasonal average return.

| t-Test 1-sample (Threshold Testing) | | |
|---|---|---|
| Test Mean (Average Seasonal Return Total) | | 3.3% |
| Sample Mean (Threshold Seasonal Return) | | 5.8% |
| Confidence Level | | 0.95 |
| Number of Observations | | 114 |
| P-value (Two-sided) | | 0.01 |
| Upper Confidence Interval | | 8.9% |
| Lower Confidence Interval | | 4.1% |

- **Contrarily, we also found strong evidence supporting the hypothesis that when there's extreme buying in discretionary stocks, returns after 1 month are -0.1% versus a monthly average return of 1.1%.**
  - o Additionally, we are 95% confident that the monthly average return after extreme buying events is between -1.4% to 1.1%, also significantly lower than that of 1.1% of the monthly average return.

| t-Test 1-sample | | |
|---|---|---|
| Test Mean (Average Monthly Return Total) | | 1.1% |
| Sample Mean (Post Big Sell Return) | | -0.1% |
| Confidence Level | | 0.95 |
| Number of Observations | | 51 |
| P-value (Two-sided) | | 0.05 |
| Upper Confidence Interval | | 1.1% |
| Lower Confidence Interval | | -1.4% |

- Based on the hypothesis test, we identify a sell signal when the buying ratio surpasses 12% or more.
  - o **When the selling ratio is above 12% for discretionary stocks, returns after one month are 0.1% versus a monthly average return of 1.1%.**
  - o Additionally, we are 95% confident that the monthly average return after extreme buying (buying ratio 12% or above) events are between -0.9% to 1.1%, also significantly lower than that of 1.1% of the monthly average return.

| t-Test 1-sample (Threshold Testing) | | |
|---|---|---|
| Test Mean (Average Monthly Return Total) | | 1.1% |
| Sample Mean (Threshold Seasonal Return) | | 0.1% |
| Confidence Level | | 0.95 |
| Number of Observations | | 122 |
| P-value (Two-sided) | | 0.04 |
| Upper Confidence Interval | | 1.1% |
| Lower Confidence Interval | | -0.9% |

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