

SENTIMENT AS INDICATION FOR MARKET REGIME SWITCHES

Executive Summary:

In this study, Sentiment is evaluated on its ability to indicate a regime switch. It is found, that while declining in effectiveness, investor sentiment, to this date of the study, is a useful measure to evaluate market risk regimes.

The study also finds and tests optimal levels of sentiment spread to effectively switch between regimes. It is interpreted that if the sentiment spread between bullish and bearish investors is high, uncertainty of the market participants is high and the market corrects, usually accompanied with higher volatility. When the spread is low, there is a common theme across investors, resulting in confidence and risk-on regimes, thus beneficial for equities. The conclusion is that investors can use sentiment levels to adjust their risk or asset class allocation in their employed strategies.

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Macro Summary | 28.04.2022

Introduction

Sentiment is a widely followed metric by investors and market participants. It provides insight how people interpret the economic environment. Typically, there are two different kinds of sentiment data: Survey data, which is collected by interviewing market participant groups, and market-based sentiment data, which is derived from market data, for example the put-call ratio.

The interpretation of sentiment data is generally of contrarian nature. When market participants are more bullish, they are likely already bought into a bullish position, therefore are less likely to buy more, and vice versa.

Following that, in theory, sentiment data should give hints on whether a market is overbought or oversold and provide information on whether the environment tendency is risk-on or more risk-off.

There is a multitude of research on the subject with mixed interpretations of the usefulness of sentiment data. In this context, two major publications used the same data as in this study. Fisher and Statman (2000) uncovered a statistically significant negative relation between investor sentiment and future returns. On the other hand, Brown and Cliff (2004) do find correlation with contemporaneous market returns, yet no predictive power. Unlike the previously mentioned publications, the goal of this paper is to

evaluate sentiment data on its usefulness as a regime indicator, not on its predictive power and to provide historical indicator levels for such an application.

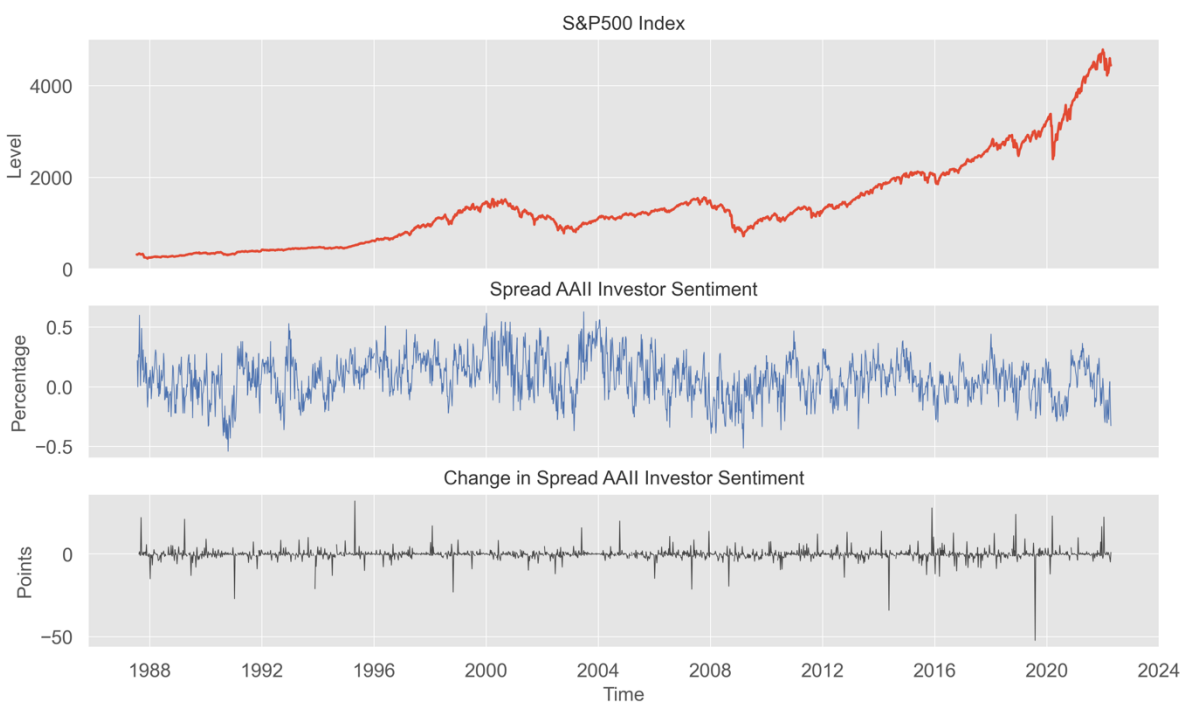
Data

The data evaluated as Sentiment is the AAll Investor Sentiment Survey data (AAll, 2022). It is a poll of AAll members since 1987 on a weekly basis and contains a simple question: *"Do you feel the direction of the stock market over the next six months will be up (bullish), no change (neutral) or down (bearish)?"*¹.

The data point of concern is the spread and the moving average of the spread between the most bullish surveys and the most bearish surveys. S&P500 Index data is also provided by the AAll. Later, 10-year US Treasury Bonds are introduced. As the simulation relies on backtests and therefore needs to be traded, the asset used is the rolling 10-year US Treasury Bond Future, adjusted for roll. The data is obtained from Bloomberg (Symbol: TY1 Comdty). All data stretches from January 1988 to April 2022 with weekly periods.

¹ AAll Investor Sentiment Survey:
<https://www.aaii.com/latest/article/16502-the-aaii-investor-sentiment-survey>

Comparing the S&P500 with the Spread AAI Investor Sentiment.



Comparing the S&P500 with the Mov Avg AAI Investor Sentiment.

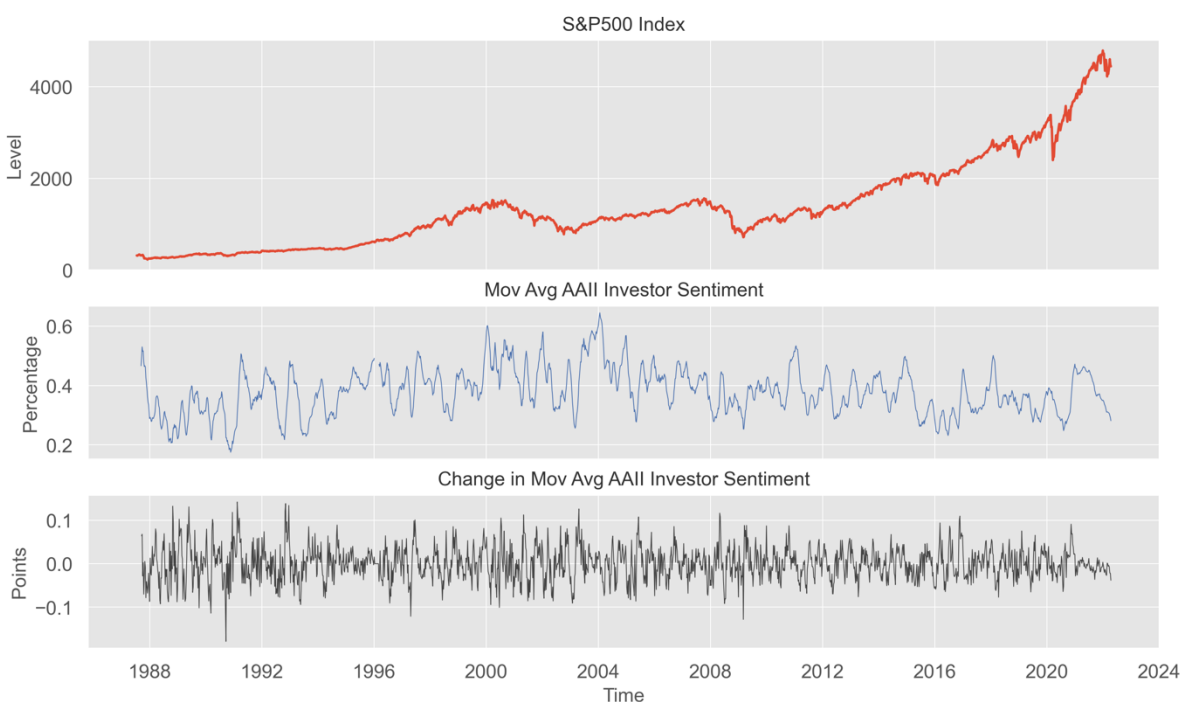


Figure 1 - S&P500 and AAI Sentiment Data:

Source: AAI Investor Sentiment Survey Data, April 2022

It is observable in the data that the average sentiment during the dotcom years and before the financial crisis is clearly higher than before and after this time span. Specifically, after the financial crisis, investors seem to become more negative in general.

Methodology

The approach chosen is straight forward: The data is evaluated on possible relations with general statistics (see Figure 5). The optimal levels for a regime switch indicator are then chosen from simulations. More specifically, strategy backtests are calculated with arbitrary values for the levels to switch between a long and a short regime. In a short regime the weights of the short can, for example, be set between no short, a 50% long position, a 30% long position or a 100% short position. All strategies with less than 15 signals are then excluded and the remaining sorted by Sharpe Ratio.

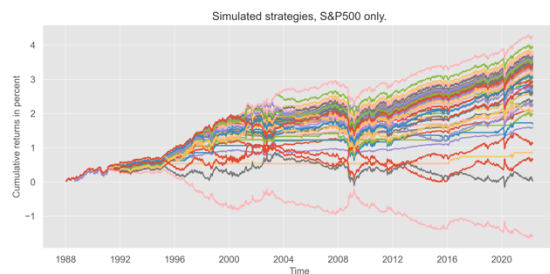


Figure 2 - S&P500 simulations
Source: AAll Investor Sentiment Survey Data, 2022

The same is done with a strategy which switches into 10-year US Treasury Bond Futures instead of changing the weights in the S&P500.

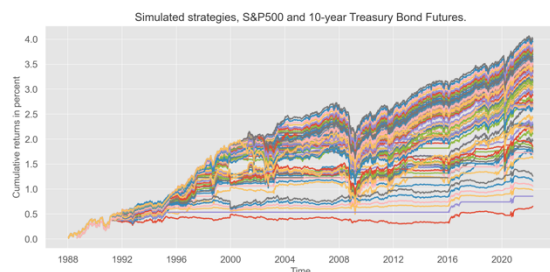


Figure 3 - S&P500 and T-Bond Futures simulations
Source: AAll Investor Sentiment Survey Data, 2022

In the last part, a regression analysis is performed to evaluate whether any level in sentiment can be associated with a change in correlation between Equities and Bonds, as this could influence allocation decisions.

Results: Indicator levels

There seems to be no direct relation between future returns and the sentiment, and thus specific levels as regime change moments are analyzed.

Strategy	short_weight	long_switch	short_switch	strat_sharpe	bench_sharpe	# of signals
1	0	0.3	0.5	0.72	0.61	15
2	0.3	0.3	0.5	0.71	0.61	15
3	0.5	0.3	0.5	0.69	0.61	15
4	0	0.4	0.5	0.66	0.61	23
5	0.3	0.4	0.5	0.65	0.61	23

Table 1 - Sentiment as timing indicator: The best levels for the spread to optimize the strategy.

Strategy	bond_weight	long_switch	short_switch	strat_sharpe	bench_sharpe	# of signals
1	1.00	0.3	0.5	0.77	0.61	15
2	0.75	0.3	0.5	0.76	0.61	15
3	0.5	0.3	0.5	0.75	0.61	15
4	0.3	0.3	0.5	0.74	0.61	15
5	0	0.3	0.5	0.72	0.61	15

Table 2 - Sentiment as regime switch indicator: The best levels for the spread to optimize the strategy.

Historically, switching the regime to risk-off would be above the 0.5 moving average spread mark, while switching to a risk-on regime would be either below the 0.3 or 0.4 mark.

Results: Simulations

Strategies:	S&P500 only			S&P500 and 10y TBF	S&P500 BnH
	<i>long_switch, short_switch, short_weight</i>	0.3, 0.5, -1	0.4, 0.5, -1	0.3, 0.5, 0	0.3, 0.5, 1
Time in Market	100%	100%	67%	100%	100%
CAGR ₆	8.10%	9.31%	8.96%	9.98%	8.85%
Sharpe	0.56	0.63	0.72	0.77	0.61
Sortino	0.82	0.9	1.03	1.09	0.85
Sortino/ $\sqrt{2}$	0.58	0.64	0.73	0.77	0.6
Omega	1.24	1.24	1.42	1.38	1.42
Max Drawdown	-58.53%	-54.38%	-49.39%	-49.39%	-54.38%
Longest DD Days	3857	2282	1582	1400	2618
Gain/Pain Ratio	0.24	0.28	0.42	0.38	0.27
Gain/Pain (1M)	0.59	0.68	1.12	0.97	0.65
Payoff Ratio	0.98	0.98	0.95	0.94	0.95
Tail Ratio	1.11	1.03	1.15	1.14	1.01
Outlier Win Ratio	3.51	3.62	6.39	4.34	3.46
Outlier Loss Ratio	3.77	3.63	3.61	4.61	3.48
1Y	8.69%	8.69%	8.69%	8.69%	8.69%
3Y (ann.)	14.76%	15.51%	15.17%	16.52%	15.51%
5Y (ann.)	11.62%	15.48%	12.98%	14.21%	13.69%
10Y (ann.)	11.49%	13.40%	12.16%	12.77%	12.52%
All-time (ann.)	8.10%	9.31%	8.96%	9.98%	8.85%
Avg. Drawdown	-4.26%	-3.62%	-3.01%	-2.97%	-3.82%
Avg. Drawdown Days	95	73	59	63	75
Recovery Factor	22.97	36.98	36.28	50.64	31.76
Ulcer Index	0.16	0.15	0.08	0.09	0.16
Serenity Index	6.14	11.21	23.9	32.17	8.19

Table 3 - Strategy Results:

Table 3 shows 5 strategy simulations. The first three show market timing (S&P500 only) backtests with the parameters for the *long_switch*, *short_switch*, and *short_weight*. The fourth strategy shows the regime tests, going into the 10-year US Treasury Bond Future when the signal shows. The fifth strategy represents the S&P500 buy and hold. The data ranges from the 01.01.1988 to the 14.04.2022 in weekly periods.

There is explicitly no simulation on a combination of equities and bonds as the weights cannot be determined and as it poorly reflects the strategies risks, since it is 100% invested in a single asset.

It is important to note that these backtests are only calculated to show and compare level efficiency for a regime switch. Conducting actual strategy backtests in this way includes hindsight bias and overfits parameters. A realistic backtest using sentiment as a timing indicator, not as a regime indicator, would likely underperform or even be unprofitable.

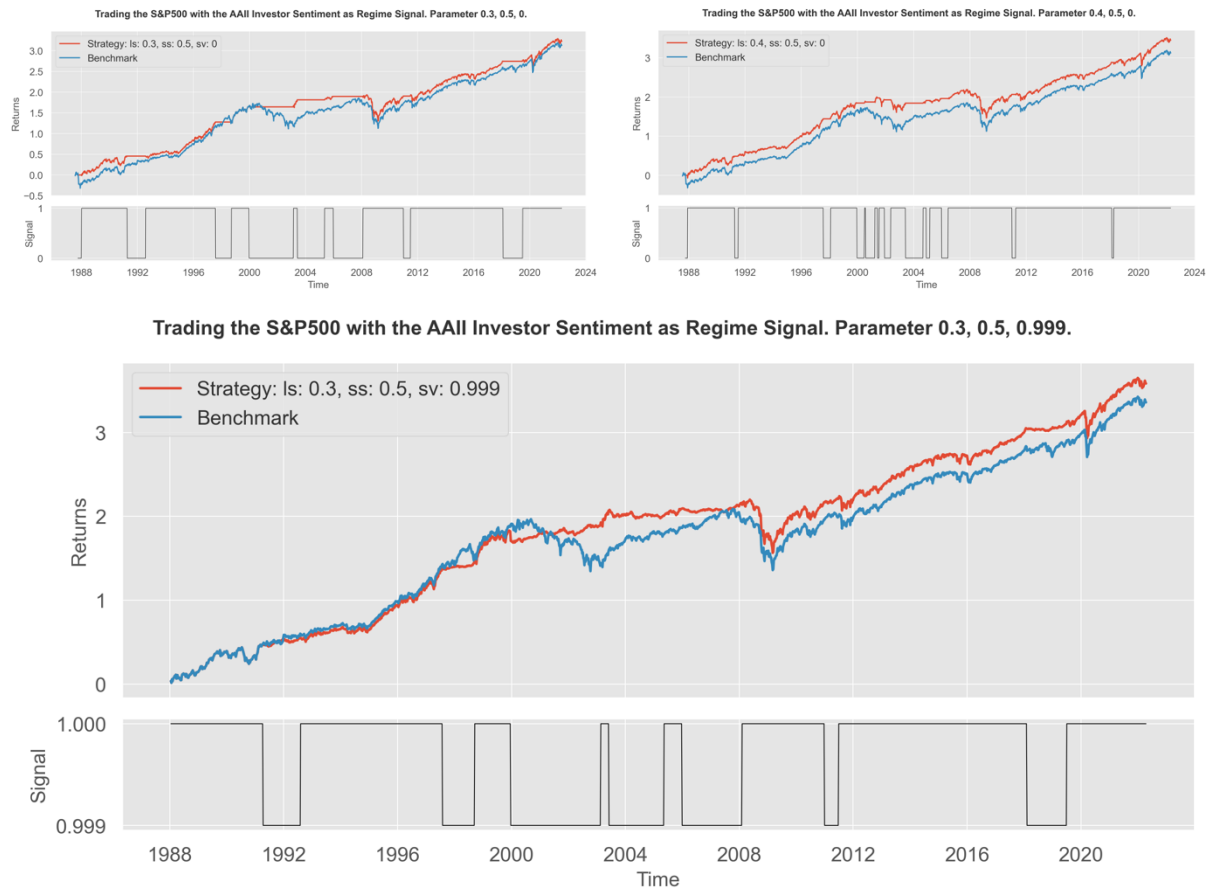


Figure 4 - Sentiment as a timing versus a regime switch signal.

Source: AAI Investor Sentiment Survey.

Note: Parameter: long_switch, short_switch, short_weight (or bond_weight in the last. 0.999 is approx. 1).

Showing the impact of the two timing methodologies and the results against a subsequent change in asset allocation. The Moving Average Investor Sentiment Spread seems to be a useful contrarian indicator when using it to switch between asset classes.

As observable in the simulation results, introducing another asset class to switch over to when the sentiment spread widens or narrows down, is beneficial in both CAGR and average or maximum drawdown reduction/duration. The strategy itself behaves much more stable even compared to the “out-of-the-market” timing version.

Results: Regression

The performed regression on any quintile of the two variables, the spread of the investor sentiment and the moving average of the spread regressed against the subsequent of returns of Equities and Bonds demonstrate that there is no measurable influence of investor sentiment onto correlations between Equities and Bonds. This is an important finding as a change in correlation would mean that the

Variable	Quintile:	Min:	Max:	R ² :	Coef.:	Interc.:
Moving Average of the Spread	1	0.17	0.31	0.00050	-0.09310	0.01000
	2	0.31	0.36	0.00130	-0.11840	0.01000
	3	0.36	0.40	0.01360	-0.34970	0.00990
	4	0.40	0.44	0.00040	-0.05250	0.00930
	5	0.44	0.64	0.00530	0.19480	0.00810
Spread	1	0.17	0.49	0.03540	-0.64160	0.01080
	2	0.21	0.54	0.01800	-0.32010	0.00870
	3	0.24	0.58	0.01840	-0.27820	0.00880
	4	0.23	0.58	0.04980	-0.43240	0.00890
	5	0.28	0.64	0.00880	-0.18870	0.00840

Table 4 - Regression Results:

A linear regression is run between the individual quintiles of the spread and the future correlation between equities and bonds.

regime switch changes its nature over time dependent on investor sentiment, thus invalidating the previous findings.

It is important to note that there seems to be a difference in relation between the sentiment being in generally more bullish or more bearish and the respective size of the spread.

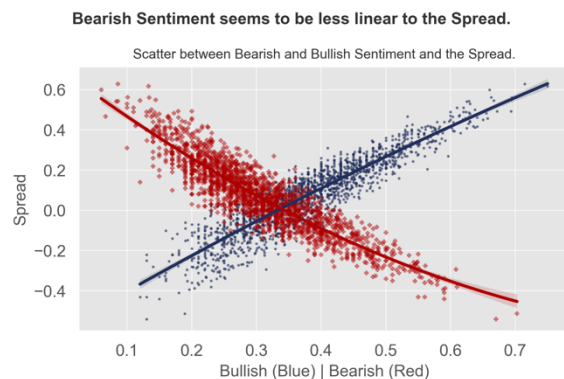
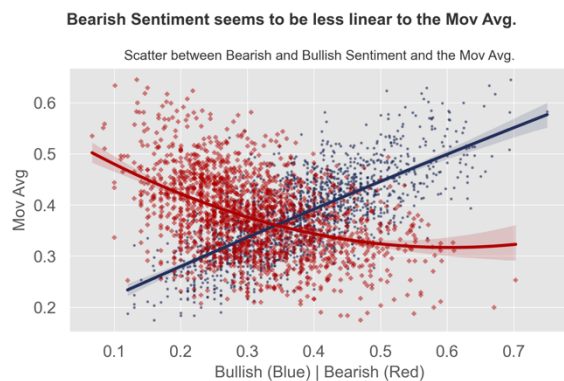


Figure 5 - Sentiment spread and level:
Source: AAI Investor Sentiment Survey Data, 2022

Discussion

The findings suggest that there is a benefit in switching the focus between asset classes when the sentiment is either very one sided or very dispersed. An interpretation would be that if the sentiment spread is high, uncertainty of the market participants is high and therefor the market searches for a new price and corrects, usually accompanied with higher volatility. When the spread is low, there is a common theme across investors and they are confident and risk-on, thus starting to buy equities.

Conclusion

The found indicator regime timing ability seems to confirm previous studies of Fisher and Statman (2000) and Brown and Cliff (2004) that there is some information in the AAI Investor Sentiment Survey but that this data cannot be used to generate a market timing signal. However, with the previously outlined levels found in this

study, it can be used as an indicator for possible risk-on, risk-off regime changes regarding allocation decisions from a top-down point of view. This is important for investors as they then can adjust their risk levels in their employed strategies. Optimally, investors should be more aggressive in their risk-taking and allocation when the moving average of the investor sentiment spread becomes narrow (below 0.3) and that they should reduce risk when the moving average of the investor sentiment spread widens (above 0.5). It should be noted however, that this might be difficult to achieve, as investors tend to share the consensus view and it difficult to be contrarian for portfolio managers especially when for instance investors in a fund and the general market have a common opinion.

References

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Appendix

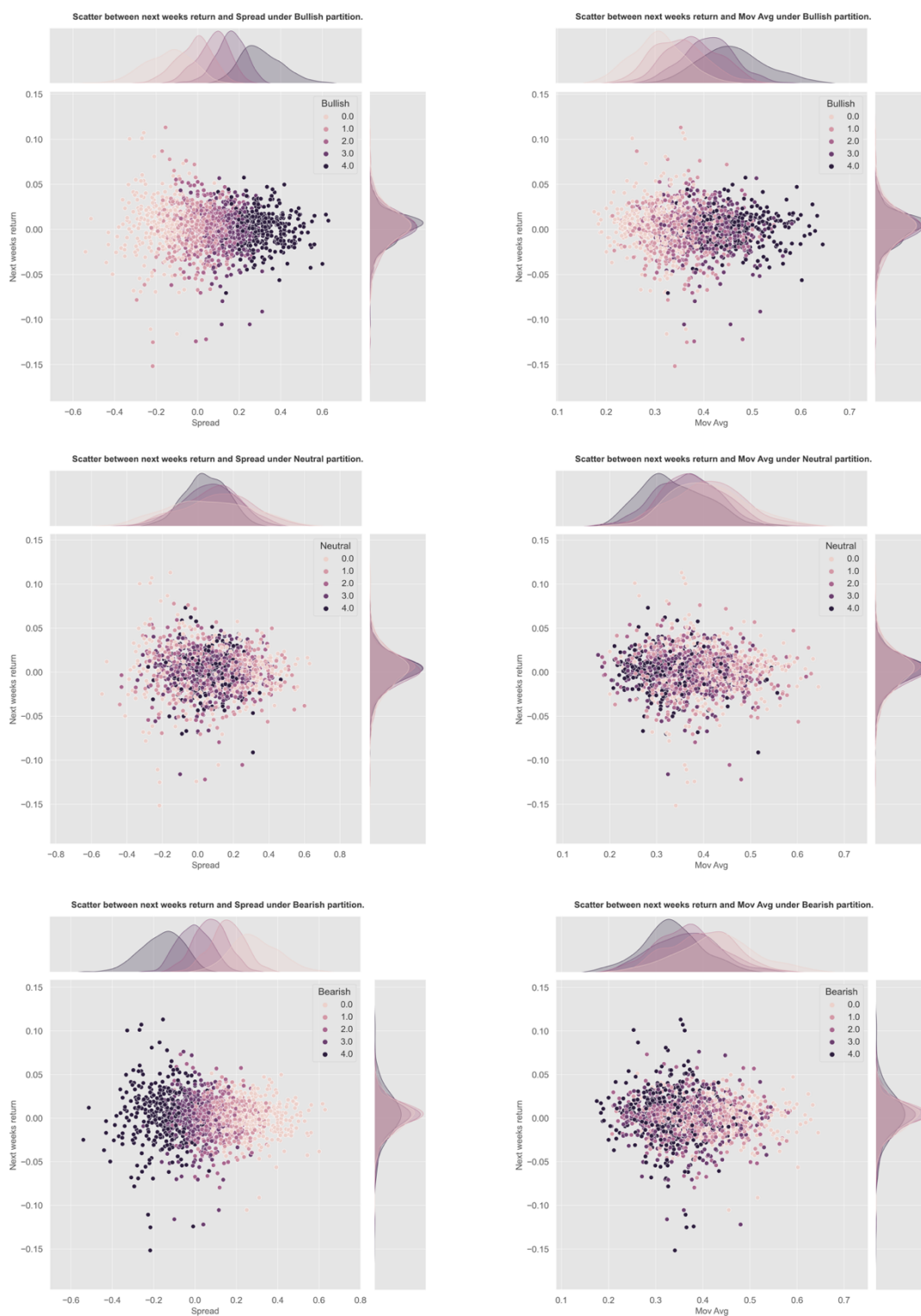


Figure 6 - Future returns against variable with quintiles of spread or moving average of spread

Like Brown and Cliff (2004) found, there seems to be no indication that there is a direct relation between Sentiment and future returns. Interestingly, there is a slight indication that when the data is sliced into quintiles according to an additional variable, the first quintile shows slight relations for bullish and bearish positions.