TRADING & QUANTITATIVE RESEARCH REPORT

THE CDS PORTFOLIO

”A zero investment strategy using credit default swap pricing as indicator of equity market inefficiency”

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Executive summary and investment thesis

Executive Summary: Information in the credit default swap (CDS) market does not diffuse to the stock market perfectly, allowing for arbitrage profits. Analysis of the 5-1 year CDS spreads for S&P 500 companies shows that a portfolio of companies with high CDS spreads yields extraordinary returns in bull markets. The CDS portfolio is also outperforming the S&P 500 portfolio in terms of Sharpe ratio over the full period; however, in the out-of-sample test, this is not the case due to stock-specific effects in mid-2018 to the end of 2018. The tests also show significant evidence that the CDS portfolio should contain the two companies with the highest CDS premium.

Analysts: Johan Andersson & Filip Franzén

Extraordinary returns during bulls and quick recovery after bears

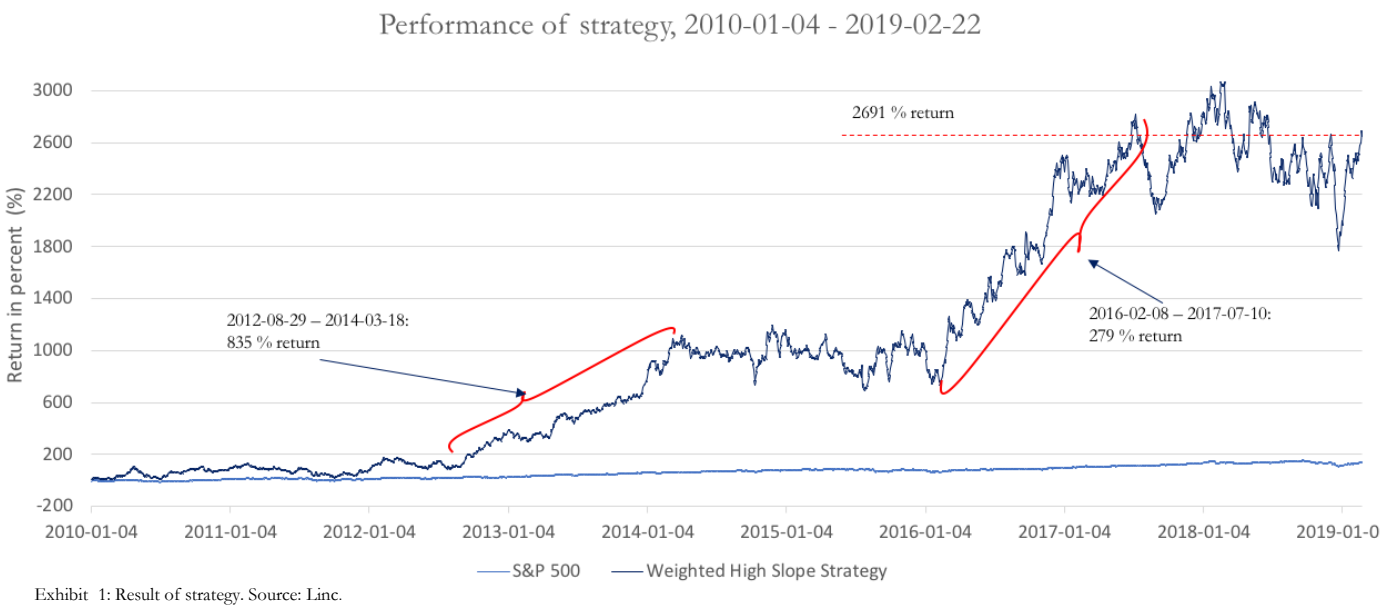

Exhibit 1: Result of strategy. Source: Linc.

Investment thesis

"Higher risk yields higher return" is a backbone in financial analysis. The thesis is that this is true for credit risk as well, and by holding high credit risk companies, one can outperform the market. However, measuring credit risk is hard, but there are two ways to go about it. Either by looking at ratings (AAA, AAB, BBB, etc.) or by looking at the premiums of the CDS. CDS are financial insurance instruments that pay out in case their underlying equity experiences a credit event or defaults. These instruments are very sophisticated, and much information goes into pricing them. Furthermore, earlier academic research suggests that the diffusion of the information captured in the prices of the instruments is fragmentary, which leads one to believe that there is arbitrage to be made.

The data analyzed consists of the daily stock prices of 347 S&P 500 companies as well as the daily premiums of the 1 and 5-year CDS for the respective company over the period 2010-2019. Calculating the 5 minus 1-year spread of the CDS gives the ability to analyze the anticipation of the market concerning these companies. Large spreads indicate high credit risk, and low spreads the opposite.

The idea of the portfolio strategy is to find a certain constant amount of companies with a certain CDS spread and hold these for an optimal, constant, amount of time, before finding the next set of companies with the specific CDS spread and holding these for as long as the previous ones, and so on. This strategy would utilize the information about these companies to outperform the market; in this case, the S&P 500 and yield competitive returns.

Development and proof of concept

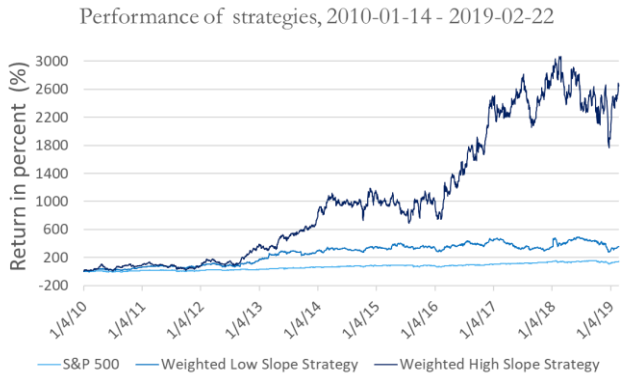

Exhibit 2: Results high and low slope strategies from the in-sample test. Source: Linc.

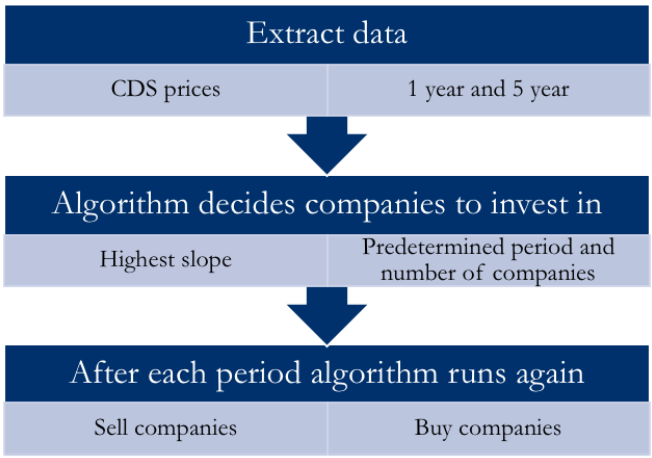

Exhibit 3: Visualization of strategy. Source: Linc.

Table 1: Portfolio Factors for full period test. Source: Linc.

Portfolio Factor	
Alpha	1.08 %
Beta	1.66
Sharpe ratio	1.08
Treynor ratio	0.017
Average return	3.78 %
Standard deviation	0.116
Value at Risk	- 5.9 %
Skewness	0.089

Note: Sharpe Ratio and Treynor Ratio is yearly, Average return and Standard deviation is monthly, and Value at Risk is 99%

Table 2: Configurations of ten best strategies. Source: Linc.

Companies	Weeks	Companies	Weeks
3	11	2	38
4	58	4	29
2	31	2	22
2	57	3	58
2	81	3	22

Data collection

The collection of data comes from two sources, Bloomberg and Datastream. Using Bloomberg for stock prices, and due to the more extensive access, the CDS data from Datastream. The data analysis starts in 2010 to avoid the financial crisis of 2008-2009 influencing the results. To follow the strategy, one would only have to extract CDS prices for the five and one-year contracts.

Development

First tested was the strategy in simple ways with small amounts of data and two different holding periods, 30 days, and 90 days. Both these tests yielded impressive results, e.g., that the return of the low spread portfolio never really went below the benchmark portfolio of S&P 500 and that the high spread portfolio reached extreme returns. Exhibit 2 displays the results from this preliminary test. However, to optimize the parameters, a computerized algorithm was necessary. By programming, in Python, the workload of testing portfolios was minimized.

Optimization

The program would hold the company with the highest CDS spread for one week, then finding what company has the highest CDS spread the week after and hold that company for one week, repeating this process up to nine years. Subsequently, it would try a holding period of two weeks up to nine years. This process would continue up to a holding period of two years, increasing the time to hold by one week every time. When the program reaches the end with the holding periods, it starts at the beginning again but appends one company, the one with second highest CDS spread, repeating this process until 174 companies are in a portfolio. The program outputs daily and accumulated returns for each combination of parameters that were sorted to find the strategies with the highest returns. Exhibit 3 displays the entire process, from data collection to optimization.

Full sample results

This sample test yielded impressive results – namely, more than 100 strategies that beat the benchmark. Many of these strategies beat it with more than 10 times as good returns. The top strategy performed at over 3500 % during the nine years. However, due to volatility and lack of alpha, many more of the top strategies found were examined, resulting in a new portfolio consisting of the ten best strategies, equally weighted. Table 1 reports the measurements for this new portfolio, and Table 2 reports the parameters for the ten sub-strategies. One thing that is very clear from the parameters of the ten sub-strategies is that they all hold very few companies in their portfolios. Half of them only hold two companies. What could be observed for the larger portfolios was the convergence towards the market portfolio S&P 500, which is not surprising as that is what theory tells us. The new portfolio has a high beta of 1.66, which is not surprising as well as the weighted high CDS slope strategy outperforms the benchmark in bull periods. Also, it is interesting to note that there is a significant alpha of 1.08 %. However, comparing it to the S&P 500 portfolio and it's Sharpe ratio of 0.72 for the same period, it is considerably better. Moreover, a positive skewness indicates that there are more large positive returns. To conclude, the average monthly return of the portfolio is 3.78 %, and this is undoubtedly an indicator that there is more to be found in this strategy in performing an out-of-sample test.

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Performance and conclusion

Exhibit 4: Updating and reweighting of three of the sub strategies. Source: Linc.

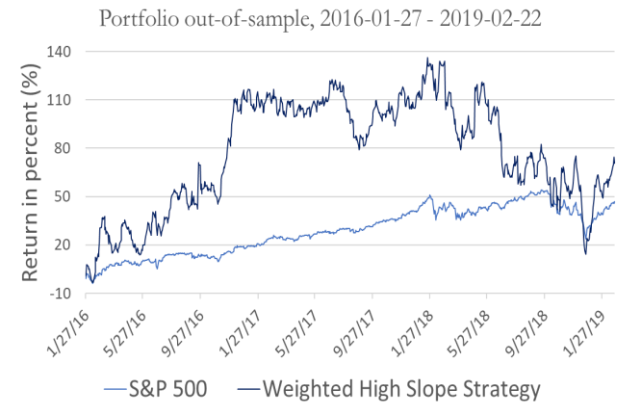

Exhibit 5: Results of out-of-sample test. Source: Linc.

Table 3: Portfolio Factors for out-of-sample forecast. Source: Linc.

Portfolio Factor	
Alpha	Not significant
Beta	1.47
Sharpe ratio	0.63
Treynor ratio	0.0098
Average return	1.8 %
Standard deviation	0.120
Value at Risk	- 5.3 %
Skewness	0.27

Note: Sharpe Ratio and Treynor Ratio is yearly, Average return and Standard deviation is monthly, and Value at Risk is 99%

Updating and reweighting the portfolio

Exhibit 4 visualizes how updating the strategy would work. On average, the strategy updates every 18 days, but several times the algorithm will output the same companies as the previous period, which means that there are no transactions in that period for that sub-strategy. Furthermore, as there are no daily transactions, transaction costs are not an issue for the strategy.

Out-of-sample forecast

To test the strength of the strategy in an out-of-sample test was used on a different time-period on the data. In this scenario, the strategy was optimized on the periods 2010-2015, resulting in a new portfolio structure. Thereafter, deriving a tested on the periods 2016-2019, the results of which can be seen compared to the S&P 500 in Exhibit 5. What can be observed is similar to the full period test, the extreme ups in a bull period, having a high correlation to the S&P 500 in a downward market and a fast recovery after a bear period. To conclude, the same large dip in late 2018 erase many of the gains, just as in the benchmark portfolio and the full sample test. This new optimal portfolio is holding only 2 firms in 9 of the 10 sub-strategies with a holding period centered around 78-82 weeks.

Portfolio measures

However, comparing the statistics with the full period, there are some similarities and differences. To start Table 3 display that alpha in the out-of-sample is not significant, but the portfolio is still a leveraged portfolio concerning its systematic risk factor. Also, the Sharpe and the Treynor ratio, as well as the returns and the skewness, are lower for the out-of-sample test. Not surprisingly, during this period, the S&P 500 portfolio had a higher Sharpe ratio of 0.96, but still not higher than the portfolio in full period test. These results have much to do with the period from May 2018 to the end of 2018, which is also the case for the full period model. This test supports the strategy since it behaves similar independent of the optimization period. Furthermore, it is evident that the portfolio should consist of few firms, most likely as few as two, as 50 % of the best sub-strategies in the full sample test holds two stocks and 90 % of the best sub-strategies in the out-of-sample test holds 2 stocks.

Further development of strategy

To improve on the CDS strategy a test on holding different percentiles of companies should be researched, i.e., not only portfolios, including the highest/lowest spreads but the mid percentile, e.g., 50 percentile/decile. Also, to test assigning different weights to the ten sub-strategies according to their standard deviation, beta, or Sharpe ratio. Furthermore, also explore a stop loss, using a VIX as an indicator to buy puts/risk-free asset/sell everything. Lastly, testing the CDS strategy with more data, such as other markets, other CDS spreads, more variables, e.g., owner structure, life length of the company, or number of owners.

Conclusion

Conclusively, the strategy delivers extremely competitive returns to the S&P 500 portfolio and a high Sharpe ratio in the full period. The strategy is not fickle, but stable, and tells us to hold 2-4 companies for fixed lengths of time in its sub-strategies. Both the full sample test and the out-of-sample test outperforms the market before May 2018 to the end of 2018. Therefore, this is zero-investment strategy is definitely the right strategy for investors with a risk appetite looking for high returns during bull markets. It is safe to say that there is a lot to be learned and earned from CDS.

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