Leveraged ETF Strategy - Ernest Chen Algorithmic Trading(pp. 164)

Book Excerpt

Imagine that you have a portfolio of stocks that is supposed to track the MSCI US REIT index (RMZ), except that you want to keep the leverage of the portfolio at 3, especially at the market close. As I demonstrate in Example 8.1, this constant leverage requirement has some counterintuitive and important consequences. Suppose the RMZ dropped precipitously one day. That would imply that you would need to substantially reduce the positions in your portfolio by selling stocks across the board in order to keep the leverage constant. Conversely, if the RMZ rose that day, you would need to increase the positions by buying stocks.

Now suppose you are actually the sponsor of an ETF, and that portfolio of yours is none other than a 3× leveraged ETF such as DRN (a real estate ETF), and its equity is over a hundred million dollars. If you think that this rebalancing procedure (selling the component stocks when the portfolio's return is negative, and vice versa) near the market close would generate momentum in the market value of the portfolio, you would be right. (A large change in the market index generates momentum in the same direction for both leveraged long or short ETFs. If the change is positive, a short ETF would experience a decrease in equity, and its sponsor would need to reduce its short positions. Therefore, it would also need to buy stocks, just as the long ETF would.)

We can test this hypothesis by constructing a very simple momentum strategy: buy DRN if the return from previous day's close to 15 minutes before market close is greater than 2 percent, and sell if the return is smaller than −2 percent. Exit the position at the market close. Note that this momentum strategy is based on the momentum of the underlying stocks, so it should be affecting the near-market-close returns of the unlevered ETFs such as SPY as well. We use the leveraged ETFs as trading instruments simply to magnify the effect. The APR of trading DRN is 15 percent with a Sharpe ratio of 1.8 from October 12, 2011, to October 25, 2012.

Naturally, the return of this strategy should increase as the aggregate assets of all leveraged ETFs increase. It was reported that the total AUM of leveraged ETFs (including both long and short funds) at the end of January 2009 is $19 billion (Cheng and Madhavan, 2009). These authors also estimated that a 1 percent move of SPX will necessitate a buying or selling of stocks constituting about 17 percent of the market-on-close volume. This is obviously going to have significant market impact, which is momentum-inducing. (A more updated analysis was published by Rodier, Haryanto, Shum, and Hejazi, 2012.)

There is of course another event that will affect the equity of an ETF, leveraged or not: the flow of investors' cash. A large inflow into long-leveraged ETFs will cause positive momentum on the underlying stocks' prices, while a large inflow into short-leveraged ("inverse") ETFs will cause negative momentum. So it is theoretically possible that on the same day when the market index had a large positive return many investors sold the long leveraged ETFs (perhaps as part of a

mean-reverting strategy). This would have neutralized the momentum. But our backtests show that this did not happen often.

Strategy Summary

For the 16 biggest Leveraged ETFs, if the ETF is up 2% over the previous close with 15 minutes to go in trading, we buy and then sell at close. Similarly, if the ETF is down 2% from the previous close with 15 minutes to go in trading, we short and then close position at close.

Notes

1. I spoke to Brett. He agreed it was a discrete event but wasn't sure when it was. He said he would ask someone for me
2. I have currently been testing whether the leveraged etf is 2%+/- not the underlying which I think is incorrect.
3.

Results

1. The first backest run from November 29, 2023 until January 13, 2024 had the following results. These results seem almost too good to be true but I will be proceeding to testing on live market conditions soon. Using position sizes of 5% of current portfolio value, we achieved a **return of 17.5%** or **142% annualized**. (Note: this was trading just equities. May consider using calls/puts to lever further)

Trades	**Wins**	**Losses**	**Win Percent**	Average Movement	**Average Win**	**Average Loss**
121	81	40	0.6694214876		0.005993750287	-0.003433611848

2. The second backest run from December 1, 2023 until January 16, 2024 had the following results. Using position sizes of 5% of current portfolio value, we achieved a **return of 15.2%** or **120% annualized**. (Note: this was trading just equities. May consider using calls/puts to lever further)' (This test used the previous close to be at least 2 days before)

Trades	**Wins**	**Losses**	**Win Percent**	Average Movement	**Average Win**	**Average Loss**
223	140	83	0.6278026906		0.004604608779	-0.004024283089

3.