STEVENS
INSTITUTE of TECHNOLOGY
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Option Volatility Trading Strategies

MGT-411 Proposal

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Research Questions

- Is there a benefit of incorporating option volatility trading strategies into standard investor portfolios?
- Can volatility strategies help produce uncorrelated returns?
- How do volatility strategies perform in different market regimes (high vol vs low vol markets)?

Problem Background

Scope and Purpose

- General investors are aware of the benefits standard puts/calls can provide their portfolio.
- Can we expand on using vanilla puts/calls to more advanced vol trading strategies to help provide investors uncorrelated returns?
- The option market provides opportunities to profit regardless of the direction of the overall market.
- The case for trading volatility as another asset class is well documented in literature.

Literature Review

Prefatory Readings

- *Volatility Dispersion Trading: Qiang Deng*
  - Dispersion trading is a hedged strategy designed to take advantage of relative value differences in implied volatility between an index and a basked of component stocks
  - This paper analyzes where dispersion profits are derived from and how to enhance them
- *Trading the Volatility Skew of the Options on the S&P Index: Juan Bueno*
  - OTM Index puts can be overpriced due to investor's wanting downside protection
  - Implied volatility on lower strike options can be inflated leading to trading opportunities
- *Trading Volatility: Colin Bennet*
  - Textbook that outlines advanced options trading strategies including dispersion, skew, and exotics

Initial Ideas on Implementation

Software and Methodology

- We plan to conduct most of the project in Python
- We have a shared GitHub to allow group collaboration on any code we produce
- Back test the strategies by simulating buys and sells of various options
  - Buy and sell underlying securities as well (hedging) and track the performance
- Analyze the performance of strategies compared to the overall market/equity portfolios,
  - Run regressions and other statistical analysis to compare the option trading strategies to the equity market
  - The analysis will include cost-benefit scenarios that outline if investing in volatility as an asset class is worthwhile for diversification (or in what market regimes is it beneficial)

Introduction to Data Sources

- We will be using Bloomberg to gather historical option pricing data
- The Excel add-in gives us access to any historical option data
- We will use a Python script to communicate with Excel to download the specific options we want and read back to Python

A1 =BDH("SPY 12/20/19 C300 Equity", "PX_LAST", 20170811, 20190814,"cols=2;rows=430")

	A	B	C	D	E	F	G	H	I	J
1	8/11/2017	2.86								
2	8/15/2017	2.82								
3	8/17/2017	2.38								
4	8/18/2017	2.3								
5	8/21/2017	2.3								
6	8/23/2017	2.51								
7	8/24/2017	2.5								
8	8/28/2017	2.4								
9	8/29/2017	2.29								
10	8/30/2017	2.72								
11	8/31/2017	2.94								
12	9/1/2017	3.01								
13	9/6/2017	2.92								
14	9/7/2017	3.01								
15	9/8/2017	2.95								
16	9/11/2017	3.35								
17	9/12/2017	3.47								
18	9/15/2017	3.75								

Project Outcomes

Initial Expectations

- A determination of which trading strategies can be used to attain beta-neutral returns that are competitive with equity-only portfolios over a long timeframe.
- Thorough backtesting analysis to determine which strategies consistently perform well out-of-sample.
- A quantifiable risk-reduction from diversifying a typical portfolio by implementing various option strategies; treating volatility as an additional asset class.
- A greater understanding of developing automated option trading strategies and incorporating them into a portfolio.

Work Plan

(Tentative)

First Semester

- First steps are really considering what data we need to get, such as which assets we will consider for options
- Another step is continuing to research the various strategies mentioned, as well as considering new ones that we see as viable and worth implementing
- Important part is to develop the code to pull and clean the data we need from Bloomberg and other sources to give us neat data from various prices
- Lastly, just be able to adapt to problems encountered

Second Semester

- Now we will backtest our strategies, there are different ways we can approach this, so we need to discuss ways to construct portfolios/asset allocations
- First step of backtesting is to test the various option strategies, once we find which ones are viable then we can implement those into typical investor portfolios
- Wrap up conclusions and present our findings in a concise manner

Risk Analysis

Possible Challenges and Risks

- Data Collection Issues
  - Missing data from Bloomberg (tickers, dates, strikes).
  - Difficulties automating data collection through python using the Bloomberg-Excel API (time/memory).
- Unrealistic Backtesting Results
  - Observing unusual option prices due to illiquidity.
  - Large bid-ask spreads.
- Poor Out-of-Sample Strategy Performance
  - Market regime changes (Covid, rapid growth of retail investor participation in option trading).
  - Overfitting our trading models.

Conclusion and Next Steps

Conclusions

- Our senior design project will investigate volatility strategies, and then look to incorporate these strategies into investor portfolios
- If we can do this effectively, demonstrating that we are providing uncorrelated returns to the portfolio, then we can investigate how these strategies perform in different market regimes
- Ultimately, we are looking to improve upon investor's portfolios with volatility treated as a separate asset class

Next Steps

- Further research on volatility strategies
- Tentative decision for what data we need for starters (ETFs options, individual stock options, etc.)
- Find most effective ways to pull the data
- Create code to extract the data and clean the data on a mass scale