CS 480 Senior Project Proposal

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Advisor and Committee

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Covered Call Screener Overview

This project will screen covered call buy-write strategies in a number of ways in order to allow the user to identify the optimal covered call to execute for their chosen strategy.

Background

When discussing options, it is important to understand the Greeks, as they provide the basis to numerical option analysis. The Greeks are: Delta, the probability that an option will expire in the money (ITM) as well as the option price change per dollar change of the underlying symbol (a delta of .4 indicates that an option has a 40% chance of finishing in the money, as well as indicating that for each dollar that the stock price changes the option price will change by $0.40); Gamma, the variability of Delta with respect to stock price changes (when the stock changes a dollar how much will Delta change); Theta: the approximate dollar amount that an option will decrease in value per day, also known as time decay; Vega: how sensitive an option is to price movement in the underlying stock, generally tied to implied volatility; Rho: the least important Greek, simulates the effect of an interest rate change on an option price. A covered call consists of buying a stock and then writing/selling a call on that stock. Each call contract sold gives the buyer the right to purchase 100 shares of stock at a given price before a certain date. The price at which the stocks are to be bought is called the strike price. The strike prices for each symbol are preset and only certain strikes are allowed to be bought and sold. There is the potential for lost profit so the seller of that call option receives both the intrinsic value of the option, as well as a premium, which can be considered a reward for risking their shares. As a seller you want high premiums. Buying calls is a bullish strategy (your calls appreciate when the stock price goes up), so selling calls is a bearish strategy (as the calls you sold depreciate you make more money). In order to sell a covered call, you must own at least 100 shares of stock which is considered a bullish position (you make more money if your stocks go up), so when you combine the bearish aspect of selling calls with the bullish aspect of owning shares, covered calls can be best considered as a delta neutral theta decay strategy. In order to analyze all covered calls associated with a stock symbol for a set date, you must use an option chain. An option chain is a list of all the strikes associated with a symbol as well as all the

Greeks, the bid price (the price at which the option can be sold), the ask price (the price at which the option can be bought), the last price (last traded price), the volume (the amount of options at that strike being traded per day), as well as the open interest (the amount of options at that strike in existence). A large stock might have dozens of strikes for each date as well as expiration dates of up to once a week, while a small stock might only have a few strikes and expiration dates of once a month. An expiration date is the last date at which the option can be executed.

Methodology Overview

This project analyzes covered calls as they currently are listed and should not be relied upon to extrapolate results beyond a single contract. This project will produce 6 set "screens" of 100 ordered covered calls each. A covered call consists of a stock symbol and a strike price as well as its associated data as described in the overview. The first screen will search for the highest expected return covered calls. The second will search for the highest possible return covered calls. The third will search for the most stable covered calls. The fourth will search for the highest expected return per day covered calls. The fifth will search for the highest possible return per day covered calls. The sixth will screen for the highest expected return per day of covered calls with a delta over .9, also known as "deep in the money" covered calls. Of these screens, the most important is "highest return per day covered calls" since it will give the highest possible return per unit time. These screens will be produced each time that a data pull of all requested symbols is completed from the open source "wallstreet" API authored by mcdallas on Github. As soon as one set of screens is produced, the process will begin again and a new set of data will be pulled and analyzed. The user gets the updated screens as soon as they are produced. The screens will be displayed on a simple website and hosted on a server using reverse Ajax to push new results to the web page as soon as they are produced. The actual covered call analysis will be conducted in a python applet run by the server, which will produce the 6 screens as CSV's.

Methodology Specifications

<u>Python Applet</u>

Pull stock option data with wallstreet API (as much as possible, try to get enough data to take about 5-10 minutes to finish a pull)

Produce the following for each data point by creating unique equations

Produce a ranking value for "highest expected return per day" HERPD

Produce a ranking value for "highest possible return per day" HPRPD

Produce a ranking value for "highest expected return per day deep ITM" HERPDITM

Produce a ranking value for "highest expected return" HER

Produce a ranking value for “highest possible return” HPR

Produce a ranking value for “highest stability” HS

Place data into a non-ordered list

Produce a sorter that uses ranking value to sort and takes index as a parameter, such that index 0 is an option’s HERPD rank, index 1 is an option’s HPRPD rank, and so on.

Produce CSV’s for each ranking value as ordered lists with 100 options each

Server

Pull screens/CSV’s whenever last pull finishes, so long as time is between 9:30 AM and 4:00 PM EST

Store current screens

Push screens to all clients using reverse Ajax

Client

Display

Dropdown menu listing 6 screen choices

Current view based on menu choice displays a graph (such as this example from Barchart) Covered Calls Screener Options Strategy - Barchart.com

JS

Create and store tables based on CSVs pushed from server

Learning Goals

For this project I will learn how to code in Python, as well as how to use reverse Ajax. Both of these are new to me, and I believe that learning a new language displays a significant learning requirement for this project.