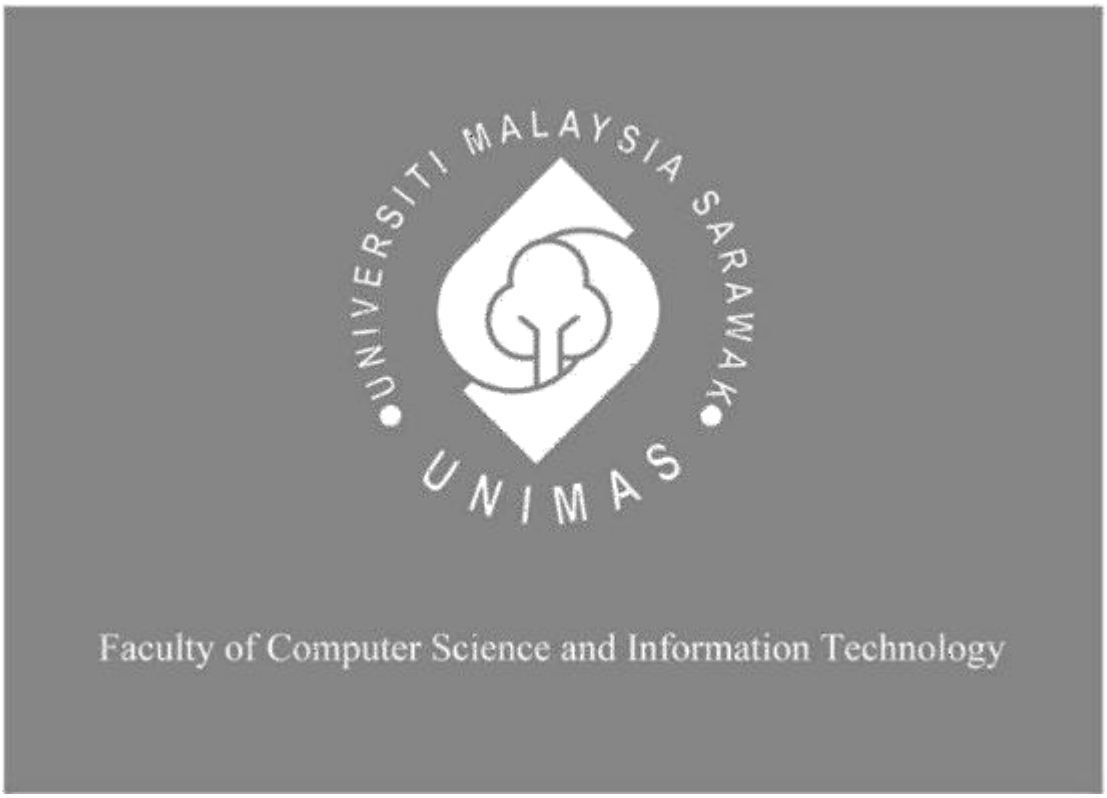

Comparing the ROI of Potential Candidates for Weekly Options Trading using Long Straddle Strategy.

Noor Syahirah Bt Noor Kifli

Bachelor of Computer Science with Honours (Computational Science)

2019

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NOOR SYAHIRAH BT NOOR KIFLI

This project is submitted in partial fulfilment

of the requirement for the

Degree of Computer Science with Honours

(Computational Science)

Fakulti Sains Komputer dan Teknologi Maklumat

UNIVERSITI MALAYSIA SARAWAK

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Projek ini merupakan asas untuk

memenuhi syarat keperluan

Ijazah Sarjana Muda Sains Komputer

(Sains Komputan)

Fakulti Sains Komputer dan Teknologi Maklumat

UNIVERSITI MALAYSIA SARAWAK

2019

UNIVERSITI MALAYSIA SARAWAK

THESIS STATUS ENDORSEMENT FORM

TITLE **COMPARING THE ROI OF POTENTIAL CANDIDATES FOR WEEKLY OPTIONS TRADING USING LONG STRADDLES STRATEGY**

ACADEMIC SESSION: 2019/2020

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ACKNOWLEDGEMENT

First and foremost, all praises and thanks to Allah s.w.t for giving me His blessing for a chance and opportunity to complete this project within the time successfully. I also would like to express my greatest gratitude in the success of this final year project to my supervisor, Dr. Shapi-ee bin Abd Rahman, for giving me all the guidance, advices, support and help from the start and throughout the development of this project until the completion. Last but not least, I would like to dedicate this special thanks to my parents, family, and my friends who have become my backbone, giving me the utmost moral support during the difficult phase that I finally able to complete this project successfully.

ABSTRACT

Financial derivatives market (both exchange traded and over the counter) is the most innovative investment sector. Novel hedging and arbitrage strategies are emerging daily, with very complex payout scenarios and multi-factor credit and market risk exposures. Nevertheless, financial options remain popular trading tools, as they afford the option buyer the element of transaction choice in the future. This paper provides an overview of fundamental option trading concepts as well as a wide range of most popular trading strategies with their applications, risks and benefits.

ABSTRAK

Pasaran kewangan (kedua-dua bursa yang diniagakan dan di kaunter) adalah sektor pelaburan yang paling inovatif. Strategi lindung nilai muncul setiap hari, dengan senario pembayaran yang sangat kompleks dan pendedahan risiko kredit dan faktor pelbagai faktor. Walau bagaimanapun, pilihan kewangan tetap menjadi alat perdagangan yang popular, kerana mereka mampu membeli pilihan pilihan elemen transaksi pada masa akan datang. Makalah ini memberikan gambaran mengenai konsep perdagangan opsyen asas serta pelbagai strategi perdagangan yang paling popular dengan aplikasi, risiko dan faedah

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CHAPTER 1: INTRODUCTION

1.1 Overview

Options are financial instruments that are derivatives based on the value of underlying risk such as stocks and ETF (Exchange -Traded Funds). They help to reduce the risk of the portfolio exposure. An options is a contract that allow a buyer to buy or sell depending on the type of contract they hold. The holder is not required to buy or sell the asset if they choose not to. There are two types of option, which are put and call option. Put is an option contract that gives the buyer the right to sell the underlying asset at the strike price at any time up to the expiration date where, a call is an option contract that gives the buyer the right to buy the underlying asset at the strike price at any time up to the expiration date.

There are many strategies available which offer different returns. There are married put, covered call, straddles, strangles and so on. For example, a straddle is an options strategy involving the purchase of both a put and call option for the same expiration date and strike price on the same underlying. A trader will profit from a long straddle when the price of the underlying risk rises or falls from the strike price by an amount more than the total cost of the premium paid.

Return on Investment (ROI) is a performance measure used to evaluate the profitability of an investment. ROI tries to directly measure the amount of return on a particular investment, relative to the investment's cost. To calculate ROI, the benefit (or return) of an investment is divided by the cost of the investment. The goal is to have a high ROI. It is usually represented as a ratio and obtained by dividing the gain earned from the investment by the investment amount.

1.2 Problem Statement

Option trading is very risky if we do not have a reliable and proven strategy. We cannot rely on analyzing the underlying stock patterns alone to predict its option price movement, as sometimes the stock and its option prices do not move in tandem. For example, even when the stocks makes a big move upward(e.g after a positive earnings announcement), however the option price could drop sharply due to the sharp drop in volatility or "volatility crush".

In this research, a few index options will be evaluated as potential candidates for a weekly hedged option trading using the long straddle strategy. Ultimately, the best candidate will be determined based on their average ROIs over a couple of weekly trades.

1.3 Scope

In this final year project, this project involves four index options indices traded on Chicago Board Option Exchange (CBOE) in the US, namely XLE, FAS, FAZ and SPY. In addition, some strategies are used to collect data, analyze data and plot a graph. Weekly Hedged Strategy is the one of trading strategy will be use to collecting data every week in period of time. For example, every Friday data will be collect for four ETF options based on Thinkorswim trading platform. Besides, to analyze the data, SPSS software is needed for complex data set. It will be recorded to analyze and determine if any significant difference between them based on comparing the ROI.

1.4 Objective

The objective of the research are:

I. To determine whether there are significant difference between the mean ROIs of the four ETF options.

II. To identify which pair of option demonstrate significant differences in their mean ROIs.

III. To rank the options accordingly in terms of their mean ROIs.

1.5 Methodology

1.5.1 Data collection

Data collection will be done based on the weekly option trades on the candidates considered. An option strategy called a long straddle strategy will be used. The straddle is one of the popular hedged strategies i.e the loss is capped or limited. Profits are made when the underlying ETF makes a big move either upwards or downwards i.e it is a directionless strategy. The ROI will be recorded for each trade, together with other data that may affect the ROI performance of each of the candidates.

The simulated trading (or paper trading) will be carried out using Thinkorswim trading platform. A trading account has to be set up prior to that by registering with TDAmeritrade Singapore (www.tdameritrade.com.sg).

The candidates will be considered in this study are the options on Exchange-Traded Fund(ETF) indices traded on Chicago Board Option Exchange(CBOE) in the US, namely

1. XLE, Energy Select Sector SPDR
2. FAS, Direction Daily Financial Bull 3x Shares
3. FAZ, The Direxion Daily Financial Bear 3X Shares
4. SPY, SPDR S&P 500

1.5.2 Data Analysis

Exploratory data analysis will be conducted on the data to get an overview of the data characteristics. To check the assumption of normality, the one-sample Kolmogorov-Smirnov test can be conducted. The Kolmogorov-Smirnov test is used to test the null hypothesis that a sample comes from a particular distribution.

The ROIs for the four candidates will be analyze and compared using either:

1) A one-way ANOVA (Analysis of Variance) technique, if the data collected is sufficient and follows a normal distribution (a parametric test).

2) Kruskal-Wallis H Test otherwise (a non-parametric test) to test whether there are any significant differences between the mean ROIs.

If significant differences are observed, a Post Hoc test will be carried out to detect the differences in the means of each pair of options.

1.5.3 Statistical analysis software

SPPS

1.6 Significance of project

In this final year project, this project involve the use of options and how to minimize the risk using long straddle strategy. This strategy is quite popular but some traders do not know how to use it effectively. In addition, this research will provide insight towards trader to choose which is the best among four options on Exchange-Traded Fund(ETF) indices traded on Chicago Board Option Exchange(CBOE). Besides, options prices depend crucially on estimated future volatility of the underlying asset. As a result, while all the other inputs to an option's price are known, trader will have varying expectations of volatility

1.7 Project Schedule

Activity	Start Date	End Date	Duration
Final Year Project 1	14/9/2019	21/12/2019	99 Days
Brief project proposal	15/9/2019	29/9/2019	15 Days
Project Proposal	29/9/2019	19/10/2019	20 Days
Research on Project	29/9/2019	6/10/2019	7 Days
Identifying objectives and scopes	7/10/2019	11/10/2019	4 Days
Determine methodology	9/10/2019	13/10/2019	4 Days
Chapter 1: Introduction	20/10/2019	26/10/2019	5 Days
Finalize Project Proposal	20/10/2019	26/10/2019	5 Days
Chapter 2: Literature Review	27/10/2019	16/11/2019	21 Days
Gathering journal and information on sample research	27/10/2019	2/11/2019	6 Days
Analysis information and documentation	3/10/2019	16/11/2019	13 Days
Chapter 3: Methodology	17/11/2019	5/12/2019	19 Days
FYP 1 Final report	12/12/2019	12/12/2019	1 Day
FYP 1 Symposium	20/12/2019	21/12/2019	2 Days

Figure 1.1 Milestone FYP 1

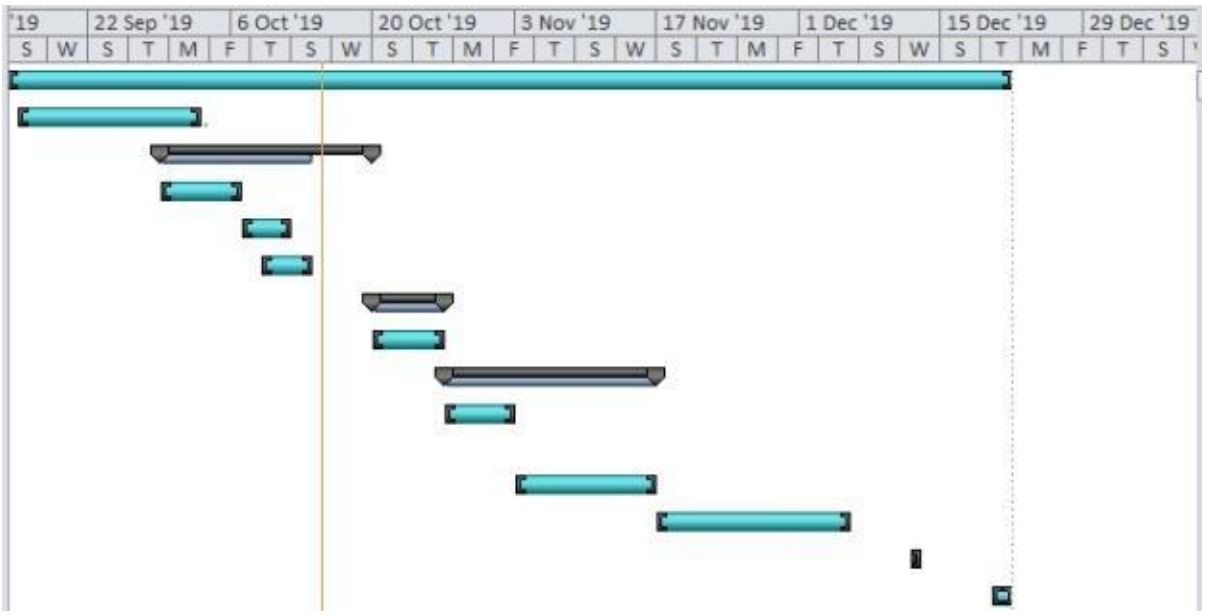

Figure 1.2 Gantt Chart FYP 2

1.8 Expected Outcome

At the end of this project, outcome of this project analysis is expected to determine significant difference between the mean of ROIs of the four ETF options. In addition, able to identify which pair of options demostrate significant diffferences in their mean ROIs. Lastly, successfully rank four ETP options based on ROI. Based on this data analysis, we will know how options strategy help to minimize the risk.

CHAPTER 2: LITERATURE REVIEW

2.1 Overview

Literature review is one of the crucial parts in the project research where research is done based on the selected area of study. It includes the review on existing system/strategies, the comparison between existing system/strategies and proposed system, details of the proposed system with justification, and lastly, produce an evaluation report.

2.2 background study

In ancient times, goods transactions contracts with embedded option features were important to commerce. The development of exchange trading for free standing option contracts took place from the 16th to 18th centuries. It is likely that trading in both forward and option contracts was a common event on the Antwerp bourse during the 16th century. By the mid-17th century, the active trade in such contracts on the Amsterdam bourse featured a sophisticated clearing process. In England, trading in both options and forward contracts was an essential activity in London's Exchange Alley by the late 17th century. Despite this, prior to the mid-19 the century, options trading was a relatively esoteric activity confined to a specialized group of traders.(Yutoglu Nadir,2018).

Option trading is a way for savvy investors to leverage and control some of the risks associated with playing the market. Pretty much every investor is familiar with the saying, “Buy Low and sell high.” But with options, it’s possible to profit whether stocks are going up, down or sideways. You can use options to cut losses, protect gains and control large chunks of stocks with a relatively small cash outlay. On the other hand, option strategies can be complicated and

risky. Not only might you lose your entire investment, some strategies may expose you to theoretically unlimited losses.

2.3 Definition of options and their users

Option contract gives the buyer the right but not the obligation to enter into a transaction specified today at a future date. The buyer will obviously use it to his advantage and only exercise the option if it is beneficial compared to the prevailing market conditions at expiry. As in the event of exercise the option seller must fulfil the obligation at loss, to compensate for the risk he charges premium payable up-front. Clearly all the buyer can lose is the cost of the premium if option expires unexercised, whilst the seller has unlimited exposure. Hence his view of the market must be opposite. Options are valuable tools used for hedging and speculation.

Hedgers use options as a form of insurance. If they believe that the price of an asset they will require in the future will increase, they buy an option that allows them to fix the purchase price today. If their expectations prove correct, they will exercise the option. However, if they can transact more cheaply in the market, they will simply abandon the option. Similarly, an option to sell an asset in the future at price agreed today provides protection against the price fall. Should the prices rise, the option would be abandoned and the asset sold more profitably in the market.

Speculators take their positions purely to make profit from expected market moves. They neither require, nor own an underlying security and aim to close out their position by reversing the option contract prior to expiry. Alternatively, they can sell options with the view that they will not be exercised, expecting to keep the premium.

Arbitrageurs aim to profit from pricing discrepancy between different products or strategies. As combinations of different option strategies can replicate other contract payouts,

it is theoretically possible that their combined cost would be different, allowing for risk-free profit. However, in practice, supply and demand would quickly eliminate any arbitrage opportunities.

2.4 Stock options alternative

In 1982, stock index futures trading began. This marked the first time traders could actually trade a specific market index itself, rather than the shares of the companies that comprised the index. First came options on stock index futures, then options on indexes, which could be traded in stock accounts.

Next came index funds, encouraging investors to purchase and hold a particular stock index. The recent growth spike began with the introduction of the exchange-traded fund(ETF) and the listing of trading options against a wide range of these latest ETFS was followed.

An ETF is basically an individual stock like mutual fund. As a result, an investor can buy or sell an ETF at any time during the trading day that represents or tracks a given market segment. Another breakthrough was the massive expansion of ETFs, which greatly expanded investors ' ability to take advantage of many unique opportunities. Intraday trading is one of the key differences between ETFs and mutual funds. At the end of the trading day, mutual funds close on one amount, known as the net asset value, or NAV. During the day, ETFs are traded on the exchange, and their price fluctuates with the supply and demand of the market, just like stocks and other days.

Futures and options for the ETF are derivative products based on existing traded funds. Futures represent an agreement in the future to purchase or sell shares of an underlying ETF at an agreed price on or before a specified date. Options, on the other hand, offer the investor the

right to trade the underlying ETF securities at a negotiated price in the future on or before a specified date, but not the obligation.

Derivatives in the ETF market operate the same as an individual equity option or futures contract. These products are typically used to take a speculative bet onthe economy, index, or specific sector with less capital outlay.

In the ETF market, derivatives function is the same as an options for individual stock or a contract for futures. Similar services are commonly used to create a strategic bet with less capital outlay on the economy, index or particular business.

2.5 Option trading strategies

This paper introduces a wide range of commonly used option strategies, categorized by the investor motivation into:

- directional trades
- volatility trades and
- arbitrage strategies

Directional trades are entered into by investors with a definite view of the direction the market is likely to take. *Bullish* traders use strategies that exploit rising market, whilst *bearish* traders expect the market to decline.

Volatility trades are utilize by investors with no view on market direction, but an expectation of fluctuations. Trading strategies are chosen depending on how large the fluctuations are anticipated to be.

Arbitrage trades exploit the price discrepancies between the options and the underlying asset price, or between different strategies.

Without basic knowledge on variety strategies trader assume all the strategies are complex. Instead of that all strategies can be constructed using four basic option types (long call, short call, long put and short put), some in combination with the sale or purchase of the underlying asset.

Strategies using only one type of trade (call or a put) are called *spreads*, whilst those involving both calls and puts are called *combinations*.

Spreads can be further divided into:

- *horizontal spread*, whereby options of the same strike, but different expiry are used
- *vertical spread*, using options of the same expiry, but different strike
- *diagonal spread*, involving options of different strike and expiry.

2.6 Four basic option contracts

Long Call- directional, bullish, suffers from time decay - constructed by buying a call.

A borrower, expecting an interest rate increase, would purchase a call option which would guarantee a fixed rate of borrowing (strike rate + premium) for a future period. Should the rates fall below the strike rate, the option would be abandoned, as the borrowing can be arranged more cheaply directly in the market. Maximum risk: premium

Maximum reward: unlimited

Breakeven: strike + premium

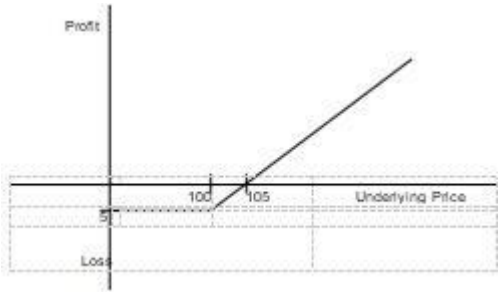

Figure 2.1 long call position