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ANALYSIS OF CALL OPTION APPLICATIONS USING BUTTERFLY AND CONDOR STRATEGY TO RETURN ON INVESTMENT IN OPTION CONTRACT ON INDONESIA STOCK EXCHANGE

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ABSTRACT

This study is conducted to know the best strategy between Butterfly Spread Strategy and Condor Spread Strategy in obtain good return on investment in option contract on Indonesia Stock Exchange within period of 1 month, 2 months, and 3 months contract in period of 2008 – 2010. Black Scholes Option Pricing Model is used to estimate call option price and followed by calculating the return on investment of both strategies from chosen period. Overall, the results of this study show that Butterfly Spread Strategy is better option strategy in terms of return on investment within period of 1 month, 2 months, and 3 months contract in period of 2008 – 2010 then Condor Spread Strategy.

Keywords: call option, butterfly strategy, condor strategy, return on investment, option contract

JEL classification: G11, G13

INTRODUCTION

Option is an official contract which gives the holder the rights to buy/sell an asset or to exchange in the future at a certain date for a certain price. Moreover, assets on options have a certain prices such as the basic price or *spot price* and also *exercise price/strike price*. Maturity of an option contract also determines that option is worth it or not, if the option contract is not executed at the time of the maturity then the option is no longer valued. Option has been known in the scope of capital market since 1975, but in Indonesia only a few companies that have used the option contract. There are 4 companies that used the option contract which are PT. Telkom, Bank BCA, PT. Astra, and PT. Indofood.

In its development options contracts have many options strategies that can be used by investors, including *bull* strategy, *bear* strategy, *strangle* strategy, *straddle* strategy, *condor* strategy, *butterfly* strategy, *box* strategy, and *calendar*s strategy. In this research, the researchers will compare the use of the butterfly spread strategy with calls to the condor spread strategy with calls.

In this study, the researchers have known that the *butterfly* strategy is an option strategy that can provide a hedge function to the investors, and had proven to protect the investor's losses when the index price decreased. Then researchers learned based on theory that there are other strategies that have similar

characteristic of hedge in *butterfly* strategy, the strategy is *condor* strategy. With a background of phenomena or event that has been described, the researchers would like to compare between the uses of both strategies, which one can produce better return on investment. The result of this research is expected to be used as an input for investors in performing option contract.

If we see in previous study, although there has been no research on the use of condor strategy, the results of research with using *butterfly* strategy proved more profitable than using *condor* strategy on option contract. But if we view from the characteristic of the advantages owned by *condor* strategy, investor will get a greater profit. It becomes the reason to see how the comparison of return on investment from both strategies.

Some references mentioned both strategies which are almost the same, whether in terms of making a purchase and selling contract to make investments and in terms of the risk responsibility (Martellini *et al*., 2002). It also mentioned that the condor strategy is a variation of the butterfly strategy. Both strategies have a low risk, but also low benefit. The same advantages of both strategies, for example are having low risk in investing and providing hedging to investors, while the disadvantage for investor is that they have not that big payoff. Because of those several similarities the researchers finds them attractive reason to do research to compare both strategies in an *option contract*.

Moreover these two strategies use a contract on long positions and short calls at the same time where both contracts are very contradictory, it is also considered to be interesting to do research because the strategies are quite extreme strategy (a strategy that is more complicated than other strategies to apply), so the researchers thinks there are more challenges in the preparation of his research.

Butterfly spread with calls strategy actually is executed using four *calls*, with the same period and also the same stock, but it looks like executing three *calls* because the execution done by purchasing one *call* with low *exercise price*, purchasing one *call* with high *exercise price*, and selling two *calls* with mid *exercise price*. While *condor spread with calls strategy* is executed with the same concept using four *calls*, there are differences with *butterfly spread with calls. Condor's* execution is done by purchasing one *call* with low exercise price, selling one *call* with quite and slightly high exercise price, and purchasing one *call* with the most high exercise price. In term of selling both *calls* there are some differences.

In calculation of the option *butterfly* and *condor* strategy that must use the underlying assets and the same time period, it needs to use the "LQ45" index as underlying assets which is researched and with the same period of option contract for one month, two months, and three months during the period 2008 – 2010. So by comparing the use of the butterfly spread strategy with condor spread strategy, researchers can find out which strategy is better in terms of achieving returns that will be used as an alternative for investors to invest in options contracts on the Index LQ 45.
Based on the background that is already stated and on the research title, the point of this research is to compare the strategy in option especially *butterfly spread with calls strategy* and *condor spread with calls strategy* in LQ 45 index to determine which one is the best on period 2008 - 2010

MATERIALS AND METHODS

Derivative is a financial instrument whose the value of transaction comes from the derivative assets that is more basic or commonly called as underlying assets. Hull (2009) stated that derivative can be defined as a financial instrument whose value depends on (or derives from) the values of other, more basic underlying variables.

Assets which underlying the value of derivative may came from various sources, such as stocks, market index, interest rates and so on. Derivatives itself has several instruments that are traded, in example *forward & future contract, swaps,* and the one of them is *option (option contract).* Option is a derivative instrument which has different criteria than the other derivative instruments, the option gives the right (but not the obligation) to swap assets or to sell or buy an underlying asset at a price and time that has been determined (Broadie *et al*., 2007). While, Reilly & Brown (2009) stated that an option contract gives its holder the right but not obligation to conduct a transaction involving an underlying security or commodity at pre-

determined future date and at a predetermined price. There are two types of option in this instrument which are *call option* is the right to buy and *put option* is the right to sell. *Call option* is the right that is given to the owner of a contract to buy the assets in the future with a certain price and time that has been agreed. While the *put option* gives the right to the owner of the contract to sell the assets in the future with price level and time that has been agreed (Bondarenko, 2003). In every *option* transactions there are two parties which involved and it called as buyer and seller. The buyers of option pay a certain amount to the *option* seller; it is called as option price (premium). Option seller receives cash upfront, but has potential of debt for in the future. The advantages and disadvantages of the option seller are inversely to the advantages and disadvantages owned by the option buyer (Buraschi & Jackwerth, 2001).

So the option contract containing several terminologies that must be understood which are 1) *Strike Price / exercise price of call option, a* set price when the contract is executed in the present time that has to be paid by the buyer of the contract when the contract expired; 2) *Exercise of call option,* an execution by paying *strike price* in order to obtain asset; 3) *Expiration date,* A maturity time where an option contract must be executed or otherwise it becomes useless; 4) *Exercise style.* There are two systems in option contract that is called as The *American* option and The *European* option. The differences between those options contract are The *American* option could execute the option contract before it ended or in certain time. Meanwhile, the execution of *European* contract can be done when the contract ends or in maturity time.

The use of call option can be described on the illustration in index (Coval & Tyler, 2001). Let's assume the investor buy *European call options* with *strike price* $90 for buying 100 shares of LQ 45 index. Suppose the current price of index is $70, the expiration date of the options is 6 month, and the price of option is $6. Because the option is European, the investor can exercise only on the expiration date. If the stock price on this date is less than $90, the investor will clearly choose not to exercise. Because it definitely will make the investor suffered losses from the payment of the option price for $600 (came from $6/share x 100 shares). And if the current price in maturity time is more than $90, the investors will use their right to buy the option. Suppose the current price in maturity time is $97. By using their right, investors can buy 100 share of LQ 45 index for $90 / share. So that the profit that gained from investor and directly sell LQ 45 index in market price is about $7 / share exclude the transaction costs. If the investor put the option price it will became $100 (came from [$97 - $90 - $6] x 100 shares)

By seeing the explanation above, it can be defined that the investors who owned the call option has the rights to choose the best way to deal with the option contract. And surely the contract owner will not use their rights if the maturity of stock price is lower than the strike price /exercise price (Driessen & Maenhout, 2007). In this situation commonly called as *out the money* position. Meanwhile, the owner of the contract will use their rights to execute the option contract if the maturity of stock price is bigger than the exercise price. This situation commonly called as *in the money* position. If the maturity of stock price is same as the exercise price, then it can be called that the option contract is on *at the money* position.

The other important thing that must be considered is when using the rights of an option contract towards its option price. Example, when the maturity of LQ45 index price is $95. If investor using their right, they will suffer $100 loss (from [$95 - $90 - $6] x 100 shares). That will be better than if the investor not using their right when they will $600 loss (from $6 x 100 shares).

Figure 1 shows how potentially the investor's net profit or loss in certain of LQ 45 index price on call

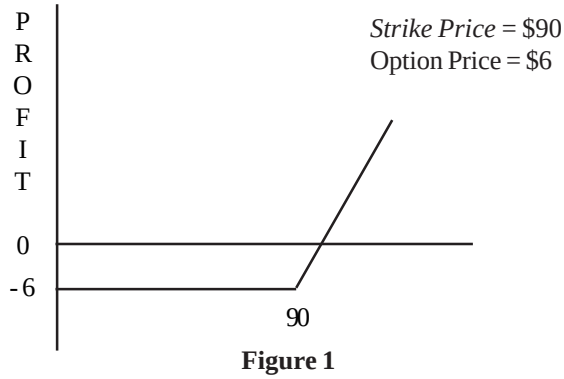

Figure 1
Profit from buying European call option on LQ 45 index
Source**: Hull, John C., 2009:180.**

option at maturity time.

Figure 1 explained about the position where the first time the investor suffered losses because of paying for the option price. But in the future the profit gained from this position is infinite (unlimited). The BEP situation happened when price is in $90, and the profit gained will be increase and increase if the stock price in the future is above $90. And then Figure 2 will shows how potential the variation of profit or loss that investor will be suffered in certain of LQ 45 index price on call option at maturity date for option's writer.

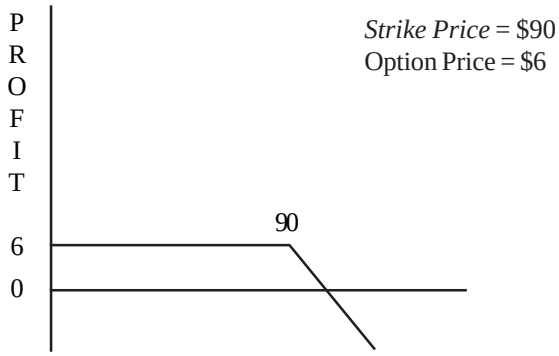

Figure 2
Profit from selling European call option on LQ 45 index
Source: Hull, John C., 2009:18.

Figure 2 explained about the position where the investors gained profit for the option price only by the option's writer (short call option). But in the future the loss that will be suffered by investor is un-finite (unlimited). Thus by explanation from the illustrations above, can be assumed if the X is strike price and S_T is final price at maturity, so the payoff for *European option* is 1) Max (S_T – X, 0) applied to long position in *European call option* and it reflects that the call option will be exercised if $S_T > X$ (*in the money* position) and will not be exercised if $S_T < X$ (*out of money* position) and 2) Min (X - S_T, 0) or – max (S_T – X, 0) applicable to short position in *European call option.*

Hull (2009) mentioned some strategies that can be used in implementing or combining a policy of the option contract. Each strategy has its own characteristic on risk and also the income. According to the description of the limitation problems that has been described previously, this research will use the application of *butterfly spread with calls* strategy and will be compare it with the *condor spread with calls* strategy.

Kolb (2000) stated that butterfly spread strategy is a strategy that used three calls with the same period and also same stock. This strategy is performed by buying one calls with low exercise price, buy one calls with a high exercise price, and selling two calls with a medium exercise price (Han, 2008). *Butterfly strategy* on option contract usually used in situations after the index price moves volatile (moves significantly). After the volatile move of index price usually price will move in sideways position (the movement of stocks not fluctuate). In unfluctuactive price movements, the *Butterfly strategy* can be used because it will gain profit (Martellini *et al*., 2002; Buraschi & Alexei, 2006).

In using this strategy, the contract holders will get something called as hedging, where when the long call is purchased suffered loss, the short call sold will bring profit, vice-versa. But the profit gained by contract holder will not be great. By the characteristic of this strategy that has been described above, *Butterfly spread with calls* strategy will involve the contract to use three calls with different strike price. And it will be described further through an illustration on application of *Butterfly spread with calls* strategy.

Table 1
Butterfly Spread with Calls

Strike price ($)	Call price($)
556065	1075

Source: Hull, John C., (2009:226).

An investor will make an option contract by using *butterfly spread with* calls strategy for a period 6 months, then/so he will buy one call with strike price $ 55 and option price $ 10, buy one call with strike price $ 65 and option price $ 5, and selling two calls with strike price $ 60 and option price $ 7 (Lakonishok *et al*., 2007). So the cost that will be spend to make the strategy is $ 10 + $ 5 – (2 x $ 7) = $ 1.

Condor spread with calls strategy is an option strategy that involves four calls from the same underlying asset and also same expiration time. The execution of this strategy is done by buying one call with

low exercise price, sell one call with slightly high exercise price, sell one call with quite high exercise price, and buying one call with the most high of exercise price (Lakonishok *et al*., 2007). The use of *Condor strategy* is almost the same as *Butterfly strategy*, which is used in a situation after the index price moves volatile (moves significantly). After the volatile moves of index usually will move in sideways position (the movements of stocks do fluctuate). So in the use of *Condor strategy* investors will expect the move of price is less volatile (un-fluctuation). So at that position, when the price falls or rises, investors will continue to have profit as long as the index value will remain on the profit area, or even suffered some loss when the price goes down those losses would not be too great/large (Han, 2008).

From the characteristic of strategy that has been explained, *Condor spread with calls* strategy involve the contract to use four different calls with different strike price. And it will be describe further through an illustration on application of *Condor spread with call* strategy (HSBC InvestDirect Securities, 2010).

Table 2
Condor Spread with Calls

Strike price ($)	Call price($)
Long 1 call 90	10
Short 1 call 95	7
Short 1 call 100	4
Long 1 call 105	2

Source: Kolb, Robert W (2000, p.330).

Assuming that an investor will make an option contract by using *Condor spread with call* strategy, so he will buy one call with strike price $ 90 and option price $ 10, sell one call with strike price $ 95 and option price $ 7. And also sell one call with strike price $100 and option price $ 4, and buy one call with strike price $ 105 and option price $ 2. Then the cost that will be spend and also becomes maximum loss is $ 1 (came from ($ 7 + $ 4 – [$ 10 + $ 2]).

Kolb & Overdahl (2003) stated that there are several factors will affect option price. The factors are current index, expiration time/expiration date, risk-free interest rate, and volatility of the stock price. Current index, payoff from call option can be defined as a difference between the stock price on expiration date and strike price (exercsice price). So the value of call option will be more valueable with the increase of stock price (current price) otherwise the value of call option becomes less valueable when the stock price is falling. Expiration time/expiration date, an addition to the value of call option will not be always equal to the addition or the increasing in the period of maturity time. It happens because during any period the holder of *European call option contract* will be only executed the option at maturity time.

The risk-free interest rate affects the price of an option. The risk-free interest rate usually obtained from the value of SBI (Sertifikat Bank Indonesia). By the increasing of interest rate in economy growth, the expected growth of the stock price tends to increase. Meanwhile the present value of any future cahs flows that received by the option holders will decrease. For the *call options* holders, the increasing of stock price will increase the value of *call option*, while the decreasing of present value of any future value cash flows will decrease the value of *call option*. However, the first effect dominates the second effect, thus increasing the risk-free interest rate will increase the value of call option. It should be emphasized that the statement above is based on the assumption that the others factors did not change. Because in practice, sometimes when the risk-free interest rate increases, then the stock price will tend to decline/decrease. Volatility of index price is a size of how uncertainties about the movement of index price in future. Volatility can also be interpreted as the standard deviation of the return value of the stock for a year that has been through the process of continuous compounding. With increasing of volatility, the possibility of index price will rise or fall will increase. So the *call option* price will tends to increase as well as the increase of volatility.

The formula to calculate the value of stock options, the model or formula is called as *Black-Scholes option pricing model*, was found through a process of mathematics reduction which is very complex with the underlying assumption which is will be described below, Hull (2009); 1) behavior of stock price follows a lognormal distribution μ and σ constant, 2) no tax expense and transaction costs, 3) during the age of option, 4) the index does not distribute dividens, 5) there is no chance to do arbitrage free-risk, 6) the activity of

buying and selling of shares takes place continuously, 7) the investor can lend or borrow money at the same risk-free interest rate, and 8) constant risk-free interest rate (r).

Black-Scholes Model produces a formula to evaluate a *call option* as below, Hull (2009):

$$c = S_0 N(d1) - X^{e-rT} N(d_2)$$

$$d_1 = \frac{1n(S_0/X) + (r + \sigma^2/2)T}{\sigma\sqrt{T}}$$

$$d_2 = \frac{1n(S_0/X) + (r + \sigma^2/2)T}{\sigma\sqrt{T}} = d1 - \sigma\sqrt{T}$$

Where:

S_0 = Stock price/current price
X = Strike price/exercise price
T = Maturity time
r = Risk-free interest rate
σ = *Volatility* of stock price
c = Value of *European call option*
$N(x)$ = Cumulative probability distribution to a variable which normally disributed with standard deviation = 1

It should be understood that r is the nominal of interest rate; the value of r must be greater than zero (r > 0).

Volatility estimation performed to determine the spread of value or the uncertainty of price on stock or index. There are two approaches to estimate the volatility which are *Historical volatility* and *estimated volatility*. *Historical* volatility is obtained from purely historical data, while the *estimated* volatility is obtained by simple linear regression model, so can obtain more accurate value of volatility.

In this research the estimation that will be used is using the *historical* estimates of volatility, based on the assumptions that the volatility which occurred in the past will continue to apply in the future. So in performing historical volatility required a sample of the index price movements at a certain period. Then the calculation is by calculating the rate of return from index which will be seen its movement, and then from the return value of the index is performed the conversion process become *continuously compounded*, after that the result of the conversions will be calculate the value of standard deviation.

The rate of return on the index data can be daily, weekly, monthly or a certain time desired. For a daily rate of return, then what will be obtained is daily standard deviation. While the calculation of *Black-Scholes model* takes the annual standard deviation, from the daily standard deviation that has been obtained we performed the calculation process by doing multiplication of variance index with the number of day on index trading in a year, the number of day on Index trading in a year is approximately 252 days.

Another way to obtain the annual standard deviation from the daily standard deviation is by doing multiplication index standard deviation with √252. While in monthly rate of return, to obtain the required annual standard deviation in the *Black-Scholes model*, it is necessary to multiply variance of the index with number of trading months in a year, which is 12 months.

H1: There is a difference between performance of call option application from butterfly and condor strategy to return on investment in option contract.

Data population is secondary data. The required data depends on the object and on the identification problem that has been explained previously. Then, several samples are found from several sources based on the following several criteria; 1) stock price of LQ 45 issued between the year 2008 to 2010, 2) volatility of LQ 45 between the year 2007 to 209, and 3) data SBI issued between the year 2008 to 2010

Based on the tittle of the research, "Comparative Analysis of Call Option Applications Using Butterfly Strategy and Condor Strategy to Return on Investment in Option Contract of LQ 45 Period 2008 – 2010", the operational variable and the measurement will be described below on Table 3.

The data that used to be analyzed in this research is quantitative data with processing by calculation approach model, formula and appropriate mathematical function.

The calculation of call option is to find the value of profit or loss which will be obtained from a *call contract*. In *Long call*, a contract maker pays an *option price* (premium) for buying the right of *option* in the future. Profit or loss obtained from the calculation of price in maturity minus with price that we agreed when make contract, and the minus the option price (premium).the profit gained will goes unfinite, while

Table 3
Operational Variable and Measurements Scale

Variable	Definition of Variable	Indicators	Measurements	Scale
Call option price	The option price (premium) to obtain the right of an option	Option price (call premium)	Rupiah	Ratio
Current price	Index price of LQ 45 when when a contract was made	Index price when make a contract	Rupiah	Ratio
Strike price	Index price of LQ 45 when maturity time	Index price of maturity time	Rupiah	Ratio
Index volatility	Measurement of uncertainty index price movements in future	Standard deviation based on historical data or the level of index volatility	Percentage	Ratio
Period of the option	The maturity time that has been agreed when make a contract	1, 2, and 3 months	Time limit	Ratio
Free risk interest rate	The level of interest measured by using SBI	Sertifikat Bank Indonesia (SBI)	Percentage	Ratio

the maximum loss suffered only of option price (premium).

$$\Pi = Sr - (X + c)$$

Description:
Π = Profit or Loss
Sr = Price of maturity time
X = Price agreed
C = Option price (call premium)

Meanwhile on *Short call*, there is an obligation to sell *option* in future. Profit or loss came from option price (premium) plus the result of price in maturity minus price agreed on contract. In the position as the seller will produce maximum profit just of option price (premium), while the loss suffered will be on unfinite number.

$$\Pi = c + (X - Sr)$$

Description
Π = Profit or Loss
Sr = Price of maturity time
X = Price agreed
C = Option price (call premium)

RESULT AND DISCUSSION

This study used 31 (thirty one) samples that consist of value movements from LQ45 index for 31 months starting from January 2008 until July 2010. The value used as the data of index price is the closing price of stock in the end of month. Meanwhile the sample points are determined from index value in first date of monthly index transactions in every month. Table 4 will shows data movements of LQ45 index in 3 years.

The risk-free interest rate includes in *Black-Scholes Model* formula to calculate the value of *Call Option*. The level of risk free rate that will be use is *"Sertifikat Bank Indonesia"* (SBI) for period of 1, 2 and 3 months in year 2008 – 2010. The risk-free interest rate affects the price of an option, where increase of risk-free rate usually makes *call option* value increased.

Historical volatility is the history of probability movements of index in previous year on the current year of research. The value of *historical volatility* is standard deviation of LQ45's value. Table 5 below will show the value of *historical volatility* from LQ45 index in 2007 - 2009.

Table 5
Historical volatility of LQ45 index in 2007 -2009

Year	Standard Deviation	Volatility
2007	0.0169	26.774%
2008	0.0296	47.048%
2009	0.0171	27.094%

Source: Research data.

Calculating *call option* using *butterfly strategy* needs three values of exercise price and three different value of *call option price (premi)*. Those three call option price come from three different, with assumption that investor expects maximum 5% increase from the index price agreed, those three different assumptions are 1) Lowest Exercise Price (X_1), 2) Highest Exercise Price (X_3) Middle Exercise Price (X_2), and 3) Lowest Exercise Price (X_1).

The lowest exercise price was applied with assumption that future index price will be same with the current index price (So = X). The application of this assumption can be found from the example of index

Table 4
LQ45 Current Index Movements 2008 – 2010

No.	Date	Current index	No.	Date	Current index
1	02/01/2008	596.554	17	01/05/2009	342.783
2	01/02/2008	570.511	18	01/06/2009	391.064
3	03/03/2008	573.347	19	01/07/2009	400.125
4	01/04/2008	511.987	20	03/08/2009	458.634
5	02/05/2008	503.807	21	01/09/2009	452.726
6	01/07/2008	513.062	22	01/10/2009	486.452
7	01/08/2008	503.936	23	02/11/2009	465.719
8	01/09/2008	467.831	24	01/12/2009	484.828
9	01/09/2008	449.362	25	04/01/2010	507.914
10	06/10/2008	326.970	26	01/02/2010	504.938
11	03/11/2008	262.084	27	01/03/2010	497.195
12	01/12/2008	237.031	28	01/04/2010	550.38
13	05/01/2009	290.869	29	03/05/2010	572.532
14	02/02/2009	256.935	30	01/06/2010	527.276
15	02/03/2009	242.475	31	01/07/2010	558.358
16	01/04/2009	289.417			

Source: www.duniainvestasi.com

price in January 2008, where the index price of LQ45 in January was 596.554. So the value of the lowest exercise price (X_1) will be equal with current index price (So) which was 596.554. That value will be used as the exercise price to make *long call* contract.

The highest exercise price was applied with assumption that future index price will increase up to 5% from the current index price. For the example the index price of LQ45 in January 2008 was 596.554. So the highest exercise price (X_3) was 596.554 x [1 + 5%] = 626.382. That value will be use as the exercise price to make *long call* contract.

Middle exercise price (X_2) was applied with the assumption that future index price will placed between the higest and the lowest exercise price. The application of this assumption can be found from the example of LQ45 index price in January (596.554). The lowest exercise price(X_1) was 596.554 and the highest (X_3) was 626.382, so middle exercise price (X_2) was (596.554 + 626.382) x 0,5 = 611.468. That value will be use as the exercise price to make *short call* contract.

The value of those exercise prices will define the call option price which has to be paid by the investors. *Exercise price* and *call option* have negative relationship where increase of exercise price will decrease the call option price and vice versa. But in condition that other variables are constant. After defining the strike price the researchers continues to calculate the call option price using *Black Scholes Option Price Model*, and the pay off calculation of long/short call (see appendix). From the pay off the investor will decide wheter execute the contract or not. There are several conditions from investor that decide to execute the contract, which are for long call positions and for short call positions. For long call positions, the investor will execute the contract if the number of pay off is greater than the call option price and the investor will not execute if the number of pay off is lower than the call option price. For short call positions, the investor will *execute* the contract if the number of pay off is lower than the call option price and the investor will *not execute* if the number of pay off is greater than the call option price.

This is the result from the return on investment (ROI) by using *butterfly strategy* which leads the investor to make the execution or not. The pay off will influence the investor to execute the contract or not. The following is the explanation from each year within period of 1 month, 2 months, and 3 months.

Table 6 describes the return on investment in call option contract using *butterfly strategy* on LQ45 index within one month period in 2008 - 2010 by considering current index price and call option price.

Table 6
ROI for One Month Contract Option Using Butterfly Strategy on LQ45 in 2008-2010

Year	Profit/Loss
2008	-15.311
2009	6.459
2010	-5.590
Total	-14.442

Source: Research data.

The result of return on investment obtained from contract within one month period from 2008 till 2010 is -14.442 index points. It shows that the option contract in LQ45 index within one month period using *Butterfly Spread Strategy with Calls* in 2008 – 2010 made the investor suffer loss of 14.442 index points.

Table 7 describes the return on investment in call option contract using *butterfly strategy* on LQ45 index within two months period in 2008 - 2010 by considering current index price and call option price.

Table 7
ROI for Two Months Contract Option Using Butterfly Strategy on LQ45 in 2008-2010

Year	Profit/Loss
2008	-10.719
2009	8.147
2010	-7.931
Total	-10.502

Source: Research data.

The result of return on investment obtained from contract within two months period from 2008 till 2010 is -10.502 index points. It shows that the option contract in LQ45 index within one month period by using *But-*

terfly Spread Strategy with Calls in 2008 – 2010 made the investor experience loss of 10.502 index points.

Table 8 describes the return on investment in call option contract using *butterfly strategy* on LQ45 index within three months period in 2008 – 2010 by considering current index price and call option price.

Table 8
ROI for Three Months Contract Option Using Butterfly Strategy on LQ45 in 2008-2010

Year	Profit/Loss
2008	-4.298
2009	17.241
2010	15.216
Total	28.159

Source: Research data.

The result of return on investment obtained from contract within three months period from 2008 till 2010 is 28.159 index points. It shows that the option contract in LQ45 index within one month period by using *Butterfly Spread Strategy with Calls* in 2008 – 2010 made the investor gain profit of 28.159 index points.

Calculating *call option* using *condor strategy* needs four values of exercise price and four different value of *call option price (premi)*. Those four call option price come from four exercises price which are different from the assumption that investor expects the increasing of index price is 5% from the index price agreed, those four different assumptions are:

The lowest exercise price was applied with assumption that in future the index price will be same with the current index price (So = X). The application of this assumption can be found from the example of index price in January 2008, where the index price of LQ45 in January was 596.554. So the value of lowest exercise price (X_1) will be equal with current index price (So) which is 596.554. That value will be used as the exercise price to make *long call* contract.

The slightly high exercise price was applied with assumption that in future the index price will increase up to 1,25% from the current index price. For the example the index price of LQ45 in January 2008 was 596.554. So the slightly high exercise price (X_2) is 596.554 x [1 + 1,25%] = 604.011. That value will be used as the exercise price to make *short call* contract.

The quite high exercise price was applied with assumption that in future the index price will increase up to 3,75% from the current index price. For the example the index price of LQ45 in January 2008 was 596.554. So the slightly high exercise price (X_3) is 596.554 x [1 + 3,75%] = 618.925. That value will be used as the exercise price to make *short call* contract.

The highest exercise price was applied with assumption that in future the index price will increase up to 5% from the current index price. For the example the index price of LQ45 in January 2008 was 596.554. So the highest exercise price (X_3) is 596.554 x [1 + 5%] = 626.382. That value will be used as the exercise price to make *long call* contract.

The value of those exercise prices will define the call option price has to be paid by the investors. Different with *Butterfly, Condor Strategy* is an option strategy that used four call option contracts. The steps are same and already explained in *butterfly strategy*, next table will show the profit/loss gained from the investor by executing the contract or not. In appendix show the call option price and the pay off that influence the investor make the execution or not.

This is the result from the return on investment (ROI) by using *condor strategy* which leads the investor to make the execution or not. The pay off (see appendix) will influence the investor to execute the contract or not. The following is the explanation from each year within period of 1 month, 2 months, and 3 months. Table 9 describes the return on investment in call option contract using *condor strategy* on LQ45 index within one month period in 2008 - 2010 by considering current index price and call option price.

Table 9
ROI for One Month Contract Option Using Condor Strategy on LQ45 in 2008-2010

Year	Profit/Loss
2008	-31.783
2009	4.273
2010	-2.835
Total	-30.345

Source: Research data**.**

The result of return on investment obtained from contract within one month period from 2008 till 2010 is -30.345 index points. It shows that the option contract in LQ45 index within one month period by using *Condor Spread Strategy with Calls* in 2008 – 2010 made the investor experience loss of 30.345 index points.

Table 10 describes the return on investment in call option contract using *condor strategy* on LQ45 index within two months period in 2008 - 2010 by considering current index price and call option price.

Table 10
ROI for Two Months Contract Option Using Condor Strategy on LQ45 in 2008-2010

Year	Profit/Loss
2008	-7.729
2009	5.571
2010	-5.943
Total	-8.101

Source: Research data**.**

The result of return on investment obtained from contract within one month period from 2008 till 2010 is -8.101 index points. It shows that the option contract in LQ45 index within two months period by using *Condor Spread Strategy with Calls* in 2008 – 2010 made the investor experienced loss of 8.101 index points.

Table 11 describes the return on investment in call option contract using *condor strategy* on LQ45 index within three months period in 2008 – 2010 by considering current index price and call option price.

Table 11
ROI for Three Months Contract Option Using Condor Strategy on LQ45 in 2008-2010

Year	Profit/Loss
2008	-0.894
2009	11.220
2010	9.166
Total	19.492

Source: Research data**.**

The result of return on investment was obtained from contract within one month period from 2008 till 2010 is 19.492 index points. It shows that the option contract in LQ45 index within three months period by using *Condor Spread Strategy with Calls* in 2008 – 2010 made the investor gain profit for 19.492 index points.

CONCLUSION AND RECOMENDATION

This research focused on calculating ROI in LQ45 index by using two strategies *option contract* which were *Butterfly Spread with Calls Strategy* and *Condor Spread with Call Strategy*. This chapter will give some conclusions and recommendations based on the previous analysis.

Conclusion

The return on investment in option contract on LQ45 index within one, two, and three months in 2008 – 2010 by using *Butterfly Spread with Call Strategy* caused the investor loss for 14.442 in one month contract, loss for 10.512 in two months contract and profit for 28.159 in three months contract. The return on investment in option contract on LQ45 index within one, two, and three months in 2008 – 2010 by using *Condor Spread with Call Strategy* caused the investor loss for 30.345 in one month contract, loss for 8.101 in two months contract and profit for 19.492 in three months contract. Between *Butterfly Spread with Call Strategy* and *Condor Spread with Calls Strategy* there is a difference performance in terms gaining the return on investment (ROI). The best strategy based on the return on investment of option contract in LQ 45 2008 – 2010 was *Butterfly Spread with Call Strategy*.

Recomendation

If the investor is willing to invest in any other index with the same increasing of index value, where the low *exercise price* and high *exercise price* use the same value for both strategies, then the investor will be better using *Butterfly Spread with Call Strategy.* Butterfly Spread with Call Strategy and Condor Spread with Call Strategy are better to use when the condition of index movements is unfluctuactive (the movements is not too extreme), whether the condition of index itself is strong or weak. *Butterfly Spread with Call Strategy*

is better than *Condor Spread with Call Strategy* if the investor wants to invest option contract in *long* and *short* at the same time, because investing two *short calls* with the same exercise price will give advantage than investing two *short calls* with different exercise price. For further researchers it is possible to compare other application of strategy using different strategy, for example using *box strategy, bear and bull strategy* or the application of *ratio strategy.* And perhaps using different volatility approach by using applied *volatility.* Using another option type from this research by describing the application of *put option* using *Butterfly Strategy* and *Condor Strategy*.

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