Option Strategies:

A good investment or a waste of money?

by

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Introduction:

Since the 1970s the number of options traded on stock exchanges all over the world has massively increased. Options offer stock traders a major opportunity for hedging purposes involving the risk they bear when they are trading in stocks or other commodities. In a number of situations large returns can be achieved with the use of options. Options can be used in strategies combined with holding stocks and there is the possibility to only trade in options. This paper focuses on option strategies without stocks involved. This paper purely focuses on the return of option strategies, there will be no attention paid to the riskiness of option strategies. The option strategies considered will be long calls, long puts, long straddles and long strangles. In this paper European options will be used. The combination of a long strangle and a European option has never been studied before. This paper studies option strategies in the period 1998-2005 and considers three different time frames, the period of the internet boom 1998-1999, the period after the burst of the internet bubble, 2000-2002 and the period of the recovery of the economy, 2003-2005. The aim of this paper is to test whether the returns of a number of different option strategies will be higher than the returns on the underlying stocks and eventually to find out if option strategies are a better way to make profits on the stock than trading in stocks. The main question of this study is: Is it possible to get higher returns with option strategies than with investing in stocks?

In the first chapter the explanation of an option will be given and some different kinds of possible option strategies will be clarified. In chapter 2 the Black-Scholes model will be discussed, a model developed to calculate the option prices. This model will be used in this paper to calculate the option prices. In chapter 3 a couple of previous studies involved in option strategies will be discussed. Special attention will be given to the results of similar tests than the test examined in this paper. In chapter 4 the actual test will be performed and the way of testing will be clarified and then in chapter 5 the final conclusion will be presented and some guidelines for further research will be provided.

Chapter 1: Options and option strategies

Options give a person a right to buy or sell a certain asset. A call option is a contract that gives one the right, not the obligation, to buy an underlying asset at a predetermined price; a put option is a contract that gives one the right, not the obligation, to sell an underlying asset at a predetermined price. A stock option is an option to buy or sell a stock. In this paper only stock options will be considered. Therefore, when options will be mentioned in this paper, this will involve stock options.

Options can be exercised within a limited amount of time. The date an option expires is called the expiration date or maturity date. An option can be exercised at any time before or on the date of maturity. However, there is a difference between American and European options. American options can be exercised at any time before or on the expiration date. European options can only be exercised on the maturity date. In this paper when an example will be discussed this example will discuss European options. Options have a strike price or an exercise price, which is a predetermined price of the underlying asset. If, for a call option, the price of the underlying asset equals the strike price the option is at-the-money. If the price of the underlying asset is higher than the exercise price the option is in-the-money and if the price of the underlying asset is lower than the strike price the option is out-of-the-money. A put option is in-the-money when the price of the underlying stock is below the exercise price and is out-of-the-money when the price of the underlying asset lies above the exercise price.

Options can either be bought or sold. Buying a call option is also referred as taking a long position in the option where selling an option is referred as writing an option or taking a short position in the option.

When an investor buys an option the price he pays for the option is called the option premium. If the option lays out-of-the-money he will not exercise his option and loose his premium. If the option lays in-the-money at expiration date he will exercise his option. The profit at the expiration date will equal the price of the underlying stock at maturity date minus the strike price. To calculate the total result of buying the option the option premium has to be subtracted from the profit on the expiration date.

When an investor takes a short position in an option he will immediately receive the option premium. If the price of the underlying asset is out-of-the-money at expiration

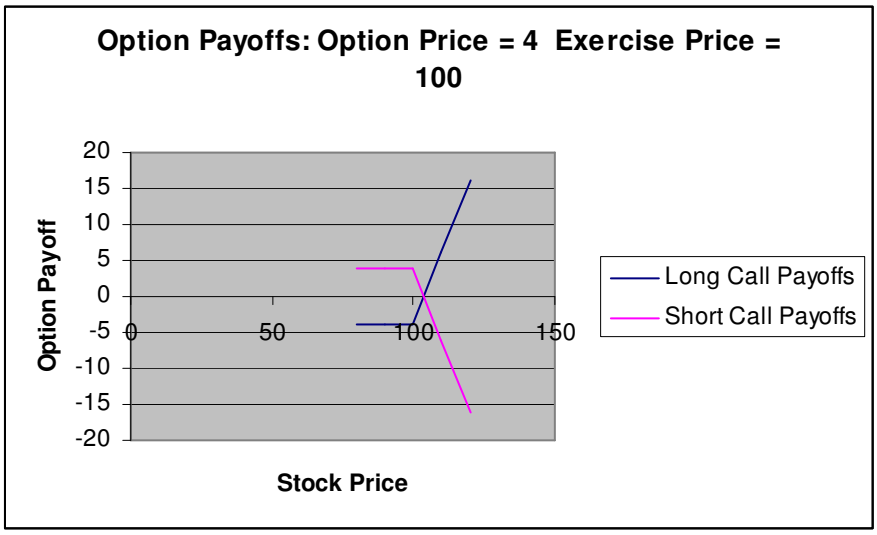
date the option will not be exercised. The total gain for the investor who sold the option will equal the option premium. If the price of the underlying stock is in-the-money at maturity date the option will be exercised and the investor will bear a loss which equals the difference between the strike price and the price of the underlying asset at maturity. The total result will be the option premium minus the amount of money lost at the date of maturity.

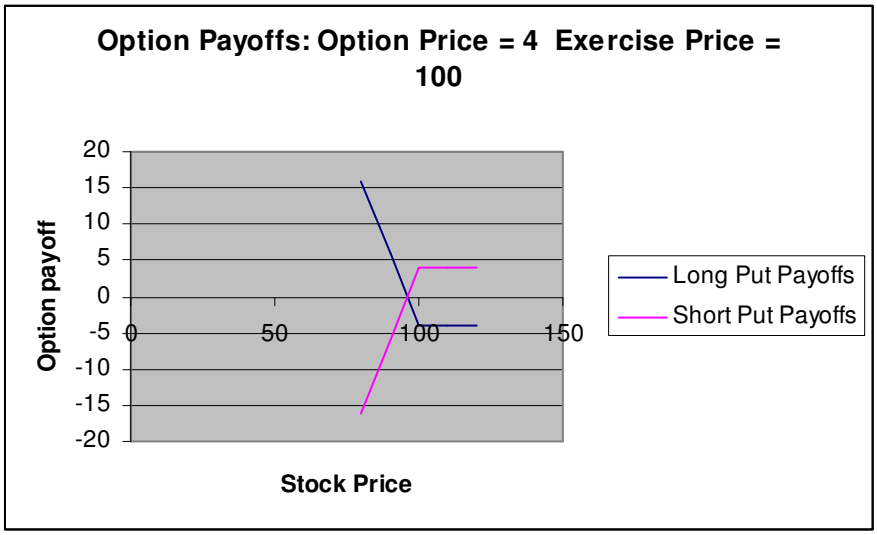
These results imply that the maximum loss on buying a call is the option premium where the maximum profit of buying a call is unlimited because as the price of the underlying stock raises the profit of the call rises. Theoretically the price of the underlying stock can rise until infinity.

The maximum profit of selling a call option equals the option premium. The maximum loss of taking a short position in a call is unlimited. Obviously, these payoffs are the opposite of buying a call option.

The maximum profit of buying a put option equals the strike price of the underlying stock minus the option premium. When the price of the underlying asset drops below the exercise price the put option will be exercised. Because the price of the underlying asset can not fall below zero the maximum profit will equal the exercise price of the option minus the option premium. The maximum loss of buying a put option equals the option premium.

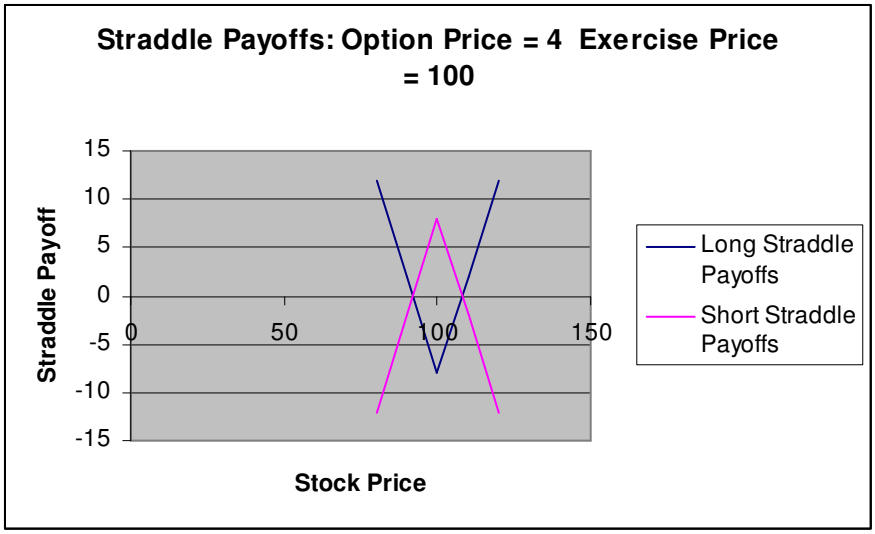
The maximum profit of selling a put option equals the option premium and the maximum loss of selling a put option equals the strike price of the put option minus the option premium. These payoffs are the opposite of taking a long position in a put option.





Buying and selling single call or put options are the most simplified option strategies. There are multiple option strategies available which are a little or even a lot more complicated. At this point a number of those strategies will be discussed.

A long straddle is simultaneously buying a call and a put option with the same exercise price. A short straddle is, of course, simultaneously selling a call and a put option with the same exercise price. A long straddle provides profits when either the call or the put fall deep in-the-money where the profit of exercising either the call or the put is higher than the option premium of the call plus the option premium of the put option. The positive payoffs of a short straddle exist out of the option premium on the call and the put option. A short straddle is profitable when the option premiums exceed the difference between the strike price and the stock price at maturity. A long straddle is useful when the underlying asset is expected to be volatile where a short straddle is useful when the underlying asset is expected to be stable.



A long strangle is simultaneously buying a call and a put option with different exercise prices. Usually, the put option has a lower strike price than the call option. A short strangle is simultaneously selling a call and a put option with different strike prices. Here the put option has a higher strike price than the call option. A long strangle provides a profit when the profit of exercising either the call or the put exceeds the option premium of the call plus the option premium of the put. The maximum loss, however, occurs not in a single point but in the price range where the stock price at maturity lies between the strike price of the put and the strike price of the call. A short strangle is profitable when the received option premium of the call and the put exceed the difference between either the strike price of the call and the stock price at maturity or the strike price of the put and the stock price at maturity. The maximum profit occurs when the stock price at expiration lies between the strike price of the call and the strike price of the put.

A spread is an option strategy where the investor takes a long and a short position in either a call or a put option but both positions contain different exercise prices or maturity dates. There is a number of different spreads available. A vertical spread has different strike prices for each position. A bearish vertical call spread exists out of a long call position and a short call position. The long position has a higher strike price and therefore this strategy is profitable when the stock price falls. A bullish vertical call spread has a long call position with a lower strike price than the short call position. This strategy delivers profit when the underlying stock price goes up. A bearish vertical put spread contains a long put and a short put position. The long put has a

higher exercise price than the short put. This strategy is profitable when the stock price falls. A bullish vertical put spread exists out of a long put position with a lower strike price than the short put position and delivers profit when the underlying stock price goes up. A calendar spread is a strategy that contains a long and a short position in either a call or a put position with the same strike prices but with different expiration dates. A diagonal spread is taking a long and a short position in either a call or a put with different strike prices and different expiration dates.

An investor buys or sells his options at a broker. A broker is a person who trades for the investor on an exchange because the broker has direct access to the exchange. A broker can be a large back or a discounter with lower transaction costs. If the investor makes a loss on his positions he might not be able to pay the broker back. Therefore the investor has to open a margin account at his broker. With the money on the margin account the broker can exercise the orders the investor has placed without worrying if the investor is able to come up with the money. If the amount of money on the margin account reaches a low level the broker can ask the investor to make an additional deposit on his margin account. This is referred to as a margin call.

Chapter 2: Option pricing

There is an enormous amount of options available at multiple stock markets all over the world. However, it is not always clear that these options are correctly priced. To determine if an option carries the right price Fisher Black and Myron Scholes developed in 1973 an option pricing model, known as the Black-Scholes option pricing model. This model is the most widely used and the best model available to determine if an option is correctly priced.

The formula for the Black-Scholes model is:

$$C(S,T) = S\Phi(d_1) - Ke^{-rT}\Phi(d_2)$$

Where

$$d_1 = \frac{\ln(S/K) + (r + \sigma^2/2)T}{\sigma\sqrt{T}}$$
$$d_2 = \frac{\ln(S/K) + (r - \sigma^2/2)T}{\sigma\sqrt{T}} = d_1 - \sigma\sqrt{T}.$$

C = price of a call

S = current stock price

K = strike price

r = constant risk-free interest rate

T = time to maturity in years

σ = stock price volatility

Φ = standard normal cumulative distribution

For a put option the Black-Scholes formula is:

$$P(S,T) = Ke^{-rT}\Phi(-d_2) - S\Phi(-d_1).$$

P = price of a put

Despite its heavy usage the Black-Scholes model has a number of limitations. Black and Scholes assumed a number of "ideal conditions". These are:

1) Interest rate is constant through time
2) The variance rate of return on the stock is constant

3) The stock pays no dividends
4) The model assumes the usage of European options
5) No transaction costs

Despite these limitations the Black-Scholes model is very useful and I will use in testing my own dataset. However, I will adjust the data to the limitations of the Black-Scholes model. This implies that in the test European options will be used, there will be a constant interest rate and a constant variance rate of returns and dividends and transaction costs will not be taken into consideration.

Chapter 3: Literature review

A lot of research on this topic has been conducted before and different results have been presented. Below a number of different studies will be discussed and their results, especially about option returns, will be summarized.

Merton, Scholes and Gladstein wrote in 1978 one of the first papers about option strategies. They wanted to show how investors could benefit from the use of option strategies, which at that time became massively available. Their purpose was to show the return characteristics of two different option strategies, a fully covered writing strategy and a buying strategy combining the purchase of options and riskless commercial paper, and to demonstrate how option strategies can change the risk-return patterns of the underlying stocks. A fully covered writing strategy includes holding a stock plus writing a call option. The second strategy includes investing 10 % of the portfolio in call options on the underlying stock and 90 % in riskless commercial paper In their paper they simulated these two option strategies for the period between July 1963 and December 1975. In this paper the writers used two different stock samples, the stocks listed in the Dow Jones Industrial Average 30 in the sample period and a sample of 136 U.S. stocks on which options were available in December 1975. The Dow Jones Industrial Average 30 provides a good estimate for the average market performance during the sample period, while the 136-stock sample outperformed the market during the sample period. In order to calculate the option prices the Merton, Scholes and Gladstein used the Black-Scholes formula. Furthermore they assumed a holding period of their options for six months, leading to 25 6-months periods from July 1963 until December 1975, each strategy contains 100 options, full reinvestment of the dividends and that the options only would be exercised at maturity date. In the sample four different exercise prices were used, 0.9, 1.0, 1.1 and 1.2 times the underlying stock price. The return on the covered call strategy is measured by this formula:

$$ROS = [V-I]/I$$
$$I = 100S - P$$
$$V = 100(d + S - Max[0, S-E])$$

where,

ROS = Return on Strategy
I = Initial investment
V = Value of the fully covered position at expiration date
S = Share price
P = option Premium
E = Exercise Price
d = dividend

Their strategy results in a maximum return for each exercise price. The maximum return is higher when the exercise price is higher but with a lower exercise price there is a higher probability of exercising the option. Holding single stocks does not provide a maximum return but there is a larger interval where a loss is incurred. In this strategy the lowest exercise price provides the least volatility and the lowest return, the highest exercise price provides the largest return and the highest volatility. However, a simple stock strategy has a higher return but also a higher volatility than any of these four strategies. Both samples provide these conclusions.
With their buying strategy also the same four exercise prices are being used. Their buying strategy consists out of 10 % invested in the call option on the underlying stock and 90 % in prime commercial paper with a semiannual yield of 3.3 %. Furthermore, the same assumptions as in the covered call strategy stand. Within this strategy every exercise price provides a maximum loss. The profits with this strategy are unlimited and profits increase as the exercise price increases. The maximum loss is the same for each exercise price, but a strategy with a lower exercise price already is profitable with a lower underlying stock price. Investing in single stocks does not provide a maximum loss, is profitable with a lower stock price than with any of the four option strategies but has lower profits with very high stock prices than the strategies with an exercise price of 1.1 or 1.2 times the stock price. Overall, an increase of the exercise price leads to an increase of the return and the volatility. Both samples support these results. A portfolio of stocks can lead to higher or lower returns and volatilities than the buying strategies. Both samples are not conclusive about this. The writers conclude from the following results that the covered call strategy will do best when the market is stable. Furthermore, they conclude that the buying strategy will do best when the market is very volatile. They do not give an answer to the

question if options strategies deliver higher returns than stocks; however, this was not the purpose of their paper.

Coval and Shumway investigated in 2001 returns on calls, puts and straddles. Coval and Shumway conducted tests with options in order to measure the returns of taking position with different risks. In order to calculate the weekly returns on European options they used data from the S&P 500 from January 1990 until October 1995. Coval and Shumway also looked at the daily returns on American options on the S&P 100 from January 1986 until December 1995. According to asset-pricing theories call option returns should exceed the returns of the underlying indices. Put option returns should be below the risk-free rate. In their immediate findings Coval and Shumway report that the returns on call options are about two percent higher per week on average than the underlying index, returns on put options are significantly below the risk-free rate and returns of call and put options are increasing with the strike price. Straddles offer returns from 0.5% to 3% below the returns of the underlying index. Further results show that average weekly European call option returns lay between 1 and 4.5% per week, average weekly European put option returns are overall negative, between 5 and 15%, and average weekly European straddle returns lay between -2.5 and -4.5%. Average daily American call option returns are between 0.5 and 1%, average daily American put option returns lay between -2.5 and -1% and average daily American straddle returns are between -1 and -0.25%.

Isakov and Morard compared in 2001 the returns of covered call strategies with stock returns. The purpose of this paper was to investigate if the covered call strategy outperforms the taking a long position in stocks. They used a sample of 11 stocks listed on the Swiss Market Index in the period from July 1989 until December 1996. In their research Isakov and Morard used American options and use time periods of 1 month and therefore they use in this paper monthly returns. In this paper the options out-of-the-money as far as possible are used.
They calculated the stock returns by adding the dividend to the stock price at period 1, then subtracting the stock price at period 0 and dividing this number by the stock price at period 0. The covered call returns are calculated in two different ways. If the option is exercised and if the option will not be exercised and matures. If the option is exercised the return is calculated by adding the dividend and the call price to the

exercise price, then subtracting the stock price at period 0 and then dividing this number by stock price at period 0 minus the call price. If the option will not be exercised the return is calculated by adding the dividend and the call price to the stock price at period 1, then subtracting the stock price at period 0 and finally this number will be divided by the stock price at period 0 minus the call price.
The results show that covered calls have lower risks than stocks but the returns are more likely equal. These results include the presence of transaction costs. Isakov and Morard also find that covered call strategies outperform equally-weighted portfolios and stock market indices.

Santa-Clara and Saretto investigated in 2004 the risk and return of option strategies. They used data from January 1985 to December 2002 on option listed on the S&P 500 and used a lot of different strategies, involving naked and covered calls and puts, straddles, strangles and calendar spreads, with different expiration dates and exercise prices. They use three different exercise prices, at-the-money, 5 % out-of-the-money and 10 % out-of-the-money. Two different terms are used for maturity, an option is near maturity when it is about 45 days to expiration, an option is far from maturity when it is about 180 days to expiration. The option prices used in this paper are the actual option prices in the investigated period. In this research paper American options are being used. Their strategy is to hold an option for one month and then sell it on the market; they will not use options which will expire within a month. If an option will lay in-the-money the option is sold and the proceeds will be invested into risk-free assets. There will be no initial investment; the amount of money needed to purchase the options will be borrowed at the risk-free rate. They calculate the monthly returns by subtracting the amount of money paid for the options from the amount of money received after one month for selling the options or the risk-free assets, dividing this by the money paid for purchasing the options and from this result the one-month risk-free rate is subtracted. Their results show that in general naked calls deliver positive returns but this comes with high volatilities. Naked puts all have negative average returns. However, selling puts has high average returns but this comes with very high volatilities which implies the possibility of bearing large losses on short put positions. Covered call positions provide the same positive average returns as the underlying stocks but with lower risk than the underlying stocks. Protective puts, a long position in the stock and a long position in the put option, have lower returns

than covered calls but also have lower volatilities. Straddles and strangles near maturity offer high average returns but high volatilities. Calendar spreads have positive average returns but not as high as straddles and strangles. However, investors in straddles, strangles or calendar spreads all have to face considerable downside risk. Furthermore, Santa-Clara and Saretto conclude in their paper that transaction costs reduce the profits gathered with option strategies. They also find that margin calls have a negative impact on the average returns of the different strategies. Margin calls and transaction costs are the reason why not every mispricing on the stock market can be arbitraged away.

Merton, Scholes and Gladstein give the return characteristics about two different option strategies and compare it with the return characteristics of stock portfolios. In their research paper they do not give a conclusive answer to the question whether investing in option strategies provides higher returns than investing in stocks.
Coval and Shumway provide information about different option strategies and their returns. Their results indicate that call options perform better than the underlying index, but put options and straddles have lower returns than the underlying index. In their research paper European call options have higher returns than American call options. On the contrary, European put options and straddles do not perform better than American puts and straddles. However, for the returns on European options Coval and Shumway use weekly returns and they use daily returns for the returns on American options. So it is not possible to compare the returns on American and European options based on these results.
Isakov and Morard investigated the returns on covered call strategies. They show that covered calls with American options perform equally well as the underlying stocks. However, in their research paper covered calls perform better than stock indices and portfolios.
Santa-Clara and Saretto investigated the risk and returns of different option strategies. They show the results of each different option strategy with the usage of American options. Long calls, short puts, covered calls, straddles, strangles and calendar spreads deliver positive average returns. Long puts deliver negative average returns.

Overall conclusions out of these papers are that covered calls perform at least equally well and sometimes even better than the underlying stocks. Call options also perform

better than the underlying stocks. This cannot be said of put options; the returns of are lower than the underlying stocks or even negative. These studies do not provide a conclusive answer about straddle returns. Strangles and calendar spreads provide positive returns, however, these strategies have only been discussed in one paper. In the next chapter I will try to give an answer to the question whether long calls, long puts, long straddles and long strangles will perform better than the underlying stocks.

Chapter 4: Testing

To test whether option strategies offer higher returns than the underlying stocks I will use a dataset containing the stocks listed on the Dow Jones 30 in the period 1998-2005. For every single stock I will test for a number of different option strategies if the returns on the strategies are higher than the returns on the long stocks. The strategies I will are long calls, long puts, long straddles and long strangles. I have picked these strategies because they are easy to fabricate for individual traders and because I will use long stock positions as a benchmark. The 30 stocks currently listed on the Dow Jones Industrial Average will be used as a benchmark.

Each month I will invest an equal amount in stocks and in the different option strategies. The returns will be calculated monthly. I will calculate the returns on stocks by dividing the difference between the new stock price and the old stock price by the old stock price. I will not take dividends into consideration because dividends are not considered in the Black-Scholes model. I will calculate the returns on the different strategies by subtracting the price paid for the option from the profits gained and then this amount will be divided by the amount invested in the option. The options have a time to maturity of one month. If the options will not be exercised they will mature worthless.

For calls, puts and straddles I will use five different strike price levels: 0.8, 0.9, 1, 1.1 and 1.2 times the stock prices of the previous month. For each level the returns will be calculated and compared with the returns on stocks. For strangles the strike price of the puts will be 0.1 times the previous month's stock price lower than the strike price of a call. The same exercise price levels will be used as with the other option strategies. The option prices will be calculated with the Black-Scholes model.

I will summarize the average returns over three different periods. These periods are 1998-1999, the years of the internet boom, 2000-2002, the years after the burst of the internet bubble and 2003-2005, the years in which the overall economy recovered.

The average monthly returns on stocks for the three different periods are listed below.

1998-1999	2.18 %
2000-2002	-0.57 %
2003-2005	0.85 %

These results are consistent with the overall state of the economy in the three different periods. The returns are positive in the good state of the economy and in the bad state of the economy they are negative.

The average monthly returns on long calls in the three different periods are as follows:

1998-1999		2000-2002		2003-2005	
K = 0.8 * S	9.42 %	K = 0.8 * S	-3.00 %	K = 0.8 * S	3.67 %
K = 0.9 * S	19.69 %	K = 0.9 * S	-0.77 %	K = 0.9 * S	7.47 %
K = S	61.30 %	K = S	23.50 %	K = S	43.57 %
K = 1.1 * S	235.44 %	K = 1.1 * S	233.09 %	K = 1.1 * S	606.50 %
K = 1.2 * S	992.81 %	K = 1.2 * S	674.12 %	K = 1.2 * S	4.29 %

These results show that the average monthly returns on long call options increase with the strike price. This leads to enormous returns with strike prices of 1.1 and 1.2 times the stock price. This is because of the limitations of the Black-Scholes model. The Black-Scholes model generates very small option prices with exercise price of 1.1 or 1.2 times the stock price. In general, the returns are lower in the period 2000-2002. Overall, the returns on long call options are higher than returns on stocks.

Long put options show the following average monthly returns:

1998-1999		2000-2002		2003-2005	
K = 0.8 * S	533.85 %	K = 0.8 * S	2511.05 %	K = 0.8 * S	-35.81 %
K = 0.9 * S	194.66 %	K = 0.9 * S	1411.31 %	K = 0.9 * S	616.66 %
K = S	9.19 %	K = S	72.15 %	K = S	22.01 %
K = 1.1 * S	-8.54 %	K = 1.1 * S	15.20 %	K = 1.1 * S	-4.72 %
K = 1.2 * S	-7.16 %	K = 1.2 * S	5.72 %	K = 1.2 * S	-3.26 %

The average monthly returns on put options are higher in the period 2000-2002. This seems logical because at that period the market was bearish. The average monthly returns on put options decrease with the strike price, leading to enormous positive returns with strike prices of 0.8 or 0.9 times the underlying stock price. This is also because of the extremely low option prices calculated with the Black-Scholes model. In general, the average monthly returns on long puts exceed those on stocks.

Long straddles show the following results:

1998-1999		2000-2002		2003-2005	
K = 0.8 * S	9.65 %	K = 0.8 * S	-2.01 %	K = 0.8 * S	3.64 %
K = 0.9 * S	21.88 %	K = 0.9 * S	6.55 %	K = 0.9 * S	7.82 %
K = S	37.41 %	K = S	46.33 %	K = S	32.51 %
K = 1.1 * S	-1.03 %	K = 1.1 * S	20.38 %	K = 1.1 * S	-2.63 %
K = 1.2 * S	6.94 %	K = 1.2 * S	6.60 %	K = 1.2 * S	-3.23 %

The average monthly returns on long straddles reach their highest level when the strike price is closest to the stock price. The results are about the same in each period. Overall, the average monthly returns on long straddles are larger than the average monthly returns on stocks.

Long strangles show the following monthly average returns:

1998-1999		2000-2002		2003-2005	
K(C) = 0.9 * S K(P) = 0.8 * S	16.85 %	K(C) = 0.9 * S K(P) = 0.8 * S	0.90 %	K(C) = 0.9 * S K(P) = 0.8 * S	7.42 %
K(C) = S K(P) = 0.9 * S	34.97 %	K(C) = S K(P) = 0.9 * S	28.41 %	K(C) = S K(P) = 0.9 * S	22.64 %
K(C) = 1.1 * S K(P) = S	31.25 %	K(C) = 1.1 * S K(P) = S	21.88 %	K(C) = 1.1 * S K(P) = S	3.60 %
K(C) = 1.2 * S K(P) = 1.1 * S	85.17 %	K(C) = 1.2 * S K(P) = 1.1 * S	8.46 %	K(C) = 1.2 * S K(P) = 1.1 * S	-2.00 %

The average monthly returns on long strangles are highest when the exercise prices are close to the stock price. The results are considered to be equal in each period. The average monthly returns on long strangles exceed those on stocks.

The results lead to the conclusion that the average monthly returns on each strategy tested in the model exceed the average monthly returns on stocks. The high returns on the different option strategies are partly caused by limitations of the Black-Scholes model. The Black-Scholes model generates extremely low option prices for deep out-of-the-money options. If these extremely low priced options eventually will end up in-the-money they will lead to extremely high returns.

Chapter 5: Conclusion

Previous studies have shown that call options and strangles generate positive average returns which are higher than the underlying stocks. Earlier studies also showed that put option had negative average returns. These returns did not exceed the returns on the underlying stocks. Previous studies could not provide a conclusive answer about straddle returns.

The model in this paper delivers the conclusion that returns on long calls; long puts, long straddles and long strangles exceed the returns on the underlying stocks. According to the model in this paper the conclusion is drawn that option strategies lead to higher returns than investing on stocks.

However, these results were not calculated with actual option prices. Hence, the returns in this study were not actual returns. In future studies it would be a good idea to use actual option returns and compare those with the option prices following from the Black-Scholes model. Actual option returns would then be compared with stock returns.

Reference list:

Black, Fisher & Myron Scholes, (1972). The Valuation of Option Contracts and a Test of Market Efficiency, *Journal of Finance*, 27 (2), 399-417

Black, Fisher & Myron Scholes, (1973). The Pricing of Options and Corporate Liabilities, *Journal of Political Economy*, 81 (3), 637-654

Coval, Joshua D. & Tyler Shumway, (2001). Expected Option Returns, *Journal of Finance*, 56, 983-1009

Dubofsky, David A. & Thomas W. Miller, Jr, (2003). *Derivatives: Valuation and Risk Management.* Oxford University Press: New York

Isakov, Dušan & Bernard Morard, (2001). Improving portfolio performance with option strategies: Evidence from Switzerland, *European Financial Management*, 7 (1), 73-91

Merton, Robert, Myron Scholes & Mathew Gladstein, (1978). The Returns and Risk of Alternative Call Option Portfolio Investment Strategies, *Journal of Business*, 51 (2), 183-242

Ross, Stephen A. , Randolph W. Westerfield & Jeffrey Jaffe (1988). *Corporate Finance.* McGraw-Hill: New York

Santa-Clara, Pedro & Alessio Saretta, (2004). Option Strategies: Good Deals and Margin Calls, *Finance*, Paper 7-05

Strong, Robert A. (2002). *Derivatives: an introduction.* South-Western: Cincinnati, Ohio

Stulz, René M. (2003) *Risk Management & Derivatives.* South-Western: Mason, Ohio