



# STRATEGIES WITH OPTIONS

Seminar Project In Analytical Finance I

Antti Laine

Toma Boyacioglu

Teacher:  
Jan Röman

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### 1. INTRODUCTION

By making combinations with different options it is possible to create (infinitely) many strategies. Your choice of strategy is depending how you, as an investor or speculator, believe that the market conditions will change.

When trading options, it's important to have a plain strategy from the beginning. Thereafter you have to continuously follow the market changes to be able to follow up the strategy and to realize the profit when possible. A common mistake done by amateurs and beginners is to hold their position for too long time. Many times it's better to sell a call option to realize the profit, and then buying a new option to a higher strike price with later maturity (if you believe on a continuous increase in the underlying price).

*Bulls make money, bears make money, and pigs get slaughtered.  
Don't get greedy!*

The material we mainly rely in this seminar project is taken from Jan Röman, (Lecture Notes In Analytical Finance, Appendix A – Strategies), but also Investopedia.com has been used for some purposes.

### 2. BASIC THEORY

#### 2.1 INTRINSIC AND TIME VALUE

The option price, or premium, can be considered as the sum of two specific elements: intrinsic value and time value.

The intrinsic value of an option is the amount an option holder can realise by exercising the option immediately. Intrinsic value is always positive or zero. An out-of-the-money option has zero intrinsic value.

The time value of an option is the value over and above intrinsic value that the market places on the option. It can be considered as the value of the continuing exposure to the movement in the underlying product price that the option provides. The price that the market puts on this time value depends on a number of factors: time to expiry, volatility of the underlying product price, risk-free interest rates and expected dividends.

#### 2.2 TIME TO MATURITY – TIME TO EXPIRY

Time has value, since the longer the option has to go until expiry, the more opportunity there is for the underlying price to move to a level such that the option becomes in-the-money. Generally, the longer the time to expiry, the higher the options time value. As expiry approaches, the value of an option tends to zero, and the rate of time decay accelerates.

#### 2.3 VOLATILITY

The volatility of an option is a measure of the spread of the price movements of the underlying instrument. The more volatile the underlying instrument, the greater the time value of the option will be. This will mean greater uncertainty for the option seller who will charge a high premium to compensate. Option prices increase as volatility rises and decrease as volatility falls.

#### 2.4 PUT-CALL PARITY

Of particular importance with regard to arbitrage trades is the concept of put-call parity. This static price relationship, which exists between European put and call options of the same class (i.e. same underlying, strike price and expiration date), states that the value of a call (put) can be derived from the value of a put (call). This concept also applies to American-style options, adjusting for dividends and interest rates.

## STRATEGIES WITH OPTIONS

For options on futures:	$C = P + F - X$	<i>where:</i>	$C$ = call price
			$P$ = put price
			$F$ = futures price
For options on stock:	$P(S, t) = C(S, t) - S + Ke^{-r(T-t)}$		$K$ = exercise price
			$S$ = stock price
			$r$ = interest rate
			$T - t$ = time difference

This relationship is shown from the fact that combinations of options can create positions that are the same as holding the stock itself. These option and stock positions must all have the same return or an arbitrage opportunity would be available to traders. Any option pricing model that produces put and call prices that don't satisfy put-call parity should be rejected as unsound because arbitrage opportunities exist.

### 3. WE ALL HAVE OUR BELIEFS <sup>1</sup>

As we all come in different colours, we also come with different thoughts and beliefs. Here is an overview of investors and their beliefs, you will be facing. Each of these "classes" has their own characteristics, and as mentioned earlier, they all make money! Recognise yourself.

#### 3.1 BEAR

- An investor who believes that a particular security or market is headed downward

Bears attempt to profit from a decline in prices. They are generally pessimistic about the state of a given market.

For example, if an investor were bearish on the S&P 500 they would attempt to profit from a decline in the broad market index. Bearish sentiment can be applied to all types of markets including commodity markets, stock markets and the bond market.

Although you often hear that the stock market is constantly in a state of flux as the bears and their optimistic counterparts, bulls, are trying to take control, do remember that over the last 100 years or so the U.S. stock market has increased an average 11% a year. This means that every single long-term market bear has lost money.

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<sup>1</sup> This whole section is from Investopedia.com. In their 'Articles' section a reader can take hours long tour through all the interesting writings about stocks, bonds, funds, etc, also about Options & Futures which we have been visiting a lot.

## STRATEGIES WITH OPTIONS

### 3.2 BULL

- An investor who thinks the market, a specific security or an industry will rise

Bulls are optimistic investors who are presently predicting good things for the market, and are attempting to profit from this upward movement. For example if you are bullish on the S&P 500 you will attempt to profit from a rise in the index by going long on it. Bulls are the exact opposite of the market's bears, who are pessimistic and believe that a particular security, commodity or entity will suffer a decline in price.

Bullishness does not necessarily apply only to the stock market; you could for example be bullish on just about anything, including commodities like soy beans, crude oil or even peanuts.

### 3.3 NEUTRAL

- A person who is non-biased in the case of a dispute, such as an arbitrator
- An option on a security or market that is neither bullish nor bearish

If an investor has a neutral opinion, that is, he or she feels a security or index will neither increase nor decrease in value in the near future, the investor can undertake an option strategy that may profit despite the lack of movement in the underlying security.

### 3.4 VOLATILE

- Volatility exists and investors must develop ways to deal with it

During volatile times, many investors get spooked and begin to question their investment strategy. This is especially true for novice investors, who can often be tempted to pull out of the market altogether and wait on the sidelines until it seems safe to dive back in.

One way to deal with volatility is to avoid it altogether. This means staying invested and not paying attention to the short-term fluctuations. Sometimes this can be harder than it sounds - watching your portfolio take a 50% hit in a bear market is more than many can take.

The thing to realize is that market volatility is inevitable. It's the nature of the markets to move up and down over the short term. Trying to time the market over the short term is extremely difficult; some would say impossible. One solution is to maintain a long-term horizon and ignore the short-term fluctuations. For many investors this is a solid strategy, but even long-term investors should know about volatile markets and steps that help investors weather this volatility.

Investors need to be aware of the potential risks during times of volatility. Choosing to stay invested can be a great option if you're confident in your strategy. If, however, you do decide to trade during volatility, be aware of how the market conditions will affect your trade.

#### 4. HOW TO DEAL WITH THE MARKET – STRATEGIES

At this point we all know that bull market is represented by a rising price trend, and a bear market is indicated by a falling price trend. With this simple definition you'd think it would be easy to determine what type of market we're in at any point in time. However, it's not quite that easy because it all depends on what time frame you look at to determine when one kind of market ends and another begins.

For example, say the market has been down for the past two years; you could then argue that we are still in the midst of a bear market. However, if the most recent three months were positive, you could argue instead that we've already hit the bottom and are actually in a new market. The first argument arises from looking at the past two years and the second argument arises from looking at the last three months - which one is right?

There is no sure way to call the market, whether bull or bear. It's always easy to look back with hindsight and see where the past peaks and bottoms were, but it's not so easy to know where the market is in the present. Of course, in 10 years it'll be a breeze to look back to the current time period and make perfect sense out of the market.

So, because the answer to this question depends on whom you ask, we can't say that there is a "correct" answer. Everybody is entitled to an opinion of where the market is going, but nobody has proven an ability to be always right. <sup>2</sup>

Below is shown a summary of some possible choices of strategies. Depending on the volatility and investor's beliefs about the market, there should exist a strategy for each and every "animal".

<b>Strategy matrix</b>	<b>Positive Market Belief</b>	<b>Neutral Market Belief</b>	<b>Negative Market Belief</b>
<b>Increasing Volatility</b>	Long Call <b>Bull spread</b> Back spread	Long straddle Long strangle <b>Short Butterfly</b>	Long Put <b>Bear spread</b> Three leg position
<b>Neutral Volatility</b>	Buy underlying/ forward Buy synthetic forward Buy Sloped synthetic forward	<b>DON'T TRADE</b>	Short forward Short synthetic forward Short sloped synthetic forward
<b>Decreasing Volatility</b>	Short Put Bull spread <b>Three leg position</b>	Short straddle <b>Short strangle</b> Long Butterfly	Short Call Bear spread <b>Ratio spread</b>

<sup>2</sup> <http://www.investopedia.com/ask/answers/03/060203.asp>

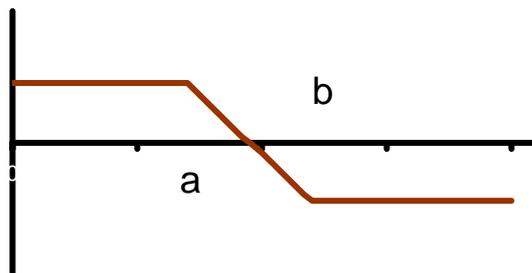
## STRATEGIES WITH OPTIONS

Since the simplest strategies (long/short call/put) are so familiar for most investors, we decide not to go through them, despite that their follow-up strategies, when market conditions change of those one expected, are quite interesting.

However, the strategies we chose to go through (highlighted **bold** in the figure) are not too complicated either but we found them to be good examples of how to build a strategies with options.

### 4.1 BEAR SPREAD

[ moderately bearish & fairly certain that the market will not rise ]



#### Market belief

You think the stock will go down somewhat or at least is a bit more likely to fall than to rise. Good position if you want to be in the stock but are unsure of bearish expectations. This is the most popular bearish strategy. This is a conservative strategy when you believe more on a decrease than an increase.

#### Construction

1. Call option is bought with a strike of **b** and another call sold with a strike of **a**, producing a net credit.
2. Put option is bought with a strike price of **b** and another put option sold with a strike of **a**, producing a net debit.

#### Profit:

Limited, reaching maximum if stock ends at or below the lower strike **a** at expiration. If put spread used, difference between strikes minus initial debit. If call spread used, net initial credit.

#### Break-even:

The strike price for the long option minus the initial premium.

#### Losses:

Maximum, if stock at expiration is at or above **b**. If put spread used, maximum loss is net initial debit. If call spread, difference between strikes minus initial credit.

**Margin requirement:** Possibility to offset the margin requirement.

## STRATEGIES WITH OPTIONS

### Comments

The time value has only a small influence since the position is balanced. As we can see in the figure, the maximum loss is limited but also the profit. The maximum loss decreases on the cost of the maximum profit. If a negative price spread succeeds and if you believe on a further decrease, the position can be rolled similarly as for a positive price spread.

On an increase: you can sell the long position. You can also issue more put options. This position requires less changes in the underlying price than a long put option and have a lower breakeven. Normally, such a strategy has a maximum profit between 75 and 150%.

### Reasons

1. To give a higher probability to a profit than a long put option.
2. This requires smaller changes in the underlying price than a long put option
3. One can buy more contracts than on a naked put option.

### Follow up

On a decrease

- Roll the price spread to a lower strike price

On an increase:

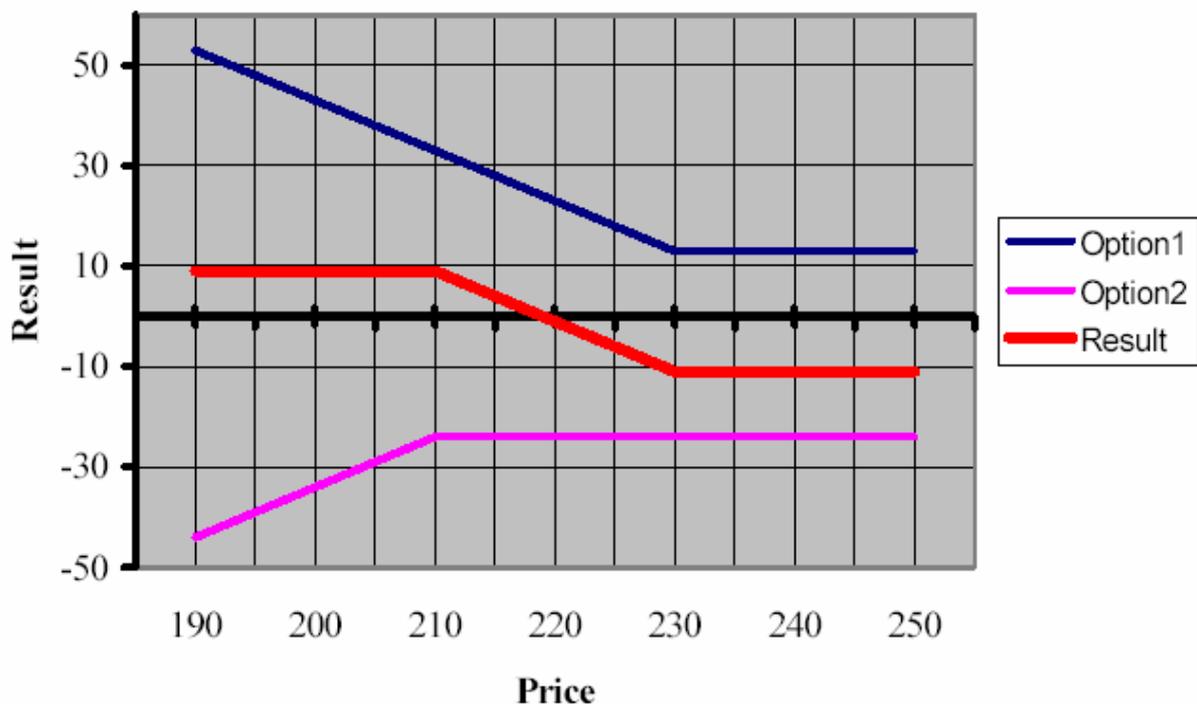
- Issue more put options and create a ratio spread or a ladder.
- Issue a call option to compensate for the initial cost and create a three-legged position.

### Example: With put options

Underlying price: 219

Buy a put option with strike price 210 to a cost of 13.

Issue at the same time a put option with strike price 230. We then get an income of 24. The net initial cost is 11.

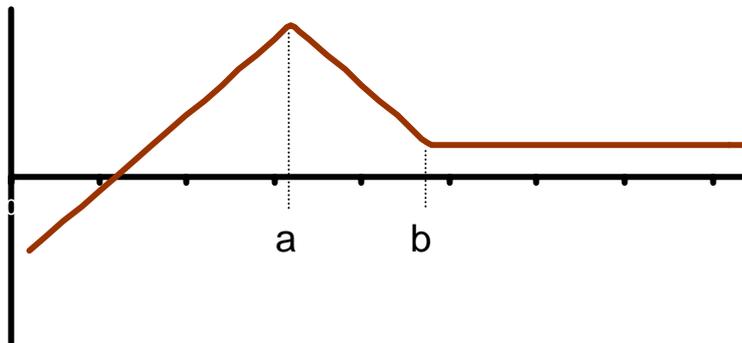


## STRATEGIES WITH OPTIONS

Due to the low initial cost, only a small change in the underlying is needed for a profit. When the underlying price shrinks below 219 we will get a profit. With only a long put option with strike price at 230, the break even is 206. The maximum profit of 9 is reached if the underlying price is below 210. This represents 82 % during the period and much more on a yearly basis. If the position is taken together with a long position in the underlying, then the negative price spread is a strategy to reduce the risk on a price decrease.

### 4.2 RATIO-SPREAD WITH PUT OPTIONS

[ very bearish ]



#### Market belief

This spread is used under the same conditions as a Long Put. You should be very bearish on the stock/index and the expected range of the stock during the particular time period should extend significantly beyond the breakeven points of the position.

#### Construction

You buy 2 of the higher strike put options that are near the current price and sell 1 put at a lower strike price than those purchased. This ratio (buy 2 ;sell 1) reduces the cost of the 2 puts purchased often to the point of a free trade.

#### Profit

Limited. The difference between the strike prices plus/minus the net profit/cost for the options. Maximum profit is reached on the lower strike price.

#### Losses

Unlimited. The strategy gives losses on a big decrease in underlying price.

**Margin requirement:** Always needed.

#### Comments

Your breakeven has 2 different points and you will lose money if the options expire at any point between the 2 breakeven prices. You can also use a 3:2 ratio (buy 3; sell 2) which will reduce the cost further or increase the credit received, but the breakeven points will be extended even further requiring an even greater move in the stock price for a profit. The probability of profit should be greater than 40% and rarely will exceed 60%. The strategy requires massive coverage.

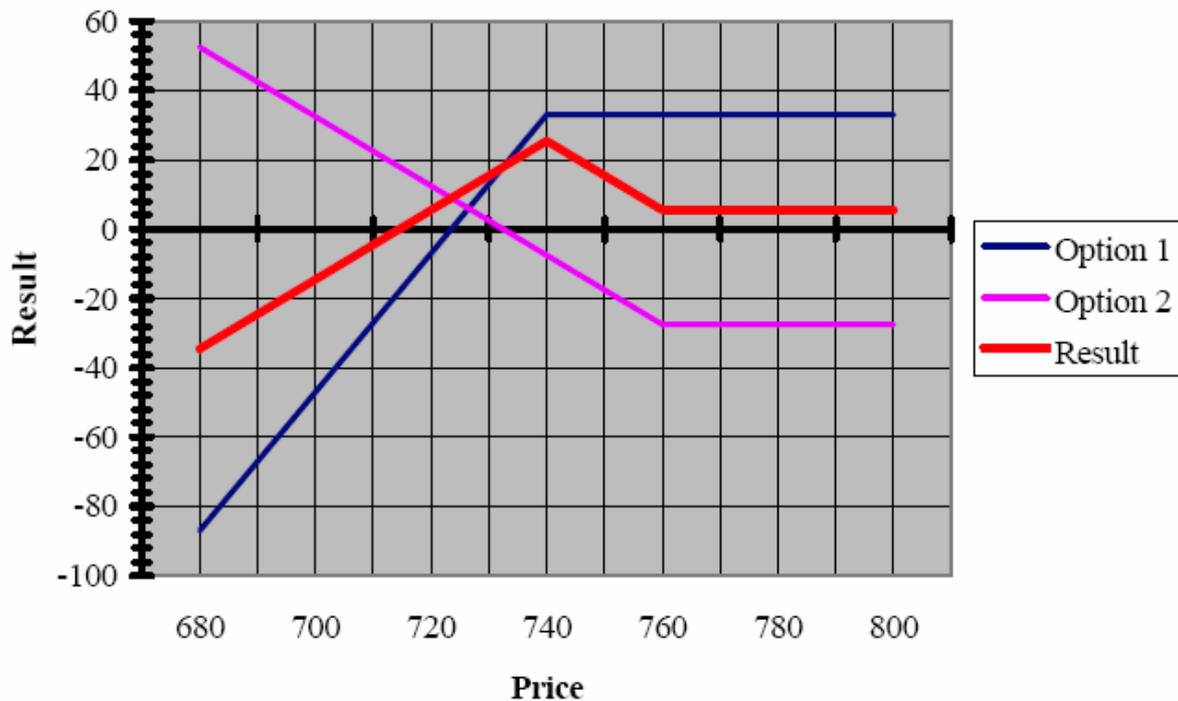
## STRATEGIES WITH OPTIONS

Example:

Underlying price: 761.

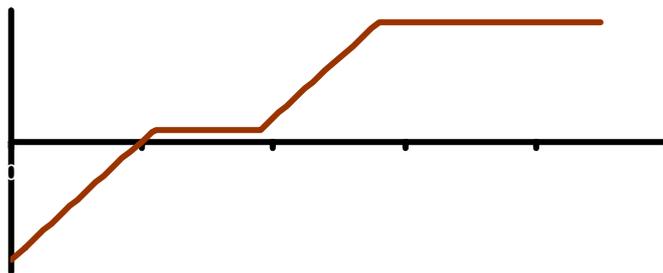
Issue two put options with strike price 740 with a total initial premium of 33.

Buy a put option with strike price 760 at a cost of 27.50. The net initial profit is then: 5.50.



### 4.3 POSITIVE THREE LEG POSITION

[ bullish ]



#### Market belief

The investor believes on a strong increase in the underlying price, but at the same time needs a good protection on a decrease.

#### Construction

Issue put options with a lower strike price, buy call options and issue call options with a higher strike price.

## STRATEGIES WITH OPTIONS

### Profit

Limited to the difference in strike prices of the call options minus initial cost or plus possible profit.

### Losses

Unlimited. The strike price of the put options plus initial cost.

### Breakeven

The lower strike price on the put option plus possible cost.

**Margin requirement:** Always needed.

### Reasons

1. The strategy gives no risk on the positive side as for the ratio spread.
2. The strategy gives lower price than a price spread.
3. The strategy gives higher probability for a profit than a long call option.

### Follow up

On a profit:

- Move the put option to a higher strike price and use the income to move the issued call option to a higher strike price.
- Roll the price spread to a higher strike price.

On losses:

- Roll the issued put option to a lower strike price and (maybe) sell the owned call option.
- Move the issued put option to a lower strike price with later maturity.
- Issue more call options and create a ratio spread or ladder.

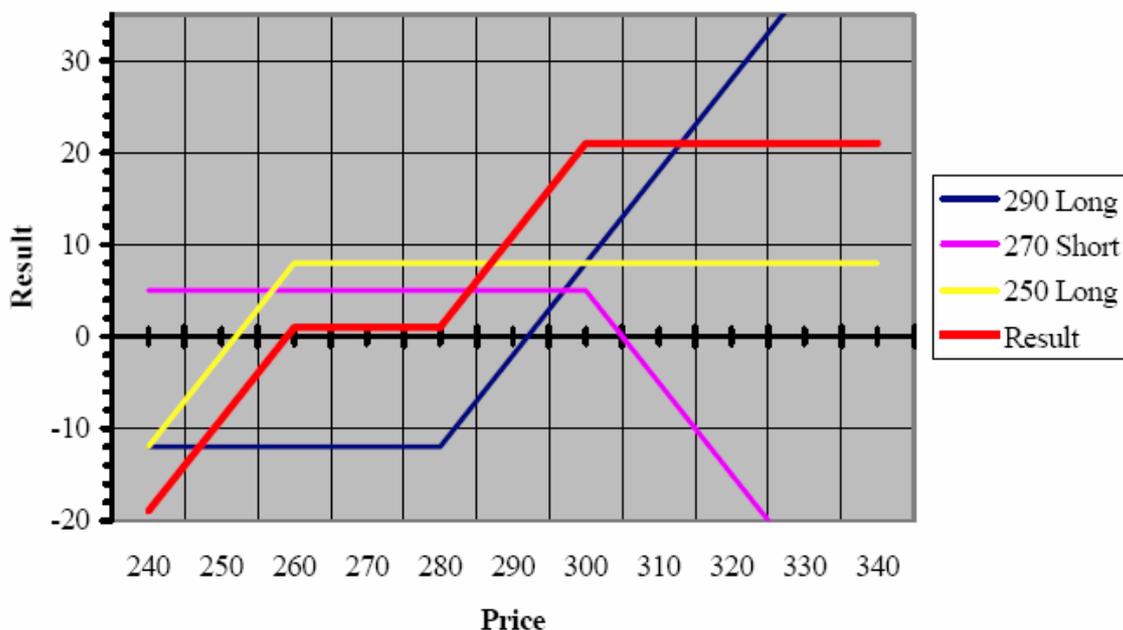
Example:

Underlying price: 280

Issue a call option on 300. The income is 5.

Issue a put option with strike price 260, with an income 8,00.

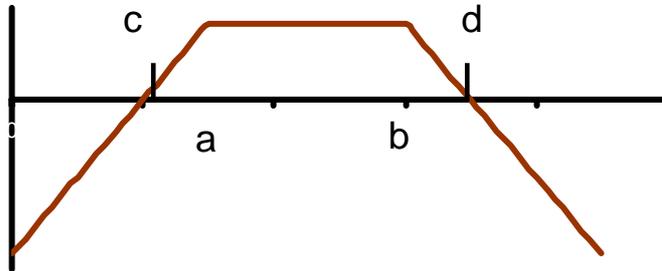
Buy a call option with strike price 280 for 12,00. Initial net profit is then 1,00.



## STRATEGIES WITH OPTIONS

### 4.4 SHORT STRANGLE

[ prices might fluctuate in a broader range ]



#### Market belief

This spread is used when you believe that the price of the stock/index will stay within a specific range in the near future. I.e., the investor believes on market with relative low volatility.

#### Construction

Sell a put option with strike price **a** and a call option with strike price **b**.

#### Profit

You profit if the price movement over the specified time period stays within the range between the two strike prices or does not extend beyond either strike price more than the premium received from the sale of the call and put.

#### Break-even

The point **c**, where the lower strike price minus the premium is reached and the point **d** where the higher strike price plus the premium is reached.

#### Losses

Unlimited.

**Margin requirement:** Always needed.

#### Comments

The rapid time decay in the last month prior to expiration is your friend in this trade. The 5-day volatility generally should be higher than the 100-day volatility. Expiration should generally be less than 30 days of when the trade is placed. Probability of profit is generally greater than 50%. This is a very high probability trade to profit if entered correctly. However, high margin requirements generally require having a larger trading account.

#### Reasons

To get a profit in a neutral or almost neutral market.

## STRATEGIES WITH OPTIONS

### Follow up

On an increase:

- Buy call options with lower strike price as protection.
- Buy the forward if the underlying reaches the level for the upward breakeven.

On a decrease:

- Buy put options with lower strike price as protection.
- Sell the forward if the underlying falls below the lower level of breakeven.

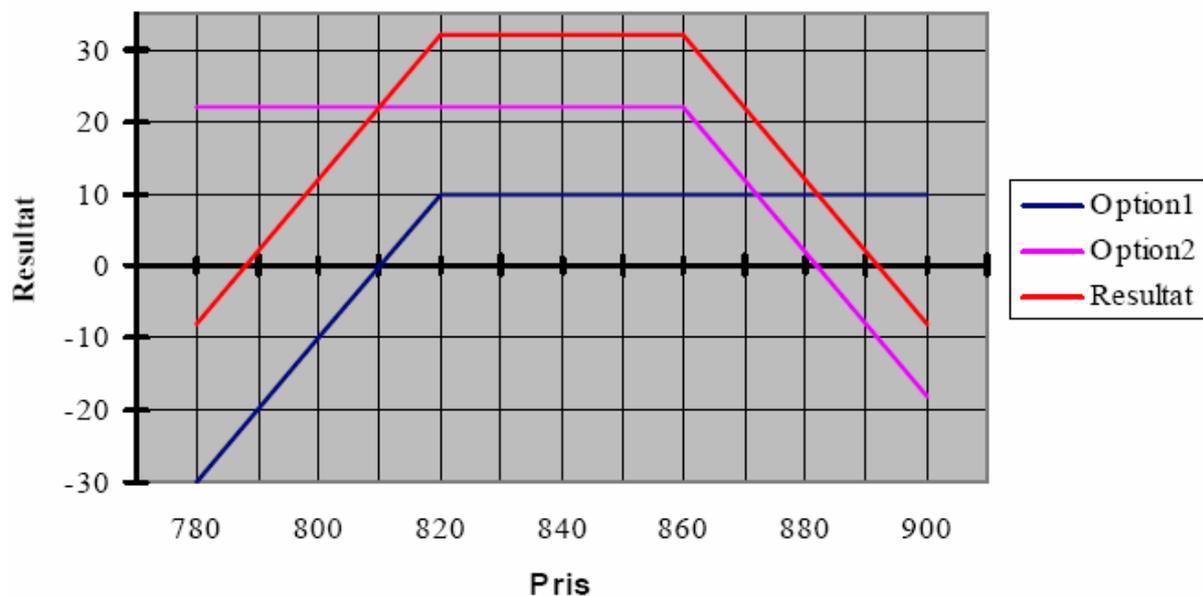
On neutral:

- If you are able to buy a call option with higher strike price and a put option with lower strike price so that the net profit is greater than the difference in strike price, then you have locked-in a profit.
- Buy call- and put option with same strike price with later maturity to lock-in the profit.

### Example:

Underlying price: 842

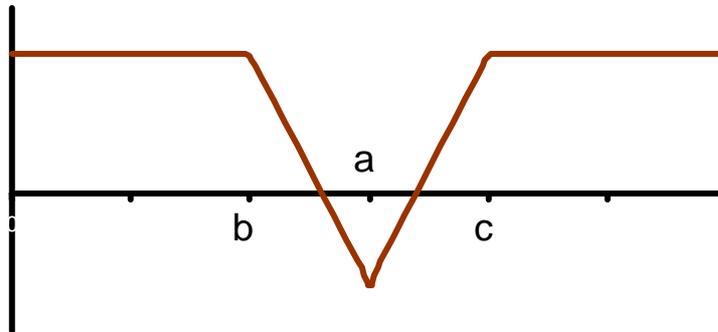
Issue a call option with strike price 860 and premium 22 and a put option with strike price 820 and premium 10. Then we have an initial income of 32.



## STRATEGIES WITH OPTIONS

### 4.5 SHORT BUTTERFLY

[ moderately expect prices to be volatile ]



#### Market belief

You believe that the stock price will move substantially.

#### Construction

Call option with low strike (b) sold and two call options with medium strike (a) bought and call option with high strike (c) sold. The same position can be created with puts.

#### Profit

Limited to the initial credit received.

#### Losses

Limited to the difference between the lower and middle strikes minus the initial spread credit.

**Margin requirement:** Low.

#### Comments

It can be difficult to realize and sell the position on a short time period. This position is a combined asset. As time passes, value of position increases/erodes toward expiration value. If volatility increases, increase/erosion slows; if volatility decreases, increase/erosion speeds up.

#### Reasons

To get an income on volatile market to a low cost.

## STRATEGIES WITH OPTIONS

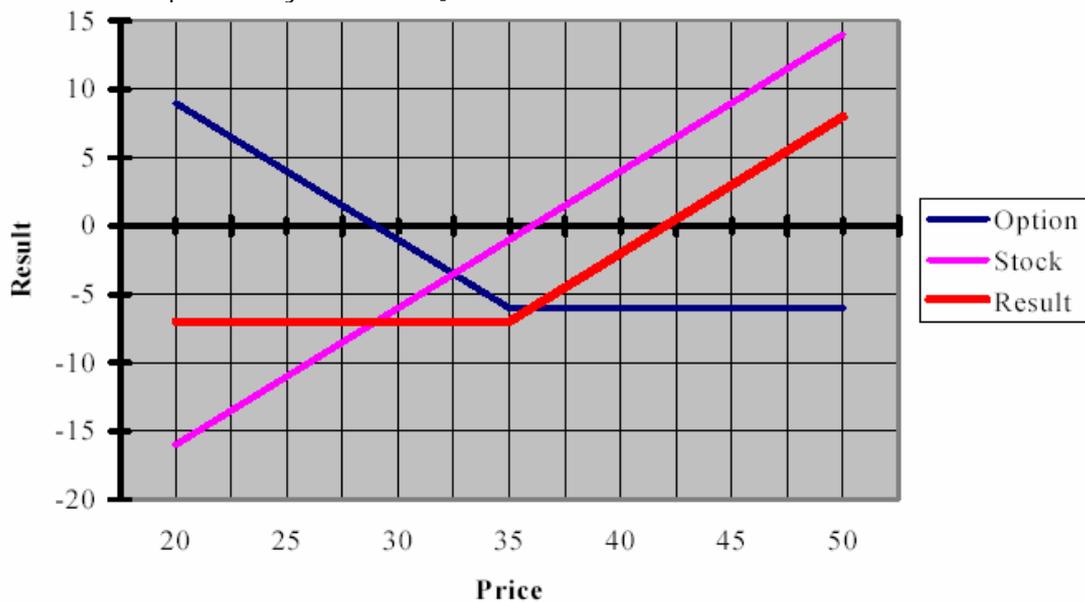
### 4.6 STRATEGIES WITH UNDERLYING

We could go on explaining strategies in detail for many pages, but the point should be clear by now – strategies can take many forms and include many different elements all depending on your beliefs about the market.

Before rounding up with this paper we want to add few more graphs just to show some possible strategies where we mix the underlying stock with options.

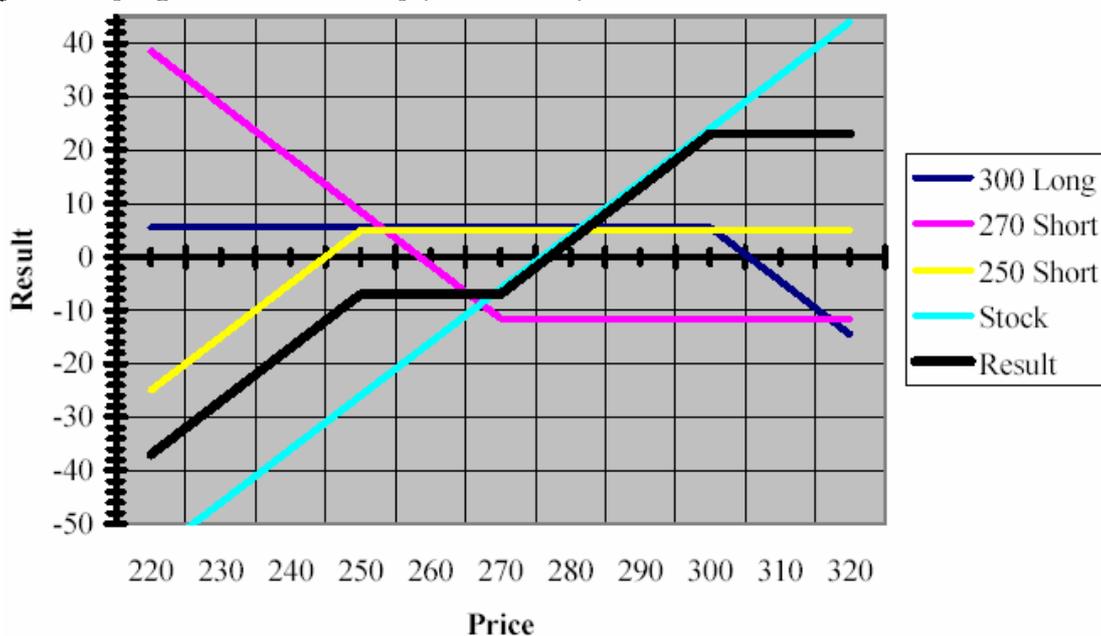
#### Protective Put

[Buy NTM / ATM put – buy the stock]



#### Positive Three-Leg Position with ownership

[Buy underlying – issue call – buy put – issue put with a lower strike]



## 5. CONCLUSION

There exist infinitely many strategies and instead of showing hundreds of them we wanted to go through only few. All the six examples are strategies concerning only options, although two "snap shot" examples are included at the end where one of the elements is the underlying.

Simple options strategies are usually the way to begin investing with options. By mastering simple strategies, one prepares himself for advanced options trading. The complicated options strategies are appropriate only for experienced investors.

We did not have the time to follow a "real" strategy, as we planned in the first place. The maturities of the options available did not fit the deadline of this seminar project.

Working with this seminar gave us however an insight how to play with derivatives in the market – something we might have use later on.

## 6. REFERENCES

Jan R. M. Röman. (2005). *Lecture notes in Analytical Finance I, Appendix A – Strategies*.

[www.investopedia.com](http://www.investopedia.com)

<http://www.numa.com/derivs/ref/os-guide/os-0.htm>