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OPTIONS HEDGING AS A MEAN OF PRICE RISK ELIMINATION

UDK / UDC: 339.164.4

JEL klasifikacija / JEL classification: F19, G13

Pregledni rad / Review

Primljeno / Received: 05. lipnja 2007. / June 05, 2007.

Prihvaćeno za tisak / Accepted for publishing: 03. srpnja 2007. / July 03, 2007

Abstract

Price risk can be considered one of most important risks most foreign trade companies face. From this aspect use of modern futures markets can be considered a basic precondition for the survival of most businesses. For the purpose of insurance hedging has been in use for more than a century, but still its forms have evolved over time. On the other hand options can be considered the most sophisticated instrument futures trade can offer at this point. The aim of this paper is to present how options, which are normally considered a main tool for speculation, can successfully be used as a tool for price risk elimination.

Key words: *hedging, price risk, options, futures markets.*

1. INTRODUCTION

Price risk is one of the financial risks that come up as a consequence of unpredictable events that make paying in international trade difficult or even impossible. When it comes to price risk there is a possibility one of the included parties will come up damaged because of sudden price movements. There is a pure logic to use futures trading as a mean of price risk protection since such markets offer a variety of trading instruments. It is a little bit ironic that the existence of speculators who see futures trading as nothing else but a place for betting makes price risk elimination possible. They generally aim to buy when prices are low and sell when prices are high, thereby helping to prevent excessive movements in either direction. In times of surplus it is often the speculators who

provide major buying orders. They are hoping to buy at depressed prices in order to sell when the market improves and in doing so they are relieving industry of the need to finance merchandise it does not need.

Futures trading or stock exchange trading has already been used for more than a century, but trading in advanced instruments of futures markets still represents one of the most sophisticated forms of modern business. The early beginnings of futures trading date back to the trade in goods, whereas nowadays, and for some years now it has been used for trading even more successfully in financial instruments, and it has been governed on the same basis and by the same rules. The development of new instruments of futures trading continues to take place at a very quick pace. When it comes to creating new instruments of futures trading or using the already existing ones, the greatest progress has been made in the most developed countries such as the USA, Japan, Great Britain etc. The principles that govern futures market operations in the developed countries have been used as a model for establishing and operating futures markets worldwide. The use of a futures market allows business entities to achieve many advantages, one of the most significant ones being the neutralization of financial and price risks, as well as significant financial gains. On the other hand, economies without sufficiently developed futures trading surely find themselves in a worse starting position in the international markets. Not only does a failure to use the existing potentials of futures trading put business entities in a subordinate position, but from a long-term point of view it puts their very existence at risk as well.

The beginnings of futures trading are connected with goods fairs where cereals and other agricultural products were sold, whereas nowadays almost anything can be sold or purchased on a futures exchange: from pork bacon and orange juice, gold and oil, to complicated financial instruments such as stock indices, interest rates, foreign currency, as well as options on all of the above mentioned forms of futures contracts. The fact that on a futures exchange you can sell something that you currently do not have and you will never have in future, or that you can purchase something you do not know what it looks like, or if you do, you would not dream of possessing it, gives everyday words 'buy' and 'sell' a completely new meaning. A more precise term to explain what actually happens on futures exchanges is betting, and a term for such an institution would be a betting shop.

Commodity futures contracts still remain insufficiently explored and used as asset, despite the fact that the US has been trading in them for over a 100 years. The main reason behind this may lie in the fact that they differ considerably from traditional investment assets such as stocks and bonds. The main differences are as follows.¹

- Commodity futures contracts are derivatives, unlike stocks and bonds

¹ Gorton, G. & Ravenhorst, K., Facts and Fantasies about Commodity Futures; Financial Analyst Journal, (2006), ABI/INFORM Global, p. 47.

- They represent short-term receivables related to real assets.
- Unlike financial instruments, many commodity futures contracts have marked seasonal fluctuations in price movements.

In the past 20 years derivatives have emerged as one of the most important entities in the financial world. Futures contracts and options are nowadays traded worldwide, on all most important financial and commodity exchanges. Financial institutions, funds and other institutional exchange traders trade regularly in futures contracts, swaps, options and other derivatives.

Derivatives are securities issued on the basis of some real securities (stocks, bonds), foreign currency or, in the case of commodity futures contracts on the basis of a real commodity. In other words, behind every derivative there is some real underlying instrument. The most important characteristic of derivatives is that a derivative holder does not have to buy or sell the value on the basis of which a derivative has been issued. Derivative itself is a marketable security that is traded in secondary markets.

In its value, the volume of trading in derivatives exceeds the value of the underlier on the basis of which derivative is issued. Prices of derivatives are quoted daily on exchanges and to the greatest extent they are determined by price movements of the underlier on the basis of which they have been issued. Some other determining factors of derivative prices are exercise date and volatility (i.e., tendency to fluctuate) of the price of the underlier on the basis of which derivative has been issued. In the case of commodity derivatives, that is, futures contracts the underlier for their issuing is commodity quoted on a stock exchange.

2. BASIC STRATEGIES OF FUTURES TRADING

Trading strategies in futures markets can be divided into²:

° *Long/short speculative trading*

Long or short speculative trading implies taking, the so-called, long or short position in a futures market. Taking a long position (going long) in a futures market means, in business terms, buying a futures contract. Speculators who buy futures contracts expect futures prices to increase. They are also known as "bulls". If futures prices increase, they will close out their initial long position by selling at a higher price, thereby yielding a profit.

Taking a short position (going short) in a futures market means selling futures contracts. Speculators who take a short position expect futures prices to decrease because it is the only way they can make a profit, considering the fact that they close out their short position by buying at a lower futures price. They are

² Lazibat T., Kolaković, M.: Međunarodno poslovanje u uvjetima globalizacije, Sinergija, Zagreb, 2004., p. 213.

also known as "bears". When it comes to long or short speculative trading, profit is made only if the direction of a price change is forecast correctly. As the above mentioned examples show the biggest advantage of long or short speculative trading is its unlimited potential to yield a profit. Unfortunately, the price for this is exposure to higher risk which is not limited, so if forecasting the direction of a price change is incorrect, a loss will be made.

° *Spread speculative trading*

This trading strategy used by a position speculator is less risky. Simultaneously, two or more opposite futures positions in the same commodity (or some other underlier) are taken, but having different months of delivery or exercise, in the same commodity but in different futures markets or in mutually substitutive commodity. Thus, we make a loss on one side and we gain or yield a profit on the other. It is crucial that we make a bigger profit than loss so that our business operations would make sense.

° Arbitrage

Arbitrage is a strategy involving simultaneous buying or selling of contracts in different markets, thus providing a possibility of making a sure profit without risky investments. It is common in situations when difference in futures prices between two months of delivery (or exercise date, when it comes to stock or foreign currency exchange) is big enough to cover all commodity costs (holding, handling, storing, financing, opportunity costs) and initial futures positions are closed out by physical delivery of commodity (payment), and not by offsetting. Since by taking initial futures positions the outcome, i.e., profit is known in advance, this strategy is often called an academic arbitrage. Activities of academic arbitrage in futures markets are rare, but when they do happen, they are of a very short period because traders notice quickly the possibility of an arbitrage and they react immediately by returning futures prices into their usual relative relations - the so-called normal market.

° Hedging

Hedging is a group of techniques and instruments designed to hedge against the risk of an increase or fall in the price of an item being traded. Traders who use hedging are called hedgers. They use futures market exclusively to minimize the risk of a price increase or price fall so as to prevent a loss, and not primarily to speculate, i.e., to make a profit. That is why in order to understand hedging and use it successfully it is necessary to know futures markets, their nature and trading strategies.³

Hedging programme of any company is always unique and it depends on internal specific characteristics of that company, its price policy and motives for

³ Lazibat, T.: *Terminsko trgovanje – izazov, potreba i «trgovina maglom»*, TEB, Zagreb, 2002. & Lazibat, T.: *Psihologija terminskog tržišta – zamke i mogućnosti*, TEB, Zagreb, 2003.

hedging. Hedging programmes always have to adapt to new emerging conditions on the market.⁴

Hedgers are individuals or companies that own or wish to own cash commodity, maize, soybean, wheat, government bonds, stocks, coal etc., but they fear that the commodity price may change before they have bought or sold it. In general, anyone wishing to protect their commodity in a spot market against an unwanted price change can use hedging in a futures market which provides them, in that case, with appropriate futures contracts.

According to the theoretical literature, primary commodity producers stand to derive considerable price risk reduction benefit from hedging with either futures contracts or forward cash contracts.⁵

3. OPTIONS

The use of derivative instruments (derivatives) has become common practice in the risk management activities of nonfinancial firms around the world. In particular, derivatives are widely used to manage foreign exchange rate and interest rate risks, while the use of commodity price derivatives is more concentrated in particular industries.

Options are also derivative instruments, which means that option's value and other trading characteristics of options are derived from the assets upon which they are based.⁶ Trading in options on futures contracts is the most sophisticated form of trading, and it emerged in the 1980s on the US stock exchanges. Today, options are traded on all futures contracts and in all futures markets.

An option is a term used on a commodity exchange, for example on the world renown *Chicago Mercantile Exchange* where you can trade in options on futures contracts for agricultural products, foreign currencies, interest rates, indices; however, options are also present on stock exchanges as options on securities trading, or stocks, to be more precise. Options trading takes place in futures markets or exchanges. They soon proved to be very useful and lucrative innovations because they involve activities where losses are restricted to a price paid for an option, while the amount of possible profit is unlimited. Thus, options trading spread very quickly on trading in all types of commodity and financial futures contracts.

⁴ Sampson, R., Crowson, P., *Managing metals price risk with the London Metal Exchange, LME*, London, 2005, p.93.

⁵ Corter, C.A., *Commodity futures markets: a survey*, *The Australian Journal of Agricultural and Resource Economics*, 43:2, (1999), p.216.

⁶ CBOE Options Institute., *Options: Essential Concepts and Trading Strategies* 3ed, McGraw Hill, 1999, p. 19.

Options on futures contracts can be defined as a special type of standardized exchange contracts where the buyer has the right, but not the obligation, to buy or sell based on an option of a certain futures contract or other asset which is the subject in the options contract. There are two basic types of options, a call option and a put option. Combinations of the two can lead to a series of subsequent options. In order to buy an option, i.e., in order to have a possibility to choose between alternatives offered, we buy that privilege, that is, we pay a certain price for it, meaning that we pay the option premium for the respective futures contract. Instead of direct trading in futures contracts, certain strategies for trading in options on futures contracts allow a possibility of unlimited potential to profit with limited and known risks. Every option has a period of duration, i.e., exercise period, with conditions of expiration of several months, which is common for most options, or it can include a longer period of more than three years, however, in that case we speak of LEAPS options.

Nowadays, options' trading is so widespread that the volume of options contracts traded on exchanges worldwide amounts to hundreds of millions of contracts a year. Majority of these options contracts represent options on stocks (more than 75 %), whereas around 15 % of options contracts account for options on futures contracts.⁷

An options contract (agreement) represents a highly standardized document that mostly includes the following elements:

- asset type to which the option relates
- strike price at which a buyer can buy or sell a certain asset or instrument,
- exercise date – the last date by which the option can be used

Buyers can choose whether to exercise the option, sell it to some other entity or not to exercise the right given by the option. Their decision is determined by the relation between the current market price and the strike price in the options agreement. On the other hand, seller/ option writer has the obligation to honour the terms based on the sold option.

Options can be divided into:

Call options, which give the buyer (holder) of the option the right, but not the obligation, to buy from the seller (writer) options on futures contracts at an already set exercise price any time within a period before the expiration date.

Put options, which give the buyer (holder) of the option the right but not the obligation to sell to the seller (writer) options on futures contracts at an already set exercise price within a period before the expiration date.

⁷ Robert W. Kolb: Futures, options and swaps, Blackwell Publishing, 2003.g. p.315.

The price that the buyer of the option has to pay to the seller of the option is called a premium.

The option premium consists of two components:⁸

- Real or intrinsic value of the option
- time or extrinsic value of the option

The real value of the option is the amount by which the option is in-the-money. A call option is in-the-money when the strike price is below the current market price, that is, below the futures contract.

A put option is in-the-money when the strike price is above the futures price.

Time or extrinsic value of the option represents a possibility that over a period of time an option out-of-the money turns into an option in-the-money, that is, that the option in-the-money becomes even more so.

Three basic factors determine the time value of the option:

a) *short-term — risk-free interest rate* – the higher the interest rate, the lower the option premium due to increased opportunity costs of capital

b) *remaining time before option expiration date*- option premium decreases as the option expiration date nears; we can think of an option as an insurance policy, the longer the period until policy maturity the greater its worth;

c) *price volatility of respective futures contract* – volatility is defined as a probability that the futures price will increase or decrease in respect to its current level. The greater volatility of the futures price, the bigger the option premium because in that case there is a greater probability that an option out-of-the-money will turn into an option in-the-money or if an option is already in-the-money, it will become even more so. Although volatility is expressed in precise coefficients, it is logical that stocks or commodity, the price of which has considerably fluctuated in the past, have considerably higher coefficient values.

4. OPTIONS HEDGING

Options not only provide insurance against price risk that is conditional on an event (receiving the bid, having a successful harvest, making the loan, making the stock offering) but also avoid any penalty if the event does not occur (the bid is rejected, the harvest is poor, the loan is not taken down, or the stock issue is not sold). It is in this sense that options provide protection against both

⁸ Vukina, T.: Osnove trgovanja terminskim ugovorima i opcijama, Infoinvest, Zagreb, 1996., p. 104-107.

price and quantity risk and are, therefore, a better tool than futures contracts in some cases.⁹

Overall, a significant number of 15-25 per cent of the firms outside the financial sector use options. This reflects the fact that options are very versatile risk management instruments that can be used to hedge various types of exposures, linear as well as nonlinear. In particular, options are a useful component of corporate risk management if exposures are uncertain, e.g. due to price and quantity risk. The elimination of the upside potential on the underlying asset is the price for the protection the derivative offers for situations where the underlying asset loses value.¹⁰

On a basic level, financial theory suggests that if and when used for hedging purposes, derivative instruments should be chosen based on the exposure profile of the firm and the payoff profiles such as forwards, futures and swaps are suitable for linear exposures, while the nonlinear payoff profile of options is appropriate to hedge a nonlinear exposure.¹¹

Hedger may use options in conjunction with long or short futures positions. Choosing a particular hedging strategy depends mainly on the level of protection desired. Hedger can use three short and three long hedge strategies. A short hedger owns the underlying futures commodity and seeks to forward price that product. The hedger can choose from three basic short hedging strategies¹²:

1. Buying a put option,
2. Writing a call option,
3. Initiating a short fence (buying a put and writing a call).

1. Buying a put option for the purpose of hedging¹³

One of the dilemmas facing any manufacturer trying to protect his position with a usual futures contract, thus "locking in" his selling price, is as follows: what if the prices increase and the manufacturer does not make a profit that he could have made on the additional increase in price. The manufacturer can resolve this dilemma by using a put option.

⁹ Stoll, H.R. & Whaley, R.E., The new options market, Futures markets: Their Economic Role, American Enterprise Institute for Public Policy Research, Washington D.C., (1985), p. 229.

¹⁰ Sohnke, M.B., The use of options in corporate risk management, Managerial Finance, Vol. 32, No. 2, 2006. p. 160.

¹¹ Sohnke, M.B., p. 161.

¹² CME Random Length Lumber Options, CME, 2005, p. 11.

¹³ Sampson, R., Crowson, P., Managing metals price risk with the London Metal Exchange, LME, London, 2005, p. 164-167.

Example:

A manufacturer of aluminium arranges a delivery of 1000 t of aluminium for a period of three months in advance at the current spot price on the LME. Production costs of aluminium amount to 1200 USD/t, and any price below the given price leaves the manufacturer with a loss. The current futures price with a delivery date of three months is 1300 USD and this completely suits the manufacturer. By simply selling futures contracts the manufacturer is able to lock in this price at 1300 USD/t. However, at the same time he believes the price could be even higher in three months. On the other hand, he does not want to leave his sale uncovered because a reverse trend could lead to a significant loss. Suppose that in this case the aluminium manufacturer is buying a put option at a price of 1300 USD with a premium of 50 USD. In this way, the manufacturer has ensured a price of 1250 USD since his final selling price is reduced by the premium amount.

Suppose also that after three months the spot price stands at 1400 USD. The manufacturer would in this case surely sell aluminium at the given price, and let the option expire. The net selling price realized amounts to 1350 USD/t, thus yielding a considerable profit. The described example shows that the use of options reduces a net selling price by the premium amount, but on the other hand it guarantees that the manufacturer in this business transaction will not suffer a loss. At the same time the profit is unlimited because the manufacturer delivers aluminium at any price the market sets, the loss cannot be realized because no matter how much the price falls, the net selling price stands at 1250 USD as a result of the put option.

In any case, one of the most important decisions facing a manufacturer who decides to hedge with options is the question of what exercise price of the option (and premium) to choose. In the given example the option was at-the-money (the current price and the exercise price of the option were the same). Suppose that the trader considered an option premium of 50 USD to be too high, in that case he would have bought a put option out-of-the-money at an exercise price of 1250 USD and he would have paid for it 25 USD. In that case, the guaranteed minimum selling price would have fallen to 1225 USD, but overall net result in case of price increase would have increased by 25 USD (compared to the situation with a premium of 50 USD).

2. Writing a call option for the purpose of hedging

The writer (seller) of a call option has the obligation to sell the underlying futures contract at the selected strike price level if the option is exercised by the call buyer. Selling calls against commodity being produced is typically presented as an income-producing strategy rather than a hedging strategy. Unlike a true hedge position, selling calls only gives the producer limited downside protection by the amount of the premium received, and may

obligate him or her to accept a short futures position if the market should move above the strike price level.

3. Initiating a Fence (selling a call and buying a put)

Another hedging technique which implies put and call options is the so-called **MinMax hedging**¹⁴ or **initiating a fence**. The main characteristic of this strategy is that a client forgoes advantages to be gained from the price change in a direction favourable for him, and in return, the price of buying instruments used to insure business transaction increases or dwindles. It has already been explained what buying a put option means for the manufacturer, but let us now examine what occurs when the manufacturer sells a call option? As previously said, the manufacturer can hedge his selling price by buying put options, however, there is a question of what if the option premium is too high and the manufacturer puts at risk the very cost effectiveness of his business if he pays the option premium. It is possible that a company does not accept any form of hedging that leads to any additional costs, and the premium definitely does that. In that case, instead of buying the put option, the manufacturer can sell the call option and earn the premium. What has been done in this way is fix the maximum selling price, so that a price increase above the one set in the call option (exercise price) has no bearing on the manufacturer. But, if the prices start moving in a direction unfavourable for him, i.e., if they start falling, then the overall yield earned by selling is increased by the premium amount.

The fence strategy consists of both selling call and buying put options, using out-of-the-money strike price levels. Some hedgers may view the fence strategy as a way to combine the best aspects of downside price protection and reduced premium expense with a limited amount of upside profit potential. The fence strategy establishes a range of possible hedge prices rather than one set price.

The manufacturer's **minmax hedging** will consist of buying a put option out-of-the-money (the exercise price below the current price) and simultaneously selling a call option out-of-the money (the exercise price above the current price). This sets a limit on the minimum (put option) and maximum price (call option). Any final price between these two extremes will cause expiration of both options. The manufacturer will simply sell metal at an appropriate price set on the day of delivery (the price is between the exercise prices of call and put options).

If we have a case where the price is below the exercise price of the purchased put option, then the put option will be exercised while the call option holder lets his option expire because the market price has fallen. Also, if the price increases above the price of the sold call option, it will be exercised while the put

¹⁴ Sampson, R., Crowson, P., *Managing metals price risk with the London Metal Exchange, LME*, London, 2005, p. 209-214.

option remains unused; in other words, the manufacturer delivers the goods at a price set in the sold call option, which suits him, since the price has increased.

If we assume that the aim of creating a minmax hedging is to use hedging without net costs (premiums for the purchased put option and sold call option have to be the same) then it is clear that the closer the exercise price of the purchased put option is to the current price, the narrower the minmax range. As it usually happens, there is a certain trade off in this situation as well, that is to say, a manufacturer is interested in participating in the price increase as much as possible, but let us see what that really means.¹¹ The manufacturer sells the call option and the farther away it is from the current price, the lower his premium (highest possible exercise price is better for him since it represent the ceiling of his selling price). However, as the premium for the sold call option decreases so does the available amount for buying the put option, which means that its exercise price is getting farther away from the current price, and thus it is less favourable for the manufacturer. So, it is better for the manufactures if the exercise price of the purchased put option is higher, but the exercise price of the sold call option should also be as high as possible. As it can be seen the relation between these two prices is set and considering costs restrictions, it is impossible to disrupt this unity. A simple example can serve to explain what has been said.

Example:

Suppose a wheat producer arranges a delivery of ten wheat contracts (50000 bushels) for a period of three months at the spot price at the time. Presently, the wheat price stands at 75 USD/bu and it completely suits the farmer. However, if he believes that in three months the wheat price could be even higher than the current price, he does not want to miss an opportunity for additional profit caused by the price increase. The farmer presently does not have available the amount required to buy a put option that would allow him to hedge in accordance with his expectations. He decides to use minmax hedging which guarantees both the maximum and minimum wheat price, without incurring additional costs. He implements this strategy by taking the following positions.

In order to purchase the so wanted put option first he has to raise some financial means and he does that by selling the call option. As we already know, the farmer tries to achieve the highest possible selling price so he wants the exercise price of the call option to be as high as possible. Option premiums depending on their exercise prices are given next:

Exercise price of call option	Premium
74 USD	10 USD
75 USD	8 USD
76 USD	6 USD
77 USD	4 USD

It would be ideal for the farmer to sell the call option at the highest possible price (which represents the ceiling of its selling price), but we should bear in mind that the farmer will invest the money, earned by selling the call option, in buying the put option (which represents his lowest price).

Premiums for put options are as follows.

Exercise price of put option	Premium
73 USD	4 USD
74 USD	6 USD
75 USD	8 USD
76 USD	10 USD

As it can be seen, the farmer has at his disposal an alternative to sell the call option on 77 USD for 4 USD and to buy for that money the put option on 75 USD. This example clearly shows that the farmer, if he wants to participate in the price increase, has to be prepared for the worse minimum price (if, for example, he had sold the call option on 76 USD, the minimum price he would have had to accept would have been 74 USD).

Let us see what happens if after three months the wheat price has increased to 80 USD. In that case, the call option holder exercises the call option and buys the wheat for 77 USD. The farmer's overall earnings would be as follows: $77 \text{ USD} \times 50\,000 \text{ bu} = 3\,850\,000 \text{ \$}$. The farmer would let the purchased put option expire, and there are no premium costs because they were compensated by selling the call option.

If the futures price has fallen to 70 USD, the situation would be as follows. The farmer would simply exercise the purchased put option and sell the wheat for 73 USD a bushel. In that case, overall earnings would be $3\,650\,000 \text{ \$}$.

Let us see what would happen if the price after three months remained at the same level of 75 USD. In that case, the farmer would let the put option expire (why sell for 73 if you can sell for 75) while the call option buyer would do the same thing (why buy for 77 if it costs 75 on the market), so they would make a profit of $3\,750\,000 \text{ \$}$.

A long hedger will need the underlying commodity at a later date and seeks to forward price the anticipated purchase. There are three basic long hedging strategies:¹⁵

1. Buying a call option,
2. Selling a put option,
3. Initiating a long fence (buying a call and selling a put).

¹⁵ CME Random Length Lumber Options, CME, 2005, p. 14.

Each strategy offers substantially different price protection and risk exposure.

1. Buying a call option for the purpose of hedging

Buying a call option gives a buyer the right to acquire certain commodity without exposing to risk of overpricing. On the other hand if the price falls substantially the buyer can easily abandon the option right and buy the commodity at a lowered price.

Example¹⁶:

In connection with the above mentioned examples, in this case we shall take a look at a position of a metal packaging manufacturer who will be a buyer on the LME looking to buy raw materials necessary for his production. The price of his finished products is estimated at 1200 USD. The buyer will purchase his products according to the spot price on the LME on the day of delivery. As it can be seen, the selling price is fixed whereas the buying price depends on market trends, so the situation is ideal for hedging.

Following the logic from the previous example it is obvious that the buyer of aluminium can protect himself by buying aluminium using futures (only if the futures price is acceptable), however the buyer can also think that the aluminium price is overpriced and in that case buying a call option would suit him better. If he is correct in forecasting that the spot price of aluminium in three months will be lower than the current futures price with a delivery date of three months, the buyer simply lets the option expire and buys aluminium at a lower price. However, if the aluminium price starts rising he can always use the call option and by exercising it he buys the option at the exercise price. In this case, the maximum price that the trader will pay for buying aluminium will be the same as the exercise price of the call option, increased by the premium amount.

In practice, with commodity futures trading we often come across the so-called **combination hedging**, and it is nothing more than a combination of hedging instruments. As we know, one can hedge by using futures contracts or options, however, there is a third possibility, and that is, not using hedging at all. If the combination hedging is used, the trader divides the whole delivery in three (not necessarily proportionate) parts and for each of these parts uses a different way of hedging. For example, he hedges a third of the delivery by using futures contracts, second third by using options, and leaves the last part uncovered. Depending on individual calculations of a particular trader the percentage he decides to hedge using different instruments does not always have to be the same. If a farmer believes that the price of his products will increase in future, he can

¹⁶ Sampson, R., Crowson, P., *Managing metals price risk with the London Metal Exchange, LME*, London, 2005, p. 176-182.

opt not to hedge 50 % of his overall production while he decides to hedge the remaining part using options and futures (25-25).

2. Writing put options

Writing puts against commodity that is going to be purchased is typically presented as cost-reducing strategy rather than a hedging strategy. Unlike a true long hedge position, selling puts only gives the producer limited upside protection by the amount of the premium received, and may obligate him or her to accept a long futures position if the market should move below the strike price level.

3. Initiating a Long Fence (buying a call and selling a put)

The long fence strategy consists of both selling put and buying call options using out-of-the-money strike price levels. Some long hedgers may view the fence strategy as a way to combine the best aspects of unlimited upside price protection and reduced premium expense with a limited amount of downside profit potential. The fence strategy establishes a range of possible purchase prices rather than one set price.

Table 1. shows the results from studies made across different countries whose aim was to investigate to what measure nonfinancial firms use derivatives altogether and special kind of derivatives.

Table 1.
Survey evidence of derivatives use by nonfinancial corporations

Study	Sample	Country	Per cent derivatives	Per cent forwards	Per cent futures	Per cent options
Bartram et al., 2003	7263 firms	48 countries	60.3	37.9	4.4	16.3
El-Masry, 2003	173 firms	UK	67.0	29.0	13.0	46.1
Guay and Kothari, 2002	413 firms	USA	56.7			
Bodnar et al., 2001	84 firms	The Netherlands	59.5	57.7	2.0	20.3
Fatemi and Glaum, 2000	71 firms	Germany	88.0			
Prevost et al., 2000	155 firms	New Zealand	67.1	14.4	2.7	33.6

Source: Sohnke, M.B., p. 166.

5. CONCLUSION

Although most economic theorists, as well as business people, agree on the fact that futures trading in any form encourages the development of the entire economy, the fact remains that in most countries this form of trading has not been fully implemented in practice. Although one article does not suffice to show all principles and inexhaustible advantages offered by the use of futures trading, even several shown examples are enough to give an idea of its importance. On the other hand, the fact that futures trading remains in its early stages in most countries, does not mean that shown examples are only theoretical. Big world companies, no matter their geographical position, have been using the mentioned instruments for decades. In addition, companies originating in smaller countries trade successfully on futures markets, on condition that these markets are in developed countries. Unfortunately, difficulty experienced by companies from small countries when trading on futures markets, lies not only in possible administrative obstacles but also in insufficient knowledge of techniques and lack of experience in futures trading. Of great importance for the development and use of futures market is also the role of the state which can provide incentives to the development of the economy in general, by ensuring high quality education and establishing an appropriate legal framework for the use of futures trading.

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**HEDGING OPCIJA KAO SREDSTVO ELIMINACIJE
RIZIKA CIJENE****Sažetak**

Rizik cijene smatra se jednim od najznačajnijih rizika s kojim se suočava većina vanjskotrgovinskih kompanija. S ovog aspekta, upotreba modernih ročnih tržišta može se smatrati temeljnim uvjetom za preživljavanje većine poslovnih djelatnosti. Što se tiče osiguranja, hedging je u upotrebi već više od jednog stoljeća, no njegovi su oblici vremenom evolvirali. S druge strane, opcije se mogu smatrati kao najsofisticiraniji instrument kojega ročno tržište nudi u ovom trenutku. Cilj ovog rada je pokazati kako se opcije, koje se inače smatraju glavnim oružjem protiv špekulacija, mogu uspješno koristiti kao sredstvo za eliminaciju rizika cijene.

Ključne riječi: hedging, rizik cijene, opcije, ročno tržište

JEL classification: F19, G13