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Redakcja wydawnicza: Anna Grzybowska, Aleksandra Śliwka

Redakcja techniczna: Barbara Łopusiewicz

Korekta: Barbara Cibis

Łamanie: Adam Dębski

Projekt okładki: Beata Dębska

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tel./fax 71 36 80 602; e-mail: econbook@ue.wroc.pl
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Spis treści

Wstęp

Z wielką przyjemnością oddajemy w Państwa ręce publikację pt. *Polityka ekonomiczna*, wydaną w ramach Prac Naukowych Uniwersytetu Ekonomicznego we Wrocławiu. Opracowanie składa się z 58 artykułów (w tym 5 w języku angielskim), w których Autorzy prezentują wyniki badań dotyczących zagadnień związanych z funkcjonowaniem współczesnych systemów gospodarczych w zakresie polityki gospodarczej. Tematyka podjęta w artykułach jest stosunkowo szeroka – mieści się w czterech obszarach problemowych. Pierwszy przedstawia rozważania związane z polityką innowacyjną, wolnością prowadzenia działalności gospodarczej oraz formami współpracy przedsiębiorstw. Drugi obszar dotyczy polityki transportowej, w tym infrastruktury i konkurencji. Trzeci obejmuje opracowania z zakresu polityki społecznej i zdrowotnej państwa – na poziomie zarówno krajowym, jak i lokalnym. Czwartą grupę stanowią artykuły dotyczące rolnictwa, w tym szczególnie wspólnej polityki rolnej i przemian w strukturze agrarnej.

Publikacja przeznaczona jest dla pracowników naukowych szkół wyższych, specjalistów zajmujących się w praktyce problematyką ekonomiczną, studentów studiów ekonomicznych oraz słuchaczy studiów podyplomowych i doktoranckich.

Artykuły składające się na niniejszy zbiór były recenzowane przez samodzielnych pracowników naukowych uniwersytetów, w większości kierowników katedr polityki ekonomicznej. W tym miejscu chcielibyśmy serdecznie podziękować za wnikliwe i rzetelne recenzje, często inspirujące do dalszych badań. Oddając powyższą publikację do rąk naszych Czytelników, wyrażamy nadzieję, że ze względu na jej wszechstronny charakter spotka się ona z zainteresowaniem i przyczyni do rozpoczęcia inspirujących dyskusji naukowych.

Jerzy Sokołowski, Grażyna Węgrzyn

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Anna Zielińska-Chmielewska, Mirosław Walawski
Poznań University of Economics and Business
e-mails: anna.zielinska@ue.poznan.pl, miroslaw.walawski@ue.poznan.pl

THE USE OF FUTURES RAPESEED CONTRACTS EXEMPLIFIED BY A TRADING COMPANY IN POLAND

ZASTOSOWANIE KONTRAKTÓW *FUTURES* NA RZEPAK PRZEZ PRZEDSIĘBIORSTWA HANDLOWE W POLSCE

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Summary: This article focuses on specific aspects of price risk management in agricultural business, with the aim of discussing a relevant hedging method for managing the commodity risks associated with agricultural production. The purpose of the paper is to carry out a simulation of *futures* contracts on rapeseed offered by a foreign commodity exchange. The Euronext platform allows hedging of raw material purchase prices for rapeseed trading company operating in Poland. The analysis showed that in the analyzed crop year from July 2014 to June 2015 much better economic effect was observed for unhedged transactions rather than for hedged transactions. The simulation showed that hedging transactions are used to minimize the risk but under no circumstances can they eliminate it. Additionally, hedging transactions protect against negative currency rate changes and bring profits in case of positive price fluctuation.

Key words: commodity price management, hedging, futures contract, Euronext, Poland.

Streszczenie: Celem artykułu było przeprowadzenie rachunku symulacyjnego w zakresie wykorzystania kontraktów terminowych typu *futures* oferowanych na giełdzie towarowej Euronext w celu zabezpieczania cen zakupu rzepaku przez przedsiębiorstwo handlowe w Polsce. Do analizy wykorzystano dane w postaci historycznych cen kontraktów *futures* na rzepak na polskim rynku gotówkowym (spot) i na europejskiej giełdzie terminowej Euronext. Wyniki badań wykazały, że stosowanie technik zabezpieczania cen zakupu rzepaku w celu zabezpieczenia jego ceny w przyszłości umożliwia ograniczenie strat ekonomicznych, wpływając na poziom wypracowanych wyników (zysków bądź strat) prowadzonej działalności. Artykuł stanowi kontynuację badań nad specyfiką i zróżnicowaniem poziomu efektywności podmiotów agrobiznesu w Polsce. Otrzymane wyniki i rezultaty wcześniejszych opracowań uzasadniają konieczność prowadzenia dalszych prac w tym zakresie, także przy wykorzystaniu kontraktów *futures*.

Słowa kluczowe: zarządzanie ceną, giełda towarowa, kontrakty *futures*, Euronext, Polska.

1. Introduction

Each enterprise involved in a business activity is exposed to different threats and risks. Business entities acting in agricultural markets are subject to cyclical, seasonal and production fluctuations in prices, characterized by high price elasticity of supply and low elasticity of consumer demand. These characteristics cause a high risk of price volatility in the industry, and trigger a need for securing a specific price level for raw material and, consequently, production costs as well as corporate profits. Polish participants in the rapeseed market who wish to protect future raw material prices using derivatives have to use the foreign futures markets, since the current markets in Poland do not create conditions for regular rapeseed futures. This situation is an impediment to the development of the future market instruments, but does not eliminate the possibility of their use by participants on the Polish rapeseed market.

The aim of the article is to determine the economic effects of the rapeseed *futures* available on the Euronext commodity exchange in order to hedge the purchase price of rapeseed through a hypothetical trading rapeseed company operating in Poland. In the paper the scientific hypothesis has been put forward that the Polish rapeseed market is part of the European rapeseed market, and is subjected to similar long-term price trends. Therefore, it can be concluded that there exists a potential for using derivatives markets for goods offered by foreign stock exchanges to protect the domestic prices of rapeseed.

1.1. Different risks in business activity

Sources of the word *risk* can be found in the Greek word *Rhiz*, which refers to the daring circumnavigation of a cape. The Latin word *risicum* refers to the probability of positive or negative consequences of an event, or its success or failure [*Słownik*… 2009]. Colloquially, risk is understood as an adverse result of a decision. The risk is a concept present in almost all the achievements of science, in particular social, mathematical, and engineering. Mutual coexistence of concepts, theories, and methods of measurement made contemporary knowledge about risk interdisciplinary, based on a common foundation [Urbanowska-Sojkin (ed.) 2012].

In the literature, there are various attempts to systematize the concept of risk and uncertainty, and to determine the relationship between them. In the traditional sense, risk can be defined as "stochastic elements of the decision problem, which can be defined as numerical objective probabilities, while uncertainty refers to the conditions of decision-making with random results, in which probabilities cannot be determined in an objective manner" [Moshini, Hennessy 2001; Rembisz 2012]. These authors are of the opinion that uncertainty is used to characterize the environment in which decisions are made, while the risk is used to determine the economic consequences of the decision-making under uncertainty.

However, it is widely understood that risk is "uncertainty in the results" [Commission 2001]. Guided by this understanding of risks and uncertainties, it may be concluded that the level of risk generally rises significantly the longer the time horizon is, which will reveal the effects of the decisions taken. This relationship is obvious, because, firstly, the longer the perspective of time, the greater the uncertainty about the conditions that occur in the distant future. Secondly, an additional risk arises with the timing of the measurement: At first, the risk can only be estimated, but after actual results are achieved, the real risk is revealed, as opposed to the original estimate. Thus, policy-makers make a subjective assessment of the risks ex ante (perceived subjective risk), not having full knowledge of the likely course of events.

On the basis of the above mentioned concepts of risk in business, the authors of the paper understand risk as the possibility of failure to achieve objectives, including losses due to lack of all necessary information [Kaczmarek 2008].

2. Material and methods

In this study, secondary research materials derived from price reports of the commodity exchange Euronext and historical quotations exchange rates from the National Bank of Poland, as well as from trade studies and domestic and foreign literature, were used. In the paper, a descriptive and comparative data analysis, supplemented with graphical presentation of the results in the form of tables and graphs, was presented.

The analysis covered the crop year 2014-2015. The hypothesis formulated in the article is that despite the lack of access in Poland to *futures* contracts, it is still possible for Polish rapeseed trading companies to use Euronext *futures*, in order to hedge the price of rapeseed on the domestic spot market. The formulated hypothesis was verified by conducting a simulation on economic effect of hedged and non-hedged *futures* contracts on rapeseed.

2.1. Hedging the rapeseed price with futures contracts

The primary objective of the hedging transactions is the neutralization of risk. This part of the paper presents the essence and the mechanism of hedging transactions, using *futures* contracts to trade agricultural products. Polish and foreign literature describing the issues of hedging and *futures* was reviewed. The authors presented a mechanism for hedging transactions with possible market scenarios.

Hedging contracts can be used in various derivative instruments. The focus of the paper is placed on *futures* contracts. In the literature, derivatives are classified as financial instruments, the main purpose of which is the transfer of risk, not capital, as it is done in equity instruments (shares) and debt instruments. The value of a derivative depends on the value of another instrument called "the base". There are three main objectives for the use of derivatives, which is hedge against exchange

risks, speculation, as well as arbitrage. It should be emphasized that any derivative is a contract between two parties, and due to this type of relationship derivatives are divided into two types [Jajuga 2009]:

1. *Futures* meaning future or forward contracts, and swaps, where both parties undertake obligations. *Futures* are contracts to buy or sell a final quantity of specific assets (goods) at a specified time in the future at a given price [Hull 1998; Tauser, Cajka 2014],

2. Options where one party acquires the right and the other the commitment. Options are contracts. A contract allows a holder to buy or sell an underlying security at a given price known as the strike price. The two most common types of options contracts are *put* and *call* options, which give the holder-buyer the right to sell or buy the underlying option at the strike if the price of the underlying option crosses the strike [Jerzak 2013; Zalewski 2010].

3. Results

Rapeseed is one of the most important oil seeds produced in Europe. In Europe, rapeseed crushed into oil, meal, or meal cake is used by local companies for domestic purposes. Out of all 28 European Union (EU) countries, Poland is the third largest producer of rapeseed with a total production equal to 2,778,000 Mt in the crop year 2013/2014; 3,276,000 Mt in the crop year 2014/2015; 2,779,000 Mt in 2015/2016, and forecast of 2,764,000 Mt in 2016/2017.

Due to a favorable climate and excellent quality of soil, Polish rapeseed production, located in the northern and western parts of the country, makes up 97% of all oil seed production in Poland. After Poland's accession to the EU, the rapeseed production has sharply risen from below 1 Mt to 1,8 m Mt on an yearly average in the period from 2004-2008, up to 2,4 Mt on an yearly average from the period 2009-2014 [*Rynek rzepaku*… 2015]. Rapeseed overproduction in Poland is exported to EU countries. The increase in Polish rapeseed production could not happen without the increase in sown area. For example, in 2004 the sown area hovered around 4% and doubled in 2009. As a result, Polish rapeseed production is one of the most dynamic in Europe. Furthermore, the EU policy regarding biofuels created additional demand for rapeseed oil. Poland is able to process and consume on average 72% of all its harvested rapeseed, and export the remaining 28% to Germany, Belgium and the Netherlands. Worldwide, the best known players in the processing industry are ADM, Bunge and Glencore − also active in Poland.

Moreover, prices of rapeseed in Poland are regulated by supply and demand as a result of EU policy, and the Polish government does not intervene in the pricing or purchasing of it. Import and export of oilseed is not protected by any duties [Strategié Grains… 2015].

In Table 1 below, rapeseed *futures* contract specifications from the Euronext commodity exchange market are shown; the rapeseed *futures* contract traded on

the Euronext-Matiff includes many specific details. The most important factor is rapeseed quality, which depends on many external factors, such as sown seed and crop condition [Ziegelbäck, Breuer 2014].

Table 1. Rape *futures* contract specification

Unit of trading	50 Metric Ton
Delivery months	February, May, August, November
Minimum price movement (tick size and value)	25 Euro cents per ton
Last trading day	6:30 on the last business day of the calendar month immediately preceding the delivery month
Trading Hours	10.45 am - 6.30 pm Paris time
Quality	Conventional rapeseed of double zero variety, of sound, fair and merchantable quality and of the following standard quality: Oil content basis 40%; Moisture basis 9%; Impurities basis 2%. The quality of the deliverable merchandise is defined: Moisture content maximum 10%; Impurities content maximum 3%; Oleic acidity maximum 2%; Erucic acid content maximum 2%; Glucosinolates content maximum 25 micromoles. Premiums and discounts apply and correspond to the difference between the delivered and standard quality.

Source: [http://www.derivatives.euronext.com/en/products/commodities-futures/ECO-DPAR/contract-specification].

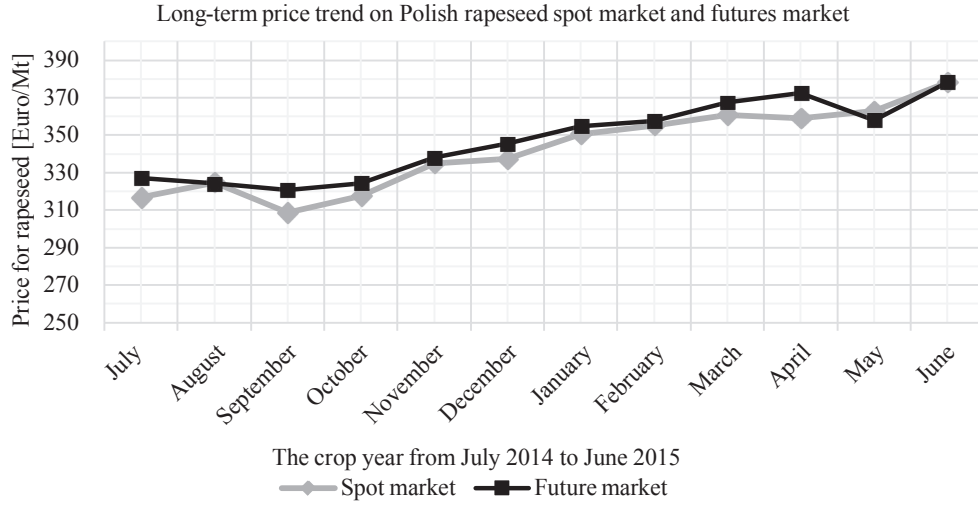

Figure 1. Presentation of long-term price trend on the Polish rapeseed spot market and commodity exchange market of Euronext in the analyzed crop year from July 2014-June 2015.

Source: own research based on Annual Data derived from the Central Statistical Office of Poland in the period 2014-2015 and historical data from future commodity exchange in Euronext and [http://www.nbp.pl].

Prices in Poland fluctuated in the crop year depending on the situation on the local and global markets (see Figure 1). As a result of fluctuation, companies should hedge to avoid the negative effect of price changes. Nevertheless, hedging is not always a suitable tool for avoiding a negative hedge effect, but can also lead to negative economic effects.

In Figure 1, two curves show the development of historical rapeseed prices on the domestic spot market and historical prices for rapeseed at the Euronext stock exchange. Long-term trends in prices on the spot market for rapeseed in Poland and at Euronext stock exchange market proceeded in a similar way. However, during the analyzed periods there were months in which trends were not consistent, for example, beginning from February to July 2014. The matching correlation of both markets' price trends allow for the use of *futures* contracts available on the stock exchange, in order to secure purchase prices for rapeseed by rapeseed trading enterprises in Poland.

Before analyzing the economic effects of hedged and non-hedged rapeseed *future*s contracts, the assumptions for the simulation must be presented:

1. In connection to forecasts of high, unexpected fluctuation of rapeseed prices on the local spot market in Poland in the up-coming crop year starting from July 2014 to June 2015 one of the biggest rapeseed trading enterprises operating in Poland and with the largest market share decided to secure the purchase price of rapeseed in the period of the analysis.
2. The implementation of the hedging strategy for rapeseed *futures* contracts resulted in opening long position by the analyzed rapeseed trading company by purchase of:

a) four one-month rapeseed *future*s contract in August 2014, October 2014, February 2015, May 2014,

b) three two-month rapeseed *future*s contract in August 2014, October 2014 and February 2015, which means that all together there are seven samples of economic effect of hedged versus non-hedged transactions.

3. Long position is maintained throughout the contract. Before the date of fulfillment of the contract the position is closed. There is no intention of a physical purchase of the contract but the financial settlement. The rolling of the position is not used.
4. The analyzed rapeseed trading company is always acting as an individual investor, securing the price of rapeseed at a future date.
5. In order to hedge, the transactions were taken from Euronext rapeseed *futures* (monthly prices) with the nearest expiration date (see examples below).
6. In each month the purchase and the sale basis were calculated as well as economic effect, which is the difference between the purchase and the sale basis.

The simulation of opening and closing positions allowed us to assess the economic effects of hedging with the use of one and two-month contracts. The economic effect is calculated on the basis of purchases and sale prices, where the basis is defined as a difference between market price and *futures* price.

Table 2. Presentation of the economic effects of one-month hedged and non-hedged transactions on the Polish spot market and future market on rapeseed at Euronext in 2014-2015

Duration of the transaction	SPOT MARKET	FUTURE MARKET
1	2	3
The first hedged transaction		
The beginning of the hedged transaction in August 2014	Planning of the purchase of 50 Mt of rapeseed at current market price 324.65 Euro/Mt	The purchase of 50 Mt rapeseed resulted in 1 lot sale *futures* contract at 324.25 to hedge this transaction
Purchase basis	324.65 − 324.25 = 0.40	
The closure of the hedge transaction in September 2014	Planning of the sale of 50 Mt of rapeseed at current market price 308.62 Euro/Mt	The sale of 50 Mt rapeseed resulted in 1 lot purchase *futures* contract at 320.73 to hedge this transaction
Sale basis	308.62 − 320.73 = −12.11	
Economic effect of the transaction	LOSS equal to 12.51	
The non-hedged transaction		
Purchase of 50 Mt of rapeseed in August 2014	Planning of the purchase of 50 Mt of rapeseed at current market price 324.65 Euro/Mt	
Sale of 50 Mt of rapeseed in September 2015	Planning of the sale of 50 metric tons of rapeseed. The current market price is 308.62 Euro/Mt	
Economic effect of the transaction	LOSS equal to 16.03	
The second hedged transaction		
The beginning of the hedged transaction in October 2014	Planning of the purchase of 50 Mt of rapeseed at current market price 334.94 Euro/Mt	The purchase of 50 Mt rapeseed resulted in 1 lot sale *futures* contract at 338.02 to hedge this transaction
Purchase basis	334.94 − 338.02= −3.08	
The closure of the hedged transaction in November 2014	Planning of the sale of 50 metric tons of rapeseed at current market price 337.33 Euro/Mt	The sale of 50 Mt rapeseed resulted in 1 lot purchase *futures* contract at 345.37 to hedge this transaction
Sale basis	337.33 − 345.37 = − 8.04	
Economic effect of the transaction	LOSS equal to 4.96	
Non-hedged transaction		
Purchase of 50 Mt of rapeseed in October 2014	Planning of the purchase of 50 Mt of rapeseed at current market price 334.94 euro/Mt	
Sale of 50 Mt of rapeseed in November 2015	Planning of the sale of 50 Mt of rapeseed at current market price 337.33 Euro/Mt	
Economic effect of the transaction	GAIN equal to 2.39	

Table 2. cont.

1	2	3
The third hedged transaction		
The beginning of the hedged transaction In February 2015	Planning of the purchase of 50 Mt of rapeseed at current market price 355.28 Euro/Mt	The purchase of 50 Mt rapeseed resulted in 1 lot sale *futures* contract at 357.45 to hedge this transaction
Purchase basis	355.28 − 357.45 = − 2.17	
The closure of the hedge transaction in March 2015	Planning of the sale of 50 Mt of rapeseed at current market price 360.89 Euro/Mt	The sale of 50 Mt rapeseed resulted in 1 lot purchase *futures* contract at 367.36 to hedge transactions
Sale basis	360.89 − 367.36 = −6.47	
Economic effect of the transaction	LOSS equal to 4.30	
Non-hedged transaction		
Purchase of 50 Mt of rapeseed in February 2015	Planning of the purchase of 50 metric tons of rapeseed at current market price 355.28 Euro/Mt	
Sale of 50 Mt of rapeseed in March 2015	Planning of the sale of 50 Mt of rapeseed at current market price 360.89 Euro/Mt	
Economic effect of the transaction	GAIN equal to 5.61	
The fourth one-month hedged transaction		
The beginning of the hedged transaction in May 2015	Planning of the purchase of 50 Mt of rapeseed at current market price 362.76 Euro/Mt	The purchase of 50 Mt rapeseed resulted in 1 lot sale *futures* contract at 357.80 to hedge this transaction
Purchase basis	362.76 − 357.80 = 4.96	
The closure of the hedged transaction in June 2015	Planning of the sale of 50 Mt of rapeseed at current market price 378.19 Euro/Mt	The sale of 50 Mt rapeseed resulted in 1 lot purchase *futures* contract at 378.20 to hedge this transaction
Sale basis	378.19 − 378.20 = −0.01	
Economic effect of the transaction	LOSS equal to 4.97	
Non-hedged transactions		
Purchase of 50 Mt of rapeseed in May 2015	Planning of the purchase of 50 metric tons of rapeseed The current market price is 362.76 euro/Mt	
Sale of 50 Mt of rapeseed in June 2015	Planning of the sale of 50 metric tons of rapeseed The current market price is 378.19 euro/Mt	
Economic effect of the transaction	GAIN equal to 15.43	

Source: own preparation based on Annual Data derived from the Central Statistical Office of Poland in the period 2014-2015 and historical data from *futures* commodity exchange in Euronext and [http://www.nbp.pl].

In the first hedged transaction starting from August 2014 to September 2014, a one-month *futures* transaction was made, which resulted in the loss equal to 12.51 Euro/Mt. But still it had a smaller negative economic effect compared to the loss of 16.03 Euro/Mt observed on the spot market resulting from the purchase of a non-hedged rapeseed contract.

In the second hedged transaction starting from October 2014 to November 2014, a one-month *futures* transaction was observed, which resulted in the loss of 4.96 Euro/Mt. However, on the domestic spot market the gain of 2.39 Euro/Mt resulting from the fact of non-hedged rapeseed contract, was observed.

In the third hedged transaction starting from February 2014 to March 2014, a one-month *futures* transaction was made and resulted in the loss of 4.30 Euro/Mt. On the other hand, on the domestic spot market the gain of 5.61 Euro/Mt resulting from the fact of non-hedged rapeseed contract, was observed.

In the fourth hedged transaction starting from May 2014 to June 2014, a one-month *futures* transaction was made and resulted in the loss of 4.97 Euro/Mt. Yet, on the domestic spot market the gain of 15.43 Euro/Mt resulting from the fact of non-hedged rapeseed contract, was observed.

To sum up the results of one-month hedged *versus* non-hedged contracts, it must be said that in the analyzed crop year 2014-2015 loss equal to 26.74 Euro/Mt has been observed on the *futures* market. In the same analyzed period gain equal to 7.4 Euro/Mt has been observed on the spot market. Nevertheless, it should be stressed that hedging strategy undertaken in the analyzed crop year was a source of additional loss and depended on the current market situation and correlation between market prices and commodity prices.

Table 3. Presentation of the economic effects of two-month hedged and non-hedged transactions on the Polish spot market and futures market on rapeseed at Euronext in 2014-2015

Duration of the transaction	SPOT MARKET	FUTURES MARKET
1	2	3
The first two-month hedged transaction		
The beginning of the hedged transaction in August 2014	Planning of the purchase of 50 Mt of rapeseed at current market price 324.65 Euro/Mt	The purchase of 50 Mt rapeseed resulted in 1 lot sale *futures* contract at 324.25 to hedge this transaction
Purchase basis	324.65 − 324.25 = 0.40	
The closure of the hedged transaction in October 2014	Planning of the sale of 50 Mt of rapeseed at current market price 317.71 Euro/Mt	The sale of 50 Mt rapeseed resulted in 1 lot purchase *futures* contract at 324.40 to hedge this transaction
Sale basis	317.71 − 324.40 = −6.69	
Economic effect of the transaction	LOSS equal to 7.09	
Non-hedged transactions		
Purchase of 50 Mt of rapeseed in August 2014	Planning of the purchase of 50 Mt of rapeseed at current market price 324.65 Euro/Mt	

Table 3. cont.

1	2	3
Sale of 50 Mt of rapeseed in October 2014	Planning of the sale of 50 Mt of rapeseed at current market price 317.71 Euro/Mt	
Economic effect of the transaction	LOSS equal to 6.94	
The second two-month hedged transaction		
The beginning of the hedged transaction in October 2014	Planning of the purchase of 50 Mt of rapeseed at current market price 334.94 Euro/Mt	The purchase of 50 Mt rapeseed resulted in 1 lot sale *futures* contract at 338.02 to hedge this transaction
Purchase basis	334.94b− 338.02 = −3.08	
The closure of the hedged transaction on January 2015	Planning of the sale of 50 metric tons of rapeseed The current market price is 350.61 euro/Mt	The sale of 50 Mt rapeseed resulted in 1 lot purchase futures contract at 354.79 to hedge transactions
Sale basis	350.61 − 354.79 = −4.18	
Economic effect of the transaction	LOSS equal to 1.10	
Non-hedged transactions		
Purchase of 50 Mt of rapeseed in October 2014	Planning of the purchase of 50 Mt of rapeseed at current market price 334.94 Euro/Mt	
Sale of 50 Mt of rapeseed in January 2015	Planning of the sale of 50 Mt of rapeseed at current market price 350.61 Euro/Mt	
Economic effect of the transaction	GAIN equal to 15.67	
The third two-month hedged transaction		
The beginning of the hedged transaction in February 2015	Planning of the purchase of 50 Mt of rapeseed at current market price 355.28 Euro/Mt	The purchase of 50 Mt rapeseed resulted in 1 lot sale *futures* contract at 357.45 to hedge this transaction
Purchase basis	355.28 − 357.45 = −2.17	
The closure of the hedged transaction in April 2015	Planning of the sale of 50 Mt of rapeseed at current market price is 359.02 Euro/Mt	The sale of 50 Mt rapeseed resulted in 1 lot purchase *futures* contract at 72.57 to hedge this transaction
Sale basis	359.02−372.57= − 13.55	
Economic effect of the transaction	LOSS equal to 11.38	
Non-hedged transactions		
Purchase of 50 Mt of rapeseed in February 2015	Planning of the purchase of 50 Mt of rapeseed at current market price 355.28 Euro/Mt	
Sale of 50 Mt of rapeseed in April 2015	Planning of the sale of 50 Mt of rapeseed at current market price is 359.02 Euro/Mt	
Economic effect of the transaction	GAIN equal to 3.74	

Source: own preparation based on Annual Data derived from the Central Statistical Office of Poland in the period 2014-2015 and historical data from future commodity exchange in Euronext and [http://www.nbp.pl].

In the first hedged transaction starting from August 2014 to October 2014, a two-month *futures* transaction was made, which resulted in the loss equal to 7.09 Euro/Mt, which had a bigger negative economic effect compared to the loss of 6.94 Euro/Mt observed on the spot market resulting from the purchase of a non-hedged rapeseed contract.

In the second hedged transaction starting from October 2014 to December 2014, a two-month *futures* transaction was observed, which resulted in the loss of 1.10 Euro/Mt. On the other hand, on the domestic spot market the enormous gain was noted of 15.67 Euro/Mt resulting from the fact of non-hedged rapeseed contract.

In the third hedged transaction starting from February 2015 to April 2015, a two-month *futures* transaction was made and resulted in the loss of 11.8 Euro/Mt. Alternatively, a gain of 374 Euro/Mt was noted on the domestic spot market as a result of the non-hedged rapeseed contract.

To sum up, the results of two-month hedged *versus* non-hedged contracts in the analyzed crop year 2014-2015 show the loss equaling 19.57 Euro/Mt on the futures market. In the same analyzed period gain equal to 12.47 Euro/Mt was observed on the spot.

The simulation showed that hedging transactions are used to minimize the risk but under no circumstances can they eliminate it. Additionally, hedging transactions protect against negative currency rate changes and bring profits in case of positive price fluctuation.

4. Conclusions

The results of the analysis and evaluation of the economic viability of the use of *futures* contracts for rapeseed trading enterprises in Poland in 2014-2015 allow us to make the following general and specific applications, and draw important insights:

1. The procedure for classification of rapeseed trading enterprises on the basis of their financial status has enabled the selection of those entities that may be potential participants in trading commodity *futures* markets.
2. The speculation analysis provides objectified distribution of rapeseed trading enterprises from the standpoint of minimizing the risk of an increase in purchase of rapeseed.
3. The spatial arrangement of rapeseed trading enterprises had no effect on the economic results obtained in a simulation.
4. The simulation which showed the use of foreign commodity markets by one of the rapeseed trading enterprises with the largest share of the marked has shown that to hedge the purchase of rapeseed is technically and organizationally possible and highly desirable.
5. During the time of analysis, rapeseed prices on the domestic market and observed Euronext prices developed in a very similar way, which means that both market prices followed similar price trends.

6. Use of the *futures* on Euronext to secure purchase of rapeseed prices for any trading enterprise over a long period could have been beneficial. Positive economic effect of hedging was not observed but hedging allows to gain additional income.

7. In the analyzed crop year from July 2014 to June 2015 much better economic effect was observed for either one-month or for two-month non-hedged contracts.

8. Higher variation of economic effects (gain or loss) was noted for hedged contracts and lower variation of economic effects was noted for non-hedged contracts.

9. In most cases, stronger positive or negative economic effects were observed for hedged transitions closed after a two-month period than after a one-month period. This is a more reasonable result, as the longer the period of transition is, the more convenient the outcome can be.

10. The hedging strategy can be a source of additional gain or loss, depending on the market situation and correlation between market prices and commodity prices.

11. There is no universal strategy of hedging, but the decision of taking a position (opening and closing) should be made based on market analyses.

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