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PRICE RISK MANAGEMENT TECHNIQUES IN TERMS OF POSSIBILITIES OF DEVELOPING COMMODITY DERIVATIVES IN POLISH AGRICULTURE

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ABSTRACT. This paper is divided into two sections: the objective of the first section concerns identification of price risk volatility system protection. The second section presents measurement and evaluation of the level of price volatility (on wheat and rye markets).

Key words: commodity market, derivatives, price, price risk, diversification, integration

Introduction

Risk is a basic fact of life in farming. In many areas yield risk due to the weather and pest problem is considerable. Also agriculture due to such a long production cycle and slow capital technology turnover is particularly exposed to production and economic risk. Instability of incomes is induced into price fluctuation of agricultural products.

Price risk has long been a major concern in farming, and that risk seems to have been increased by greater reliance on international markets by changes in agricultural policy.

In upcoming future Polish farmers will be facing the problem of price risk management. In order to ensure themselves profitable production, they will have to protect future products' prices and gain from price risk management methods.

In the specialist literature are mentioned many different price risk management methods and techniques. In the group of individual technique as basic ones are mentioned:

- mutualisation – formation of producers' organizations and producers' cooperative,
- diversification – concern direction of production and time of selling goods.

In agriculture there are shown great possibilities of derivatives instruments on the commodity exchange and their significant role in order to use them in price risk management.

Polish agricultural market in the last decade is known for unstable, changeable production conditions and prices of basic agricultural goods, especially wheat and rye markets.

All statements mentioned above induce us to conduct research on possibilities of benefiting from instruments of products' derivatives in Polish agricultural as the market tools in price risk management and stabilization in product price. Also in the research was accomplished evaluation of price level volatility as a basic factor in terms of functioning commodity derivatives.

The research has been conducted in the Department of Food Management Economics of The August Cieszkowski Agricultural University of Poznań.

Material and methods

This paper is divided into two sections: the objective of the first section concerns identification of price risk volatility system protection. The second section presents measurement and evaluation the level of price volatility (only selected agriculture products: rye and wheat).

Primary data for the identification of price risk management techniques were collected from 60 research units among farms in the Wielkopolska region. The project research was implemented in 2002-2003. For the project research was used questionnaire method (direct interview).

Secondary data and indirect information were gained from Central Statistical Office (CSO) statistic publication, from Institute of Agricultural and Food Economics, domestic and foreign literature (publications, reports, papers, analysis), concerning prices of wheat and rye in Poland, within period 1990-2001.

In the evaluation of the price volatility was measured the dynamic effects, classical position measurement (arithmetical mean) and classical variability measurement (mean square, standard deviation, coefficient of variation).

Individual price risk management techniques

In the conducted research the respondents considered agricultural production as being on high and average risk level. Due to this situation producers are searching for different methods that may help them to minimize that risk. Moreover, all respondents feel needs to stabilize and protect agricultural production prices on the defined level.

Among the respondents, 84% preferred gaining lower guarantee price but in stabilized market situation. Only 16% of the farmers preferred having chance to gain higher price on unstable market with uncertain sale and prices.

Specificity of agricultural production, price variability caused that farmers are searching for optimal solutions that may help them restrict price risk management.

In the conducted research identification of price risk management tools used by farmers were implemented. To the most common chosen methods were: production diversification (45%), horizontal integration (19%), and vertical integration (28%).

Only 8% of the respondents pointed national intervention as a political tool of intervention on market. None of the respondents pointed on possibilities of using derivatives instruments on the commodity exchange to protect their prices.

Below are presented the results of the research in that field.

Production diversification

The analyzed farms were multidirectional production oriented. All respondents, except cultivation of field, bred animals in purpose of gaining milk, pork livestock, which are sold in certain period of time. More than half of respondents ran poultry breeding, and only 2% of them bred sheep. In practise, farmers have traditionally used crop diversification in order to manage farm income risk. Through time, farmers have been specialising in a few products in order to decrease production cost, increasing farming size.

Figure 1 shows that 68% of respondents consider diversification as a good price risk protection tool, 22% as a poor, while 10% recognize diversification as a very good method.

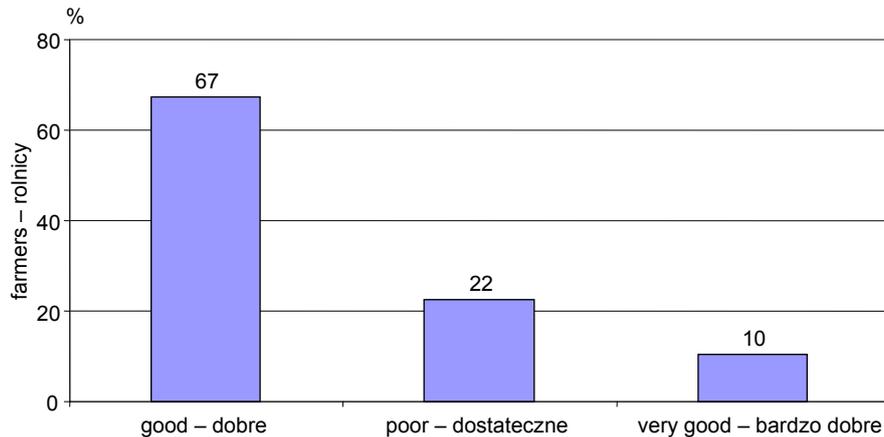


Fig. 1. Perception of production diversification as risk loss protection techniques
Ryc. 1. Postrzeganie różnicowania produkcji jako techniki przeciwdziałania ryzyku strat

Horizontal integration

40% of the pollee is running agricultural production under a formal producer group. The farmers percept this type of running their farms as a very good tool to reduce price risk and outlet risk.

Producer groups are of great importance in price stabilization on producer level. Horizontal integration distributes price risk between all participants of the group. An individual farmer does not have any possibilities to influence market prices. Their chances are growing up when they act together and in solidarity.

Vertical integration

Another price risk management tool used by the farmers was vertical integration.

Vertically integrated companies are united through hierarchy and share a common owner. Each member of the hierarchy usually produces a different product and the products are combined to satisfy common needs.

Among the respondents 68% produce on the basis of vertical integration (Fig. 2). However, in most cases in contracts they do not fix the price for products, in practice; contracts only make them confident to sell their products. 53% of the farmers sign an agreement with sugar factories, 18% cooperate with milk cooperatives acting in the Wielkopolska region.

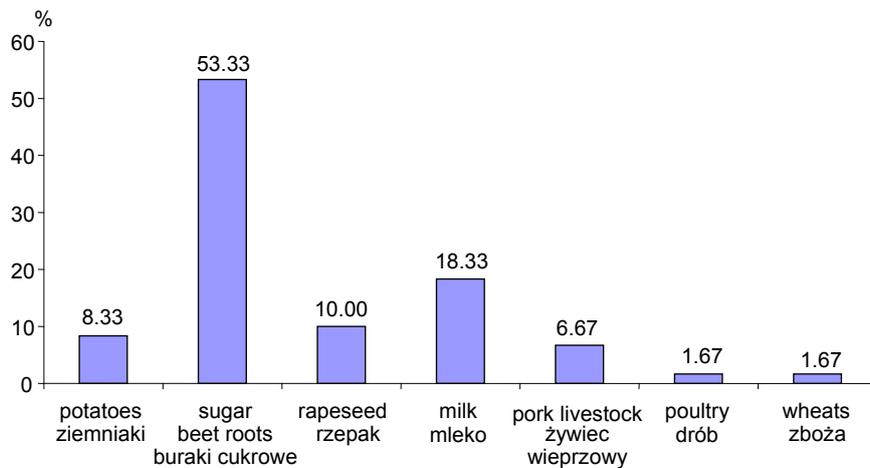


Fig. 2. Products under contractation
Ryc. 2. Produkty objęte kontraktacją

Derivatives instruments

Another alternative which gives farmers possibility to protect against price risk volatility are commodity exchanges.

Among the respondents only 23% know commodity exchange offer in terms of derivatives. For the rest the problem remains unknown. The basic reason in lack of interest is lack of understanding of their role. Moreover, the farmers do not have enough information about this institution and do not tend to be interested in a new way of selling their products.

Analysis of price variability selected agricultural products

In the second part of the paper was conducted analysis of price volatility on Polish wheat and rye markets. Concerning the data, enclosed in Table 1, it is observed that wheat market has big market price volatility despite of destructive intervention policy on Polish agricultural market at that time.

Table 1

Wheat price volatility on spot market in 1990-2001 in Poland (on the basis of CSO data)
Zmienność cen pszenicy konsumpcyjnej na rynku gotówkowym w latach 1990-2001
w Polsce (na podstawie danych GUS)

Year Rok	Mean price (zł/t) Średnia cena (zł/t)	Index Indeks (%)	Standard deviation (zł/t) Odchylenie standardowe (zł/t)
1990	80.23	–	5.07
1991	48.75	60.76	2.15
1992	105.03	215.45	30.74
1993	183.78	174.98	8.21
1994	195.72	106.50	21.57
1995	283.16	144.68	21.04
1996	491.1	173.44	43.47
1997	446.32	90.88	16.25
1998	478.4	107.19	34.96
1999	429.77	89.83	16.75
2000	540.46	125.76	49.33
2001	528.02	97.70	43.68

Wheat market

Considering the dates enclosed in Table 1, it is concluded, that the level of standard deviation had the lowest value position: 2.15 zł in 1991, but the highest value position: 49.33 zł in 2000. In 2001 standard deviation reached the level of 43.68 zł. The greatest price decrease in 1991 in relation to previous year 1990 reached the level of 39.2%. But the highest price rise was observed in 1992 (115.45%).

Rye market

Domestic rye market is characterised by big market price volatility. Considering the data enclosed in Table 2, it is concluded, that level of standard deviation had the lowest value position: 3.65 zł in 1991, but the highest value position: 66.88 zł in 1998. In 2001 standard deviation reached the level of 51.23 zł. The greatest price decrease in 1991 in relation to previous year 1990 reached the level of 48.7%. But the highest price rise was observed in 1993 (119.4%). In 2001 the rye market price level was stabilised (due to small price rise on 6.7% level).

Table 2
Rye price volatility on spot market in 1990-2001 in Poland (on the basis of CSO data)
Zmienność cen żyta na rynku gotówkowym w latach 1990-2001 w Polsce
(na podstawie danych GUS)

Year Rok	Mean price (zł/t) Średnia cena (zł/t)	Index Indeks (%)	Standard deviation (zł/t) Odchylenie standardowe (zł/t)
1990	60.48	–	4.29
1991	30.97	51.21	3.65
1992	64.95	209.72	28.48
1993	142.53	219.45	16.96
1994	136.63	95.86	9.35
1995	182.23	133.37	10.22
1996	303.97	166.81	35.50
1997	334.09	109.91	22.72
1998	318.02	95.19	66.88
1999	295.00	92.76	24.52
2000	380.24	128.89	28.27
2001	405.77	106.71	51.23

Conclusions

1. The farmers are fully aware of existing outlet risk and adverse price changes. Due to this situation they move towards reducing price risk by using different methods.

The most popular remedy for price risk counteraction and protection of their incomes in agriculture is production diversification.

2. Market participants are searching for the best solution to reduce price volatility by using horizontal and vertical integration.

3. Respondents have rudimentary information about commodity derivatives and their role in using them as price risk management tools. Moreover, the farmers do not show interest in learning new types of techniques to protect their incomes.

4. The results of the paper show us that the Polish cereal grain, specifically the wheat and rye markets, have a big market price volatility. Such being the case there is a great potential to develop future markets on the Polish agricultural market.

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TECHNIKI ZARZĄDZANIA RYZYKIEM CENOWYM W ASPEKCIE CZYNNIKÓW UMOŻLIWIAJĄCYCH ROZWÓJ TOWAROWYCH INSTRUMENTÓW POCHODNYCH W POLSKIM ROLNICTWIE

S t r e s z c z e n i e

Badania były prowadzone w dwóch etapach. W pierwszym etapie dokonano identyfikacji dostępnych na rynku indywidualnych technik zarządzania ryzykiem niekorzystnej zmiany ceny przez podmioty rynku rolnego. W drugim etapie dokonano analizy zmienności cen wybranych towarów rolniczych (pszenica, żyto) jako podstawowego czynnika decydującego o możliwości stosowania rynków towarowych instrumentów pochodnych.

W wyniku przeprowadzonych badań można stwierdzić, iż rolnicy mają świadomość istnienia ryzyka zbytu i niekorzystnych zmian cen, a także dążą do niwelowania jego efektów poprzez korzystanie z różnych instrumentów. Najpowszechniejszym sposobem przeciwdziałania ryzyku niekorzystnej zmiany ceny i dochodów w gospodarstwie jest różnicowanie prowadzonej produkcji. Uczestnicy rynku poszukują rozwiązań pozwalających im na ograniczenie ryzyka niekorzystnej zmiany ceny, wykorzystując formy integracji zarówno poziomej, jak i pionowej.

Przeprowadzona analiza zmienności cen na krajowych rynkach pszenicy konsumpcyjnej, żyta oraz ziemniaków wskazuje na korzystne kształtowanie tego czynnika z punktu widzenia możliwości wprowadzenia towarowych rynków instrumentów pochodnych na polskim rynku rolnym.