

• F I N A N S E I P R A W O F I N A N S O W E •  
• Journal of Finance and Financial Law •

Wrzesień/September 2016 • vol. III, no. 3

ISSN 2353-5601

<https://doi.org/10.18778/2391-6478.3.3.02>

## BASICS ON COMMODITIES RISK MANAGEMENT FOR GRAINS TRADING

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### Summary:

The purpose of the article is to determine the kinds of risk groups existed on cereal market and presenting possibilities of limiting the undesirable phenomena. An issue appears: what way the subjects of cereal market, producers in particular, should alone neutralize the appearing risk, and when should expect support from the state institutions. More often financial instruments find the solution for agricultural hedgers. Derivatives, such as: forward, future and option contracts are transferring the price risk from producers to intermediaries of the market and are improving the flow of contracts on the cereal market.

Key words: agricultural commodity market, commodity risk management, agricultural derivatives.

JEL Class: G1, G13, G15.

Przyjęto/Accepted: 25.08.2016

Opublikowano/Published: 30.09.2016

### INTRODUCTION

Economists dealing with agriculture for few decades now, are concerned with obtaining more understanding of individuals behavior when confronted with risk, moreover with developing of such tools that would address decision-making concerning under risk situation. This should not be surprising accounting weathers variability, outputs and inputs market uncertainty and

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various other risks that agricultural producers are confronted with [Barnett and Coble 1998: 6–7, retrieved: 19.02.2016].

With the economy condition having its ups and downs, natural phenomenon occurring unexpectedly or anthropologic causes swaying the certainty of future, commodity producers, governments, exporters, importers and buyers become banished to fluctuations of commodity prices. Depending on the type of commodity: grains, metals, gas, electricity etc., there are various distinctive reasons for change of the market value, which may change global insight for product. Many of investors hesitate to invest commodities especially agricultural products due to general misconception that they are a risky venture. However, despite the credibility of risk factor, in reality misconception does not lie in sector but in investor himself.

### 1. DEFINING POTENTIAL RISKS

Agricultural enterprises are vulnerable to several kinds of risks. Each of them can significantly increase the exposure to failure. The failure can simultaneously strike not only producers but also buyers, exporters and governments. Separate receiver of goods may face distinctive kinds of risks. Below are enlisted types of dangers that members of the commodity markets are exposed to [Jajuga 2016: 19–20]:

- biological risk,
- chemical risk,
- economic risk,
- price risk,
- market risk,
- financial risk,
- institutional risk,
- liability risk,
- personal risk.

Biological and chemical group of risk factors can be associated with some negative results that stem from predicted biological and climatic variables. Because agriculture is very often characterized by high variability of production results or production risk. Generally agricultural producers are not able to predict with high certainty the level of output that they production process will yield. This happens due to external factors such as pests, weather and disease's. Farm owners that produce agricultural goods can as well be hindered by adverse events during harvesting or collecting period – that result in some commodity losses [*Managing Agricultural...*, 2005: 53].



All mentioned above conditions may happen due to interconnected biological and chemical risks, such as:

- wrong choice of technology,
- inappropriate selection of crop species and their variations,
- wrong harvest cultivation,
- wrong fertilizers,
- inappropriate use of plant preservation means.

Although human errors, such as crop selection cannot be entirely eliminated, risk connected with climatic – also known as weather conditions can be eliminated to a certain point. In operation there are weather contracts. They can be simply defined as a „weather contingent contract whose payoff will be in an amount of cash determined by future weather events. The settlement value of these weather events is determined from a weather index, expressed as values of a weather variable measured at a stated location” [Dischel 2002: 73–74].

After generally discussing biological and chemical risks that agricultural producer can often be faced with group of economic factors need to be considered. As mentioned above economical risk accounts price, market, financial, institutional, liability and personal risk.

Knowing that prices of agricultural commodities are extremely volatile it is important to describe its reasons. Variability of output price can originate both from endogenous and exogenous market shocks. Agricultural markets that are segmented for sure will be influenced by supply and demand conditions that occur locally whereas globally integrated markets will be more affected with international dynamics of production.

On local markets, this price risk may be mitigated through natural factor. Which is an effect in which a decrease/increase of annual production may tend to increase/decrease the output price, though not necessarily affect the farmers revenues.

Though on integrated markets price reduction is not generally correlated with local supply conditions and because of that some price shocks can pose substantial effect on the producers. Next economic factor is the financial risk, though ways in which business finance their activities is crucial for many economic enterprises. It seems obvious that many agricultural production cycles tend to stretch over time – sometimes they are long periods. Farmers need to anticipate their expenses because they may be recuperated only once their product is marketed. Straightforward, this leads to potential cash flow problems that are exacerbated by lack of access to credit and high costs of borrowings.

Another important source of uncertainty that affects agricultural producers is the institutional risk. It is most often generated by unexpected changes in regulations affecting producers' activities. Profitability of farming activities can be significantly altered because of regulations changes. This happens most



often in the case of import/export regimes and dedicated support schemes. But equally important in the case of phyto-sanitary and sanitary regulations restricting producers activity and imposing costs on households.

Essential value for most entrepreneurs, like agricultural producers are responsibilities for all consequences of their actions. Growing concern connected with impact of agriculture on the environment that includes the introduction of genetically modified organisms (GMO's) – can cause an increase of producers liability risk.

Personal risk must be considered as well as the risk of agricultural households. It takes into account the wellbeing of people working on the farm, asset risks, possibilities of damage or theft of production assets and equipment [*Managing Agricultural...*, 2005: 6].

After mentioning and explaining the groups of risk that may affect the producers it is also quite important to mention other groups of subjects that are present on the market and may suffer because of the problems and market risks. Nature and source of danger may entirely different but always relates to closed group of agents, which are presented on the figure 1.

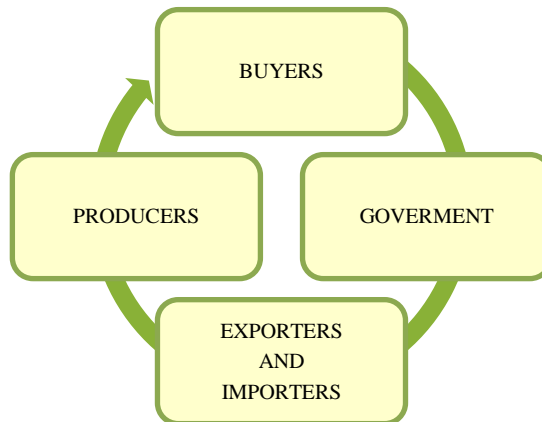


Figure 1. Subjective Structure of Agricultural Market

Source: Author's project.

Producers represent the group of commodity creators like farmers, mining and plantation companies and they are regarded as the most important group in this chain. Buyers are individual and cooperative entities or commercial traders. Exporters and importers are individual and commercial entities, international institution with developed logistics. At last government which is represented by public institutions of agricultural market.



Whatever side of the market agents occupy, one is affected by certain kinds of peril. For instance governments, the biggest institutional participants of market with responsibility to its citizens deal with obvious commodity quantity risk and the price of it in terms of tax revenues, with special concern on situation of positive correlation between tax rates and commodity prices or where donations and other payments rely on level of commodity prices.

Second party of commodity market – exporters and importers – are fragile to currencies exchange rates of interest and closing countries, adverse changes in price of commodity among home and destination places. They tend to close contracts with posterior group of buyers in foreign countries. Purchasers balance variations of price between up-country buy and final sale, commonly to associated exporter and importer.

Fourth group is established by everyone who produces and seeds crops, manufactures or quarry commodity, no matter what size of company or business they own. Farmers or plantation companies and exceptionally mining companies are included in the group.

Having listed risks that interfere with global and local commodity market, presenting participants both individual and commercial of market, the lacking element is an introduction and description of methods helping to secure financial future of each party of market [Andersen 2006: 3–4].

## 2. RISK MANAGEMENT STRATEGIES

In order to properly explain appropriate risk management policies, it is important to understand mechanisms and strategies that are used by producers to deal with risk. For this a purpose discussion concerning distinguishing between informal and formal risk management mechanisms as well as between ex ante and ex post strategies needs to be highlighted.

One can divide two special ways of risk management policies in the agriculture area. They are clear enough and easy to distinguish.

Informal strategies are identified as „arrangements that involve individuals or households or such groups as communities or villages,” while formal arrangements are „market-based activities and publicly provided mechanisms” [*Managing Agricultural...*, 2005: 6–9].

Second classification – ex-ante and ex post focuses on the point in time in which the reaction to risk takes place: before the occurrence of the potential harming event (ex-ante) or after it has occurred (ex-post). Among the ex-ante reactions, it is useful to underline the differences between on-farm strategies and risk-sharing strategies. This division seems to be artificial and incomplete but gives some view on the analyzing issue. Table 1 summarizes mentioned above classifications.

Table 1. Risk Management Strategies in Agriculture

		Informal Mechanisms	Formal Mechanisms /Publicly provided/	
Ex-ante Strategies	On-farm	Avoiding exposure to risk Crop diversification and intercropping Plot diversification Diversification of income source Buffer stock accumulation of crops or liquid assets Adoption of advanced cropping techniques (fertilization, irrigation, resistant varieties)	Market factors	Agricultural extension Pest management system Infrastructure (roads, dams, irrigation system)
	Sharing risk with others	Crop sharing Informal risk pool Producers' groups activity	Contract marketing and futures contracts Insurance	Agricultural derivatives
Ex-post Strategies	Coping with obstacles	Sale of assets Reallocation of labour Mutual aid	Commercial Credit	Social assistance Social funds Cash transfer

Source: *World Development Report...* [2001].

What characterizes informal ex-ante strategies is the diversification of income sources and agricultural production strategy. Strategy that can be most simply employed is risk avoidance. When there are cases of extreme poverty that may cause averse to risk. This results in risk activity avoidance, but that also can bring larger income gains. Above described situation is sometimes assessed as inability to manage risk and accumulate and retain wealth.

The selected strategy of production is an important mean of mitigating crop failure. Obviously, traditional cropping systems rely on diversification of crop and plot. Intercropping and diversification of crop systems are means to reduce the crop failure risk due to adverse crop pest and insect attacks as well as unexpected weather events. They can be defined as weather agricultural contracts whose payoff will be in an amount of cash determined by future weather events. They enable the stabilization of cash flow in the farming process and reduce the weather risk through getting into position in opposing derivative securities [Szopa 2012: 451].

The weather is an important factor in the final crop yield for cereal. Some damage can occur during the pollination stage, when high temperatures and severe drought will reduce the number of grains set [Dunsby et al. 2008: 109].

When producers decide to engage in farming activities, the selected strategy of production is an important mean of mitigating crop failure. In many places traditional cropping systems rely on diversification of crop and plot. Inter-cropping and diversification of crop systems are means to reduce the crop failure risk due to adverse crop pest and insect attacks as well as adverse weather events. There are some evidence that households whose consumption levels are close to subsistence, thus are highly prone to income shocks, are devoting a larger amount of land to safer, more traditional varieties of castor and rice, than to riskier varieties yielding more crop. Moreover near-subsistence households diversify their plots spatially in order to reduce impacts posed by weather shocks varying by location.

Apart from agricultural production strategies altering, some households tend to smooth their incomes by diversifying sources of income – thus minimizing the negative shock effect to any one of them. This diversification usually comes from generating income from at least two different sources – most typically from crop and dairy or livestock. Least often off-farm seasonal labor, such as trade or sale of handcrafts is an source of income.

Importance of diversification of income sources as a part of risk management proves that one or more household members are often engaged in steady wage employment, especially with farms of higher profit volatility. Credit use, buffer stock accumulation of crops and liquid assets may lead to household smooth consumption. Crop and currencies inventories may be a buffer or precaution for savings.

Labour hiring and crop-sharing arrangements in renting land can be an effective way of providing shared risk among individuals, in this way reducing exposure to risk of producers. There are other ways of risk sharing, among them community-level risk pooling. This occurs among specific communities or extended households. In those cases members of groups transfer their resources among themselves in order to rebalance marginal utilities. Mentioned ways of arrangements are quite effective for consequence risk counterbalancing for the events that affect some members of the community. Unfortunately those do not work well in the cases of covariate income shocks.

As for ex-post informal incomes smoothing mechanisms. They are more typical for assets sale, such as livestock or land, or relocation of labor resources – to off-farm activities. During analyzing the cost risk on ex-ante agricultural production strategies most efficiency losses connected with risk mitigation are found to be due to lack of specialization – in other words most farmers trade of income variability to profitability. To smooth idiosyncratic and correlated

shocks against consumption it comes to serious cost in terms of consumption efficiency as well as reduction of profits and efficiency. That in terms lowers the overall household consumption.

Solution for rural households would be to engage in risk sharing with households or other institutions from largely uncorrelated areas but with the same risk conditions. Examples of such risk sharing can be found in the literature, for example by sharing credit and transfer with distant relatives, or through marriage's or mitigation, even ethnic networks.

Mentioned securities are not so commonly used that is why most households are still left with no insurance against correlated risk – that the main source is weather. Next big section is formal risk managing mechanisms. Those can be classified as publicly provided or market based. Knowing that government plays an important role in managing agricultural risk – both ex- and post-ante.

Some ex-ante services and education that are provided by agricultural extension provide help to familiarize producers with the risk consequences and to help with adoption to strategies dealing with risk. What is more, most of governments also help with reducing the risk impact through developing relevant infrastructural and social schemes, adopting as well cash transfers for some relief after shock occurrence.

Referring to the informal mechanisms, production and market risk seem to influence the agricultural activity in highest degree – especially the producers. There are some developed strategies on the agricultural market and especially financial instruments which can reduce successfully undesirable level of risk.

### 3. INSURANCE RISKS

Risk that encounters participants of market has not changed since the very beginning of commodity exchange. Prosperity of agricultural products affects variation of producer's revenues. Alternations may be enlarged by accidental climatic condition phenomenon like droughts, floods, epidemic having influence on agriculture production, price of harvest what results in revenues. Buy and sell transactions have been just as spontaneous as the market fluctuations, depending on seasonality of price values, weather forecast conditions or accidental movements after crucial information. Speculation was the major known approach on the market, another recently known approaches were either not available or of reduced significance.

For years producers have chased methods securing their revenues like in agrarian politics in all local, national, European and global extent. Insurance of revenues is a minor form in European agriculture, but is getting more and more popular than standardized futures contracts. Alternatively there are





limitations concerning donations to producers in EU that harvest undependably on a size of production, instead government tend to inform of direct surcharge.

European Union has restricted amount agrarian commodity markets, where production risk and securing the price can be conducted via insurance policy. In most of countries producers can secure risky exposure with for instance risk of smaller harvest and losses in harvest within a few instruments containing specific kinds of danger. More often the practiced method of partially securing producer's product are delivery contracts. In last decade, however, options and futures contracts, which are to be introduced and thoroughly described in the evaluation, are used on daily basis at LIFFE market in London, Paris and Frankfurt, outside the EU region in Chicago CBOT, New York NEXT [Dorsey et al., 2007: 32]. In Canada for instance insurances are encouraged by government, which even offers surcharges.

Securing company via insurance is more attractive for producer as a whole unit not instead as a set of separate products in contradiction to insurance companies which concentrate on profitability though prefers insurance for every branch of production. Such mismatch of interest is also the outcome of asymmetry of information between producers and insurance companies. Moreover inconvenience in evaluation of revenues before and after harvest expands the difference [*Managing Agricultural...*, 2005: 9].

In fact covering revenues with acquired insurance is generally expensive and quite fond. Deep knowledge of commodity prices held by producers is crucial, as well as acquaintance of price reference point for needs of insurance. Defying forecasts of price and production can be done by quotations futures contracts, if such exists for the commodity. Usability of this information of derivative market drastically increases credibility of its existence, simultaneously declining fitness of revenues insurance.

In the United States private insurance campaigns offer insurance instruments securing risks security for particular crop productions. They deliver and service complex insurance programs of production companies. Programs assume insurance policies to be partially subsidized for farmers. They cover roughly approximately 25% of program's insurance due. Subsidies cover substantial portion of reinsurance costs dealt by insurance companies in terms of revenues security.

European countries also seek encouragements for homeland union's farmers. As exemplary is Spain that government tends to subsidize insurance plans of revenues by 45% depending on product's type and terms of insurance packet. Recently there are revenues' insurance introduced, which would guarantee to farmer are venue at the end of year. In Nederland unique disputes are lead about bringing in a program of mutual insurances mainly in respect to losses from crop production due to natural disasters, like long-term rains or droughts. So far

government used to defray costs of reinsurance in case of greater random incidents; similar situation is present recently in Germany.

Great Britain likewise USA function throughout private insurance companies. They use the mean prices of crops from futures contracts to calculate policy price. Harvests are measured basing on results of particular region; they are set as reference point. Such terms of insurance agreement facilitates objectivity and advantage of derivative market. Nonetheless, this offer is of limited popularity because of no subsidies from GB government and significantly low understanding amongst British farmers about derivatives.

Polish farmers alike to other in EU are supported by the government and they are the beneficiaries of CAP as well [Sobieszkańska and Sadowski 2015: 34–35]. Natural disasters stalking Poland like foods in the south of country are being attended via harvest delivery or in cash. The questionable issue remain term of prioritizing list of receivers – usually selection happens spontaneously.

When disaster afflicts a small group or in meager and lean area dilemma appears whether public capital should be used for the cause or left for potentially bigger issue in the future – therefore financing partial costs of insurance would outweigh burden of public capital expenditure [Giruć 2015: 243].

For the moment Polish producers may rely on minimal prices set by government each year and though secure revenues without special effort; minimal prices superseded donation to production. There is a possibility to start to use hedging financial instruments based on the act of the commodity markets but this way of security of cereal price is not popular [*Ustawa z dnia 26 października 2000 r. o giełdach towarowych*].

Having the view of Polish commodity markets and lack of financial knowledge of managers, one can conclude that most business entities and within even more agricultural producers are mostly unprepared and unaware of derivative instrument. But still developing financial consciousness of derivative market enthusiasts tempers positively for the future.

Crediting risk of agricultural producers was and still is the subject of consideration. Either governmental support or insurance policies are not securing completely revenues. Little interest in insurance is the result of little knowledge of instruments and complete awareness of risk concept. Yet, not surprisingly that futures market are unknown to producers as a method of securing their revenues [Giruć 2010: 121].

Although little knowledge may be the main reason for not properly educated market players but there are some more problems connected with insurances, such as [*Managing Agricultural...*, 2005: 54]:

- distorted incentives,
- asymmetry of information,
- adverse selection,



- moral hazard,
- administrative costs.

Incentives are distorted when insurers know that government is willing to automatically cover most of the losses. In those situations incentive to pursue sound insurance practice while losses assessment is reduced. In extreme situations insurers may collude with farm owners in filing exaggerated or falsified claims.

Generally it is said that the insurer should have adequate information about nature of risks that are being insured. However it is almost impossible to have more knowledge about potential crop yields than the farmers, that is why asymmetry of information occurs.

Asymmetry of information can lead to adverse selection that is farmer's risk underestimation. Resulting in charging such premium rates that do not reflect clients true risk. Opposite situation may also happen, that in turn results in premiums being higher than actual risk. As a result of whole situation clients who's premiums are lower than their actual risk more likely will purchase insurance.

Moral hazard can also be caused by information asymmetry. Due to better risk knowledge, concerning the subject of insurance, of the client than the insurer moral hazard may arise. Caused by individuals behavior rather than some outside factor such as weather or other peril.

Two of the above insurance problems can be avoided – adverse selection and moral hazard. Unfortunately in turn they produce another problem – administrative costs. Those costs are generated through careful monitoring of the programs and greater investment in risk assessment and classification. This process made for small farmers drives up the administrative costs for the insurance thus making the premium prohibitive

Though mentioned above insurance problems may seem simple they can effectively discourage potential clients from this source of security. That is why other forms of securing agricultural risk exist – among them more and more popular derivatives – are crucial for commodities risk management in the area of grains trading.

## CONCLUSION

Risk occurring in the field of commodity traders and producers has been a primary problem throughout centuries. Since the very beginning businesses have tried to minimize the extent of it or to migrate to other entities. At the start direct agreements between traders were practiced but with vague effectiveness. Lack of centralized placed that could possibly standardize and unify parameters

and conditions of contracts was limiting amount of considerate businesses. There was also no way to offer long-term deliveries at specified priced due to lack of any instruments enabling such solution without any risk.

Since the commodity markets have appeared in the world many options have been introduced. Opportunity to trade at one specified place on agreeable common facilitated trading and probably allowed more businesses to become vivid on the market. Before financial markets were established and their instruments dedicated for commodities markets, some unofficially similar to forward agreements were used.

Financial market was the reason for derivative instruments. They were established initially to enable hedging for producers, later traders tend to use them, and finally three venues of hedging arbitrage and speculation were distinguished.

Forward, futures, options and swaps are the major instruments available for any interested in securing risk of changing price of commodity. Depending on the strategy, demand for margin and liquidity each of them can be used in various situations. Adding to selection of most appropriate exchange to our country one can eliminate as much risk as is possible – both commodity and currency.

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## PODSTAWY ZARZĄDZANIA RYZYKIEM W HANDLU ZBOŻEM

Celem artykułu jest określenie rodzajów grup ryzyka występujących na rynku zbóż oraz przedstawienie możliwości ograniczania wystąpienia zjawisk niepożądanych. Pojawia się kwestia: w jakim stopniu podmioty rynku zbóż, a w szczególności producenci, powinni sami neutralizować występujące ryzyko, a kiedy powinni oczekiwać wsparcia ze strony instytucji państwowych. Coraz powszechniej zastosowanie znajdują instrumenty finansowe w postaci instrumentów pochodnych. Kontrakty terminowe na produkty rolne przenoszą ryzyko cenowe z producentów na pośredników rynku i poprawiają płynność rozliczeń kontraktów zawieranych na rynku zbóż.

**Słowa kluczowe:** rynki rolne, zarządzanie ryzykiem w rolnictwie, rolne instrumenty pochodne.