

COORDINATION MODELS FOR AGRO-FOOD CHAINS

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Abstract: The coordination for agro-food chains is an issue of a large interest in Romania, where agricultural structures are atomized and produce mostly for self-consumption. Cooperation and integration, like coordination mechanisms, must be reconsidered in chains' efficiency terms. In this paper the are given models' proposals of agro-food chains coordination in Romania.

Keywords: coordination mechanisms, integration, cooperation, equity, efficiency, transaction costs

Coordination mechanisms

The concept of vertical coordination includes all the ways of harmonizing the vertical stages of chains. The coordination mechanisms are pricing system, vertical integration, cooperation and contract coordination, considered separately or in different combination [5]. A stage include any value-adding process, whether a change in location, time, or form of the agro-food commodity.

The concept of coordination mechanism includes the set of institution and arrangements that are used to accomplish the harmonization of adjacent stages of commodity system. Coordination mechanisms include a method of pricing if the stages are not integrated [4]. A given commodity sub sector may employ a number of coordination mechanisms, the predominant one varying from stage to stage.

The classification used is not exclusive but serve to illustrate significant differences and provide a basis for discussion of the relationship of coordination methods to the performance of commodity sub sectors in Romania.

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Agro-food markets

Terminal markets for agro-food products have as distinguishing characteristics public trading and products assembly, which means that market is open to everyone, and the products traded are physically assembled in the market facility at the time of sale.

Prices are established by private negotiations between demand and offer representatives. Often, the price of the terminal market represents a reference for contract establishment on other markets.

Terminal agro-food markets have the role of chain's coordination because of high level of transactions occurred on these channels. They present advantages and disadvantages. The advantages refer both producers and consumers. In structural conditions of the Romanian agriculture, the small farmers, with low level of production traded, find on this type of market opportunities to deliver the part of production that exceed the self-consumption. Also, they cash on spot the money for their sold commodity, assuring the financement for the next cycle of production. The consumers have the opportunity to acquire fresh agricultural products, directly from the producers, the price level being lower in comparison with other markets. Among disadvantages, there is the commerce developed in unsuitable hygiene condition, un-organized, sometimes speculative. In addition, the farmers are taking care of selling an important part of their time, instead of developing production operations.

Contract coordination

Contract coordination of the chain represents an intermediate position between spot agro-food market's coordination and integration. The contracts cover a variety of arrangements and commitments to deliver and receive goods at some later time. The contracts establish the amount, time, quality and place for a future delivery. Prices could be established spot or future.

The reasons why the contracts are used in the coordination of the agro-food chain may vary under appropriate conditions. The contracts allow participants to capture some of the benefits of internalizing coordination while retaining the benefits of remaining as separate business entities [4]. Contracts may reduce the transactions costs and the risks associated with quality variation. Contracts may also contribute to the stability of the business involved, may restrict short-run access to markets but not in the longer term.

Government Programs

Government programs have direct impacts on coordination of the agro-food chain through price supports, direct production controls, direct payments etc. Prices' distortion by subsidies allocation may increase costs in short run.

Integration

While agro-food markets, contracts and government programs are alternative means to coordinate by market price, integration represents the opposite solution, where two or more adjacent stages of the chain are coordinated by intrafirm administrative direction (vertical integration).

Integration has the big advantage of reducing the profit's variation. Economical theory demonstrates that competitive marketing firm margins will be low when quantity is low and producer prices and profit are high. In opposite, marketing margins are high when quantity is large and the producer prices are low (integration case). Also, combining the production and marketing stages may reduce income variation, as well as transaction costs.

Integration can be found in almost all commodity sub sectors. In meat sector, processing and distribution are integrated; some restaurant chains have integrated the distribution of food and supplies to the stores; grocery chains have integrated into milk processing; wine making centers have integrated the grapes production, wine making and distribution, including export.

The main advantage of integration consists in the reason of their own establishment: transactions costs' reduction, meaning efficiency improvement on the chain.

Cooperation

While the main reason of integration is reducing the transaction costs, the reason of cooperation is related to farmers' perception of a market power imbalance between themselves and the smaller number of buyers of their products and the sellers of their production supplies. Cooperation appears, generally, between farmers and is put in relation with sharing the power on the chain.

In Romania, there are a lot of farmers who own small areas and livestock. The level of production is low and non-homogenous. Excessive atomization of farmers is the reason why they should cooperate by unifying their forces in order to negotiate better selling and buying conditions upstream and

downstream. Another reason for cooperation is that farmer has no more the selling function, focusing on producing. In this way, a marketing cooperative in a particular area may resolve the inputs' supplying and selling issues of its members.

The cooperative may carry out different services: inputs supplying, outputs selling, financing, mechanical land work, storage, common use of the machineries etc.

Cooperatives may divide into [6]:

- *Marketing cooperatives*, for agricultural products' collecting, processing and selling;
- *Supplying cooperatives*, carrying out inputs supplying for farmers: seeds, chemicals, construction materials, feed, machineries, equipments, tractors etc.;
- *Services cooperatives*, carrying out mechanical services, artificial inseminations, agro-food storages, selling, scientifically research, agricultural training etc.;
- *Credit cooperatives*, for financing the activities;
- *Cooperatives for common lands' exploitation*, met just in Eastern Germany.

The relationships between marketing cooperative and its members refer to commodities' selling condition: prices, payments' terms, quality standards, rights and obligations during transactions, primes and discounts. Cooperatives' objectives are: income increasing, prices stabilization, gaining and keeping the markets, partnerships and markets' extension, improving the process of market information getting out etc.

We consider cooperatives very important for Romanian agro-food system, characterized by small and powerless farms. In Romania, cooperation process has a wrong image through farmers, because they were forced to cooperate in communist period [2]. In the future, in Common Market Organization's condition, which implies particular rules like restrictions regarding deliveries on the markets, the cooperation process should be reconsidered. In present conditions, small farmers put the products on the markets in unsuitable condition of hygiene. This type of commerce will be forbidden when Romania will join European Union.

Chains' power depends on their coordination [7]. Progress depends on developing an equilibrate partnership between all participants, partnership that respects the interest of everyone and shares added value equitably for all agents.

Models of agro-food chains' coordination

Price and coordination are inter-related. Still, as we've just seen, there are others coordination mechanisms, too. Their use depends from one stage of the chain to another and has different impact on efficiency.

There are elaborated scenarios estimating coordination impact on the agro-food chain, especially price impact [1]. The impact was assessed in relation with the main characteristics of performance: efficiency, equity, transaction costs, market access and prices and income stability.

Efficiency has two different forms: allocative and technical. The first one refers to the resources allocation related to economical optimal point. The second one is related to technical maximal point.

Equity means the equal treatment of all system participants. While efficiency requires recognition of differences in value to users resulting from differences in quality, location and timing, equity means that these rewards accrue to the persons who control the product attributes involved [4]. For example, contracts that place production or harvesting practices under control of the buyer and penalize the grower for problems caused by the buyer are considered inequitable.

Transaction costs include the costs of searching for alternatives, the costs associated with physical exchange, and the costs added because of uncertainty associated with exchange. These costs are deeply influenced by the information availability. If all participants were aware of all offers in agro-food system, transaction costs may be small, almost equal to physical distribution costs.

Accessibility of markets is a key criterion in performance assessment. Access to buyers and sellers is necessary to enter and to remain a stage of a chain. Problems may appear when a buyer or a seller wants to enter a market and there are restrictions, even if he can sell or buy in better efficiency conditions, those others agents already entered on that market. In Romania, this situation occurs when small farmers want to enter terminal markets through large supermarkets, although their prices are lower in comparison with those of the engross-sellers or importers. Access to information is important in this case, too. While not all known markets are accessible, those that are not known are certainly not accessible.

Stability refers to reducing the prices and income variations for all chain's participants.

The model *Agro-food terminal markets – chain’s performance*

Efficiency		Equity	Transaction costs	Market access	Stability
Allocation	Technical				
high		high	high		
	medium			medium	
					low

Agro-food terminal markets offer to farmers and consumers high levels of equity and efficiency. The producer asks for a real price that covers production and transaction costs for the products sold directly to the consumer. This one finds the price real, too. Transaction costs are high because the alternative searching for commodity selling is a hard work process. In addition, the expenses with transportation, storage, and selling are directly supported by the farmer. Although the access to the market should be free, still, there are speculative agents who raise restrictions for farmers entering on terminal markets, having monopole for some commodity selling. Prices and income stability is low, because of restrictive access to the market.

The model *Economical contracts – chain’s performance*

Efficiency		Equity	Transaction costs	Market access	Stability
Allocation	Technical				
	high				
		medium		medium	medium
low			low		

Economical contracts offer a variable equity that inclines to industry or distribution. Income stability increases because of selling insurance increasing. Market access is low for farmers and medium for other participants of commodity system. Transaction costs are lower; they entering in distributors’ responsibility, so the agricultural producers can focus on farming.

The model *Governmental programs – chain’s performance*

Efficiency		Equity	Transaction costs	Market access	Stability
Allocation	Technical				
			high		high
		medium		medium	
low	low				

Governmental programs offer high stability for income and price, this representing the reason for what they are issued. Efficiency is low because resources’ allocation is not realized through economical criterion, but centralized ones. Accessibility to market may vary and transaction costs are high, because there are no contracts or integration or cooperation process.

The model *Integration – chain’s performance*

Efficiency		Equity	Transaction costs	Market access	Stability
Allocation	Technical				
high	high			high	
		medium			medium
			0		

Vertical integration of chain’s activities from different stages reduces the transaction costs to 0. Resources’ allocation is high. Accessibility to markets is easy because negotiation power of integrated participants is high. Price and income stability is medium, and depends on equity variation: power sharing depends on the integrator agent that could be the industry or distributors.

Cooperation offer benefits without risking problems related to price or equity, often met in the case of economical contracts. Resources’ allocation efficiency is high and transaction costs are low. There are made important economies of expenses for farmers who perform some services – supplying, storage, selling – together with others. Accessibility to markets is high because

the cooperative performs the service of information providing about different possibilities of commodity delivery. Income stability is higher than in terminal market case, but lower than integration one [3].

The model *Cooperation – chain's performance*

Efficiency		Equity	Transaction costs	Market access	Stability
Allocation	Technical				
	high	high		high	
medium					medium
			low		

As we saw in the models presented, the highest level of performance is achieved in the case of integration and cooperation.

Coordination mechanisms, presented in particular conditions of Romanian agriculture, determine different levels of performance on agro-food chains. In modern commodity systems, the role of terminal markets has reduced, the main role have integration and cooperation of all chain's participants.

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