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**Testing Theories of Cooperative Arrangements  
in Agricultural Markets:  
Results from Producer Groups in Poland**

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## **Abstract**<sup>1</sup>

The main question posed in the paper asks why do some cooperative arrangements in agricultural markets survive and succeed and others fail? We define “success” and factors affecting success of cooperation using transaction costs theory and game theory. Transaction costs theory provides insights on comparative advantage of one form of organization versus others and proposes, while game theory focuses on interdependencies between partners entering the arrangements. Data were collected from 62 Polish farmer cooperative organizations called *producer groups*. The main aim of those organizations was to organize joint sales of output produced individually by their members. Some of the groups were functioning effectively while others that had disbanded or were no longer performing their essential functions. Variables such as the leader’s strength, previous business acquaintances, initial selection of members, and number of members have a significant positive impact on the likelihood of success of the researched organizations.

## **Key words**

Cooperation, agricultural markets, producer groups, Poland

## **1 Introduction**

In the mid-1990s organizations called producer groups first appeared in Poland. Producer groups were formed by farmers, and their main purpose was to jointly sell agricultural output produced individually by members. Farmers entering producer groups kept their distinct property rights, and they coordinated only on some transactions such as searching for buyers, negotiating contracts and transportation. The groups adopted different legal forms ranging from informal oral agreements, through associations, unions, limited liability companies and cooperatives.

Data from an empirical survey carried out with leaders of producer groups located in Wielkopolska Province show a big disproportion in the performance of producer groups. First of all, at the time the research was carried out 20% of the groups were disbanded. Second, only 80% of functioning groups performed the main task of organizing joint sales of the output produced individually by member-farmers; others were engaged only in organizing such activities as joint transportation, joint purchase of the means of production, organizing trainings for members and other social events. Third, some of the functioning groups that performed joint sales were not able to negotiate any price premium for their members’ output and were selling their products at the same price as non-members farmers; others were able to negotiate as much as a 39% higher price premium for their members (Banaszak 2006a).

The central question posed in this article is why such big differences among the producer groups exist. Why do some of the cooperative organizations fail over time, why

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do some keep existing without performing their main functions, and why do others expand and build up their market power?

Success and failure of cooperative enterprises in agricultural markets has been subjected to empirical research; however, the literature merely focuses on organizations that were operating and performing their main tasks at the time the research was carried out. What also emerges from the literature review is that the authors define success of cooperative organizations in very different terms. Bruynis (1997), for instance, executed an empirical survey with 52 American marketing cooperatives and distinguished eight keys to success, understood in terms of longevity, business growth, profitability, and member satisfaction. Such factors as implementation of a management training process; employing an experienced, full-time general manager; regularly distributing accurate financial statements among the management team; using marketing agreements to secure business volume commitments from the members; and utilizing human resources appeared to be significant for the researched organizations achieving success (Bruynis 1997: 54). Sexton and Iskow (1988), who built their study around vertical integration theory, distinguished three groups of organizational, financial, and operational keys to success of agricultural cooperatives. The authors surveyed 61 U.S. agricultural cooperatives and asked the respondents to rank their cooperatives on a four-level success scale. Such factors as open membership, accepting nonmember business, and employing full-time management were correlated with self-understood success.

Among research including disbanded organizations, we find Ziegenhorn (1999), who based his research on economic anthropology and New Institutional Economics and carried out a few case studies of farmer production networks in the swine industry. The author also investigated cases of actors failing to cooperate. The greatest responsibility for a network's success or failure in terms of its survival was attributed to a network organizer whose knowledge and selection of participating farmers influenced compatibility (Ziegenhorn 1999: 66).

The definition of the success of cooperative enterprises proposed in this study is based on transaction costs theory and game theory. The choice of transaction cost theory was motivated by its focus on comparison between different modes of organizations. Producer groups are only one possible way of organizing transactions between farmers and purchasers of their products. Another way is a direct exchange or an exchange through a middleman. The theory provides insights on the comparative advantage of one form of organization versus others. The choice of game theory was motivated by its focus on interdependencies and strategic behavior of actors. Once farmers enter a producer group their choices and actions become interdependent. For the sake of the group, the best would be if they all cooperated and respected the rules agreed upon. However, under certain conditions those farmers who break the group rules might earn more. Game theory provides insights on both external and internal factors that might either facilitate or hinder cooperation.

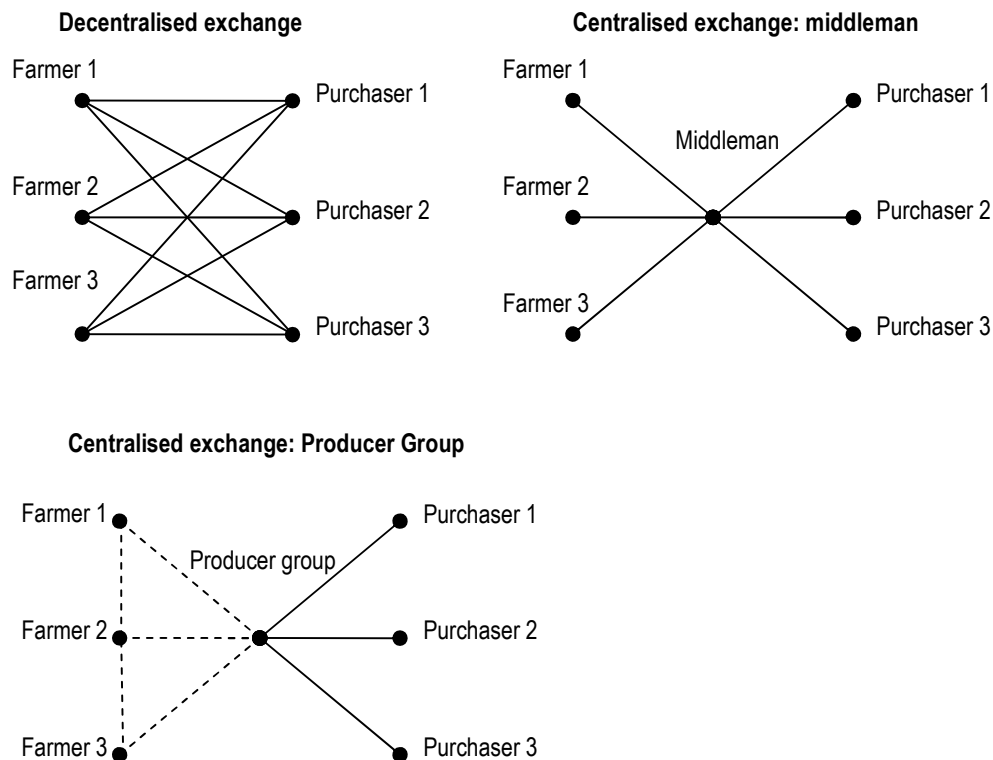
The paper is organized as follows: Section 2 provides a theoretical framework for investigating success and failure of cooperative organizations such as producer groups and identifies propositions to be tested further. Section 3 presents the methodology of the research, and section 4 presents the empirical evidence. Finally, Section 5 concludes and discusses the results.

## **2 Theoretical Framework**

In this section we are going to construct a definition of success of producer groups based on transaction cost theory (Section 2.1) and game theory (Section 2.2). Each theory also provides insights on factors affecting the likelihood of achieving success by cooperative organizations. Sometimes the factors overlap. We thus develop propositions 1 to 5 based on transaction costs arguments and propositions 6 to 11 based on game theory arguments.

### **2.1 Success or Failure of Farmers' Cooperative Enterprises in Light of Transaction Costs Theory**

Regarding the implementation of their main task—that is, organizing joint sales of the output produced by individual member farmers—producer groups act as intermediary market organizations that coordinate the exchange of goods and services between farmers and purchasers of their produce. Intermediaries are firms that seek out suppliers, find and encourage purchasers, select buy and sell prices, organize the transactions, keep the records, and hold inventories to supply liquidity or availability of goods and services (Spulber 1999: 3). Intermediaries appear on the market if the net gains from trade exceed those obtained through direct exchange. The profit of intermediaries is raised by identifying innovative transactions that either increase gains from trade or reduce transaction costs associated with search, negotiation, communication, computation, contracting, and monitoring the transaction and its partners (Spulber 1999: 259, 260). In this respect, producer groups take the role traditionally fulfilled on the market by middlemen and other traders. Nonetheless, the advantage to producer groups, which puts them in competition with middlemen and traders are the potential savings on transaction costs offered to the farmers associated in producer groups due to horizontal and vertical integration. Horizontal integration occurs between different businesses located on the same level of the channel (Caputo & Mininno 1996: 64) and, in producer groups, takes place due to the association of farmers into one organization. Vertical integration occurs between businesses located at different stages of the channel (Caputo & Mininno 1996: 64) and, in producer groups, takes place whenever the groups move up in the market channel while organizing joint transportation or processing the produce. The main intermediary function of producer groups is therefore coordinating an exchange of goods and services between individual member farmers and purchasers of the farmers' agricultural output (Figure 1). Producer groups also undertake the intermediary function in organizing such activities as joint purchases of the means of production or joint transportation.



**Figure 1: Exchange With and Without an Intermediary and a Producer Group Between Farmers and Purchasers of Their Output**

*Source:* Adapted from Spulber (1999: 264)

Nonetheless, producer groups are not classic firms. Firms integrate property rights, thus subsuming all transaction costs related to the production of goods and/or services (Ménard 2005: 294). Farmers associated in producer groups do not integrate property rights and do not merge their farms into one organization. Each of them individually makes the final decision on how to produce the good and when and to whom to sell it. Producer groups of informal character cannot even sign any official agreement with purchasers on behalf of farmers, since they do not have a legal form recognized by law. Such hybrid arrangements, in between market and firm modes of governance, cover only a subset of the transactions in which participating firms are involved (Ménard 2005: 294). In hybrid organizations functioning in agriculture, the advantage of keeping separate ownership rights and not merging farmers into one farming enterprise is that due to idiosyncratic knowledge specific for farming it would be impossible for a company to accurately judge the quality of farmers' inputs (Bonus 1986: 331-331).

An intermediary will be functioning if an exchange of a particular good or service through an intermediary yields the buyer value  $V^I$  which entails opportunity costs  $C^I$  for the seller, and the total transaction costs for the buyer, seller, and the intermediary  $T^I$  is higher than exchange of that good or service through direct exchange, which yields the buyer value  $V^D$  and entails opportunity costs  $C^D$  for the seller with transaction costs for

the buyer and seller  $T^D$  (Sulber 1999: 256, 261). Furthermore, we may expect that a producer group will appear on the market if it is able to organize transactions yielding the value  $V^{PG}$  which entails opportunity costs  $C^{PG}$  and transactions costs  $T^{PG}$  that are higher than exchange through an intermediary. In other words:

$$V^{PG} - C^{PG} - T^{PG} > V^I - C^I - T^I > V^D - C^D - T^D \quad (1)$$

We may propose that *successful producer groups* will be those that *manage to coordinate the exchange between farmers and purchasers and that additionally operate at per unit costs not exceeding per unit costs of organizing the transaction through alternative ways, such as decentralized exchange or intermediation by other agents.*

If three types of transactions entail the same transaction costs,  $T^{PG} = T^I = T^D$ , an exchange through a producer group will occur when it increases the net gains from direct and intermediary exchange:

$$V^D - C^D < V^{PG} - C^{PG} > V^I - C^I$$

A rise in the net gains from trade can occur if a more valuable transaction is produced at the same level of transaction costs. This can take place by supplying additional services which increase buyer willingness to pay or lower seller opportunity costs (Spulber 1999: 261). A producer group could increase the net gains from trade, for instance, by accepting a delay in payments from purchasers, which usually is hard to accept for individual farmers, or by offering a uniform product.

If three types of transactions yield the same gains from trade,  $V^{PG} - C^{PG} = V^I - C^I = V^D - C^D$ , an exchange through a producer group occurs if it lowers transaction costs:

$$T^D > T^{PG} < T^I$$

The level of transaction costs can be decreased by increasing the frequency of transactions. The more frequently the transaction takes place, the lower the fixed costs per unit (Ménard 2006: 28). In a producer group situation, frequency of transactions can be raised through increasing the number of members. Additionally, enlarging the number of organization members might decrease the danger of opportunistic behavior and internal rent seeking by members since it implies a lower share in the organization's profits for each individual and discourages internal rent seeking. Those organizations that survive are not the most profitable but are most successful at solving problems of internal rent seeking (Kräkel 2006:2, 21).

**Proposition 1.** *The number of members is expected to have a positive impact on the likelihood of formation of a successful producer group.*

Nonetheless, decreasing transaction costs by enlarging the number of group members increases internal coordination and bureaucracy costs. Producer groups should therefore have to bear the costs of coordinating farmer actions and organizing production, marketing, and administration. Internal coordination costs might be decreased by leadership. A strong central coordinator enables the group to save on both total transaction information transmission and decision-making costs (Williamson 1983: 41, 45). However, developing an adequate information system among partners also matters. An overly-strong, dominant leader who can capture information is a threat to the continuity of the relationship in hybrid forms of governance (Ménard 2004: 351).

**Proposition 2.** *A stronger leader contributes to saving on internal transaction costs and thus is expected to have a positive impact on the likelihood of formation of successful producer groups up to a point; however, an overly-strong, dominant leader reduces the likelihood of success.*

Sharing rents in hybrids, however, involves a danger of opportunistic behavior that can potentially provoke conflicts. Therefore, the identity of partners is important and their selection is a key element (Ménard 2004: 351). In most cases, the selection of partners is based on previous experience in market relationships, on previous hybrid arrangements, and/or on reputation (Ménard 2004: 361). Hence, we may expect that both selection of alliance partners and previous business relationships in which the partners had an impact on formation of successful producer groups. A similar argument is put forward by Whipple and Frankel (2000), who discuss strategic alliances. Firms implementing alliances have problems with the transition from adversarial to a cooperative relationship; the changes in mind-set, culture, and behavior can be overwhelming. The largest barrier to alliance success is organizational culture. It is the greatest cost for alliances, and it takes a long time to modify partners' traditional habits and beliefs while adopting new ways of conducting business (Whipple and Frankel 2000: 22).

**Proposition 3.** *Selection of members and having a previous business relationship between the members is expected to have a positive impact on the likelihood of formation of successful producer groups.*

The nature of safeguards needed for securing the agreement and the significance of contractual hazards will be determined by the level and forms of specific investments undertaken for a specific arrangement (Ménard 2005: 298). "The more specific mutual investments are, the higher the risks of opportunistic behavior and the tighter the forms of control implemented" (Ménard 2004: 355). The choice of government structure and contract arrangements is thus critical for survival of alliances. The anticipated complexity of tasks and coordination is a major factor in the choice of a specific governance mode and in the design of mechanisms for monitoring the arrangements. Contracts play a crucial role in coordinating partners; in particular, they specify the number of parties included in the agreement and its duration (Ménard 2004: 351-2, 361). These arguments stress the role of both level of investments and the nature of contractual arrangements for the likelihood of achieving success with hybrid arrangements.

Regarding the institutional framework in which the Polish producer groups are functioning, the tighter the forms of control implemented by producer groups, the higher their set up and organizational costs. Hence, we may expect that farmers who do not undertake any joint investments will choose the loosest and cheapest form of informal group. As we explain in detail in Sections 3.4 and 5.9, association and union require higher time and money investments, and their accumulated capital is legally protected. In association, however, the partners have no right to withdraw the accumulated capital or profits. The accumulated capital and profits can only be spent on the organizational activities defined in the statute (Legislation: Act from 7<sup>th</sup> April 1989, Art. 34). Unions are more flexible with regard to the law, but the generated profits have to be equally distributed among all members (Ejsmont & Milewski 2005: 65). Farmers who undertake considerable investment will therefore be expected to adopt not only the most safeguarding, but also the most costly form – the commercial company (Legislation: Act



from 15<sup>th</sup> September 2000b). Similar establishment and running costs follow the choice of the organizational form of cooperative. This form, however, involves less control over the capital due to the decision-making process in which each member has equal decision-making power irrespective of the invested capital (Legislation: Act from 16<sup>th</sup> September 1982, Art. 36, § 3).

**Proposition 4.** *Groups that make a higher initial capital investment have to choose a legal form that provides an appropriate level of safeguards corresponding to the coordination costs. If this decision is mismatched, groups will suffer either too-high costs or opportunistic behavior. Consequently, they are expected to be more likely to fail.*

Hybrids tend to develop in highly competitive markets in which pooling resources is a way to survive and to decrease uncertainty (Ménard 2005: 295). Competition is beginning to shift from firm versus firm to supply chain versus supply chain, which creates the need for integration strategies (Bowersox et al. 1999). Competition may destabilize hybrid forms, since the partners might be tempted to switch among arrangements, particularly if investments in the cooperation are only moderately specific. The problem that hybrids face is therefore which mechanism to adopt in order to delineate joint decisions, discipline partners, and solve conflicts while preventing free riding (Ménard 2005: 295-6). On the one hand, competition might increase the likelihood of producer group formation; on the other, the resultant instability of the arrangements may affect the likelihood of success.

**Proposition 5.** *Competition may destabilize cooperative arrangements and thus is expected to have a negative impact on the likelihood of achieving success by producer groups.*

## **2.2 Success or Failure of Farmers' Cooperative Enterprises in Light of Game Theory**

The interdependencies among members of producer groups could be modeled as a coordination game, prisoner's dilemma or a public goods game. In coordination games the choice of a certain cooperation strategy by all the players results in a Pareto superior Nash equilibrium, but each coordination game might have more than one Nash equilibrium. The problem here is how to coordinate players on the most efficient equilibrium (Rasmusen 2001: 29). In coordination game settings the producer group is able to negotiate higher prices for the members' produce by enlarging the quantities of the product offered on the market, which could result in lowering per-unit transaction costs. In terms of Equation 1, the game describes a situation where direct exchange among farmers and purchasers of their output is replaced by establishing a producer group. If other parameters stay constant, a higher net gain from trade through the producer group is due to its lower transaction costs in comparison with the direct exchange:

$$T^{PG} < T^D$$

In both prisoner's dilemma and public goods games, the dominant strategy for each of the players is not to cooperate with the other players. If the majority of the players chooses this strategy, however, it brings worse payoffs for all of them. The dominant strategy equilibrium in this game is not engaging in cooperation, but all group members would be better off cooperating than defecting (Dawes and Messick 2000: 111). A prisoner's dilemma game might be experienced by producer groups which have to

compete with other intermediaries such as middlemen, and if the group is unable to negotiate a sufficiently high price premium or has entered into a long-term contract, farmers might deviate from the group rules and sell their output through a competing intermediary. If other parameters stay constant, in such a situation the value of a transaction organized through the producer group will be lower than the value of a transaction organized through the intermediary:

$$V^{PG} < V^I$$

A public goods game might be played by producer groups which manage to increase the value of the transaction, by providing a product of a better quality; however, if only the average quality matters, those members might earn more who free ride and do not contribute to sustaining the quality standards.

We may *propose* that successful producer groups manage to set the game in such a way that *all players choosing a certain cooperative strategy will achieve a Pareto superior Nash equilibrium, from which none of the players has an incentive to deviate.*

In addition, as suggested by Binger and Hoffman (1989: 68), some social arrangements also arise as *inefficient equilibriums* of repeated games and endure because no one would benefit from a unilateral change. We may expect that *some producer groups keep functioning despite failing to coordinate their members on achieving the most efficient equilibrium.* Such groups might be only engaged in organizing activities like joint purchases of the means of production or trainings and educational activities. Payoffs from organizing such activities are expected to be lower than from organizing joint sales. However, coordination on these activities is more likely to be achieved, and the game is less vulnerable to market conditions that could transform the game into a social dilemma. If one farmer refuses to buy a certain amount of fertilizer purchased by the group, it is easy to sell it to someone else. Defection in such situations does not imply major losses.

Banaszak and Beckmann (2006b) point out that some variables related to the environment in which cooperation takes place and to group structure might either facilitate or hinder cooperation. One of the factors which might decrease the likelihood of achieving successful cooperation is competition. As pointed out above, competition with other intermediaries might increase the likelihood of deviation from group rules expressed through sales outside, and thus decreases the likelihood of achieving success by producer groups:

**Proposition 6.** *Competition may increase the likelihood of playing a prisoner's dilemma game and thus is expected to have a negative impact on the likelihood of achieving success by producer groups.*

Furthermore, several authors point out that irrespectively of game setting leadership is a factor that facilitates cooperation. In coordination games, leadership as a form of hierarchy helps to coordinate member actions on one of multiple equilibria, and therefore lowers bargaining costs that players would have to spend to agree on and implement one of the strategies (Miller 1992: 50). Leadership might also add additional utility from reciprocating cooperation (Foss 1998: 13, 22; Shamir et al. 1993: 577). Strong leaders might also make the threat of punishing shirking players more feasible. Banaszak and Beckmann (2006a: 17) show that leaders' decision-making power was significantly correlated with exercising sanctions in producer groups in Poland. Due to additional utility from reciprocating cooperation, the payoff structure in a prisoners' dilemma game might be transformed into a coordination game.

**Proposition 7.** *Leadership facilitates cooperation in all game settings and thus is expected to increase the likelihood of achieving success by producer groups.*

Another factor that might influence cooperation rates is group size. Larger groups find it harder to communicate and coordinate their actions (Olson 1965: 59-60). Other studies argue the opposite. Sandler (1992: 35) discusses provision of public goods and argues that not only group size but also cost allocation and technological considerations play a role. Issac et al. (1994) provide results that groups of size 40 and 100 provide a public good more efficiently than groups of size 4 and 10. Kollock (1998: 201) points out that too many parameters are changing tandem with the group size and thus assessing the impact of this parameter might be problematic.

**Proposition 8.** *The number of members in producer groups has an indeterminate impact on the likelihood of achieving success by producer groups.*

Furthermore, Kleindorfer et al. (1993: 247-251) point out that homogeneous groups with similarities in the partners' potential power and interests are more likely to achieve a higher cooperation rate. Haag and Lagunoff (2003: 21) examine characteristics of cooperative behavior in a repeated prisoner's dilemma game and provide arguments that homogenous groups in respect to time preferences of their members are more cooperative. The larger the differences in players' time preferences, the less cooperative is the group (Haag and Lagunoff 2003: 7).

**Proposition 9.** *Members' homogeneity is expected to have a positive impact on the likelihood of achieving success by producer groups.*

In addition, groups in which players interact more durably or frequently increase identifiably, and information about individuals' past actions are expected to cause higher cooperation (Axelrod 1984: 62-63). Knowing the identity and history of other players allows the group to develop a reputation, which in turn enables the players to respond in an appropriate manner (Axelrod 1984: 62-63, Kleindorfer et al. 1993: 247-251, Kollock 1998: 199). Ahn et al. (2001: 137) show that in a one-shot prisoner's dilemma experiment success in coordinating on the payoff dominant equilibrium in previous plays of coordination games has a positive impact on the probability of cooperating in the prisoner's dilemma game.

**Proposition 10.** *Preplay members' acquaintance is expected have a positive impact on the likelihood of achieving success by producer groups.*

In a similar way, communication structures may encourage better exchange of information about the individuals involved in the interaction. Kollock (1998) mentions a number of studies that point out that communication promotes cooperation. Communication allows players to make explicit commitments and promises about their future moves and to appeal to the "right" or "proper" thing to do, thus exerting moral pressure. Brosig and Weimann (2003) examine communication effects in public goods experiments that only differ with respect to pre-play communication. The results indicate that successful cooperation might be attributed to the opportunity to coordinate behavior in the communication phase. However, the success of communication depends strongly on the communication medium. The results show that the most efficient is face-to-face communication. Interestingly, it did not make a difference whether people were sitting at the same table or watching each other on a video screen (Brosig and Weimann 2003: 217, 231).

**Proposition 11.** *Communication among players is expected to have a positive impact on the likelihood of achieving success by producer groups.*

### **3. Research design**

#### **3.1. Methods and techniques of the research**

Producer groups in one province were selected as the object of the research. The chosen province of Wielkopolska is one of 16 provinces in Poland and is located in the western part of the country. The cross-sectional research design was selected as a research method for this investigation. This design employed the technique of social survey, which uses a structured interview with producer group leaders as the data collection strategy. Fifty functioning groups and 12 disbanded group groups were subjected to the research. The 50 functioning groups associated 4,056 farmers; the 12 inactive ones associated 394 farmers. The interviews were carried out in early 2005.

The structured interview with producer group leaders was organized into a questionnaire composed of six sections which addressed: (i) general information about the group such as the group's address, legal status, number of members, and activities performed, (ii) the process of group formation, (iii) group functioning (divided into three sections: management and decision making, production and marketing, and membership), (iv) costs and benefits of cooperation, (v) the role of the institutional environment, and (vi) leadership. These six sections comprised 132 questions in total. Two types of questions were asked: the first was related to facts such as numbers or descriptions of processes, the second to the subjective evaluation of these facts.

#### **3.2. Computation of variables**

An ordinal probit model was employed in the research. The ordinal regression model is a nonlinear model in which the magnitude of change in the outcome probability for a given change in one of the independent variables depends on the levels of all of the independent variables (Long & Freese 2001: 137).

Additionally, in order to compare differences in the mean values of variables characterizing distinguished categories of success, we have used one-way analysis of variance (ANOVA). ANOVA involves one independent variable (referred to as a factor), which has a number of different levels. These levels correspond to the distinguished different groups. ANOVA compares the variance (variability in scores) between the different groups (believed to be due to the independent variable) with the variability within each of the groups (believed to be due to chance). A significant F test indicates that we can reject the null hypothesis, which states that means across the groups are equal (Pallant 2001: 186).

## **4 Empirical Results**

### **4.1 Measuring "Success"**

As reviewed in Section 1, different definitions have been applied to measure success and failure of cooperative enterprises. Bruynis (1997) defines success in terms of longevity, business growth, profitability, and members' satisfaction. Sexton and Iskow (1988) measure success based on self-evaluation. Ziegenhorn (1999) understands success of networks in terms of their survival.

In Section 2 we proposed two new definitions of success and failure of producer groups based on transaction costs theory and game theory. As suggested by the transaction costs investigation, successful producer groups will be those that manage to coordinate the exchange between farmers and purchasers and that additionally operate at per unit costs, which do not exceed per unit costs of organizing the transaction through alternative ways, such as decentralized exchange or intermediation of other agents. Such understood success could be measured by either investigating the price premium that the groups negotiate for the members' output, or by investigating whether the benefits of the groups' functioning are higher than its costs. Price premium was measured by questioning percent difference between the price obtained by group members for their products and that obtained by nonmember farmers on the market. On average, producer group members were selling their products at a 6.2% higher price premium. Twenty-seven groups were either not selling jointly at all or were selling their products at a 0 price premium. Two groups were able to negotiate a price premium as high as 39.3% (SD=10.32). Regarding whether producer groups were obtaining higher benefits than operation costs, the question was coded as a dummy variable, in which 1 stood for having higher benefits than operation costs. Fifty-one percent of the interviewed producer group leaders classified their groups as obtaining higher benefits from operation than costs.

As pointed out by the game theory analysis, we may distinguish a few categories of success or failure of producer groups. The first category is disbanded groups which are clear examples of failure in coordinating farmers to achieve Pareto-efficient equilibriums. Twelve groups that disbanded were identified in the research process.

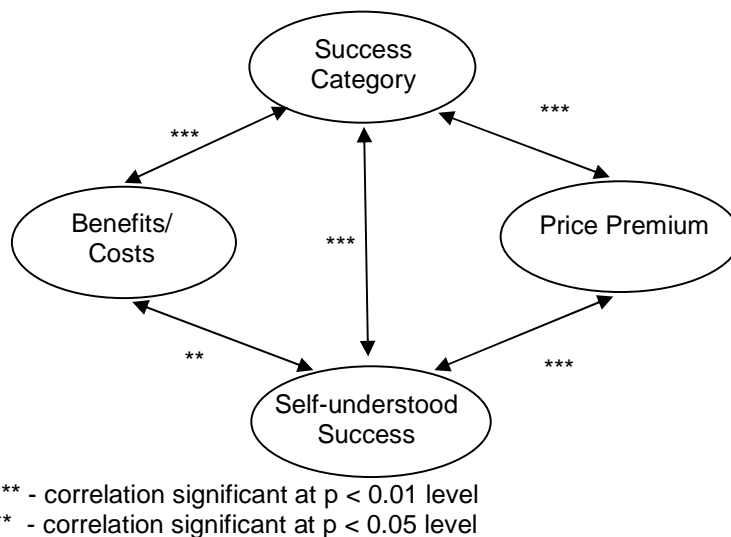
Some producer groups are nevertheless expected to continue functioning, despite failing to coordinate their members on achieving the most efficient equilibria. Such groups might only be engaged in organizing such activities as joint purchases of the means of production or trainings and educational activities. Payoffs from organizing such activities are expected to be lower than from organizing joint sales. Coordination on these activities is more likely to be achieved, and the game is less vulnerable to market conditions that could transform the game into a social dilemma. We therefore propose to include these groups into the second category of partial failure. The groups failed to coordinate farmers on a Pareto superior equilibrium but still provided their members some collective action benefits. Within the research process we have identified 10 such groups.

But how does one measure the success of producer groups? The game theoretical analysis suggested that successful producer groups are those that manage to set the game in such a way that if all players choose a certain cooperative strategy, a Pareto superior Nash equilibrium will be achieved. None of the players have incentives to deviate from this equilibrium. Such understood success could be measured by the deviation rate from joint sales organized by the groups. We may assume that if the group is not able to convince the members that it has the best possible market arrangement, members will simply sell their products to other purchasers. Hence, we may propose to include groups that did not experienced members' defection in joint sales in a third category of success, and those who did into a fourth category of partial success. In the research, 33 groups classified as partial success and seven groups classified as success were identified.

Below we present how the identified measurements of producer group success correspond to each other. For comparison of the distinguished based on the theory

categories with self-perception of the actors involved in cooperation, we also include a self-evaluated measure of success suggested by Sexton and Iskow (1988). The interviewed producer group leaders could rank their groups as a major success, a minor success, “too early to say,” or unsuccessful. Forty percent of the interviewees classified their groups as unsuccessful (ranked as 0), 8% as “too early to say” (ranked as 1), 27.4% as having achieved minor success (ranked as 2), and 24.2% as having achieved major success (ranked as 3). Most of the leaders (40.3%) understood self-evaluated success or failure of their groups in terms of the ability to profitably market member output. For 24.2% success or failure of their groups was understood in terms of the ability to function, and 17.7% in terms of the ability to get farmers together. Other groups evaluated their success or failure in terms of achieving initial goals (6.4%), obtaining subsidies (4.8%), acquiring investments (3.2%), and achieving good product quality (3.2%).

Since the variable indicating four categories of success, which were distinguished according to game theory, was the only one correlated at the most significant level with the remaining variables, we decided to use this variable in the subsequent empirical analysis (Figure 2).



**Figure 2: Correlations Between the Variables Indicating Different Measures of Producer Group Success**

#### 4.2 Characteristic of the Dependent Variable

We treat the distinguished categories of success as the dependent variable. In the next section we are going to test the impact of the propositions suggested in Section 2 on the likelihood of achieving success. However, before we do so, in this section we would like to provide a description of the dependent variable and explore the differences between the four distinguished categories in respect to basic characteristics of producer groups such as the year of establishment, number of members, impetus for formation, level of initial level of invested capita, legal form, type of members’ production, and activities

performed. We use the ANOVA technique in order to compare whether the differences in the basic characteristics across the distinguished categories are statistically significant.

### **Category 1: Failure**

Twelve groups that had ended their cooperation were subjected to the research. Before the groups disbanded, they had associated 394 farmers, an average of 33 members per group. The smallest group had only eight members, the biggest 60. Most of those groups were created in 1999 and disbanded soon after, the most in 2001. The oldest group from this category was created in 1995, the youngest in 2001. On average each group was functioning for 2.8 years. One functioned less than a year, one was disbanded after 8 years of operation.

Thirty-three percent of these groups were formed as an initiative of the farmers involved, and a further 17% as an initiative of outside businessmen. Interestingly, 50% of the groups in this category were established in a result of an initiative of the extension service.

The majority of these groups preferred the simple legal form of association (66.7%). Three groups (25%) were functioning as limited liability companies, one as a union (8.3%). The simple yet “loose” legal form of association was preferred for fear of bureaucracy, taxation, and of being bound together too closely and too soon. The most frequent type of output produced by group members was pork (58.3%) and vegetables (16.7%). There was one group (8.3%) that associated farmers producing fruits, one producing grains, and one with general production. The mean value of invested capital for groups in this category was 1,104 EUR (32 EUR per member).

We also shortly review here data on factors the interviewed producer groups leaders pointed to as critical for the failure of their groups. The most frequently reported problem was a so-called “mentality of the people” which had to do with commitment, loyalty and trust in the leader and other members. Two groups did not want to change their purchasers to those appointed by the leader, and in three cases the members did not want to compensate the leader for his work or to hire a manager. Regarding other cases, two groups reported having problems with finding purchasers; one group was destroyed by a middleman who offered members a higher price if they sold their output outside the group; in one case the group was embedded in a conflict between two neighboring villages, and inhabitants of one village spread false information about the leader in order to destroy the group; and in the last case the leader pocketed the groups’ money and members did not want to continue cooperation afterwards.

### **Category 2: Partial failure**

We studied ten groups that were functioning but not performing joint sales of output produced by the member farmers. Half of these groups were created in 1999. The oldest group was created in 1992, the youngest in 2004. The groups associated 293 farmers, and each one associated an average of 30 farmers. The smallest group had only six members, the biggest 69. Four groups associated farmers producing pork, with one group in each production type: cattle, fruits, grains, vegetables, mushrooms, and poultry.

Most of the groups were initiated by one farmer or a group of farmers (70%); the other 30% were initiated by an outside organization, in two cases by the extension service and in one case by a processing company. Half of the groups chose the legal form of association, while 30% chose a union. The remaining two groups (20%) were registered

as limited liability companies. Simple forms of association and union were preferred due to a desire to avoid costs such as taxes, which were required from groups functioning as an LLC or cooperative. Some interviewees from groups that preferred the simplest forms reported that farmers at first wanted to do something simple without investing any capital: should it be possible, they intended to engage themselves in more complicated activities. Regarding the start-up capital, on average groups in this category collected 5,013 EUR (471 EUR per member).

None of these groups performed the task of organizing joint sales at the time the interviews were carried out. Three groups (30%) were selling jointly for some time but then stopped. One group stopped joint sales because a dishonest member took over group contracts. Another disbanded due to a decrease in prices on the market. The last one was saddled with financial problems caused by the deceitfulness of a purchaser, who took a great deal of the group's output without paying for it. Almost all of the groups, however, were active in other fields—joint supply of production means for members (70% of the groups), trainings and educational trips (70%), joint transportation (10%), and integration events for the members (40%). Another group organized joint packages for the members' output, and one other joint sorting, packing and storing. Only one group did not perform any of these tasks; the only thing the members did was meet once a month to discuss their problems. Groups in this category could not obtain subsidies from the national and EU budgets since they were not performing joint sales (subsidies were paid as a percentage of total turnover of the group, from which at least 50% had to be generated from joint sales) (Legislation: Act from 15<sup>th</sup> September 2000b, art. 3 § 4; details on the conditions for obtaining subsidies are explained in Section 5.9). Nonetheless, it is interesting that one group with the help of an extension service official, recorded fictitious joint sales, and thus managed to obtain the subsidies.

### **Category 3: Partial success**

Subjected to the research were 33 groups performing joint sales of individual farmer output who admitted having problems with members deviating from group agreements and selling their output outside the groups. Most of those groups were established in 1998 and 1999. The oldest group in this category was created in 1992, the youngest in 2004. The groups associated an average of 97 farmers, which is the highest mean group size for all the identified categories. The smallest group had only five members, the largest 141. The most popular legal forms among these groups were unions (33.3% of groups) and associations (30%). Taking the formation factor into account, the majority of the groups were initiated by direct actions of involved farmers (63.6%) and 36.3% by outside organizations such as extension services (21.2%), processing companies (9.1%), municipality cooperatives (3%), and outside businessmen (3%).

Eighteen percent of the groups were functioning as Limited Liability Companies, 15% were of an informal character, and 3% (one group) chose the legal form of a cooperative. The most frequent type of output produced by the members was pork (66.7%), vegetables (18.2%), and fruits (6.1%); there was one group (3%) each in potatoes, grain, and hop. On average these groups collected 8,051 EUR as start-up capital (282 EUR per member).

All the groups performed the task of organizing joint sales. Nonetheless, most of the groups also executed other activities. Eighty-four percent of the groups organized trainings and educational trips for their members, 72% organized joint purchases of the



means of production, 27% joint transportation, and 64% organized integration events for the members. Two groups were also sorting, packing, and storing the produce, while two others provided insurance for their members, and one provided loans for their members. Eleven groups (33%) also applied for and received subsidies.

#### **Category 4: Success**

Only seven producer groups, which were selling the output through the group and did not have problems with members deviating from the group agreements, were subjected to the research. On average the groups were established in 2001: the oldest group was established in 1993 and the youngest in 2004. The number of members per group was the highest in this category, equal to 75.7 members per group. The smallest group had only five members, the largest 301. The most popular legal forms chosen among those groups were unions, chosen by three groups (43%), and limited liability companies, chosen by three groups. The remaining group operated as a cooperative. Regarding the starting up capital on average the groups collected 10,221 EUR (1,174 EUR per member) With regard to the type of produced output, four groups produced vegetables (57.2%), two produced pork (28.6%), and one produced rape seed (14.3%). Four groups (56.9%) were initiated by the direct actions of involved farmers, two groups (28.6%) by a processing company, and one (14.3%) by a municipality cooperative.

All the groups performed the task of organizing joint sales through the group. Other activities performed by the groups included the organization of joint transportation (performed by 57.1% of groups), of training and educational trips for members (performed by 57.1% of groups), of joint supply of production means (42.9% of groups), and of integration events for the associated farmers (performed by 42.9% of the groups). Four other groups also performed less common types of activities: One group provided insurance, storage space, and other services such as soil analyses. Another group slaughtered pigs produced by individual farmers, while yet another dried and purified rape seed. One group in fresh tomatoes produced the goods jointly, which makes them similar to a production cooperative. Five groups in this category (71%) also managed to arrange subsidies.

Table 1 presents a summary of characteristics of the identified producer group categories. The last row in the table also presents a comparison of the average size of the members' agricultural holdings in each category. Due to the difficulty of comparing different agricultural production types, the data we present only deals with groups associating farmers who produce hogs, since most producer groups (56%) associated hog farmers.

A series of one-way analyses of variance ANOVA was run in order to identify whether there were any significant differences in the mean scores of the variables presented in Table 1 for the distinguished categories of success. A significant difference in mean scores indicated the variable representing whether the group was formed from the initiative of the extension service ( $F(3, 58)=2.4, p=0.077$ ). The effect size was 0.11. The significant difference was between Category 1 and Category 4. It suggests that considerably more groups that failed were initiated by the extension service than groups that achieved success.

**Table 1: Main Characteristics of the Distinguished Categories of Producer Groups**

FACTOR	Coding		Cat. 1: Failure groups N=12	Cat. 2: Partial failure N=10	Cat. 3: Partial success N=33	Cat. 4: Success groups N=7	TOTAL N=62
Start-up year	Year	M SD	1998 1.70	1999 2.97	1999 2.19	2001 3.86	<b>1999 2.51</b>
Number of members	No.	M SD	32.83 12.20	29.30 19.26	97.97 141.23	75.71 106.74	<b>71.77 112.41</b>
Formation factor (dummy)	Farmers themselves Extension service Outside business	Mean	0.33 0.50 0.17	0.70 0.20 0.10	0.64 0.21 0.15	0.57 0 0.43	<b>0.58 0.24** 0.18</b>
Legal form (dummy)	Informal Association Union Cooperative LLC	Mean	0 0.67 0.08 0 0.25	0 0.50 0.30 0 0.20	0.15 0.30 0.33 0.03 0.18	0 0 0.43 0.14 0.43	<b>0.08 0.29** 0.23 0.03 0.23</b>
Start-up capital (EUR)	Total Per member	M SD M SD	1,104 1,474 32 38	5,013 6,838 471 1,222	8,051 21,894 282 726	10,221 12,274 1,174 2,498	<b>6,461 16,809 365 1,101</b>
Type of good (dummy)	Pork Vegetables Fruits Other	Mean	0.58 0.17 0.08 0.17	0.40 0.10 0.10 0.40	0.67 0.18 0.06 0.09	0.29 0.57 0 0.14	<b>0.56 0.21* 0.06 0.16</b>
Actions performed by the group (dummy)	Joint sales Joint supplies Trainings, educ. trips Joint transport Integration events Obtaining subsidies	Mean	- - - - - -	- 0.70 0.70 0.10 0.40 0.10	1.00 0.73 0.85 0.27 0.64 0.33	1.00 0.43 0.57 0.57 0.43 0.71	<b>0.65 0.55 0.65 0.29 0.45 0.27</b>

The stars indicate significant differences in the mean scores of the variables for the distinguished categories of success:

\*\*\* differences significant at .01 level

\*\* differences significant at .05 level

\* differences significant at .10 level

The mean scores for choosing the legal form of association were also significantly different at  $p < 0.05$  level ( $F(3, 58) = 3.7$ ,  $p = 0.16$ ). The effect size was 0.10. The significant differences were between Category 1, Category 3, and Category 4, which suggest that the governance form of association is more frequent among groups that failed than among those that achieved either partial or full success.

Regarding the question of why the form of association was chosen, again we see a large impact of the extension service. Thirty percent of groups functioning as associations chose this form due to advice of the extension service. Others chose it because it was considered a “loose” form, which did not require capital investments (17%), because it

was a cheap form (13%), because it was considered to provide a sufficient level of security (8%), or because farmers were not aware that there are other forms available (8%).

We find a slightly significant but negative correlation between the choice of the legal form of association and the level of invested capital ( $p < 0.1$ ). This suggests that maybe the level of capital invested in associations was too small to enable the group to survive in the market. One such investment could be paying a salary to the leader for organizing the task of joint sales. A very significant negative correlation is found between choosing the legal form of association and paying a salary to the leader ( $p < 0.01$ ). Additionally, as discussed by Banaszak and Beckmann (2007: 186) leaders of producer groups who did not receive a salary were less likely to negotiate a high price premium.

Regarding the type of production of the member farmers, the mean scores for only one variable – that is, producing vegetables – differed significantly at  $p < 0.1$  level ( $F(3, 58) = 2.28, p = 0.089$ ). The effect size was medium and equaled to 0.10. The difference was between Category 2 and Category 4. Vegetables are a more frequent type of production among successful groups than among those that suffered a partial failure.

### **5.3 Characteristic of the Independent Variables**

In this section we present how we operationalize the propositions derived from theory in Section 2. In respect to the likelihood of achieving success by producer groups, the propositions derived from transaction costs analysis point to such factors as group size and the strength of leadership in decision-making, selection of members entering the organization, having an earlier business relationship with group members, mismatching of capital investments with governance form, and functioning in a competitive environment.

Regarding the group size, each group associated an average of 71 members. Group sizes, however, were greatly disproportionate, which is indicated by the high standard deviation. The smallest group had only five members, the largest 700. The role of leadership in decision-making was measured by asking the interviewed producer group leaders whether they make most group decisions. The mean for the answers to the question reached 2.8 on a scale of 1 to 4, in which 1 stood for disagree and 4 for agree. Only 10 groups (16%) declared that their groups were homogenous. Selection of partners for the alliance was measured by asking whether there was a selection process of members during the group's formation stage. This had happened in 31% of the groups. The existence of a previous business relationship was measured by asking the interviewed leaders whether one had existed with most of the group members. Fourteen percent of them fully agreed with this statement, 9.7% partially agreed, 14.5% partially disagreed, and 61.3% disagreed entirely. Regarding the decision on allocation of appropriate governance with respect to the invested capital, the groups were divided into three categories: those having start-up capital below 10,000 PLN (approx 2,600 EUR), in between 10,000 PLN and 50,000 PLN (approx 13,200 EUR), and above 50,000 PLN. Groups that misallocated their governance structure choice were those that had invested capital below 10,000 PLN and chose costly forms of cooperative or limited liability company (four such cases were identified); those that had invested a sum between 10,000 and 50,000 and chose forms that did not providing enough security for invested capital, such as informal groups or associations (seven such cases were identified); and those that had invested over 50,000 PLN and additionally chose a form other than a cooperative or

limited liability company (one such case was identified). Division into the three groups was motivated by actual patterns of choosing governance forms with respect to the invested capital. Competition was measured by investigating how the interviewees evaluated market relationships with the main competitors of producer groups – middlemen. Fourteen and a half percent of the groups reported experiencing harsh competition with middlemen, and 30.6% found them minor competitors.

The propositions derived from game theoretical analysis also highlighted the role of leadership, the number of members and competition. Additionally, the propositions suggested that group homogeneity, availability of information about past actions, and communication structures are also expected to facilitate cooperation. Group homogeneity was measured by asking the interviewees whether members of their groups had similar economic potential. Sixteen percent of groups were homogenous. Availability of information about past actions was measured by investigating whether the members knew each other before establishing the producer group. In most cases, all members were acquainted with each other (66%); in 29% the majority of the members knew each other before; and in only 3 groups (5%) the majority of the members were not previously acquainted. Regarding communication structures, we asked the interviewees whether all members were involved in the initial stage of planning and designing the group. In 30.6% of the groups, all members were involved in the discussion; in 64% of the groups only some members were involved; and in 4.8% of the groups the decisions were made exclusively by the initiative actor, and there was no discussion with other members. Table 2 presents summary statistics for the distinguished independent variables.

**Table 2: Summary Statistics for the Independent Variables**

Variable	Measurement	Coding	N	Mean	SD	Min	Max
<b>Group size</b>	Number of members	Number	62	71.77	112.41	5	700
<b>Leader's decision-making strength</b>	Does the leader make most of decisions in the group?	1-disagree, 2-rather disagree, 3-rather agree, 4-agree	62	2.81	1.01	1	4
<b>Selection of members</b>	Was there any selection process for the members?	Yes-1, no-0	62	.31		0	1
<b>Business acquaintance</b>	Did the members have business relationships before establishing the group?	4-all had, 3-majority, 2-some, 1-none	62	1.77	1.12	1	4
<b>Misallocated Governance Form</b>	In respect to the amount of invested capital whether the group have chosen a form which is either too costly or not providing enough of security	Yes-1, no-0	62	.20		0	1
<b>Competition</b>	How would you evaluate the competition with the middlemen on the market?	3-major competition, 2-minor competition, 1-no competition	62	1.60	.73	1	3
<b>Homogeneity</b>	Do members have similar economic potential?	1-yes, no-0	62	.16		0	1
<b>Preplay acquaintance</b>	Did the members know each other before establishing the group?	4-all members knew each other, 3-some didn't know each other, 2-majority didn't know each other, 1-nobody knew each other	62	3.61	.58	2	4
<b>Communication</b>	Were all the members involved in the initial discussion about the group?	1-none, 2-some, 3-all	62	2.26	.54	1	3

## 5.4 Regression Modeling Results

In order to measure the impact of the independent variables above on the distinguished categories of success of producer groups, we ran an ordinal probit regression. A few pairs of independent variables were correlated with each other. The regression was thus run stepwise. The cut significance level was defined as  $p < 0.1$ . Additionally, due to perfect negative correlation between the variable indicating the number of members and the variable indicating the previous acquaintance, one of them had to be removed from the regression. Since number of members was pointed out by both game theory and transaction costs theory as influencing the likelihood of setting up a successful cooperation, this variable was kept in the model. The regression results are presented in Table 3.

**Table 3: Stepwise Ordinal Probit Regression Results for the Distinguished Dependent Variable and Independent Variables**

<i>Independent variables</i>	<i>Dependent variable</i>
	Category of success: 1 to 4
Leader's strength	.270 * .150
No. of members	.003 ** .001
Selection of members	1.037 *** .376
Business acquaintance	.526 *** .166
Pseudo R2	.209
No. of observation	62

The upper line in the row indicates coefficient; the bottom one indicates standard error

- \*\*\* significant at .01 level
- \*\* significant at .05 level
- \* significant at .10 level

The strongest impact on the likelihood of producer group success was achieved by the variables indicating whether the members had had a previous business relationship and by the variable indicating whether there was a selection process of the members at the group's formation stage. The variables were additionally correlated ( $p < 0.01$ ). The finding supports Proposition 3 derived from the transaction costs prediction that the key element for success of hybrid modes of governance is the selection of partners based on previous experience in market relationships. It might also explain the failure of the large proportion of producer groups that were established on the initiative of the extension service. We might suspect that, while the extension service officials aimed at forming a producer group and encouraged all farmers in the area to join the group, the groups formed in alternative ways were more selective and careful about choosing potential partners. A significant negative correlation was found between the variable indicating whether the group was formed due to an initiative of the extension service and the variable indicating whether there was a process of member selection ( $p < 0.1$ ).

The variable that had the second strongest significant positive impact on the likelihood of producer group success was the group size. The larger the group, the more likely it was to be successful. This supports Proposition 1 derived from transaction costs theory, which proposed that larger organizations are more likely to decrease per unit

transaction costs, and that in addition, larger groups are less vulnerable to the danger of internal rent seeking and opportunistic behavior. The findings also confirm Proposition 8 derived from game theory. However, the authors referred to while discussing the proposition were not very clear about the sign of the expected relationship.

Our finding that success is positively related to group size is somewhat in opposition to the discussion on provision of collective benefits. Olson (1965) argued that larger groups find it harder to communicate and coordinate their actions, which was expected to hinder cooperation. We might stipulate that leadership is the factor that counteracts the negative impact of enlarging group size on communication and coordination costs. This corresponds to the finding that the variable indicating leadership decision-making strength was also significant. The stronger the leader, the more likely the group was to be successful. This confirms Proposition 2 derived from transaction costs theory that proposed that leadership contributes to saving on internal transaction costs and has a positive impact on forming successful producer groups. The finding also supports Proposition 7 drawn from game theory that, irrespective of game settings, leadership enhances cooperation. Additionally, since producer groups operate in market settings, increasing the number of members and decreasing transaction costs might also increase the groups' bargaining power and thus provide higher benefits to members.

The second part of Proposition 2 suggested that a strong and dominant leader who captures information is a threat to the continuity of relationships in hybrids and therefore decreases the chances of having a successful hybrid arrangement. The findings from Banaszak and Beckmann (2007: 186) suggest that this might also be the case. Leaders' decision making power had a significant positive impact on the likelihood of the group entering a long-term contract. Nonetheless, as suggested in Banaszak and Beckmann (2006b: 18), selling group products through a long-term contract increases the likelihood of playing a prisoner's dilemma game and thus might potentially increase deviation rates.

The number of group members was additionally perfectly negatively correlated with the variable indicating previous acquaintance, which was excluded from the regression. It does suggest, however, that having ordinary previous knowledge of group members will have a negative impact on the likelihood of successful producer group formation. If one organization has too many overlapping social relationship layers, the organization might experience problems with members' discipline and might have difficulties in performing professional and business functions (Banaszak and Beckmann 2006b: 18).

## **6 Conclusions**

The article investigated the question of success and failure of cooperation in agricultural markets. We also included disbanded organizations in the analysis. The empirical data were collected from 62 producer groups located in Wielkopolska Province, Poland.

We proposed a new approach to investigating success and failure of farmers' cooperative enterprises. The definition of success or failure of the researched organizations was based on game theory and transaction costs theory. Game theory suggested that successful groups manage to set the game in such a way that choosing a certain cooperative strategy brings the highest payoffs for the players and results in achieving a superior Nash equilibrium. Players in such a situation have no incentives to deviate from the group agreements. Transaction costs theory suggested that successful producer groups manage to coordinate the exchange between farmers and purchasers and operate

at per unit costs that do not exceed the per unit costs of organizing the transaction through alternative ways.

In order to measure such understood success and failure, we proposed a classification of the producer groups into four categories. The first category contained 12 groups that had stopped functioning; it is clear that these groups failed. The second category contained 10 groups that were still functioning, but for different reasons were currently not performing their main task – organizing joint sales; we called this category a partial failure. The third category was called partial success and comprised 33 groups that were functioning, performing joint sales, but still having problems with members shirking the group agreements and selling their output outside the group without group permission. This indicates that these groups did not manage to coordinate their members on strategy, which would have resulted in the highest possible payoffs to the members. The fourth and final category contained seven of the most successful groups, which were functioning, performing joint sales, and did not have problems with members deceiving group agreements. The division among categories three and four was significantly positively correlated to the price premium the members received for the output sold through the group, the variable indicating whether the group obtained higher benefits from functioning than costs, and the variable indicating self-perceived success.

What is striking in the comparison of the identified success categories is that a major portion of failed groups was established on initiative of the extension service (50%). Additionally, none of the groups classified as successful were established by the extension service. There is also significant difference in adopting the legal form of association between the groups that failed and those that were successful. The most frequent reason to choose the legal form of association was due to advice of the extension service. We suppose that the extension service employees might have lacked sufficient information about business management and thus they advised adopting the form of association, which is cheap but does not provide safeguards for invested capital, and additionally does not allow members to withdraw either invested capital or profits. Consequently it could discourage members to invest capital in such groups. Although we did not find significant differences in the level of invested capital in the distinguished categories of producer groups, some level of investments might be necessary to survive in the market.

Another interesting finding is that the most frequent problem among groups that failed entirely or partially concerned member commitment and leadership. Considering the commitment problem, Banaszak and Beckmann (2006a: 18) suggest that member commitment, which is understood in terms of compliance with producer group rules, is mainly related to the payoffs from the group activity measured in the price premium members receive for output sold through the group. This indicates that the groups that failed partially and entirely did not manage to provide high enough benefits for their members, which would have motivated them to commit to the group.

Considering the problems with leadership, Banaszak and Beckmann (2006b: 27) show that groups have to compensate leaders for their work if they want to keep their work motivation high. If a group does not solve this motivation problem, the leaders might be more willing to choose options that are less work intensive for themselves and that are less valued by group members. This could result in hindering or eventually disbanding cooperation.

Transaction costs theory and game theory also provided insights on factors that might contribute to formation of successful cooperative arrangements. Based on the discussion we derived 11 research propositions. The propositions were operationalized into nine independent variables. We measured the impact of the variables on four categories of success category using the technique of ordinal probit regression.

Regarding the likelihood of achieving success in terms of the identified categories, the findings correspond to the results obtained by Ziegenhorn (1999: 66), who pointed out that leadership, knowledge, and selection of network participants influence compatibility. We show, however, that the quality of the knowledge of the participants is also important and should be based on previous business acquaintance.

The most significant impact on the likelihood of group success was achieved by the variables indicating whether the members had had a business relationship before establishing the group, as well as the variable indicating whether there was a member selection process during the group's formation. Both variables were strongly correlated as well. These findings support the proposition derived from transaction costs theory that the key to the success of hybrid modes of governance such as producer groups is the selection of partners based on previous experience in market relationships. This finding might provide another explanation on the failure of such a large proportion of producer groups established by the initiative of the extension service. We might suspect that extension service officials just wanted to form producer groups and encouraged all farmers in an area to join a group, while groups formed in alternative ways were more selective and careful about choosing the potential partners. A significant negative correlation was found between the variable indicating whether the group was formed by an initiative of the extension service and the variable indicating whether there was a member selection process.

The third variable with a significant positive impact on the likelihood of producer group success was group size. The larger the group, the more likely it was to be successful. This is in line with the proposition that suggested that the large organizations on one hand might decrease transaction costs, and on the other hand lower the danger of internal rent seeking and opportunistic behavior.

The last variable with a positive impact on the likelihood of success was leadership strength. It supports the proposition derived from transaction cost theory which suggested that leadership might decrease internal transaction costs and thus make the organization more competitive. It is also in line with the proposition derived from game theory that leadership increases chances of coordinating members on efficient equilibriums and facilitates cooperation.

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### **Legislation**

Act from 16th September 1982, Prawo Spółdzielcze (Dz.U. z 1994, Nr. 30, poz. 210 z póź. zm.)

Act from 7th April 1989, Prawo o stowarzyszeniach (Dz.U. z 1989, Nr. 20, poz. 104 z póź. zm.)

Act from 15<sup>th</sup> September 2000, Ustawa o grupach producentów rolnych i ich związkach oraz o zmianie innych ustaw wraz z kolejnymi zmianami (Dz.U. 2000, Nr. 88, poz. 983)