Article

Size of Membership and Survival Patterns of Producers' Organizations in Agriculture—Social Aspects Based on Evidence from Poland

Aleksandra Chlebicka and Michał Pietrzak *

Faculty of Economic Sciences, Warsaw University of Life Sciences, 02-782 Warsaw, Poland;
aleksandra_chlebicka@sggw.pl

* Correspondence: michal_pietrzak@sggw.pl

check for updates

Abstract: Agricultural producer organizations are considered to be an efficient way for farmers to build up bargaining power, thereby increasing farmers' incomes. While making a contribution to the research on the longevity of cooperatives, we tried to identify some regularities concerning the survival of these entities in the specific context of transition economies. In this paper, we look more closely at potential relationships between the development of producers' organizations (POs) and the size of their membership. Then, we link the size of the membership with the concept of social capital. For our purposes, it is necessary to depart from using a general concept of social capital and to differentiate between bonding and bridging social capital. Our results, based on two unique datasets from Poland, clearly showed that relatively larger POs have higher rates of survival. This, in turn, is correlated with the stock and the type of social capital. The main contribution of the study is in identifying the relevance of the size of the membership of newly-established POs to their survival. The findings are followed by policy recommendations that may be useful in the context of promoting farmers' cooperation in recognizing the low stock of social capital, specifically bridging social capital.

Keywords: producers' organizations; survival; social capital; cooperation

1. Introduction

The issue of the relatively weak bargaining power of family farms as compared to companies operating at other stages of the food chain is an important benchmark in the debate on the effective market organization of the agricultural sector [1–4]. Consequently, measures aimed at strengthening farmers' market position have become an important part of agricultural policy [5,6].

Cooperation in producers' organizations (POs) may be justified by the advantages of the economies of scale and the willingness to minimize transaction costs accompanying the processes of producing and selling agri-food products [7,8]. It should enable the concentration of the supply of agricultural products, thereby facilitating negotiations relating to the conditions of their sale. Similarly, by creating the possibility for planning joint production and concentrating demand for agricultural inputs, it ought to reinforce the farmers' negotiation position vis-a-vis the suppliers of agricultural inputs. Finally, by making it possible to take advantage of economies of scale, such cooperation may also enable farmers to cover the costs of investment projects aimed at capturing new markets, improving the quality of the commodities produced, or creating and promoting their own brands. Furthermore, it is worthwhile mentioning that a side effect of the producer groups' existence might be the links between producers, processors, and commercial agents; these links could be important for the efficient functioning of the market, resulting in market and price stabilization [6,9].

There are also other tangible benefits brought by producer groups. Those most often mentioned are an increase in the income of producers in the groups, improvement of the quality of commodities

produced, and a greater diversity of products placed on the market [6]. However, one should not forget that cooperation and the related benefits require farmers to relinquish their independence in marketing and production activities. From an individual producer's perspective, they also imply a slower decision-making process or the need to incur the costs of additional investment [10].

Like other European Union countries, Poland has also provided support from public funds for the setup and operation of producers' organizations (POs). The fact that such measures have been consistently included in agricultural policy measures indicates that cooperation among farmers in Poland, although very much desired, is still insufficient [11]. Investigations show that the effects of support for the setting up of agricultural producer organizations are at best moderate when we take into account the number of farmers that are members of POs and their share in the marketing of agricultural products. After about 20 years of implementing measures aimed at setting up POs in Poland, many still operate. However, data from public registers of POs show that a significant number of them closed despite receiving support from public funds.

Due to these factors, questions have been raised about the patterns of survival and development of newly established POs. Naturally, these questions concern factors that may stimulate or inhibit the process of forming agricultural producer organizations, or that determine their success or failure. In addition to institutional factors, of key importance is also the resources available to farmers—not only tangible assets such as land, machinery or funds, but also resources that are less obvious and more difficult to evaluate. This may include, for instance, the ability to cooperate, or resources derived from established social relations, the accompanying social standards, and trust. Literature on cooperatives that addresses social relations, trust and social capital is so far limited. We believe that our study will contribute to this literature in two ways. Since the process of establishing itself in the free market economy started in Poland after 1989, we focus on the issue of collective action and its formation and development at the initial stage of operation. Moreover, based on some characteristics of the stock of social capital harmed by the legacy of communism, we try to complement the literature with an explanation of how different types of social capital may affect farmers' cooperation.

Therefore, the subject of our interest is the potential relationship between the survival of producer organizations and farmers' social capital. The structure of the study is as follows: in Section 2, we describe the specifics of the development of producer organizations in Poland. In Section 3, we discuss the notion of social capital. Given that the subject of our considerations is agricultural producer organizations, we primarily refer to the definition of social capital where it is seen as an attribute of individuals, not as an attribute of society as a whole. We also refer to historical conditions due to the relevance of the legacy of communism on social capital, which has been widely discussed in the literature. Next, we use a systems approach to the dynamic complexity to identify the key mechanisms through which social capital may have an impact on the development of cooperation among farmers. In Section 4 we explain research design, including data sources and methods of data collection and analysis.

In Section 5, we explore secondary data from governmental registers to evaluate survival patterns in the population of new established POs in Poland. In this part of our analysis, we focus on investigating whether POs consisting of a wider membership survive longer than smaller ones. Then, we complement this analysis with a study based on primary data from a survey with 200 farmers (members of 50 producer organizations) to obtain more insight into the relationships between survival patterns of POs and the social capital of farmers. While studying the primary data, we focus on answering the question of whether the stock and structure of social capital is the factor that differentiates the size of established POs. Finally, we conclude our findings and give recommendations vis-à-vis agricultural policy aimed at establishing and developing POs, especially in the context of a low level of bridging capital in rural areas.

2. Study Background: Polish Experiences in Re-Establishing Farmers' Cooperation

Polish agriculture occupies an important place in the agricultural landscape of the European Union: it comprises approximately 9% of the EU agricultural area and produces about 12% of the EU agricultural production. However, the defective agrarian structure, manifested by the fragmentation of farms and surplus labor force, remains an unresolved problem. Small farms dominate, and those with an area larger than 100 ha constitute only 1% of farms and produce 17% of the total agricultural production. As a result, labor and land productivity remains three times lower than the European average and several times lower than in that of the Western European countries leading in agricultural production [12].

At the same time, in the environment of agriculture, there have been major transformations—associated first with the introduction of a free market economy and later with its inclusion in the single market of the European Union. Particularly important from the point of view of agricultural producers were the changes in the structure of the sector, leading to the strengthening of the position of processors and commercial agents [13]. As a result, farmers are under increasing pressure to improve production efficiency and to ensure large, stable, uniform quality product deliveries. Given the slow pace of land concentration, changes in the farmers' degree of cooperation is the only real possibility of bolstering their market position [14].

Traditions of cooperative movements in Poland date back to the 19th century [15]. In 1937, there were 12.9 thousand cooperatives with 3.0 million members. After the Second World War, co-operatives and their unions were included in the central planning system. Most of the time, member registration was compulsory and the executives were appointed by authorities. Moreover, cooperatives were not particularly concerned about profitability since they were subsidized by the government. At the same time, they were subject to rigid state planning, with state control extended to instructions and directives concerning a broad scope of managerial aspects [16]. The imperative of meeting central-planning objectives effectively eliminated the right of cooperatives to make their own decisions, which led to the distortion of the idea of cooperative movement [17]. What should be stressed here is that farmers in Poland resisted compulsory land collectivization, and the most important element of the farm ownership structure in Poland was individually-owned farms, which accounted for 76% of the total area of agricultural land in the late 1980s [18]. However, in the face of the failure of collectivization, repressions against its opponents were introduced, including revisions, destruction of property, and numerous arrests and fines for failure to comply with mandatory deliveries [19].

Just before systemic changes in Poland (1987–1988), nearly 6.5 thousand coops were related to agriculture and rural areas. Political, legal, and economic transformation resulted in a dramatic decline in the importance of cooperatives in the economy. This was certainly true for the agricultural sector and rural areas; by 2013, the number of agricultural and rural cooperatives fell by over 50% to around 3 thousand [20]. The adoption of legal changes in the organization and operation of cooperatives in 1990 resulted in the need to liquidate cooperative unions and thereby cease their economic activity. As a result, the economic assets of these unions were scattered and degraded, and the existing supply and purchase channels of agricultural products were dissolved [21].

Following the transition that started in 1989, the process of creating formal structures of cooperation among farmers in Poland had to begin anew. The perception of cooperatives among Polish farmers was so negative that, when the first comprehensive legal arrangements concerning formal cooperation among farmers were developed in 2000, the term "agricultural producer group" (APG) was introduced instead of the word "cooperative". This phenomenon was observed in all the Central and Eastern Europe countries. As noted by the Plunkett Foundation (1995), the use of the word "cooperative" in CEE countries would not only "create the wrong impression, but could also create barriers to progress" [16].

Under the definition laid down in the Polish law, an agricultural producer group is identified based on the specification of its functions and goals. Thus, the term agricultural producer group does not imply a specific legal form, but refers to an organization whose major objective is to place

the commodities produced on member farms on the market, thereby ensuring maximum benefits proportionately to the quantity of products sold by the group. Producer groups are owned by their members-producers; they are set up, controlled, and managed by producers in a way that brings them specific benefits.

At the end of 2015, a total of 1630 agricultural producer groups (including fruit and vegetable POs) were registered in Poland. One should also bear in mind that, additionally to newly-established agricultural groups (APGs) and organizations of fruit and vegetable producers that we put under investigation, there are also other types of POs in the Polish food sector. These include agricultural production cooperatives, farmer circles' cooperatives, and horticultural and beekeepers' cooperatives. However, as reported by Matczak [22], the role of these entities in the market is marginal and diminishing; moreover, in the general public's opinion, they are often treated as remnants of the old communist era. The most successful cooperatives with a long-standing tradition operate in the dairy sector (about 70% of the market share).

The number of producer groups alone does not prove that farmers are well organized. If we compare the number of members of POs—approximately 27.4 thousand—and the number of farmers who are CAP beneficiaries, it turns out that in 2016, as little as 2% of agricultural producers were associated with producer groups. A relatively modest share in supplies of agricultural products on the market belonging to producer groups can be clearly seen in international comparisons [5]. The level of formal cooperation among farmers remains relatively low. Furthermore, another negative phenomenon observed in recent years is the decline in the overall number of POs.

From searching for the causes for this situation in the literature review, we first present the concept of social capital, which is subsequently used to indicate significant conditions that may influence the stability of cooperation between agricultural producers. Then, we move to a systems approach to dynamic complexity in the explanation of barriers restricting the development of the collective action of farmers, in terms of both the creation of APGs and the increase of the size of the membership.

3. Theoretical Background

3.1. Importance of Social Capital for the Setting-Up and Functioning of POs

Social capital is an extremely popular, though not very specific and clearly operationalized, concept enabling research into social conditions favorable to better economic performance at different levels, including the state [23], local community [24], organization [25], or individual [26] levels. The works of Bourdieu [27], Coleman [28], Putnam [29,30], and Fukuyama [31,32] provide the primary inspiration for the concept of social capital. In this study, we are primarily interested in a micro perspective, therefore it is worthwhile to evoke here the definition of social capital offered by Bourdieu. It treats social capital as resources that accrue to an individual or a group by virtue of possessing a durable network of relationships of mutual acquaintance and recognition. Thus, this definition allows us to look at social capital both from the perspective of an individual (a farmer who decides to join a producer organization) and the organization (a producer organization).

Dividing the concept of social capital into two distinct aspects—bonding and bridging social capital—is popular in the literature. The former refers to fostering solidarity within the community or organization/group. In doing so, it develops trust and reciprocity of norms and simultaneously helps create mechanisms safeguarding against opportunistic behavior in breach of the rules applicable to the group. It also deepens members' involvement in attaining collective goals and facilitates knowledge sharing [28,33,34]. However, it is worth emphasizing that, in addition to the above-mentioned benefits, this type of social capital may generate considerable costs, causing the group's closure to the outside world and making its development and the introduction of indispensable adaptation-related changes difficult [35].

The bridging type of social capital enables the establishment of contacts outside the organization/group. It is thus responsible for enhancing the group's adaptation possibilities, enables

the maintenance of openness to diverse perspectives, and increases access to information and innovation [36,37]. However, this type of social capital may distract people from attaining the group's objectives [33], while weak relationships may not be sufficient to build up trust and, consequently, to acquire new knowledge [38].

Moreover, one may observe that an animated discussion in which these two types of social capital are compared takes place in the literature. For instance, Putnam's [30] position is that social bonding capital is a second-class capital relative to social bridging capital. Svendsen and Svendsen [39], in turn, argue that it is connected with the corrosion of social capital, whereas Fukuyama associates it with "amoral familism" [31,32]. It may be also assumed that the impact of social capital at the individual level is, to a considerable extent, conditioned by social capital resources at the community level. On the one hand, social capital resources at these two levels may reinforce each other, implying a positive correlation between them. On the other hand, strong social capital at the community level may weaken the motivation of individuals to form an association, by serving as a kind of producer group substitute.

Numerous studies show that the level of social capital in Poland is low, not only in rural areas but also all across the country. In studies concerning rural areas, various scholars have emphasized that rural inhabitants are characterized by a relatively low level of trust in people, including local residents [40–42]. The weak status of civil society, which, if it exists at all, has a familial-egoistic nature, is likely a contributing factor to this [40]. Furthermore, it is generally claimed, especially in the context we are interested in, that this type of social capital is determined by historical factors—more precisely, the negative legacy of communism [4,43–45]. This refers to a possible low level of activity of citizens used to receiving support from the state, or unwillingness to establish cooperation due to bad experiences with enforced collectivization or a degenerated form of cooperatives [17,46,47]. However, across the Central and Eastern Europe (CEE) countries, regarding the ideological pressure of being developed under communism, only in Poland did mass-collectivization fail and family farms survive until the transition [48].

Furthermore, we need to emphasize the fact that cooperation, instead of being a grassroots initiative, was imposed from above. This brought about not only unwillingness to cooperate, but also degenerated forms of social capital leading to amoral familism, nepotism, or corruption. This problem is also reflected in the studies demonstrating that barriers to the development of cooperative behavior are created due to the lack of a tradition of grassroots initiatives organizing themselves into formal structures, learned passivity, and a low level of trust in the "external world", as well as national and local authorities, among rural inhabitants [49].

3.2. Systems Approach to Dynamic Complexity

As we mentioned in the previous section, the consequences of a legacy of communism in Poland is a low stock of social capital and the relative dominance of bonding capital over bridging capital. These effects are even more visible in rural areas, particularly among farmers. Consequently, an important barrier to developing the collective action of farmers and the creation of POs exists. In order to overcome this barrier, support measures aimed at the establishment of APGs have been introduced under agricultural policies (within a Rural Development Program co-financed from the national and European Union budget). The results of this support were quite promising, as measured by the number of POs established. However, the recent soaring dynamic of the growth of the number of APGs (from 8 POs in 2001 to 1391 in 2013) has started to break-down, and the number of existing POs has declined (1324 in 2015). This phenomenon is part of the rule described by Senge: "when the same action has dramatically different effects in the short run and the long, there is dynamic complexity" ([50], p. 71).

Under the conditions of dynamic complexity, "linear" reasoning and conventional methods are not well equipped to deal with the problem ([50], pp. 70–71). Therefore, system thinking turns out to be a more effective way of dealing with such issues, whereby the focus is on the whole rather than on its elements—in search of the interrelations in their dynamics rather than a static picture. In short,

system thinking aims to identify structures that underlie complex dynamic situations ([50], pp. 68–69). As Senge observed, "one of the most important and potentially most empowering, insights to come from (. . .) system thinking is that certain patterns of structure recur again and again" ([50], p. 93). Those patterns are called "archetypes". Therefore, to illustrate barriers restricting the development of collective action of farmers and the creation of APGs, the archetypical feedback loop diagram seems to be useful.

The previously mentioned barriers are well depicted by the "limits to growth archetype" (Figure 1). The main mechanism of this generic structure is the interrelation between two feedback processes: the reinforcing process and the balancing process. The reinforcing process (we denote it as R) means that the growth of A leads to the growth of B, and the growth of B leads to the growth of A. Thus, starting this loop is a way of amplifying growth. The balancing process (we denote it as B) is the dynamic which aims to stabilize the outcome nearly around the goal (the explicit or implicit target). Thus, starting this loop achieves stabilization by directing a too low or too high level to the target level. Typically, the amplifying process produces the spiral of success. This process feeds on itself, resulting in accelerating growth. Then, the growth begins to slow down and eventually stops. This is due to the balancing process being approached as a limiting condition ([50], pp. 79, 94–103, 390–391).
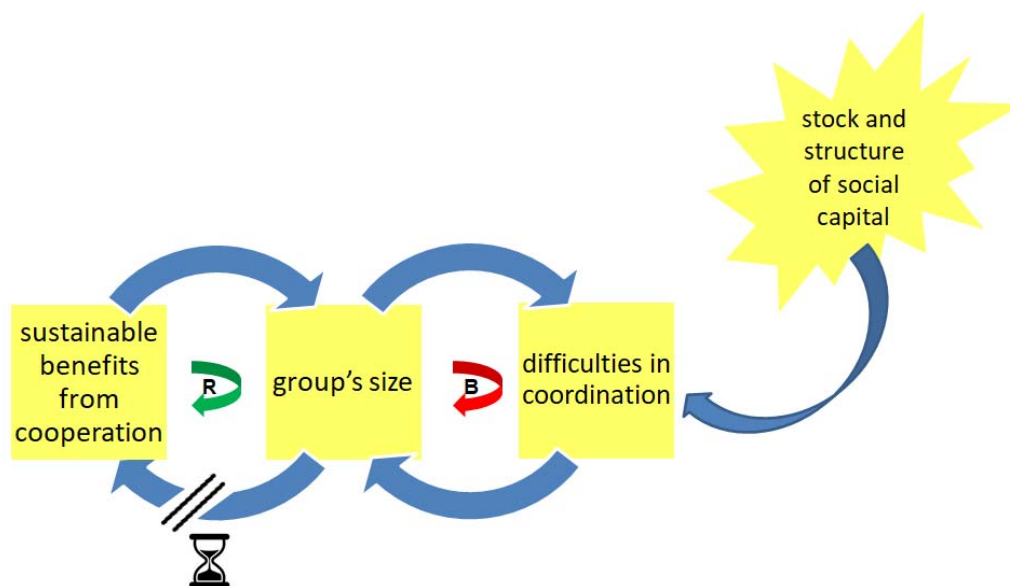

Figure 1. The system archetype: the limits to growth -used in the explanation of the role of the size of a PO and its limitations. Source: own elaboration based on the idea of Senge ([50], pp. 94–103, 390–391).

Cooperation among farmers is explained by the economies of scale and the effort of minimizing transaction costs [5,8,51]. If one or both of these purposes is met, collective action benefits farmers. Achieving economies of scale is ceteris paribus (at a given amount of the individual farm contribution), dependent on the number of group members. Similarly, the larger size of the group arising from the greater number of members also contributes to the reduction of transaction costs due to the decreasing number of market transactions required and/or limited opportunism. A group of farmers could act as a single contractor on behalf of its members, lowering the number of transactions needed, and their costs [52]. The costs connected with a loss of reputation are higher if the group acting as a trading partner is bigger [53]. Consequently, the larger the group is (in terms of the membership), the easier and more sustainable the benefits achieved by its members are. Such benefits lead to higher attractiveness of the group, which, in turn, increases the likelihood of new members joining, thus reinforcing the amplifying loop. However, there can be a delay (denoted by an hourglass) in the reinforcing spiral. A larger membership allows an increment of both productive capital and stock of reputation, which

produces benefits from collective action, yet it takes some time before this influence can be realized (Figure 1).

As shown in Figure 1, the size of the group influences (with some delay) the benefits for its members. This dependency can be expressed by the production function ([54], p. 243). In this case, the production function relates to the size of the membership versus the group's outcomes. As presented in Figure 2, this relationship could take many forms, such as linear, general third order (S-shaped curve), or the step function ([54,55], p. 245). Different shapes of this function can create different dynamics in otherwise similar contexts and, therefore, can lead to different outcomes ([55], p. 523).

However, in limits to the growth archetype, the amplifying spiral is concatenated with a balancing loop. After approaching some level of growth, the reinforcing process slows down (or may even reverse itself and decline) by starting (by exceeding the limit condition) the stabilizing loop. Thus, in this case, the S-curve seems to be a more accurate illustration of the relevant dynamics (compare Reference [50], p. 98).

In Figure 1, the size of the group is related to the difficulty of coordination. Difficulties can arise both ex ante (at the forming of the group stage) and ex post (the activity of the group stage). The issue of the influence of group size on its functioning can be considered from several different points of view. In particular, this problem has been viewed as part of the sociological theory of social life forms, within the framework of group theory and management theory.
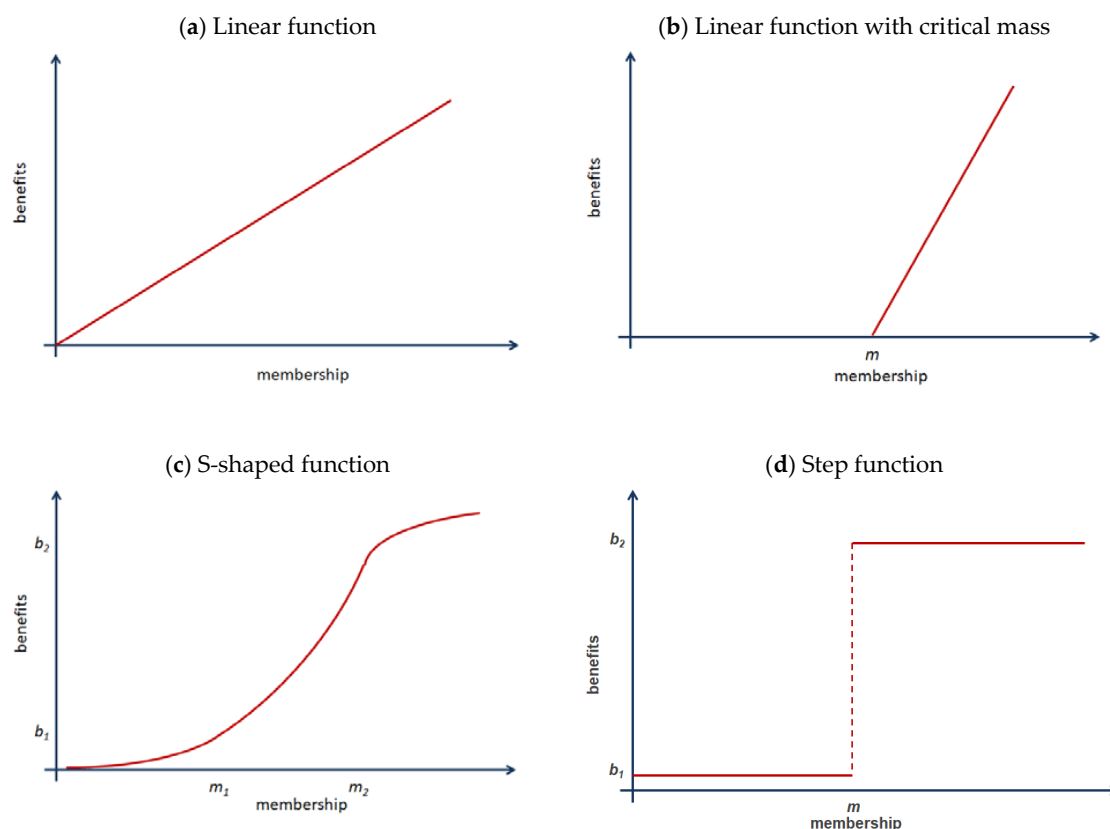

Figure 2. Examples of different shapes of production functions in the collective actions. Source: Modified from Oliver, Marwell, Teixeira ([55], p. 527) and Ostrom ([54], p. 245).

A German sociologist, Simmel, was one of the first researchers to investigate the relationship between the number of group members and the performance of the group. Looking at the group as a whole, he found that it "betrays certain qualities only below or above a definite extent" ([56], pp. 192–193). Next, he analyzed a few historical legal recommendations related to the minimum or

maximum number of members in different associations. These recommendations were established so that only above a minimum number was required or only below a maximum number was permitted, in order that the group may perform certain functions or may be held liable for certain obligations. "The special qualities which associations develop on the ground of their membership (. . .) would, to be sure, always be the same, attached to the same number, if there were no psychological differences between men" ([56], p. 193). However, regarding the inevitable differences between individuals, it is difficult to establish exact numbers. Nevertheless, most of the prescriptions cited by Simmel oscillate between five and eight (we will call this Simmel's first threshold) members, or fluctuate around 20 associates (we will call this Simmel's second threshold) ([56], pp. 194–195). Contemporary sociologists also emphasize the significance of the number of about 20 people for the functioning of the group ([57,58], p. 201). Above this limit, intimacy and direct contact disappear, while contact mediation and formalism appear ([58], p. 201).

A second insight into the issue of group size is offered by the theory of collective action. Olson claims that "unless the number of individuals in a group is quite small, or unless there is coercion or some other special device to make individuals act in their common interest, rational self-interested individuals will not act to achieve their common or group interests" ([59], p. 2). Individual interests can be advanced by personal action. Collective action is expected to further the common interests of the agents who organized it. However, as the number of agents involved becomes larger, no one will notice when any one individual starts to have a free ride. Olson argues that due to the fact that the group creates collective good (for example, if any agent X_i in the group of $X_1, \ldots X_i, \ldots X_n$ uses or consumes this good, it cannot be inhibited by the others in that group), those who do not pay for it cannot be excluded from its consumption ([59], pp. 14–15).

If V_g denotes the group's gain and V_i denotes the gain to the individual, the fraction (F_i) of the group gain would then be equal to V_i/V_g. According to Olson's reasoning, collective good will be achieved if $F_i > C/V_g$, where C denotes the total cost. Thus, V_i has to be bigger than C ([59], pp. 23–24). In other words, if there is some quantity of a collective good that can be gained at a cost that is sufficiently low in relation to the benefit that a member of the group would gain from providing that good all by himself, then there is a presumption that the collective good will be provided. For example, if there are five members in the group and we assume their equal share in the gain, the total cost of organizing the collective action for gaining from the collective good could not exceed 20% of the total gain from such an action. If the group consists of 20 members, a similar ratio could not go beyond 5%. This is the key point of Olson's claim: that only small organizations of collective action are able to supply collective good without other requirements.

Such a pessimistic view of collective action offered by Olson has been argued against by Ostrom [54] in three ways. Firstly, she pointed that Olson's category of collective good is too broad. He based his reasoning on the Musgrave [60] distinction between goods—whether or not some agent can be excluded from benefiting once the good is supplied. However, such a distinction does not differentiate common-pool resources (CPR) from public goods (PG). To do this, one could use the second attribute of goods, namely, jointness of consumption. The issue here is whether or not the individual consumption of any agent leads to the subtraction from any others individual's consumption of the relevant good. True public goods are those which are both not excludable and not competitive in consumption. CPR are those for which exclusion is not feasible, but of which consumption subtracts from the total consumption available to others. In consequence, as Ostrom argues, Olson's claims about collective action are more appropriate for a subset of collective action problems, rather than for the whole set of such issues ([54], pp. 240–241). Additionally, Oliver et al. [55] presented some critique of the generality of Olson's conjectures, which conceal some differences between collective actions. The extended empirical study conducted by Ostrom in her seminal book [61] showed that there are possible successful collective actions concerning CPR which are not very small as measured by the number of participants. Ostrom ([54], pp. 243–245) also argued that one should take into account the production function of producing collective goods (see Figure 2 and the discussion above). The success

of collective action depends, among other factors, on the particular shape of that function ([54], pp. 243–245). Thirdly, Ostrom considered the problem of the allocation function, which assigns participants of collective action a share of gains and costs. There are possibly different allocation formulas (Olson used only one of them), which vary in the degree to which they are supportive of collective action ([54], pp. 247–248). Regardless of Ostrom's critique of Olson radicalism, there is still the issue of the size of the group and its influence on collective performance.

The third point of view is offered by management theory. One of the precursors of this theory, Barnard, defined the upper boundary of a basic organization as 15–20 persons [62]. The issue of group size was then developed in the literature on teams in management theory. The size of the group affects its cohesiveness; that is, as the number of members increases, the cohesiveness of the group decreases [62]. Empirical studies have found that the performance and productivity of employee teams were the highest close to the Simmel's first threshold of about five members ([63], p. 696). Small teams of employees show relatively more agreement among members, more personal contact, tend to be less formal, and make fewer demands on team leaders. On the other hand, bigger teams show more differences and disagreements among members, which leads to more demands on leaders. In such teams, subgroups are formed and conflicts occur more often, and communication becomes more difficult. Moreover, as groups increase in size, so does the tendency to engage in free riding ([63], p. 696).

The dominant factor supporting the establishment of POs in Poland is strong family or acquaintance relations [53,64]. Fałkowski et al. [64] stressed that the reliance on personal relations may not be the first choice of means; however, in light of the stock and structure of social capital inherited from the communist dictatorship, this could be the only way not to act on one's own. They also formulated an opinion that, if PO start-ups succeed, the farmers will learn by themselves that collective action can make them better off. Thus, this will lead to the evolution of social norms over time, and allow for family and acquaintance relationships to be replaced by a more impersonal relationship-based form of cooperation. Such an opinion may be too optimistic, however. The implicit assumption behind this idea is the proportional increase in the benefits from collective action (see Figure 2a). If, however, the true relationships between membership and gains from cooperation are better modelled by functions like functions depicted in Figure 2b–d, such an optimistic scenario may not be realistic. The insufficient stock and mix of components of social capital could act as the limiting factor, triggering the balancing loop which, in turn, blocks the amplifying process of the reinforcing loop (Figure 1). Therefore, it is probable that even if many small POs are established, a lot of them would not achieve enough benefits to promote continued participation in collective action. Thus, farmers cannot learn by themselves that cooperation can make them better off and, therefore, the evolution of social norms over time will not be started.

3.3. Research Gap

In his theoretical discussion, Valentinov stressed that cooperatives are strongly social capital dependent organizations [65,66]. He pointed out that 'the enterprise cannot be effectively created and maintained unless it is supported by the required amount of social capital. In this sense (. . .) the agricultural producer cooperative (APC) is the most social capital dependent form' ([65], p. 23). However, the picture of the role of social capital in the formation and development of POs in agriculture is not fully clear.

Particular emphasis in the literature devoted to agricultural cooperation is placed on the issue of trust [67–69]. The main common conclusion from these studies is that higher levels of trust are beneficial for both the emergence of POs and their success. More interestingly, studies focusing on new emerging producer organizations highlight the role of trust in the formation of collective action among farmers. For example, Möllers et al. explored the factors that determine the intention of farmers to join marketing cooperatives in Romania. Although the trust variable turned out to be not significant as a

predictor of the intention to cooperate in their model, the authors found qualitative indications that trust plays a role when intention is translated into actual behavior [70].

The issue of motivation to cooperate was also addressed by Chlebicka et al. [71]. The authors provided some evidence that a lack of trust may be perceived as an obstacle to establishing producer organizations in Poland. In addition, the picture emerging from this study documented some links between different types of trust and the amount of cooperation. According to the authors, interpersonal relationships and mutual trust between individuals facilitate the establishment of producers' groups of a relatively small size, whereas trust in formal institutions should support collective action in bigger organizations. The same authors investigated this issue further, focusing on the type of relationships among farmers and the extent to which they use these relationships when establishing collective action. Using a dataset from Poland, they described the differences between POs organized around family bonds, acquaintanceships, and impersonal relations. The results they obtained show that those who perceive trust as important for solving commitment problems more often resort to close interpersonal relations to govern collaborative actions. Moreover, they suggest that groups organized around family relations tend to be smaller than groups based on more impersonal mechanisms of governance.

Interesting insights into the social effects of the scale of cooperation of farmers are provided by Nilsson et al. [72]. They argued that increasing the scale of cooperatives by far-reaching vertical and horizontal integration leads to lessening trust, fewer face-to-face interactions among members and between members and leaders, weekend democratic control, and increasing difficulties in solving collective action problems. They concluded their investigation by cooperatives stating that "the withering of values contained in a stock of social capital has a serious impact on these enterprises' economic performance".

The key justification of our analysis is the lack of evidence regarding how the size of membership depends on the stock and the type of social capital of farmers. We attempt to address this firstly by looking closely at the relationship between the longevity of a PO on the market and the size of a PO, as measured by the number of members.

4. Research Design, Data, and Methods

The basic research question we would like to answer in our empirical study is as follows: does the size of the membership matter for the survival of producer organizations? Specifically, we focus on investigating whether POs consisting of a larger member base perform better than POs with smaller ones. Our approach to answering this question is straightforward and could be expressed as "survival of the fittest". If the group size is interrelated with the sustainable benefits from cooperation, then bigger POs should survive longer and smaller groups should fail more easily. This research strategy is similar to the "survival test" proposed by Stigler [73] in his seminal paper. The logic of survivorship studies is simple—"if a particular plant size is efficient, eventually all plants in the industry should approach that size. Any plant of firm size that survives for a long time is efficient" ([74], p. 42). In practice, this method requires the split of the observed population or sample into fractions of various sizes and the observation of their evolution over time [73,75–77]. Firm or plant sizes which survive and contribute a growing proportion of total production are efficient, while those which represent a declining share are not efficient ([78], p. 82). Therefore, the survival test can only identify the range of efficient sizes ([74], p. 43). Moreover, dividing the population or sample into size groups involves a degree of arbitrariness ([78], p. 82). Nevertheless, survivorship studies are among the most popular empirical approaches for assessing the economics of scale ([77,78], pp. 79–85).

Regarding the distinction between the two kinds of social capital, we assume that their roles in supporting the formation and maintenance of farmers' organizations manifest in different ways (Figure 3). Bonding capital is essential to the process of forming cooperation. Based on the literature review above, we predict that the gains from close, intimate, face-to-face relations will reach a maximum level at somewhere around five members (Simmel's first threshold)—(m_1). However, the role of these interconnections will weaken with the growth in the membership base. In line with

this growth, the significance of bridging capital increases. Therefore, if a shortage of social capital provokes blockage, in the worst scenario, cooperation will never achieve the level required by the farmers. We conjecture that the essential role of bridging capital will surpass the role of bonding capital somewhere around 20 (Simmel's second threshold) members—m_2. This is also connected with a shift into more formal and indirect relations between members. According to Polish regulations, the smallest recognized POs should consist of at least five members. Thus, this will be our first size category. The second category will consist of POs containing between 6 and 19 farmers, and the last category will be those with 20 farmers or more.
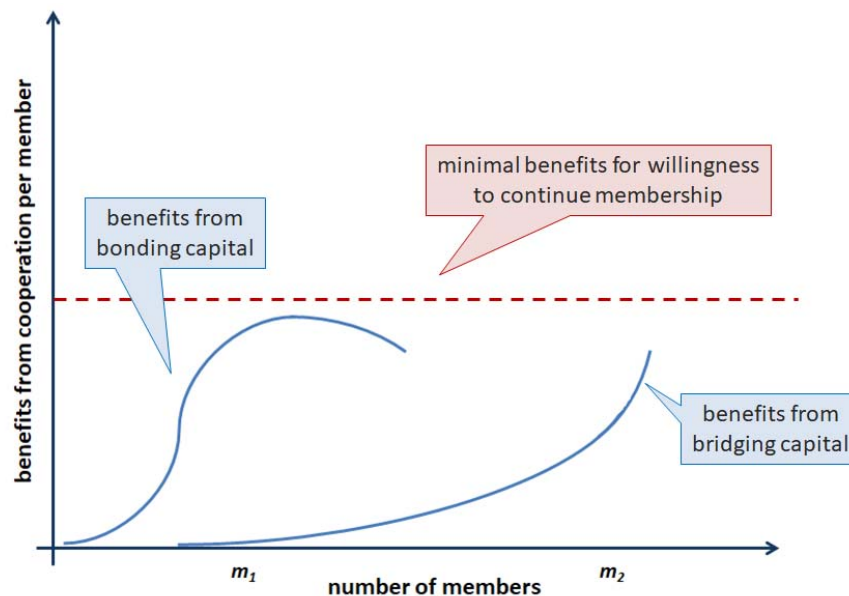

Figure 3. The complementarity of bonding and bridging social capital in the creation of benefits from cooperation. Source: own elaboration.

The second research question that we would like to investigate relates to whether the stock and structure of social capital is the factor that differentiates the size of established POs. To do so, we used answers to survey questions as proxies to estimate the stock of the two kinds of social capital: bonding and bridging.

While exploring the relationships outlined above, we used both secondary data (dataset_1) and primary data (dataset_2). In the first part of our analysis, we used dataset_1, which is comprised of basic data on agricultural producer groups (APGs) from 16 regional registers maintained and published by the regional divisions of the Agency for Restructuring and Modernization of Agriculture (ARMA). In dataset_1, we also included data on fruit and vegetable producer organizations from the central register managed by ARMA. Dataset_1 covers the basic data on 1812 APGs and 340 fruit and vegetable POs from registers published at the beginning of 2018. Data from registers covers the name, location, date of registration, legal form, and the number of members of each PO.

What should be emphasized here is a dramatic outflow of POs, which started in 2014. The newest data shows that 914 POs were deleted from the official registers (854 of which were APGs). Moreover, there are as many as 572 groups without a clear status in terms of recognition (571 APGs). According to our best knowledge, it is highly probable that many of these POs will also be removed from the register. We used secondary data to identify the survival patterns of all POs—including agricultural producer groups and fruit and vegetable producer organizations in Poland. However, the incomplete data restricted us from drawing a Kaplan–Meier plot for the whole population. We were able to do this for only 974 POs, which cover 17,611 associated farmers. Dataset_1 covers almost half of the population (45%).

To gain more insights into the relations described earlier, we also used microdata from a survey conducted among 200 farmers associated with 50 agricultural producer groups, who have already been members of producer groups (dataset_2). These farmers came from 10 regions out of 16 in the country, which yields 20 observations per region. The number of respondents per group was four, except for two groups—one with three and one with five. The questions asked were connected with a variety of factors related to setting up a PO and its initial stage of operation, with a special emphasis on farmers' objectives concerning cooperation, the types of relations among farmers, and mutual and general trust.

The survey was conducted in 2014, during training organized by the National Cooperative Council. Therefore, dataset_2 cannot be treated as representative of the country. Further, our respondents constitute only a fraction of all the members of the agricultural producer groups included in our sample. Finally, it must be noted that what we show here are correlations and not necessarily any sort of causal relationships. The second dataset should be treated as a separate, yet complimentary analysis aimed at understanding the relations described in the section on research design. Since the picture drawn only based on secondary data shows the dependence of POs' survival on the size of membership, we decided to enrich the study by adding an exploratory perspective coming from the primary data. These caveats should be kept in mind while interpreting the results of our study.

5. Results

At the end of 2015, a total of 1324 agricultural producer groups were registered in Poland, as shown in Figure 4. In fact, the total number of APGs that were listed in the register from 2001–2015 was higher (1721) but some of these entities were deleted from the register. The exact number of companies deleted from the agricultural producer groups register was 397 (about 23% of the total). In addition to the agricultural producer groups, there were also 305 organizations in 2015 set up and provided with support under the regulations on the common organization of the market in fruit and vegetables. Thus, overall, around 1630 entities may be regarded as producer organizations in Poland.
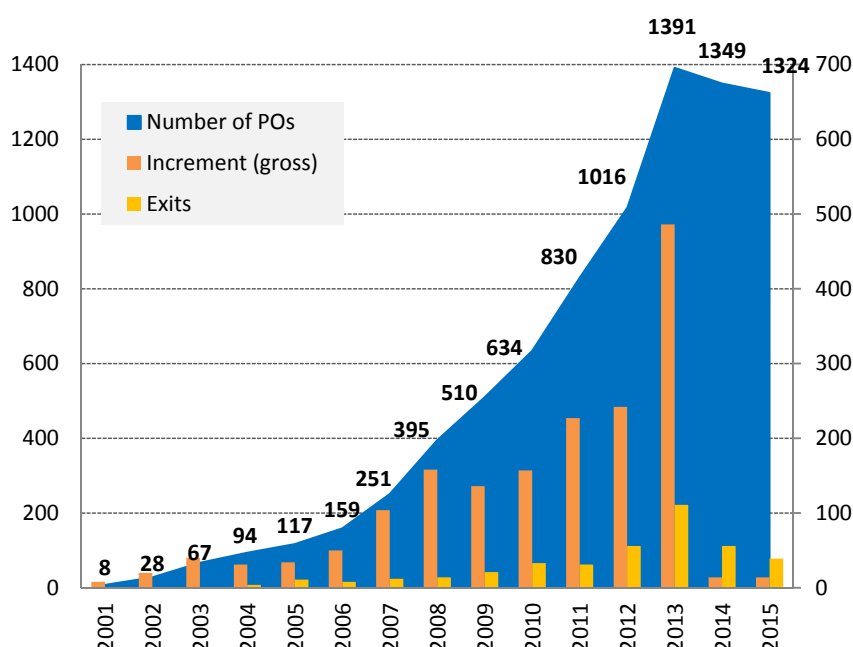

Figure 4. The number of POs (agricultural producer groups only) in Poland: 2001–2015. Note: Number of POs—left scale; Gross increment and Exits—right scale. Source: based on data published by the Ministry of Agriculture and Rural Development.

As explained earlier, the first step in our analysis was to plot the survivorship curve for the 974 POs (dataset_1) that we have complete data for. In the survival analysis, the length of time until the moment of removing a PO from the official register is of particular interest to us. In our case, the period from 2001 (registration of the first POs in Poland) until the end of 2017 (latest data are available from early 2018) is covered. Consequently, the research period for dataset_1 is 16 years (0X-axis in Figure 5). During this period of time, some elements from the sample did not survive; that is, they were removed from the register. It should be kept in mind that some of the objects were still operating at the end of the research period, which does not exclude them; however, they could "die" (could be deleted from the register or closed) sometime in the future. We will refer to these POs as censored objects. Based on the data on the length of observations that end with "death" (deletion), and the length of time of the functioning of the censored objects, we estimated the probability of survival for a given period of time (calculated in years). Then, we drew a Kaplan–Meyer plot, which is a graphical presentation of the estimated probability. Figure 5 shows that for dataset_1, about 75% of POs had a chance of surviving for 6 years, and just over 50% of POs had a chance of continuing to operate for 10 years.
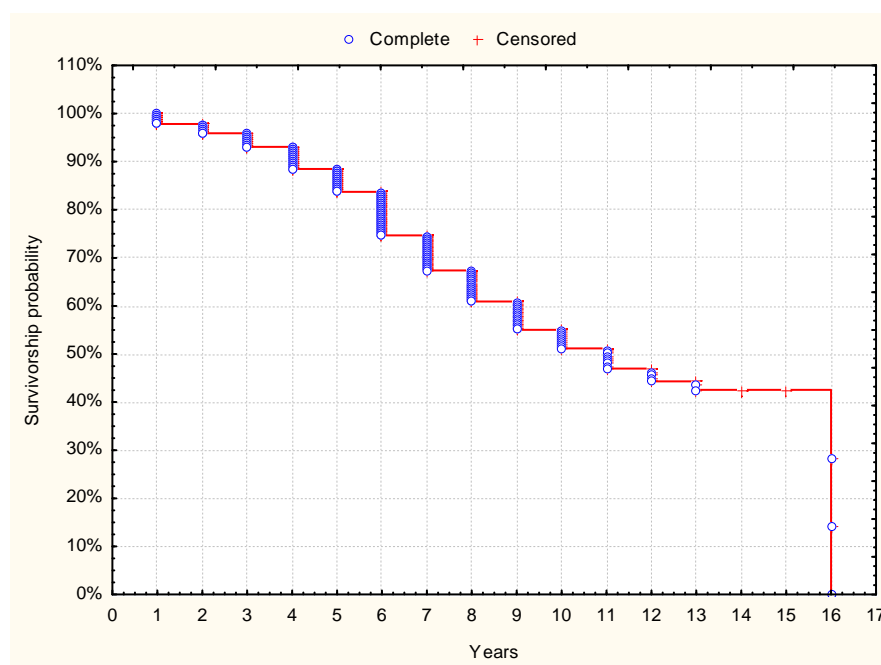

Figure 5. The Kaplan–Meier plot for dataset_1. Source: own calculations based on data published by ARMA.

In order to verify our assumption regarding the link between the size of the group and the benefits arising from collective action (as approximated by survival rate), we performed the survival analysis in relation to three subgroups of POs: (1) POs with 5 members (382 objects); (2) POs with 6 to 19 members (422 objects); and (3) POs with 20 or more members (170 objects). The Kaplan–Meier curve shows that the size of the group, measured by the number of members, strongly differentiates the probability of survival (Figure 6). Furthermore, producer organizations with only five members have a lower chance of survival for six years when compared to dataset_1 overall (the exact probability of survival in this subgroup is 65%). At the same time, the results for the subgroup of medium-sized POs (77% likelihood of surviving six years) are similar to those for dataset_1 as a whole. POs with 20 or more members have an 89% probability of surviving for six years, which is definitely higher than the average for dataset_1. Moreover, these differences are also visible in the longer time horizon. Only about 32% of small POs have a chance of operating for 10 years, while in the category of medium-sized groups,

the percentage of success is almost 60%. In the subgroup of the largest POs, it slightly exceeds 70%. These differences are confirmed as statistically significant (Table 1).

Therefore, based on the logic of survivorship studies, the answer to our basic research question is that the size of membership base does matter. Specifically, producer organizations of Polish farmers which consist of only five members have the lowest probability of surviving; therefore, referring to the rule of "survival of the fittest", we conclude that they perform the worst on average. Better performance is represented by POs with a membership base between 6–19 farmers. The highest longevity and, therefore, according to the same logic, the best performance is achieved by POs which consist of 20 farmers or more. These empirical results are in line with the archetype presented in Figure 1.
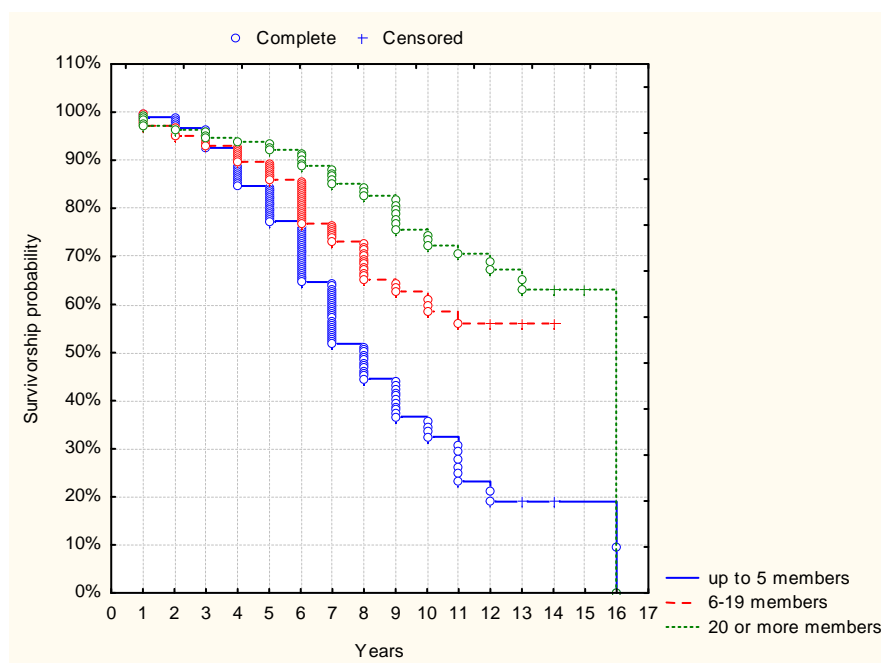

Figure 6. The Kaplan–Meier plot for dataset_1 broken down into three size categories of POs. Source: own calculations based on data published by ARMA.

The results described above are based on dataset_1, which consists of nearly one thousand POs. However, this dataset covers a very limited number of variables. Therefore, attempting to answer the second research question based on dataset_1 would be futile. That being the case, we additionally explored a second dataset based on a survey conducted with 200 farmers from 50 POs (dataset_2). As previously mentioned, dataset_2 is much more limited in population coverage, and the data collection method does not preserve representativeness. For that reason, the conclusions developed based on the analysis of dataset_2 may be less reliable when compared to those formulated based on dataset_1. Nevertheless, due to the very limited empirical literature on social issues connected with the cooperative effort of farmers [64,70], analyzing even small samples could give us valuable insights.

Table 1. The statistical significance of survivorship differences.

Groups Differences	Log-Rank Test	*p*-Value
Small versus medium	5.317359	0.00000
Small versus the biggest	8.161482	0.00000
Medium versus the biggest	3.001920	0.00268

Source: own calculations based on data published by ARMA.

As we mentioned earlier, the measurement of social capital remains a serious obstacle and, in practice, the stock of capital is estimated by proxies. In order to answer our second research question (is the stock and structure of social capital the factor that differentiates the size of farmers' groups?) we used four proxies—two for each kind of social capital (bonding and bridging).

In our study, we used the answers from the survey to the two questions about relationships with other members of the group at the stage of joining a PO as proxies for bonding social capital. Specifically, this refers to possessing family members and acquaintances in the PO. As presented in Table 2, the occurrence of family bonds is much more frequent in the case of smaller POs (membership below or equal to the median, namely, ≤8 farmers) than having no relatives in the group. To some extent, the opposite situation is found in the bigger POs (above 8 members)—in these groups, not having family relationships with other members of the group is the norm. As the results of the χ^2 test show, the relationship is statistically significant.

Table 2. The occurrence of family bonds in POs.

| Item | Categories | Family Bonds with Other Members | | Sum of the Rows |
		None at All	Yes	
	Up to Median	28	57	85
	Percent of Total	17.610%	35.849%	53.459%
Size of a PO	Above Median	41	33	74
	Percent of Total	25.786%	20.755%	46.541%
Sum of the Column		69	90	159
Sum of Percentages		43.396%	56.604%	100%
χ^2: 8.13			*p*-value: 0.0044	

Sum of respondents lower than 200 is due to lacking answers. Source: own calculations based on survey.

Almost all the respondents have some acquaintances in the group (Table 3). However, in this category of relationships, the situation is different in relation to relatives. While there is a fraction of farmers with no acquaintances in their POs, in the case of larger groups this situation is extremely rare. The relationship is statistically significant. Therefore, it is probable that the following pattern emerges: nn the smallest POs, the bonding capital is dominated by kinship relations, while such bonds start to be supplanted by connections with acquaintances as the membership base becomes bigger.

Table 3. The occurrence of acquaintance relation in POs.

| Item | Categories | Acquaintance Relationships with Other Members | | Sum of the Rows |
		None at All	Yes	
	Up to Median	13	79	92
	Percent of Total	7.386%	44.886%	52.273%
Size of a PO	Above Median	3	81	84
	Percent of Total	1.705%	46.023%	47.727%
Sum of the Column		16	160	176
Sum of Percentages		9.091%	90.909%	100%
χ^2: 5.92			*p*-value: 0.0149	

Sum of respondents lower than 200 is due to lacking answers. Source: own calculations based on survey.

Furthermore, as proxies for bridging social capital, we use two types of declarations from the survey in relation to the following statements:

- In my neighborhood, people generally trust each other (we called this proxy generalized trust);

- In my neighborhood, people are generally eager to cooperate (we called this proxy generalized attitude to cooperate).

The respondents could choose from five answers: disagree, rather disagree, rather agree, agree, and hard to say. We interpreted disagree and rather disagree as a low level of generalized trust or attitude to cooperate, while rather agree and agree as a high level of generalized trust or attitude to cooperate. We did not take into account the "hard to say" answers.

As presented in Table 4, in groups of up to 8 members, high generalized trust is declared only slightly more often than low trust. In bigger groups, high generalized trust occurs nearly four times more often than low trust. The relationship is statistically significant.

Table 4. The distribution of generalized trust.

Item	Categories	Generalized Trust		Sum of the Rows
		Low	High	
Size of a PO	Up to Median	32	40	72
	Percent of Total	24.427%	30.534%	54.962%
	Above Median	12	47	59
	Percent of Total	9.160%	35.878%	45.038%
Sum of the Column		44	87	131
Sum of Percentages		33.588%	66.412%	100%
χ^2: 8.45		*p*-value: 0.0037		

The sum of respondents is lower than 200 due to omitting "hard to say" answers and incomplete surveys. Source: own calculations based on survey.

The advantage of POs consisting of more than 8 members is even clearer when taking into account a generalized attitude to cooperate (Table 5). While in smaller groups a high level of attitude towards cooperation is only 1.3 times bigger than a low level of the same, in the case of bigger POs the proportion is 5.5:1. The relationship is statistically significant.

Table 5. The distribution of a generalized attitude towards cooperation.

Item	Categories	Generalized Attitude towards Cooperation		Sum of the Rows
		Low	High	
Size of a PO	Up to Median	35	46	81
	Percent of Total	23.026%	30.263%	53.289%
	Above Median	11	60	71
	Percent of Total	7.237%	39.474%	46.711%
Sum of the column		46	106	152
Sum of percentages		30.263%	69.737%	69.737%
χ^2: 13.77		*p*-value: 0.0002		

The sum of respondents is lower than 200 due to omitting "hard to say" and incomplete surveys. Source: own calculations based on survey.

Summing up our analysis based on the survey, we identified some differences regarding bonding social capital. Smaller POs are more embedded in kinship bonds, while bigger POs are more embedded in acquaintance relations. A clear-cut distinction is observable in the stock of bridging capital in favor of bigger farmer organizations. Thus, the relationships depicted by the adapted archetype "limits to growth" (Figure 1) are confirmed, at least in regard to dataset_2. One should, however, be aware of the limitations of our data, as explained earlier.

6. Discussion

Our results in this research point to certain patterns in the survival of organizations created for farmers' cooperation, relating specifically to social capital. Analysis carried out on a sample covering almost half of the Polish population of POs showed that a higher survival rate was observed in the case of entities that have more members. Moreover, our findings stress that the distinction between bonding and bridging capital is, in the context of the analysis of POs, not only very helpful, but even indispensable in setting up the group and maintaining its subsequent functioning.

For the purposes of our study, the observation of Valentinov—that there are some limitations of cooperation which emerge as a consequence of the insufficient availability of social capital, that could be due to the expansion of the membership base—was particularly insightful ([65], p. 12). What is similar to our approach (compare Figure 1) in Valentinov's work is the linking of social capital availability (stock), the membership base (group size), and cooperative performance (benefits from cooperation). A similar line of reasoning is presented by Nilsson et al. [72], as discussed earlier.

However, our approach differs in two important ways. Firstly, the authors cited above focus on the problems of availability of social capital in large, complex, and firmly established cooperatives. In most European countries, the collective action of farmers can be traced back to the middle of the 19th century ([79], p. 517). However, in countries that experienced communism, the accumulation of social capital associated with pre-communistic cooperation was destroyed and the natural evolution of cooperatives was interrupted ([79], pp. 80, 518, 558, 560). "Distrust based on this experience reinforced individualism, which explains the slow progress towards voluntary cooperation" ([80], p. 560). Thus, cooperative efforts in CEECs countries do not primarily face the problem of lacking social capital due to very large membership bases (although this could be the case for dairy cooperatives, which successfully survived the transition period in Poland). Rather, they primarily face the problem of lacking a sufficient stock of social capital due to the "communist legacy", and this is the main obstacle during the formation of new groups of farmers and in making these groups self-sustaining (compare to Reference [52]).

The main novelty of our approach is that we investigate the relationships of the stock of social capital, the membership base, and the performance of farmers' cooperation not at the maturity stage, but at the infancy stage. While other authors have dealt with the problem of the degeneration of cooperatives faced during the "Recognition and Introspection" phase (fourth phase of the basic life cycle framework of cooperatives), we aimed to explain the obstacles faced in the "Economic Justification" phase (first phase) [81].

Our results confirmed that producer organizations of various sizes differed in terms of their stock of bonding and bridging capital. Small POs relied more on familial relationships to start cooperation. This form of bonding capital allowed farmers to lower transaction costs connected with searching for potential partners for cooperation and negotiating terms and conditions under which cooperation was to take place. The results suggest that bonding and bridging capital should not always be treated as complementary to each other. Specifically, in the case of countries with a legacy of communism, where the atrophy of civil society can be observed, the positive impact of bonding capital (particularly that based on kinship bonds) on the longstanding cooperation of farmers is questionable. These findings are in line with previously discussed arguments [31,44].

Taking into account previously discussed arguments on the relatively weak social capital and familism specific to post-communist societies [40–46], it can be assumed that the financial support granted for POs attracts not only farmers aiming at real cooperation, but also those aiming at fake cooperation to obtain financial support. Following our results, it seems that such motivations could be relatively easily developed and hidden under the umbrella of a family. It seems to us that if a PO started with only five members and continues to operate with such a limited, membership, the chance that those members are short-term oriented increases. This explains, to some extent, the shortest longevity occurring in the category of POs representing the smallest entities that we observed based on dataset_1.

In line with the arguments on the size of the group [56,57,62], our results show that an increase in the number of farmers cooperating in a PO reduces the reliance on informal social relationships between members in favor of bridging social capital. When the risk of amoral familism evaporates with the growing number of members in a PO, the chance for longevity improves. Bonding capital certainly has many positive effects, as stressed by Fukuyama [32] and, more recently, by Fałkowski [64]. Yet, it can theoretically also promote the same kind of opportunistic short-term profit-seeking behavior mentioned above. In this context, however, we found that the larger scale and accompanying formalization of larger groups are less conducive to abuses and, therefore, it can be assumed that short-term profit-seeking farmers will avoid creating larger groups.

The discussion above could be summarized by the interconnection of the two systemic archetypes; namely, "limits to growth" (Figure 1), and "shifting the burden to the intervenor" (Figure 7). An improper structure of social capital (prevailing role of kinship bonds, which could easily degenerate into amoral familism) and the particular shortage of bridging capital that a "communism legacy" creates, are important limiting factors to increasing the membership base for the development of POs. Such barriers block the possibility of achieving sustainable benefits from collective action which will be attractive enough to maintain continued membership (Figure 3). This is the reason newly created forms of farmers' cooperation did not develop in the nineties in Poland. The insufficient number of farmers' POs triggered public support for farmer organization creation, which started in 2001 and was firmly reinforced under the CAP umbrella after the Polish accession to the EU in 2004. However, the policy of public support is focused mainly on new PO creation—thus solving only the symptom, but not the fundamental problem.

Public support creates quick and tangible success as measured by the increasing number of newly established POs. However, the symptomatic solution is not costless. Focusing on the symptom of the problem—the insufficient number of POs—led to public policy incentives for the easy creation of farmer groups. An extremely low barrier for entry, as measured by the five member threshold, and the chance to access public funds can provoke amoral familism behavior—many POs were created just for receiving public money instead of looking for ways to achieve sustainable benefits from cooperation. This perpetuates the improper (too small) size of the groups. Furthermore, amoral familism in the long term is destructive for trust and for the attitude towards fair and longstanding cooperation.
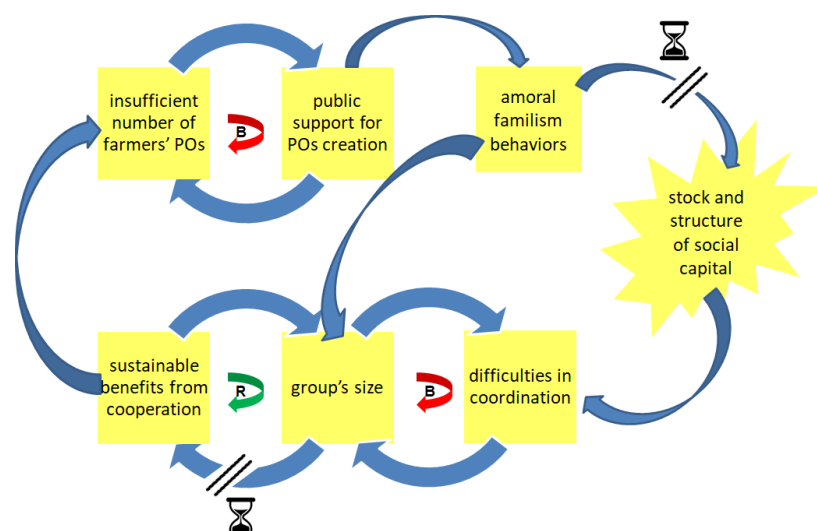

Figure 7. The two systemic archetypes that are interconnected: shifting the burden to the intervenor and limits to growth. Source: own elaboration based on the idea of Senge ([50], pp. 94–112, 390–394).

These conclusions are in line with the general observations of Forrester, the founder of system dynamics thinking. He claims that public regulation results often fall far short of expectations and

government programs often prove to be ineffective, since the dynamic behavior of the social systems is not understood. System dynamics explains how the contrary results of intervention can occur. Social systems exhibit conflict between the short-term and the long-term consequences of public support programs. A policy that improves the situation in the short run is often one that destroys the system in the long run [82].

In this context, a question arises: what could be done better? "Shifting the burden to the intervenor" is a special case of the "shifting the burden" archetype. In the latter, the general principle is to focus on the fundamental problem, but if a quick solution is essential, it should be used to gain time while working on a solution for the fundamental problem. The general principle in the "shifting the burden to the intervenor" generic structure is to focus on enhancing the capabilities of people to solve their problems by themselves, by developing their own skills, resources, and infrastructure ([50], pp. 392–393).

Thus, following this line of reasoning, we suggest changes to public support for farmers' cooperation, which are depicted in Figure 8. The corporate strategy literature distinguishes between short-wave (quick benefits) and long-wave (delayed but more important and sustainable benefits) programs [83]. With this in mind, we suggest a twofold policy of public support. For the short-wave program, the funds should be redirected from only supporting the establishment of new entities into supporting the increase of the membership base of already established entities, as well as of start-ups. This should help to trigger reinforcing loops based on achieving sustainable gains and, in the long term, indirectly improve the stock and structure of social capital. For the long-wave program, public policy should focus on rebuilding social capital, particularly bridging social capital.

Our findings call for further analysis on the effectiveness of support for producer organizations. Further research in this field seems to be of key importance, especially in the European context, taking into account recent announcements by the European Commission regarding the strengthening of the role of producer organizations in the food chain [84]. So far, the relevant literature is scarce, although recently these issues have begun to attract the attention of researchers, specifically in the context of Central and Eastern Europe (CEE) countries [85].
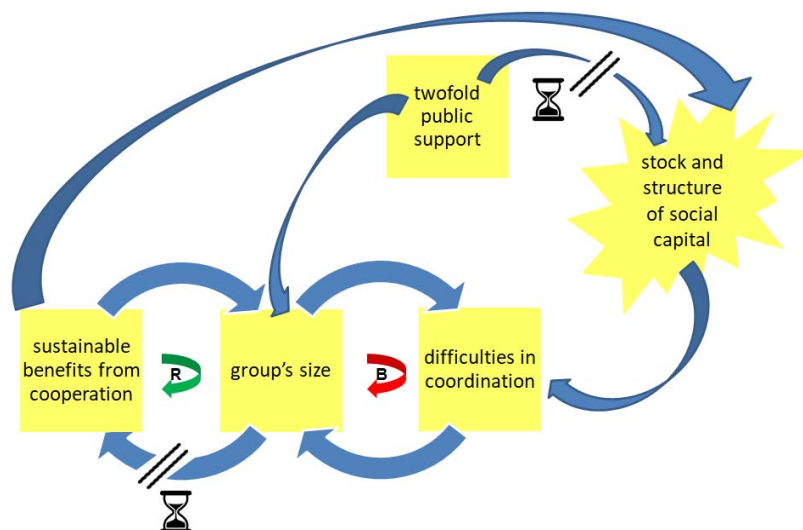

Figure 8. The desired change in public support for farmers' cooperation. Source: own elaboration based on idea of Senge (Senge 2006, pp. 94–103, 390–391).

Our results also complement other recent empirical studies focused on the interpersonal relationships of farmers who have decided to engage in agricultural producer groups [68–70]. We believe that the above-presented analysis improves the understanding of the general assumption that farmers' cooperation is deeply embedded in social and cultural contexts [5]. However, the picture

of the dependency of the establishment and the success of farmers' collective action on social capital is still incomplete.

7. Conclusions

The weak position of family farms in comparison to other parties representing the downstream and upstream parts of the food chain has been widely discussed in the literature. Many authors suggest that the collective action of farmers and the cooperation between them could become an important remedy for such an underprivileged situation. However, in Poland, the negative legacy of communism has led to a low level of citizen activity, particularly among rural citizens, in turn creating an unwillingness to establish cooperation. Therefore, public support from the EU and domestic funds dedicated to the setting up and the operation of POs could be important for strengthening farmers' bargaining power. As a result of this support, a process of rebuilding farmers' cooperation took place in Poland. Since 2000, a relatively high number of POs have been established. However, there are some concerns about the sustainability of their survival and growth.

Indeed, the results of our study concerning the patterns of survival of POs confirmed the aforementioned concerns. In line with theoretical assumptions, the survival rate was particularly low in the case of the smallest POs. Importantly, our results provide evidence that the smallest POs had the highest stock of bonding capital. This could have a potentially positive influence in the broad social context if used to establish a longstanding cooperation among farmers. However, it could also evolve into amoral familism. One possible way of interpreting our results might be that the low survivorship of POs with up to five members was due to the short-term opportunistic motivations of a substantial proportion of small groups, created by closely related networks of relatives. At the same time, POs consisting of 20 or more members represented much more stable, sustainable patterns of survival. Our results showed that larger POs had the highest bridging capital when compared to smaller entities, which turned out to be helpful in promoting the unity of the group, allowing farmers to perform well as a social entity even without strong familial relations.

In addition, we believe that these findings highlight opportunities to shape more effective policies supporting the establishment and development of farmers' cooperation. We suggest the supplementation of the current support schemes for POs with measures that address the issue of longevity of these entities. In our opinion, the policy measures might, in particular, include special support for the continuation of the operations of previously supported groups, aimed at increasing their membership. These short-wave policy measures should be supplemented by long-wave programs aimed at developing the bridging type of social capital.

There are some limitations to consider in our study. First of all, all our evidence comes from Poland, which means that our results may be specific to a certain socio-cultural context. In other words, we do not know if our findings could be directly applicable in other countries. However, choosing Poland offers a unique opportunity to observe and analyze the collective action of farmers at a very early stage of a life cycle and, thus, to identify patterns of survival of agricultural producer organizations.

It should also be emphasized that our samples (dataset_1 and dataset_2) are not representative of the population, which could have affected our results. Nevertheless, dataset_1 covers almost half of the general population and it seems justified to explore the survival patterns of POs in Poland using this dataset. Dataset_2, in turn, offers unique insights into important social issues in POs in relation to forming and maintaining farmers' cooperation. Considering a shortage of empirical research on the collective action of farmers, it also seems to be justified to conduct such exploratory studies to shed some more light on these as yet unexplained issues.

Finally, the notion of social capital that we refer to is still not clearly conceptualized. Not surprisingly, the operationalization of this theoretical concept is even more problematic. We used the notion of two kinds of social capital—bonding and binding—and tried to measure each of them using proxies. Therefore, the way we measure bonding and bridging capital could cause distorted results.

Despite the limitations listed above, we still believe that the results of our study are promising and justify continued research in this area. It will be interesting to continue the observation of the survivorship of POs in Poland across a longer period of time. The use of this analytical approach could be of particular interest when assessing the entire current programming period for RDP. It would also be worth comparing our findings of the survivorship of POs with the evidence from other countries, both from the EU (CEE and Western Europe) and other countries that did not introduce support for POs. It also seems justified to verify our results pertaining to the stock and types of social capital and their consequences on farmers' collective action in other countries with different historical and socio-cultural contexts. Finally, combining survival analysis with the co-operative life-cycle concept [81] could be another promising area for future research.

References

1.　Sexton, R.J. Market power, misconceptions, and modern agricultural markets. *Am. J. Agric. Econ.* **2013**, *95*, 209–219. [CrossRef]

2.　Sheldon, I.; Sperling, R. Estimating the Extent of Imperfect Competition in the Food Industry: What Have We Learned? *J. Agric. Econ.* **2003**, *54*, 89–109. [CrossRef]

3.　Perekhozhuk, O.; Glauben, T.; Grings, M.; Teuber, R. Approaches and Methods for the Econometric Analysis of Market Power: A Survey and Empirical Comparison. *J. Econ. Surv.* **2017**, *3*, 303–325. [CrossRef]

4.　Fałkowski, J.; Malak-Rawlikowska, A.; Milczarek-Andrzejewska, D. Farmers' selfreported bargaining power and price heterogeneity: Evidence from the dairy supply chain. *Br. Food J.* **2017**, *119*, 1672–1686. [CrossRef]

5.　Bijman, J.; Iliopoulos, C.; Poppe, K.J.; Gijselinckx, C.; Hagedorn, K.; Hanisch, M.; Hendrikse, G.W.J.; Kühl, R.; Ollila, P.; Pyykkönen, P.; et al. *Support for Farmers' Cooperatives*; European Commission: Luxembourg, 2012.

6.　Van Herck, K. *Assessing Efficiencies Generated by Agricultural Producer Organisations*; Publications Office of the European Union: Luxemburg, 2014; ISBN 978-92-79-39284-9.

7.　Hendrikse, G.W.J.; Bijman, J. On the emergence of new growers' associations: Self-selection versus market power. *Eur. Rev. Agric. Econ.* **2002**, *29*, 255–269. [CrossRef]

8.　Menard, C. Cooperatives: Hierarchies or Hybrids? In *Vertical Markets and Cooperative Hierarchies. The Role of Cooperatives in the Agri-Food Industry*; Karantininis, K., Nillson, J., Eds.; Springer: Dordrecht, The Netherlands, 2007; pp. 1–17, ISBN 1-4020-4072-5.

9.　Chlebicka, A.; Fałkowski, J.; Wołek, T. Powstawanie grup producentów rolnych a zmienność cen. *Zagadnienia Ekonomiki Rolnej* **2009**, *319*, 59–73.

10.　Fałkowski, J.; Ciaian, P. *Factors Supporting the Development of Producer Organizations and Their Impacts in the Light of Ongoing Changes in Food Supply Chains*; JRC Technical Reports; Publications Office of the European Union: Luxemburg, 2016.

11.　Chlebicka, A. Producer Organizations in Agriculture—Barriers and Incentives of Establishment on the Polish Case. *Procedia Econ. Financ.* **2015**, *23*, 976–981. [CrossRef]

12.　European Commission. *Agriculture, Forestry and Fishery Statistics*; Publications Office of the European Union: Luxemburg, 2017; ISBN 978-92-79-75765-5.

13.　Boselie, D.; Henson, S.; Weatherspoon, D. Supermarket procurement practices in developing countries: Redefining the roles of the public and private sectors. *Am. J. Agric. Econ.* **2003**, *5*, 1155–1161. [CrossRef]

14.　Ministerstwo Rolnictwa i Rozwoju Wsi. *Strategy for Sustainable Development of Rural Areas, Agriculture and Fisheries for 2012–2020*; Ministerstwo Rolnictwa i Rozwoju Wsi: Warsaw, Poland, 2012.

15.　Chloupkova, J. *Polish Agriculture: Organisational Structure and Impacts of Transition*; Unit of Economics Working Papers 2002/3; Food and Resource Economic Institute, The Royal Veterinary and Agricultural University: Copenhagen, Denmark, 2003; pp. 1–23. Available online: file:///C:/Users/User/AppData/Local/

Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/3RDMNOFX/ew020003.pdf (accessed on 10 May 2018).

16. Gardner, B.; Lermann, Z. Agricultural Cooperative Enterprise in the Transition from Socialist Collective Farming. *J. Rural Coop.* **2006**, *34*, 1–18.

17. Chloupkova, J.; Svendsen, G.H.L.; Svendsen, G.T. Building and Destroying Social Capital: The Case of Cooperative movements in Denmark and Poland. *Agric. Hum. Values* **2003**, *20*, 355–369. [CrossRef]

18. Bański, J. Changes in agricultural land ownership in Poland in the period of the market economy. *Agric. Econ.* **2011**, *57*, 93–101. [CrossRef]

19. Jarosz, D. The Collectivization of Agriculture in Poland. In *The Collectivization of Agriculture in Communist Eastern Europe Comparison and Entanglements*; Iordachi, C., Bauerkamper, A., Eds.; Central European University Press: Budapest, Hungary, 2014; pp. 113–146, ISBN 978-615-5225-63-5.

20. Boguta, W. *Działalność Spółdzielni Rolniczych ze Szczególnym Uwzględnieniem Zarządzania Spółdzielnią Oraz Prowadzenia Działalności Finansowej i Marketingowej*; Krajowa Rada Spółdzielcza: Warszawa, Poland, 2014.

21. Domagalski, A. *Organizowanie się Gospodarcze Polskich Rolników po 1990 Roku*; Krajowa Rada Spółdzielcza: Warszawa, Poland, 2010.

22. Matczak, P. *Support for Farmers' Cooperatives*; Country Report Poland; European Commission: Luxembourg, 2012.

23. Knack, S.; Keefer, P. Does Social Capital Have an Economic Payoff? A Cross-Country Investigation. *Q. J. Econ.* **1997**, *112*, 1251–1288. [CrossRef]

24. Ostrom, E. Social capital: A fad or a fundamental concept? In *Social Capital: A Multifaceted Perspective*; Dasgupta, P., Serageldin, I., Eds.; The World Bank: Washington, DC, USA, 2000; pp. 172–214.

25. Nahapiet, J.; Ghoshal, S. Social Capital, Intellectual Capital, and the Organizational Advantage. *Acad. Manag. Rev.* **1998**, *23*, 242–266. [CrossRef]

26. Burt, R. The Contingent Value of Social Capital. *Adm. Sci. Q.* **1997**, *42*, 339–365. [CrossRef]

27. Bourdieu, P. The forms of capital. In *Handbook of Theory of Research for the Sociology of Education*; Richardson, J.G., Ed.; Greenwood Press: New York, NY, USA, 1986; pp. 241–258.

28. Coleman, J.S. *Foundations of Social Theory*; Harvard University Press: Cambridge, MA, USA, 1990; ISBN 9780674312265.

29. Putnam, R.D.; Leonardi, R.; Nanetti, R. *Making Democracy Work: Civic Traditions in Modern Italy*; Princeton University Press: Princeton, NJ, USA, 1993; ISBN 9780691037387.

30. Putnam, R.D. *Bowling Alone: The Collapse and Revival of American Community*; Simon & Schuster: New York, NY, USA, 2000; ISBN 8601400226735.

31. Fukuyama, F. *Trust: The Social Virtues and the Creation of Prosperity*; Free Press: New York, NY, USA, 1995; ISBN 0684825252.

32. Fukuyama, F. Social Capital and Civil Society (April 2000). IMF Working Paper 2000. Available online: https://ssrn.com/abstract=879582 (accessed on 10 April 2018).

33. Burt, R. *Brokerage and Closure: An Introduction to Social Capital*; Oxford University Press: New York, NY, USA, 2005; ISBN 0199249156.

34. Cohen, D.; Prusak, L. *Good Company: How Social Capital Makes Organizations Work*; Harvard Business School Press: Cambridge, MA, USA, 2001; ISBN 9780875849133.

35. Gargiulo, M.; Benassi, M. Trapped in Your Own Net? Network Cohesion, Structural Holes, and the Adaptation of Social Capital. *Organ. Sci.* **2000**, *11*, 183–196. [CrossRef]

36. Burt, R.S. *Structural Holes: The Social Structure of Competition*; University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship: Champaign, IL, USA, 1992; ISBN 9780674843714.

37. Tsai, W.; Ghoshal, S. Social Capital and Value Creation: The Role of Intrafirm Networks. *Acad. Manag. J.* **1998**, *41*, 464–476. [CrossRef]

38. Adler, P.S.; Kwon, S.-W. Social Capital: Prospects for a New Concept. *Acad. Manag. Rev.* **2002**, *27*, 17–40. [CrossRef]

39. Svendsen, G.L.H.; Svendsen, G.T. *The Creation and Destruction of Social Capital: Entrepreneurship, Cooperative Movements and Institutions*; Edward Elgar: Cheltenham, UK, 2004; ISBN 1-84376-616-7.

40. Halamska, M. Społeczna kondycja polskiej wsi. Struktura, kapitały i społeczeństwo obywatelskie w I dekadzie XXI wieku. In *Rozwój Obszarów Wiejskich w Polsce. Diagnozy, Strategie, Koncepcje Polityki*; Nurzyńska, I., Drygas, M., Eds.; IRWiR PAN: Warsaw, Poland, 2011; pp. 39–55.

41. Wieruszewska, M. Społeczność wiejska—Podstawy samoorganizacji. In *Samoorganizacja w Społecznościach Wiejskich: Przejawy, Struktury, Zróżnicowania*; Wieruszewska, M., Ed.; IRWiR PAN: Warsaw, Poland, 2002; pp. 12–90.

42. Fedyszak-Radziejowska, B. Kapitał społeczny wsi—W poszukiwaniu utraconego zaufania. In *Kapitał Ludzki i Zasoby Społeczne wsi. Ludzie—Społeczność Lokalna—Edukacja*; Szafraniec, K., Ed.; IRWiR PAN: Warsaw, Poland, 2006; pp. 71–120.

43. Lovell, D.W. *The Transition: Evaluating the Postcommunist Experience*; Aldershot: Hants, UK, 2002; ISBN 0754630617, 9780754630616.

44. Paldam, M.; Svendsen, G.T. An essay on social capital: Looking for the fire behind the smoke. *Eur. J. Political Econ.* **2000**, *16*, 339–366. [CrossRef]

45. Fidrmuc, J.; Gërxhani, K. Mind the Gap! Social Capital, East and West. *J. Comp. Econ.* **2008**, *36*, 264–286. [CrossRef]

46. Turowski, J. *Socjologia wsi i Rolnictwa*; Towarzystwo Naukowe KUL: Lublin, Poland, 1995.

47. Bondyra, K. Kooperacja a przemiany na wsi. *Wieś i Rolnictwo* **2003**, *3*, 350–356.

48. De Master, K. Designing Dreams or Constructing Contradictions? European Union Multifunctional Policies and the Polish Organic Farm Sector. *Rural Sociol.* **2012**, *77*, 89–109. [CrossRef]

49. Michalewska-Pawlak, M. Możliwości i bariery rozwoju kapitału społecznego na obszarach wiejskich w Polsce. In *Kapitał Społeczny—Interpretacje, Impresje, Operacjonalizacja*; Klimowicz, M., Bokajło, W., Eds.; CeDeWu Sp. z o.o.: Warsaw, Poland, 2010; pp. 185–202.

50. Senge, P.M. *The Fifth Discipline. The Art and Practice of the Learning Organization*; Random House Business Books: London, UK, 2006; ISBN 9781905211203.

51. Hendrikse, G.W.J.; Veerman, C.P. Marketing Cooperatives and Financial Structure: A Transaction Costs Economics Analysis. *Agric. Econ.* **2001**, *26*, 205–216. [CrossRef]

52. Banaszak, I. *Success and Failure of Cooperation in Agricultural Markets. Evidence from Producer Groups in Poland*; Shaker Verlag: Aachen, Germany, 2008; ISBN 978-3-8322-6995-1.

53. Chlebicka, A.; Fałkowski, J.; Łopaciuk-Gonczaryk, B. Grupy producentów rolnych a kapitał społeczny— Potencjalne zależności. *Wieś i Rolnictwo* **2014**, *164*, 137–156.

54. Ostrom, E. How types of goods and property rights jointly affect collective action. *J. Ther. Politics* **2003**, *15*, 239–270. [CrossRef]

55. Oliver, P.; Marwell, G.; Teizeira, R. A Theory of the Critical Mass. I. Interdependence, Group Heterogenity, and the Production of Collective Action. *Am. J. Sociol.* **1985**, *91*, 522–556. [CrossRef]

56. Simmel, G. The Number of Members as Determining the Sociological Form of the Group. II. *Am. J. Sociol.* **1902**, *8*, 158–196. [CrossRef]

57. Sennett, R. *Together: The Rituals, Pleasures and Politics of Co-Operation*; Yale University Press: New Haven, CT, USA, 2012; ISBN 978-0300188288.

58. Sztompka, P. *Socjologia*; Wydawnictwo Znak: Kraków, Poland, 2007; ISBN 978-83-240-0218-4.

59. Olson, M. *The Logic of Collective Action. Public Goods and the Theory of the Groups*; Harvard University Press: Cambridge, MA, USA, 1971; ISBN 0-674-53751-3.

60. Musgrave, R.A. *The Theory of Public Finance*; McGraw-Hill: New York, NY, USA, 1959; ISBN 978-0070855311.

61. Ostrom, E. *Governing the Commons. The Evolution of Institutions for Collective Action*; Cambridge University Press: Cambridge, UK, 2011; ISBN 978-0-521-40599-7.

62. Barnard, C.I. *The Functions of the Executive*; Harvard University Press: Cambridge, MA, USA, 1974; ISBN 978-0674328037.

63. Griffin, R.W. *Management*; Houghton Mifflin Company: Boston, MA, USA, 2008; ISBN 978-0-618-83345-0.

64. Fałkowski, J.; Chlebicka, A.; Łopaciuk-Gonczaryk, B. Social relationships and governing collaborative actions in rural areas: Some evidence from agricultural producer groups in Poland. *J. Rural Stud.* **2017**, *49*, 104–116. [CrossRef]

65. Valentinov, V. *Social Capital, Transition in Agriculture, and Economic Organisation: A Theoretical Perspective*; IAMO Discussion Paper; Leibniz Institute of Agricultural Development in Transition Economies (IAMO): Halle, Germany, 2003; pp. 1–35.

66. Valentinov, V. Toward a Social Capital Theory of Co-operative Organisation. *J. Coop. Stud.* **2004**, *37*, 5–20.

67. Fulton, M. Cooperatives and member commitment. *Finn. J. Bus. Econ.* **1999**, *4*, 418–437.

68. Nilsson, J.; Kihlen, A.; Norell, L. Are Traditional Cooperatives an Endangered Species? About Shrinking Satisfaction, Involvement and Trust. *Int. Food Agribus. Manag. Rev.* **2009**, *12*, 101–121.

69. Szabo, G.G. The importance and role of trust in agricultural marketing co-operatives. *Stud. Agric. Econ.* **2010**, *112*, 5–22.

70. Möllers, J.; Traikova, D.; Bîrhală, B.; Wolz, A. Why (not) cooperate? A cognitive model of farmers' intention to join producer groups in Romania. *Post-Communist Econ.* **2017**, *30*, 56–77. [CrossRef]

71. Chlebicka, A.; Fałkowski, J.; Łopaciuk-Gonczaryk, B. Horizontal integration between farmers governing cooperation through different enforcement mechanisms. In *It's a Jungle Out There—The Strange Animals of Economic Organization in Agri-Food Value Chains*; Martino, G., Karantininis, K., Pascucci, S., Dries, L., Codron, J.M., Eds.; Wageningen Academic Publishers: Wageningen, The Netherlands, 2017; pp. 85–104, ISBN 978-90-8686-301-3.

72. Nilsson, J.; Svendsen, G.L.H.; Svendsen, T.G. Are large and complex agricultural cooperatives losing their social capital? *Agribusiness* **2012**, *28*, 187–204. [CrossRef]

73. Stigler, G.J. The Economies of Scale. *J. Law Econ.* **1958**, *1*, 54–71. [CrossRef]

74. Carlton, D.W.; Perloff, J.M. *Modern Industrial Organization*; Pearson Addison Wesley: Boston, MA, USA, 2005; ISBN 0-321-22341-1.

75. Saving, T.R. Estimation of Optimum Size of Plant by the Survivor Technique. *Q. J. Econ.* **1961**, *75*, 569–607. [CrossRef]

76. Weiss, L.W. The Survival Technique and the Extent of Suboptimal Capacity. *J. Political Econ.* **1964**, *72*, 246–261. [CrossRef]

77. Rogers, R.P. The Minimum Optimal Steel Plant and the Survivor Technique of Cost Estimation. Working Paper No. 197. 1992. Available online: https://www.ftc.gov/sites/default/files/documents/reports/minimum-optimal-steel-plant-and-survivor-technique-cost-estimation/wp197.pdf (accessed on 7 May 2018).

78. Scherer, F.M. *Industrial Market Structure and Economic Performance*; Rand McNally College Publishing Company: Chicago, IL, USA, 1970.

79. Gijselnickx, C.; Bussels, M. Farmers' cooperatives in Europe: Social and historical determinants of cooperative membership in agriculture. *Ann. Public Coop. Econ.* **2014**, *85*, 509–530. [CrossRef]

80. Hagedorn, K. Post-socialist farmers' cooperatives in Central and Eastern Europe. *Ann. Public Coop. Econ.* **2014**, *85*, 555–577. [CrossRef]

81. Cook, M.L.; Burress, M.J. A Cooperative Life Cycle Framework. Available online: http://departments.agri.huji.ac.il/economics/en/events/p-cook.pdf (accessed on 10 June 2017).

82. Forrester, J.W. Counterintuitive Behavior of Social Systems. Available online: https://ocw.mit.edu/courses/sloan-school-of-management/15-988-system-dynamics-self-study-fall-1998-spring-1999/readings/behavior.pdf (accessed on 10 May 2018).

83. Kaplan, R.S.; Norton, D.P. *Strategy Maps. Converting Intangible Assets into Tangible Outcomes*; Harvard Business School Press: Boston, MA, USA, 2004; ISBN 1-59139-134-2.

84. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. The Future of Food and Farming (COM/2017/0713 Final). Available online: https://publications.europa.eu/en/publication-detail/-/publication/03dc8701-d5aa-11e7-a5b9-01aa75ed71a1/language-en (accessed on 10 April 2018).

85. Michalek, J.; Ciaian, P.; Pokrivcak, J. The impact of producer organizations on farm performance: The case study of large farms from Slovakia. *Food Policy* **2018**, *75*, 80–92. [CrossRef]