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**THE HOLD-UP PROBLEM  
IN AGRICULTURAL CONTRACTS.  
A STUDY OF CONTRACTUAL CORRELATIONS  
BETWEEN POLISH GROUPS OF AGRICULTURAL  
PRODUCERS AND FIRST RECIPIENTS**

*JEL codes: D8, D23, Q13*

**Summary:** The pre- and post-hold-up problem occurs when partners behave in opportunistic way, contracts are incomplete and there are requirements to invest in assets (both specific and general ones). The most exposed to this issue are farmers having weaker market position than their partners or when there is a significantly lower level of horizontal integration among them. The primary purpose of the paper is twofold. The first goal is to identify farming contracts related to investments in assets (the post-contractual hold-up problem), while the second one is to recognise these agricultural producers' groups in Poland, which were exposed to the pre-contractual hold-up problem. To complete these research goals the case study method, based on empirical data, was applied. The analysis of data was carried out through descriptive statistics and the chi-square test. One can claim that the post-contractual hold-up problem may have occurred in ca. 42% of total contracts. The research proves also that approximately 31% of agricultural producer' groups have never been exposed to the pre-contractual hold-up problem.

**Key words:** contracts farming, vertical transaction coordination, hold-up problem, agricultural producers' organizations.

## **1. INTRODUCTION**

Contractual correlations as one of the vertical forms of transaction coordination in agriculture are subject to permanent changes, which result, among others, from the intensification of consolidation processes in certain links of the agricultural business, changing consumption patterns, trading processes, development of modern forms of food distribution, logistic and transport processes, production technology or increasing *e-commerce* [Barry 1995, p. 130-131]. Myers, Sexton and Tomek [2010, p. 378-380, 395] pointed out that due to the above indicated phenomena it is justifiable to conduct research as regards contracting<sup>1</sup>, also adding

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<sup>1</sup> On vertical coordination of a transaction in [Frank i Henderson 1992, p. 941].

that agricultural contracts allow to mitigate problems connected with information asymmetry between parties concerned. As a result, it is possible to shift price and production risks from an agricultural producer to a first recipient, which is usually justified by the fact that the latter has stronger market position and ability to further diversify market risk than the former<sup>2</sup> [Bogetoft i Olesen 2004, p. 52-55].

In the case of Poland, the way of creating and carrying out transactions within food distribution channels was also influenced by such factors as the state system transformation and EU membership. The last two decades have also marked a strong concentration of capital (including foreign one) in the food industry (in relation to the agricultural production), increase of importance of huge shopping centres as well as changes in the quantity and quality of consumed food [see Grzelak 2008, p. 163, 165-166; Laskowski 2008; Firlej 2013, p. 29-36; Halicka and Rejman 2010]. It is therefore justifiable to deal with the issue connected with contractual relations between agricultural producers or producers' organizations and their trade partners. One should also add that in the Polish specialist literature there is a significant gap referring to the vertical coordination of transactions by agricultural contracts both as regards their theoretical and empirical level. The existing publications by Urban [1990, p. 90], Grzelak [2008, p. 175-182] or Kagan [2013] do not refer to such research problems as the coordination of production and risk, motivating, transactional costs or factors conditioning choice of specific forms of transactions.

Agricultural contracts are mainly destined to manage physical transfer (as well as the transfer of ownership title) of agricultural raw materials from an agricultural producer (or producers' organization) to a buyer. Basic issues determined in contracts include: selling price of agricultural raw material, quantity, quality and delivery date. In addition, specific character of agricultural production leads to the fact that they may also contain provisions concerning applied production means, checking of farms or requirements concerning the work of people employed in such farms. Moreover, buyers within contractual relations may require from their suppliers making an investment into fixed assets (e.g. sorting facilities, warehouse, cold store, etc) that are necessary to carry out their processing chain<sup>3</sup>. It is also important in such context whether the required investment will be of general or specific aim as in such circumstances the so called "hold up" problem may appear. This may consist in partial or whole loss of quasi-benefit by a party of a transaction who had to invest more due to such situation as, for

<sup>2</sup> An interesting direction of research as regards contractual relations is also evaluating their impact on improving profit situation of agricultural farms in developing countries that cope with such problems as large amount of small farms, economic weakness of agricultural farms and their poverty, limited access to knowledge and technological progress for farmers and their families [Minten, Randrianarison and Swinnen 2009; Barret and others. 2012; Bellemare 2012; Wang, Wang and Delgado 2014; Bellemare and Novak 2017].

<sup>3</sup> In such a way they may shift some of commitment from a recipient (e.g. a processing party) connected with preliminary raw material processing, i.e. transfer from production to marketing contracts.

example, losing of a contractor as a result of its opportunist behaviour (while the contract was still valid) and is finally left with investment that produces lower profit beyond the contract (within its alternative application), or – in the most unfavourable case – may not use it in any other way due to very specific character of such fixed assets<sup>4</sup>. Furubotn and Richter [2000, p. 131] also point out to the situation when a potential/future contractor makes specific investment a condition of signing an agreement (in an informal way), which constitutes a form of pre-contractual trap (hold-up). In such a case there is a problem of its differentiation from the usually observed processes of market organization.

Assuming that the relation between both parties of a transaction (agricultural producer/agricultural organization/agent and the first recipient/principal) is characterized by both pre and after-contractual opportunism and information asymmetry, such signed contract between the parties has the form of incomplete agreement, but at the same time determines the need to make an investment<sup>5</sup> by an agent (before or after signing such agreement). Having to deal with such delineated economic phenomenon, one may suppose that such agent may be exposed to so called pre- and post-contractual hold-up<sup>6</sup>.

Two aims have been established for such research object. The first one is identifying contracts<sup>7</sup> whose implementation was connected with the need to make an investment into fixed assets (the problem of post-contractual hold-up). Another one included identification of groups of agricultural producers who according to their own opinion/evaluation were in the course of their operations vulnerable to the problem of pre-contractual hold-up. The latter aim was related exclusively to the situation when despite the fact that the first recipient conditioned concluding an agreement with a group of producers on making an investment into the fixed assets, the final contract was not signed. During carrying out of the second aim, the author decided also to find out whether there had been any correlation between being exposed to the pre-contractual hold-up problem and some selected features with the group of producers such as: year of establishing such group, number of its members, kind of produced agricultural material, type of a group according to the functional criterion and kind of market it operated on.

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<sup>4</sup> The hold-up problem is increasing when the value of a specific investment is lower beyond the contractual relation than the necessary means to be involved require and contractors sign incomplete contracts [Bogetoft and Olesen 2004, p. 64], i.e. it does not contain provisions regulating every possible situation when the contract is in force.

<sup>5</sup> The article applies Williamson's attitude and understanding of opportunism and specific character of fixed assets [Williamson 1998, p. 58-69, 76-79]. On problems connected with adaptation of the theory of contracts to the analysis of agricultural contracts in [Wu 2014].

<sup>6</sup> In this case, the possibility of occurrence of hold-up problem on the part of a buyer/contractor is deliberately omitted.

<sup>7</sup> Although in the Polish legislation [Civil Code 2018] and agricultural practice a contracting agreement functions (called a contract in everyday language), however due to the applied theoretical approach (the theory of contracts, including the economics of transactional costs, contractual relations/contract/agreements to supply are considered to be all formal (written) relations between subjects operating within original agricultural production and their first recipients.

## 2. THE MATERIAL AND METHODOLOGY OF RESEARCH

For such delineated aim of the work, case study was chosen as a basic research method. It resulted, firstly, from the lack of original data relating to the problem of vertical coordination, including especially contractual relations between subjects of the domestic agricultural market and recipients of their products. Secondly, the established aim of the research required diversified and relatively hardly observable data both of numeric character (number of contracts, sales volume by specific channels, among others) but also descriptive ones (referring, for example, to some specific provisions in agreements as well as some situations occurring in the course of operations by the economic units under study<sup>8</sup>).

Microeconomic approach was mainly applied during the research with one's own research using two tools such as a questionnaire form and standardized interview as the basic method of collecting material<sup>9</sup>. The research work was conducted in the period of March-May 2015. The data analysis was carried out *ex post* and referred mostly to the main forms of domestic vertical coordination of transactions (spot market, a contract, hybrid organization, full vertical integration [see MacDonald and others. 2004, p. 3-6; Boland, Borton and Domine 2002, p. 3-6]), especially in such cases when agreements were signed in 2014<sup>10</sup> (where it was found justifiable, its range was expanded over previous years). In order to describe distinctive features of observed economic phenomena, the descriptive statistics were used as the main evaluation method. When it was not feasible, also the correlation analysis with the use of chi-square was applied, significance level, V-Cramer's coefficient as well as C-Pearson's contingency coefficient in order to identify potential correlations between certain features of a group and being exposed to the pre-contractual hold-up. In order to present the data, word description was used or tables indicating amount and empiric frequency as well as meters of descriptive statistics and correlation between studied variables. The research aimed at meeting the adopted objectives has been divided into the following stages:

- a) identification of vertical forms of transaction coordination;
- b) identifying groups of agricultural producers who have concluded new agreements with first recipients in 2014 and determining their numbers;
- c) analyzing the problem of contracting in the context of contractual commitments concerning making an investment into fixed assets by some selected units;

<sup>8</sup> Application of a case study method in this research was aimed at attempting to work out and check the selected tool/technique of observing economic phenomena.

<sup>9</sup> Application of a quality research was aimed exclusively at verifying data in the course of the proper empirical research with the use of a questionnaire form and completing the analysis of the collected material. The interview results, however, were not included formally into the analysis of the research results.

<sup>10</sup> The collected data allowed only for a static analysis.

- d) identification and analysis of the situation during the operation of the surveyed groups of producers when a potential first recipient conditioned concluding an agreement on making an investment into fixed assets; both the cases were considered: when the recipient has signed an agreement and when has failed to do it.

The empirical research was conducted among Polish groups of producers registered till 31.12.2013 (they constituted general population<sup>11</sup>) and still functioning when the research was in progress, i.e. between March and May 2015<sup>12</sup>. It concentrated on contractual relations as established by such subjects and their first recipients<sup>13</sup>. The determined general population and units for drawing lots<sup>14</sup> amounted to 1,292 groups of agricultural producers (GPR). Sample testing was utilized with the choice of samples determined by the agricultural sector where GPR functioned (they were registered with the ministerial register). The choice of sectors on which the empirical research concentrated was made basing mainly on specialist literature and research results of some chosen research objects [see Hueth and others 1999; Knoeber and Thurman 1989; Tsoulouhas and Vukina 1999].

Random technique was used to choose the sample – simple, individual drawing lots without returns. The original assumption of the empirical research was to gain representation at the level of the selected sectors<sup>15</sup>. The research made use of computer assisted telephone interview with questionnaire form as the research technique<sup>16</sup>. Finally randomly selected and realized sample amounted to 395 units (31% of the general population with diversified features regarding location<sup>17</sup>, a sector where it was registered<sup>18</sup>, number of members<sup>19</sup>). Due to the high indicator of refusals of taking part in the research, the original aim was not met, i.e. gaining representation at the level of specific sectors. For further analysis, eight sectors were chosen, for which the size of sample amounted to: cereals (122

<sup>11</sup> The choice of these units resulted from the intuitive assumption that objects should be characterized by relatively higher share of contracts than individual agricultural farms, which results from the conception of their establishment and financial supporting since 2000.

<sup>12</sup> The sampling frame for drawing lots was a statutory list of group of producers made accessible by the Ministry of Agriculture and Countryside Development.

<sup>13</sup> In the present article, a fragment of research carried out by the author within the research framework of project no 2011/03/D/HS4/03386 and financed from the means of the National Centre for Science is presented.

<sup>14</sup> The research units were competent persons as regards the object of the research and indicated by the leaders/presidents of the surveyed groups.

<sup>15</sup> Originally selected sectors included: cereals, pigs, poultry, meat cattle, bird's eggs, potatoes, sugar beet. The minimum amount of sample for specific sectors was determined according to [Miszczałk 2004, p. 9].

<sup>16</sup> The questionnaire form consisted of two parts, i.e. the main one containing 52 questions (closed questions: cafeteria of questions and dysjunctive ones; half-open, special: filtering, question-tables, open questions; quanity, nominal and ordering scales) and 16 demographic questions.

<sup>17</sup> The sample included units functioning in all 16 provinces.

<sup>18</sup> They operated in 14 different sectors.

<sup>19</sup> The sum of members of the surveyed objects amounted to 13174.

objects; share of gained tests in the whole population at the sector's level: 29%), pigs (100; 33%), poultry (67; 27%), milk (38; 44%), fruits and vegetables (31; 38%), meat cattle (11; 26%), potatoes (8; 35%), bird's eggs (5; 26%)<sup>20</sup>.

The analysis of the collected data was carried out at the level of the above indicated sectors, but also results for the whole surveyed population of groups were provided, which constituted a comparison/reference point. Due to the accepted research aims, only those groups were selected for further analysis that signed new agreements with their first recipients or renewed them in 2014. In total, 247 such objects were singled out that signed 1337 agreements and in the selected sectors this presented in the following way: cereals (89 groups with signed agreements in 2014; total of 576 contracts); potatoes (8; 26), fruits and vegetables (16; 123), bird's eggs (1; 2), milk (21; 111), pigs (63; 319), poultry (36; 166), meat cattle (4; 18) [Malchar-Michalska 2018, p. 131-154].

### 3. RESEARCH RESULTS

Table 1 presents the share of signed agreements by the surveyed units in 2014 that concluded formal commitments (a clause in an agreement) or informal ones as regards making investments into fixed assets at the level of a group or member farms (a warehouse, a building, packing house, etc.<sup>21</sup>). According to the analysis almost 42% of the total surveyed agreements contained such type of contractual commitment. From the sector's point of view, relatively, the highest amount of indications as regards investment was identified for potato related transactions. In turn, such agreements were most seldomly signed for the production and selling of fruits and vegetables. Also relatively few cases concerned agreements for the supply of fruits and vegetables, which may result from their relative high investment support as compared to the groups of agricultural producers operating on other agricultural markets, taking into account also recognizing for initially recognized groups of fruits and vegetables producers within the joint organization of fruit and vegetable market<sup>22</sup>. One may, therefore suppose that such groups possess fixed assets adapted to their contractors' needs<sup>23</sup>, and their contractors do not demand it.

<sup>20</sup> During the research, also a category of „others” was created that included objects selected at random from such sectors as dried tobacco leaves, calves, mushrooms, cultivated herbs, sugar beet, ecological agricultural products, however they were not analyzed thoroughly.

<sup>21</sup> The surveyed units did not have to indicate what type of investment a contractor required, which might have been used to determine their specific character and classification into general and specific use.

<sup>22</sup> Till the end of July 2017 financial support was granted for 314 groups of fruit and vegetable producers in the amount of almost PLN 7.9 billion (of which about 360 million for administrative costs of newly established groups and PLN 7.5 billion to cover part of the investment costs) [ARiMR 2018].

<sup>23</sup> An interesting research problem would be whether fruit and vegetable groups will be able to maintain such level of investment when the financial support within joint EU agricultural policy is finished.

Table 2 presents data referring to subjective evaluation as regards the need to make fixed asset investment before signing an agreement within the operations of a group of producers. It was aimed at recognizing the frequency of occurrence of a potential pre-contractual hold-up among the surveyed units. The replies were separated into two groups. The first one included the situation when investment was required, the surveyed subject realized it and consequently an agreement was signed. Another one, however, concerned the situation when in spite of meeting the requirements of a future potential contractor, an agreement was not signed<sup>24</sup>. According to the results gained, one may claim that almost 59% of all surveyed groups encountered the situation of signing an agreement after making an investment by them, with relatively highest share by the groups operating on potato market and the lowest share – on fruit and vegetable market. One may also suppose that groups operating on the latter market were the rarerst to be exposed to the need of making a choice and consequent investment risk without having any guarantees of signing an agreement by a contractor (compare with the results from table 3 regarding static characteristics such as mode value, for example). In turn, when analyzing the situation concerning the need to make an investment and not signing an agreement and assuming that there had been an informal promise of implementing such contractual transactions, such phenomenon was most often encountered by groups operating on milk and potato markets (about 72% and 63% respectively), which also is also proved by analyzing table 3 (mode for the groups selling potatoes amounted to 5, whereas for the groups in total – 1).

**Table 1. Investment commitment in contracts signed in 2014 (the classification of agricultural outputs produced in producers' groups; the percentage share of indications**

| Investment commitment                  | Total contracts<br>(n <sub>i</sub> =1377) | Cereals<br>(n <sub>i</sub> =576) | Potatoes<br>(n <sub>i</sub> =26) | Fruits and Vegetables<br>(n <sub>i</sub> =123) | Milk<br>(n <sub>i</sub> =111) | Pigs<br>(n <sub>i</sub> =319) | Poultry<br>(n <sub>i</sub> =166) | Meat Cattle<br>(n <sub>i</sub> =18) |
|--|---|----------------------------------|----------------------------------|--|-------------------------------|-------------------------------|----------------------------------|-------------------------------------|
| YES (contract or informal commitments) | 42,2                                      | 37,3                             | 68,6                             | 26   | 49,8                          | 50,5                          | 43,9                             | 55,6                                |
| NO                                     | 57,8                                      | 62,7                             | 31,4                             | 74   | 50,2                          | 49,5                          | 56,1                             | 44,4                                |

n<sub>i</sub> – the sum of contracts signed in 2014 by producers' groups (n); where n – number of groups with contracts signed in 2014 (see table 2).

Source: own research.

<sup>24</sup> The collected data did not make it possible, however, to analyze the second case and clear stating that the surveyed subjects were trapped by the problem of pre-contractual hold-up and consequently lost a part or whole of a quasi-benefit. In order to implement this aim, it would be necessary to determine specific character of investment for a transaction.

**Table 2. Opinions of research units related to requirements of the investment making – cases of signed and not signed contracts (the percentage share of indications)**

| Investing in fixed assets (a storehouse, a production line etc.) |                 |             |             |             |          |                     |             |           |             |            |
|--|-----------------|-------------|-------------|-------------|----------|---------------------|-------------|-----------|-------------|------------|
| Classification of groups by agricultural output selling          | Contract signed |             |             |             |          | Contract not signed |             |           |             |            |
|  | 1               | 2+3         | 4           | 5+6         | 7        | 1                   | 2+3         | 4         | 5+6         | 7          |
| <b>Total groups (n=247)</b>                                      | <b>28,7</b>     | <b>20,2</b> | <b>12,6</b> | <b>34,5</b> | <b>4</b> | <b>30,8</b>         | <b>27,1</b> | <b>17</b> | <b>24,3</b> | <b>0,8</b> |
| Cereals (n=89)   | 24,7            | 22,5        | 10,1        | 38,2        | 4,5      | 27                  | 27          | 15,7      | 30,3        | 0          |
| Potatoes (n=8)   | 0               | 12,5        | 12,5        | 75          | 0        | 12,5                | 12,5        | 25        | 50          | 0          |
| Fruits and vegetables (n=16)                                     | 49,9            | 25          | 6,3         | 6,3         | 12,5     | 49,9                | 31,3        | 0         | 18,8        | 0          |
| Milk (n=21)  | 23,8            | 19          | 28,6        | 28,6        | 0        | 19                  | 57,2        | 9,5       | 14,3        | 0          |
| Pigs (n=63)  | 27              | 17,5        | 15,9        | 36,4        | 3,2      | 27                  | 27          | 28,5      | 17,5        | 0          |
| Poultry (n=36)   | 38,9            | 19,4        | 11,1        | 25          | 5,6      | 41,6                | 13,9        | 13,9      | 25          | 5,6        |
| Meat cattle (n=4)  | 0               | 25          | 0           | 75          | 0        | 50                  | 0           | 25        | 25          | 0          |

\* n – a number of objects which took part in the research;

1 – Never; 2+3 – Very rare + rare; 4 – Do not have any opinion; 5+6 – Often + very common; 7 – Always

\*\* research units indicated answers on the ordinal scale 1-7; where 1 – never; 7 – always.

Source: own research.

**Table 3. Static characteristic of opinions of research units related to requirements of the investment making – cases of signed and not signed contracts**

| Feature   | Total groups (n=247) |            | Cereals (n=89) |     | Potatoes (n=8) |     | Fruits and vegetables (n=16) |     | Milk (n=21) |     | Pigs (n=63) |     | Poultry (n=36) |     | Meat Cattle (n=4) |      |  |
|---|----------------------|------------|----------------|-----|----------------|-----|------------------------------|-----|-------------|-----|-------------|-----|----------------|-----|-------------------|------|--|
|   | A                    | B          | A              | B   | A              | B   | A                            | B   | A           | B   | A           | B   | A              | B   | A                 | B    |  |
| <b>Investing in fixed assets (storehouse, production line etc.)</b> |                      |            |                |     |                |     |                              |     |             |     |             |     |                |     |                   |      |  |
| Arithmet-<br>ic mean  | 3,5                  | <b>3,1</b> | 3,6            | 3,2 | 4,9            | 3,9 | 2,6                          | 2,4 | 3,3         | 2,8 | 3,7         | 3,1 | 3,2            | 3   | 4,8               | 2,8  |  |
| Mode  | <b>1</b>             | <b>1</b>   | 1              | 1   | 5              | 5   | 1                            | 1   | 4           | 3   | 1           | 4   | 1              | 1   | 5                 | 1    |  |
| First quartile  | <b>1</b>             | <b>1</b>   | 2              | 1   | 4,75           | 3,5 | 1                            | 1   | 2           | 2   | 1           | 1   | 1              | 1   | 4,5               | 1    |  |
| Third quartile  | <b>5</b>             | <b>4,5</b> | 5              | 5   | 5,25           | 5   | 3,25                         | 3   | 5           | 3   | 5,5         | 4   | 6              | 5   | 5,25              | 4,25 |  |
| Median  | <b>4</b>             | <b>3</b>   | 4              | 3   | 5              | 4,5 | 1,5                          | 1,5 | 4           | 3   | 4           | 3   | 3              | 2,5 | 5                 | 2,5  |  |

\* n – number of objects (agricultural producers' groups) which took part in the research

A – contract signed; B – contract not signed.

\*\* research objects used the ordinal scale 1-7; where 1 – never; 7 – always.

Source: own research.

In order to capture some correlation between the chosen features of the surveyed units of non-parametric character, testing of independence by chi-square was used. A zero hypothesis ( $H_0$ ) was assumed: two features of X and Y describing the surveyed static population are independent, and hypothesis one ( $H_1$ ): features X and Y are stochastically dependent from each other. In the case of rejecting  $H_0$ ,  $H_1$  was recognized as a true one and a force of such correlation was established<sup>25</sup>. One should add that the variables of X, i.e. dividing the groups according to realized functions and kind of operated market was made on the basis of one's own research [Malchar-Michalska 2018, p. 168, 175].

Table 4 presents the results referring to the identification of dependence between some selected variables. According to them, one may conclude that there is only a correlation between being exposed to the pre-contractual hold-up and the type of produced agricultural output within a group. The force of such correlation with the use of V-Cramer's coefficient may be described as a weak one, but using the C-Pearson's contingency coefficient as moderate. No dependence between potential pre-contractual hold-up problem and such group features as: establishing year, number of members, group type as regards realized functions and serviced market has been identified.

Table 4 makes an identification and measures the correlation force between some selected features of the surveyed units and the frequency of indications regarding the requirement of making an investment into fixed assets in the case when an agreement was signed. For such defined research problem, one correlation was noticed (of relatively low force) between variable Y and the type of group as regards the market it operates on<sup>26</sup>.

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<sup>25</sup> The accepted significance level for decomposition of  $\chi^2$  ( $P$ ) = 0,05, according to which  $H_0$  was considered as true or rejected,  $\chi^2_\alpha$  – value of chi-square test as read out from the chi-square decomposition tables of  $k=(r-1)*(s-1)$  levels of freedom, where  $r$  – number of lines and  $s$  – number of columns in double-column tables;  $\chi^2_e$  – empirical value of chi-square test;  $H_0$  – zero hypothesis stating that X and Y features are independent, where the test of such hypothesis is  $H_0: \chi^2_e > \chi^2_\alpha$ , then it is rejected (X and Y are then dependent and  $H_1$  is true), in the case of  $\chi^2_e < \chi^2_\alpha$   $H_0$  is true (X and Y are independent);  $H_1$  – hypothesis stating that the features X and Y are dependant: V – V-Cramer's coefficient;  $p$  – significance level calculated on the basis of freedom grades and  $\chi^2_e$ ; C – Pearson's contingency coefficient;  $C_{\max}$  – maximum value of Pearson's coefficient;  $C_{\text{kor}}$  – corrected value of Pearson's coefficient. It was assumed that: V; C;  $C_{\text{kor}} < 0,3$  – weak relation between surveyed features/variables;  $0,3 < V; C; C_{\text{kor}} < 0,5$  – moderate relation between surveyed features/variables;  $0,5 < V; C; C_{\text{kor}} < 1$  – strong relation between surveyed features/variables.

<sup>26</sup> From one's own research results that according to that criterion about 76% of the surveyed units may be classified as producer's groups operating mainly on one market. The least amount of such cases occurred in the case of fruit and vegetable groups (about 32%).

**Table 4. Correlations between selected characteristics of agricultural producers' groups having new contracts in 2014 (the variable X) and the frequency of indications related to investment requirements (the variable Y) – cases of signed and not signed contracts (chi-squared statistic, p-value, Cramér's V, Pearson's chi-squared statistic)**

| Variable X  | Variable Y   |  |
|---|--|--|
|   | Contract signed  | Contract not signed  |
| Type of agricultural output   | $\chi_e^2 < \chi_\alpha^2$   | $\chi_e^2 > \chi_\alpha^2$ ;<br>p=0,05; V=0,2216;<br>C=0,4052;<br>C <sub>max</sub> =0,9186;<br>C <sub>kor</sub> =0,4411;<br>$\chi_e^2=48,5269$ |
| Number of members within the agricultural producers' groups                               | $\chi_e^2 < \chi_\alpha^2$ ,   | $\chi_e^2 < \chi_\alpha^2$   |
| Year of establishment   | $\chi_e^2 < \chi_\alpha^2$   | $\chi_e^2 < \chi_\alpha^2$   |
| Type of agricultural producers group regarding its core market (production, marketing)    | $\chi_e^2 > \chi_\alpha^2$ ;<br>p=0,02;<br>V=0,2177;<br>C=0,2129;<br>C <sub>max</sub> =0,8008;<br>C <sub>kor</sub> =0,26658;<br>$\chi_e^2=11,7241$ | $\chi_e^2 < \chi_\alpha^2$   |
| Type of agricultural producers group regarding its core functions (production, marketing) | $\chi_e^2 < \chi_\alpha^2$   | $\chi_e^2 < \chi_\alpha^2$   |

Source: own research.

#### 4. SUMMARY

Investment at the level of agricultural farms or groups of producers may be analyzed in the context of a financial risk, their profitability etc. In economic practice, one may also observe situations when within contract coordinated transactions, a recipient/buyer/contractor conditions their execution on making by an agent of some investment into fixed assets of specific or general destination. Such economic phenomenon might apparently seem to be beneficial for both parties of a transaction assuming that such parties will not exhibit opportunist attitudes or use one's own market position, etc. An agricultural producer or a producers' organization carry out some investment in accordance with a contract and in return a contractor is obliged to buy within some period a certain amount of agricultural output at agreed price, which is optimal for both parties of the transaction. In such way, a supplier has a secured demand and the recipient receives a material suited to his technological processes, e.g. for processing. Such

model transaction is unfortunately far from what may be observed in economic practice. Therefore the theory of contracts<sup>27</sup>, and especially economics of transactional costs allows to notice what results and types of behaviour may occur in the case when partners within their contractual relation do not act in an optimal way and trespass them or act in an opportunistic way in order to achieve highest individual profits possible. One should, however, remember that the hold-up problem means not only resigning by a contractor/buyer from a contract. If the investment was highly specialized in the way of meeting the requirements of only one recipient and one cannot find an alternative way for it, a buyer may use its dominant position by, for example, suggesting relatively low price of buying of such agricultural output. An agent/agricultural producer will be then forced to agree to such conditions as s/he will not be able to find customers for his/her product and s/he would like at least partially to cover the incurred costs<sup>28</sup>. One should also mention here that according to Bogetoft and Olesen [2004, p. 63-64] the hold-up problem may be mitigated by strengthening horizontal integration/cooperation of agricultural producers within producers' organizations, which is especially recommended in the countries characterized by multitude of small farms. It seems, however, that effectiveness of such processes of horizontal cooperation among farmers is influenced not only by economic factors, but mostly by widely conceived institutional conditioning.

The present article attempts to identify and determine the number of contracts signed in 2014 by the surveyed units that involved the need to effect an investment into fixed assets (the first aim of the research). It was assumed intuitively for the purpose of the analysis that such type of contracts may be vulnerable to post-contractual hold-up problem. According to the conducted research one may conclude that this problem might have potentially concerned 42% of all contracts. Most of such contracts were identified in the case of groups operating on potato, meat cattle and pig market, which may result from the specific character of such agricultural output destined mainly for processing, type of operated market as well as the type of a group as regards performed functions (marketing one vs producer's one<sup>29</sup>). Relatively, the contracts requiring making an investment occurred most rarely in the case of selling fruits and vegetables. One may suppose that relative high financial support meant for investments by the organizations of producers operating on that market in an indirect way influenced the form of agreements on that market. One may also intuitively conclude that due to such

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<sup>27</sup> The theory of contracts is said to be based on highly theoretical mathematical models that are far away from reality. Therefore, more and more often the theory is put to empirical verification and being transferred into economic practice.

<sup>28</sup> A case is also possible when an agricultural producer/producer's organization will have a dominant position. A buyer will not be able to find a supplier meeting his production requirements and will agree to a relatively higher price than that agreed in a contract. Due to the existing market structure in Poland it seems that such situations do not happen very often.

<sup>29</sup> It seems to be an interesting direction for research, however held data did not allow me to establish such kind of correlation.

support they possess fixed assets suited to the market/requirements of potential contractors and therefore the latter have no need to apply such kind of requirements in their contracts.

According to the conducted analysis, basing on subjective opinions of the surveyed objects, also certain identified economic situations exposed the groups concerned to the pre-contractual hold-up while conducting their business (the second aim of the article). On the basis of the achieved results, one may conclude that as many as 31% of the groups in survey who signed contracts in 2014 have never been exposed to the pre-contractual hold-up. Relatively, most such groups were identified on the fruit and vegetable (about 50%) and poultry (about 42%) markets, and the least amount on the potato (about 12.5%) and milk (about 19%) markets. In the case of potato groups one should add that about 50% of them had often or very often to deal with a situation of making a promise by a contractor of signing a contract after making an investment and later withdrawing from it by the latter. In this context, the author proved that there is a dependence between being exposed to the pre-contractual hold-up and the type of produced agricultural output by a group of producers. The analysis did not show, however, a dependence between the hold-up problem and such features of the surveyed groups as: establishing year, number of members, type of a group as regards functional criterion and kind of market it operates on.

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## **PROBLEM PUŁAPKI W KONTRAKTACH ROLNYCH. STUDIUM POWIĄZAŃ UMOWNYCH MIĘDZY POLSKIMI GRUPAMI PRODUCENTÓW ROLNYCH A PIERWSZYM ODBIORCAMI**

**Streszczenie:** Problem pułapki przed- i post-kontraktowej ma miejsce, gdy partnerzy cechują się oportunistycznie, kontrakt jest niekompletny i występuje konieczność dokonania inwestycji zarówno o charakterze specyficzny, jak i ogólnego użytku. Na problem pułapki kontraktowej mogą być narażeni producenci rolni choćby ze względu na słabszą pozycję rynkową czy też niski poziom zintegrowania horyzontalnego. W artykule wyznaczono dwa cele. Pierwszy stanowi

identyfikację umów rolnych, z których realizacją wiązało się dokonanie inwestycji w aktywa trwałe (problem pułapki post-kontraktowej). Drugim zaś jest rozpoznanie grup producentów rolnych, które według własnej opinii były w toku swej działalności narażone na wystąpienie problemu pułapki przedkontraktowej. Dla realizacji wyznaczonych celów zastosowano metodę studium przypadku, wykorzystując materiał empiryczny pozyskany w toku badań własnych. Do analizy danych użyto statystyki opisowej, analizy współzależności z wykorzystaniem testu chi-kwadrat. Na podstawie wyników można wnioskować, że problem pułapki post-kontraktowej mógł dotyczyć blisko 42% kontraktów ogółem. Natomiast blisko 31% badanych grup nigdy nie była narażona na problem pułapki przedkontraktowej.

**Słowa kluczowe:** kontrakty rolne, pionowa koordynacja transakcji, pułapka kontraktowa, grupy producentów rolnych.

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