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CADASTRAL EFFECTS OF THE CONSOLIDATION PROCEDURE

Key words: rent, land management, land consolidation, economic efficiency, land records

ABSTRACT. Agricultural land consolidation schemes have been implemented in Poland with European Union financial support since 2004. The improvement of farm layout facilitates the achievement of economic benefits by farmers. However, methods for full evaluation of the economic viability of consolidation projects are still lacking. The aim of the paper was an attempt at determining the cadastral effects of consolidation proceedings received by land owners and county administrator offices as a result of sorting out plot borders and land registration as a consequence of the consolidation procedure. Conducted analyses show that, in entities characterised by the most fragmented area structure of farms, the overall non-productive benefits obtained jointly by land owners and county administrator offices, as a result of completing the consolidation procedure, can exceed the total cost of carrying out consolidation. However, where farms are characterised by a larger average surface area of agricultural plots subject to consolidation and where the shapes of such plots are regular, much smaller benefits should be expected. The proposed solutions require further improvement and adaptation to local conditions. Still, even these pioneer studies clearly demonstrate that cadastral effects of consolidation proceedings can prove important in the discussion over the economic viability of consolidation projects. It can encourage land owners and county administrator offices to take advantage of consolidation schemes, and constitute a strong argument in favour of continuing to finance consolidation projects from public funds.

INTRODUCTION

The area structure of Polish agriculture is systematically improving. However, changes go beyond the figures presented in official statistics [Wojewodzic 2017], as a portion of land is leased or lent for use informally. There is no doubt that an increase in the competitiveness of Polish agriculture and the improvement of agricultural production effectiveness require land consolidation in addition to the processes of land ownership concentration. One of the measures supported from public funds, designed to improve the layout of farms and have a positive impact on the living and working conditions of rural inhabitants, is the consolidation of agricultural and forest land. Since 2004, it has been implemented in Poland with the support of European Union funds as part of successive packages of rural area support.

Land consolidation is, according to the statutory definition [Journal of Laws 2003.178.1749], a measure designed to create more favourable management conditions

in agriculture and forestry by improving the area structure of farms, forests and wooded areas, through rational field outlay, and by adjusting property boundaries to the system of irrigation and drainage facilities, roads and topographical relief. As can be easily noted, the expected benefits of consolidation activities are in the area of production and income and result from the improvement of agricultural production conditions. However, the completion of a consolidation procedure leads to a range of additional benefits, resulting, among other things, from sorting out the legal status of properties and updating land and building registers and as an effect, a modern real estate cadastre in the consolidated area can be established.

METHODOLOGICAL REMARKS

Attempts at valuating the economic effects of consolidation projects in Poland were undertaken by a team led by Franciszek Woch et al. [2011] and a team led by Mariusz Dacko et al. [2019], among others. There is a range of studies devoted to the hierarchisation of entities according to the urgency of consolidation works undertaken by Justyna Wójcik-Leń and her co-researchers [2017, 2019]. However, the valuation of non-productive benefits of the consolidation procedure was addressed there to a limited extent. This study is an attempt to attract more attention to non-productive effects of the consolidation procedure.

Economic rent, in the classical meaning, mainly signifies additional payment generated by factors of production, i.e. payment in excess of minimum income that is required for a given factor to be employed. In the theory of economics, the concept of economic rent found a great number of applications, which led to distinguishing many categories of economic rents, i.e. land rent resulting from the quality of land, location rent, geographical rent, environmental rent, political rent, planning rent and many more [Czyżewski 2009, Marks-Bielska 2010, Wojewodzic et al. 2019]. The definitions of rents provided in the literature always point to certain special benefits, which can have different causes.

The aim of the paper was an attempt at valuating the cadastral effects of consolidation proceedings received by land owners and county administrator offices as a result of sorting out plot borders and land registration as part of the consolidation procedure. The studies covered consolidation projects implemented under the Rural Area Development Programme 2007-2013¹ in the following provinces: Lubelskie (36), Lesser Poland (6) and Silesia (9). The research material comprised reports on the completion of consolidation operations as well as material and financial statements submitted by starosts to the relevant departments of marshal offices upon the completion of successive stages of operation implementation.

¹ Scheme 1. Land consolidation, in Measure 1.7. "Improvement and development of infrastructure connected with the development and adaptation of agriculture and forestry".

NON-PRODUCTIVE EFFECTS OF THE CONSOLIDATION PROCEDURE

The effects of land consolidation in Poland are mainly viewed in terms of changes in the structure of farms, which should bring measurable income effects in agricultural production². However, it is also worth recognising those elements in the consolidation process that do not bring production or income effects, but contribute to improved arrangement of the rural area, thus expanding possibilities of the further, multi-functional development of the area being consolidated [Dacko 2006].

A serious problem, often unsolvable in the case of individual landowners, is the issue connected with the unclear legal status of a property. In the consolidation process, issues of joint ownership are resolved as part of the consolidation procedure itself. Another issue that needs to be sorted out is joint land property [Musiał 2019]. Pursuant to Article 5.2 of the amended law of 29 June 1963 on the management of joint land property [Journal of Laws 1963.28.169], the division, and thus liquidation, of joint land property only occurs when land is subject to consolidation with the consent of an absolute majority of persons with a right to property.

However, the most important issue, as it concerns all the inhabitants of the area being consolidated, is establishing new land registration records for the areas subject to consolidation and demarcating properties excluded from consolidation (built-up properties).

In Poland, cases when data in records differ from the actual situation on the ground are relatively frequent. Provisions of cadastral law impose an obligation to keep land and building registers and documentation updated on starosts and mayors of cities with county rights [Journal of Laws 1989.30.163]. Updating involves establishing new records or upgrading already existing ones in a continuous or comprehensive way.

Consolidation works involve determining the borders of built-up plots, which are not subject to consolidation, but pursuant to relevant law [Journal of Laws 2003.178.1749], the borders of such plots can be changed during land consolidation (provided that the use of such property, in particular access to buildings, does not become more difficult – Art. 2.3a). Borders determined in this way would have often required separate procedures for establishing, re-establishing or demarcating property [Journal of Laws 1989.30.163].

Research literature [Taszakowski et al. 2016] postulates the introduction of the term “cadastral land consolidation”, which can be an alternative to the process of upgrading land and building registers with a view to creating a fully-fledged cadastre in Poland, especially with regard to rural communes. To date, the term has not been regulated by law. Therefore, establishing a new record should be regarded as value added of the consolidation process (post-consolidation cadastral rent).

The improvement of space arrangement as part of consolidation works benefits not only individual participants, but also brings measurable benefits to municipality authorities. Regulation of municipal property by sorting out the legal status of properties significantly improves municipal service management.

² Studies conducted by employees of the University of Agriculture in Krakow under the project: “The economic viability of land consolidation in Poland” KSOW KSOW/3/2019/020 [Dacko et al. 2019] show that the production and income effects arising from the improvement of plot layout, the liquidation of certain field margins and the reduction of transportation costs amounted, in the areas under study, to PLN 354 per ha.

As part of the consolidation procedure, it is also possible to demarcate, without the expropriation procedure, necessary areas for the purposes of technical and social infrastructure, regulate the agricultural, forest and water boundary as well as remove unnecessary field margins and rehabilitate the land. All of these can be called consolidation-related measures; they are often overlooked when evaluating the benefits of an undertaking known as agricultural land consolidation. However, when each of these measures needs to be carried out separately, the undertaking may not only exceed the financial capacity of individual land owners but also the municipality itself. Yet, these matters are so important and crucial that failure to sort them out may limit the development of rural areas.

ATTEMPT TO ASSESS THE ECONOMIC IMPACT OF THE ESTABLISHMENT OF A CADASTRE

For small farm owners, the costs they would have to incur to prepare their (agricultural) land for sale can be disproportionately high relative to land value [Wojewodzic 2017]. The possibility of regulating farm borders as part of the consolidation procedure without incurring any costs represents a clear advantage to farm owners. At the same time, it should facilitate agricultural land transfer, both with a view to improving the agrarian structure and using land for other spatial functions.

For an owner of agricultural land, the establishment of a cadastre means, above all, saving money due to the fact that the borders of his/her property become regulated as a result of the consolidation procedure. This is an additional benefit of the consolidation procedure, the main aim of which is changing the parameters of agricultural and forest plots, and thus realising production and profit benefits. The amount of such benefits depends on a number of factors such as location, prices of plots, are topography and legal status. The costs of procedure aimed at regulating a farm's borders are valued on an individual basis and depend on the offer of surveying companies that undertake to provide such a service. There are no standard prices of such services. The most common solution is to multiply the number of border markers that need to be established along the border by the rate per border marker. The analysis of Internet resources (for example: <http://www.cennik-uslug.pl/budownictwo-i-inzynieria/ceny-geodezja>) conducted for the purpose of this paper shows that, in the period 2010-2015, when consolidation operations under study were carried out, the rate was around PLN 150-400 per border marker. At these rates, the re-establishment of borders of a single regularly shaped plot of a small area generated the cost of over PLN 1,000. However, the re-establishment of borders of a whole farm consisting of a dozen irregularly shaped plots, i.e. with a large number of border markers, cost as much as several or even dozens of thousands of PLN. In the analyses, it was assumed, based on conservative estimates, that the cost of the re-establishment of borders in the area subject to consolidation depends on the average number of plots per one hectare of area and the average number of border markers that need to be established to demarcate one plot. It was assumed that demarcating the first plot usually generates a higher cost. To estimate the costs of re-establishing the borders of plots in the area subject to consolidation, the following formula was proposed (1):

$$K_{wd} = a \times g \times (1 + 1/b) \quad (1)$$

where: K_{wd} – the average cost of re-establishing the borders of plots in a given area (PLN/ha), a – cost of establishing one border marker, b – average surface area of a plot in the area subject to consolidation (ha), g – average number of border markers needed to demarcate one plot.

Assuming, for the purpose of these analyses, that the number of border markers needed to demarcate one plot is 3 (which is a very conservative estimate, as it can be much higher in practice) and that the rate for establishing one border marker is PLN 200, the cost of re-establishing the borders of a plot with a shape of a regular quadrangle and an area of 1 ha would be PLN 1,200. However, it should be noted that, in practice, plots are often irregularly shaped, and with no agreement between the neighbours as to where the borders run, it is necessary to implement the delimitation procedure. In such a case, prices are much higher.

The adopted assumptions allowed for calculating the amount of benefits obtained by farmers as a result of the fact that they did not have to pay individually for re-establishing the borders of their properties. The higher the land fragmentation, the higher the amount of potential benefits for land owners. They ranged from PLN 261.39 per ha within Horodyszcze (Biała Podlaska County) to PLN 3,969.78 per ha within Łętownia (Sucha County). The average amount of benefits of establishing a cadastre in the consolidated area for land owners was over PLN 1,414 per ha in the entities under study (Table 1).

Table 1. Potential benefits obtained by owners of agricultural land and wooded areas as a result of sorting out the borders of plots in an area subject to consolidation

Average plot area in the entity subjected to consolidation	Average	Minimum	Maximum	Coefficient of variation
	PLN/ha			%
< 0.50	2,058.62	1,239.61	3,969.78	39.0
0.50-1.00	942.91	686.29	1,203.57	19.8
> 1.00	437.27	261.39	606.30	22.2
In total	1,414.61	261.39	3,969.78	65.1

Source: own study

The beneficiaries of cadastre submission in the merge area include, apart from farmers, county authorities, which obtain complete sets of data on land and buildings as a result of a completed consolidation procedure and do not need to carry out expensive work on the consolidated area to upgrade the land and building register database. Upgrading the land and building register involves a set of technical, organisational and administrative activities undertaken by a starost to supplement the database and create comprehensive data sets in accordance with the requirements of relevant regulation, and adjust existing data to meet the requirements laid down in the Regulation of the Minister for Regional Development

and Construction of 29 March 2001 on the land and building register [Journal of Laws 2001. 38.454]. Upgrading the land and building register is an activity with a much smaller scope of work than the consolidation procedure, as it does not include the stabilisation of border markers, does not lead to a change in the number of plots and how their borders run and does not result in an increase in the average size of plots in registration units. Therefore, it can be assumed that the sum of benefits obtained by county administrator offices, as a result of carrying out the consolidation procedure in a given area, is not less than the potential cost of upgrading the land and building register.

Upgrading works may vary greatly in their scope and, consequently, prices. There are no clear guidelines on the valuation of the costs of such works, and prices are usually determined via tender procedures announced by individual county administrator offices. However, Stanisław Zaremba [2012] observed that a bigger number of established and measured borders within a structure has a significant impact on the increase in unit price of a plot, and higher prices are charged for bigger plots.

Based on this information, a linear regression model was built for 25 tender procedures for the comprehensive upgrading of the land and building register organised between 2010 and 2014 in the provinces under study. The information about the scope and prices of the contracts awarded in the tender procedures was obtained from the Bulletins of Public Information of the selected counties. The modelling process performed based on such data allowed for determining a relationship between the average number of plots per one ha (x) and the unit price of upgrading the land and building register (Y) as described by the simple regression equation (2):

$$Y = 35.03258x \tag{2}$$

The coefficient of determination R² for this model was 0.88, the standard error was 2.635, whereas the F-test was 176.7582 with a p level = 2.78E-12.

The application of the above regression model to the figures from the reports on the completion of consolidation operations allowed to estimate the amount of benefits generated by land consolidation for county administrator offices as a result of upgrading the land and building register for the area subject to consolidation (Table 2).

Table 2. Potential benefits obtained by county administrator offices as a result of upgrading land and building registers as part of the consolidation procedure

Average area of a plot in the entity being consolidated [ha]	Average	Minimum	Maximum	Coefficient of variation
	PLN/ha			%
< 0.50	121.26	73.01	233.82	39.0
0.51-1.00	55.54	40.42	70.89	19.8
> 1.00	25.76	15.40	35.71	22.2
In total	83.32	15.40	233.82	65.1

Source: own study

The amount of saved expenses on upgrading the land and building register ranged from PLN 15.40 per ha to PLN 233.82 per ha, with the most fragmented structures characterised by far the highest value: Łętownia (Sucha County), Basonia (Opole Lubelskie County, Lublin Province), Wiercica (Częstochowa County) and Łuszczów (Hrubieszów County).

In entities characterised by the most fragmented area structure of farms, the overall benefits obtained jointly by land owners and county administrator offices as a result of completing the consolidation procedure can exceed the total cost of carrying out consolidation (Table 3). In the Basonia entity, where the amount of benefits of establishing a cadastre was estimated at around PLN 3,843 per ha, the unit eligible cost of the consolidation procedure, which also involved post-consolidation management, exceeded PLN 3,593 per ha. This means that, in the case of this entity, the potential return on investment in the form of establishing a cadastre was 6.9% higher than the eligible costs of the entire consolidation procedure.

Where agrarian structure is characterised by a larger average surface area of agricultural plots subject to consolidation and where the shapes of such plots are regular, much smaller benefits of establishing a cadastre should be expected. In the group of entities under study, the average amount of benefits of establishing a cadastre was estimated at close to PLN 1,500 per ha, which accounts for around 73% of the costs of preparing and implementing a consolidation plan, i.e. almost 30% of total eligible costs of a consolidation procedure.

Table 3. Potential amount of benefits of establishing a cadastre depending on the fragmentation scale of plots in the area being consolidated

Average area of plot in the entity being consolidated [ha]	Benefits of establishing a cadastre (BEC) [PLN/ha]	BEC/ECC*	BEC/CKKS**
< 0.50	2,179.88	1.05	0.43
0.51-1.00	998.45	0.51	0.19
> 1.00	463.03	0.23	0.09
In total	1,497.93	0.73	0.29

* ECC – Eligible costs of a consolidation plan, ** CKKS – Total eligible costs of a consolidation project (sum of the eligible costs of a consolidation plan and post-consolidation management)

Source: own study

SUMMARY AND CONCLUSIONS

The significance of benefits of establishing a cadastre has been overlooked in evaluating the economic viability of agricultural land consolidation. It is the National Rural Network project, implemented by the employees of the University of Agriculture in Krakow, which examined the economic viability of consolidation, also in terms of potential benefits, that has led to more attention being paid to this important element in the evaluation of consolidation viability. It should be stressed that the amount of potential benefits brought by the established cadastre in the area of consolidation is often higher than the volume of

production and income effects. An accurate calculation of savings achieved by farmers and county administrator offices requires a detailed analysis of cadastral data (i.a. determining border markers within the area being consolidated, verifying the quality and completeness of surveying and mapping documentation in land and building registration databases) and research of the surveying services market. The method for estimating benefits obtained by farmers and county administrator offices, as presented in the paper, although yields less accurate results, can be widely used in practice due to its simplicity. However, it is necessary to increase the number of entities constituting the basis for building a regression model and adjust other parameters, i.e. the cost of establishing one border marker as part of the re-establishment of borders, the average number of border markers on one plot, etc., to local conditions. Benefits of establishing a cadastre, although it is a potential effect (it can but does not have to occur), is a very important argument in the discussion over the economic viability of consolidation. It can encourage land owners and county administrator offices to take advantage of consolidation schemes and constitute a very important driver for continuing to finance consolidation schemes from public funds.

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KATASTRALNE EFEKTY POSTĘPOWANIA SCALENIOWEGO

Słowa kluczowe: renta, gospodarka gruntami, scalenia gruntów, efektywność ekonomiczna, ewidencja gruntów

ABSTRAKT

Programy scalania gruntów rolnych realizowane są w Polsce przy wsparciu środkami finansowymi Unii Europejskiej już od 2004 roku. Poprawa rozłogu gospodarstw sprzyja osiągnięciu przez rolników korzyści gospodarczych. Wciąż jednak brakuje metod pozwalających na pełną ocenę efektywności ekonomicznej scaleń. Celem opracowania była próba określenia katastralnych efektów postępowania scaleniowego, które uzyskali właściciele ziemi oraz starostwa powiatowe, dzięki uporządkowaniu granic działek i ewidencji gruntów, będących następstwem postępowania scaleniowego. W wyniku przeprowadzonych analiz stwierdzono, że w obiektach o najbardziej rozdrobnionej strukturze obszarowej gospodarstw, suma korzyści pozaprodukcyjnych, które uzyskują łącznie właściciele gruntów i starostwa powiatowe w wyniku przeprowadzenia postępowania scaleniowego, może przekraczać całkowity koszt wykonania scalenia. Natomiast tam, gdzie gospodarstwa charakteryzują się większą średnią powierzchnią działek rolnych podlegających scaleniu oraz tam, gdzie kształty tych działek są regularne, należy oczekiwać znacznie mniejszych korzyści. Zaproponowane rozwiązania wymagają dalszego doskonalenia oraz dostosowania do warunków lokalnych. Jednak już te pionierskie badania wyraźnie wskazują, że katastralne efekty postępowania scaleniowego mogą mieć istotne znaczenie w dyskusji nad efektywnością ekonomiczną scaleń. Może motywować właścicieli ziemi i starostwa powiatowe do korzystania z programów scaleń oraz stanowić mocny argument za kontynuacją finansowania scaleń ze środków publicznych.

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