Land Rent Development in the Period 2011 – 2013

Radek Zdeněk, Jana Lososová, Daniel Kopta

Abstract: The article deals with the growth of land rent in the period 2011 – 2013 of the selected farms. The growth rate of land rent is compared with the growth rates of other economic indicators and evaluates the influence of hectare land rent, the share of rented land and production on the change of land rent costs. There was found, by testing the statistical influences of 22 factors, that the fertility expressed in official prices, the proportion of land in Less Favoured Areas (LFA) and the associated altitude, the share of agricultural land in a municipality, the share of arable land of a farm and the share of rented land have had the largest effect on the price of land rent. This amount in the basic period affects most significantly the land rent growth within the period 2011 – 2013.

Key words: Land Rent · Price of Land · Agricultural Land · Land Rent/Revenues Ratio

JEL Classification: Q14 · Q15

1 Introduction

The Czech Republic is a country consisting of a large number of small landowners, most of whom do not farm the land themselves. Within the EU, the share of rented agricultural land is almost doubled in the Czech Republic. Currently, the main competitive advantage is, in addition to the size of a farm, the lower cost of land as well as the land rent, which has been increasing significantly in recent years. There are two types of land prices set on the Czech land market. The official price, set according to land fertility is published by the Ministry of Finance price regulations and the market prices based solely on supply and demand interaction. The amount of land rent is regulated by the Law no. 229/1991 Coll., based on the adjustment of the ownership of the land and other agricultural properties, in later versions, where the rent is set at 1% of the official price of agricultural land unless the owner and the tenant agree otherwise. As of October 1st 2014, the State Land Office (SLO) changes the annual land rate for agricultural land with a competence to farm from 1% to 2.2% (SLO, 2014). The ongoing increase in decoupled payments and the increase in major crops prices are the main reasons for the growth of land rent level. However, due to the multi-annual rent agreements set with a fixed growth coefficient, the rent price does not react immediately to the annual price changes and market development. The land rate, as one of the cost items, has a direct impact on farming profitability and is also an indicator of interest for both the landowners and farms.

2 Literature and Methodology

Factors affecting the land price as well as the land rent are, in addition, indirectly related to the production which was researched by Huang et al. (2006). Land productivity, land size, distance from major cities, index city–countryside, farms density, income and inflation were set as explanatory variables in the analysis. The regression shows that land prices are positively correlated with land productivity and population density. On the other hand, however, it is inversely correlated with the land size, rural character of a district and the distance from city centres. Craig et al. (1998) regressed the land prices as a function of land type, terms of trade, traffic conditions and geographic and demographic factors. Land rent is defined as a price of land paid annually for generally observed factors such as land productivity or size of the land but also the profitability of the products associated with it (for example cattle, pig and other domestic animals breeding). Non-agricultural land use is introducing the distance from major cities, population density in the region, urbanization rate in the region and income not related to farming as the factors influencing the land price. Empirical evidence may therefore include a broad range of agricultural and non-agricultural factors. In addition to the existing factors, future factors can also be evaluated. The production structure seems to have a significant impact on the agricultural land rent. Pace et al. (1998) discussed the measures related to structural changes in agriculture and livestock along with the other factors like consumer prices or pig density. Land rent and land prices are derived not only from the current land use but also from the potential future use.

1 Ing. Radek Zdeněk, Ph.D. University of South Bohemia in České Budějovice, Faculty of Economics, Department of Accounting and Finance, Studentská 13, 370 05 České Budějovice, Czech Republic, zdenek@ef.jcu.cz
Ing. Jana Lososová, University of South Bohemia in České Budějovice, Faculty of Economics, Department of Accounting and Finance, Studentská 13, 370 05 České Budějovice, Czech Republic, lososova@ef.jcu.cz
Ing. Daniel Kopta, Ph.D., University of South Bohemia in České Budějovice, Faculty of Economics, Department of Accounting and Finance, Studentská 13, 370 05 České Budějovice, Czech Republic, kopta@ef.jcu.cz
Hamza & Miskó (2007) describe the adjustment of land rent in Hungary during the entry into the EU. The rents are bound to a yield and the price of wheat grain on the grain exchange in the middle of summer. Many landowners do not agree with such price setting and prefer the fixed amount such as a certain percentage of subsidies (40% – 50% in this case). Stoyneva (2007) points out that the rent situation in Bulgaria is similar to Hungary. There are no significant differences in land rents across the regions and the rent mainly depends on the agricultural income level. The rent amount is mainly determined by the demand and is neutral towards supply. In many developing countries the rent represents more than 40% of gross annual production. Boinon et al. (2007) analyses the impact of the Common Agricultural Policy (CAP) reforms on the land rent and the land market and concludes that subsidies increase the demand for land and thus affect the value of rents and land prices. Ciaian et al. (2010) analyses the effect of CAP on the agricultural land prices and the land rents across the EU states. The results of the study show that the introduction of a single payment scheme on the area has a greater impact on rents than on land price. Studies conducted by Happe & Balmann (2003), Roberts et al. (2003), Lence & Mishra (2003), Barnard et al. (2001) and Featherstone & Baker (1988) demonstrate the positive impact of direct payments on the rent. Clark et al. (1993) analyses the factors influencing the development of the land market and rent prices. The payments linked to the production and decoupled payments have a different influence on rents due to the fact that a different production is associated with such payments. Patton et al. (2008) states, that the land rent is theoretically regarded as a function of expected market revenues and direct payments related to such revenues. The influence of direct payments linked to the production and decoupled payments on rents in years 1994 – 2002 was analysed by the authors in Northern Ireland. The results indicated that the impact of direct payments on the land rent is different with respect to the type of a payment. Sklenička et al. (2013) regressed the impact of eight variables (municipality size, the size of a parcel sold, soil quality stated by official prices, the distance between a sold parcel and the edge of settlement, the accessibility of the land, travel time to Prague, travel time to a regional town, travel time to a district town) on the price of agricultural land in the Czech Republic using linear regression model. The results showed that the most influential factor in terms of land price is the distance from a current settlement. Other significant factors were: the size of a municipality, the distance from the capital city, the accessibility of the land and the land fertility. The results were interpreted by setting a threshold value for significant factors that support future non-agricultural use of land and significantly boost the current price of the land.

The purpose of this study was to determine the growth rate of land rent among the observed sample of farms within the last three years and the identification of factors that significantly affect the land rent and its growth. The raw data regarding the land rent are mainly collected from three public databases: Eurostat, DG AGRI and FADN. The paper uses own sample survey data of local agricultural farms complemented by the data from the Czech Statistical Office, the Czech Office for Surveying, Mapping and Cadastre and from the application www.mapy.cz. The influence of the below stated variables on the rent amount was tested [CZK/ha]: rented land area [ha]; share of rented land; share of arable land in farm; share of land in LFA in farm; share of plant production revenue; share of animal production revenue; revenue share from non-agricultural production; operational subsidies per hectare of agricultural land [CZK/ha]; share of arable land in the municipality; share of arable land in district; share of land in LFA in district; altitude [m]; land official price [CZK/m²]; municipality size [number of inhabitants]; municipality area [ha], agricultural land share in the municipality; agricultural land share in district; distance to the capital; distance to regional centre; distance to district centre; distance to municipality with extended competence; distance to municipality with authorized municipal office [km].

Land rent/revenues ratio \( c \) is defined using three analytical indicators; land rent per hectare, share of the rented land and production intensity. Land rent per hectare \( l \) [CZK/ha] is defined as the share of costs on the land rent and the area of rented land; the share of the rented land \( s \) is a share of rented land area and the total acreage of cultivated land; intensity of production \( p \) [CZK/ha] is the share of the volume of production and acreage of cultivated land,

\[
e = l \cdot s : p. \tag{1}
\]

Using the indicators stated above, the change in land rent cost \( c_{2013} \) since 2011 \( c_{2011} \) can be determined,

\[
\Delta c = c_{2013} - c_{2011} = \Delta l + \Delta s + \Delta p, \tag{2}
\]

where \( \Delta l \) represents the change in land rent caused by the land rent costs per hectare; \( \Delta s \) is a change in land rent costs influenced by the proportion of rented land; \( \Delta p \) is a change in land rent costs determined by the production intensity. The influence of analytical indicators on the change in land rent costs are calculated using index logarithm methods,

\[
\Delta l = \ln (l_{2013} / l_{2011}) / \ln (c_{2013} / c_{2011}) \cdot \Delta c,
\]

\[
\Delta s = \ln (s_{2013} / s_{2011}) / \ln (c_{2013} / c_{2011}) \cdot \Delta c,
\]

\[
\Delta p = -\ln (p_{2013} / p_{2011}) / \ln (c_{2013} / c_{2011}) \cdot \Delta c.
\]
3 Results

The sample contains 52 identical farms in 2011 – 2013 out of which 26 are cooperatives, 18 are joint-stock companies, 7 are limited liability farms and 1 is individual. These farms operate in 9 regions of the Czech Republic. There are 31% of the farms operating outside the LFA area, 23% are operating within the mountain LFA region, and 46% in LFA in other regions. The average profit before tax per hectare in 2013 reached 5569 CZK which is a 16% increase compared to 2011. The average operating subsidies in 2013 amounted to 8767 CZK/ha, which is a 9.5% increase since 2011. The average farm operated on 1828 ha of agricultural land out of which 87% consisted of rented land. Such a ratio is a 3% decrease compared to 2011, where the rented land ratio reached 90%. In comparison with 2011 the average size of agricultural land decreased to 98.6% and the size of arable land decreased to 95.4%. The annual land rent averaged 2.848 million CZK, a 21% increase compared to 2011. Yet land rents are among the less significant cost items, the average rent cost ratio is 0.027 and the average growth rate of rent costs is 10.2% annually. The average growth rate of land rent per hectare reached 15% with profits rising only by an average of 7% per annum, operating subsidies grew by 4% p.a. and production grew by 3%.

The average land rent increased from 1200 CZK (2011) to 1422 CZK (2012) and later to 1586 CZK (2013) increasing by approximately 15% annually. The distribution of land rents is characterized by mild right-sided skewness and higher kurtosis, both of which are decreasing in time. The sample median grew from 1000 CZK (2011) to 1200 CZK (2012) and to 1433 CZK (2013). The mode value of the land rent is 1000 CZK/ha (decreasing in time to mode frequency of 6). The range of the sample is stable during the observed period, ranging from 200 CZK/ha to 4000 CZK/ha (figure 1). The hypothesis of consistent distribution of land rent in each year is rejected by Friedman’s ANOVA (p-level < 0.001).

![Figure 1 Land rent box diagram](image)

Table 1 shows the basic characteristics of the explanatory variables. The size of the municipality and especially the municipality inhabitancy show a very high variability. A number of explanatory variables represent a strong degree of mutual statistical dependence, out of the corporate indicators for example share of arable land and subsidies received ($r = -0.72$).

Out of the individual factors the land rent indicates the highest dependency rate on the official land price, where $r = 0.71$. Tenant farmers and landowners therefore use the official price as the basis for determining the rent amount. As mentioned earlier the statutory rent is 1% of the official agricultural land price unless the parties agree otherwise. The average rent within the observed sample amounted to 2.4% of official price in 2011 and 3% in 2013. In all farms the land rent is higher than the statutory value. In 2013 19% of the farms stated that the land rent is lower than the newly set
rents of the land managed by the State Land Office (2.2% of the official land prices). In 2011 3 farms exceeded the 5% land rent rate; in 2013 9 farms exceeded such rate (figure 2) the maximum value peaked at 14.3%. Various production and climate management conditions as well as different economic indicators of the farm were observed when comparing the farms with land rents higher than 2.2% of official price. Conversely the farms with the rent higher than 5% of the official price are characterized by weaker production and climatic conditions poorer land fertility with 95–100% of the acreage in LFA and with the exception of one farm below-average income and earnings per hectare.

**Table 1** The basic characteristics of explanatory variables in 2013

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Average</th>
<th>Minimum</th>
<th>Maximum</th>
<th>The coefficient of variation (v)</th>
<th>Land rent dependence on the indicator (r)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rented land area [ha]</td>
<td>1591</td>
<td>381.7</td>
<td>4301</td>
<td>59.2</td>
<td>0.426**</td>
</tr>
<tr>
<td>Rented land share</td>
<td>0.87</td>
<td>0.36</td>
<td>1</td>
<td>12.6</td>
<td>−0.103</td>
</tr>
<tr>
<td>Share of arable land in farms</td>
<td>0.668</td>
<td>0.993</td>
<td>38.4</td>
<td>0.443**</td>
<td></td>
</tr>
<tr>
<td>Land share in LFA</td>
<td>0.6895</td>
<td>1</td>
<td>61.8</td>
<td>−0.595***</td>
<td></td>
</tr>
<tr>
<td>Share of plant production revenue</td>
<td>0.37</td>
<td>0.98</td>
<td>63.1</td>
<td>0.369**</td>
<td></td>
</tr>
<tr>
<td>Share of animal production revenue</td>
<td>0.49</td>
<td>0.95</td>
<td>48.4</td>
<td>−0.324*</td>
<td></td>
</tr>
<tr>
<td>Share of other revenue</td>
<td>0.14</td>
<td>0.95</td>
<td>134.0</td>
<td>−0.054</td>
<td></td>
</tr>
<tr>
<td>Operational subsidies / agricultural land area [CZK/ha]</td>
<td>8948</td>
<td>6314</td>
<td>16773</td>
<td>25.5</td>
<td>−0.049</td>
</tr>
<tr>
<td>Altitude [m]</td>
<td>470</td>
<td>230</td>
<td>850</td>
<td>27.6</td>
<td>−0.465***</td>
</tr>
<tr>
<td>Official price [CZK/m²]</td>
<td>5.31</td>
<td>1.39</td>
<td>60.6</td>
<td>0.71***</td>
<td></td>
</tr>
<tr>
<td>Share of arable land in the municipality</td>
<td>0.71</td>
<td>0.21</td>
<td>0.94</td>
<td>27.1</td>
<td>0.348*</td>
</tr>
<tr>
<td>Share of arable land in district</td>
<td>0.69</td>
<td>0.37</td>
<td>0.92</td>
<td>22.7</td>
<td>0.236</td>
</tr>
<tr>
<td>Share of land in LFA in district</td>
<td>0.69</td>
<td>0</td>
<td>46.1</td>
<td>−0.378**</td>
<td></td>
</tr>
<tr>
<td>Number of inhabitants in municipality [inhabitants]</td>
<td>1911</td>
<td>110</td>
<td>159.4</td>
<td>−0.188</td>
<td></td>
</tr>
<tr>
<td>Municipality area [ha]</td>
<td>2103</td>
<td>567</td>
<td>6113</td>
<td>69.5</td>
<td>−0.135</td>
</tr>
<tr>
<td>Agricultural land share in the municipality</td>
<td>0.59</td>
<td>0.20</td>
<td>0.92</td>
<td>30.2</td>
<td>0.496***</td>
</tr>
<tr>
<td>Agricultural land share in district</td>
<td>0.52</td>
<td>0.34</td>
<td>0.71</td>
<td>21.4</td>
<td>0.275*</td>
</tr>
<tr>
<td>Distance to the capital [km]</td>
<td>139.2</td>
<td>14</td>
<td>287</td>
<td>41.9</td>
<td>−0.105</td>
</tr>
<tr>
<td>Distance to regional centre [km]</td>
<td>48.5</td>
<td>8</td>
<td>106</td>
<td>47.0</td>
<td>−0.105</td>
</tr>
<tr>
<td>Distance to district centre [km]</td>
<td>18.0</td>
<td>0</td>
<td>37</td>
<td>50.5</td>
<td>−0.327*</td>
</tr>
<tr>
<td>Distance to municipality with extended competence [km]</td>
<td>12.1</td>
<td>0</td>
<td>31</td>
<td>61.9</td>
<td>−0.112</td>
</tr>
<tr>
<td>Distance to municipality with authorized municipal office [km]</td>
<td>8.8</td>
<td>0</td>
<td>27</td>
<td>64.8</td>
<td>−0.141</td>
</tr>
</tbody>
</table>

Source: The own survey of selected farms

Note: The achieved significance of hypothesis H₀: r = 0, H₁: r ≠ 0, * - p-level < 0.05; ** - p-level < 0.01; *** - p-level < 0.001.

Another factor on which the land rent has a higher degree of dependence is the share of land in the LFA, where \( r = −0.595 \), the share of agricultural land in the municipality \( (r = 0.496) \), mean altitude \( (r = −0.465) \), arable land share \( (r = 0.443) \) and rented land area \( (r = 0.426) \).

A cost of rents is affected by three factors, namely hectare rents, the share of rented land and the intensity of production that among the firms operate differently. The rent per hectare and the share of rented land is in direct relation with the land rent/revenues ratio. The land rent/revenues ratio and production intensity are in an indirect relationship.
Figure 2 The relationship between land rent and official land prices

Based on the above methodology, the land rent/revenues ratio for the average farm increased from 0.02419 in 2011 to 0.02744 in 2013 (i.e. about 0.00325) therefore an increase in cost ratio of rented land occurred in 71% of farms. There is a crucial influence of the rents per hectare, which explains an increase in the cost ratio of rents by 0.00633. Negative effect (i.e. the reduction of land rent cost ratio due to declining land rent) occurs only in 5.8% of cases and zero effect in 15.4% of the cases. The effect of land rent is partially compensated by an increasing production intensity (−0.00209) and the production intensity helps to decrease the land rent cost ratio in 78.8% of cases. There is a negative effect of the land rent share and the share reduction caused a decline in land rent cost ratio by −0.00099 (an increase in the share of rented land and thus to a positive effect on the growth of land rent cost ratio occurred in 9.6% of cases).

The land rent increase in the observed period is shown in Figure 3, where the vertical line shows the average land rent. The land rent in the farms in which it was previously below average grew the fastest.

Figure 3 The relationship between land rent and its growth rate

Source: The own survey of selected farms
4 Conclusion

In conclusion, the land rent growth, along with the growth in land prices, affects the majority of the Czech farms due to the high percentage of rented land. Despite the fact that these farms are trying to acquire the rented land and so the share of rented land is decreasing annually, such a share percentage is still high above the EU average. Farmers fear that the land rent costs may negatively affect their farm plans in the near future, and therefore, the article is trying to analyse the land rent development and define the most influential items behind the land rent procedure. Regardless of the limited data available (using the database of the agricultural farms within 2011 – 2013) it is clear that the land rent growth rate significantly exceeds the growth rate of profit, revenues and subsidies.

Out of the observed factors, the biggest positive influence on the land rent change (an increase in rent cost ratio) is caused by land rent per hectare. Conversely, the negative influence (a decrease in rent cost ratio) is mainly determined by the production and by the share of land rented. In the majority of cases, the land rent share affects the land rent cost ratio negatively. On the other hand, however, there are four farms where the land rent share had a positive effect on land rent cost ratio due to an increase in land rent share. The production positively affects the land rent cost ratio in 10 cases, out of which the majority reported a decrease in annual production within the observed period.

Out of the tested indicators, land rent is most dependent on official land price. Within the observed period, all farms report land rent higher than 1% of the official price. The other significant factors with higher degree of correlation with land rent are: land share in LFA, agricultural land share in municipalities, average altitude, rate of arable land in farm and the area of rented land. In addition, when comparing the farms with highest land rent growth, it is evident that such companies are among those having below average land rent costs in the basic period.

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References


